

## Table of Contents

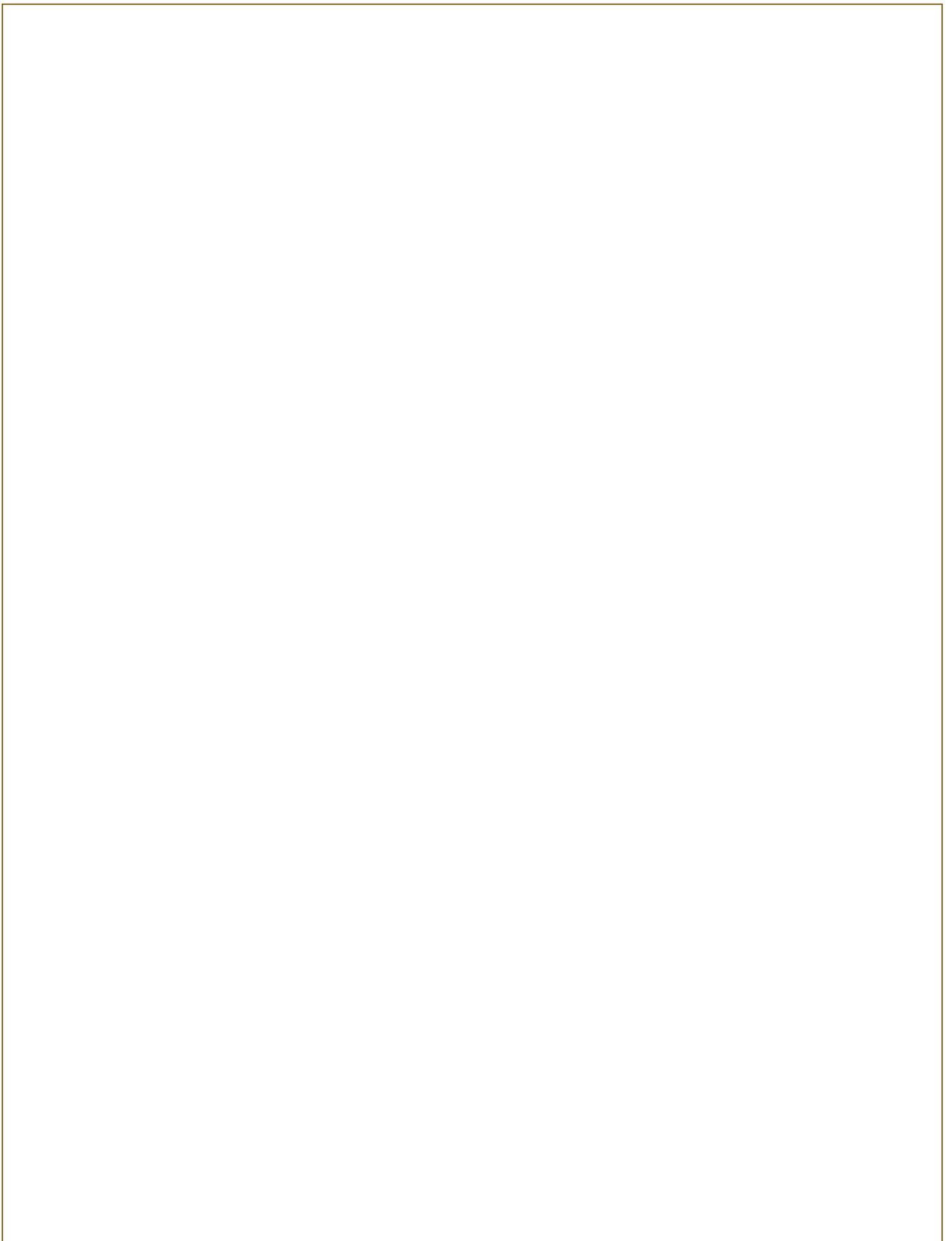
2018 Medical Students Clinical Vignette – Podium Presentations.....	7
Mississippi-Clinical Vignette-Podium Presentation Denise E Powell.....	8
New Jersey-Clinical Vignette-Podium Presentation Alexa Melucci .....	10
Ohio-Clinical Vignette-Podium Presentation April Choi .....	12
Texas-Clinical Vignette-Podium Presentation Nicole C Ryman.....	13
Wisconsin-Clinical Vignette-Podium Presentation Andrew M Brown .....	15
2018 Medical Students Clinical Vignette – Poster Finalists .....	16
Arizona-Clinical Vignette-Poster Finalist Tijana Milinic .....	17
Arizona-Clinical Vignette-Poster Finalist Jessica Padniewski.....	18
Arizona-Clinical Vignette-Poster Finalist Melody Maarouf.....	20
Arkansas-Clinical Vignette-Poster Finalist Shil Punatar .....	22
California-Clinical Vignette-Poster Finalist Anita Chanana .....	23
California-Clinical Vignette-Poster Finalist Kristine Galang .....	24
California-Clinical Vignette-Poster Finalist Semi Han .....	26
California-Clinical Vignette-Poster Finalist Anna Luc.....	28
California-Clinical Vignette-Poster Finalist Frederick Venter.....	29
California-Clinical Vignette-Poster Finalist Megan Trieu .....	31
Connecticut-Clinical Vignette-Poster Finalist Sarah Chiu.....	33
Connecticut-Clinical Vignette-Poster Finalist Carrie A Flynn .....	35
District of Columbia-Clinical Vignette-Poster Finalist Caroline Jensen.....	37
Dominican Republic - Clinical Vignette-Poster Finalist Emilio Fabian.....	39
Florida-Clinical Vignette-Poster Finalist Tracy Kodiyan .....	40
Florida-Clinical Vignette-Poster Finalist Arti Patel .....	42
Georgia-Clinical Vignette-Poster Finalist Leo Jia.....	44
Georgia-Clinical Vignette-Poster Finalist Muaaz Masood.....	46
Georgia-Clinical Vignette-Poster Finalist Margaret Q To.....	47
Illinois-Clinical Vignette-Poster Finalist Yuet Chan .....	49
Illinois-Clinical Vignette-Poster Finalist Rahim Jiwani.....	51
Indiana-Clinical Vignette-Poster Finalist Melanie Wiseman.....	53
Jamaica -Clinical Vignette-Poster Finalist Rochelle Ogilvie.....	54
Kansas-Clinical Vignette-Poster Finalist Nathaniel Parker.....	56

Kansas-Clinical Vignette-Poster Finalist Elizabeth Braden.....	58
Kentucky-Clinical Vignette-Poster Finalist Xiaohui Wang.....	59
Kentucky-Clinical Vignette-Poster Finalist Allyson Hughes.....	60
Louisiana-Clinical Vignette-Poster Finalist Dylan Johnson.....	61
Louisiana-Clinical Vignette-Poster Finalist Joan Winter.....	63
Massachusetts-Clinical Vignette-Poster Finalist David G Deckey.....	64
Michigan-Clinical Vignette-Poster Finalist Joshua Coutinho.....	66
Minnesota-Clinical Vignette-Poster Finalist Elizabeth Fairbairn.....	67
Mississippi-Clinical Vignette-Poster Finalist Avani K Patel.....	68
Missouri-Clinical Vignette-Poster Finalist Sean Lacy.....	69
Missouri-Clinical Vignette-Poster Finalist Kristen Scheitler.....	70
Nebraska-Clinical Vignette-Poster Finalist Victoria Noble.....	72
New Hampshire-Clinical Vignette-Poster Finalist Tiffany Brazile.....	74
New Jersey-Clinical Vignette-Poster Finalist Matthew R Norris.....	76
New York-Clinical Vignette-Poster Finalist Fiorella B Castillo.....	78
New York-Clinical Vignette-Poster Finalist Muhammad Bhutta.....	79
North Carolina-Clinical Vignette-Poster Finalist Jinae B Desai.....	80
North Carolina-Clinical Vignette-Poster Finalist Bret Robinson.....	82
North Dakota-Clinical Vignette-Poster Finalist Sara M Paulson.....	84
North Dakota-Clinical Vignette-Poster Finalist Jace Kusler.....	86
Ohio-Clinical Vignette-Poster Finalist Elizabeth Albers.....	87
Ohio-Clinical Vignette-Poster Finalist Riju Dasgupta.....	89
Ohio-Clinical Vignette-Poster Finalist Rebecca Haraf.....	90
Ohio-Clinical Vignette-Poster Finalist Ann Kim.....	92
Ohio-Clinical Vignette-Poster Finalist Eric S Lee.....	94
Ohio-Clinical Vignette-Poster Finalist Kelly Shibuya.....	96
Ohio-Clinical Vignette-Poster Finalist David Xiong.....	98
Ohio-Clinical Vignette-Poster Finalist Eric F Krumpelbeck.....	100
Ontario-Clinical Vignette-Poster Finalist Louai Naddaf.....	102
Ontario-Clinical Vignette-Poster Finalist Adam Suleman.....	103
Ontario-Clinical Vignette-Poster Finalist Jithin Varghese.....	104
Oregon-Clinical Vignette-Poster Finalist Claire C Groth.....	106
Oregon-Clinical Vignette-Poster Finalist Antonious Hazim.....	108

Oregon-Clinical Vignette-Poster Finalist Ryan Nesbit.....	109
Oregon-Clinical Vignette-Poster Finalist Minhazur Sarker .....	111
Oregon-Clinical Vignette-Poster Finalist Lauren Wessler .....	113
Oregon-Clinical Vignette-Poster Finalist Emily Ager .....	114
Pennsylvania-Clinical Vignette-Poster Finalist Aaron Haag .....	116
Pennsylvania-Clinical Vignette-Poster Finalist Allison Montgomery .....	117
Pennsylvania-Clinical Vignette-Poster Finalist Frederick B Peng .....	119
Rhode Island-Clinical Vignette-Poster Finalist Shaan Ahmed .....	120
Rhode Island-Clinical Vignette-Poster Finalist Audrey Carr .....	122
Rhode Island-Clinical Vignette-Poster Finalist Nicholas Panarello .....	124
South Carolina-Clinical Vignette-Poster Finalist Edward Duffy.....	126
South Dakota-Clinical Vignette-Poster Finalist Caitlin A Hof .....	127
Texas-Clinical Vignette-Poster Finalist Jennifer Doran .....	129
Texas-Clinical Vignette-Poster Finalist Hayden Jefferies .....	130
Texas-Clinical Vignette-Poster Finalist Katherine Jernigan .....	132
Texas-Clinical Vignette-Poster Finalist Sara Journeay.....	133
Texas-Clinical Vignette-Poster Finalist Nhon Le.....	134
Texas-Clinical Vignette-Poster Finalist Weijie V Lin .....	135
Texas-Clinical Vignette-Poster Finalist Navin N Maredia .....	137
Texas-Clinical Vignette-Poster Finalist Vignesh Ramachandran .....	138
Texas-Clinical Vignette-Poster Finalist Katharine Yang.....	140
Texas-Clinical Vignette-Poster Finalist Thomas Johnson .....	141
Virginia-Clinical Vignette-Poster Finalist Lily Dastmalchi .....	142
Virginia-Clinical Vignette-Poster Finalist Michael Kahn .....	144
Virginia-Clinical Vignette-Poster Finalist Ibrahim Tora .....	146
Wisconsin-Clinical Vignette-Poster Finalist Joshua Lorenz .....	147
Wisconsin-Clinical Vignette-Poster Finalist Mason MocarSKI .....	148
Wisconsin-Clinical Vignette-Poster Finalist Blair L Tilkens.....	149
Wisconsin-Clinical Vignette-Poster Finalist Benjamin Wang .....	151
2018 Medical Students Research – Podium Presentations .....	152
Connecticut-Research-Podium Presentation Trevor Borries.....	153
Mississippi-Research-Podium Presentation Shaoxin Lu .....	154
Missouri-Research-Podium Presentation Nishkala Shivakumar .....	155

New York-Research-Podium Presentation Luisa Sperry .....	156
Tennessee-Research-Podium Presentation Rochelle Wong.....	158
2018 Medical Students Research – Poster Finalists .....	160
California-Research-Poster Finalist Samuel Asanad .....	161
California-Research-Poster Finalist Damian Hall.....	162
California-Research-Poster Finalist Christopher Nguyen.....	163
California-Research-Poster Finalist Jin Sol Lee.....	164
California-Research-Poster Finalist Jeffrey Duong.....	166
California-Research-Poster Finalist Mohammed Amer Swid.....	167
Georgia-Research-Poster Finalist Robert Bragg.....	169
Georgia-Research-Poster Finalist Maha Elsebaie .....	170
Georgia-Research-Poster Finalist Nitin Venugopal.....	172
Georgia-Research-Poster Finalist Zoe Kopp.....	174
Georgia-Research-Poster Finalist Ashruta Patel .....	175
Georgia-Research-Poster Finalist Michael Scott.....	176
Germany -Research-Poster Finalist Daniel Schuette .....	178
Illinois-Research-Poster Finalist Candice Cuppini .....	180
Illinois-Research-Poster Finalist Daniel Saca.....	181
Iowa-Research-Poster Finalist Perry Wu.....	183
Japan - Research-Poster Finalist Yuki Furukawa.....	185
Kansas-Research-Poster Finalist Megan Watson.....	186
Kansas-Research-Poster Finalist Noria M McCarther .....	187
Kentucky-Research-Poster Finalist Elizabeth Hart .....	188
Louisiana-Research-Poster Finalist Kayla Hudson.....	189
Louisiana-Research-Poster Finalist Aaron Brug .....	190
Maryland-Research-Poster Finalist Joshua Yang .....	191
Massachusetts-Research-Poster Finalist Peter Natov .....	193
Michigan-Research-Poster Finalist Alexandra Ortiz.....	195
Michigan-Research-Poster Finalist Stephanie Saravolatz.....	197
Minnesota-Research-Poster Finalist Caleb J Murphy .....	198
Minnesota-Research-Poster Finalist Garrett A Welle .....	200
Mississippi-Research-Poster Finalist Amit B Reddy, MBBS.....	202
Missouri-Research-Poster Finalist Hunter Faris.....	204

Missouri-Research-Poster Finalist Jordan Feltes .....	207
Missouri-Research-Poster Finalist Sean Lacy .....	209
Missouri-Research-Poster Finalist Quoc Tran .....	210
Missouri-Research-Poster Finalist Anastasia Evanoff .....	211
Nevada-Research-Poster Finalist Erika Mauban .....	212
Nevada-Research-Poster Finalist Lazaro R Peraza .....	213
New Mexico-Research-Poster Finalist Parisa Mortaji .....	215
New York-Research-Poster Finalist Bassem Zeidan .....	217
New York-Research-Poster Finalist Anthony Delicce .....	218
New York-Research-Poster Finalist Alexander Polyak .....	219
New York-Research-Poster Finalist Justina L Ray .....	221
New York-Research-Poster Finalist Mohan Satish .....	223
North Carolina-Research-Poster Finalist Camilla Powierza .....	224
North Carolina-Research-Poster Finalist Kyle Admire .....	226
North Carolina-Research-Poster Finalist Emily Lupez .....	227
North Dakota-Research-Poster Finalist Brett Johnson .....	228
Ohio-Research-Poster Finalist Cristina Ortiz .....	229
Ohio-Research-Poster Finalist Grace Kim .....	231
Ohio-Research-Poster Finalist Akaansha Ganju .....	233
Ontario-Research-Poster Finalist Joey A Mercier .....	234
Oregon-Research-Poster Finalist James Stanek .....	235
Oregon-Research-Poster Finalist Talitha Wilson .....	236
Oregon-Research-Poster Finalist Katherine Runkel .....	238
Pennsylvania-Research-Poster Finalist Martha Dillon .....	239
Pennsylvania-Research-Poster Finalist Cameron Incognito .....	240
South Carolina-Research-Poster Finalist Alexa Bianchi .....	241
Tennessee-Research-Poster Finalist Ahmad Mohammadi .....	242
Tennessee-Research-Poster Finalist Jason Gandelman .....	243
Tennessee-Research-Poster Finalist Rochelle Wong .....	244
Texas-Research-Poster Finalist Timothy Lin .....	246
Utah-Research-Poster Finalist Andrew Stephens .....	248
Virginia-Research-Poster Finalist Shipra Maheshwari .....	249



# **2018 Medical Students Clinical Vignette – Podium Presentations**

# Mississippi-Clinical Vignette-Podium Presentation

## Denise E Powell

**Title:** Atypical Bacteremia after Memorable Braces: An Unusual Presentation

**Authors:** Denise Powell, Medical Student, Sarah Kerut, MD, Alisha Parker, DO, Christian Weaver, MD, Pradeep Bathina, MD, University of Mississippi Medical Center, Jackson, MS

**Introduction:** *Fusobacterium nucleatum* is an overlooked gram-negative anaerobe that causes a wide array of life threatening infections. The variable and vague clinical presentation of this bacteria makes early diagnosis of *Fusobacterium* bacteremia crucial to ensure optimal treatment.

**Case Presentation:** A 23-year-old African-American female presented with sore throat, right lateral neck pain, and malaise. She had not received maintenance of braces or dental care for 7 months. On examination, she had blood- stained braces, gum hyperplasia, black eschars of her lips, bleeding oral ulcers, thrush, and enlarged yellow papillae on her tongue. Vitals were blood pressure of 100/63 mmHg, maximum temperature of 101.6°F, respiratory rate of 18/min, and heart rate of 114 beats/min; labs on presentation included WBC count of 20,000/uL, sodium of 127 mmol/L, anion gap of 14.0 mmol/L, BUN of 87 mg/dL, creatinine of 4.00 mg/dL, glucose of 151 mg/dL, AST of 816 U/L, ALT of 175 U/L, alkaline phosphatase of 233 U/L, total bilirubin of 7.10 mg/dL, CRP of 12.3 mg/dL, creatinine kinase of 57,040 U/L, eGFR of 17.0 mL/min/1.73m<sup>2</sup>, lipase of 553 U/L, procalcitonin of 100 ng/mL, and lactate of 2.70 mmol/L. Clinical diagnosis of severe sepsis was made, and broad spectrum antibiotics vancomycin/piperacillin-tazobactam were started. During hospital course, patient also needed vasopressors after a fluid challenge. CT showed tonsillar abscesses and distant pulmonary septic emboli. Blood cultures were positive for *Fusobacterium nucleatum*, and throat cultures were positive for *Streptococcus pyogenes* and *Staphylococcus aureus*. Oral Maxillofacial Surgery was consulted, and dental braces were removed for source control. Echocardiogram was done to rule out vegetations and found incidental foramen ovale. She was discharged on long-term IV ceftriaxone/metronidazole.

**Discussion:** This case illustrates the variability in clinical spectrum of *Fusobacterium* infections in patients with orthodontic fixed appliances. *Fusobacterium* is an obligate gram-negative anaerobic rod (GNAR), and poor care of her braces provided a foreign material that was easily colonized by other facultative species and promoted a symbiotic environment that allowed *Fusobacterium* to thrive. The subsequent throat infection progressed to tonsillar abscesses and bacteremia. *F nucleatum* then disseminated and colonized the lungs because of its specialized virulence factor, FadA adhesin, that binds to cadherins. There was no radiological evidence of venous thrombus, but this patient's clinical presentation of septic pulmonary emboli was a rare case of septic emboli traversing the patent foramen ovale via right-to-left shunting and causing distant metastatic infections in the lung. When confronted with a sore throat and nonspecific symptoms in a young patient with braces, the possibility of anaerobes as causative agents of infection must be considered. The importance of dental follow-up and dental hygiene with braces could prevent similar clinical presentations. Early diagnosis and treatment can result in avoiding complications, such as septic shock, septic emboli, or even death.

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# New Jersey-Clinical Vignette-Podium Presentation

## Alexa Melucci

**Title:** Raoultella planticola bacteremia after canned tuna consumption in an immunocompetent patient

**Authors:** Alexa Melucci, MS4; Frances Hetherington, MD, Department of Medicine, Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ. Sarbjit Sandhu, MD, ID Care, Hillsborough, NJ.

**Introduction:** Raoultella planticola, a gram-negative bacillus and emerging pathogen, has caused an increased number of clinically significant infections. Most reported infections occur in immunocompromised patients with only two documented cases after consumption of seafood.

**Case Presentation:** A 48-year-old man with a past medical history of chronic dysphagia with food impaction and osteoarthritis of the hips presented to an urgent care center with epigastric pain and fever. He was referred to the Emergency Department (ED) where blood cultures were drawn. He was treated with fluids and Ketorolac in the ED and discharged upon symptomatic resolution. Both blood cultures grew gram-negative rods on smear and the patient was called back to the ED.

On admission, the patient reported a history of abdominal pain for one week and fevers with a temperature of 103.9°F. He denied other constitutional symptoms, odynophagia, nausea, vomiting, diarrhea, hematochezia, or melena. A complete review of systems was negative. He reported increased nonsteroidal anti-inflammatory drug (NSAID) use for arthritic pain. He denied any recent travel or sick contacts, but reported consuming canned tuna two days prior to admission. Medication review revealed that he was taking more than thirty-four over-the-counter (OTC) supplements.

On initial evaluation, the patient was tachycardic (109 bpm) and febrile (101°F), but otherwise hemodynamically stable with no pertinent physical exam findings. Laboratory studies were notable only for transaminitis (AST 150 U/L, ALT 319 U/L) and hyperbilirubinemia (total bilirubin 1.8 mg/dL). Ceftriaxone was started and was subsequently broadened to Meropenem due to continued fevers. Two of two blood cultures grew *R. planticola*. CT of the chest, abdomen, and pelvis was obtained which revealed a 4-cm ill-defined fullness in the distal esophagus. Gastroenterology was consulted and esophagogastroduodenoscopy was performed, which revealed a ringed esophagus with grade C esophagitis, a single superficial esophageal ulcer, gastritis, and duodenitis. A proton-pump inhibitor was initiated. Fevers resolved and the patient was discharged home to complete a fourteen-day course of Levofloxacin.

**Discussion:** This case demonstrates the ability of *R. planticola* bacteremia to cause a clinical infection in an immunocompetent patient. The source is likely secondary to bacterial ingestion after consumption of tuna fish and gut translocation in the setting of chronic inflammation secondary to trauma from high dose NSAIDs. To our knowledge, this is the first case secondary to consumption of canned fish. We also considered the possible role of OTC supplements in inflammation, immunity, and ingestion of bacteria. However, the effect of supplements and their impact on our patient's disease remains unclear.

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# Ohio-Clinical Vignette-Podium Presentation

## April Choi

**Title:** Case of the Tortoise and the Hare: When “Slowly-and-surely” loses the race

**Authors:** April Choi, Medical Student, Case Western Reserve University School of Medicine, Cleveland, OH

**Introduction:** Prompt treatment with etoposide and dexamethasone should be initiated when there is high clinical suspicion for Hemophagocytic Lymphohistiocytosis (HLH) based on the recently validated HScore, even when the diagnostic criteria outlined by HLH-2004 is not met at the time of presentation.

**Case Presentation:** A 54 year old Caucasian female initially presented to the ED with frequent falls and altered mental status. She stated that a physician has told her that her liver is failing. Patient was transferred to Cleveland Medical Center for workup of her liver failure. Subsequent labs performed over the course of two days found her to be pancytopenic (1.3>9.2/26.9<68), hyponatremic, and with elevated liver enzymes (AST 986, ALT 332, Alk Phos 970). Notably, she had significantly elevated ferritin (>9000 ug/L), elevated triglyceride (376 mg/dL), and low fibrinogen (53mg/dL). She was also found to be EBV positive. Preliminary Results: of the liver biopsy showed hemophagocytosis; she was promptly started on the treatment regime outlined in the HLH-94 protocol. With the initiation of etoposide, ferritin level dropped to 200 ug/L, and her overall health seemed to improve somewhat. Unfortunately, etoposide treatment was held after cycle 4 due to concern for low blood counts. Few days later, she developed a pulmonary embolism which led to severe and persistent tachypnea and tachycardia. She passed away few days after.

**Discussion:** Hemophagocytic Lymphohistiocytosis (HLH) is a disease of abnormal immune activation leading to excessive inflammation and destruction. While it can affect patients of all ages, it is mostly found in infants up to 18 months old. The Histiocyte Society set forth an updated diagnostic guidelines for HLH which involves a molecular diagnosis consistent with HLH or 5 of 8 of the following: fever, splenomegaly, cytopenias affecting >2 lineages, hypertriglyceridemia and/or hypofibrinogenemia, hemophagocytosis, low NK cell activity, ferritin >5000 ug/L, sCD25 >2400 U/mL. However, in an acute setting, Results: of NK cell activity, sCD25, and molecular HLH diagnosis are difficult to obtain. This leads to us having to meet 5 out of merely 6 “feasible” criteria. During the first 13 days of hospitalization, she was only able to meet 4 of the criteria. However, HScore set forth in 2014 utilizes 9 weighted variables which relies less on the hard-to-obtain values. Our patient’s HScore was calculated to be 265 which translates to 99.7% probability of having HLH. The HScore justified the use of etoposide despite not meeting the HLH-2004 criteria. While our patient did not survive, utilization of the HScore may aid the decision to start preemptive etoposide in other suspected HLH patients.

# Texas-Clinical Vignette-Podium Presentation

## Nicole C Ryman

**Title:** A Painful Trait

**Authors:** Nicole Ryman and Michael McNeal, M.D.

**Introduction:** Sickle cell trait individuals are known to suffer from certain complications, such as renal papillary necrosis. A complication that may not be as well established in the literature is superior mesenteric venous thromboembolism.

**Case Presentation:** A 34 year old African American female with a medical history significant for sickle cell trait, bleeding disorder in an aunt, and two miscarriages, presents with severe, diffuse abdominal pain. She reports nausea, emesis, and several episodes of diarrhea. In addition, her history included oral contraceptive use, episodic tobacco use, obesity, and cholecystitis. CT abdomen showed inflammatory changes of the central mesentery with scattered mesenteric lymph nodes with occlusion, dilation of the superior mesenteric vein, and thickening of the small bowel wall suggesting vascular congestion. Uncomplicated cystitis without hematuria was suggested by urinalysis, and ceftriaxone was started. There was no evidence of peritonitis or gastrointestinal bleeding. Heparin was started. Her pain was managed with morphine, and she remained on bowel rest with clear liquid diet. Labs were insignificant; no rise in lactate and lipase was 29. Then, 24 hours later, repeat CT abdomen revealed edema throughout the central mesentery with the superior mesenteric vein dilated. Upon discharge, she was prescribed xarelto for 3 months and tramadol for pain. A repeat CT abdomen/pelvis in 4 weeks was also ordered. She was assigned to follow up with hematology in order for her hypercoagulable state to be further investigated.

**Discussion:** This case demonstrates an uncommon finding that likely occurred due to a perfect storm of risks. This patient was recently post-partum, has sickle cell trait, and a history of smoking, oral contraceptives use, and obesity.<sup>1</sup> It is possible that a combination of these risks led to the formation of superior mesenteric thromboembolism, a rare entity.<sup>2</sup> Recognizing the risk of venous thromboembolism in sickle cell trait patients has not been widely reported. Folsom et al demonstrated in a prospective study comparing individuals with sickle cell trait and those without any HbS allele that a 1.5 fold increase risk of venous thromboembolism, particularly with pulmonary embolism, for those with sickle cell trait.<sup>3</sup> A recent study conducted in the UK suggests an association with sickle cell trait and venous thromboembolism, specifically pulmonary embolism.<sup>4</sup> The pathophysiology has not been completely illustrated, but some have reported increase in coagulation activity in sickle cell trait individuals like significantly higher levels of d-dimer, thrombin-antithrombin complexes, and prothrombin fragment 1.2 Blood monocytes were increased compared to match controls, and monocytes play a role in endothelial damage, atherogenesis, and plaque rupture.<sup>5</sup> More studies can further elucidate a potential association between venous thromboembolism and sickle cell trait and thus allow medical professionals to counsel these individuals on risk factors and improve early identification and management.

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# Wisconsin-Clinical Vignette-Podium Presentation

## Andrew M Brown

**Title:** Buccal Bleeding: A Challenging Case of Immune Thrombocytopenia

**Authors:** Andrew Brown, MS4; Devin Madenberg, DO; Cory Ganshert, DO; Sara Dunbar, DO

**Introduction:** Immune thrombocytopenia (ITP) is an acquired autoimmune thrombocytopenia caused by autoantibodies against platelet antigens. Inciting factors can vary widely, and range from infection, autoimmune disease, medication, and hematologic malignancy. Clinical manifestations of the disease most commonly include bleeding and thrombocytopenia. Evaluation and treatment can prove challenging, especially when patients do not respond to initial treatment. This patient also presented with oral lesions, which have a broad differential including malignancy, bleeding disorders, and autoimmune disease. In this case, we display the differential for these issues and the treatment of refractory ITP.

**Case Presentation:** A 64 year old female with a history of hypertension, type 2 diabetes, CVA, and GERD. She initially presented with a three day history of oral blisters after biting the inside of her cheek. Physical exam showed petechia of her neck and upper chest and bilateral fibrinous lesions of the buccal mucosa without active bleeding. Initial evaluation revealed a new thrombocytopenia with a platelet count of less than 3 k/uL and a hemoglobin of 9.1 g/dL. Peripheral smear was without schistocytes. Negative workup Results: included CMV, HSV, EBV, Hepatitis B and C, HIV, Parvovirus, ANA and anti-DS DNA. She was recently diagnosed with *H pylori* and was on triple therapy, which was considered as a potential cause. She was treated for suspected ITP with four day course of 40 mg IV dexamethasone, four doses of IVIG 400 mg/kg, 8 units of platelets as well as one dose of romiplostim 250 mg; however, her platelets count remained less than 5 k/uL. Due to concern for lymphoproliferative disorder as a cause, a bone marrow biopsy was obtained and showed atypical megakaryocyte hyperplasia which was thought to be from romiplostim administration with no signs of malignancy. On the sixth day of admission, platelet count recovered to 77 k/uL. She was transitioned to daily prednisone with continued improvement in her platelet count to 514 k/uL. She was discharged after 9 days with daily prednisone and weekly romiplostim. At an outpatient hematology appointment 2 weeks after discharge, her skin and oral lesions had resolved and platelet count was 381 k/uL.

**Discussion:** This case was particularly challenging to determine an etiology and treatment plan for her ITP. Primary, secondary and drug-induced causes were all considered. Treatment of refractory ITP has special considerations: IVIG dosage must be adjusted in patients with a history of CVA, and use of rituximab has the potential for Hepatitis B reactivation. Thrombopoietin receptor agonist therapy can be considered for patients failing to respond to earlier line treatments. Finally, this case demonstrates the broad differential for oral lesions which include infection, malignancy, and other autoimmune phenomena.

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# **2018 Medical Students Clinical Vignette – Poster Finalists**

# Arizona-Clinical Vignette-Poster Finalist

## Tijana Milinic

**Title:** Sifting out False Positives: The Case of a Discordant ACTH

**Authors:** Tijana Milinic<sup>1</sup> and Anu Sharma<sup>2</sup>, <sup>1</sup>University of Arizona College of Medicine, Tucson, Arizona, <sup>2</sup>Department of Diabetes and Endocrinology, University of Utah School of Medicine, Salt Lake City, Utah

**Introduction:** Assessment of the pituitary-adrenal axis is frequently required in cases of long standing glucocorticoid use. Knowledge of the limitations in its assessment is of utmost importance in interpretation of the data.

**Case Presentation:** A 74-year-old male with a long-standing history for rheumatoid arthritis (RA) and interstitial lung disease was referred to endocrinology by his pulmonologist with concern for ectopic adrenocorticotrophic hormone (ACTH) production. His RA was controlled with prednisone for 8 years. He was placed on a prednisone taper and had stopped prednisone 2 months prior to presentation. On discontinuation, he developed significant fatigue and muscle aches. His medications at initial assessment included topical betamethasone, topical clobetasol, inhaled budesonide, alendronate, hydrocodone, ethosuximide and tocilizumab. Laboratory data revealed a high ACTH (119 pg/ml; normal 0-46 pg/ml) and a low cortisol (0.55 µg/dl; normal 4.3-22.4 µg/dl). Chest CT revealed a new peripheral mass-like consolidation in the upper left medial lung lobe. Given his elevated ACTH level, there was concern by the referring provider that the mass was producing ACTH. Physical examination did not reveal any signs of Cushing's syndrome. ACTH and cortisol concentrations were re-measured 2 weeks after stopping topical steroids and were unchanged. Given that his clinical assessment was in keeping with secondary adrenal insufficiency rather than ectopic ACTH production or primary adrenal insufficiency, the elevated ACTH was hypothesized to be a false positive. The ACTH assay was therefore re-analyzed and found to have heterophile antibody interference, which can result in a falsely high ACTH concentration. He was therefore started on hydrocortisone for secondary adrenal insufficiency with a slow taper. Repeat cortisol testing 6 weeks after showed recovery of adrenal gland function (AM cortisol 9.9 µg/dl). A repeat CT scan of his lung demonstrated resolution of the mass like consolidation, which was thought to be inflammatory in nature.

**Discussion:** This case underscores the need to understand the limitations of laboratory testing. Recognizing that the ACTH concentration was incongruent with his clinical assessment prevented further unnecessary work up and potential invasive procedures. Clinicians must remain cognizant of the potential for heterophile antibody interference in cases when lab data do not align with the overall clinical picture.

# Arizona-Clinical Vignette-Poster Finalist

## Jessica Padniewski

**Title:** Parathyroidectomy in MEN1 associated hyperparathyroidism and insulinoma

**Authors:** Jessica Padniewski OMS III and Russell Pluhm, OMS III, Mohamad Hosam Horani, MD

**Introduction:** Multiple endocrine neoplasia type 1 (MEN1) is a rare heritable disorder classically characterized by a predisposition to tumors of the parathyroid glands, anterior pituitary, and pancreatic islet cells. The presence of MEN1 is defined clinically as the occurrence of two or more primary MEN1 tumor types, or in family members of a patient with a clinical diagnosis of MEN1, the occurrence of one of the MEN1-associated tumors. One tumor associated with MEN1 is an insulinoma. The common clinical manifestation of an insulinoma is fasting hypoglycemia, with discrete episodes of neuroglycopenic symptoms that may or may not be preceded by sympathoadrenal symptoms. Postprandial hypoglycemia may be a feature or the sole manifestation of hypoglycemia. Hypoglycemia in persons with insulinoma is primarily due to reduced hepatic glucose output rather than increased glucose utilization. Patients with insulinoma are expected to have prolonged elevated free insulin, even in the instance of extremely low blood glucose, along with elevated chromogranin A indicating increased pancreatic or neuroendocrine activity.

**Case Presentation:** A 43-year-old male with a known history of MEN1, TIA, and 25 years of nicotine dependence presented to the Emergency Department with unilateral weakness and numbness in the face, arm and leg with associated slurred speech, hypoglycemia and mental status changes. Labs were drawn, an ECG was obtained, and the patient was urgently worked up for TIA with a brain CT angiography and neurology consultation. Labs revealed hypercalcemia (11.2; normal 8.4-10.2), hypoglycemia (46; normal 70-105), hyperinsulinemia (264; normal 3-19) and elevated PTH (194.5; normal 8.5-72.5). ECG showed sinus arrhythmia with incomplete right bundle branch block. Although the patient's history was suggestive of recurrent TIA, CT angiography of brain revealed no significant arterial stenosis, or signs of meaningful new infarction. Due to his MEN1 history, endocrinology was then consulted. Parathyroid scintigraphy, and subsequent lab studies were performed. Labs revealed an elevated chromogranin A (176; normal 0-95), and right parathyroid was positive for inferior adenoma. Surgery was consulted for removal of 3 parathyroid glands to address hyperparathyroidism and adenoma. Post parathyroidectomy, fasting insulin levels had dropped to 39, and hypoglycemia was easier to control. Calcium and parathyroid hormone levels were now within normal limits at 9.3 and 51 respectively. Patient's neurological deficits soon corrected and he was discharged.

**Discussion:** Parathyroidectomy in hyperparathyroidism decreases insulin secretion, improves insulin resistance, and improves diabetic insulin control. Elevated PTH has been shown to increase insulin resistance, leading to compensatory hyperinsulinemia. When paired with an insulinoma this can lead to potentially dangerous blood insulin, glucose, and calcium levels. This case highlights that parathyroidectomy has therapeutic value not only when an insulinoma is found on a parathyroid gland, but also that in individuals with insulin resistance, reducing PTH levels via partial parathyroidectomy can decrease insulin resistance and levels, leading to more controllable hormone profiles.

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# Arizona-Clinical Vignette-Poster Finalist

## Melody Maarouf

**Title:** Disordered Presentation of Paraneoplastic Pancreatitis, Polyarthrits and Panniculitis (PPP) Syndrome in a Patient with End-Stage Pancreatic Cancer

**Authors:** Melody Maarouf MHS<sup>1</sup>, Marilyn R. Wickenheiser MD<sup>2</sup>, James E. Sligh MD PhD<sup>2</sup>, Keliagh Culpepper MD<sup>3</sup>, Vivian Y. Shi MD<sup>2</sup>, 1) University of Arizona, College of Medicine, AZ, 2) University of Arizona, Department of Medicine, Division of Dermatology, AZ, 3) Dermopath Diagnostics, Tucson, AZ

**Introduction:** Pancreatic disease, panniculitis, and polyarthrits (PPP) syndrome is a rare multi-systemic disease seen in 0.3-1% of patients with benign or malignant pancreatic disease. Pancreatic parenchyma disruption leads to pancreatic enzyme release into the circulation, fat lobule hydrolysis, and deposition of byproducts in subcutaneous fat and periarticular fat pads; this Results: in panniculitis and polyarthralgia, respectively.

**Case Presentation:** A 53-year-old gentleman with stage IV beta-islet neuroendocrine pancreatic cancer and liver metastasis presented with a one-month history of worsening polyarthralgia of all joints on the upper and lower extremities, which began concurrently with the initiation of chemotherapy (capecitabine/temozolamide). His vital signs, cardiopulmonary and abdominal exams were unremarkable. Routine CBC and CMP revealed leukocytosis (WBC 34.4 1000/uL: Neutrophils 91%, Lymphocytes 4%, Monocytes 5%) and elevated lipase (25,560 U/L) and inflammatory indices (C-reactive protein: 27.05 mg/dL; ESR 48 MM/HR; LDH 503 IU/L). Autoimmune and infectious diseases work-up were unrevealing. Initial suspicion for septic arthritis prompted an MRI, which revealed cellulitis with a left ankle soft tissue ulcer and right wrist abscess. Joint aspirations were negative besides the single most painful joint, which expressed a purulent aspirate growing few gram-positive cocci. His polyarthralgia did not subside with broad-spectrum antibiotics, prednisone, NSAIDs, and opiates. During his month-long hospitalization for pain control, he developed erythematous indurated subcutaneous nodules on the bilateral posterior legs. Punch biopsy confirmed lobular panniculitis with necrosis of adipocytes and a mixed inflammatory infiltrate.

**Discussion:** PPP syndrome is typically associated with benign pancreatic disorders and rarely in pancreatic malignancy. Islet cell carcinoma is even more uncommon as a culprit. It is seen in only 1-2% of PPP syndrome cases, and is considered a paraneoplastic syndrome. Interestingly, his polyarthralgia started shortly after chemotherapy induction. We suspect that overwhelming tumor lysis may have increased systemic levels of pancreatic enzymes. Tumor lysis and metastasis may have synergistically augmented pancreatic parenchymal disruption, causing his PPP syndrome.

The concomitant presentation of polyarthralgia and panniculitis is often the initial presenting component of PPP syndrome, with mild or absent abdominal symptoms. Thus, pancreatic pathology is often the last element to be detected, despite it being the etiologic component of the syndrome. Our patient had an already established diagnosis of pancreatic carcinoma months prior to the development of polyarthralgia and panniculitis. This created a confusing clinical picture and delayed diagnosis of his PPP syndrome.

Our case highlights the potential for a delayed cutaneous manifestation in PPP syndrome. Prompt diagnosis can allow judicious treatment of pancreatic pathology and implementation of appropriate therapy.

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# Arkansas-Clinical Vignette-Poster Finalist

## Shil Punatar

**Title:** Composting Conundrum: Cerebral Nocardiosis in Hodgkins Lymphoma

**Authors:** Shil Punatar OMSII [1,2], Rehan Sarmad M.D.[2], Amitkumar Mehta M.D.[2], [1]NYITCOM at Arkansas State University, [2]University of Alabama-Birmingham

**Introduction:** Hodgkins Lymphoma is a highly curable lymphoma with ABVD (Adriamycin, Bleomycin, Vinblastine, Dacarbazine) chemotherapy. While ABVD is myelo- and immunosuppressive, the patient's life style is a very important factor for chemotherapy related complications. While many adverse events are common, there still exists a challenge in diagnosing and treating opportunistic infections. Here we discuss a rare case of cerebral nocardiosis in a patient undergoing active ABVD chemotherapy with a hobby of gardening.

**Case Presentation:** A 68-year-old white male with newly diagnosed Hodgkin's Lymphoma was admitted after two cycles of ABVD chemotherapy, with confusion and slurred speech over four days. Upon admission, brain MRI showed rim enhancing lesions in bilateral frontal lobes with central restricted diffusion, compression of the left lateral ventricle, and mild midline shift. CT scan of the brain revealed a 1.5x1.3 cm lesion in the left frontal lobe along with vasogenic edema. CT scans of the chest, abdomen, and pelvis showed diffuse lymphomatous disease with multiple spiculated pulmonary nodules along with mediastinal, mesenteric, and pelvic lymphadenopathy. As Hodgkin's lymphoma is extremely rare to have cerebral metastasis, extensive infectious work up was performed. Initial differential included brain involvement by infection in addition to Hodgkin's lymphoma thus patient was started on dexamethasone. He underwent bronchoscopy to evaluate the lung lesions, a safer alternative to a brain biopsy as was decided after neurosurgical consult, which revealed gram positive cocci on culture. Histopathology reports were negative for malignancy and the patient was started on vancomycin. Meanwhile, his neurological symptoms worsened and MRI showed enlargement of the cerebral lesions. Ultimately, he underwent biopsy of the brain lesions. Interestingly, the biopsy revealed brain abscesses with gram positive, filamentous rods consistent with actinomyces/nocardia species. He was initiated on imipenem and trimethoprim-sulfamethoxazole with significant improvement in neurological symptoms, including expressive aphasia and personality changes and was then discharged. Subsequent brain MRI on Day 54 post admission showed almost complete resolution of brain lesions. Only mild memory impairment persisted at this time. He was initiated on brentuximab vedotin for Hodgkin's lymphoma and had a very good partial response.

**Discussion:** Nocardia is a common bacterium present in decaying plants and soils, which due to the patient's hobby as an active gardener and compost maker is a likely source of infection. While nocardiosis commonly presents with initial lung infection, presentation is widely differentiated and treatment strategies are not definitively defined. This case teaches us to have a high index of suspicion for opportunistic infections and stresses the importance of detailed history taking.

# California-Clinical Vignette-Poster Finalist

## Anita Chanana

**Title:** The Rare Mitotic Figure Clinched the Diagnosis

**Authors:** Anita Chanana, Medical Student, Stanford University School of Medicine, Stanford, CA, Shefali Dujari, Neurology Resident, Stanford University Medical Center, Stanford, CA, Nina Bozinov, Neurology Resident, Stanford University Medical Center, Stanford, CA

**Introduction:** Involvement of lymphoma in the central nervous system can present a diagnostic challenge, especially when there are evolving neurologic symptoms that are not easily localizable.

**Case Presentation:** A healthy 55-year-old woman developed decreased sensation over her left posterior thigh. Over two weeks, this progressed to severe pain radiating down to her foot; a diagnosis of sciatica was made. Over the following two months she developed left lower extremity weakness and a left Bell's palsy. Her neurologic exam was notable for left-sided facial droop, full strength with the exception of 5-/5 left hip flexion (HF) and 4/5 left dorsiflexion (DF). MRI brain did not show any structural cause of her symptoms. An EMG suggested lumbosacral radiculopathy. Two months later, her weakness progressed to bilateral foot drop and she required a walker for ambulation. Given the continued progression, she was admitted to the hospital from neuromuscular clinic. She reported a recent 20lb weight loss, without associated B symptoms. Her neurologic exam demonstrated stable left-sided ptosis, new asymmetric hand and finger weakness (right > left) of the median and radial innervated muscles, bilateral lower extremity proximal and distal weakness (1/5 HF, 1/5 right DF, 0/5 left DF), decreased pinprick and light touch in the left L5 dermatome, and areflexia in bilateral lower extremities. Initial labs including CBC, CMP, CRP, and ESR were within normal limits. An MRI full-spine was notable for enhancement of the cauda equina with thickening of the ventral nerve roots. Repeat EMG showed evidence of an active neurogenic process affecting the cervical, thoracic, and lumbar myotomes. CSF studies showed: glucose 52, protein 213, WBC count 51, RBC count 2, and the presence of a rare mitotic figure. Additional history revealed the patient had 3 weeks of floaters in her right eye. Ophthalmologic exam revealed sub-retinal lesions. Our concern for CNS lymphoma was increased based on the mitotic figure and ophthalmologic findings. The next day, final CSF cytology indicated involvement of large B cell lymphoma. Within a day, intensive intra-thecal chemotherapy was initiated. Two days later, a PET scan revealed systemic lymphomatous disease. One month post-treatment, there was resolution of choroidal infiltration and the only residual neurologic deficits were a left foot drop and left-sided ptosis.

**Discussion:** This case illustrates a rare presentation of Stage IV Diffuse Large B Cell Lymphoma consisting of solely CNS findings without additional systemic changes. The presence of a mitotic figure in the CSF elucidated the underlying pathology; though, in most cases CSF cytology is much less sensitive than contrast-enhanced brain and spine imaging. Overall, in diagnosing systemic lymphoma with secondary CNS metastasis it is critical to follow a diagnostic algorithm to ensure rapid institution of chemotherapy with the potential for resolution of neurologic symptoms.

# California-Clinical Vignette-Poster Finalist

## Kristine Galang

**Title:** Double Positive Anti-Glomerular Basement Membrane Disease And MPO-ANCA In A Hispanic Female

**Authors:** Kristine Galang, MS IV, Ramanjeet Sidhu M.D., Arash Heidari, M.D., Sabitha Eppanapally, M.D.

**Introduction:** Anti-Glomerular Basement Membrane (Anti-GBM) disease is extremely rare affecting 0.5-1 case per million per year in the United States<sup>1, 2</sup>. It is an autoimmune disease that attacks the alpha 3 chains on type IV collagen present on the basement membrane of alveoli and glomerulus in the nephron<sup>3</sup>. Anti-GBM disease is differentiated from Goodpasture's disease as there is no pulmonary involvement and injury is isolated to the kidney. Approximately, one-third of patients who present with Anti-GBM disease are also positive for antineutrophilic cytoplasmic antibodies (ANCA), most commonly myeloperoxidase (MPO-ANCA). The following describes the case of a patient with double seropositivity of both Anti-GBM and MPO-ANCA.

**Case Presentation:** 60-year-old Jehovah Witness female with history of asthma presented with nausea and vomiting for 3 weeks. She was found to have an elevated BUN and Creatinine of 82 mg/dL and 12.6 mg/dL, respectively. She was started on hemodialysis and later found to be positive for anti-GBM IgG Ab and MPO-ANCA. Pulse steroid therapy was started and a renal biopsy demonstrated necrotizing and crescentic glomerulonephritis with activity and chronicity. The biopsied specimen also displayed 43% active crescents, 3% subacute crescents, and 47% remote crescents with a moderate amount of tubulointerstitial scarring. Acute tubular injury and tubulointerstitial nephritis was also present along with arterial and arteriolar nephrosclerosis. Plasmapheresis was not initiated since there was no pulmonary involvement; however, cyclophosphamide therapy was started and later discontinued because her kidney function failed to improve. Subsequently she was continued dialysis for end stage renal failure.

**Discussion:** Anti-GBM disease was first described by Ernest Goodpasture in the early 1900s<sup>4</sup>. It is an extremely rare autoimmune disease that has bimodal distribution with its first peak affecting males in the third decade and its second peak equally affecting both males and females in the sixth and seventh decades<sup>5</sup>. Patients with renal involvement may present with hematuria, hypertension, and uremia. Treatment for Anti-GBM disease includes the use of pulse steroids, plasmapheresis and cyclophosphamide. However, plasmapheresis is typically reserved for those with pulmonary hemorrhage. Previously studies have suggested that positivity to both MPO-ANCA and Anti-GBM antibodies may have a coinciding vasculitis and have an overall better outcome, however, other studies have suggested that patients with double positivity unfortunately do worse<sup>1, 6</sup>. Patients with dialysis-dependent renal failure upon initial presentation have poor renal survival even after therapy<sup>6, 7</sup>.

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# California-Clinical Vignette-Poster Finalist

## Semi Han

**Title:** Hepatic Subcapsular Pancreatic Juice Collection: A Rare Complication of Pancreatitis

**Authors:** Semi Han, Medical Student, and Hershan Johl, Associate Physician  
Diplomate, University of California Davis School of Medicine, Sacramento, California

**Introduction:** Pancreatic duct leaks can occur as a result of acute or chronic pancreatitis and most commonly presents as pseudocyst, pancreatic ascites, pancreatocenteric/biliary/bronchial fistula, or peripancreatic fluid collection.<sup>1,2</sup> This case is the first case to present pancreatic duct leak manifesting as a hepatic subcapsular pancreatic collection.

**Case Presentation:** Hepatic subcapsular accumulation of pancreatic juice is a rare complication seen post-ERCP. We present a 79-year-old woman who presented from an outside hospital with severe right upper quadrant abdominal pain and elevated lipase of 387. Two months prior patient had a blunt abdominal trauma from a golf cart accident which was complicated by traumatic AV fistula s/p coil embolization. At that time, she was found to have a large peri-pancreatic fluid collection. Pt was followed up with an ERCP as an outpatient and Results: showed mild ectasia of the upstream main pancreatic duct. Pancreatic duct cannulation was unsuccessful and procedure was aborted. 7 days post ERCP, she presented to the hospital with acute right upper quadrant pain without any nausea, vomiting, or changes in bowel movement. CT of the abdomen was unremarkable without any residual peri-pancreatic fluid. Abdominal US was negative for cholecystitis. On day 11 post-ERCP new right hepatic subcapsular fluid collection and fluid accumulation in portis hepatis were noted on CT. Percutaneous drain was emergently placed and subcapsular fluid showed amylase level of 6,171. Patient reported initial improvement with RUQ pain, however, the pain soon returned along with dyspnea and oxygen desaturation. Subsequent MRCP showed persistent pancreatic leakage and collection in multiple areas including anterior abdomen, pleural space, and peritoneal space. Percutaneous drain from subdiaphragmatic space showed amylase of 53,226 and culture positive for enterococcus faecalis. At this point patient was placed on octreotide, total parenteral nutrition and ampicillin. Patient had gradual improvement in abdominal pain and she was discharged with abdominal drain nasojejunal tube for feeding.

**Discussion:** This case presents a rare finding of hepatic subcapsular pancreatic juice accumulation that caused significant abdominal pain in a patient with recent pancreatic trauma followed by ERCP. The persistent pancreatic leak is most likely from the peri-pancreatic pseudocyst. The exact path of entry into the subcapsular space is most likely via hepatoduodenal ligament given its proximity to the pancreas head where her pseudocyst was located. The therapeutic approach is similar to other types of subcapsular accumulations, which is fluid drainage and conservative management. Our patient continued to have leakage from the pancreas leading to accumulation in anterior abdomen, pleural space and peritoneal space,

thereby requiring octreotide and PTN with long term pancreatic enzyme treatment. This case illustrates how pancreatic juice accumulation should be on the differential when hepatic subcapsular collection was noted on imaging in patients with history of pancreatitis.

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# California-Clinical Vignette-Poster Finalist

## Anna Luc

**Title:** How About A Multiplex Disease?

**Authors:** Anna Luc, Natasha Varughese, Mahmuda Islam MD, and Subhasri Kannan MD

**Introduction: Learning objectives:** Illustrate the utility of the MPO/PR3 classification system for ANCA-associated vasculitis

**Case Presentation:** A 65 year old man with hypertension, hyperlipidemia, silicosis, ligated right common iliac artery aneurysm with left to right femoral-femoral artery bypass, and recent severe hematemesis and melena, presented to the emergency department with a 1 week history of left leg pain and numbness. Due to his vascular surgery history, the patient was admitted over concern for DVT, but Doppler ultrasound was negative and the patient's parasthesia worsened to include bilateral hand stiffness and numbness. Physical examination found asymmetric weakness in the upper extremity, as well as asymmetric sensory loss in all 4 extremities and foot drop. During the course of the hospital stay, the patient also developed scleritis, GI bleeding, and acute kidney injury with proteinuria. An autoimmune workup was positive for ANA, rheumatoid factor, and MPO-ANCA. EMG of the sural nerve was performed and showed asymmetric axonal sensorimotor polyneuropathy with active denervation (a mononeuritis multiplex) which led to high suspicion for a vasculitis. The patient was started on 1 gram of solumedrol per day for 5 days before transitioning to oral prednisone and cyclophosphamide. Colonoscopy showed ischemic colitis and sural nerve biopsy suggested vasculitis with a predominant plasma cell infiltration. Renal biopsy revealed myeloperoxidase-ANCA-associated (MPO-ANCA) focal crescentic glomerulonephritis.

**Discussion:** This case illustrates the clinical utility of the MPO/PR3 classification system for the ANCA-associated vasculitides (AAV), rather than traditional separation into the named syndromes of granulomatosis with polyangiitis (GPA), microscopic polyangiitis (MPA) and eosinophilic granulomatosis with polyangiitis (EGPA) (1). Even though AAV is a rare condition (13-20 cases/million), mononeuritis multiplex is closely associated with vasculitis (2), so detection of asymmetric motor and sensory deficits should prompt an immediate rheumatological workup given the severity of this disease and its response to immunosuppression. However, the overall clinical picture in this patient was an overlap of common features of EGPA (peripheral neuropathy), GPA (scleritis) and MPA (segmental glomerulonephritis) (1). A similar case report from India in January 2017 described a 46 year old female with MPO-ANCA vasculitis who also presented with mononeuritis multiplex (suggesting EGPA) but had an atypical collection of symptoms from the MPA/GPA continuum (3). Both cases, however, were consistent with common findings for the MPO classification.

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# California-Clinical Vignette-Poster Finalist

## Frederick Venter

**Title:** Buschke-Lowenstein with Paraneoplastic Hypercalcemia

**Authors:** Frederick Venter MS III, Arash Heidari M.D., Macsen Viehweg MS III, Mark Rivera M.D., Piruthiviraj Natarajan MD., Everardo Cobos M.D.

**Introduction:** Over 80% of genital warts are associated with low-risk HPV sub types 6 & 11 and the rest with high-risk HPV sub types 16,18,52 and 56 <sup>2?</sup>. A long standing genital wart can turn malignant due to the dynamics between the virus and the immunologic response of the host <sup>4?</sup>. Warts that grow to a considerable size are called Giant Condyloma Acuminatum and the ones associated with Squamous Cell Carcinoma are called Buschke Lowenstein Tumors.

**Case Presentation:** A 42-year-old Native American male was admitted to the Emergency Department with nausea, vomiting, abdominal pain localized to groin with foul-smelling discharge. The genital warts diagnosed at the age of 17, deferring excision, had reached a considerable size over the years. For the past 5 months the friable mass rapidly increased in size and expanded its ulcerated borders and was associated with occasional serous/bloody discharge. He had unintended weight loss of 100 pounds in the past year with fatigue and loss of appetite. A large irregular mass over bilateral inguinal regions involved the penis, scrotum and perineum measuring 31 x 17 x 6 cm with an ulcer measuring 11 x 7 x 5 cm with multiple fissures draining foul-smelling purulent discharge. Serum blood calcium level at admission was 13.8 mg/dL (N=8.5 -10.2 mg/dL) with PTHrP 24.1 pmol/L (N= less than 2.0pmol/L) suggesting secondary hyperparathyroidism. HSV-1 Results: were positive with IgG > 5 OD ratio. HTLV and HIV sub types were negative. Biopsy H&E stain showed infiltrating hyperchromatic squamous cells, enlarged nuclei and higher nuclear/cytoplasmic ratio; Hyperkeratotic spurs and acanthosis were also present. On CT Pelvis, marked skin thickening and irregularity in the perineal/inguinal/upper thigh regions and the right inguinal region was associated with inflammation and fistulous tracts. CT Chest was negative for metastasis. The oncologist team started on Pembrolizumab for the inoperable mass.

**Discussion:** HPV completes its life cycle outside the genital epithelial basement membrane and the E7 gene of HPV impairs the antigen presenting cells in the skin, enabling the virus to stay undetected for extended periods of time. The E6, E7 oncogenes induce Telomerase resulting in cellular immortalization of the infected cells <sup>7?</sup>. The E6, E7 oncogenes also induce chronic oxidative stress within the HPV infected cells increasing susceptibility to DNA damage and paving way for carcinogenesis <sup>8?</sup>. It has been found that co-infection with HIV/HSV-1 enhance the oncogenesis of HPV and our patient being positive for HSV-1 IgG is susceptible for this carcinomatous transition <sup>9? 10?</sup>. Squamous cell clusters with high mitotic activity and keratinization among the condyloma stroma on HPE suggest nests of carcinomatous transformation. An association of carcinoma with hypercalcemia usually indicate a poor prognosis. The moderate hypercalcemia in our patient was attributed to PTHrP secreted by tumor cells.

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# California-Clinical Vignette-Poster Finalist

## Megan Trieu

**Title:** Primary cardiac sarcoma as a rare cause of severe mitral stenosis

**Authors:** Megan Trieu BA, Richard Watson MD PhD, Monica Tsai MD, Justine Korolyov MD, Joseph Frye MD, Michael Yang MD

**Introduction:** Primary cardiac sarcomas are a rare but potentially fatal cause of common cardiopulmonary symptoms. We describe a case of primary cardiac sarcoma that presented as new-onset diastolic heart failure due to severe mitral stenosis.

**Case Presentation:** A 61-year-old previously healthy woman presented with two weeks of progressive dyspnea and non-productive cough. On initial evaluation, she was hypoxic (SpO<sub>2</sub> 88% on room air) and tachypneic (28 breaths/minute), with physical exam notable for elevated JVP (10 cm), soft apical holosystolic murmur with mid-diastolic click, bibasilar crackles, and bilateral lower extremity pitting edema. Chest x-ray and CT revealed bilateral pleural effusions and a large, amorphous filling defect in left atrium. Transthoracic echocardiogram (TTE) subsequently demonstrated a 3x5 cm left atrial mass, causing severe mitral stenosis (mean transmitral gradient 21), moderate mitral regurgitation, severe tricuspid regurgitation, and pulmonary artery (PA) systolic pressure 77 mmHg. She was urgently taken to surgery, where the mass was found to extend through the interatrial septum to involve right atrium, coronary sinus, and tricuspid valve. Tumor was resected, but negative margins could not be obtained. Pathology revealed high-grade, undifferentiated sarcoma with myoid differentiation, consistent on molecular analysis with intimal sarcoma. After tumor debulking, her symptoms improved and repeat TTE demonstrated no mitral stenosis, mild mitral regurgitation, and PA systolic pressure 24 mmHg. After extensive discussion, patient deferred adjuvant chemotherapy. Six months after her surgery, she presented again with acute decompensated heart failure. TTE revealed a recurrent mass measuring 4x3 cm attached to the interatrial septum prolapsing the mitral annulus. Over the following three months, she was hospitalized three additional times for similar exacerbations. Serial TTEs revealed continued enlargement of the left atrial mass, growing up to 8x3 cm, extending the full length of the atrial chamber, with a new right atrial mass measuring 3x2 cm. Given tumor recurrence and extent of disease, patient was deemed a poor surgical candidate. She was discharged with supportive measures, forgoing palliative chemotherapy. She passed away peacefully at home approximately 9 months after her initial diagnosis.

**Discussion:** Primary cardiac sarcomas are extremely rare, with a prevalence of 0.0017%. Intimal sarcomas are commonly found in the great vessels and pulmonary veins but have only rarely been reported to arise from the heart. This case illustrates that primary cardiac sarcomas, despite their rarity, can present as common noncancerous conditions, including valvular disease. Because these tumors are highly aggressive, prognosis is generally poor, with median survival of 6-12 months. If resected, valvular abnormalities can be reversed and prognosis can improve to 17 months; however, tumor-free margins are difficult to obtain due to frequent involvement of vital structures and early metastasis. While surgical resection followed by adjuvant chemotherapy with or without radiation is standard of care, no randomized control trials have been performed to date.

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# Connecticut-Clinical Vignette-Poster Finalist

## Sarah Chiu

**Title:** Streptococcus Anginosus: “A Facultative Anaerobe to be Reckoned with”

**Authors:** Sarah Chiu, BSc, MS3 (1), and Julia Zefirova, MD, PhD (2), 1) Frank H. Netter M.D. School of Medicine, North Haven, Connecticut, 2) St. Mary’s Hospital, Waterbury, Connecticut

**Introduction:** The *Streptococcus anginosus* group bacteria (SAG; formerly *Streptococcus milleri*), consisting of *S. anginosus*, *Streptococcus intermedius*, and *Streptococcus constellatus*, are facultative anaerobes that rarely cause pneumonia but have been increasingly found in empyema.

**Case Presentation:** A 30-year-old man was admitted to the hospital for increasing shortness of breath and chest pain. A week prior, he was treated with oral azithromycin for community-acquired pneumonia with chest x-ray significant for left lower lobe infiltrate. The patient had no history of medical problems. Social history was significant for smoking tobacco and polysubstance use. Review of systems was positive for chills, cough, and diaphoresis. Vital signs showed a heart rate of 112 beats/minute, blood pressure 123/79 mmHg, respiratory rate 16 breaths/minute, temperature 98.0°F, and 92% oxygen on room air. On exam the patient was in no acute distress, spoke in full sentences, but appeared diaphoretic. Dentition was poor with tooth decay. Heart exam demonstrated no murmurs. Lung exam was significant for decreased chest wall expansion over the left lung as well as egophony, crackles, and decreased tactile fremitus over the right lower lobe. Labs revealed a white blood count (WBC) of 27,500 cells/uL, 16% bandemia. Urine toxicology was positive for cocaine, opiates, tetrahydrocannabinol, and phencyclidine. Chest x-ray showed opacification of the left hemithorax. Computed tomography revealed left lung collapse with large, multiloculated left pleural effusion. Two left chest tubes were placed with 2500 ml of frank pus evacuated. Gram stain showed Gram-positive cocci in chains. Pleural fluid culture grew *Gemella morbillorum* and revealed glucose of 92 mg/dL, pH 7.3, protein <3.0 g/dL, WBC 18,000 cells/uL with 72% neutrophils, and lactate dehydrogenase of 719 U/L. Blood cultures remained negative. The patient was treated with ceftriaxone and clindamycin in addition to thoracostomies with tissue plasminogen activator administration. However, adequate drainage of multiple loculations was still not achieved; the patient had persistent leukocytosis and intermittent fevers and required thoracotomy nine days after admission. Pleural culture revealed *Streptococcus anginosus* that was sensitive to penicillin and resistant to clindamycin, erythromycin, and tetracycline. His antibiotic course was changed to intravenous penicillin G. After surgery, the patient felt better and the leukocytosis resolved with WBC of 6,900 cells/uL. He was discharged home on oral penicillin.

**Discussion:** The incidence of empyema is increasing worldwide and rises by 3% per year in the United States (1). The bacteriology of pleural infection and antimicrobial susceptibility change over time. The most common causes of empyema are *Streptococcus pneumoniae*, *Streptococcus pyogenes*, and *Staphylococcus aureus*; however, SAG are gaining importance as causative organisms (1). They are known to form abscesses, be rapidly progressive, and demonstrate synergy with oral anaerobes in causing pleural infection (2). SAG are highly resistant to phagocytosis by polymorphonuclear leukocytes, of which the mechanism is still unclear (3).

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# Connecticut-Clinical Vignette-Poster Finalist

## Carrie A Flynn

**Title:** Infectious Complications in the Returning Medical Tourist: A Case of *Mycobacterium abscessus*

**Authors:** Carrie A. Flynn, MS<sup>1</sup>; Emilie O'Neill, MD<sup>2</sup>; Sumit R. Kumar, MD, MPA<sup>2</sup>; Anna Dill, MD<sup>2</sup>; Abhay J. Dhond, MD, MPH, FACP<sup>2</sup>, Author Affiliations: <sup>1</sup>Medical Scientist Training Program, Yale School of Medicine; <sup>2</sup>Yale Primary Care Internal Medicine Residency Program, Department of Internal Medicine, Yale School of Medicine

**Introduction:** The most pathogenic rapidly growing mycobacteria (RGM), *Mycobacterium abscessus* is a rare cause of human infection despite its ubiquity in the environment. Consisting of the subspecies *abscessus*, *massiliense*, and *bolletii*,<sup>1</sup> *M. abscessus* is characterized by biofilm formation and intrinsic resistance to many disinfectants, qualities which have led to postsurgical infections through contamination of surgical equipment and injection solutions<sup>2-4</sup>. The rise of medical tourism among US patients, especially for cosmetic procedures, has led to a rise in *M. abscessus* infections, presenting an important public health problem in the US<sup>5-8</sup>. This problem is complicated by challenges physicians face in diagnosing and adequately treating these infections<sup>1,9-11</sup>.

**Case Presentation:** This case regards a 36-year-old woman who presented to the emergency department (ED) with lower abdominal pain and swelling over her surgical site, where 2 weeks prior she had undergone abdominoplasty and liposuction in the Dominican Republic. She also noted increased output from a drain placed during the surgery. On initial evaluation, the patient was afebrile and tachycardic to the low 100s with otherwise stable vitals. Physical exam and laboratory findings were grossly within normal limits. A CT of the abdomen revealed skin induration and thickening thought to be consistent with wound healing, and she was discharged home. Over the next month, the patient visited the ED three more times as well as her primary care physician (PCP) and an outpatient plastic surgeon with worsening pain and swelling, but infection was not suspected. At her final ED visit she was mildly febrile prompting a repeat abdominal CT scan which revealed development of multiple abscesses in the ventral abdominal wall. She was admitted, underwent Interventional Radiology-guided drainage of the abscesses, and was initially started on empiric broad spectrum antibiotics. When culture Results: returned with *M. abscessus*, the patient was started on clarithromycin, amikacin, and cefoxitin with improvement in her symptoms and discharged to outpatient care with her PCP and an Infectious Disease specialist.

**Discussion:** This case highlights many of the issues physicians and public health agencies face when caring for medical tourists, from drains or hardware that may be placed without clear instructions for follow up to infections with otherwise uncommon etiologies. As in this patient's case, the presentation of nontuberculous mycobacteria can be subtle and insidious, and medical tourism can result in outbreaks outside of traditional geographic distributions. Additionally, gram staining and standard cultures are not sensitive for this pathogen, and most clinical microbiology laboratories are unable to distinguish between subspecies of *M. abscessus* or conduct sensitivity testing. Together, this can make diagnosis difficult and delay treatment. As medical tourism and its health consequences become increasingly common in the US, more comprehensive reporting of cases like this is an important objective.

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# District of Columbia-Clinical Vignette-Poster Finalist

## Caroline Jensen

**Title:** Azathioprine-Induced Pancytopenia Presenting with HSV Oral Ulcers in a Patient with Normal Thiopurine S-Methyltransferase Activity

**Authors:** Caroline Jensen MS3<sup>1</sup>, John Tiu MD<sup>2</sup>, Jillian Catalanotti MD<sup>2</sup>, 1) School of Medicine and Health Sciences, George Washington University, 2) Division of Internal Medicine, George Washington University

**Introduction:** Pancytopenia is a rare complication of azathioprine therapy that is often associated with reduced thiopurine S-methyltransferase (TPMT) activity due to gene polymorphisms of the rate-limiting enzyme. Routine testing of TPMT activity or the TPMT variant allele prior to azathioprine administration has been suggested to reduce the risk of serious adverse outcomes and cost of azathioprine-induced myelosuppression. While the connection between pancytopenia and low TPMT activity levels has been documented, there are few reported cases that show azathioprine-induced pancytopenia in patients with normal TPMT activity. This has implications for the clinical monitoring of patients with normal TPMT levels after administration of azathioprine.

**Case Presentation:** A 65-year old male with a history of treatment-resistant psoriatic arthritis and presumed drug-induced lupus started a trial of azathioprine to control worsening lupus disease activity. Prior to starting azathioprine therapy, his TPMT activity was within normal range at 21.0 u/mL RBC.

The patient was started on azathioprine 50 mg while taking methotrexate 2.5 mg and prednisone 20 mg. His azathioprine dose was increased to 75 mg after one week. One month after being on both azathioprine and methotrexate, the patient noted alopecia. He was advised to stop methotrexate and increase azathioprine to 125 mg daily. 5 days after increasing his azathioprine dose, the patient developed severe HSV1+ stomatitis. 4 days after the development of oral ulcers and approximately 3 weeks after starting azathioprine treatment, the patient was found to have pancytopenia. The patient was instructed to immediately stop taking azathioprine. One week after discontinuation of azathioprine, the patient was hospitalized with worsening pancytopenia.

The patient's oral ulcers were treated with IV acyclovir. Bone marrow biopsy was deferred on the hypothesis of azathioprine-induced pancytopenia. The patient received IV leucovorin for 3 days and IV filgrastim for 3 days, and his cell counts started to improve on day 3 of his hospital stay. The patient was discharged after 8 days of hospitalization.

**Discussion:** This case demonstrates that normal TPMT activity does not exclude patients from the possible outcome of pancytopenia with azathioprine drug therapy. Close blood count monitoring is indicated after the initiation of azathioprine therapy in all patients, regardless of TPMT activity or variant allele status. Additionally, presentations of pancytopenia can be clinically variable, and the external manifestations of immunosuppression, like the HSV1+ oral ulcers as discussed in our patient, may serve as a critical clue to pancytopenia that should not be mistaken as an adverse reaction to the drug therapy. Lastly, the clinical course of azathioprine-induced pancytopenia, requiring 1 to 3 weeks for recovery after discontinuation of the drug, has implications on the management of presumed azathioprine-induced pancytopenia, as it suggests that bone marrow biopsy is not immediately indicated.

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# Dominican Republic - Clinical Vignette-Poster Finalist

## Emilio Fabian

**Title:** Vitamin K, a lot more than just a dietary supplement

**Authors:** Emilio J. Fabián Corona, Medical Student UNIBE School of Medicine, Class of 2017, Cristal Núñez, MD, Jhan Carlos Gonzalez, MD, PGY4 CEDIMAT, Theany Torres, MD, PGY1 CEDIMAT

**Introduction:** Superior vena cava (SVC) syndrome Results: from any condition that leads to obstruction of blood flow through the SVC or thrombosis of blood within the vessel. Most cases are related to the presence of indwelling intravascular devices; however this syndrome is rare in a patient without a clear risk factor such as malignancy or blood dyscrasias.

**Case Presentation:** A 35-year-old female nurse who presents to the Emergency Department complaining of shooting pain on the right side of her neck, following an uneventful physical examination the patient was discharged from the emergency department with analgesics. A week later the patient presented to the emergency department once again but this time with symptoms of dyspnea, mild headache, facial plethora, and edema of the head and upper limbs and a diagnosis of superior vena cava syndrome was made. The patient's past medical history revealed chronic normocytic normochromic anemia and polycystic ovarian syndrome (PCOS). Laboratory tests showed serum electrolytes, creatinine and BUN within normal limits and the CBC reflected a hemoglobin of 7.1 mg/dL. Upper extremity ultrasound showed no evidence of thrombus in the veins of either arm, chest X-Ray and non-contrast CT-scan revealed that the etiology of blood flow obstruction was not extrinsic compression of the vessel.

The patient was taken into the OR for angiography which showed a thrombus extending from the right subclavian vein into the SVC. Endovascular revascularization via thrombectomy was performed and the symptoms resolved in the following days. Although the patient's clinical manifestations were improving we focused the attention on identifying the etiology of the syndrome in order to prevent future recurrences. Several rheumatoid conditions were screened, including lupus and antiphospholipid syndrome and several blood dyscrasias were rule out as well. The patient eventually confided a history of recurrent self administration of vitamin K due to her menstrual cycle irregularities with profound and uncontrollable bleeding attributable to her PCOS during a post operative clinical history reassessment.

**Discussion:** The case illustrates an unusual etiology of SVC syndrome in a healthcare professional with access to and self administration of a seemingly innocuous controlled substance for off label utilization. The vitamin K self administration promoted a pro-coagulative milieu within the vasculature and its omission from the initial clinical history impeded an accurate and timely recognition of etiology stressing the importance of clinical history reassessment to capture information that patients initially omit whether that be intentional or not.

# Florida-Clinical Vignette-Poster Finalist

## Tracy Kodiyan

**Title:** The association between ethnicity and glucose metabolism disorders in Northern Colombia in 2015.

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**Introduction:** The International Diabetes Federation (IDF) has estimated that the number of adults with Type 2 diabetes mellitus (T2D) in Colombia is expected to rise from 2.14 million in 2013 to 3.34 million by 2035. Diabetes is the fifth leading cause of death in Colombia with a rate of 15 deaths per 100,000 individuals. Our study hopes to find the high-risk ethnic group, specifically the Afro Colombian population, that may be predisposed to developing a glucose metabolism disorder. This will enable the healthcare community to implement changes to the healthcare system to help prevent diabetes rather than treating the costly complications and disabilities associated with these glucose metabolism disorders.

Ethnicity, as defined by Williams, is “a complex multidimensional construct reflecting the confluence of biological factors and geographical origins, culture, economic, political, and legal factors, as well as racism”. Studies are limited when looking at the association between ethnicity and diabetes in Latin America. The objective of this study was to determine whether there was an association between ethnicity and glucose metabolic disorders (GMD) in northern Colombia in 2015.

**Case Presentation: Methods::** This is a secondary data analysis of the Colombian Diabetes Risk Score study (CoDRISC), a cross-sectional study conducted between October/2014 and February/2015. Participants aged 18-75 years, were randomly selected from the health-care insurance company *Mutual-SER-EPSS* database in 30 municipalities of the Atlántico, Bolívar, Córdoba, Magdalena and Sucre provinces located in northern Colombia. All participants underwent an oral glucose tolerance test. GMD was defined as impaired fasting glucose, impaired glucose tolerance, or newly detected T2D. Ethnicity was classified as Afro-Colombians and non-Afro-Colombians. Participants with a history of diabetes, pregnancy/breastfeeding, cancer, corticosteroids use, or hemophilia were excluded.

**Discussion: Results::** Among the final sample size of 2060 participants, 472 (22.9%) had previously undetected GMD. After adjusting for age, sex, BMI, hypertension, family history of diabetes, education status, smoking, physical activity, and consumption of fruits and vegetables, the risk of developing GMD in Afro-Colombians was similar than non-Afro-Colombians (OR=1.08; 95%CI 0.81-1.44). The odds of having GMD were increased in participants with BMI  $\geq 30$  kg/m<sup>2</sup> (OR=1.68; 95% CI 1.24-2.28), hypertension  $\geq 140/90$  mmHg (OR=1.48; 95%CI 1.14-1.91), or had parents or siblings diagnosed with diabetes (OR=1.63; 95% CI 1.24-2.15).

**Conclusion:** In Conclusion:, there was no association found between the Afro-Colombian population and the prevalence of GMD. Secondary findings found an increased risk of GMD among participants that had BMI > 30 kg/m<sup>2</sup>, hypertension (>140/90 mmHg), and parents or siblings with a history of diabetes. Due to the increased prevalence, we suggest public health in Colombia make screening tests to detect GMD and hypertension. The study participants that were found to have GMD were subsequently made aware of their diagnosis and given treatment. Promoting lifestyle changes can help reduce the prevalence of GMD among the Colombian population.

# Florida-Clinical Vignette-Poster Finalist

## Arti Patel

**Title:** I Can't Believe It's Not A Kidney Stone!

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**Introduction:** Kidney infarction Results: from an interruption of blood flow in the renal artery. It is an extremely rare occurrence with an incidence rate of approximately 0.005% of emergency department visits. Cardioembolic disease and hypercoagulation disorders are the major causes of kidney infarct. In many cases there is no identifiable cause. Risk factors for kidney infarction include atrial fibrillation, ischemic heart disease, endocarditis, and renal artery dissection. The presenting symptoms are sudden abdominal flank pain and hematuria. These symptoms can mimic nephrolithiasis, making an accurate diagnosis difficult.

**Case Presentation:** A 42 year old male with no significant past medical history presented to the emergency department with a four hour history of severe left flank pain. The pain was described as dull, constant, and non-radiating with no associated fever, chills, dysuria, or macroscopic hematuria. It was rated 9/10. The urinalysis was positive for microscopic hematuria. A CT without contrast was performed, and it was negative for stone identification in the ureters and bladder. A CBC showed a WBC of 11.3 thousand/uL and a creatinine of 0.9 mg/dL. All other measurements were unremarkable. He was deemed ready for discharge, but given the reluctance of the patient to leave the hospital due to the severity of the pain, he was admitted under observation where the pain intensified. At this point the patient developed a 38.7°C fever. On physical examination the patient's left kidney was extremely tender to palpation. There was positive left costovertebral angle tenderness. The testicular exam was negative for masses. A CT scan with contrast was performed to rule out a kidney abscess, and it showed an infarct of the anterior lateral left kidney with perinephric stranding. Two-thirds of the left renal parenchyma was involved. A workup to exclude endocarditis included a transthoracic and a transesophageal echocardiogram were unremarkable. The bubble study was negative for a patent foramen ovale. There were no recorded episodes of atrial fibrillation on telemetry. A full hypercoagulability profile was completed. Protein C, protein S, and INR were within limits. The patient had a factor V leiden heterozygous mutation. He was started on Lovenox and discharged on Eliquis.

**Discussion:** Spontaneous kidney infarction in a previously healthy adult male with no risk factors is unusual. Searching for a hypercoagulable state was imperative because it determined the patient's plan of care. In a patient presenting with flank pain and hematuria with a negative nephrolithiasis workup, kidney infarction should always be on the differential list as a prompt diagnosis can save the patient from a life threatening condition.

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# Georgia-Clinical Vignette-Poster Finalist

## Leo Jia

**Title:** The High Price of Getting High: Marijuana-Induced Apical Bullae

**Authors:** Leo Jia, BA; Walter Hodges, BA; Ashwin Rao, MD; Tarun Kukkadapu, MD; Vinayak Kamath, MD; Jayanth Keshavamurthy, MD

**Introduction:** Reflecting recent trends regarding marijuana legalization, an increasing number of Americans are smoking marijuana under the assumption that this drug is harmless, despite numerous documented complications suggesting otherwise. These detrimental consequences include altered brain development, cognitive impairment, chronic psychosis disorders as well as an increasingly evident relationship between smoking marijuana and pulmonary pathology. We present a case of marijuana-induced apical bullae presenting with pneumothorax.

**Case Presentation:** A previously healthy 21-year-old African American male presented to the Emergency Department with sudden onset of severe, right-sided pleuritic chest pain involving the right shoulder with associated dyspnea. He admitted to using a bong to smoke marijuana at the time that the pain began and additionally reported several years of daily combined tobacco and marijuana use. Physical examination showed decreased breath sounds to the right upper and lower lung fields. Initial chest radiograph (CXR) demonstrated right-sided tension pneumothorax with a left-shifting mediastinum. Chest tube was placed with immediate improvement of the patient's pain and dyspnea. Post-procedural CXR showed concavity of the pleural line in the right apex relative to the lateral chest wall. This finding was initially reported as residual right apical pneumothorax by the radiology resident but was later corrected to right apical bulla upon review by the radiology attending. Computed tomography (CT) was ordered and revealed the presence of multiple bilateral bullae, confirming the diagnosis of apical bullae. The patient successfully underwent bilateral blebectomy and pleurodesis via video-assisted thoroscopic surgery (VATS). After an uncomplicated recovery, he was discharged with close pulmonology follow-up and recommendations to cease both marijuana and tobacco smoking.

**Discussion:** Increasing popularity of marijuana use has led to more than 180 million active users worldwide<sup>1</sup>. Despite the pervasive notion that marijuana use is harmless, there are numerous documented pulmonary and extrapulmonary complications from marijuana use<sup>2</sup>. An important health concern involves the increased risk of developing giant upper zone bullae that have the potential to rupture and form pneumothoraces<sup>3</sup>. One study reported a 9-fold increased risk in those with a history of concomitant tobacco and marijuana use<sup>4</sup>. Patients with bullae rupture may present with complaints of acute pleuritic chest pain with associated dyspnea<sup>5</sup>. As demonstrated in this case, CXR of apical bullae is commonly mistaken for pneumothoraces<sup>6</sup>. However, the pleural line associated with large bullae is concave relative to the lateral chest wall; a convex pleural line suggests pneumothorax<sup>7</sup>. CT should be employed to confirm the presence of bullae to the upper lobes. Treatment for apical bullae depends on the severity of symptoms and number of bullae but commonly includes blebectomy with pleurodesis via VATS. This case underscores the importance of a comprehensive history including marijuana and illegal drug use when interviewing a patient in the acute care setting.

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# Georgia-Clinical Vignette-Poster Finalist

## Muaaz Masood

**Title:** Pancreatitis: a Taken-for-Granted Diagnosis

**Authors: First Author:** Muaaz Masood, BS, **Co-Authors::** Lawrence Chang, DO, MPH

**Introduction:** Autoimmune pancreatitis (AIP) is a disease that has been seen mostly in Japanese case reports. Its prevalence, incidence, and reported cases in the US, however, are scarce to date. The disease is chronic and manifests as acute attacks of pancreatitis with quick response to steroids. The autoimmune aspect usually stems from high IgG levels and autoantibodies detected in the blood. The autoantibodies deposit in the pancreas and cause ductal strictures and narrowing, inflamed and enlarged pancreas, and may co-exist with other immunological dysfunctions.

**Case Presentation:** A 75-year-old Hispanic male with past medical history of COPD presented to the emergency department with constant, sharp abdominal pain radiating to the back and non-bloody, non-bilious watery diarrhea. The patient denied alcohol use and history of gallstones or liver disease. On admission, he was afebrile, normocardic and normotensive. Physical exam was significant for epigastric tenderness. On initial labs, his lipase was found to be 399 and amylase was >940. CT scan of the abdomen and pelvis was non-diagnostic. He was admitted to general medicine floor for management of pancreatitis. The patient was placed on intravenous fluids and restarted on his home dose of prednisone 5 milligrams for COPD. Throughout the hospital course, his abdominal pain subsided with amylase and lipase trended downward. He was NPO then eventually upgraded in diet to clear liquids followed by regular diet. Surgery did not recommend any intervention as there was no evidence of gallstone pancreatitis. Gastroenterology recommended ordering IgG4 titers as part of the workup in determining the underlying etiology of the pancreatitis. IgG4 levels were found to be significantly elevated at 254. The patient was diagnosed with Type 1 IgG4-related Autoimmune Pancreatitis. Since the patient was asymptomatic and clinically stable, he was discharged home. He was to follow up with gastroenterology clinic to determine necessity for short courses of steroids for autoimmune pancreatitis

**Discussion:** Autoimmune pancreatitis is a rare, often missed diagnosis. There are two major types. Type 1 AIP, as in this case, is usually a male 60 years and older, with IgG4 related multi-organ involvement - eyes, bile ducts, lymph nodes, salivary glands, thyroid, kidneys, and lungs. IgG-related pancreatitis may be allergic in origin. Type 2 AIP, affects males and females over the age of 40 years old and have co-morbid inflammatory bowel disease. The autoimmune etiology should be considered in pancreatitis, especially when considering patients with no significant history of alcohol, drugs, or gallstones. Here, the patient only had COPD with chronic use of low dose steroids. It is thus important to include immunologic dysfunction as a differential cause of pancreatitis, which in turn will allow clinicians to more easily identify and efficiently manage the root of disease at hand.

# Georgia-Clinical Vignette-Poster Finalist

## Margaret Q To

**Title:** *Streptococcus agalactiae*: a “pain in the neck”

**Authors:** Margaret To, Marcos C. Schechter MD, Cassie M. Ackerley MD

### **Introduction: Objectives:**

- Differentiate osteomyelitis from other causes of neck pain.
- Identify infectious etiologies of vertebral osteomyelitis.

**Case Presentation:** A 26 year-old Peruvian woman presented with 2 weeks of persistent left neck pain. She was recently diagnosed with Kikuchi Fujimoto (a self-limited idiopathic condition, causing necrotizing lymphadenopathy). She had a distant history of cerebral tuberculoma and a recent craniotomy for a traumatic subdural hematoma.

Her cramping pain radiated to her head and shoulder, with tenderness over the cervical muscles but no nuchal rigidity. She reported phonophobia and unilateral headache. Sensory and motor function remained intact. Laboratory evaluation was unremarkable– WBC 10 with normal differential, CPK within normal limits. Initial CT demonstrated resolution of necrotic lymph nodes from her prior admission.

Cyclobenzaprine, sumatriptan and Percocet were ineffective. Repeat head CT on day three revealed erosion of C4 with epidural space thickening. MRI demonstrated circumferential soft tissue enhancement and severe spinal cord stenosis at C3-C4. She emergently received a C4 corpectomy with decompression. Phlegmon surrounding the dura grew pan-sensitive *Streptococcus agalactiae* (Group B Streptococcus or GBS). She was started on ceftriaxone and discharged after significant improvement.

**Discussion:** General internists commonly encounter patients with neck pain. Cervical strain is self-limiting and the most common cause of neck pain; however the ability to distinguish it from more harmful causes, including infection, neoplasm, and myelopathy, is critical. Physical exam maneuvers, including the Spurling maneuver (axial loading of neck with head extended and rotated), or testing for Lhermitte sign (electric shock with neck flexion) suggest spinal involvement. Diagnosis, however, is not always straightforward.

Vertebral osteomyelitis can present insidiously, mimic muscle pain, is inconsistently associated with fever, and may respond to conservative measures. When infectious etiology is suspected, microbiology cultures should be collected. *Staphylococcus aureus* accounts for over 50% of cases, but other organisms may also be seen. Enteric gram-negative bacilli may spread following urinary tract instrumentation. *Pseudomonas* and *Candida* are seen with intravenous catheter infections, while Groups B and G hemolytic streptococci mostly affect patients with chronic diseases. As in our patient, tuberculosis should be suspected in individuals with risk factors; her AFB cultures have been negative to date.

What remains unclear is the source of her GBS infection. Her craniotomy may have sourced a bacteremia that subsequently seeded her spine. Negative blood cultures make this less likely, but not

impossible. GBS osteomyelitis is most commonly caused by contiguous spread through soft tissue or direct inoculation. The proximity of our patient's osteomyelitis to her prior lymphadenitis suggests a progression of symptoms with contiguous spread. She may have initially had *Streptococcal* adenitis, casting doubt on her Kikuchi disease diagnosis.

Given the multitude of patients who present with neck pain, hospitalists should be aware of vertebral osteomyelitis and implicated organisms, including the more rarely seen *Streptococcus agalactiae*.

# Illinois-Clinical Vignette-Poster Finalist

## Yuet Chan

**Title:** To Be Malignant or Not To Be, That is the Question - The Histologic Controversy Behind Malignant Granular Cell Tumor

**Authors:** Chan Yuet-Ming<sup>1</sup>, Paz Luis<sup>2</sup>, Andrade Xavier<sup>2</sup>, Alebich Michael<sup>2</sup>, 1) Rush University Medical College, Chicago, IL, 2) Department of Internal Medicine, John H. Stroger, Jr. Hospital of Cook County, Chicago, IL

**Introduction:** Granular cell tumor (GCT) is a rare neoplasm of controversial histogenesis favoring neural/schwannian origin. It occurs predominantly in men around the fourth to sixth decade of life and has been described in multiple locations; tumors of the head and neck, specifically the tongue and oral mucosa, englobe the majority of cases(1,2,3). GCT is typically benign and resectable. Conversely, less than 2% of GCT behave aggressively with metastatic potential and are classified as malignant(1). Among malignant cases, about 40% mortality is seen at 3 years, 32% have local recurrence and 50% develop metastatic disease(4). Given the small number of malignant GCT cases, predicting its natural behavior using histologic features is controversial.

**Case Presentation:** We present the case of a 45-year old man who sought medical attention early 2012 after 8 months of progressive lower lip growth. Biopsies were consistent with "malignant GCT" and he underwent radical resection with submaxillary lymph node excision without tumoral involvement. He completed radiotherapy and achieved clinical remission. The mass recurred in 2014, however he was lost to follow-up until 2016, when evidence of locally advanced tumor triggered a trial of palliative chemotherapy with no response.

The patient arrived at Chicago in June 2017 with significant speech impairment and weight loss due to mass-related feeding limitations. Computerized tomography and magnetic resonance imaging showed an 11 cm heterogeneously-enhancing mass, destruction of the right hemimandible and symphysis, extensive involvement of the oral cavity and skull base with multiple enlarged lymph nodes. Biopsy showed spindle-shaped, pleomorphic hyperchromatic cells, increased nuclear:cytoplasmic ratio and prominent nucleoli. There were 5 mitosis/10 HPF in a background of suppurative exudate with necrosis. Immunohistochemistry was positive for S-100, neuronal-specific enolase and CD-68. Ki-67 was evident in 70% of cells. He was started on the tyrosine-kinase inhibitor Pazopanib based on prior case reports and mild reduction of tumor size was observed.

**Discussion:** Fanburg et. al. asserts that malignant GCT has an unfavorable prognosis when 3 or more features are present: nuclear polymorphism, cell spindling, vesicular nuclei, increased mitotic rate, increased nuclear:cytoplasmic ratio, and necrosis<sup>5</sup>. Tumor size, presence of metastasis and Ki-67>10% are additional predictors of prognosis. Conversely, others propose that histologic features only differentiate between tumors with and without malignant potential<sup>4</sup>.

Our patient fits multiple proposed criteria for a poor prognosis, yet he has demonstrated prolonged survival and good functional status and responded to pazopanib, raising the need for alternative Methods: to predict outcomes and guide treatment. Whole-gene sequencing from a patient who responded to pazopanib identified a mutation in GFRA2, a gene present in the receptor tyrosine kinase

pathway, that may explain GCT's response to pazopanib<sup>7</sup>. We speculate that tailored investigations such as molecular profiling may provide clarity in the treatment and predict prognosis more accurately in these individuals.

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# Illinois-Clinical Vignette-Poster Finalist

## Rahim Jiwani

**Title:** Postoperative Posterior Reversible Encephalopathy in Escherichia coli Bacteremia

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**Introduction:** Posterior reversible encephalopathy syndrome (PRES) is clinically characterized by headaches, decreased cognition, cortical vision loss, confusion, seizures and it is associated with characteristic radiological findings.

**Case Presentation:** The currently known etiologies of PRES include: hypertension, renal failure, immunomodulating drugs, infective processes, and shock. The relative infrequency combined with the broad differential diagnosis makes PRES a diagnostic challenge. We describe a case of a 73 year old male with past medical history significant for recently diagnosed colorectal cancer who presented to the hospital with rectal bleeding and symptomatic anemia. Two units of packed red blood cells (PRBC) were promptly administered, to which the patient's clinical symptoms improved and became hemodynamically stable. Over the next 48 hours due to persistent hypotension and tachycardia the patient was administered another two units of PRBC. Blood cultures indicated *E. coli* blood stream infection, with the source most likely being the urinary tract. On hospital day 4, the patient was taken for an exploratory laparotomy, recto-sigmoid resection with anastomosis and diverting ileostomy. Intraoperatively, the patient was given two more units of PRBC. The patient tolerated the procedure well under general anesthesia and post-operative vitals were in the normal range. Shortly after surgery the patient's condition deteriorated. Two episodes of generalized seizures were observed by medical staff, the patient was non-responsive, failed to track objects and became quadriparetic. Computer tomography (CT) of the head was obtained and revealed decreased attenuation in the bilateral occipital lobes without mass effect, indicating possible PRES, early edema or bilateral ischemic changes. Subsequent magnetic resonance imaging (MRI) of the brain without contrast showed various abnormal findings including: patchy areas of hyperintensity within the temporal, frontal, and parietal lobes and cortical hyperintensity within the thalami bilaterally. These findings were consistent with PRES. With conservative management and antiepileptic therapy, the patient regained his baseline mental status.

**Discussion:** We present a unique case of PRES in the setting of acute lower gastrointestinal bleeding, *E. Coli* bacteremia and recent general anesthesia. The absence of the more common etiologies in this case of PRES highlights the diagnostic value of maintaining a broad clinical differential diagnosis when evaluating a patient with newly onset post-operative seizures to correctly guide diagnostic work up and treatment.

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# Indiana-Clinical Vignette-Poster Finalist

## Melanie Wiseman

**Title:** Bupropion Overdose: A Brain Death Mimic

**Authors:** Melanie Wiseman, MS4 Indiana University School of Medicine; Laura Tormoehlen, MD, Assistant Professor of Clinical Neurology and Emergency Medicine, Indiana University, Indianapolis, IN

**Introduction:** Bupropion is known to produce cardiac and neurotoxicity, especially in the setting of drug overdose. Cardiac toxicity from bupropion includes tachycardia, hyper- or hypotension, QRS widening, QTc prolongation, and ventricular dysrhythmias. Neurological toxicity from bupropion can result in slurred speech, lethargy, confusion, hallucinations, tremors, seizures, and coma.<sup>1</sup> These severe side effects make bupropion a dangerous drug when taken at supratherapeutic levels.

**Case Presentation:** A 24-year-old man with a history of anxiety and depression presented to the emergency department 1 hour after ingesting 130 tablets of Wellbutrin® XL 150mg in a suicide attempt. The patient presented with tachycardia (110 bpm) and normal mental status. He was given activated charcoal upon arrival and was treated with lorazepam for tachycardia and concern for impending encephalopathy and seizures. Over the next few hours, he progressively became more tachycardiac (140 bpm) with worsening agitated delirium. He was evaluated by toxicology in the emergency department and the decision was made to admit to the intensive care unit based on his large ingestion of Wellbutrin®XL and rapid decline. Electrocardiograms (ECGs) showed progressively prolonged QTc and QRS intervals, peaking at 571 and 150 respectively, and the patient was treated with potassium repletion, magnesium supplementation, and started on a sodium bicarbonate infusion. He continued to decline neurologically, progressing from hallucinations, confusion, and poor concentration, to unresponsiveness and 2 tonic-clonic seizures. The patient was intubated approximately 6.5 hours after ingestion for airway protection due to seizure activity and unresponsiveness. Approximately 8.5 hours after ingestion, the patient was started on norepinephrine for refractory hypotension with blood pressures in the 80s/40s. Eleven hours after ingestion the patient was found to have fixed and dilated pupils and absent gag, corneal, and vestibulo-ocular brainstem reflexes. A STAT Head Computed Tomography (CT) scan was obtained, which showed no acute intracranial abnormality and no herniation. Electroencephalography (EEG) showed interictal epileptiform discharges. The patient continued to be treated with lorazepam and ketamine drips for seizures, as well as correction of hypokalemia, magnesium supplementation, and sodium bicarbonate boluses for QTc and QRS abnormalities. The patient's hospital course was also complicated by aspiration pneumonia. He had intermittent fevers, with a Tmax of 103 degrees Fahrenheit on hospital day 3, and a chest x-ray on hospital day 4 showing increasing perihilar opacities. He gradually improved, began following commands, and was eventually extubated. His mental status returned to normal, and he was evaluated and cleared by psychiatry.

**Discussion:** This case illustrates the potential for a bupropion overdose to result in a rapidly progressive neurological decline with eventual mimic of clinical brain death in the setting of a severe overdose. Recognition of this is critical for clinicians caring for patients in such a setting to help them to better predict neurological decline and prognosis.

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# Jamaica -Clinical Vignette-Poster Finalist

## Rochelle Ogilvie

Title: **Fatal Free Fluids - Hereditary Diffuse Gastric Carcinoma Presenting with Ascites**

Authors: Rochelle Ogilvie, BSc (Bio, Bioc, Chem); Abe`-Noelle Pryce; Candi Whittick, MBBS, MSHSA; Mike Mills, FACP, FACG, FRCP, Department of Medicine, University Hospital of the West Indies, Kingston 7, Jamaica

**Introduction:** Hereditary Diffuse Gastric Carcinoma (HDGC) is a rare and aggressive form of gastric cancer due to a mutation in the CDH1 gene. Of all ascites cases, 10% relate to malignancy and it may be the only presenting symptom in abdominal malignancy.

**Case Presentation:** A 19-year-old male with no known chronic illness, had a 4-week history of progressively increasing abdominal girth and abdominal pain associated with nausea and anorexia. One week prior to presentation he had shortness of breath, dry cough, and pleuritic chest pain. Three days prior to presentation, he passed 2-3 loose stools daily. He had no other notable symptoms. He had a family history of hypertension, gallbladder cancer and breast cancer and no history of alcohol, smoking, drug use, sexual partners nor tattoos. Vitals were normal. On examination, he was found to have a firm globally distended abdomen with periumbilical and suprapubic tenderness and fluid thrill. Free fluid in the abdomen and pelvis was confirmed on ultrasound and CT. Ultrasound guided aspiration of abdomen confirmed mild ascites with normal portal venous flow. Liver span was 16cm with a normal echo pattern on ultrasound. Blood work was normal except – WBC of 13.74K/ml (neutrophils = 82.5%, lymphocytes = 10%), platelets of  $506 \times 10^9$  L, ESR of 96mm/hr and LDH of 640U/L. Urine dipstick was normal. Paracentesis produced a slightly cloudy, dark yellow fluid. The fluid WBC count was 837/ $\mu$ L (41% neutrophils, 14% lymphocytes), fluid albumin was 34g/L, no organisms seen on gram stain and SAAG was 0.9g/dL. Cytology of fluid detected no malignant cells.

On day 2 of admission he had two emetic episodes with significant tenderness and guarding. He presented with tachycardia and a temperature of 38.5°C. Blood and urine cultures were negative. Repeated paracentesis showed a total protein of 53g/L, LDH of 439U/L, and glucose of 3g/dL. Abdominal ultrasound showed no changes. CT abdomen showed no evidence of bowel perforation. Collagen vascular disorder screen was normal. C13, VDRL and Mantoux tests were negative. Blood CRP was 13 mg/dL. Upper endoscopy showed poorly differentiated diffuse gastric adenocarcinoma, with histology of biopsy specimen suggestive of HDGC. He was treated with Rocephin 2g, IV once daily.

**Discussion:** HDGC represents about 1% of gastric cancer cases. It should be suspected more so in males younger than 30 years presenting with abdominal symptoms, and 1<sup>st</sup> or 2<sup>nd</sup> degree relatives with breast cancer. Sudden onset of fever, vomiting and changes in vitals are suggestive of Systemic Inflammatory Response Syndrome which is related to increased mortality of malignancy. Once more common ascites differentials are excluded, a complete clinical history is important in diagnosing HDGC. Screening of high risk individuals is vital for early detection.

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# Kansas-Clinical Vignette-Poster Finalist

## Nathaniel Parker

**Title:** Benign metastasizing leiomyoma – a contradiction in nomenclature

**Authors:** Nathaniel A. Parker<sup>1</sup>, Christopher S.R. Dakhil<sup>2</sup>, Shaker R. Dakhil<sup>2</sup>, <sup>1</sup>Medical Student, Kansas City University of Medicine & Biosciences, Kansas City, MO, <sup>2</sup>Medical Oncologist / Hematologist, Cancer Center of Kansas, Wichita, KS

**Introduction:** Leiomyomas affect up to 30% of reproductive-aged women <sup>[1]</sup>. They most commonly arise from the uterus, but can originate in other tissues <sup>[2]</sup>. Metastasis have been described. Thus, these rare events have been named as benign metastasizing leiomyomas (BML) and intravenous leiomyomatosis (IVL) that represent contradiction in nomenclature.

**Case Presentation:** Case 1: A non-smoking 30-year-old Vietnamese woman was referred for lung lesions. Two years prior, she underwent total hysterectomy. At that time, a single uterine fibroid was noted and excised. Pathology confirmed a diagnosis of leiomyoma. At the time of presentation, patient complained of only flu-like symptoms. Chest x-rays showed bilateral lung lesions. Subsequent an extensive work up resulted in unremarkable CT scans, bronchoscopy, and thoracoscopy. Lung tissue biopsy showed benign-appearing smooth muscle nodules, suggestive of BML. Over the next two decades, patient's lung lesions persisted despite proposed therapeutic regimens that included megestrol, Tamoxifen, medroxy-progesterone, leuprolide and letrozole. No curative therapy was identified. Nine years post-hysterectomy, additional lung lesion tissue acquired. Immunostaining revealed full negativity to c-kit and Her2/neu, but mixed negative EGFR Results: with slightly positive staining of material among muscle cells and not the muscle cells themselves. Genomic sequencing by Foundation<sup>®</sup> testing was performed by blood samples. An ALK: N1532D variant of unknown significance (VUS) was discovered. Currently, patient is being conservatively managed with observation and symptom management.

Case 2 : A Caucasian 33-year-old woman of European descent presented with abdominal pain. CT scans showed an adnexal mass. Total hysterectomy and bilateral oophorectomy were performed. At that time, a well-circumscribed mass was noted. Pathology confirmed diagnosis of leiomyoma. During ten year post-hysterectomy period, patient developed lung, cardiac, and intra-abdominal masses. Exploratory procedures revealed further gynecological, retroperitoneal, caval and right atrium tissue involvement. Immunostains from needle core biopsies were positive for desmin, actin, estrogen receptor, and WT-1, supporting a Mullerian origin. Pathology not only revealed tumors made of spindle cells, but also supported diagnoses of IVL. Urgent therapy by thrombus and mass removal, IVC reconstruction, tricuspid valve replacement and nephrectomy was performed soon after patient's presentation. Genomic sequencing by Foundation<sup>®</sup> testing was performed on tissue samples. Three VUS were detected - EGFR:V674I; ERBB4:K1002R; and TSC2:L826M.

**Discussion:** In our cases the interval between uterine fibroid diagnosis, hysterectomy, and metastasis was two and zero years, respectively. Based on the literature, IVL is a less common phenomenon. These cases illustrate the importance of awareness of BML and IVL as a conditions with no currently known definitive treatment. Currently, efforts are being made to compare genomic profiling data of two patients diagnosed with BML and IVL. With this information, a goal is to learn if specific signaling

pathway inhibitors or immune-modulating therapies can be used to treat these rare but debilitating transformations in the near future.

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# Kansas-Clinical Vignette-Poster Finalist

## Elizabeth Braden

**Title:** A Curious Case of Abdominal Pain: A Unique Presentation of Disseminated Varicella

**Authors:** Elizabeth Braden, Jesse Richards DO, Steven Simpson MD

**Introduction:** Infections with varicella, the herpes virus responsible for chicken pox and shingles, can occur in a primary or reactivated form and presents as cutaneous lesions in a vast majority of cases. Disseminated varicella is very rare but much more common in immunosuppressed and bone marrow transplant patients and is often fatal. Disseminated varicella is usually preceded by a rash, but in rare instances can present itself as abdominal pain, hepatitis or other clinical syndromes. This can make diagnosis very difficult, which is critical due to its high mortality and the importance of early antiviral treatment.

**Case Presentation:** A 51 year old man with a past medical history of panhypopituitarism, adrenal insufficiency, diabetes insipidus and multiple myeloma post autologous stem cell transplant (ASCT) presented to ED with abdominal pain and fever. CT abdomen/pelvis showed a few bony lytic lesions but no acute process, lipase was within normal limits and basic labs were unremarkable. Shortly after admission his serum sodium declined from 138 to 130 and eventually to 123. Urine osmolality was high which was consistent with SIADH. AST and ALT climbed with a peak of 1562 and 1277 respectively. Creatinine elevated from 1 to 3 within 2 days. EGD showed gastric and duodenal ulcers but biopsies were non-diagnostic.

While these symptoms seemed random and difficult to connect, on the second day a vesicular rash developed, starting on the scalp and spreading to the chest, abdomen and proximal lower extremities. Given that he was immunosuppressed from both post-transplant maintenance and adrenal insufficiency therapy, empiric antiviral therapy was started and fluid was sent for varicella zoster virus (VZV), which was positive along with high serum levels of VZV found later. The patient was transferred for ICU for sodium correction. Shortly after transferring to the ICU, the patient became altered, hypotensive, and experienced respiratory failure. He was intubated and started on vasopressors and stress dose steroids. Patient required CRRT due to renal failure, and despite supportive care never recovered consciousness. Eventually his family transitioned to comfort measures and he passed away.

**Discussion:** This case highlights the importance of looking for atypical presentations in immunocompromised patients. Disseminated varicella has been associated with a multitude of different clinical complications affecting various organs including the liver, kidneys, and lungs among others. Our patient represents an exceedingly rare case in which both abdominal pain and SIADH presented before cutaneous lesions. This patient developed extensive organ damage including hepatitis, esophageal and duodenal ulceration, and severe thrombocytopenia, possibly due to DIC, all of which have been associated with varicella. Because of the havoc this process can wreak, it is important to keep a wider differential in our immunosuppressed patients and be aware of atypical presentations of infections in order for timely and life-saving treatments.

# Kentucky-Clinical Vignette-Poster Finalist

## Xiaohui Wang

**Title:** Infectious Pulmonary Tuberculosis Presenting as “Incidentalomas:” A Grave Public Health Implication for Unwitting Transmission and Spread

**Authors:** Xiao Wang, Courtney Perry MD, Gaddam Padmaja MD, and Preetham Talari MD

### Introduction:

**Case Presentation One:** A 58-year-old African-American male presented to the ED after a dog attack resulting in degloving of the right earlobe. A CTA to evaluate trauma showed incidental consolidation in the right lung apex. He was completely asymptomatic except for the injury. He did report a history of incarceration and substance abuse. He was placed in Acid Fast Bacilli (AFB) isolation. Sputa showed positive AFB smears (1+), GeneXpert and cultures confirmed Mycobacterium Tuberculosis (MTB) susceptible to all first-line drugs.

**Case Two:** A 25-year-old male refugee from Uganda presented to the ED for after motor vehicle accident. CTA for trauma showed bilateral upper lung cavitory lesions and diffuse nodular opacities suggestive of pulmonary Tuberculosis Disease(TBD), which was later confirmed by GeneXpert and culture. Past history showed that he was identified as having TB infection with reactive TB skin test, normal CXR at time of immigration but failed to follow up at the health department (HD), and that a CXR performed for a productive cough during an incarceration was “negative” per patient and he was released. But a retrospective review of the CXR showed an early LUL infiltrate. The HD has identified an aunt, an uncle with nine siblings, ages ranging from 23 months to 21 years, with TST conversion rate of 70%, clinical TBD in two family members and culture-proven disease in one.

**Discussion:** We shared our experience with two asymptomatic patients who were incidentally found to have radiographic changes of pulmonary TB, leading to prompt isolation, work-up that confirmed TB and treatment. Thus health care workers were protected, but it required extensive contact tracing by the HD to identify all potential secondary cases in the community. Failure to diagnose TBD is multifactorial. Low incidence of TBD leads to a false sense of security among patients and providers in considering TBD as a diagnosis in community-acquired pneumonia. Failure to appreciate the risk factors for TBD, and the lack of classic symptoms of fever, night sweats, weight loss and hemoptysis also contribute to delayed diagnosis. Noncompliance with processes designed to treat early infection and to prevent progression to TBD is another barrier.

Infectious TBD poses a significant health threat to the contacts in the community and burdens resource-limited HD. We propose that all patients have a risk assessment for TB regardless of the reason for presentation to the hospital and patients identified with risks have a blood assay for TB and a CXR to assist in the diagnosis. Prompt notification of the HD is essential to provide continuation of treatment after discharge and to initiate contact investigation in the community starting with the patient’s household. Astute and vigilant primary providers are critical to diagnose TBD and limit secondary cases in the community.

# Kentucky-Clinical Vignette-Poster Finalist

## Allyson Hughes

**Title:** Itching For a Burger

**Authors:** Allyson Hughes, M4, Aletia Farmer, MD

**Introduction:** •Recognize the symptoms of alpha-gal allergy

- Appreciate the temporal connection between tick bites, red meat ingestion, and anaphylaxis/urticaria
- Recognize the geographic distribution of alpha-gal sensitivity in the United States

**Case Presentation:** A 56-year-old female from Kentucky presented to outpatient clinic with a five month history of persistent tender, peeling, and swollen lips with associated dry mouth and oral ulcers. She also reported episodes of hives and redness on her palms and hands after eating fast-food hamburgers.

**Discussion:** Alpha-gal allergy is a condition due to an IgE antibody production to the oligosaccharide galactose-alpha-1, 3-galactose, a carbohydrate molecule that is found in the meat of mammals, including cattle, sheep, deer, bison, and pigs. Alpha-gal allergy presents as a delayed urticarial, angioedema, & anaphylactic reaction 3-6 hours following ingestion of red meats. Gastrointestinal symptoms are also common but do not precede the allergic response in time. There is a strong geographic connection within the Southeast United States for alpha-gal allergy cases. Recent research has found that alpha-gal sensitivity is closely related to the geographic distribution of *Amblyomma Americanum*-- The Lone Star Tick. Many patients have a history of a tick bite followed by itching for two or more weeks prior to the diagnosis of Alpha-gal allergy. Hypersensitivity symptoms develop 1-3 months after tick bite. The specific cause of the IgE response is unknown with theories including direct response to tick saliva, response to products in its previous blood meal or response to a novel organism that is harbored within the tick itself.

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# Louisiana-Clinical Vignette-Poster Finalist

## Dylan Johnson

**Title:** Pseudoepitheliomatous Hyperplasia May Indicate the Need for Further Studies

**Authors:** Dylan Johnson, Levi White, Brenda Cruciani, American University of the Caribbean School of Medicine, Cupecoy, Sint Maarten

**Introduction:** Pseudoepitheliomatous hyperplasia (PEH) is a benign skin condition associated with reactivity to chronic inflammation such as that seen with infection, autoimmune disorders, and foreign body retention.<sup>1</sup> PEH has also been associated with melanoma, among other malignancies.<sup>2</sup> With a diagnosis of PEH, it is important to remain mindful of its associated conditions when determining if further biopsies are indicated.

**Case Presentation:** A 56-year-old Caucasian woman presented with increasingly severe pain and drainage secondary to a chronic perineal wound of approximately 3 years' duration. She also reported recently discovering a new "bump" in her vagina. Several biopsies of her wound taken over the previous two years had reported PEH. However, all subsequent attempts to reveal an occult infection were unsuccessful. Her past medical history included psoriasis and hypothyroidism; she had no history of malignancy, immunocompromise, nor Crohn's disease. There was no history of cancer in her family. Upon examining the patient, a circumscribed area of induration and erythema could be visualized just left of the perineum. Due to uncontrolled pain, a pelvic exam was deferred at that time, and the patient elected for a pelvic exam under anesthesia with additional biopsies.

In the operating room, a small nodule was palpated in the anterior vaginal wall. Excisional biopsies were taken of both the vaginal nodule and perineal wound. The perineal wound biopsy reported squamous cell carcinoma (SCC) in a background of hidradenitis suppurativa (HS). The biopsy of the vaginal nodule returned as melanoma with lymphovascular invasion. The patient underwent a PET scan which reported metastatic intrathoracic, retroperitoneal, and pelvic lymphadenopathy. A subsequent retroperitoneal lymph node biopsy confirmed metastatic melanoma.

**Discussion:** PEH is a benign skin condition associated with a variety of ongoing inflammatory states such as those seen with chronic infection and autoimmune disorders. PEH has also been associated with many malignancies, including melanoma. HS is a chronic inflammatory disease that affects areas of the skin containing apocrine glands, such as the groin and axillae. In addition to its deleterious effects on patient self-esteem and quality of life, HS is also associated with SCC.<sup>3</sup>

Although it is well known that SCC can arise with chronic inflammation, also known as a Marjolin's ulcer, there may be less awareness regarding the association between PEH and melanoma. The squamous hyperplasia seen in PEH warrants caution to avoid unnecessary iatrogenesis that may follow a false positive diagnosis of SCC. However, clinical judgement must be given to each case when deciding if further biopsies are warranted to rule out malignancy. Additionally, PEH can arise secondary to a nearby condition that is benign, such as HS, in which case further biopsies may also be indicated to definitively diagnose and manage the patient's disease and its associated risks accordingly.

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# Louisiana-Clinical Vignette-Poster Finalist

## Joan Winter

**Title:** Wet, Wobbly, and Salty

**Authors:** Joan Winter MS, Rachel Dayno MD, Daniel Edwards MD, Catherine Jones MD

**Introduction:** Syphilis is known to be a disease with an incredibly variable presentation. Less common clinical manifestations of the disease include SIADH, central hypothyroidism, normal pressure hydrocephalus, cognitive impairment, sensory loss, gait incoordination, myoclonus, speech dysarthria, behavior changes, and Parkinsonism. This case underscores the importance of syphilis screening in the presence of deteriorating cognitive function and gait ataxia, and the importance of following CDC guidelines for syphilis workup and treatment.

**Case Presentation:** A 55-year-old African-American man with a history of neurocognitive impairment, mental health issues, memory problems, and multiple hospitalizations for dehydration presented with dizziness. According to his caretaker, the patient appeared wobbly when standing up after lunch and had recent incontinence of urine. Family reported that the patient was previously incarcerated multiple times when he was younger.

On admission, the patient was tachycardic but normotensive. He appeared malnourished with occasional unpurposeful movements of his arms. He had visual loss in his right eye and his left eye was non-reactive to light and accommodation. He had a positive Romberg test. The patient was oriented to person and place. Labs were significant for: Sodium 172, BUN 52, Creatinine 1.83, and HIV negative. RPR titer returned as 1:4. A lumbar puncture revealed elevated protein and positive CSF VDRL with a 1:1 titer. MRI of the brain showed diffuse parenchymal volume loss with proportional ex vacuo enlargement of the ventricles. MRI of thoracic and lumbar spine showed no abnormalities.

The hypernatremia was treated with intravenous D5W for 6 days, until his sodium was 145. We initially thought his hypernatremia was secondary to diabetes insipidus, however, urine osmolality >1000 and urine sodium 34 is more consistent with SIADH. These findings led us to believe there may be other causes of his hypernatremia and altered mental status, namely neurosyphilis. Neurosyphilis was treated with intravenous Penicillin G continuous infusion 24 million Units. After about 24 hours of infusion, his potassium was 6.9 with peaked T waves, thus therapy was switched to Ceftriaxone 2g daily for 14 days.

**Discussion:** This case underscores the importance of thorough diagnostic workup in the setting of recurrent hospital admissions in a patient with progressive cognitive decline and gait ataxia. This patient's hypernatremia initially appeared very straightforward. Thorough history, physical exam, and RPR titer were instrumental in discovering and treating the underlying diagnosis. Neurosyphilis is treated with Penicillin G 24 million units for 14 days. The suspension contains sodium and potassium, which could have effects on patients susceptible to subtle electrolyte changes. Patients allergic to Penicillin and sensitive to electrolyte changes can take Ceftriaxone 2g/day for 14 days. Although effective and early Methods: of treatment have become more accessible in recent years, there is still an increase in cases of late and latent syphilis. Thus, early recognition and evidence based treatment are important in improving patient outcomes and possibly reversing some cognitive symptoms of neurosyphilis.

# Massachusetts-Clinical Vignette-Poster Finalist

## David G Deckey

**Title:** Not Your Idiopathic Erythema Nodosum

**Authors:** David G. Deckey<sup>1</sup>, Nicholas M. Panarello<sup>1</sup>, and Laura K. Snyderman<sup>1</sup>, <sup>1</sup>Tufts Medical Center

**Introduction:** Erythema Nodosum is a rare clinical entity with a broad differential diagnosis. The majority of cases are of idiopathic origin, making the diagnostic relevance difficult to interpret.

**Case Presentation:** A 65-year-old Cantonese woman with no significant past medical history presented with fever, malaise, myalgias, and tender, erythematous nodules on her bilateral anteromedial shins and dorsum of the left wrist. Her symptoms developed over a week without any antecedent trigger. Erythema Nodosum (EN) was suspected and treatment with potassium iodide and NSAIDs was initiated, which resulted in rapid clinical improvement and discharge [1]. She re-presented two weeks later due to several episodes of bloody diarrhea, lower extremity edema, joint swelling, continued fatigue, myalgias and persistent lesions on her bilateral anteromedial shins. Extensive laboratory evaluation revealed elevated inflammatory markers (ESR 104, CRP 91.62), stable iron deficiency anemia (Hgb 9.6), elevated ACE 183, and negative Quantiferon. CXR showed hilar changes that could be consistent with latent granulomatous disease. CT chest/abdomen showed multiple hypodense subcentimeter liver and kidney lesions too small to characterize, and a subsegmental filling defect in the right lung. Heparin drip was initiated for management of the incidental pulmonary embolism. The patient's first-ever colonoscopy revealed a 4-5cm exophytic, friable mass 10cm from the rectal vault that occupied approximately three-quarters of the lumen. Pathology confirmed the mass was well-differentiated, invasive adenocarcinoma. MRI showed involvement of external iliac and mesorectal fat lymph nodes, without liver or lung involvement.

**Discussion:** This case underscores the importance of avoiding premature closure. While most cases of EN are idiopathic, it is essential to explore other possible etiologies, such as Group A Strep, chronic inflammatory and autoimmune diseases, and malignancy. EN typically presents with the sudden onset of painful, warm, erythematous, subcutaneous nodules on pretibial surfaces. Patients may also experience prodromal symptoms that our patient experienced: fever, malaise, fatigue, arthralgias, headache, and abdominal pain. With vague constitutional symptoms and as many as 50% of cases being idiopathic, it is easy to prematurely close a case such as this one [2].

Therefore, when considering the differential diagnosis of a systemic inflammatory disorder, such as EN, malignancy must be considered. In our patient, her stage three invasive colorectal adenocarcinoma initially manifested through a paraneoplastic syndrome, prior to more typical symptoms such as bright red blood per rectum. Although gastrointestinal malignancy begins as a local, uncontrolled proliferation of abnormal cells, the development of invasive disease is correlated with more systemic findings, such as paraneoplastic syndromes, particularly dermatoses. If recognized in a timely fashion, early treatment can be initiated, leading to better clinical outcomes. Evaluation for underlying malignancy should begin with a thorough history, physical examination and laboratory testing, in addition to ensuring that age-appropriate screening examinations have been performed.

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# Michigan-Clinical Vignette-Poster Finalist

## Joshua Coutinho

**Title:** Armour Thy-Roid Rage - a dangerous mixture.

**Authors:** Joshua F Coutinho, B.Sc , Justin Field, MD , Anupam A Sule, MD, PhD, FACP

**Introduction:** Armour Thyroid is a natural porcine derivative thyroid supplement that is frequently used without physician monitoring by health enthusiasts as a weight loss supplement. Although there are no publications associating Armor Thyroid and major coronary events, significant drug interactions do exist.

**Case Presentation:** A 32 year old male with a history of hypothyroidism, cystic acne and solitary congenital kidney presented to the emergency room after experiencing crushing substernal chest pain radiating to his left shoulder accompanied by diaphoresis and shortness of breath. The patient denied any tobacco use or family history of heart disease. He was self administering 120 mg of Armour Thyroid daily. On examination the patient was well developed with cystic acne and flushed appearance. His vital signs on admission were: Blood pressure: 171/106 mmHg high, heart rate: 88 bpm normal, respiratory rate of 16 breaths/min normal. The electrocardiogram revealed marked ST-segment elevation in anterior chest leads. Laboratory studies revealed elevated troponins. Urine drug screen was negative. The patient underwent emergent coronary angiogram which confirmed an occluded left anterior descending artery. He was treated successfully by thrombectomy and stenting of his left anterior descending artery. Evaluation for other causes of thrombosis was negative: HbA1C 5.5% normal, LDL 127 mg/dL high normal, HDL 33mg/dL low, hypercoagulable evaluation negative. Hgb 17.1 gm/dL high. LH and FSH <0.20 mIU/mL low. Thyroid profile was (TSH 0.20 mIU/mL low, T3 free 4.08 pg/mL high, T4 total 1.2 mcg/dL low) consistent with exogenous thyroid hormone administration.

Focused questioning triggered by his cystic acne led to the discovery that the patient was self administering exogenous testosterone replacement therapy. This was confirmed by a high Testosterone level of 1,311 ng/dL.

**Discussion:** Hyperthyroidism increases the risk of cardiovascular events two to three times through the propagation of a hypercoagulable, hypofibrinolytic state possibly via an increase in clotting factors, decrease in fibrinolytic enzymes and increased inhibition of the protein C pathway. Neither exogenous levothyroxine nor exogenous testosterone supplementation by themselves have been associated with increased risk of myocardial infarction. The combined therapy likely resulted in a testosterone-stimulated potentiation (alteration in thyroxine binding globulin resulting in decreased thyrotropin (TSH) and total T4 but increased T3 and free T4) of Armour Thyroid hypercoagulable, hypofibrinolytic effects. Given the absence of all other risk factors, the cause of myocardial infarction in our patient was likely due to drug interaction between Armour Thyroid and exogenous testosterone therapy.

**Conclusion:** Due to potential drug interaction between both natural and prescribed thyroid hormone supplements and testosterone replacement therapy, patients on both should require close monitoring and dosage reduction.

# Minnesota-Clinical Vignette-Poster Finalist

## Elizabeth Fairbairn

**Title:** Sticking Point: Severe Shoulder Pain Following Vaccine Administration

**Authors:** Elizabeth Fairbairn, MS3, University of Minnesota Medical School, Kyle Lehenbauer, MD FACP, Department of Medicine, VA of Minneapolis

**Introduction:** Should recent vaccine administration be considered a cause of shoulder bursitis or inflammatory arthritis?

**Case Presentation:** A 76-year old man with past medical history of ulcerative colitis treated with vedolizumab, mesalamine, and methotrexate presented to clinic with a swollen and painful right shoulder that he believed was due to a pneumococcal vaccination he received 10 days prior. He was on day 3 of a 10day course of amoxicillin/clavulanate for a dental infection. His right shoulder is visibly swollen with a tender effusion on the anterior shoulder. Patient refuses range of motion testing due to pain. Ultrasound imaging of shoulder revealed a 6 cm mildly complex subdeltoid fluid collection communicating with the joint space. The fluid collection was aspirated with the following Results:: cloudy yellow fluid; 62,000 WBCs, 4000 RBCs; cultures were negative; crystals and a few intracellular calcium pyrophosphate (CPP) crystals were seen. One case report on SIRVA following pneumococcal vaccination included aspiration Results: with elevated WBC, but no crystals.(2) No cases of CPP deposition in possible SIRVA have been reported. Treatment consisted of a course of prednisone for pseudogout. Recommended treatment for SIRVA is also prednisone. At time of submission, patient has completed prednisone treatment and had complete remission of symptoms. He was willing to get his influenza vaccine 2 months after this incident.

**Discussion:** There are case reports of shoulder injuries related to vaccine administration (SIRVA). It is believed to be caused by antigenic material improperly injected into shoulder bursas or synovial space.(1) Symptoms usually appear in 24 to 48 hours and can last for weeks to months. Risk factors include decreased subcutaneous fat or low muscle mass and underlying shoulder abnormalities. This patient's BMI of 22.7, muscle atrophy, and xray findings indicative of a rotator cuff pathology put him at increased risk.

SIRVA can be prevented by proper vaccine administration focusing on proper site, patient positioning, and needle length to ensure the injection is in the deltoid muscle.(3) Being at the same level as the patient; e. g., both sitting, can help ensure the injection isn't given too high on the shoulder and that the needle is perpendicular to the skin.

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# Mississippi-Clinical Vignette-Poster Finalist

## Avani K Patel

**Title:** When Renal Function Fades Like a Vapor in the Wind: A Case of Vaping Associated Propylene Glycol Induced Acute Interstitial Nephritis

**Authors:** Avani Patel, MS3; Paul Dotherow, MD; Lyssa Weatherly, MD; Pradeep Vaitla, MD; Alisha Parker, MD; Azniv Azar, MD; Jack Lewin, MD

**Introduction:** Drug-induced acute interstitial nephritis is a common cause of acute kidney injury which frequently presents as a rise in creatinine level. Here we report a case that initially presented as acute renal failure leading to a diagnosis of drug-induced acute interstitial nephritis precipitated by propylene glycol.

**Case Presentation:** A 43-year-old African American female with no significant past medical history presented to the emergency room with difficulty ambulating, fatigue, bilateral lower extremity edema, rhabdomyolysis, and acute kidney injury. Her chief complaint was bilateral lower extremity weakness and shortness of breath. A few days prior to admission, she was admitted to another hospital where she was treated for a urinary tract infection and given intravenous fluids and antibiotics. A comprehensive physical and neurological examination were unremarkable. Labs revealed elevated serum creatinine, proteinuria, elevated creatine phosphokinase (CPK), and a urinalysis with large blood but only thirteen red blood cells. The initial differential diagnoses included acute renal failure due to nephrotic syndrome with proteinuria, membranous nephropathy, membranoproliferative glomerulonephritis, focal segmental glomerulosclerosis, systemic lupus erythematosus (SLE) nephritis, post-infectious glomerulonephritis, ANCA-associated vasculitis, or IgA nephropathy. Further work up revealed negative ANCA, ANA, anti-Smith, anti-Jo-1, anti-dsDNA, and normal C3 and C4 complement levels. A renal biopsy revealed drug-induced acute interstitial nephritis with focal acute tubular damage and tubular epithelial regeneration. Upon further procurement of history, the patient revealed significant smoking history for which she recently started alternative nicotine therapy with vaping. The three months preceding her initial symptoms, she had continuously inspired large volumes of a propylene glycol based vaping solution, which was presumed to be the precipitant of her renal failure. She denied use of over-the-counter/prescription NSAIDs, recent antibiotic usage, herbal supplements, or any other medications. Thus, we were able to begin treatment for drug-induced interstitial nephritis with steroids, to which she responded well along with vaping cessation. She is now doing well with return to her baseline normal renal function.

**Discussion:** Here we report a unique case in which propylene glycol based vaping resulted in unusual clinical manifestations including drug-induced acute interstitial nephritis. Vaping has been on the rise in the recent past; hence, it is important to recognize the potential side effects from vaping ingredients. When confronted by acute renal failure with nephrotic range proteinuria in the setting of negative antibody testing and the use of vaping solution, a clinician should consider propylene glycol induced acute interstitial nephritis.

# Missouri-Clinical Vignette-Poster Finalist

## Sean Lacy

**Title:** Living Life in Repetition: Echo Phenomena Following Abscess Drainage

**Authors:** Sean Lacy, Andres Marte-Grau MD, Kansas City University of Medicine and Biosciences

**Introduction:** Echolalia is a rare complication after removal of a parieto-occipital abscess. We describe a patient who exhibited echo phenomena presenting three weeks post operatively.

**Case Presentation:** A 64-year-old Caucasian female presented to the emergency room with altered mental status. Contrast enhanced MRI showed a 14 mm x 17 mm ring enhancing lesion with associated edema in the right parieto-occipital region. A craniotomy with resection was performed, during which frank purulent material was encountered. Aerobic, anaerobic, mycology, and acid-fast cultures of the material were negative and the patient was discharged on post-operative day three with dexamethasone and Keppra. On post-operative day 21, she returned to the emergency room for confusion. Her husband reported that her speech was repetitive and her thoughts were loosely connected. Upon examination, she had waxing and waning orientation. Neurological exam was pertinent for delayed semiconductive echolalia and echopraxia. Cranial nerves 2-12 were intact bilaterally. During periods of orientation, the patient was aware that she was repeating her speech and actions, but was unable stop. This became frustrating for the patient. She denied past psychiatric history or use of lorazepam or Percocet. A CT scan was unremarkable, except for post-operative changes. An EEG was also unremarkable. Laboratory values were pertinent for sodium 136, BUN 20, WBC 8.2, and TSH 0.459. Urinalysis showed small leukocyte esterase with WBCs rare. Keppra was discontinued and Dexamethasone was rapidly tapered. Zyprexa was initiated without alteration of symptoms. The patient was then transferred to a long-term care facility and continued to exhibit these symptoms for six months with gradual waning.

**Discussion:** In this case, we describe a rare complication after surgical intervention for drainage of a parieto-occipital lesion. Echo phenomena is commonly seen in autism spectrum disorder and Tourette syndrome. Echolalia has also presented during seizures, cerebrovascular accidents in the parieto-occipital region, and closed head injuries. While these causes were investigated in our patient, they were ruled out. Our patient's presentation of echopraxia and delayed semiconductive echolalia due to drainage of a sterile abscess is a unique etiology that has not been previously described in the English literature.

# Missouri-Clinical Vignette-Poster Finalist

## Kristen Scheitler

**Title:** Vancomycin-Induced Thrombocytopenia: An Underreported Cause of Acute Thrombocytopenia in Hospitalized Patients?

**Authors:** Kristen M. Scheitler, M3; Emily A. Coberly, MD

**Introduction:** Vancomycin-induced thrombocytopenia has been reported only rarely in the literature but may be underdiagnosed in hospitalized patients with multiple other potential explanations for acute thrombocytopenia, such as sepsis or heparin therapy. We present a case series of three patients with laboratory-confirmed vancomycin-induced thrombocytopenia.

**Case Presentation:** Over a six-month period, three patients admitted to the University of Missouri Hospital developed severe thrombocytopenia after treatment with vancomycin. Patient 1 was a 75 year-old male with a pacemaker pocket infection. Patient 2 was a 58 year-old male with a hip joint infection. Patient 3 was an 82 year-old female with sepsis. In all three cases, the platelet count was normal on admission but decreased after initiation of vancomycin therapy. Patients 1 and 2 experienced an abrupt severe thrombocytopenia, prompting discontinuation of vancomycin and a subsequent gradual recovery of platelet count back to the normal range over several days. Neither patient experienced bleeding or required transfusion. Patient 3 experienced a gradual decrease in platelet count that was initially attributed to sepsis; vancomycin was not discontinued, and the platelet count continued to decrease. Platelet count remained low despite multiple platelet transfusions. The patient ultimately died from severe sepsis.

In all three cases, the diagnosis of heparin-induced thrombocytopenia was initially considered but subsequently excluded by negative immunoassays for antibodies against heparin/platelet factor 4 complexes. Testing for vancomycin-dependent antibodies was performed for all three patients: patient serum was incubated with normal platelets in both the presence and absence of vancomycin. Flow cytometry detected IgG antibodies against normal platelets only in the presence of vancomycin in all patients, thereby confirming the diagnosis of vancomycin-induced immune thrombocytopenia.

**Discussion:** The drop in platelet count in vancomycin-induced thrombocytopenia is often dramatic, usually greater than 50% of the pre-treatment platelet count. Patients are often refractory to platelet transfusion, and the only treatment is immediate discontinuation of vancomycin. A high level of suspicion for vancomycin-induced immune thrombocytopenia is warranted in hospitalized patients with acute thrombocytopenia who have received vancomycin, even when other potential causes, such as sepsis or heparin therapy, may be present. The diagnosis is confirmed by detection of vancomycin-dependent platelet-reactive antibodies using flow cytometry.

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# Nebraska-Clinical Vignette-Poster Finalist

## Victoria Noble

**Title:** An Uncommon Cause for Recurrent Thromboembolism: Elevated Factor VIII and vWF

**Authors:** Victoria Vardell Noble, Daniel Arthur Ermann MD, Venkata Andukuri MD, MPH

**Introduction:** Venous thromboembolism is a major cause of morbidity and mortality in the United States, affecting more than 300,000 Americans each year with a disproportionately high incidence in African Americans. Although recurrence is a significant predictor of mortality, thrombophilia testing fails to reveal an underlying cause of hypercoagulability in up to 50% of patients. Identification of rare or novel thrombophilias, such as hereditary elevations in Factor VIII (FVIII) or Von Willebrand Factor (vWF), can play a role in identifying patients at increased risk for recurrent thrombotic events and may help guide treatment and prevention.

**Case Presentation:** A 28-year-old obese (BMI 59) African American female presented for bilateral swelling and pain in her lower extremities that progressed over two weeks. She had a seven-year history of hypercoagulability, including at least six episodes of pulmonary embolism (PE), with one saddle embolus, and two separate episodes of symptomatic deep venous thrombosis (DVT). The patient reported one spontaneous abortion and a first cousin who died secondary to pulmonary embolism in her 20's.

The patient was found to have bilateral DVTs of the lower extremities, and chest CT showed evidence of recurrent PEs. On multiple occasions she tested negative for all commonly investigated thrombophilias, including Factor V Leiden mutation, prothrombin gene mutation, activated protein C mutations, as well as cardiolipin antibodies, lupus anticoagulant, and antithrombin III.

However, Both vWF and FVIII were found to be elevated at 335% (normal 50-165%) and 348% (normal 55-150%) respectively.

**Discussion:** Population studies have demonstrated elevated FVIII levels in up to 11% of adult Americans. As a key factor in the intrinsic clotting cascade, elevations in FVIII theoretically lead to a hypercoagulable state. This theory is supported by recent literature, which has documented elevated FVIII as an independent risk factor for hypercoagulable states and VTE, particularly in African Americans. Furthermore, recent studies have demonstrated that elevated FVIII and vWF show a clear and consistent dose-dependent risk factor for VTE. The mechanism behind this risk has been shown to be due to constitutively elevated levels of FVIII, and conveys up to a sixfold increased risk. Acute spikes, as may occur as part of the acute phase response, have not been shown to be of concern for increased risk of VTE.

Though a risk factor for recurrent thromboembolic events, and one that is of particular danger in African Americans, FVIII and vWF levels are rarely tested in patients. These tests can play an important role in guiding therapy and predicting outcomes in patients with recurrent thromboembolic events that are not explained by other common thrombophilias.

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# New Hampshire-Clinical Vignette-Poster Finalist

## Tiffany Brazile

**Title:** All That Wheezes Is Not Asthma

**Authors:** Tiffany L. Brazile<sup>1</sup>, Member; Katrina Soriano MD<sup>2</sup>, Member; Hilary Ryder MD, FACP<sup>1,2</sup>, <sup>1</sup>Geisel School of Medicine at Dartmouth, Hanover, NH <sup>2</sup>Dartmouth-Hitchcock Medical Center Department of Medicine, Lebanon, NH

**Introduction:** Atrial septal defects (ASD), often diagnosed during childhood, can present at any age, with exercise intolerance as the most common initial symptom<sup>1,2</sup>. Delays in diagnosis and treatment can lead to potentially irreversible complications, including Pulmonary Arterial Hypertension (PAH), right ventricular (RV) failure, paradoxical emboli, or TIA<sup>1,3</sup>. Management and outcomes vary based on the patient's age and presence of complications<sup>4</sup>.

**Case Presentation:** A 25-year-old woman with moderate, intermittent asthma (diagnosed in childhood) presented to the ED with 8 months of progressive weight gain, DOE, PND, and 8-pillow orthopnea consistent with NYHA Class IIIb heart failure. Her symptoms persisted despite multiple trials of inhalers and oral steroids. PFTs showed no bronchodilator response. She also reported brief, episodic left-sided hemiplegia, horizontal diplopia, and occipital headaches with increasing frequency. Physical exam revealed JVP elevated to 9cm H<sub>2</sub>O and a split S2 with a loud P2 component. Her labs were notable for an elevated pro-BNP to 652pg/mL. EKG findings were consistent with RVH. CT chest with contrast showed evidence of elevated right heart pressures without PE. TTE demonstrated severe RV dilation and hypokinesis and an ASD. She was admitted to Cardiology for work up due to concern for Eisenmenger physiology. TEE revealed a large secundum ASD with bidirectional shunting and right heart strain. Right heart catheterization showed severe PAH and elevated pulmonary vascular resistance (PVR) with limited response to 100% O<sub>2</sub> and iNO 80ppm, with a decrease in pulmonary pressure to 57mm Hg and resistance to 16 Wu/m<sup>2</sup>. She was started on tadalafil and ambrisentan to improve her eligibility for surgical repair. Anticoagulation was initiated to reduce her risk of paradoxical emboli.

**Discussion:** Dyspnea is often misdiagnosed as asthma in patients with hemodynamically significant ASDs. Patients with ASDs demonstrate asthma-like symptoms due to inflammatory, physiologic, and structural changes that result from the initial left-to-right shunt that stimulate bronchial wall muscle hypertrophy, interstitial +/- airway wall edema, or reflex bronchoconstriction. The resulting delay in diagnosis/treatment can lead to devastating and potentially irreversible complications from eventual shunt reversal, including PAH, RV failure, paradoxical emboli, or TIA<sup>1,3</sup>.

Studies have shown that surgical closure of an ASD before the age of 25 can lead to rapid hemodynamic stability, cardiac remodeling, and symptom resolution, of which the extent is inversely related to the patient's age at the time of closure<sup>4,5</sup>. Unfortunately, severe PAH is a contraindication to ASD closure. Treatment for PAH, resulting from abnormal proliferation and contraction of bronchial smooth muscles, consists of targeted pulmonary vasodilators to improve a patient's hemodynamics, functional status, and survival. Thus, advanced pulmonary vasodilator therapy may provide a bridge to more definitive treatment<sup>6,7,8</sup>. This case highlights the importance of considering an ASD in young patients with progressive DOE to prevent the long-term, irreversible adverse outcomes associated with Eisenmenger Syndrome.

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# New Jersey-Clinical Vignette-Poster Finalist

## Matthew R Norris

**Title:** A Case of Ashwagandha Supplementation Preceding Onset of Optic Neuritis and Discovery of Demyelinating Disease.

**Authors:** Matthew R. Norris, BA (St. George's University, School of Medicine, Grenada, West Indies)  
Dr. Christopher Kuriakose, MD (Atlantic Health System, Overlook Medical Center, Department of Medicine, Summit, NJ)

**Introduction:** In the United States, dietary supplements are available, accessible, and popular. Over half of American adults use them. Most people are self-medicating without their doctor's advice or knowledge. Although proposed benefits of supplements are often well-advertised, possible drug-drug and drug-disease interactions are often poorly understood by both patients and their physicians. This case highlights how a woman with a history of autoimmune diseases began self-medicating with a supplement called Ashwagandha that she was unaware had immune-stimulating properties and subsequently developed an unrelated autoimmune condition that revealed a different underlying autoimmune disease.

**Case Presentation:** A 28-year-old female with celiac disease and systemic sclerosis presented to our emergency department with complaints of blurred vision in her left eye of ten-day duration. This was associated with dyschromatopsia, painful eye movements, and a central scotoma of one-day duration. On physical exam of her left eye, visual acuity was worse than 20/200; furthermore, both a central visual field deficit and left afferent pupillary deficit were present. Although not taking medications, she had started taking Ashwagandha 800mg twice daily two weeks prior to onset of visual symptoms and continued their use up until time of admission. She was diagnosed with optic neuritis and admitted for treatment with IV methylprednisolone. During her hospitalization, she was evaluated for multiple sclerosis. Head MRI showed scattered foci of high FLAIR signal intensity within the cerebral white matter with several foci visualized in the periventricular region. A MRI C-spine showed foci of T2 hyperintensity within the cervical spinal cord at the C4 and C5 vertebral levels consistent with demyelinating plaques in a patient with multiple sclerosis. Of importance, there was no abnormal enhancement in the MRI C-spine suggestive of active demyelination. After four days, most of her symptoms resolved. She was advised to follow up with neurology and to discontinue Ashwagandha.

**Discussion:** Ashwagandha is a plant that has been found in vitro to have immune-stimulating properties. It has been shown to selectively stimulate Th1 immunity as well as enhance proliferation of CD4+/CD8+ and NK cells. Phytochemicals in Ashwagandha that contribute to Th1 immune polarization have also been identified. Optic neuritis is characterized in the acute phase by predominant T-cell activation with release of pro-inflammatory cytokines. It follows that a disease characterized by activation of T cells might be affected by a drug with Th1-predominant response. It is important to recognize our patient now has multiple autoimmune conditions characterized by T cell stimulation. Two studies link both multiple sclerosis and systemic scleroderma through a polymorphism at CD86. A polymorphism could further explain why Ashwagandha supplementation either initiated or aggravated a case of subclinical optic neuritis. This case emphasizes the need for patients to exercise caution before beginning a new supplement.

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# New York-Clinical Vignette-Poster Finalist

## Fiorella B Castillo

**Title:** Paced right bundle branch block pattern due to coronary sinus lead placement

**Authors:** Fiorella Castillo, MSPH<sup>1</sup> Jonathan Mejia<sup>1</sup> Adekunle Kiladejo, MD<sup>2</sup> Valbona Kulla, MD<sup>3</sup> Shahrokh Rafii, MD<sup>4</sup>, <sup>1</sup> Ross University School of Medicine, <sup>2</sup> Division of Cardiovascular Medicine, SUNY Downstate Medical Center, <sup>3</sup> Department of Internal Medicine, Brookdale University Hospital and Medical Center, <sup>4</sup> Division of Cardiology, Brookdale University Hospital and Medical Center

**Introduction:** Since 1958, pacemakers have been used to further extend life in individuals with significant heart disease. In its most common configuration, right ventricular pacing usually displays a left bundle branch block morphology on electrocardiogram. Finding a paced right bundle branch block (RBBB) has only been demonstrated in the setting of biventricular pacing, septal lead placement, and malposition of pacing lead into the coronary sinus or left heart through a septal defect or perforation.

**Case Presentation:** We present the unusual case of an 80-year-old male who was brought in after an episode of cardiac arrest with return of spontaneous circulation achieved after eight minutes of CPR and two rounds of epinephrine. Upon further investigations in the cardiac care unit, it was found that his dual-chamber pacemaker displayed a RBBB morphology with an extreme (northwest) axis and QS complex in lead I during both spontaneous pacing and with magnet prevention of internal pacemaker settings. Review of the ventricular lead configuration seen on chest x-rays raised the suspicion that the lead actually entered the coronary sinus (through the right atrium) and possibly went into a cardiac vein resulting in left ventricular pacing. This was then confirmed as the echocardiogram showed the lead traversing across the right atrium instead of traversing the tricuspid valve and going into the right ventricle.

**Discussion:** Due to the potentially fatal complications of a paced RBBB pattern in a patient without a biventricular pacemaker, the etiology of a paced RBBB should be recognized immediately for prompt surgical revision, lead extraction, or anticoagulation therapy.

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# New York-Clinical Vignette-Poster Finalist

## Muhammad Bhutta

**Title:** Chelidonium majus Intoxication: A Rare Cause of Hepatotoxicity

**Authors:** Muhammad Yaasen Bhutta BSc, Maria Elena Correa MD, Rishab Gupta MD, Paul No, Manjeet Bhamra MD, JihaeLee MD, Latif Salam MD

**Introduction:** Complementary and alternative medicine (CAM) has become increasingly popular amongst Americans for the past decade. Although many 'natural' products seem harmless, there is little awareness about the rare, but serious adverse effects. Chelidonium majus, (Greater Celandine) from the poppy (Papaveraceae) is an herbal remedy used externally for skin conditions (warts, eczema) and internally for gastric and biliary disorders. Chelidonium majus (CM) is a rare yet explored cause of herbal hepatotoxicity or herb-induced liver injury (HILI), as it has appeared over 20 times in the literature for potentially causing acute hepatotoxicity. causing typical symptoms and signs of cholestatic hepatitis. Our case involves a 54 year old female who presented to the ER after chronically ingesting this compound as a tea.

**Case Presentation:** A 54-year-old female of Eastern European descent presented with sudden onset jaundice and abdominal discomfort 6 days prior. She had no medical conditions or drug allergies other than chronic eczema on her back for 7 years. She denied any medication use, alcohol or substance abuse, or exposure to hepatitis viruses. Physical examination revealed marked jaundice, scleral icterus, and tenderness of the right upper quadrant without rebound or guarding and an enlarged liver on palpation.

Labs reveal significantly elevated liver function enzymes (refer to Table 1). Common causes of liver diseases were ruled out with low serum acetaminophen, alcohol levels and a negative hepatitis panel. Autoimmune hepatitis was also ruled out with negative antinuclear antibody, anti-smooth muscle antibody and urine porphobilinogen tests.

Ultrasound examination showed mild hepatomegaly with no evidence of focal hepatic mass. Gallbladder findings were suggestive of adenomyomatosis of the gallbladder, a benign condition that would not lead to the findings in our patient. Upon detailed questioning, patient admitted to drinking Chelidonium tea daily for two months prior to presentation to treat her chronic eczema. Intake of Chelidonium was discontinued immediately and she was treated with NAC (N acetyl-cysteine) for 4 days. Symptoms of abdominal discomfort and jaundice improved with treatment. Upon discharge, ALT and AST levels had decreased to 984 IU/L and 607 IU/L, respectively (refer to table 1 and graph).

**Discussion:** Our case provides another significant source of causality between the oral use of Chelidonium with HILI. It raises concern as Chelidonium is legally sold in the United States with little oversight on the potential risks involved with its consumption. Prescribers and customers should be made aware of risks involved in herbal remedies. As there is no diagnostic means for herbal-related toxic hepatitis, clinicians should always inquire about alternative remedies especially when there is liver damage of unknown etiology.

# North Carolina-Clinical Vignette-Poster Finalist

## Jinae B Desai

**Title:** Multiple Sclerosis and Dysphagia: When the Truth is Tough to Swallow

**Authors:** Jinal Desai<sup>1</sup>, Brody School of Medicine, William Leland, M.D., ECU Department of Gastroenterology

**Introduction:** Multiple Sclerosis is the most common immune-mediated demyelinating disease of the central nervous system. During acute MS flares, there is a high occurrence of oropharyngeal dysphagia in patients. Achalasia is a rare motor disorder of the esophagus due to the inability of the lower esophageal sphincter (LES) to relax. Clinical features include progressive dysphagia to both solids and liquids with regurgitation of food and saliva, heartburn, and weight loss. We report the first case, to our knowledge, of dysphagia due to primary achalasia in a patient with preexisting MS.

**Case Presentation:** A 37-year-old female veterinarian with past medical history of migraines was diagnosed with multiple sclerosis (MS) in December 2015. In April 2016, she was admitted with 3 weeks of progressive dysphagia and 20lb weight loss. Although MRI of the brain and cervical spine obtained during admission showed no new lesions, her symptoms were initially thought to be due to an MS flare. She was treated with high dose IV steroids with no resolution of symptoms. Workup, including a barium swallow, showed fixed gastroesophageal junction luminal narrowing with beaklike configuration. The patient subsequently had a normal appearing EGD with normal biopsies. High resolution esophageal manometry was conducted which was diagnostic for primary achalasia. Despite serial EGDs with Botulinum injections the patient's dysphagia symptoms worsened, along with an unintentional weight loss of 30lbs. Due to this, the patient underwent a peroral endoscopic myotomy (POEM) with prolonged symptomatic relief.

**Discussion:** The etiology for MS has been a debate but the overall pathogenesis is characterized by inflammation, immune dysregulation, and immune over activity. Similarly, the true etiology of primary achalasia is unknown. Recent studies have analyzed the neural antibody profiles of patients with this diagnosis which suggests autoimmune and infectious factors are the most common causes. The serum of these patients did not have a particular autoantibody, however, there was a high frequency of several neural autoantibodies in these patients when compared to the control. Autoimmune disease is overall 3.6% more likely in patients with achalasia, but in a review of 193 patients with primary achalasia, none were found to be associated with MS. Dysphagia in MS patients, on the other hand, is mostly associated with impairment in the oral and pharyngeal phase of swallowing, and occasionally with dysfunction of the upper esophageal sphincter. Dysphagia has been estimated to occur in at least 33% of impaired MS patients and in 17% of MS patients with milder impairments. In addition, achalasia is rarely described in the setting of any central neurodegenerative disorder except for a few case reports of association with Parkinson's disease. Given the limited number of cases of neurodegenerative disorders linked to primary achalasia, we propose that this patient's predisposition to autoimmunity was unlikely the cause for achalasia.

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# North Carolina-Clinical Vignette-Poster Finalist

## Bret Robinson

**Title:** Neutrophilia of unknown origin.

**Authors:** Bret Robinson, Medical Student; University of North Carolina School of Medicine, Chapel Hill, NC.

**Introduction:** The complete blood count (CBC) is the most commonly used laboratory tool for the management of hospitalized patients, often central in clinicians' decision-making. Despite its dominance and routineness, a CBC can cause diagnostic confusion, prolong a hospitalization, and lead to unnecessary testing and procedures.

**Case Presentation:** A 44-year-old woman presented to the emergency department with vomiting, diarrhea, and abdominal pain in the setting of fever and elevated neutrophil count. Her past medical history was significant for colonic inertia, *status post* hemicolectomy and recent methicillin-sensitive *S. aureus* (MSSA) bacteremia due to prolonged total parenteral nutrition. Physical examination revealed moderate, diffuse abdominal tenderness with normoactive bowel sounds; no abdominal masses were noted and there was no organomegaly. Cardiac and pulmonary exams were significant for tachycardia and tachypnea. Several days after admission and administration of broad spectrum antibiotics, her fever resolved and her vital signs and pain returned to baseline, yet her white blood cell count remained markedly elevated up to 19,800/ $\mu$ L, with an absolute neutrophil count of 17,600/ $\mu$ L. With all blood cultures returning without any growth, a negative *C. difficile* stool antigen, and a negative gastrointestinal pathogen panel, the etiology for this neutrophilia remained unclear. She had not been prescribed any glucocorticoids, had no history of recurrent infections, and had no myelocytes present on her peripheral blood smear; plus, she was clinically stable. An abdominal CT scan was scheduled for the following day to locate a source of neutrophilia. Meanwhile, additional investigation into the patient's historical laboratory data revealed that she had had multiple CBCs drawn, all of which had incalculable platelet readings and which reported the same finding: "platelet clumps". The constellation of elevated leukocyte count, immeasurable platelet count, absent fever with negative blood cultures, and clinical stability supported a diagnosis of pseudoleukocytosis. An additional CBC was drawn in a citrated tube, yielding a leukocyte count of 9,200/ $\mu$ L with an absolute neutrophil count of 7,000/ $\mu$ L. We cancelled the CT scan planned for later that day and subsequently discharged the patient after scheduling urgent follow-up with her gastroenterologist.

**Discussion:** In some patients (up to 0.1% of healthy people), cold agglutinins present in the serum can react to EDTA present in peripheral blood specimen tubes(1). These EDTA-dependent agglutinins cause platelets to clump together and may result in a misread by the flow cytometer used to measure each cell type(2). The clumps are readily identifiable under microscopy of the peripheral smear and are distinct in morphology from white blood cells. Platelet clumping can be reversed by simply redrawing in a sodium citrate tube(3). This case demonstrates the dangers of unrecognized laboratory error in the diagnostic process, which can expose patients to unneeded or risky testing and precipitate misuse of medical resources.

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# North Dakota-Clinical Vignette-Poster Finalist

## Sara M Paulson

**Title:** Biopsy Proven EBV Infection with Negative Heterophile Antibody and EBV IgM Tests

**Authors:** Sara Paulson, MSIII, University of North Dakota School of Medicine and Health Sciences

**Introduction:** When common infections have uncommon presentations, clinicians may miss a diagnosis with lack of intuitive clinical suspicion. Acute mononucleosis due to Epstein Barr virus is common and known to present variably with fever, sore throat, cervical lymphadenopathy, and fatigue. Initial labs often reveal elevated transaminases, atypical lymphocytosis, and heterophile antibodies. Further work-up includes the following EBV antigen-specific antibodies to characterize infection status: viral capsid antigen IgG, VCA IgM, Epstein-Barr nuclear antigen (EBNA) IgG, and early antigen (EA) IgG. Polymerase chain reaction assays may also be used to diagnose infectious mononucleosis by detecting EBV DNA.

**Case Presentation:** A 60-year-old incarcerated male with a history of HIV disease well-controlled on anti-retroviral therapy presented with pruritus and a generalized macular rash that spared the hands, feet, and face. Seven weeks later, he developed a persistent fever and marked posterior cervical lymphadenopathy. He was hospitalized with concerns for lymphoma, opportunistic infectious etiologies, and inflammatory etiologies. Initial labs revealed elevated cytomegalovirus IgM. CMV IgG and EBV VCA IgM were negative. Transaminases were normal. Serum protein electrophoresis showed a polyclonal increase in gamma globulin. Full-body CT showed marked generalized lymphadenitis with massive splenomegaly. Bone marrow and lymph node biopsies showed polyclonal reactivity without evidence malignancy. Slides were sent to an outside reference lab for review. Meanwhile, the patient was treated with valgancyclovir for his CMV infection, stabilized, and discharged from the hospital. The reference lab confirmed the biopsy interpretations and revealed the presence of EBV infection in the lymph node via in situ hybridization. Testing ten days after hospital discharge revealed negative VCA IgM and heterophile antibodies. VCA IgG, EBNA IgG, EA IgG markers all were positive. PCR confirmed EBV in the serum. Transaminases remained normal. The patient was treated conservatively with symptom management. His lymphadenopathy continued to resolve and his fever did not return.

**Discussion:** The case vignette demonstrates that EBV mononucleosis should be considered in the absence of elevated transaminases, elevated EBV VCA IgM, and heterophile antibodies when clinical suspicion remains. It is commonly stated that transaminases are abnormal in almost all cases of infectious mononucleosis. However, evaluation of this statement amongst literature shows citations of a fifty-year-old military case series and other historical articles dating back to the 1950s and 1960s. This case report supports the finding that acute EBV infection may not be accompanied by abnormal liver function tests and that relying on historical literature may lead to a missed diagnosis. Providers should not exclude EBV mononucleosis as a differential due to the lack of elevated transaminases.

Likewise, providers should not exclude the diagnosis in the absence of serologic markers. VCA IgM, heterophile antibodies, and EA IgG markers have much overlap of when they are usually elevated. This case shows the unlikely case of negative VCA IgM and heterophile antibodies with positive EA IgG.

Therefore, in patients who show incomplete or ambiguous serology Results; it is important to maintain intuition for EBV infection and perform complete EBV serology and test for the presence of EBV DNA.

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# North Dakota-Clinical Vignette-Poster Finalist

## Jace Kusler

**Title:** Syphilitic Osteomyelitis

**Authors:** Jace Kusler MS III University of North Dakota School of Medicine and Health Sciences

**Introduction:** From 1964 to 2013 there have only been 37 reported cases of syphilis with bone involvement in English literature. There are currently no treatment guidelines for syphilitic osteomyelitis.

**Case Presentation:** The patient is a 50-year-old Native American female who presented to the clinic with what she thought was a bladder infection and was given Metronidazole. One month later she developed a diffuse body rash that involved the palms and soles as well as a severe pounding headache. Her ESR was elevated with a normal CRP. The suspected diagnosis was giant cell arteritis, and she was started on 60mg of oral prednisone daily that helped the headaches. A temporal artery biopsy was done and showed no evidence of vasculitis. The patient was tapered from the steroid and started having progressive blurry vision and floaters. Three months later the patient presented to the emergency department and was admitted to the hospital due to the blurry vision and floaters at which time she had a positive fluorescent treponemal antibody absorption test and Lyme antibody. The patient had a Venereal Disease Research Laboratory test of the CSF done which came back negative. Her cerebral spinal fluid cell count was 178 nucleated cells, and she had a rapid plasma reagin titer of 1:1024. She was diagnosed with neurosyphilis for which she was started on IV Penicillin G and severe uveitis for which she was started on oral Prednisone. A CT and MRI of the head showed four osseous lesions in her skull, and the patient had a skull biopsy done which came back positive for syphilitic osteomyelitis. The patient completed 14 days of IV Penicillin G for the neurosyphilis, ocular syphilis and syphilitic osteomyelitis. Upon follow up the patient still complained of blurry vision, but denied a headache or skin rash. The eye exam showed improvement and showed no signs of ocular syphilis. Four months after discharge from the hospital her blood rapid plasma reagin titer was 1:256 which is more than a four fold decrease from her baseline, and a CT scan of the head showed the osseous lesions were unchanged from the previous CT scan. Three months after her previous follow up her rapid plasma reagin titer was 1:128. A repeat lumbar puncture continued to show 18 nucleated cells. A Venereal disease research laboratory test of the cerebral spinal fluid is now positive with a 1:8 titer that was negative on the previous exam.

**Discussion:** This case illustrates a complication of syphilis is osteomyelitis. It is important to recognize and treat syphilis early to help prevent this complication.

# Ohio-Clinical Vignette-Poster Finalist

## Elizabeth Albers

**Title:** Pregnancy related hemophagocytic lymphohistiocytosis associated with herpes simplex virus-2 infection: A diagnostic dilemma

**Authors:** Elizabeth Albers<sup>1</sup>, M. Farhan Nasser, MD<sup>2</sup>, Anurag Duggal, MD<sup>2</sup>, <sup>1</sup>Northeast Ohio Medical University, <sup>2</sup>Cleveland Clinic Akron General

**Introduction:** Hemophagocytic Lymphohistiocytosis (HLH) is a severe inflammatory disorder characterized by uncontrolled proliferation of lymphocytes and histiocytes with hemophagocytic activity in the bone marrow. It can be classified as primary/familial or secondary. Primary HLH is known to present in childhood. Secondary HLH can occur due to malignancies, autoimmune disorders or infections.

To our knowledge, there have been a few reported cases of pregnancy related HLH. This case is about a patient who presented to the hospital in her third trimester of pregnancy and was diagnosed with HLH.

**Case Presentation:** A 36 year old woman, gravida 7 para 2 aborta 4, presented at 31 weeks' gestation after a fall and was incidentally found to have elevated blood pressures and elevated AST of 130 and ALT of 85. Emergency C-section was performed because of preeclampsia and worsening clinical status. Patient proceeded to develop a blanching erythematous rash on face and chest and was also noted to have splenomegaly and fevers up to 40C, but continued to have negative blood and urine cultures along with negative viral antibody titers (HSV, CMV, Toxoplasma, Parvovirus and EBV). Her ASTs and ALTs continued to worsen with levels of 1957 and 1267 respectively, along with a constantly decreasing Hb of 9 and a platelet level of 73,000. Due to persistent fevers, worsening transaminitis, anemia and thrombocytopenia, a ferritin level was checked and found to be 5296.8 ng/ml. The patient was started on high dose dexamethasone due to suspected HLH which was confirmed with a bone marrow biopsy. It revealed "normocellular marrow with trilineage hematopoiesis and evidence of hemophagocytosis." Subsequently, the baby was found to have HSV encephalitis and patient was then started on acyclovir. Repeat HSV-2 IgM/IgG were positive. The patient was then discharged with a two-week course of acyclovir.

**Discussion:** Diagnosis of HLH requires the detection of an HLH associated mutation or the presence of at least 5 of the following 8 criteria: fever > 38.5C, ferritin > 500 ng/ml (levels >3000 ng/ml are more suggestive), 2 peripheral blood cytopenias, hypertriglycerides and/or hypofibrinogenemia, hemophagocytosis in the bone marrow, spleen, lymph node or liver, splenomegaly, low or absent NK cell activity or elevated soluble CD 25. The presence of fever, splenomegaly, cytopenias (anemia and thrombocytopenia) and transaminitis in the setting of pregnancy raised suspicion for HELLP but due to continuous rise in transaminases even after delivery of the baby made it unlikely.

Goal of treatment is to suppress the inflammatory response and treat the precipitating events. High dose steroids and acyclovir have been documented in literature to help treat HLH due to HSV-2.

It is imperative to differentiate HLH from similarly presenting conditions such as HELLP and acute fatty liver of pregnancy due to their different complications and therapeutic implications.

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# Ohio-Clinical Vignette-Poster Finalist

## Riju Dasgupta

**Title:** A Mysterious Subcarinal Mass in a Young Patient

**Authors:** Riju Dasgupta, MS<sup>3</sup>, Dennis Tishko, MD<sup>2</sup>, David Taylor, MD<sup>3</sup>, Asok Dasgupta MD, <sup>3,4</sup> Paresh Timbadia MD <sup>3,4</sup>, <sup>1</sup>Northeast Ohio School of Medicine, Rootstown, Ohio, <sup>2</sup>Martin Health System, Florida, <sup>3</sup>Mount Carmel East Hospital, Columbus, Ohio <sup>4</sup>Mount Carmel Medical Group, Columbus, Ohio

**Introduction:** Perivascular Epithelioid Cell Tumors (PEComas) are rare mesenchymal tumors associated with tuberous sclerosis complex. Of these tumors, mediastinal PEComa's are an infrequent subtype. Due to the sparsity of these tumors, mediastinal PEComa's represent a diagnostic & therapeutic challenge.

**Case Presentation:** A 27 year old Indian male presents to the hospital with a 1 month history of fever, left sided chest pain, dyspnea and cough. Past medical history is unremarkable. Surgical history consists of excised occipital fibrolipoma many years ago. Family history is negative for malignancy or lung disease. Positive exam findings include shagreen patch on the left lateral neck, hypomelanotic ash leaf spot on the sternum and unguis fibroma.

Chest X-Ray reveals extensive infiltrate in the left lower lobe, emphysematous changes bilaterally, and perihilar interstitial markings in the right upper lobe. Chest CT reveals severe bullous emphysema and necrotizing pneumonia in both lung bases. CT also detects a large, 6.7 cm subcarinal heterogeneous mass. Patient subsequently undergoes right thoracotomy, where a large mass in the subcarinal region with a well encapsulated overlying pleural envelope is found. Envelope was opened and soft grayish mass was readily identifiable. Patient was given a 2 week course of PO Levofloxacin for pneumonia treatment upon discharge.

H&E staining of biopsy shows spindle cell neoplasm, consisting of cells arranged in long intersecting fascicles showing moderate pleomorphism with ovoid nuclei, finely stippled chromatin, small nucleoli, and abundant fibrillary eosinophilic cytoplasm with large cytoplasmic vacuoles. Biopsy sample are immunoreactive and positive for actin, desmin, and HMB-45. Samples are negative for S-100, CD34, kit (CD117), Melan-A, and h-caldesmon. Tumor necrosis factor was not tested. Diagnosis of PEComa conclusively is made due to immunoreactivity. In addition, given constellation of findings, diagnosis of tuberous sclerosis was also made.

Patient is started on Sirolimus for his PEComa and continues to show improvement in the tumor size.

**Discussion:** This case illustrates an example of a rare neoplasm associated with Tuberous Sclerosis Complex. Furthermore, PEComa's should be included in the differential diagnosis of mediastinal mass in such patients. The diagnostic workup can be challenging but needs to be pursued due to its impact on morbidity and mortality.

# Ohio-Clinical Vignette-Poster Finalist

## Rebecca Haraf

**Title:** Thalidomide as a Cough Suppressant in Idiopathic Pulmonary Fibrosis

**Authors:** Rebecca H. Haraf, Arjan S. Flora, M.D., and Ragheb Assaly, M.D., Division of Pulmonary, Critical Care, and Sleep Medicine, Department of Internal Medicine, University of Toledo Medical Center, Toledo, Ohio

**Introduction:** Chronic cough has long been acknowledged as a prevalent feature idiopathic pulmonary fibrosis (IPF), with studies suggesting it may affect up to 80% of individuals with the disease.<sup>1</sup> While a variety of therapeutic interventions have been recommended for symptomatic management of individuals with IPF, no treatment regimens have been shown to have a substantial impact on this chronic and debilitating cough, making improving patient comfort a significant challenge for providers.

**Case Presentation:** We report a 74 year-old male who presented with worsening chronic nonproductive cough and dyspnea on exertion. Initial evaluation with chest x-ray and subsequent computed tomography (CT) revealed evidence of interstitial lung disease in a usual interstitial pneumonia (UIP) pattern. After further workup excluded other potential etiologies for his lung disease, he was diagnosed with idiopathic pulmonary fibrosis (IPF). The patient was started on a treatment regimen of prednisone, azathioprine, and pirfenidone. With therapy, he was able to maintain an active lifestyle without significant dyspnea. His only complaint during this time was a persistent, bothersome dry cough.

After several years of stable disease, the patient rapidly declined. Repeat CT scans showed evidence of honeycombing and traction bronchiectasis, consistent with end-stage IPF. Attempts at slowing the disease progression, including switching pirfenidone to nintedanib, providing home oxygen, and beginning tadalafil therapy for pulmonary hypertension, were unsuccessful. During this time, the patient began to report that his cough was worsening. He described prolonged coughing spells that led to severe shortness of breath and an inability to sleep most nights of the week. A variety of medical therapies were unable to control the cough, including antacids, decongestants, nasal saline lavage, nasal steroid inhaler, steroid bursts, and multiple types of bronchodilators.

Because of his age and comorbidities, the patient did not qualify for lung transplantation. Therefore, the decision was made to pursue experimental palliative therapy for his persistent and disabling cough using low-dose thalidomide. Two weeks after starting on Thalidomide 200mg by mouth twice a day, our patient reported significant improvement in his cough with notable decrease in severity and number of nighttime exacerbations. However, he did note several side effects, including increased fatigue and considerable lower extremity edema. With some dosing adjustments, the patient has since continued on thalidomide therapy with resolution of his cough symptoms, while the adverse effects of the medication have remained tolerable.

**Discussion:** This case demonstrates that thalidomide is a promising therapeutic agent for palliative treatment of refractory cough in end-stage IPF. While its mechanism of action continues to be an area of considerable research, thalidomide has the potential to significantly impact symptomatic management, and therefore quality of life, in patients suffering from this progressive condition.

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# Ohio-Clinical Vignette-Poster Finalist

## Ann Kim

**Title:** Aseptic abscesses—a missed diagnosis

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**Introduction:** Aseptic abscesses syndrome is a newly recognized inflammatory condition characterized by sterile abscesses that are neutrophil predominant and responsive to steroids, but not antibiotics<sup>1</sup>. It is frequently associated with inflammatory bowel disease which can develop prior to or subsequent to abscess formation<sup>2</sup>. The differential is broad and must exclude infection, primary immunodeficiencies, malignancy, and other inflammatory conditions. Diagnosis is difficult due to lack of awareness of the syndrome and the extensive work-up needed to rule out other causes.

**Case Presentation:** A 40-year-old male with a history of splenectomy at age 19 after multiple splenic abscesses presented with a 1.5 year history of intermittent fevers, night sweats, and chronic abdominal pain. Lab work showed leukocytosis (15,800/mcL) and initial CT imaging showed a pancreatic mass and necrotic mesenteric lymph nodes, concerning for infectious etiology. He was treated with broad spectrum antibiotics and antifungals. However his symptoms persisted and he underwent laparoscopic lymph node biopsy which showed no malignant or infectious processes.

His symptoms spontaneously diminished and he presented months later with a superficial leg abscess. Blood and wound cultures were negative and he was treated with antibiotics and surgical debridement. He also reported abdominal pain and underwent CT-guided biopsy of his previous pancreatic mass, which showed no malignancy or infection. Endoscopy was performed which showed mild gastritis and focal cryptitis. Repeat CT showed new developments of necrotic retroperitoneal lymph nodes and rim-enhancing hepatic lesions, with resolution of his pancreatic mass and necrotic mesenteric lymph nodes. The patient was admitted for further work-up.

Upon hospitalization, the patient continued to have fevers and abdominal pain, with leukocytosis (29,900/mcL). Work-up included colonoscopy and capsule endoscopy which showed mild ileo-colitis. Laparotomy with surgical biopsies of the hepatic lesions and intra-abdominal lymph nodes visualized pus, which were culture and broad range PCR negative. Pathology showed neutrophilic inflammation and acute lymphadenitis. Given the lack of infectious etiology, antibiotics were not started. Immunophenotyping, lymphocyte and granulocyte function, and serum immunoglobulins were grossly normal. The patient also developed a superficial foot abscess during this time.

Given the extensive negative work-up for any infectious or malignant etiology, a diagnosis of aseptic abscesses was high on the differential. He was then started on prednisone 60 mg (1 mg/kg). Two days later, his leukocytosis normalized (10,100/mcL) and his CRP decreased from 16.31 mg/dl to 5.99 mg/dl. He was discharged home on prednisone 60 mg for 2 weeks, followed by 40 mg daily with a follow-up rheumatology appointment.

**Discussion:** This case illustrates the importance of awareness of aseptic abscesses syndrome as an elusive, yet treatable condition. Awareness of this condition can allow for appropriate diagnosis and treatment with first-line oral corticosteroid therapy, which often Results: in resolution of neutrophilia, down-trending inflammatory markers, and prevention of future abscesses.

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# Ohio-Clinical Vignette-Poster Finalist

## Eric S Lee

**Title:** Pathological Crying Prior to the Onset of Pontine Ischemic Stroke

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**Introduction:** Pathological crying spell at the onset of ischemic infarcts of the pons is a clinical phenomenon that correlates with the disruption of pontine pathways involved in emotional control. Pseudobulbar affect causing extremes of emotional response is well described in pathology affecting the brainstem. However, reports of acute new-onset emotional disturbance in the form of a crying spell prior to the manifestation of pontine infarct are scant [1].

**Case Presentation:** Patient-1 is a 50-year-old male with a history of heavy alcohol abuse and minor right cerebellar stroke. Clinical exam was remarkable only for his crying spell and dysarthria initially, but within the next several hours he became unresponsive and lethargic. Emergent imaging showed large ischemic infarct of the pons, with occlusion in the basilar artery.

Patient-2 is a 28-year-old male with a known history of ventriculoperitoneal shunt for childhood hydrocephalus, Chiari-II malformation and previous ischemic strokes, had recurrent reversible episodes of confusion and ataxia for several hours after taking an herbal male performance enhancing supplement. Emergent scan revealed complete occlusion of vertebrobasilar circulation with an evolving pontine infarct.

Patient-3 is a 59-year-old male who presented with acute vertigo and unresponsiveness which were preceded by a crying spell 12 hours prior to presentation. Angiogram showed complete basilar artery occlusion and although he underwent emergent endovascular thrombectomy, he clinically progressed to “locked-in” syndrome with scan showing pontine infarct.

**Discussion:** It is now widely accepted that pseudobulbar affect (PBA) – a state resulting in either exaggerated or inappropriate emotional response – is due to disruption of the cerebro-ponto-cerebellar pathway [2]. The frontal motor and association areas, temporal areas and the limbic system send fibers down to the brainstem, predominantly to the pons, and the cerebellum. The cerebellar afferents to the brainstem components of this circuit have a “gate-control” role where they modulate the emotional response to reflect the context of the initial trigger. The disinhibition of the crying reflex seen in cases like ours is likely due to the lowering of emotional threshold from disrupting the cortico-ponto-cerebellar circuitry [3]. Alterations in serotonergic neurotransmission centered around the raphe nuclei in the brain stem has also been noted to be associated with PBA, and serotonin reuptake inhibitor drugs are used successfully to treat late onset PBA [4],[5]. It is unclear if such neurochemical changes could have happened acutely prior to the stroke in the cases presented here. Notwithstanding the mechanism, it is important to note that these cases had a hyperacute to acute pseudobulbar-like

presentation prior to their strokes, and physicians should be aware of such an occurrence when considering stroke on examination.

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# Ohio-Clinical Vignette-Poster Finalist

## Kelly Shibuya

**Title:** Transcatheter aortic valve replacement in a patient with end-stage renal disease

**Authors:** Kelly Shibuya, BS<sup>1</sup>, J. Harry Isaacson, MD<sup>1,2</sup>, 1. Cleveland Clinic Lerner College of Medicine of Case Western Reserve University, Cleveland, OH, 2. Department of Internal Medicine, Cleveland Clinic, Cleveland, OH

**Introduction:** Transcatheter aortic valve replacement (TAVR) has emerged as a promising treatment option for patients with symptomatic aortic stenosis (AS) who are high-risk candidates for surgical AVR. However, many clinical trials of AVR have excluded patients with end-stage renal disease (ESRD). We present a case of a patient with ESRD and severe AS who underwent successful TAVR. We review guidelines on selection of candidates for TAVR and evidence of the clinical benefit of TAVR on morbidity and mortality.

**Case Presentation:** An 88-year-old man presented to the emergency department with 2 weeks of progressive fatigue, dyspnea, and chest pain. His PMH was notable for a history of ESRD on peritoneal dialysis, frequent episodes of peritonitis, recent stroke, and known asymptomatic AS. On exam, he was hypoxic to 85% on room air. Work-up for cardiac ischemia was negative. Chest x-ray showed bilateral pleural effusions. Echocardiography performed 6 months earlier for routine screening showed moderate AS (AV area 1.12 cm<sup>2</sup>, peak velocity 3.6m/s, mean gradient 34 mmHg) and normal ejection fraction. However, repeat echocardiography on this admission showed progression to severe AS (AV area 0.70 cm<sup>2</sup>, peak velocity 4.1m/s, mean gradient 44 mmHg) with left ventricular dysfunction (EF 42%). Despite optimization of his peritoneal dialysis regimen, his symptoms persisted, consistent with NYHA class III heart failure. He was deemed high-risk for surgical AVR given his advanced age, ESRD, previous stroke, recurrent peritonitis, and decreased EF. Thus, he underwent successful TAVR with prompt resolution of symptoms and left ventricular dysfunction (EF 54%). He continues to do well, living independently on hemodialysis without ongoing cardiopulmonary symptoms.

**Discussion:** Utilization of TAVR has dramatically increased since its approval in 2011. TAVR uses an arterial catheter to insert a bioprosthetic valve within the diseased aortic valve. It is recommended for patients with symptomatic severe AS and a predicted post-TAVR survival >12 months who are at prohibitive (≥50% risk of death within 30 days of surgical AVR) or high-risk (≥15% risk of death within 30 days of surgical AVR) for surgical AVR.<sup>1</sup> These indications have been recently expanded to include patients who are at intermediate surgical risk (≥4% risk of death within 30 days of surgical AVR).<sup>1</sup> For patients with prohibitive surgical risk, TAVR decreased mortality rates for up to 5 years and improved symptoms when compared with medical treatment with or without aortic balloon dilation.<sup>2</sup> Among patients with high surgical risk, TAVR was comparable to surgical AVR in 5 year mortality.<sup>3</sup> However, patients on dialysis, who have a higher incidence of severe AS, were excluded from these pivotal clinical trials. Our patient's experience suggests that the presence of ESRD should not prohibit the consideration of TAVR.

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# Ohio-Clinical Vignette-Poster Finalist

## David Xiong

**Title:** Ring-enhancing brain lesions – an uncommon infectious cause

**Authors:** David D Xiong, Medical Student, Cleveland Clinic Lerner College of Medicine, Case Western Reserve University, Cleveland OH.

**Introduction:** *Nocardia* is a genus of aerobic, gram-positive, and weakly acid-fast saprophytic bacilli that can cause infection primarily in males and immunocompromised individuals. Although rare, most infections present with pulmonary involvement though disseminated disease can involve any organ including the brain.

**Case Presentation:** A 59-year-old man presented for 1 week of worsening cough productive of white sputum. He recently returned from a vacation where he hiked and sledged. His past medical history was significant only for sarcoidosis solely treated with a fluticasone/salmeterol inhaler. There was no history of long-term systemic corticosteroid or immunosuppressive therapy. He denied other symptoms and a full review of systems and physical exam was normal. Chest X-ray showed diffuse bilateral airspace disease consistent with pneumonitis which was treated with azithromycin and a 6-day prednisone taper. However, his symptoms persisted. Three weeks later, he developed dyspnea, fevers, chills, and blood-streaked sputum, and he was then hospitalized for pneumonia and discharged on levofloxacin and another prednisone taper. Two weeks later, he presented again with a cough, dyspnea, anorexia, sweats, a 25-pound weight loss, and new-onset weakness and dizziness. Physical exam revealed diplopia, weakness, and loss of sensation in the right lower extremity. CT and MRI of the brain revealed multiple diffuse ring-enhancing lesions in the brain parenchyma, which were suggestive of either septic emboli or metastases. Biopsy of a brain lesion revealed an abscess with cultures positive for coagulase-negative streptococci suggestive of *Nocardia*. He was started on Bactrim and Amikacin but developed a thrombocytopenia thought to be secondary to Bactrim. Bactrim was discontinued and Imipenem-cilastatin was added. Final susceptibilities returned the *Nocardia farcinica/cyriacigeorgica/cattitridis* group, and he was switched to linezolid and moxifloxacin. At the time of discharge, the patient was asymptomatic, physical exam was within normal limits, and his thrombocytopenia had significantly improved.

**Discussion:** *Nocardia* most commonly occurs in immunosuppressed patients and rarely affects immunocompetent patients. Exposure comes through the soil, with more cases in dry, dusty, and warm climates such as the American southwest. Diagnosis is often delayed due to its nonspecific presentation and relatively slow growth in culture. The most common predisposing condition is chronic lung disease, usually in association with long-term systemic steroid therapy. *Nocardia* accounts for 1-2% of all brain abscesses, with a significantly higher mortality rate compared to other bacterial brain abscesses (30% vs 10%). *Nocardiosis* dissemination to the brain is especially unusual in immunocompetent patients. A handful of case reports of *Nocardia* infections in the setting of sarcoidosis have been described but these patients were all receiving long-term oral glucocorticoid therapy. The role of inhaled corticosteroid treatment in the inoculation and dissemination of this patient's infection is also unclear but may have put him more at risk, as did his chronic pulmonary sarcoidosis.

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# Ohio-Clinical Vignette-Poster Finalist

## Eric F Krumpelbeck

**Title:** Disseminated Blastomycosis Presenting with Cutaneous Lesions

**Authors:** Eric Krumpelbeck, Layla Nasr MD, Michael W. Ellis MD, Claudiu Georgescu MD, Department of Medicine, University of Toledo, Toledo, OH

**Introduction:** Blastomycosis is an endemic mycosis caused by *Blastomyces dermatitidis*. Infection with *B. dermatitidis* primarily manifests as pulmonary disease; however, it may disseminate. Owing to its rarity and tendency to mimic other conditions, disseminated blastomycosis often poses a diagnostic challenge, resulting in delay in diagnosis and delay in implementing effective therapy.

**Case Presentation:** A 37-year-old man living in northwest Ohio initially presented with two months of cough, hemoptysis, and weight loss. The patient had emigrated from Taiwan at age three, and had no other significant travel history. He worked in a parcel warehouse and had no outdoor hobbies. His physical examination revealed no abnormalities. Chest radiograph and computed tomography (CT) with contrast revealed a left upper lobe lesion (approximately 4 x 6 cm) with associated mediastinal lymphadenopathy. Consequently, the patient underwent transbronchial biopsy. Mycobacterial and fungal stains and cultures were negative, and histopathology demonstrated non-caseating granulomatous inflammation. The patient was empirically started on a 4-drug regimen (rifampin, isoniazid, ethambutol, and pyrazinamide (RIPE)) for pulmonary tuberculosis. Follow-up chest radiograph one month after starting RIPE demonstrated decrease in size of the pulmonary lesion. At the time of having completed a six-month regimen for pulmonary TB, the patient again presented, but this time with the new complaint of multiple cutaneous lesions-some verrucous and others subcutaneous nodules. These lesions were on his face, torso, and extremities. He had no other systemic symptoms. Apart from his cutaneous lesions, his physical examination was normal. A chest CT revealed near complete resolution of his lung mass; however, CT of head and neck demonstrated numerous white matter ring-enhancing lesions bilaterally in frontal, parietal, temporal lobes and cerebellar hemispheres as well as a retropharyngeal abscess (6 x 3 x 1 cm). Basic laboratory values were all normal. Fungal serology and HIV testing were negative, and blood cultures demonstrated no growth. Subcutaneous nodules were incised and drained, and specimens were sent for pathology and culture. While awaiting pathology and culture data, the patient was empirically treated for nocardiosis with trimethoprim-sulfamethoxazole, imipenem, and amikacin. Ultimately, histopathology revealed broad-based, thick-walled budding yeast suggestive of *B. dermatitidis*. Urine antigen testing for *B. dermatitidis* was positive, and eventually fungal cultures grew *B. dermatitidis*.

**Discussion:** Induction with four weeks of liposomal amphotericin B followed by oral voriconazole led to resolution of skin and brain lesions as noted by follow-up imaging. He is currently asymptomatic and completing a 12 month oral voriconazole regimen. This case highlights that blastomycosis may mimic other infectious and non-infectious pulmonary or systemic diseases resulting in a delay in diagnosis, progression of disease, and delay in effective therapy.

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# Ontario-Clinical Vignette-Poster Finalist

## Louai Naddaf

**Title:** A broken heart from an unlikely incident

**Authors:** Louai Naddaf MS-IV, Sujan Thapaliya, M.D., Debajit Roy, M.D

**Introduction:** Takotsubo Cardiomyopathy (TCM), also known as stress-induced cardiomyopathy or broken heart syndrome, is a type of non-ischemic cardiomyopathy in which there is a sudden temporary weakening of the muscular portion of the heart and is usually triggered by emotional stress. The name 'Takotsubo' comes from a Japanese word for octopus trap, which resembles the shape of the left ventricle in the disease. Here we present a post-menopausal woman, who was initially admitted for symptoms related to respiratory failure and later diagnosed to have TCM.

**Case Presentation:** A 61-year-old female with past medical history of paroxysmal Atrial fibrillation under anticoagulant, asthma, diabetes mellitus type 2, pulmonary hypertension, stroke, hypertension, hyperlipidemia and obstructive sleep apnea presented with severe shortness of breath, wheezing, orthopnea and bilateral lower limb edema. Her symptoms have been present for 5 days and have become severe for the past 1 day. She was kept on BiPAP transiently. Chest x-ray was done, notable of vascular congestions and an echocardiogram was done, notable of a reduced ejection fraction (EF) at 30%. She was seen by a cardiologist and diuresed with 40 mg intravenous Lasix. On Day 2 of admission, she suddenly developed 10/10, intermittent chest pain radiating to her neck, that lasted for an hour. ECG revealed new T-wave inversions in leads I, aVL, v4-v6. Troponin was found to be 3.1. At this time, she was immediately transferred to the University of Maryland for cardiac catheterization. Catheterization findings included normal coronary arteries, left ventricle with hyperkinetic basal segments and an akinetic apex. After about 10 days of hospital stay, she was discharged with EF of 25-30% and was asked to follow up with cardiology.

**Cardiac catheterization:** Patent LCA and branches (a) and RCA (b); Left ventricular movement during systole (c) and diastole (d).

**Echocardiogram:** Dilatation of the left ventricle in systole (e) and diastole (f)

**Discussion:** The hallmark of TCM that differentiates it from a myocardial infarction is the bulging out of the left ventricular apex with a hypercontractile base with no coronary artery obstructions. Theorized pathogenic mechanisms include catecholamine excess, microvascular dysfunction, and multivessel coronary artery spasm. In patients who present with a clinical picture consistent with ACS, clinical suspicion of possible TCM should not alter evaluation and management of these ACS conditions. The significant majority of these cases are due to occlusion of a coronary artery and revascularization therapy should not be delayed. The differential diagnosis of TCM includes ACS, cocaine-related ACS, myocarditis, and pheochromocytoma. Our patient presented with symptoms of acute respiratory failure, which could potentially lead to physical and emotional stress.

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# Ontario-Clinical Vignette-Poster Finalist

## Adam Suleman

**Title:** Disseminated Cryptococcosis in a patient with untreated chronic lymphocytic leukemia: A Case Report and Literature Review

**Authors:** Adam Suleman<sup>1</sup>, Ruth Padmore<sup>2</sup>, Juthaporn Cowan<sup>3,4</sup>, <sup>1</sup>Faculty of Medicine, University of Ottawa, <sup>2</sup>Division of Hematopathology, Department of Pathology and Laboratory Medicine, The Ottawa Hospital, <sup>3</sup>Clinical Epidemiology Program, the Ottawa Hospital Research Institute, <sup>4</sup>Division of Infectious Diseases, Department of Medicine, The Ottawa Hospital

**Introduction:** *Cryptococcus neoformans* infections commonly affect patients immunocompromised patients, and may result in a potentially lethal meningitis. This is commonly seen in HIV patients, and has rarely been seen in patients with chronic lymphocytic leukemia (CLL) after treatment with chemotherapy.

**Case Presentation:** Our patient with untreated CLL presented with a history of mild headaches, fevers, diffuse skin nodules, weight loss, and fatigue over eight weeks. *Cryptococcus neoformans* was identified in his skin, blood and CSF. The patient received Amphotericin B and Flucytosine in intensive phase however, only for two weeks due to significant cytopenia. Therefore, he was treated with Amphotericin B and high dose Fluconazole instead for two months followed by Fluconazole for almost one year. His recovery was slow as demonstrated by persistent CSF pleocytosis at two months, although lower titre of cryptococcal antigen in CSF and absent of growth. His course was also complicated by increased intracranial pressure. CSF analysis finally became normal at eleven months, but again detectable cryptococcal antigen and scant amount of degenerative cryptococcal cells were seen.

**Discussion:** We report the first case of a patient with untreated chronic lymphocytic leukemia who developed disseminated cryptococcosis, and review six cases of cryptococcosis in patients with CLL. Our case indicates the extent of immunodeficiency in chronic lymphocytic leukemia.

# Ontario-Clinical Vignette-Poster Finalist

## Jithin Varghese

**Title:** The Role of Early Focused Cardiac Ultrasound in a Not-So-Typical Presentation of Takotsubo Cardiomyopathy: A Case Report.

**Authors:** Jithin George Varghese, Saba University School of Medicine Qurat-ul-ain Jelani, MD, Bridgeport Hospital Stuart Zarich, MD, Bridgeport Hospital. Brooks Walsh, MD, Bridgeport Hospital

**Introduction:** First reported in Japan in 1990, Takotsubo cardiomyopathy is now estimated to occur in 1-2% of acute MI patients. Transient regional wall motion abnormalities in the classic apical ballooning pattern is the hallmark of TCM, although atypical echocardiographic patterns have been noted. We describe a case report of TCM with atypical clinical features (a premenopausal female with no identifiable emotional or physical stressors without significant ECG changes). We highlight the early detection of TCM via focused cardiac ultrasound (FoCUS) in the emergency department (ED) and the rapid reversibility of cardiac dysfunction.

**Case Presentation:** A 47-year-old woman with history of hypothyroidism on replacement therapy, presented to the ED with a 6-hour history of chest pain and dyspnea. Earlier the day, she had attended her daughter's soccer tournament but denied any frightening or emotional events at the game. While walking back to her car, she noted the onset of chest pain and dyspnea, which slowly resolved during her drive home. However, they recurred later that night and she presented to the ED.

Her vital signs were unremarkable except for mild tachypnea, and her only pertinent physical finding was jugular venous distension. The ECG showed normal sinus rhythm at 90 beats/min with nonspecific T wave flattening, without significant ST segment shifts. Her initial troponin level was elevated at 1.89 ng/mL. FoCUS was performed in the ED, revealing akinesis of the midventricular segments of the left ventricle (LV) extending to the apex with apical ballooning, hyperkinesis of the basal segments, and a moderately reduced ejection fraction (EF) of 35–40%, consistent with TCM.

Furosemide 40 mg intravenously, metoprolol 25 mg orally every 12 hours, aspirin 81 mg orally, and intravenous heparin were administered. Repeat echocardiography the following day revealed an improved EF at 50–55% with only focal distal septal and apical hypokinesis that had markedly improved from prior study. Cardiac catheterization was subsequently performed and revealed normal coronary arteries. She was subsequently discharged. A repeat ECG 16 days later showed no wall motion abnormalities, normal LV size, thickness, and function, with an EF of 65%.

**Discussion:** We have shown that the use of FoCUS early in the ED can be an invaluable tool in recognizing TCM, prompting appropriate diagnostic evaluation and therapy, as well as long-term follow-up without missed diagnoses. TCM is an entity that mimics acute coronary syndrome and, while reversible, is still associated with an increased risk of pulmonary edema and dysrhythmias, as well as mortality at 1 year. The reversibility of TCM typically occurs within days to weeks, yet we report rapid changes back to baseline as early as day two from initial presentation. Our case further highlights that TCM can present in young patients without identified physical or emotional stressors, and with unremarkable ECG findings as opposed to the classic post-menopausal women.

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# Oregon-Clinical Vignette-Poster Finalist

## Claire C Groth

**Title:** Puzzling purpura: is vitamin C the missing piece?

**Authors:** Claire Groth (Oregon Health and Science University), Stephanie Griffith, MD (Providence St. Vincent Medical Center)

**Introduction:** Vitamin C (ascorbic acid) deficiency, the etiology of the syndrome scurvy, is uncommonly diagnosed despite epidemiological data suggesting that the prevalence is 7.1% in the United States. Risk factors for deficiency include chronic alcohol use, smoking, and low socioeconomic status. Non-thrombocytopenic purpura is most often associated with vasculitides, such as Henoch-Schönlein purpura (HSP), but can also be caused by disrupted blood vessel collagen synthesis as seen in scurvy.

**Case Presentation:** A 70-year-old woman consulted her physician because of two weeks of a red rash on her legs accompanied by joint pains, abdominal pain, and diarrhea. She had a history of obesity, depression, polymyalgia rheumatica (PMR), and alcohol use disorder. She lived alone and reported a diet consisting of highly processed food and over a liter of wine nightly. She was started on prednisone for a PMR flare. Her abdominal pain and diarrhea improved but the rash progressed. She developed swelling in her hands and feet. She was referred to a dermatologist where a skin biopsy showed leukocytoclastic vasculitis with eosinophils suggestive of a drug reaction. She presented to the Emergency Department where she was treated with IV antibiotics for cellulitis. The rash failed to improve and her creatinine climbed from 1.5 to 4.54 prompting transfer to a tertiary care center. Exam was notable for altered mentation, anasarca, mucosal erosions, and a diffuse rash predominated by palpable purpura and petechiae. Labs revealed acute on chronic macrocytic anemia, normal platelet count, serum complement C3 of 90, serum IgA of 931, and an ascorbic acid level of 8umol/L. Antinuclear, anti-glomerular basement membrane, anti-neutrophil cytoplasmic, and antistreptolysin-O antibodies were negative. Testing for Hepatitis C, rapid-plasma reagin, and HIV was also negative. Urine microscopy revealed WBC casts, RBC casts, and nephrotic-range proteinuria. Her acute kidney injury progressed and she required urgent dialysis for symptomatic hyperkalemia. Renal biopsy revealed mesangial proliferation and positive staining for IgA. She was started on IV steroids, cyclophosphamide, and oral vitamin C. Her rash and mentation improved rapidly within a few days of treatment and she was discharged to a skilled nursing facility.

**Discussion:** This case is most consistent with a severe presentation of HSP, an IgA vasculitis. However, the low ascorbic acid level, along with the presence of features shared by both conditions including (e.g. purpura, edema, and arthralgias) called into question the degree to which vitamin C deficiency contributed to her presentation. It is possible that impaired collagen synthesis led to particularly severe cutaneous manifestations of HSP. While it is difficult to determine the true significance of vitamin C deficiency in this case, it is an important diagnosis to consider in at-risk populations as it is an easily treatable but potentially fatal condition.

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# Oregon-Clinical Vignette-Poster Finalist

## Antonious Hazim

**Title:** A New Murmur in a Transplanted Heart

**Authors:** Antonious Z. Hazim, Dr. André M. Mansoor MD

**Introduction:** Acid-fast bacilli are a rare cause of infective endocarditis posing a diagnostic challenge when encountered.

**Case Presentation:** A 64-year-old male with a history of orthotopic heart transplantation requiring chronic immunosuppressive therapy was admitted to the hospital with fever and chills. Relevant history began three weeks prior to presentation when the patient experienced the onset of a “dull aching” pain in the right thigh. On the morning of admission, he developed fever and chills, prompting him to seek evaluation. On examination, temperature was 100.4°F and heart rate 130 beats per minute. There was a new grade 2/6 holosystolic murmur best heard over the left lower sternal border that augmented with inspiration. Breath sounds were decreased at the apex of the right lung with dullness to percussion of the same area. There was tenderness to palpation of the right thigh. Laboratory evaluation was notable for a white blood cell count of 3.0, which was stable from prior. Computed tomography (CT) of the chest showed multiple peripheral lung nodules with a right-sided pleural effusion. Magnetic resonance imaging (MRI) of the right proximal leg demonstrated a 2 cm intramuscular lesion of the quadriceps muscle. Blood culture Results: were positive for Gram-positive bacilli. Given the Gram stain Results: and the immunocompromised status of the patient, trimethoprim-sulfamethoxazole (TMP/SMX) was started to cover the possibility of infection with *Nocardia* species. A transthoracic echocardiogram showed new moderate tricuspid regurgitation, but no clear vegetation. Over the following two days, blood cultures returned positive for *Nocardia asteroides*. A transesophageal echocardiogram demonstrated a small mobile mass on the tricuspid valve. Given evidence of endocarditis and the disseminating nature of *Nocardia*, a brain MRI was obtained and revealed a 9 mm ring-enhancing lesion in the right temporal lobe. With confirmed CNS involvement, imipenem-cilastatin was added to the antibiotic regimen and later adjusted to an 8-week course of ceftriaxone based on microbial sensitivity testing. TMP/SMX was continued indefinitely. The patient improved with treatment and there was no evidence of residual infection on follow-up imaging.

**Discussion:** Nocardiosis is most often an opportunistic infection, commonly involving the lungs, subcutaneous tissues, and/or central nervous system. It has rarely been reported to affect native heart valves. Here we report a case of disseminated nocardiosis complicated by infective endocarditis involving a transplanted heart. Due to underlying CKD, this patient was on pentamidine rather than TMP/SMX for PCP prophylaxis. Unlike TMP/SMX, pentamidine does not provide coverage for *Nocardia*. This raised suspicion for nocardiosis, which was reaffirmed when Gram-positive bacilli were found in the blood. Currently, there is no official recommendation for prophylaxis for *Nocardia*. However, TMP/SMX does provide at least some prophylactic coverage.<sup>1</sup> This case demonstrates the importance of the cardiac examination and emphasizes the need for prophylactic medications in immunocompromised individuals.

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# Oregon-Clinical Vignette-Poster Finalist

## Ryan Nesbit

**Title:** An Unusual Presentation of Non-Uremic Calciphylaxis

**Authors:** Ryan Nesbit, BA, Taylor C Myers, MD, Shona Hunsaker, MD

**Introduction:** Calciphylaxis, or calcific uremic arteriopathy (CUA), is a well described pathology of small- and medium-sized vessels that subsequently leads to ischemic necrosis most often associated with end stage renal disease (ESRD) or hyperparathyroidism and an associated high mortality. There are scarce reports of calciphylaxis in non-uremic patients, all highlighting potential associations with corticosteroid or warfarin use, diabetes, obesity, and alcoholic cirrhosis. We report a case of non-uremic calciphylaxis (NUCA) in a 70-year old man without history of renal insufficiency.

**Case Presentation:** Patient is a 70-year old man with past medical history of cirrhosis secondary to non-alcoholic fatty liver disease (NAFLD), well controlled diabetes mellitus type II, asthma, COPD, gout, and Parkinson's disease, admitted for a three month history of extremely painful, non-healing distal left lower leg extremity wounds, initially developed following minimal trauma.

Physical exam notable for no evidence of chronic liver disease, and reticulated, violaceous atrophic plaques of left lower leg, in addition to three irregularly shaped eschars, largest being three centimeters in diameter, surrounded by violaceous and non-blanchable erythema with areas of necrosis.

A leg radiograph reveals diffuse calcification of veins. Due to presentation, characterization of lesions and imaging, dermatology felt consistent with NUCA. The patient received intralesional (IL) sodium thiosulfate (STS) during admission. Since discharge, patient continues to receive IL STS, and IV infusion three times weekly. Unfortunately, while some lesions improved, new lesions developed, prompting initiation of further experimental treatment, including bisphosphonate and vitamin K therapy. With the combination of these four treatments, patient had complete resolution of lesions 6 months after initiating therapy.

**Discussion:** NUCA is most commonly associated with primary hyperparathyroidism, malignancy, alcoholic liver disease, autoimmune disease, warfarin or corticosteroid use. Our patient's greatest risk factor for NUCA is liver disease. This case is unique given the unilateral presentation, and NAFLD (previously associated only in alcohol related liver disease), in the setting of normal levels of calcium, phosphate, and PTH, minimal corticosteroid use, without use of warfarin.

Optimal treatment of NUCA is not known, but reviews of CUA indicate that multi-intervention management is optimal. IV STS is standard of treatment for patients on hemodialysis and a recent report of IL STS treatment showed promising outcomes. Duration of treatment and side effects can be highly variable with potential serious consequences. Treatment approach stresses wound care, pain management, treatment of abnormal electrolytes and underlying pathology (if identified), and potential experimental use of vitamin K and bisphosphonates.

NUCA is increasingly reported, although difficult to determine whether secondary to increased awareness or incidence. Our case adds a unique example of NUCA, in which to consider this disease associated with high mortality and emphasizes a multi-intervention approach to this difficult to manage pathology.

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# Oregon-Clinical Vignette-Poster Finalist

## Minhazur Sarker

**Title:** Rhabdomyolysis Triggered by Acute Hemolysis in a G6PD Deficient Patient

**Authors:** Minhazur Sarker<sup>1</sup>, Dr. Waleed Gliza<sup>2</sup>, Dr. Preetivi Ellis<sup>2</sup>, <sup>1</sup>School of Medicine, Oregon Health & Science University, Portland, OR; <sup>2</sup>Internal Medicine, PeaceHealth Sacred Heart Medical Center at Riverbend, Springfield, OR

**Introduction:** Glucose 6-phosphate dehydrogenase (G6PD) deficiency is the most common disorder of red blood cells (RBCs) worldwide. The disorder Results: in RBCs that are more susceptible to oxidative insults such as certain medications, fava beans, and chemicals like naphthalene. The majority of patients with this disorder, however, are asymptomatic when not experiencing an exacerbation or hemolytic episode. This case highlights a rarely reported manifestation of G6PD deficient hemolytic anemia – rhabdomyolysis.

**Case Presentation:** The patient is an 18-year old male with a history of G6PD deficiency who began experiencing jaundice, myalgia, and abdominal tenderness prompting admission to the hospital for evaluation of a suspected acute hemolytic episode. He was found to have elevated aspartate aminotransferase and alanine aminotransferase, elevated total bilirubin, and low hemoglobin. His creatine kinase (CK) was measured at 51370 and a urine analysis (UA) was positive for blood with no red blood cells. Patient's history was significant for weight lifting, few glasses of wine, and working as a firefighter during the recent summer. History was otherwise negative for exposure to any new medications, fava beans, or strong oxidants. He denies tick or bug bites during his firefighting. On review of systems, he noted some diarrhea and dark urine during the week prior that is consistent with his G6PD related exacerbations. All other systems were negative. Patient had no other medical history.

**Discussion:** This patient's presentation was suspicious for rhabdomyolysis (CK/UA Results:) and an acute hemolytic anemia. Per history, we were unable to identify a clear etiology for either diagnoses and thorough autoimmune and infectious causes of rhabdomyolysis were worked up but returned negative. Initial treatment included aggressive IV fluids. The routine management protocol for rhabdomyolysis was sufficient since the patient's CK levels trended downward over the course of 5 days from 51370 down to 9971. He showed no signs of acute kidney injury throughout the stay and his acute hemolysis also subsided.

Literature review highlighted cases of rhabdomyolysis associated with G6PD deficiency, however these patients had underlying sickle cell trait, other comorbidities, and/or significant exposure to oxidants.<sup>1-3</sup> We believe this patient's rhabdomyolysis was, in part, triggered by the simultaneous G6PD deficiency associated hemolysis. Further research is needed to fully determine if G6PD deficiency associated hemolytic episodes can trigger rhabdomyolysis and by what mechanism. One hypothesized mechanism is the following: G6PD deficiency mediated hemolysis causes acute hypoxemia/acidosis, ATP depletion, and dysfunction in Na<sup>+</sup>/K<sup>+</sup> and Ca<sup>2+</sup> ATPases resulting in influx of Na<sup>+</sup>/K<sup>+</sup>/Ca<sup>2+</sup>. This ion influx causes osmotic swelling and Ca<sup>2+</sup> mediated lipase activation and ultimately, muscle cell death.

For now, this case shows a connection based on a diagnosis of exclusion and highlights that G6PD deficiency associated rhabdomyolysis may be managed similarly to rhabdomyolysis secondary to other causes.

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# Oregon-Clinical Vignette-Poster Finalist

## Lauren Wessler

**Title:** The Perils of Elimination: A Case of Lactation Ketoacidosis in a Non-diabetic Postpartum Woman

**Authors:** 1. Lauren Wessler, Medical Student, OHSU, 2. Angela Alday, MD, Assistant Professor of Medicine, Clinical & Medicine Teaching Hospitalist Services, OHSU

**Introduction:** Ketoacidosis is a potentially life-threatening condition that occurs when a negative energy balance precipitates a transition from glycolysis to ketogenesis. Lactation is a high energy-demand state that is usually adequately met by diet and mobilization of glycogen stores. However, there have been case reports of “lactation ketoacidosis” occurring in breastfeeding mothers, often in the setting of inadequate carbohydrate intake.

**Case Presentation:** A 31 year-old G3P3 woman presented to the Emergency Department with two weeks of nausea, vomiting and diarrhea. Past medical history was significant for hypothyroidism, multiple food allergies and two cesarean sections. She was exclusively breastfeeding her five-month old infant, as she had her two older children. Early in the post-partum period, she had begun an elimination diet out of concern that her infant was experiencing food sensitivities, eating only turkey, olive oil and selected vegetables. Her only home medication was levothyroxine.

On presentation, vitals were within normal limits. On exam, she had diffuse abdominal tenderness. Labs were significant for a combined anion gap and non-gap metabolic acidosis; arterial blood gas had a pH of 7.10 and pCO<sub>2</sub> of 21; bicarbonate was 6, sodium 134, chloride 105, and anion gap of 23. Her blood glucose was 63. Her urine was positive for ketones, but creatinine, lactate and blood counts were normal. Urine pregnancy test was negative and urine drug screen was positive for cannabis. TSH was low with a normal T4. Abdominal x-ray and CT were unremarkable.

Further workup revealed an elevated plasma osmolal gap and negative urine anion gap. Plasma acetone concentration was elevated but salicylates and remaining alcohol differential panel were negative. Plasma morning cortisol and ACTH were also normal. C-peptide, insulin, and proinsulin were in appropriate ranges and a sulfonylurea panel was negative.

Over the course of her four-day hospitalization, her diarrhea resolved, and nausea was controlled with intravenous anti-emetics. The presenting metabolic derangements and hypoglycemia resolved with dextrose-containing intravenous fluids and resumption of oral intake. The patient continued to breastfeed. On discharge, she was advised to diversify her diet to include carbohydrates.

**Discussion:** Although well-described in the veterinary literature, lactation ketoacidosis (“bovine ketosis”) is rare in humans. Prior case reports have occurred in the setting of a low-carbohydrate diet undertaken with the aim of weight loss. As anxieties about food allergies and newborn colic are on the rise, many breastfeeding mothers begin elimination diets out of concern for food sensitivity in their infants. This case illustrates the potential for significant ketoacidosis in a young, non-diabetic lactating woman in the context of a low-carbohydrate elimination diet, with possible precipitation by an acute diarrheal illness. It emphasizes the importance of inquiring about food avoidance in lactating women and providing nutritional counseling to ensure a sufficiently balanced diet.

# Oregon-Clinical Vignette-Poster Finalist

## Emily Ager

**Title:** Bullous Pemphigoid & Bloody Bowel Movements

**Authors:** Emily Ager<sup>1</sup>, Dr. Rebecca Harrison<sup>2</sup>, <sup>1</sup>School of Medicine, Oregon Health & Science University, Portland, OR; <sup>2</sup>Internal Medicine, Oregon Health & Science University, Portland, OR

**Introduction:** Bullous pemphigoid (BP) is an acquired autoimmune subepidermal blistering disease characterized by tense, fluid-filled bullae on the skin and mucous membranes with pruritus. Direct immunofluorescence shows linear deposits of immunoglobulin-complement complexes in the mucosal basement membrane zone. BP is a cutaneous paraneoplastic manifestation, and raises suspicion for internal malignancy.<sup>1</sup>

**Case Presentation:** A 76-year-old man without medical care for the past 20 years was admitted for several months of progressive shortness of breath and weakness. He also reported 3 weeks of bloody stools, a 30lbs weight loss in the last year, and a diffuse rash on his trunk, extremities, and oral mucosa present for the past several months. The lesions were painful, non-pruritic, and began as erythematous patches that blister before healing.

On admission, he was found to have a hemoglobin of 5.9 g/dL with microcytosis, a ferritin of 47 ng/mL, and an albumin of 1.6g/dL. On rectal exam there was no evicent mass. A CT showed bilateral pleural effusions, right common femoral vein thrombosis, ascites, right nephrolithiasis, and abnormal rectal wall thickening. A skin biopsy showed subepidermal vesiculobullous dermatitis with eosinophils consistent with bullous pemphigoid.

On day two of hospitalization, he had an episode of bright blood per rectum, followed by a large rectal mass prolapse. As a result of the large volume of blood loss, the patient developed hypotension, and was transferred to the MICU. His vitals quickly stabilized with pRBC transfusion and fluid resuscitation. The patient subsequently underwent excision of the prolapsed rectal mass without complications. Pathology of the excised tissue was consistent with an invasive, poorly differentiated primary rectal adenocarcinoma.

The patient's bullous rash was treated with systemic prednisone, topical triamcinilone ointment, and a "sauna suit" to increase absorption. Immunomodulators were contraindicated in the setting of malignancy. His body and mucosal rash steadily improved, with no new bullae forming after initiation of treatment. The patient was discharged to an Intermediate Care facility for strengthening.

**Discussion:** This case illustrates the rare, but previously documented, occurrence of a paraneoplastic autoimmune blistering disorder. It is theorized that the blisters are caused by antibodies directed against tumor-specific antigens of malignant cells cross-reacting with BP antigens in the basement membrane.<sup>2</sup> Previous cases have shown association of BP with squamous cell lung carcinoma and renal cell carcinoma. In this case, suspicion for a GI malignancy was high. However, other patients with cutaneous disease may not present with such clear red flags.

A wide variety of dermatologic signs have been associated with GI malignancy, and these cutaneous manifestations may present before the neoplasm is identified. Their prompt recognition can significantly aid in a more rapid diagnosis. Although not always associated with neoplasms, BP should raise a high index of suspicion for a cutaneous paraneoplastic manifestation of various malignancies.

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# Pennsylvania-Clinical Vignette-Poster Finalist

## Aaron Haag

**Title:** Post-Polio syndrome in the Gross Anatomy Lab

**Authors:** Haag, A., Ward, PJ. Department of Biomedical Sciences, West Virginia School of Osteopathic Medicine, Lewisburg WV, 24901. United States.

**Introduction:** Upon routine dissection in 2017-2018 anatomy lab, the right leg of a female cadaver was discovered to have complete replacement of skeletal muscle by adipose tissue. Upon approved review of medical records obtained by the Human Gift Registry, a pre-mortem history of polio infection followed by post-polio syndrome was noted.

**Case Presentation:** During normal student dissection in the WVSOM anatomy lab in 2016-2017, students and faculty discovered that the right leg of a 94-year-old female had adipose tissue completely replacing the skeletal muscle several compartments. The fasciae separating each muscular compartment were completely intact, showing normal physiologic shape and attachments, but with what appeared to be adipose tissue instead of skeletal muscle within these compartments. Continued dissection showed that all muscles innervated by the right sciatic nerve were completely replaced with adipose tissue. This adipose replacement included the posterior thigh, anterior leg, lateral leg, posterior leg, dorsal foot, and plantar foot. Histology samples from these sites stained positive for adipose tissue with minimal cytological remnants of muscular structure. This replacement was limited to the right leg only and no other muscles showed any replacement. Muscles that have dual innervation, such as the adductor magnus, showed only partial fatty replacement. Compartments innervated by the obturator and femoral nerves, the medial and anterior thigh, respectively, showed normal skeletal muscular tissue. Medical history revealed a progressive weakness of walking that progressed from limited assistance with a cane to being wheelchair bound by the end of life. A diagnosis of post-polio syndrome was ascribed to the individual at the time of death.

**Discussion:** At the time of dissection, this case provided a very interesting and rare pathology to explore. Post-poliomyelitis syndrome (PPS) remains a relatively unknown phenomenon in contemporary medicine with several processes believed to contribute to muscle weakness and distal nerve loss. Most cases of PPS present with fatigue, pain, newfound muscle weakness in previously affected muscles and later unaffected muscles<sup>1</sup>. Specifically, we believe this is a case of Post-Polio-Muscular Atrophy (PPMA). In PPMA, the muscle weakness is usually slowly progressive and appears unilateral<sup>2</sup>. The new muscle weakness is believed to occur due to the increased metabolic stress of still functioning motor neurons, the aging processes and possibly several other factors<sup>1-3</sup>. We believe the process led to gross muscle loss and replacement with adipose issues in the regions innervated by the right sciatic nerve. While rare, it is important for physicians to understand and recognize possible cases of PPS and provide care for those individuals.

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# Pennsylvania-Clinical Vignette-Poster Finalist

## Allison Montgomery

**Title:** Cutaneous polyarteritis nodosa resulting from a paclitaxel-eluting balloon angioplasty

**Authors:** Allison Montgomery, BA, Jeffrey Kushner, DO, David Altman, MD

**Introduction:** Cutaneous polyarteritis nodosa (cPAN) is a vasculitis of medium sized arteries in the dermis and subcutaneous tissues. Etiology is presently unknown, although it may be immune complex mediated and has been linked to various infections, drugs, and autoimmune diseases. Dermatologic abnormalities are common at presentation, and may include nodules, ulcers, livedo reticularis, or purpura. We describe a rare case of unilateral cPAN, which developed after placement of a drug-eluting balloon four weeks prior to the onset of clinical symptoms.

**Case Presentation:** A 59-year-old female with a past medical history of multiple catheterizations presented with a unilateral, painful rash which appeared several weeks prior on her left leg. The patient was afebrile without leukocytosis but was undergoing treatment with vancomycin for a presumable infectious etiology. The patient had no history of preceding minocycline or propylthiouracil treatment. She did not have hepatitis. Notably, four weeks prior to presentation, a drug-eluting balloon, Lutonix®, was placed in her left superficial femoral artery.

On physical examination, painful erythematous nodules were found on her left leg, extending from the ankle to the mid-thigh, in the distribution of the superficial femoral artery. Necrosis, ulcers, and livedo reticularis were absent. Her right leg was spared. A punch biopsy showed a neutrophilic vasculitis involving a large vessel in the deep dermis with surrounding fat necrosis, most consistent with cutaneous polyarteritis nodosa.

Rheumatology was consulted. Laboratory testing revealed an elevated P-ANCA. The patient was started on triamcinolone 0.1% topical ointment and prednisone 1 mg/kg/day initially, which was then tapered.

**Discussion:** Drug-Eluting Balloons (DEB) commonly use paclitaxel, an anti-proliferative drug to prevent restenosis after dilating the narrowed artery. Paclitaxel is locally delivered to the wall of the artery, decreasing growth of the neointima by inhibiting proliferation of vascular smooth muscle cells. Carrier molecules are commonly used for delivery of anti-proliferative drugs to the target site. Our patient received a paclitaxel-eluting balloon coated with the hydrophilic carrier molecules polysorbate and sorbitol. In a study performed in a porcine model, 54.4% of initial coating components were found to wash off into distal circulation during balloon inflation. Hydrophilic carrier molecules were associated with greater paclitaxel tissue concentrations. There have been reports of vasculitis resulting from a superficial femoral artery angioplasty with a paclitaxel-eluting balloon.

We propose that our patient's cPAN developed from paclitaxel and carrier molecules traveling downstream into circulation, initiating an immune response. This is substantiated by the fact that the erythematous, painful nodules appeared only in the territory of the superficial femoral artery in her left leg, the symptoms developed four weeks after receiving the DEB, and the patient did not have any known risk factors for developing cPAN. While we acknowledge that cPAN is generally benign, we present an adverse reaction and clinical sequelae resulting from a drug-eluting balloon.

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# Pennsylvania-Clinical Vignette-Poster Finalist

## Frederick B Peng

**Title:** Drug abuse manifesting as persistent hypoglycemia - a case report of hidden sulfonylurea poisoning

**Authors:** Frederick B. Peng, BS<sup>1</sup> and Sharon Li, MD<sup>2</sup>, <sup>1</sup>-Sidney Kimmel Medical College, Thomas Jefferson University, Philadelphia, PA, <sup>2</sup>. Department of Medicine, Thomas Jefferson University Hospital, Philadelphia, PA

**Introduction:** Benzodiazepines are frequently abused drugs, but street-obtained versions are commonly substituted or mixed with alternative products. Unsuspecting users can be subject to life-threatening side effects. To clinicians caring for these patients, the composition of substances may not easily be identifiable, making treating intoxications a challenge.

**Case Presentation:** A 45-year-old man with no significant past medical history presented with confusion, diaphoresis and weakness two days in a row. Vitals were significant for tachycardia to 115 and high blood pressures to 220/110. Physical exam showed an anxious, diaphoretic male in mild distress. Point-of-care accuchecks revealed hypoglycemia into the 30s. Despite multiple amps of glucose, he remained hypoglycemic so was started on a D5W, then D10W infusion. Urine drug screen revealed cocaine, opiates, and benzodiazepines. He admitted to snorting heroin and taking Xanax; both were obtained from the streets with last use 1.5 days prior to admission. He denied taking any other medications. On admission, his insulin levels were found to be abnormally elevated (up to 27 mIU/L). He also had an elevated proinsulin (50.1 pmol/L), normal c-peptide (2.90 ng/mL), and normal beta-hydroxybutyrate (0.6 mmol/L). His HgA1C was 5.8%. Due to concern for insulinoma, he received an abdominal MRI; this showed no masses. Eventually, his blood glucose stabilized and D10W was weaned off without further hypoglycemic episodes. His sulfonylurea screen came back positive for a high level of glipizide (120 ng/mL). It was determined that the Xanax the patient was taking was probably substituted and mixed with sulfonylureas. The patient was subsequently discharged with a referral for drug rehab.

**Discussion:** This case illustrates the potential for unsuspected substances, particularly sulfonylureas, to contaminate street drugs. Clinicians should be aware of persistent hypoglycemia being a complication of drug overdose and should perform workup as appropriate.

# Rhode Island-Clinical Vignette-Poster Finalist

## Shaan Ahmed

**Title:** Thiamine Deficiency Mimicking Guillain-Barré Syndrome

**Authors:** Shaan A. Ahmed, AB<sup>1</sup>; Gerardo Carino, MD, PhD<sup>1</sup>, <sup>1</sup>Warren Alpert Medical School of Brown University, Providence, RI, USA

**Introduction:** Thiamine (vitamin B1) deficiency is rare in the United States, presents with neurologic or cardiovascular sequelae, and can mimic other illnesses. We present a case of thiamine deficiency mimicking Guillain-Barré Syndrome (GBS) in a patient with polyneuropathy.

**Case Presentation:** A 47-year-old Cambodian male presented with dyspnea, numbness, tingling, and progressive weakness of his lower extremities for one month. He reported occasional alcohol consumption. He was afebrile, tachypneic (40 breaths/minute), hypotensive (BP 78/46), and exam was notable for lower extremity weakness and diminished patellofemoral reflexes bilaterally. Notable serologies included decreased HCO<sub>3</sub> (10 mEq/L), and elevated lactate (6.1 mEq/L) and BNP (958.5 ng/L). Chest x-ray was unremarkable. The patient was admitted to the ICU to receive fluid resuscitation for presumed dehydration, however hypotension failed to improve with fluids. Echocardiogram demonstrated right ventricle systolic dysfunction, tricuspid insufficiency, and pulmonary hypertension. Chest CT was negative for pulmonary embolism, and the patient was started on vasopressors and diuresed for hypervolemia.

Extensive workup was initiated for what appeared to be an acquired demyelinating polyneuropathy. CT pan-scan, spine MRI, and lumbar puncture were unremarkable. Electromyogram (EMG) demonstrated a demyelinating pattern consistent with GBS, and intravenous immunoglobulin (IVIG) was started for 5 days. Extensive infectious and rheumatologic testing was otherwise unremarkable. Of note, on hospital day 2, thiamine level was ordered as part of the workup for lactic acidosis, followed by empiric intravenous thiamine replacement. On hospital day 6, thiamine level was resulted as <7 nmol/L (critically low). Although the patient completed 5 days of IVIG, his hypotension and lactic acidosis had started improving soon after initiating thiamine repletion. One month post-discharge, the patient was continuing thiamine repletion and remained clinically stable.

**Discussion:** Thiamine is critical for cellular metabolism and nerve impulse propagation. In the U.S. and Europe, alcoholics are most likely to become thiamine deficient due to poor nutrition. The two manifestations of thiamine deficiency are Wernicke-Korsakoff syndrome and beriberi. Symptoms of Wernicke-Korsakoff include encephalopathy, ophthalmoplegia, ataxia, and dementia. Beriberi consists of two classic phenotypes, known as “dry” (predominantly peripheral neuropathy) and “wet” (predominantly heart failure, edema, and tachycardia). Mixed dry and wet phenotypes as seen in this case can present too.

Thiamine deficiency may mimic other illnesses. In our case, subacute lower extremity weakness, diminished reflexes, and characteristic EMG findings led to the initial diagnosis of GBS. However, GBS often includes respiratory and bulbar weakness, whereas this is extraordinarily rare in beriberi. Elevated lactate is a common feature of thiamine deficiency, but atypical in polyneuropathies such as GBS. Diagnosis requires significant clinical suspicion, and is supported by low thiamine level and clinical

improvement with repletion. This case highlights the variable presentation of thiamine deficiency and emphasizes the importance of considering it in any patient presenting with progressive polyneuropathy.

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# Rhode Island-Clinical Vignette-Poster Finalist

## Audrey Carr

**Title:** My, oh my! Leukemia in the eye: bilateral retinal hemorrhage as the presenting sign of chronic myelogenous leukemia

**Authors:** Audrey Carr MS3 (1), Zoe Weiss MD (2), Rabin Niroula MD (3), (1) Warren Alpert Medical School of Brown University, (2) Warren Alpert Medical School of Brown University, (3) Department of Hematology/Oncology, Rhode Island Hospital

**Introduction:** Ocular manifestations of hematologic malignancies may present as asymptomatic changes in the retina, choroid, or orbit. Retinopathy is a rare presenting sign of chronic myeloid leukemia (CML). Here we describe a case of CML diagnosed after bilateral retinal hemorrhages were identified on routine eye exam.

**Case Presentation:** A 23 year old previously healthy male presented to his primary care physician after he was found to have new retinopathy on routine optometry examination. His optometrist noted bilateral dot blot retinal hemorrhages, cotton wool spots, and retinal vessel attenuation. Visual acuity and pupillary exam were unchanged from prior exams. He reported no visual symptoms and physical exam was unremarkable, without evidence of splenomegaly. He had an elevated white blood cell count at 60,000 cells/ml (normal 4,300-5,700 cells/mL) with a peripheral blood smear that demonstrated granulocytes at various stages of maturity without blasts, as well as eosinophilia and basophilia. Subsequent bone marrow biopsy revealed hypercellular bone marrow (cellularity of 95-100%) with granulocytic and erythroid hyperplasia, few blasts, decreased histiocytic iron stores and mild reticulin fibrosis. Cytological analysis of biopsy specimen was positive for the translocation 9;22, confirming a diagnosis of CML complicated by leukemic retinopathy. He was initiated on a tyrosine kinase inhibitor, imatinib, and has subsequently had no visual or systemic complications.

**Discussion:** Ophthalmologic changes are frequently seen in myeloid leukemias. 5-10% of CML patients present with ophthalmologic symptoms at initial diagnosis and up to 50% of new diagnoses will have asymptomatic manifestations on ophthalmologic exam. Patterns of ocular involvement in CML are diverse and can include perivascular sheathing, retinal hemorrhages, microaneurysms, venous dilation, cotton wool spots, and optic nerve infiltration. While the retina is the most commonly affected ocular structure in CML, fewer than 10 case reports describe retinopathy as a presenting symptom of CML. Multiple mechanisms of ocular tissue damage have been described, including direct infiltration by leukemic cells, hyperviscosity, and localized thrombosis due to toxic products from leukemic cells. Subsequent anemia and thrombocytopenia may also cause ophthalmologic abnormalities. Interestingly, there is no apparent correlation between retinal involvement and WBC or platelet level. Ocular involvement of CML is associated with lower 5-year survival and can result in permanent vision impairment if the underlying malignancy is untreated.

Ophthalmologic abnormalities can present as the first sign of hematologic malignancy in an otherwise asymptomatic patient and may be more common than previously recognized. The identification of ocular manifestations of CML also has prognostic value. In the setting of unexplained retinal lesions with or without visual changes, new or relapsed leukemia should be considered as part of the differential and appropriate systemic workup initiated.

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# Rhode Island-Clinical Vignette-Poster Finalist

## Nicholas Panarello

**Title:** Not Your Idiopathic Erythema Nodosum

**Authors:** David Deckey and Nicholas Panarello

**Introduction:** Erythema Nodosum is a rare clinical entity with a broad differential diagnosis. The majority of cases are of idiopathic origin, making the diagnostic relevance difficult to interpret.

**Case Presentation:** A 65-year-old Cantonese woman with no significant past medical history presented with fever, malaise, myalgias, and tender, erythematous nodules on her bilateral anteromedial shins and dorsum of the left wrist. Her symptoms developed over a week without any antecedent trigger. Erythema Nodosum (EN) was suspected and treatment with potassium iodide and NSAIDs was initiated, which resulted in rapid clinical improvement and discharge. She re-presented two weeks later due to several episodes of bloody diarrhea, lower extremity edema, joint swelling, continued fatigue, myalgias and persistent lesions on her bilateral anteromedial shins. Extensive laboratory evaluation revealed elevated inflammatory markers (ESR 104, CRP 91.62), stable iron deficiency anemia (Hgb 9.6), elevated ACE 183, and negative Quantiferon. CXR showed hilar changes that could be consistent with latent granulomatous disease. CT chest/abdomen showed multiple hypodense subcentimeter liver and kidney lesions too small to characterize, and a subsegmental filling defect in the right lung. Heparin drip was initiated for management of the incidental pulmonary embolism. The patient's first-ever colonoscopy revealed a 4-5cm exophytic, friable mass 10cm from the rectal vault that occupied approximately three-quarters of the lumen. Pathology confirmed the mass was well-differentiated, invasive adenocarcinoma. MRI showed involvement of external iliac and mesorectal fat lymph nodes, without liver or lung involvement.

**Discussion:** This case underscores the importance of avoiding premature closure. While most cases of EN are idiopathic, it is essential to explore other possible etiologies, such as Group A *Strep*, chronic inflammatory and autoimmune diseases, and malignancy. EN typically presents with the sudden onset of painful, warm, erythematous, subcutaneous nodules on pretibial surfaces. Patients may also experience prodromal symptoms that our patient experienced: fever, malaise, fatigue, arthralgias, headache, and abdominal pain. With vague constitutional symptoms and as many as 60% of cases being idiopathic, it is easy to prematurely close a case such as this one.

Therefore, when considering the differential diagnosis of a systemic inflammatory disorder, such as EN, malignancy must be considered. In our patient, her stage three invasive colorectal adenocarcinoma initially manifested through a paraneoplastic syndrome, prior to more typical symptoms such as bright red blood per rectum. Although gastrointestinal malignancy begins as a local, uncontrolled proliferation of abnormal cells, the development of invasive disease is correlated with more systemic findings, such as paraneoplastic syndromes, particularly dermatoses. If recognized in a timely fashion, early treatment can be initiated, leading to better clinical outcomes. Evaluation for underlying malignancy should begin with a thorough history, physical examination and laboratory testing, in addition to ensuring that age-appropriate screening examinations have been performed.

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# South Carolina-Clinical Vignette-Poster Finalist

## Edward Duffy

**Title:** The Intussusception Deception: An Unlikely Cause of Intussusception in an Adult

**Authors:** Edward Duffy, Eric M Sellers MD, Andrew Brock MD

**Introduction:** Intussusception makes up 1 to 5 percent of intraluminal bowel obstruction in adults. The process begins with a “leading edge” or anatomical change in the bowel wall that is pulled through the bowel lumen by peristalsis. Celiac disease is regarded as an autoimmune disease triggered by a response to dietary gluten in genetically predisposed individuals. It is classically seen in childhood as failure to thrive and malabsorption. In adults, symptoms can be more vague, and include abdominal pain, anemia, and changes in bowel habits. Celiac disease is a rare cause of intussusception in adults that should be considered in the appropriate clinical setting.

**Case Presentation:** 58 yo male with a history of BPH, HLD presented to the ED with acute, sharp, right lower quadrant abdominal pain. 8 out of 10 in severity without radiation to the back. He reported a similar episode 5 years prior that resolved without treatment. He could not identify aggravating or alleviating factors. He had regular bowel movements of formed consistency without BRBPR or hematochezia. He denied any fevers, nausea, vomiting, weight loss, GERD, NSAID use, diarrhea, recent illness, alcohol use, rash, food allergies, family history of malignancy or autoimmune disease.

On presentation, BP was 144/90, HR was 95, Temp was 36.7°C and SpO2 was 98% on room air. Abdominal exam was notable for hyperactive bowel sounds. RUQ was tender without rebound or guarding. No palpable masses. Lab work, including CBC, CMP and lipase, were within normal ranges. CT abdomen demonstrated jejunojejunal intussusception in the central abdomen and no evidence of bowel obstruction. Soon after his evaluation, his pain resolved and he requested discharge home with follow up capsule endoscopy. His capsule later revealed small bowel stenosis with markedly abnormal appearing mucosa. Antegrade single balloon enteroscopy was subsequently performed notable for atrophic mucosa in the duodenum and jejunum as well as mild jejunal stenosis. Biopsies revealed intraepithelial lymphocytes with villous blunting. Tissue transglutaminase antibody IgA levels were ordered and was 47.9 U/ML (normal <14.9). The diagnosis of Celiac disease was made.

**Discussion:** Intussusception can be idiopathic but also related to extra-luminal or intra-luminal lesions. Up to 30% of cases can be attributed to malignancy, which should prompt complete investigation.

Although rare and under recognized, Celiac disease can also lead to intussusception. Autoantibodies trigger an attack at the intestinal mucosa leading to the characteristic finding of villous atrophy. The damage of the mucosal layer can also predispose the bowel to intussusception.

While biopsy is the gold standard, tissue transglutaminase IgA antibody is usually the starting point for Celiac disease evaluation with a 90 to 98 percent sensitivity and 95 to 97 percent specificity. Thus, Celiac disease should be considered in the differential of patients presenting with intussusception.

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# South Dakota-Clinical Vignette-Poster Finalist

## Caitlin A Hof

**Title:** An Unusual Headache: An abscess case study

**Authors:** Caitlin Hof, MS IV & Larry Burris, DO

**Introduction:** *Aggregatibacter aphrophilus* (formerly *Haemophilus aphrophilus* of the HACEK bacteria) is a gram-negative, oxidase- and catalase-negative coccobacillus that is part of the normal oropharyngeal flora.<sup>1,2,3</sup> *A. aphrophilus* accounts for 2-7% of cultivable intracranial abscesses, which is a higher proportion than it is found within the oropharynx. The species contains virulence properties that are associated with intracranial abscess formation.<sup>4</sup> Intracranial abscesses are a rare condition that can be secondary to a septic focus. The mortality rate has decreased to between 0-24%, however morbidity can still be significant.<sup>5,6</sup>

**Case Presentation:** A 58 year old man with a 45 pack year smoking history and no other significant PMH presents to the ED for a headache lasting one week. He had been seen by his PCP and was diagnosed with a sinus headache for which he received the appropriate treatment. The headache progressively worsened, and the patient developed difficulty with gait, dysarthria, nausea, and vomiting. A CT displayed a cerebellar mass and hydrocephalus secondary to compression of the fourth ventricle.

### **Physical Exam:**

Pupils sluggish; Nonresponsive to verbal stimuli; Minimally responsive to pain; DTRs intact; Positive corneal and gag reflexes

### **Hospital Course:**

CT of the abdomen and pelvis were completed looking for primary lesions to be biopsied. Decadron and keppra were started and an EVD was placed. MRI showed a ring enhancing lesion within the cerebellum and loculations along the dura measuring up to 3 mm. Edema and a mass effect were present in the cerebellum with effacement of the fourth ventricle associated with obstructive hydrocephalus.

The following day the physical exam improved. The patient was alert and oriented, with clear and appropriate speech. He was able to follow commands and move all four extremities. The LP preliminary report showed no growth and CSF was unremarkable. He was taken to surgery for further evaluation of the mass. It was incised and drained, and irrigation followed. Approximately 20 cc of fluid was removed and sent for further evaluation. Preliminary gram stain pointed to gram positive cocci.

The patient began empiric therapy until the culture speciated. The culture grew *Staphylococcus intermedius* and *Aggregatibacter aphrophilus*, formerly known as *Haemophilus aphrophilus*.

These bacteria point to a dental origin and a Panorex was obtained. A lucency at the root of the right second mandibular molar was found. Since the HACEK organisms are associated with endocarditis, a TEE was included in the work up. It was negative for vegetations or any abnormalities. The patient was started on ceftriaxone and metronidazole per ID consult. The patient's exam improved and he was

transferred to rehabilitation.

- **Discussion:** Signifies importance of oral hygiene
- Serious infection may occur in an otherwise healthy adult
- For favorable clinical outcomes:
  - Prompt recognition of abscess
  - Early surgical treatment
  - Administration of appropriate prolonged antimicrobial treatment

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# Texas-Clinical Vignette-Poster Finalist

## Jennifer Doran

**Title:** Not everything that cavitates is tuberculosis: misdiagnosis of an immunocompetent patient

**Authors:** Jennifer A, Doran; Miguel A, Chavez

**Introduction:** Pulmonary cavitary lesions seen on X-ray accompanied by clinical symptoms of fever, night sweats, and weight loss are typical presentations of *Mycobacterium tuberculosis*. However, other *Mycobacterium* can present similarly, although, usually associated with malignancy or underlying lung disease. Molecular Methods: are crucial to identify *Mycobacterium* species and initiate adequate treatment.

**Case Presentation:** A 49-year-old male presented with four-week history of nocturnal fevers, night sweats, weight loss, productive cough, and pleuritic chest pain. He presented to an outside hospital that found on chest X-ray a right upper lobe cavitary lesion and positive acid fast bacilli in sputum. He was started empirically on quadruple therapy for tuberculosis. Two weeks later, because of worsening symptoms, he was admitted to our institution. He denied shortness of breath, palpitations, lymphadenopathy, or lower extremity edema. He denied any past medical history. He lived in Texas, working as a constructor of RVs but previously of homes with exposure to asbestos, wood dust, and mold. He travelled to Mexico 19 years ago but denied previous incarcerations and tuberculosis contacts. He had a 30 pack-year smoking history and drank a six pack of beer daily but quit both at initiation of symptoms. On physical exam he was afebrile, pulse of 84 beats per minute, and 20 respirations per minute. He looked cachectic, but otherwise exam was unremarkable. Laboratory analysis revealed leukocyte count of 10.68 cells/ $\mu$ L with 72.2 % granulocytes, 16.1 % lymphocytes, and 0.3 % eosinophils. Computed tomography of the chest showed 7.6 cm cavitary lesion with multiple spiculated lung nodes and mass-like opacities in the right lung. Microbiology tests showed 3 + acid fast bacilli, negative *Mycobacterium tuberculosis* DNA in the sputum, and culture grew rapid growing *Mycobacterium* species. The outside hospital isolated *Mycobacterium abscessus/chelonae* group using high performance liquid chromatography. Quadruple therapy for tuberculosis was discontinued at this time and replaced with amikacin, linezolid, clarithromycin and cefoxitin for empiric treatment against *Mycobacterium abscessus*, most commonly known to affect the lungs. A few days later, final cultures at our institution identified *Mycobacterium abscessus*, and treatment was continued for 8 weeks with intention to switch to PO regimen for additional 12 months.

**Discussion:** *Mycobacterium abscessus* is a rapid growing *Mycobacterium*, usually identified as *Mycobacterium abscessus/chelonae* complex. It is associated with esophageal disease, malignancy, underlying lung disease such as bronchiectasis, and rheumatologic conditions. It typically presents as an interstitial, mixed with alveolar, or reticulonodular pattern and rarely as cavitation's. However, this case shows cavitation's are possible and how easily they can be mistaken for tuberculosis lesions if proper testing is foregone. Molecular testing instead of high performance liquid chromatography is crucial to isolate the specific *Mycobacterium* species and determine proper treatment for the patient to elicit an effective response.

# Texas-Clinical Vignette-Poster Finalist

## Hayden Jefferies

**Title:** Subtle Swyer-James-MacLeod Syndrome in a 54-year-old Woman

**Authors:** Hayden B. Jefferies, Brenden J. Moore

**Introduction:** Swyer-James-MacLeod Syndrome (SJMS) is a rare acquired lung condition characterized by unilateral postinfectious obliterative bronchiolitis. The initial infection occurs in early childhood and leads to destruction and fibrosis of bronchioles, failure of early lung alveolization, and underdevelopment of the parenchyma and vasculature of the affected lung<sup>1</sup>. SJMS usually manifests radiologically as unilateral hemithorax lucency on X-ray. Presented here is a 54-year-old woman with Swyer-James-MacLeod Syndrome found on angio-CT in the workup for shortness of breath after chest radiograph was unremarkable.

**Case Presentation:** A 54-year-old African American woman presented to the emergency department complaining of shortness of breath and chest tightness, both of which had been increasing since that morning. The patient denied any fever, nausea, or vomiting. Past medical history was notable for recurrent pneumonia, asthma, and pulmonary emboli with placement of inferior vena cava (IVC) filter. On physical examination, her respiratory rate was 18 breaths per minute and oxygen saturation was 99% while breathing room air. Decreased breath sounds were heard over the left lung upon pulmonary auscultation.

Laboratory Results: of troponin I, lactic acid, procalcitonin, complete blood count, basic metabolic panel, and urinalysis testing were all within normal limits. Coagulation test Results: included a partial thromboplastin time (PTT) within normal limits, a prothrombin time (PT) of 12.7 seconds (normal: 9.4 – 12.5 seconds), and international normalized ratio (INR) of 1.14 (normal: 0.85 – 1.11 INR unit).

Anteroposterior chest radiograph revealed clear lungs with no acute abnormality. Computed tomography angiography (CTA) revealed no evidence to suggest pulmonary embolism. The parenchymal markings of the entire left hemithorax were diminished and the left main pulmonary artery was atretic. Diffuse bronchiectasis was present throughout the entirety of the left hemithorax with mucous plugging involving the left lower lobe bronchi.

The patient was admitted to the hospital and her respiratory symptoms were treated with ipratropium, albuterol, and methylprednisolone. She was also prescribed levofloxacin for infection prophylaxis. She was discharged the next day after being prescribed acetylcysteine for mucolysis. A plan for follow-up with pulmonology was arranged.

**Discussion:** This presentation of SJMS is particularly notable for the subtlety of the radiographic findings. There was no evidence of the unilateral hyperlucency or air trapping on chest X-ray that are characteristic of SJMS. Only upon CTA were the characteristic findings of SJMS revealed. Very few cases of SJMS diagnoses in adults have been reported, but the incidence of SJMS is likely underestimated due to the insensitivity of the chest radiograph in establishing the diagnosis. This patient had a number of comorbidities that commonly mimic her presenting symptoms, so SJMS was an unexpected etiology. Treatment of SJMS includes management of symptoms with bronchodilators and corticosteroids, and

infection prophylaxis with influenza and pneumococcal vaccinations. Resection of the affected lung has also been shown to be effective<sup>2</sup>.

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# Texas-Clinical Vignette-Poster Finalist

## Katherine Jernigan

**Title:** Could Implantable Contraceptive Device Usage be a Modifiable Risk Factor in the Development of Idiopathic Intracranial Hypertension?

**Authors:** Katherine Jernigan, Lindsey Stockton MD, Annika Silfvast-Kaiser MD, Mallory Clark DO, Megan Newman MD

**Introduction:** Etonogestrol (Nexplanon) is a progesterone only subcutaneous implantable contraceptive device approved for up to three year use. It is known to cause modest weight gain, abnormal bleeding, and less than 1% of women develop pelvic inflammatory disease [1]. However, idiopathic intracranial hypertension (ICH) has not been reported with Nexplanon but has been reported with Implanon- another etonogestrol implantable contraceptive [2]. This is the first case report associating Nexplanon with idiopathic intracranial hypertension.

**Case Presentation:** Our patient is a 25 year old obese female presenting from the eye clinic after complaining of diplopia, headaches, and neck pain for the past 2 weeks. She has a history of hypertension, migraines, and post-partum depression after giving birth 9 months ago. Her medications are significant for Abilify, Wellbutrin, Vitamin D, meloxicam, pre-natal vitamin and etonogestrol (Nexplanon). Nexplanon was inserted about seven months prior to presentation. At the ophthalmology clinic, dilated eye exam showed grade four papilledema with preserved acuity. On physical exam, left cranial nerve VI palsy was noted in which the patient could not abduct her left eye in left lateral gaze and she had corresponding nystamus of her right eye in left lateral gaze. In the hospital, she had an MRI and MRV of the brain which were negative for masses or venous sinus thrombosis. Subsequently, a lumbar puncture in the lateral decubitus position on a flattened bed was completed with opening pressure >55 cm H<sub>2</sub>O as it overflowed the manometer. The rest of the LP laboratory Results: were benign for infectious process. Her headache resolved following LP but the CN 6 palsy persisted. Obstetrics was consulted to remove Nexplanon and patient was discharged the next day with prescription of acetazolamide with close follow-up.

**Discussion:** According to Halmagyi et al, ICH is due to impairment of CSF reabsorption and is associated with obesity with 20 fold increase risk in young obese females [3]. The association between ICH and contraceptives has been debated for several years now. There are two case reports of ICH related to Implanon and in these cases, the trigger for ICH was deduced to be related to rapid weight gain. Our patient was 197lbs in January 2017 and was 187lbs in June 2017 which does not correlate with this theory. After a thorough work up of the causes of her intracranial hypertension, no cause was found except for Nexplanon implant. While this complication remains rare, we hope our case continues to highlight the importance of considering all medication side effects when traditional diagnostic modalities fail to reveal a cause of intracranial hypertension.

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# Texas-Clinical Vignette-Poster Finalist

## Sara Journey

**Title:** Obscure Clinical Course of Polymyositis

**Authors:** Sara Journey, Medical Student, University of Texas Medical Branch, Galveston TX., Farshad Amirkhosravi, Medical Student, University of Texas Medical Branch, Galveston TX., Megan Devine, Assistant Professor, Department of Pulmonary Medicine, UT Health Northeast, Tyler TX.

**Introduction:** Polymyositis is an autoimmune disease that classically presents with symmetric, proximal muscle weakness, arthralgias, and rash on the hands, face, and trunk. This case demonstrates an unusual presentation of polymyositis with associated interstitial lung disease.

**Case Presentation:** A 51-year-old man presented to the emergency department with several months of fever, cough, dyspnea, fatigue, and weight loss. His social history was significant for extensive exposure to organic compost, including chicken manure and old wood. His physical exam was significant for a temperature of 102.3°F, chronic skin changes on his hands, and faint rales in the lower portions of his chest. A chest x-ray showed bilateral lower lobe infiltrates. He was admitted for further evaluation and treatment of presumed pneumonia with IV vancomycin and zosyn. A CT scan of the chest showed a diffuse nodular ground-glass infiltrate. CT of the head and sinuses were unremarkable. He underwent bronchoscopy with lavage and transbronchial biopsies. All of the cultures were negative and the biopsies showed non-specific changes. Blood cultures, serum fungal antibodies, and serum rickettsial antibodies were all negative with the exception of a mildly elevated IgG *Rickettsia rickettsii* antibody. He continued to have fever so doxycycline was added. He then developed worsening dyspnea and hypoxia requiring supplemental oxygen. Given no other evidence of infectious disease, additional tests were done for auto-immune disease. He declined further over the next several days, so a video-assisted thoracoscopic surgery with open lung biopsy was done to obtain tissue for further pathology and culture. Shortly after the surgery, his lab Results: showed a positive ANA antibody and a positive Anti-Jo1 antibody. CK and aldolase were also checked, with values of 1251 ng/ml and 41.6 U/L, respectively. A diagnosis of polymyositis was made, and he was started on solumedrol. Despite doses of one gram daily for three days, he continued to show no clinical improvement. Chest imaging showed worsening disease. He developed overt respiratory failure requiring support with non-invasive ventilation. At that time, the decision was made to treat him with Cytoxan. Over the next two weeks, his imaging improved markedly, and his oxygen requirements decreased. The open lung biopsy Results: were consistent with interstitial lung disease related to connective tissue disease. His solumedrol was tapered over the course of two weeks without recurrent disease. He was then transitioned to prednisone, and ultimately, discharged from the hospital to his home.

**Discussion:** In this case, the presentation of polymyositis with associated interstitial lung disease was obscured by a history and presentation strongly suggestive of infection. It emphasizes the importance of thorough initial differential diagnoses, as his course may have been more abbreviated if the investigation for autoimmune disease was done at the time of presentation, rather than later in his hospital course.

# Texas-Clinical Vignette-Poster Finalist

## Nhon Le

**Title:** *Streptococcus constellatus* brain abscesses masquerading as metastases

**Authors:** Nhon Le BS, Ravi Patel MD, Julian Swanson MD, Kevin Yuqi Wang MD, Neda Zarrin-Khameh MD, Anita Kusnoor MD

**Introduction:** *Streptococcus constellatus* is a component of the natural flora of the mouth, gastrointestinal tract, and genitourinary tract, and has a long-recognized predilection to form abscesses. We present a unique case of *S. constellatus* brain abscesses mimicking metastases in a patient with primary esophageal squamous cell carcinoma (SCC) and a tracheoesophageal fistula.

**Case Presentation:** A 67-year-old Vietnamese gentleman with a history of heavy alcohol (4-6 beers daily) and tobacco use (30-pack-years) was brought to the emergency room after being found down and unresponsive at home by his family. His family reported a preceding four-week history of intermittent fevers, headaches, worsening dysphagia, post-prandial emesis, and a twenty-pound weight loss.

On arrival, the patient was febrile, agitated, and only mouthing words. He appeared cachectic, had coarse breath sounds bilaterally, but no focal neurologic deficits or meningismus. Computed tomography (CT) of the head showed a large, right occipital mass. CT of the chest revealed an esophageal mass with direct invasion into the right lung. Esophagogastroduodenoscopy (EGD) demonstrated a tracheoesophageal fistula at the site of the mass, and biopsy confirmed SCC. A preliminary diagnosis of stage 4 esophageal SCC with brain metastasis was made. Further, brain magnetic resonance imaging (MRI) performed for staging revealed a ring-enhancing lesion that seemed to communicate with the right ventricle. Neurosurgery resected the lesion and reported that it appeared as a necrotic tumor on gross examination. Gram-stain and culture of the mass, however, uncovered an abscess growing *Streptococcus constellatus*. Following surgery, the patient received a six-week regimen of intravenous ceftriaxone and metronidazole with clinical improvement.

**Discussion:** Brain abscesses are clinically difficult to differentiate from brain metastases, especially in patients with cancer. Our patient's brain abscess was likely caused by bacterial seeding from his tracheoesophageal fistula, which resulted in hematogenous spread. While brain abscesses due to *S. constellatus* are rare, they should be considered in patients with disruption of mucosal barriers. Magnetic resonance imaging and biopsy can differentiate brain abscesses from metastatic lesions, provide a bacteriologic diagnosis, determine the nature of intervention, and facilitate the timely initiation of treatment.

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# Texas-Clinical Vignette-Poster Finalist

## Weijie V Lin

**Title:** Is Too Much Vitamin C Harmful to Your Kidneys?

**Authors:** Weijie Violet Lin (1), Christie G Turin MD (2), David W McCormick MD (2), Christopher Haas MD (2), Gregory M Constantine MD (2), 1. School of Medicine, Baylor College of Medicine, Houston, TX, 2. Department of Internal Medicine, Baylor College of Medicine, Houston, TX

**Introduction:** Oxalate nephropathy Results: from oxalate crystal deposition in the tubules and interstitium of the kidney, causing acute tubular necrosis and renal failure. It is associated with hereditary hyperoxaluria, Crohn's disease, previous gastrointestinal surgery, and alcohol ingestion. High doses of vitamin C (2g/day or more) are recognized as a cause of oxalate nephropathy.

**Case Presentation:** A 69-year-old male with history of benign prostatic hyperplasia and small bowel resection due to strangulated Meckel's diverticulum presented with gradual onset of fatigue, anorexia, and confusion over three weeks. He denied dysuria or decreased urine output. Of note, he reported daily vitamin C intake (2g/day) over the course of >2 years. On examination, he was afebrile, normotensive, with a heart rate of 74. There were no focal neurologic deficits, but he demonstrated some difficulty with word finding. Laboratory evaluation revealed an elevated blood urea nitrogen (BUN) (135 mg/dL) and creatinine (9.51 mg/dL); baseline 7 mg/dL and 0.95 mg/dL, respectively. Computed tomography of the head did not show any acute intracranial abnormalities. A Foley catheter was placed on admission, which drained 500mL urine. Initial urinalysis was bland. On the second day of admission, he developed hematuria, with 1264 RBCs/hpf, 24 WBCs/hpf, and muddy brown casts on the repeat urinalysis. Further workup, including hepatitis panel, complement levels, ANA, and c- and p-ANCA, were negative. Due to persistently elevated BUN and creatinine, hemodialysis was initiated on the fifth day of admission. He required a total of four sessions of dialysis. As the etiology of the acute kidney injury remained unclear, a renal biopsy was performed, revealing interstitial edema, fibrosis and inflammation. Lymphoplasmacytic infiltration was noted along with the presence of positively birefringent calcium oxalate crystals within the lumen and cytoplasm of the renal tubules. Vitamin C supplementation was discontinued, and patient was educated on low oxalate diet. His renal function recovered without further need for hemodialysis at the time of discharge.

**Discussion:** We present a case of ascorbic acid-induced oxalate nephropathy in a patient with a history of small bowel resection and long-term vitamin C supplementation (2g/day), leading to acute kidney injury with tubular atrophy. Our patient had signs of post-renal obstruction due to benign prostatic hypertrophy, which may have led to increased oxalate crystal deposition in the renal tubules as result of urinary retention. Comorbid conditions including Crohn's-like colonic inflammation and history of small bowel resection may have precipitated oxalate formation via enteric malabsorption. Oxalate nephropathy could lead to severe complications including chronic renal disease requiring transplantation or long-term dialysis, or death. Given the potential severity of this disease, it is important for the clinicians to consider excessive ascorbic acid intake and oxalate nephropathy when evaluating a patient for acute renal failure in the absence of a clear etiology.

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# Texas-Clinical Vignette-Poster Finalist

## Navin N Maredia

**Title:** Metastatic Penile Melanoma

**Authors:** Navin Maredia, BS <sup>1,2</sup>, Anamika Goenka, MD<sup>1,2</sup>, 1. University of Texas Southwestern Medical Center, Dallas, TX, 2. Parkland Health and Hospital System, Dallas, TX

**Introduction:** Melanoma, the most serious skin cancer and the sixth most common cancer in North America, is associated with UV light radiation from sun exposure. The majority of melanomas develop on sun-exposed areas, but melanoma can also occur on non-sun exposed areas. This case illustrates the importance of doing a thorough physical exam, formulating an extensive differential diagnosis, and identifying possible cognitive biases that may lead to misdiagnosis.

**Case Presentation:** A 58-year-old Hispanic man with diabetes, 40-year history of smoking, and 20-year work history in construction presented to the hospital with shortness of breath, weight loss, and a productive cough. He first developed the cough 5 months ago when visiting family in Mexico and failed multiple antibiotic courses for pneumonia over the last few months. He subsequently developed shortness of breath with no fevers, chills, nausea, vomiting, hemoptysis or night sweats. Due to a concern for tuberculosis, he was admitted and placed in isolation. His vital signs including oxygen saturation were within normal limits and his white count was elevated. The chest x-ray showed a prominence in the right hilum and right lower lobe opacities unchanged from the x-ray 1 month ago. TB was ruled out with negative MTB/FIB PCR and AFB cultures with smear. The chest CT showed a bulky mediastinal and right hilar adenopathy with mass-like consolidation in the right lower lobe with internal necrosis, highly suspicious for bronchogenic carcinoma. An EBUS biopsy showed a poorly differentiated carcinoma and the immunohistochemistry staining did not indicate a primary lesion. Further history and physical exam revealed multiple penile lesions which were growing for the past several months. Skin biopsy confirmed the diagnosis of melanoma.

**Discussion:** Early detection of melanoma is very important as prognosis depends on staging with cure being excision in early stages. Metastatic disease to brain and lung are suggestive of worse prognosis. Non-sun exposed melanoma is less treatment responsive due to differences in tumor biology leading to significantly lower 5 year survival rates of 69% in blacks compared to 83% in white population. Interestingly, Hispanic and black populations usually have melanomas on non-sun exposed areas, leading to later detection. Another possible reason for the delayed diagnosis in this patient includes cognitive biases such as representativeness restraint. Representative restraint bias involves looking for a prototypical manifestation of disease: "if it looks like a duck, quacks like a duck, then it is a duck." However, relying on representativeness to make judgments can lead to misdiagnoses because the fact that something is more representative does not actually make it more likely. Therefore, one needs to be aware of and avoid cognition bias by creating an extensive differential diagnosis. Moreover, a thorough history and physical examination is essential to the diagnosis of any clinical scenario. Though the incidence of melanoma is less in non-white groups than in white groups, it is important to stay vigilant for suspicious lesions.

# Texas-Clinical Vignette-Poster Finalist

## Vignesh Ramachandran

**Title:** Acute pancreatitis secondary to hypertriglyceridemia precipitated by diabetic ketoacidosis in a previously undiagnosed ketosis-prone diabetic

**Authors:** Vignesh Ramachandran B.S.<sup>1</sup>, Diana M. Villa M.D.<sup>2</sup>, John M. Cochran M.D.<sup>2</sup>, Andrew C. Caruso M.D.<sup>2,3</sup>, Rajeev Balchandani M.D.<sup>2,3</sup>, 1. Baylor College of Medicine, Houston, TX, 2. Department of Medicine, Baylor College of Medicine, Houston, TX, 3. Department of Medicine, Michael E. DeBakey VA Medical Center, Houston, TX

**Introduction:** Diabetic ketoacidosis (DKA) is a potentially fatal complication of diabetes mellitus that may result in hypertriglyceridemia. Rarely, the resulting hypertriglyceridemia may precipitate acute pancreatitis.

**Case Presentation:** A previously healthy 33-year-old obese male presented with two days of worsening sharp epigastric pain. He endorsed a fever to 101.3F, thirst, nausea, and non-bloody, non-bilious vomiting for one day. He reported no alcohol use, history of gall stones, trauma, or new medications. Family history was significant for diabetes mellitus in his mother who was diagnosed in her 30's. On presentation, the patient was afebrile, hemodynamically stable, and had an unlabored respiratory rate of 16 on room air. Physical exam revealed severe tenderness in the epigastric region, negative Murphy's sign, and no rebound tenderness. Initial laboratory Results: revealed elevated amylase and lipase consistent with acute pancreatitis complicated by an anion gap of 17 mmol/L (pH 7.28). His blood glucose was 310 mg/dL and plasma  $\beta$ -hydroxybutyrate was highly elevated, indicative of diabetic ketoacidosis. A lipid panel showed very severe hyperlipidemia (total triglycerides 2,845 mg/dL, total cholesterol 400 mg/dL). Glycated hemoglobin was 13.5% correlating to an average glucose of 340.75 mg/dL. The patient was managed conservatively with orders for nothing per mouth, aggressive fluid resuscitation with intravenous normal saline, continuous insulin drip, repletion of electrolytes as needed, and basic metabolic panels repeated every four hours. Twenty-two hours after admission, labs revealed total triglycerides 486 mg/dL, blood glucose 176 mg/dL, and persistently closed anion gap. The patient was transitioned to subcutaneous insulin with sliding scale. However, labs 46 hours after admission showed a reopened anion gap of 13 despite down-trending total triglycerides (309 mg/dL), total cholesterol (214 mg/dL), and blood glucose (156 mg/dL). His plasma  $\beta$ -hydroxybutyrate, however, increased. He was maintained on subcutaneous insulin and started on a clear liquid diet that included juices. Labs the following morning revealed a persistently closed anion gap of 8 mmol/L with total triglycerides 274 mg/dL and  $\beta$ -hydroxybutyrate 2.569 mmol/L. At this time, the patient tolerated a regular diet and was initiated on gemfibrozil 600mg twice per day. Physical exam was benign and he was discharged later that day. One week later, workup of the patient's diabetes mellitus showed Results: consistent with A- $\beta$ + ketosis-prone diabetes mellitus.

**Discussion:** Ketosis-prone diabetes is a heterogeneous syndrome of patients who do not fit the typical phenotype of autoimmune Type 1 diabetes mellitus, but who may nevertheless present with DKA or unprovoked ketosis. This case illustrates conservative management principles in the unusual presentation of acute pancreatitis secondary to hypertriglyceridemia in a ketosis-prone diabetic. Further studies are needed to investigate the relationship between ketosis-prone diabetics presenting with the

rarely-documented triad of diabetic ketoacidosis, hypertriglyceridemia, and acute pancreatitis, including clinical features, outcomes, and longitudinal management of these patients to prevent recurrences.

# Texas-Clinical Vignette-Poster Finalist

## Katharine Yang

**Title:** Brown tumor from secondary hyperparathyroidism– A Mimicker of Metastatic Bone Disease

**Authors:** Katharine Yang, MS-IV, Albert Huh, MD, Myra Wong, MD, Nalini Ram, MD

**Introduction:** Brown tumors are non-malignant tumors of the bone that may arise from severe hyperparathyroidism in end stage renal disease (ESRD) patients. They manifest with pain and lytic lesions in the cranium, mandible, ribs, long bones, and less commonly in the spine. Brown tumors are more common diagnoses in developing countries where there is limited access to medications and dialysis for ESRD patients<sup>1</sup>. In the United States, the diagnosis is uncommon. Of all ESRD patients in the U.S., SHPT is observed in 54%, and among those with SHPT, Brown tumors occur in only 1.5-1.75%.<sup>2</sup> Brown tumors are thus not a diagnosis that comes to mind among providers in developed countries.

**Case Presentation:** We discuss a 31-year-old man with ESRD previously inconsistently receiving hemodialysis (HD), who presented with worsening lower back and hip pain for three months. The pain impaired his ability to stand straight and walk without support. He denied radiation of pain, numbness, urinary or fecal incontinence, or weight changes. The patient was on HD on an emergent basis for nine years due to lack of funding before starting scheduled HD. He was not compliant with medications until the last 1.5 years. Laboratory evaluation revealed serum PTH level of 1231pg/mL (goal < 300pg/mL for ESRD patients), serum calcium level of 9.3mg/dL (reference range 8.5-10.2), and serum alkaline phosphatase level of 351 U/L (reference range 45-117 U/L). CT of the abdomen/pelvis, ordered for abdominal pain (which subsequently resolved), revealed a 2.6 x 4.1 x 4.1 cm enhancing mass in the T11 vertebra with additional lytic lesions in the sacrum, ilium, and left femur, concerning for metastatic malignancy. MRI of the spine revealed posterior epidural extension, severe canal stenosis, cord compression, and bilateral foraminal stenosis at T10-T11 and T11-T12. He subsequently underwent embolization of the spinal mass, laminectomy to remove the spinal mass with allograft placement, insertion of an intramedullary nail in the left femur to prevent pathologic fracture, and a three-gland parathyroidectomy. Pathology reported the spinal mass to be Brown tumor of hyperparathyroidism, two parathyroid glands to be parathyroid adenomas, and the other to be unremarkable parathyroid tissue. After surgery, serum PTH level trended down to 133 pg/mL and serum calcium down to 7.1 mg/dL. He was prescribed calcitriol and supplemented with calcium to prevent hungry bone syndrome. Six months after the parathyroidectomy, he was able to walk without using a cane and independently complete activities of daily living.

**Discussion:** This case illustrates the morbidity caused by Brown tumors in a patient with ESRD. Diagnosis should be considered if the patient has had prolonged untreated or medication-refractory SHPT and presents with bone pain. Provider awareness is vital for prevention, early diagnosis, and intervention.

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# Texas-Clinical Vignette-Poster Finalist

## Thomas Johnson

**Title:** An Unexpected Cause of TUM-my Pain

**Authors:** Thomas Johnson, Jisoo Kim, and Tracey Lindeman, MD

**Introduction:** Acute pancreatitis is a common condition in the inpatient setting with many different causes, including hypercalcemia. Many syndromes can cause hypercalcemia: hyperparathyroidism, malignancy, milk alkali syndrome. One infrequent cause is sarcoidosis.

**Case Presentation:** A 31-year old Caucasian man with past medical history of DVT presented to the hospital with severe epigastric pain and malaise for a few months, worsening in the past day. He endorsed nausea, vomiting, polyuria and polydipsia. He presented to clinic several times for similar symptoms, but was diagnosed with gastroenteritis. He reported taking more than 5000 mg of calcium carbonate daily allegedly for his abdominal pain. He denied recent alcohol use. He was found to have hypercalcemia (14.7 mg/dL with ionized calcium of 7.0), hypertriglyceridemia (413), hyperglycemia (122) with an A1C of 8.1%, azotemia (BUN of 32 and creatinine of 1.90), and an elevated lipase (1689). Based on his physical exam and laboratory findings, he was initially diagnosed with acute kidney injury, type 2 diabetes mellitus and acute pancreatitis secondary to hypercalcemia.

Further work-up was conducted to find the etiology of hypercalcemia. PTH was low (4.4). Based on his history of taking excessive calcium carbonate, milk-alkali syndrome was at the top of the differential. After aggressive IV fluid resuscitation, his pancreatitis resolved. However, his AKI and hypercalcemia had not improved, warranting further workup. A CXR showed bilateral hilar lymphadenopathy and rounded opacities. Further evaluation with CT scan showed marked mediastinal lymphadenopathy, ground-glass opacities, and tree-in-bud nodularity throughout the lungs bilaterally. Bronchoscopy and biopsy revealed noncaseating granulomatous inflammation. The patient was diagnosed with sarcoidosis based on the findings of bilateral hilar lymphadenopathy, noncaseating granulomas, and elevated calcium, ACE, and Vit D 1,25-OH.

**Discussion:** Sarcoidosis is a granulomatous disease that can affect any system of the body. It occurs in all races and genders, however, it is more common in those of Northern European or African descent and in women. The most commonly affected organs are the lungs, eyes, heart and skin<sup>1</sup>. Typically, a patient presents with cough, dyspnea, fatigue, fever, arthralgias and weight loss. On imaging, patients may have reticular opacities and bilateral hilar lymphadenopathy. Diagnosis is made through biopsy of the lesions and finding noncaseating granulomatous lesions along with corresponding clinical and radiographic findings. The macrophages in the noncaseating granulomas express 1- $\alpha$  hydroxylase which converts 25-hydroxyvitamin D to 1, 25-dihydroxyvitamin D. The imposed hypervitaminosis D then causes increased gut absorption and renal excretion of calcium, resulting in both hypercalcemia and hypercalciuria. The proposed mechanism for hypercalcemia-induced pancreatitis is through deposition of calcium in the pancreatic duct and activation of pancreatic enzymes like trypsinogen within the pancreas<sup>2</sup>. This case demonstrates the importance of balancing the evidence and experience of an astute clinician in deducing the etiology of a patient's illness.

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# Virginia-Clinical Vignette-Poster Finalist

## Lily Dastmalchi

**Title:** The importance of Family History: A 26 year old with MLH1 positive mucinous appendiceal adenocarcinoma

**Authors:** Lily N Dastmalchi -Edward Via College of Osteopathic Medicine, Virginia Campus , Lisa Gray, DO- Lewis Gale Physicians Gastroenterology, General Surgery

**Introduction:** Primary appendiceal tumors occur 0.12 per 1,000,000 persons per year and only among 0.4% of all gastrointestinal tumors with an average age of onset of 60 [1,2]. Among the three types of appendiceal tumors, mucinous adenocarcinoma is the least common. The prevalence of appendiceal tumors does not increase in patients with Lynch Syndrome and are not MLH1 positive like in colorectal cancers [3].

**Case Presentation:** A 26-year-old Caucasian male presented to the emergency department with a 7 hour duration of right lower quadrant pain, anorexia, nausea and malaise. At presentation he did not know his family history, however, it was later discovered his maternal grandmother had colon cancer, mother diagnosed with colon cancer <50 years of age, sister had breast cancer at 18 years of age and his paternal grandfather had pancreatic cancer. His social history was notable for a smoking history of 13 years, alcohol consumption, and poor nutrition. Significant physical exam findings were a temperature of 99.8, heart rate of 113, and tenderness in the RLQ. There was high suspicion for appendicitis given his age and presentation. The patient was sent for a CT with contrast. Imaging showed an enhancing inflammatory appearing mass in the region of the appendix that extended to the adjacent terminal ileum, a few ileocolic chain lymph nodes and a 1.4 cm hypodense focus in the left hepatic lobe. Radiology could not discriminate between acute appendicitis or appendiceal carcinoma as the cause of illness. Per imaging and physical exam findings, the patient was diagnosed with appendicitis and prepared for appendectomy. The laparoscopic appendectomy was unsuccessful as the appendix was unidentifiable amongst the large mass adherent to the abdominal wall. A right hemicolectomy was performed via open laparotomy with resection of the mass and grossly normal bowel margins, 25 mesenteric lymph nodes, and peritoneal implants. Pathology report showed a moderate to poorly differentiated mucinous adenocarcinoma arising from the appendix with 4/25 lymph nodes positive for metastasis. Assessing with the revised Bethesda Criteria, the patient was younger than 50 years of age and had first and second degree relatives with cancers associated with Lynch Syndrome. Genetic testing was indicated and the masses were positive for MLH1, PMS2, MSH-6, and MSH-2.

**Discussion:** According to the American Gastroenterology Association, current guidelines for those with Lynch Syndrome includes upper endoscopy and colonoscopy biennially. Imaging of the appendix should be included as these tumors are asymptomatic until there is much large and small bowel involvement and metastasis. Additionally, patient family history is of fundamental value to assess the need to consider cancerous processes as the cause of an acute onset of symptoms.

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# Virginia-Clinical Vignette-Poster Finalist

## Michael Kahn

**Title:** An unusual case of bone marrow suppression in a patient with Lemierre's syndrome

**Authors:** Kahn, Michael; George Washington University School of Medicine and Health Sciences, Malik, Raeva; George Washington University Hospital, Department of Medicine, Internal Medicine Residency Program, Paul, Courtney; George Washington Medical Faculty Associates, Department of Medicine, Division of Hospital Medicine, Siegel, Marc O.; George Washington Medical Faculty Associates, Department of Medicine, Division of Infectious Diseases

**Introduction:** Lemierre's syndrome, a suppurative thrombophlebitis of the internal jugular vein, is a rare disease with an incidence of 1 per million patients. Case reports of this disease are not uncommon; however, we report a case of Lemierre's syndrome in a healthy 29-year-old man whose diagnosis was delayed due to his afebrile status and myelosuppression, an atypical presentation that has not been previously reported in the literature. This poster will discuss the diagnosis and treatment of this potentially fatal disease.

**Case Presentation:** A previously healthy 29-year-old man presented to the hospital with a history 4 days of sore throat, fevers, and nonpleuritic chest pain. In the emergency room he was afebrile with a blood pressure of 96/52 mmHg and tenderness over the right chest. He had no pharyngeal exudates, trismus, nuchal rigidity, or cervical lymphadenopathy. Initial laboratory studies were significant for white blood cell count 8800 cells/ $\mu$ L, platelet count 83000 cells/ $\mu$ L, and serum creatinine 2.0 mg/dL. Intravenous piperacillin-tazobactam was initiated. Admission blood cultures grew *Fusobacterium necrophorum* after 48 hours and a diagnosis of Lemierre's syndrome was made. Computerized tomography (CT) scan of the neck and thorax showed a left internal jugular vein thrombus and multiple septic emboli throughout the lungs. The patient subsequently became febrile to 38.1 C and developed leukocytosis up to 16800 cells/ $\mu$ L on hospital day 3, and significant thrombocytosis. After clinical improvement the patient was switched to oral metronidazole and made a full recovery. No anticoagulation was initiated.

**Discussion:** Clinicians should consider Lemierre's syndrome in patients with pharyngitis and a negative rapid *Streptococcus pyogenes* test, given that patients appropriately treated for Lemierre's syndrome still have an estimated 5% mortality rate, which increases dramatically if this entity goes untreated.<sup>1-2</sup> Broad-spectrum antibiotics such as piperacillin/tazobactam are appropriate for hospitalized patients with a transition to oral penicillin or metronidazole once the patient clinically improves. Antibiotic courses range from 10 days to 8 weeks.<sup>1,3</sup> There is no clear evidence to support the use of anticoagulation in Lemierre's syndrome. However, a recent retrospective study suggested adding anticoagulation for patients without clinical response to antibiotics alone within 48-72 hours.<sup>4-5</sup>

Bone marrow suppression in sepsis, a well-described phenomenon in systemic Gram negative infections,<sup>6</sup> has not been previously reported in association with Lemierre's syndrome. As highlighted in this case, myelosuppression can delay the identification of this uncommon and frequently misdiagnosed infection, thereby increasing the already high morbidity and mortality.<sup>4</sup> Our patient's presentation with pharyngitis without neck tenderness and a normal white blood cell count were not initially suggestive of Lemierre's syndrome. However the patient's history of a recent fever associated with his thrombocytopenia and relative leukopenia should have prompted the physicians to consider Gram

negative sepsis as a possible cause of his symptoms.<sup>6</sup> This case raises the importance of considering Lemierre's syndrome even in atypical presentations given the high mortality associated with delayed diagnosis.

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# Virginia-Clinical Vignette-Poster Finalist

## Ibrahim Tora

**Title:** Intracranial Hemorrhage in Epstein-Barr Virus Induced Hemophagocytic Lymphohistiocytosis: A rare complication of a rare disease

**Authors:** Ibrahim Tora, Christopher Armstrong

**Introduction:** Hemophagocytic lymphohistiocytosis (HLH) is a rare disorder of immune hyperactivation caused by Natural Killer Cell dysfunction. The onset of the syndrome is triggered by an immune insult, most commonly a persistent viral infection or hematological malignancy. The disease is difficult to diagnose and has high mortality even with appropriate treatment.

**Case Presentation:** A 22-year-old male presented to an outside facility with generalized weakness worsening over four days associated with diffuse muscle pain, shortness of breath and headache. The patient was a migrant farm worker from Mexico who moved to the United States nine months prior. He was hospitalized six months previous for a respiratory infection and given a diagnosis of anemia. Initial workup revealed rhabdomyolysis, acute kidney injury and elevated liver enzymes. The patient was transferred to our hospital after three days.

He presented to our facility appearing ill but non-toxic. He was afebrile, mildly hypotensive, and bradycardic. Physical exam revealed scleral icterus, diffuse musculoskeletal tenderness and hepatosplenomegaly. Laboratory values were significant for pancytopenia (WBC 2.5, Hgb 8.2, Plt 46), acute kidney injury (Cr 5.1, BUN 81), liver injury (T. bili 3.6, ALT 221, AST 595, ALP 319), coagulopathy (D-dimer positive, fibrinogen 79, INR 1.5), lipid derangements (LDL 8, HDL 6, VLDL 115, triglycerides 577), massive hyperferritinemia (18,364), evidence of hemolysis (LDH >2,500, haptoglobin <10), abnormal inflammatory markers (CRP 9.5, ESR 15), and rhabdomyolysis (CPK 48,240). Hepatosplenomegaly, bilaterally enlarged kidneys, hydropneumothorax without tension, and ascites were noted in imaging. Bone marrow biopsy showed hypercellular marrow with myeloid hyperplasia. Flow cytometry was unconvincing for malignancy. A presumptive diagnosis of HLH was made. Treatment with methylprednisone was initiated with improvement clinically and in laboratory measures. On hospital day four, the patient had worsening anemia (Hgb 7.2, WBC 7.0, Plt 63) prompting an increase in steroid dosage. On hospital day five, the patient developed severe headache with nausea and vomiting refractory to medical management. The patient suffered a seizure and CT showed intracranial hemorrhage with brainstem herniation. He underwent emergent subtentorial evacuation and ventriculostomy. Post operatively, the patient had a Glasgow Coma Score of 3 and loss of nearly all brainstem reflexes. His neurological status remained unchanged and he passed on hospital day eighteen. A diagnosis of EBV-induced HLH was confirmed with EBV DNA PCR (>81,000 copies) and elevated CD25 (32,945 U/mL).

**Discussion:** Four of eight diagnostic criteria identified in the HLH-2004 trial were fulfilled on presentation. Standard Treatment with etoposide was discussed but delayed due to an improving clinical picture on steroid therapy. This case demonstrates that intracranial hemorrhage is a rare complication of EBV-induced HLH. It emphasizes that a high index of suspicion is needed for diagnosis and empiric treatment should be pursued even in the absence of confirmed disease.

# Wisconsin-Clinical Vignette-Poster Finalist

## Joshua Lorenz

**Title:** A rare case of pulmonary blastomycosis complicated by ARDS in an immunocompetent individual

**Authors:** Sophie Rodriguez, Joshua Lorenz, Pinky Jha, MD

**Introduction:** Blastomycosis is a systemic fungal infection caused by *Blastomyces gilchristii* or *Blastomyces dermatidis*. Oftentimes, infection can mimic other diseases, resulting in delayed diagnosis and treatment and therefore worse outcomes. Rarely, it is complicated by acute respiratory distress syndrome (ARDS), which is associated with a high mortality rate. Here we report a rare case of an immunocompetent patient with blastomycosis complicated by ARDS.

**Case Presentation:** A 71-year-old female presented to an emergency department with progressive weakness and dyspnea with dry cough for 2 weeks; she was afebrile but hypoxic, requiring 2 liters oxygen by nasal cannula. Physical examination was remarkable for diminished right lung sounds. Labs were unremarkable except for elevated C-reactive protein (194.6 mg/L). Chest x-ray revealed a dense consolidation in the right lung base with pleural effusion. CT with PE protocol showed a small right lower lobe pulmonary embolism, mass-like infiltrate, and central adenopathy. Pneumonia and malignancy were initially suspected. Moxifloxacin was started and later switched to ceftriaxone. The patient was started on enoxaparin, but this was discontinued due to bleeding complications. Therefore, she subsequently underwent IVC filter placement. Two right-sided thoracenteses were performed; pleural fluid analysis demonstrated exudative effusions. Bronchoscopy, bronchoalveolar lavage (BAL), and bronchial biopsy of the right upper lobe were performed. Cultures and cytology were negative for organisms and malignancy, respectively.

She continued to be hypoxic, now requiring 7-10L high-flow oxygen. She was transferred to the Authors' hospital 13 days after initial presentation. Upon arrival, patient was tachypneic with increased work of breathing. Due to impending respiratory failure, the patient was intubated. She developed septic shock complicated by ARDS requiring norepinephrine. Another bronchoscopy with BAL was performed. Analysis showed a red blood cell count of 4500/ $\mu$ L and a white blood cell count of 1,575/ $\mu$ L; 86% neutrophils, 1% lymphocytes, 6% eosinophils, and 7% monocytes/macrophages. Visualization of BAL fluid showed broad-based budding yeast, and blastomycosis was suspected. The patient was started on amphotericin B and steroids due to the severity of the inflammatory response. Cultures later confirmed *Blastomyces dermatidis*. She completed 2 weeks of amphotericin B during hospitalization and was discharged to a long term care facility on itraconazole 200mg twice daily for 6-12 months.

**Discussion:** This case illustrates the need for clinicians to maintain a high suspicion for fungal infections in patients with respiratory distress refractory to standard care. Although ARDS is a rare complication of blastomycosis, it has a high mortality rate. The standard treatment regimen alone is insufficient to treat blastomycosis complicated by ARDS. This case, along with several others, demonstrates successful management with adjuvant steroids. Nevertheless, there have been no conclusive studies indicating the effectiveness of an adjunctive agent in the treatment of blastomycosis associated ARDS. Similar cases should continue to be reported to increase clinicians' awareness of this infection and to hasten diagnosis and develop more effective treatments.

# Wisconsin-Clinical Vignette-Poster Finalist

## Mason MocarSKI

**Title:** Idiopathic Hypereosinophilic Syndrome Presenting as Gastrointestinal Symptomatology

**Authors:** Mason MocarSKI, MS3; Devin Madenberg, DO; Corey Ganshert, DO; Andrew Brown, MS4  
Medical College of Wisconsin, Department of Medicine

**Introduction:** Hypereosinophilic syndrome (HES) is a rare condition that occurs when overproduction of eosinophils leads to tissue infiltration and organ damage in the absence of known secondary causes. Several different organ systems can be affected, resulting in unpredictable presentations and challenging diagnoses. In this case, we present a patient with HES that manifested as gastrointestinal symptoms.

**Case Presentation:** A 34-year-old female with a history of narcolepsy and hypothyroidism presented to a GI clinic with a 1-week history of diarrhea, nausea and right upper quadrant abdominal pain. She denied any recent medication changes, diet changes, or travels. Labs were significant for elevated AST to 141, ALT to 235, Alkaline Phosphatase to 256, and WBC to 16.8 with an absolute eosinophil count (AEC) of 3.5. Ova and parasite stool testing and strongyloides IgG were negative. A peripheral blood smear confirmed the presence of leukocytosis with eosinophilia. Abdominal ultrasound showed gallbladder wall thickening but no dilatation or gallstones. Hepatitis and CMV screens were negative, Ceruloplasmin was normal, ferritin unremarkable, alpha-1 antitrypsin was normal, and anti-mitochondrial antibody was negative. A HIDA scan and MRCP were performed, showing a diffusely thickened gallbladder with normal function. Three days after her initial presentation, LFTs had risen to AST 312, ALT 483 and Alk Phos 386. Her AEC increased to 7.9 and her INR rose from 1 to 2.3, prompting direct admission to the hospital. A full workup for eosinophilia found no obvious cause. Hematologic malignancy was ruled out with unremarkable flow cytometry and FISH analysis. Autoimmune etiologies were deemed unlikely with a negative ANA and ANCA. Due to the concern for evolving liver failure, a transvenous liver biopsy was performed. This revealed prominent eosinophilic inflammation, thus confirming our suspicion for HES. She was started on a 60mg daily course of oral prednisone and responded in dramatic fashion. Her AEC dropped to 0.28 after one dose and her LFTs slowly began to trend downward after subsequent doses. Two months after discharge, her prednisone was tapered down to 10mg daily and her LFTs normalized.

**Discussion:** This case shows an example of idiopathic HES with gastrointestinal involvement, just one of many presentations in which this disorder can appear. Idiopathic HES is a diagnosis of exclusion, thus a comprehensive, systems-based evaluation should be performed to provide a timely and accurate diagnosis in symptomatic patients with eosinophilia. Due to the potential for HES to lead to severe damage to effected organs, prompt treatment with corticosteroids should be initiated when suspected.

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# Wisconsin-Clinical Vignette-Poster Finalist

## Blair L Tilkens

**Title:** Case of esophageal intramural pseudodiverticulosis in an AIDS patient

**Authors:** Blair Tilkens MS4 , Dr. Julien Fahed, MD, & Dr. Aboud Affi, MD

**Introduction:** Esophageal intramural pseudodiverticulosis (EIP) is a rare disease that is described as small outpouches of the esophageal wall<sup>1</sup>. The pouches do not incorporate the muscularis propria, therefore they are not true diverticuli. The etiology is unclear; however, pathology has shown dilated excretory ducts of the submucosal glands<sup>2</sup>. Other diseases commonly associated with EIP are esophageal strictures, gastroesophageal reflux disease, diabetes, esophageal Candidiasis, and chronic alcoholism. The common presentation is odynophagia or dysphagia but often patients are asymptomatic. The diagnosis is made with imaging using an esophagram or esophagogastroduodenoscopy (EGD). We present a patient with impressive upper endoscopic findings of EIP.

**Case Presentation:** A 56 year old African American woman with a history of HIV with AIDS, hepatitis C cirrhosis, and esophageal candidiasis presented with odynophagia, dysphagia, and associated diffuse abdominal pain. She lived in a homeless shelter, drank two beers daily, smoked three cigarettes daily, and smoked crack cocaine regularly. She was noncompliant with her antiretroviral treatment and never received treatment for hepatitis C. She denied nausea, vomiting, melena, hematemesis or hematochezia. On physical exam she had oral thrush of the oropharynx and tongue. She had diffuse tenderness to palpation of the abdomen. Her most recent CD4 count was 49. EGD was performed and revealed multiple small diverticuli of the proximal esophagus without evidence of stricture, esophagitis or esophageal ring. These findings are compatible with diffuse EIP. Random biopsies showed signs of mild chronic inflammation. There was no viral cytopathic effect, intestinal metaplasia/dysplasia, or GMS stain for fungal organisms.

**Discussion:** Our patient had previously been diagnosed with esophageal candidiasis and presented with EIP and no signs of active esophagitis. Patients may present with dysphagia or odynophagia but often they are asymptomatic. It has been suggested that chronic submucosal inflammation causes periductal fibrosis leading to obstruction and dilation of secretory ducts in submucosal glands of the esophagus forming the pseudodiverticula<sup>3</sup>. Of the EIP cases reported some were complicated by esophageal strictures but few reported EIP with esophageal candidiasis<sup>4</sup>. One study showed that aggressive treatment of the esophageal strictures or esophagitis lead to the improvement of the EIP<sup>5</sup>. Conversely, other reports failed to show improvement after 2 years of treatment with PPI therapy<sup>6</sup>. One case report demonstrated successful treatment of EIP following treatment of the Candida infection<sup>3</sup>. By decreasing chronic inflammation of the esophageal wall with antifungals and/or PPIs, the EIP tends to improve or resolve.

In our case, the patient was previously treated for esophageal candidiasis, however the diverticula still remained on endoscopy. This case is unique in that previous esophageal candidiasis is associated with the development of EIP and the diverticula did not resolve after clearance of the infection. The patient was started on PPI will be followed for improvement of her EIP.

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# Wisconsin-Clinical Vignette-Poster Finalist

## Benjamin Wang

**Title:** A rare case of Urea Cycle Disorder in Adulthood

**Authors:** Benjamin Wang, Paul Iglar, Pinky Jha M.D.

**Introduction:** Urea cycle disorders are metabolic disorders of nitrogenous waste substances due to either complete or partial deficiency of enzymes.

**Case Presentation:** A 48-year-old female with a past medical history of asthma, peptic ulcer disease and PE presented to the emergency department with lethargy, gait disturbance, and weakness for a day. Three weeks prior to this admission, the patient had EGD that showed gastric ulcer and esophageal stricture requiring stricture dilatation procedure. Patient continued to have nausea and vomiting after the procedure. Upon presentation, the patient was lethargic. Vital signs were notable for tachycardia. On examination patient was unresponsive. Laboratory analysis showed an ammonia level of 406 umol/L, a bicarbonate of 8, and an anion gap of 31. Additional workup including imaging and toxicology were negative. The patient was admitted to the ICU for hyperammonemia and was intubated for airway protection. A diagnosis of urea cycle disorder was discovered upon review of history. About 6 years ago patient had presented to the hospital with altered mental status and was found to have ammonia of 756 umol/L associated with anion gap acidosis. Extensive workup including hepatic function test and toxicology screen was unremarkable. Given her presentation the genetics team was consulted who confirmed the diagnosis of urea cycle disorder. During the ICU stay, patient was treated with sodium phenylacetate, sodium benzoate, arginine replacement, and dextrose 10% 0.45% saline as per the genetics recommendations. Patient was extubated on day 5 following improved ammonia levels and admitted to the medicine floor on hospital day 9. Ammonia levels remained stable and patient regained normal functional status, and the patient was discharged on hospital day 11.

**Discussion:** Here we present an unusual case of urea cycle disorder presenting in an adult woman. Though many cases of urea cycle disorder present in the neonates 24-48 hours following birth, a delayed presentation may be observed in female carriers with partial ornithine transcarbamylase deficiency and with partial activity of all urea cycle enzymes because it is inherited as an X-linked trait. These patients are often only symptomatic when stress-related events trigger increased ammonia levels. In our patient, her lack of a consistent diet due to vomiting led to a state of starvation likely triggering a catabolic state involving protein breakdown. Hyperammonemia should be addressed immediately in the acute setting as it can cause irreversible neurological injury or death. Treatment includes IV sodium benzoate and phenylacetate with hemodialysis at 8 hours if ammonia levels do not decrease. A diagnosis of urea cycle disorders should be suspected in patients who had a recent stressor with progressive lethargy and confusion that is refractory to hyperammonemia therapies.

# **2018 Medical Students Research – Podium Presentations**

# Connecticut-Research-Podium Presentation

## Trevor Borries

**Title:** The Impact of Telemedicine on Patient Self-Management Processes and Clinical Outcomes for Patients with Type I of II Diabetes Mellitus in the United States: A Scoping Review

**Authors:** Trevor M Borries<sup>1</sup>, MS; Arti Bhukhen<sup>1</sup>; Joshua Rismany<sup>1</sup>; Jessica Kilham<sup>1</sup>, MLIS; Richard Feinn<sup>1</sup>, PhD; Thomas P Meehan<sup>1,2</sup>, MD, MPH, <sup>1</sup> Quinnipiac University Frank H. Netter MD School of Medicine, North Haven, CT, <sup>2</sup> Connecticut Center for Primary Care, Farmington, CT

**Introduction:** Diabetes Mellitus (DM) is a chronic condition that affects 29 million people in the United States. Diabetic patients require many examinations, procedures, and clinical visits. New tools are being developed and tested to better engage patients and to improve diabetic care and clinical outcomes. Telemedicine, which is the application of telecommunication technology to treat or diagnose patients, is one such tool.

**Methods:** We utilized a structured scoping review protocol to conduct this research. We searched the published medical literature utilizing two databases, PubMed and CINAHL, and we included all original research articles published prior to April 15, 2016. Using a 4-step systematic approach, we identified, reviewed, extracted and summarized data from all relevant studies.

**Results:** We identified 594 articles in an initial search conducted with specific MESH terms. Next, we removed duplicates and applied inclusion criteria, narrowing the list to 227 articles. Then, we applied exclusion criteria which narrowed our selections to 40 relevant articles. Finally, we identified 2 additional articles via cited searching. This brought our final article total to 42. Of these, 21 involved patients with type II DM, 9 involved patients with type I DM, and 12 did not specify DM type. Of the articles that reported setting of care, 91% (21/23) were in primary care. Telemedicine impact was reported as positive in articles addressing several components of patient self-management: 83% (10/12) assessing adherence to blood glucose monitoring with half (5/10) achieving statistical significance ( $p < 0.05$ ); 78% (11/14) evaluating day-to-day decision-making related to self-care with 72.7% (8/11) achieving statistical significance ( $p < 0.05$ ); and 62% (8/13) assessing adherence with medications with 37.5% (3/8) achieving statistical significance ( $p < 0.05$ ). The most commonly reported clinical outcome was an intermediate measure, i.e. HbA1c level. We found that 69% (18/26) of the articles evaluating this outcome reported telemedicine having a positive impact with 67% (12/18) statistically significant ( $p < 0.05$ ). No study evaluated impact on long term clinical outcomes such as blindness, amputation, cardiovascular events, development of chronic kidney disease, or mortality.

**Conclusion:** This scoping review provides important information about studies evaluating the impact of telemedicine on patient self-management and on clinical outcomes in patients with DM. Published research suggests that telemedicine is having a positive impact on self-management processes and on HbA1c levels. However, future evaluative reviews are necessary to confirm and to quantitate the impact of telemedicine on self-management processes, and primary studies are necessary to evaluate its impact on long term clinical outcomes.

# Mississippi-Research-Podium Presentation

## Shaoxin Lu

**Title:** Aspirin Protects Heart Against Ischemia-reperfusion Injury Via LKB1-Sestrin2-AMPK Signaling Cascade

**Authors:** Yanping Bi MD, Shaoxin Lu MS3, Chelsea Lockett, Ji Li PhD, UNIV OF MISSISSIPPI MED CENTER, Jackson, MS

**Introduction:** AMP-activated protein kinase (AMPK) is a stress signaling enzyme that orchestrates the regulation of energy pathways. Intrinsic AMPK activation protects the heart against ischemic injury, but whether the pharmacologic AMPK stimulation by aspirin mitigates ischemia-reperfusion (I/R) damage is unknown.

**Hypothesis:** Aspirin as an emerging AMPK agonist could stimulate the cardiac AMPK signaling pathway that attenuates myocardial ischemia-reperfusion injury.

**Methods:** The cardioprotective activity of aspirin was evaluated in an *in vivo* regional I/R (45 min/24 hours) injury model in which the left anterior descending coronary artery (LAD) was occluded and released. The Langendroff perfused heart system was used to approach an *ex vivo* global ischemia and reperfusion model.

**Results:** Isolated mouse hearts *ex vivo* pre-treated with aspirin had better recovery of left ventricular contractile function (55% vs. 29% of baseline heart rate-pressure product;  $p < 0.05$ ) and less myocardial necrosis (56% reduction in infarct size;  $p < 0.01$ ) during post-ischemic reperfusion. Pre-treatment with aspirin *in vivo* attenuated myocardial infarction in C57BL/6J mice undergoing left coronary artery occlusion and reperfusion compared to vehicle (36% vs. 18%,  $p < 0.05$ ). Mouse hearts with genetically inactivated AMPK catalytic subunit were not protected by aspirin treatment, indicating the critical role of cardiac AMPK activation by aspirin in cardioprotection against ischemic injury. Moreover, pre-treatment with aspirin *in vivo* increased the AMPK downstream phosphorylation and inactivation of eukaryotic elongation factor 2 (eEF2), preserved energy charge during ischemia and delayed the development of ischemic contracture. Aspirin treatment augmented the interaction between AMPK upstream LKB1 and Sestrin2-AMPK complex, also enhanced activation of AMPK downstream endothelial nitric oxide synthase (eNOS) during ischemia, which partially attenuated myocardial stunning.

**Conclusion:** AMPK is a therapeutic target that can be stimulated by a direct-acting small molecule in order to prevent injury during I/R. The use of aspirin may represent a novel strategy to protect the heart and other solid organs against ischemia.

# Missouri-Research-Podium Presentation

## Nishkala Shivakumar

**Title:** A digital health tool aimed at COPD in high-risk individuals reduces all-cause hospitalization via effect on other co-morbidities: A randomized, controlled trial

**Authors:** Shivakumar N1, Xu R1, Sink E2, Kim E2, Patel K2, Groenendyk J1, Javaherian K1, Peters R1, Shifren A1, Polites G1, Blanchard M1, Ross W1,+  
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**Introduction:** Due to its capacity to perform remote assessments, telemedicine is rising as a new force in COPD management. Patients with COPD often have multiple comorbidities, including heart failure, diabetes, hypertension. The effect of a text messaging digital health tool, EpxCOPD, on all cause hospitalization has not yet been assessed. We conducted a six-month randomized-controlled-trial to study the effect of an automated telemedicine intervention on patients' all-cause hospitalizations for a population of actively engaged patients at the resident clinic at Washington University in St. Louis.

**Methods:** We randomized 149 patients with a diagnosis of COPD in the past 24 months enrolled to receive intervention at a primary care clinic who are actively followed by residents, defined as having made at least one appointment in the past year. The treatment group received daily phone messages from an automated system asking them to report if they were breathing better, worse, or the same the day prior. Patients reported their breathing status by responding to the text message or call. If a patient reported breathing worse, an alert was sent directly to that patient's provider within the clinic. The control group received the same daily phone messages as the treatment group. However, no proactive breathing alerts were ever generated to the provider for these subjects and instead subjects were directed to make an appointment using the main line. The primary outcome was number of patients hospitalized due to COPD-related cause or any cause during the trial period.

**Results:** The absolute risk reduction (ARR) in percentage of patients with all-cause hospitalizations was 11.55% between treatment and control groups. The absolute difference comparing all-cause hospitalization reduction and COPD hospitalization reduction was 7.88% (1.47-14.57). The hazard ratio comparing treatment and control group's time to all-cause hospitalization was 1.917 (0.9439-3.892). Subject engagement averaged 82% (78-93%) and 73% (75-85%) for control and treatment groups respectively.

**Conclusion:** In this analysis, we find that a telehealth tool, EpxCOPD, has a strong effect on all-cause hospitalization. Although the tool was primarily focused on COPD symptomatology, in this actively followed group, we find the intervention actually having a significantly greater than expected change in all-cause hospitalizations as compared to placebo, suggesting a broader effect of the intervention on comorbidities. Connecting patients with providers outside the bedside, e.g. telephonic contact, may give better care than the existing standard, especially for high-risk patients with multiple co-morbidities. The use of non-smartphone interventions reduces barriers to care presented by more complicated and expensive technologies. The intervention represents a simple, innovative, and inexpensive tool for improved management of care for patients with COPD and other comorbidities. Further study is necessary to understand the mechanism by which this effect occurs.

# New York-Research-Podium Presentation

## Luisa Sperry

**Title:** Why Are We Missing Delirium in the ICU? Quality Improvement Implications of a Nursing Survey on Delirium Screening

**Authors:** Luisa Sperry, MS4<sup>1</sup>; Michael Mintz, MS4<sup>1</sup>; Aaron Pinkhasov, MD<sup>2</sup>, 1. Stony Brook University School of Medicine, Stony Brook, NY, 2. Chairman, Department of Behavioral Health, NYU Winthrop Hospital, Mineola, NY

**Introduction:** Despite its high prevalence in critically ill patients, delirium frequently goes unrecognized. The Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) is a validated delirium screening tool with three possible ratings: positive (delirium present), negative (delirium absent), and unable to assess (UTA). The purpose of this study is to evaluate baseline CAM-ICU adherence and delirium recognition in the ICU. We also sought to assess nurses' views on delirium screening and perceived barriers to using the CAM-ICU in order to determine areas for improvement.

**Methods:** CAM-ICU Assessment Comparison: Two trained investigators performed CAM-ICU assessments twice daily for all patients aged 65 and over admitted to the medical ICU at NYU Winthrop Hospital during a two-week period in December 2016. Investigators' assessments were compared to corresponding nursing assessments. Survey: ICU nurses completed an anonymous paper survey distributed by the unit nurse manager. The 13-question survey consisted of 10 five-point Likert scale questions, two yes/no questions, and one free text question.

**Results:** CAM-ICU Assessment Comparison: 58 unique patients were included for a total of 156 CAM-ICU assessments. Investigators identified 43 (28%) positive delirium assessments. However, nurses missed delirium in 32 (74%) instances, instead assigning an inappropriate negative (34%, n = 11) or UTA rating (41%, n = 13) or not performing the CAM-ICU at all (25%, n = 8). Survey: The response rate was 77% (33 of 43). Nurses feel it is important to screen for delirium (88%) and routinely use the CAM-ICU (79%). Furthermore, they believe the CAM-ICU is a valid and reliable way to screen for delirium (73%) and feel they have adequate time to use this tool (73%). However, a minority of nurses believes their screening will ultimately improve patient care (45%), and few feel that physicians consider screening Results: when making treatment decisions (6%). Additionally, nurses do not believe that the CAM-ICU is validated for use in intubated and sedated patients (66%) or those with preexisting dementia (81%).

**Conclusion:** ICU nurses believe it is important to screen patients for delirium and are willing to do so. However, they do not believe that the CAM-ICU is validated for use in intubated and sedated patients or those with preexisting dementia. This finding may account for many UTA ratings inappropriately assigned to delirious patients. Additionally, nurses do not feel that their assessments influence physicians' management decisions or patient outcomes. These findings suggest that interventions to improve delirium screening should focus on providing education on assessing patients who are intubated and sedated or have preexisting dementia. Furthermore, these findings highlight the need to develop a system for physicians to be alerted to positive delirium screening assessments made by nurses, so that this information can be used to improve patient care.

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# Tennessee-Research-Podium Presentation

## Rochelle Wong

**Title:** Model of an Interdisciplinary Medical-Legal Partnership at a Student Run Free Clinic

**Authors:** Rochelle Wong, BS<sup>1,2</sup>, Rohini Chakravarthy, BA<sup>1,2</sup>, Allison Jones, JD<sup>3</sup>, Chay Sengkhounmany, JD<sup>4</sup>, Shannon Jordan, LMSW<sup>1</sup>, Robert F. Miller, MD<sup>1,2</sup>

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**Introduction:** Unmet civil legal needs have a negative impact on overall health. 86% of civil legal needs remain unaddressed because legal services are limited. The medical-legal partnership (MLP) was created to better address the connection between poverty and poor health. Shade Tree Clinic (STC) is a student-run primary care clinic that serves as a free, comprehensive medical home for 380 uninsured patients and exposes future healthcare professionals to the MLP model early in their careers. Legal issues are common at STC due to limited access to resources and services. Our MLP program aimed to create a sustainable and effective means of identifying and addressing legal needs among STC patients.

**Methods:** The Shade Tree Social Work Department addresses the social determinants impacting the health of our patients. Ten medical student and nine law student volunteers work alongside a licensed social worker and two attorneys to connect patients with community resources and provide brief annual screenings for social and legal needs.

STC partnered with Legal Aid Society of Middle Tennessee and the Cumberlandands to provide free legal services to low-income Tennessee residents. STC also works with Vanderbilt University Law School to bring law students to clinic when a licensed attorney is not available. Law students use a screening tool developed by the Tennessee Alliance for Legal Services to capture patients' civil legal needs and connect them to appropriate resources.

Legal didactic trainings were also provided as supplemental components of the medical and law school curriculum to improve legal literacy.

**Results:** Between 2016-2017, of the 261 patients seen by STC social work volunteers, 65 patients (25%) had an unmet legal need identified. Of those, 54 cases were opened by Legal Aid Society. 20 cases were lost to follow-up or ineligible for services due to documentation status. 21 received advice, 5 received brief services, 2 were decided by an administrative agency, and 6 were ongoing. The majority of cases were social security or food stamp appeals, housing disputes, and immigration counseling.

From the didactic portion of the model, 100% of the 37 students and volunteers who received trainings said they had a better understanding of the legal issues patients face. 95% plan to use what they learned in their medical or legal practice.

**Conclusion:** There is a large need for legal services among low-income and uninsured patients seen at student-run free clinics. Our MLP model has been successful in providing a service that is financially inaccessible to most our patients, as well as improving legal literacy of future providers and attorneys.

Next steps include investigating the success rate of opened cases and obtaining qualitative data of patient satisfaction with legal aid services. Our data suggests the importance of utilizing funds to aid in establishing medical-legal partnerships.

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# **2018 Medical Students Research – Poster Finalists**

# California-Research-Poster Finalist

## Samuel Asanad

**Title:** Can Patient Disability Status as Early as 4 Days Post-stroke Accurately Predict Final Disability Status at Day 90?

**Authors:** Asanad S<sup>1</sup>, Starkman S<sup>1</sup>, Hamilton S<sup>2</sup>, Conwit R<sup>3</sup>, Sanossian N<sup>4</sup>, Saver JL<sup>1</sup>, 1. Department of Neurology, David Geffen School of Medicine at UCLA, Los Angeles, CA USA, 2. Stanford Stroke Center, Stanford University Medical School, Standord, CA USA, 3. National Institute of Neurological Disorders and Stroke (NINDS), National Institute of Health (NIH), Bethesda, MD USA, 4. Neurocritical Care/Stroke Section, Keck School of Medicine of USC, Los Angeles, CA USA

**Introduction:** Final patient disability status following an acute stroke is classically assessed 3 months (90 days) post-onset, standardly using the modified Rankin Scale (mRS). However, a reliable method to predict patient disability status at the final day-90 mark is lacking and is critically needed to project the outcomes of patients lost to follow-up post-discharge in pivotal clinical trials and in clinical quality improvement programs. This study proposes a predictive model of final patient disability status using patient information on initial presentation post-stroke. We hypothesized patient disability status as early as 4 days post-stroke can accurately predict final disability status at day-90.

**Methods:** We enrolled 1633 all acute cerebral ischemia and intracranial hemorrhage patients from the NIH Field Administration of Stroke Therapy–Magnesium (FAST-MAG) Phase-3 Clinical Trial. All patients enrolled were assigned mRS scores both on day-4 and day-90 post-stroke. The significance of day-4 mRS scores in predicting final day-90 patient outcomes was statistically analyzed using Spearman correlation and weighted kappa agreement. Multivariate and bivariate regression analyses performed accounting for 16 candidate baseline variables.

**Results:** Among the 1633 enrolled patients with acute cerebrovascular disease, 1245 (76.2%) were identified as acute cerebral ischemia and 387 (23.7%) with acute intracranial hemorrhage. Day-4 mRS and day-90 mRS scores correlated strongly,  $r=0.79$ . The weighted kappa agreement between day-4 and day-90 mRS was moderate,  $r=0.59$ . For dichotomized outcomes, simple carry-forward of day-4 mRS to day-90 performed fairly well, agreeing with day-90 mRS at rates of: mRS 0-1, 85%; mRS 0-2, 79%; fatal outcome, 88%. Multivariate models incorporating additional baseline variables improved agreement rates to: mRS 0-1, 93%; mRS 0-2, 85%; fatal outcome, 97%.

**Conclusion:** These findings confirm our hypothesis that patient disability status as early as 4 days post-stroke can accurately predict final disability status at day-90 in acute stroke patients. Patient disability status 4 days post-stroke can serve as useful measure in the hospital setting for imputing final patient disability outcome in addition to clinical trials and quality improvement programs.

# California-Research-Poster Finalist

## Damian Hall

**Title:** ESKD within the Pediatric Population: Then and Now

**Authors:** Damian Hall, BS MS<sup>2</sup>, Scott Reule, MD,<sup>1</sup> and Robert Foley, MD<sup>2</sup>, <sup>1</sup>Department of Medicine, Veterans Affairs Health Care System, Minneapolis, Minnesota., <sup>2</sup>University of Minnesota Medical School, University of Minnesota, Minneapolis, Minnesota.

**Introduction:** Temporal trends in care delivery among those with end stage kidney disease (ESKD) in the US population have changed over the past two decades leading to improved quality of life for numerous patients. Whether the pediatric population (age < 18 years) mirrors these trends remain unknown. We describe epidemiologic trends in characteristics and care delivery among those with ESKD in the pediatric population from 1996-2012.

**Methods:** This retrospective cohort study used the US Renal Data System database (n = 1,069,343), 1996-2012, to identify patients with ESRD among those aged < 18 years treated with renal replacement therapy, or RRT (n = 12,703). The cohort was divided into Era 1 (1995-2005) and Era 2 (2006-2012) and analyzed with the goal of describing any differences in incidence of ESKD. A total of 8478 patients were identified in era 2, whereas 4552 were identified for inclusion in era 1.

**Results:** In Era 2 vs. Era 1, the mean age was higher (10.5865 vs. 10.0301, p<.0001), and Hispanic patients comprised 51.2% vs. 48.8% with an AOR of 1.24 (1.14-1.34). No differences in gender were observed between eras. Among those receiving kidney transplant, the total number of allografts received increased from 450 to 1395 (Era 1 vs 2). Wait list time was nearly halved in Era 2 vs Era 1 (134.6 vs 253.4 days, p<0.001) and the length of time before failure of that first transplant was trebled (1566.6 vs 491.2 days, p<.0001).

**Conclusion:** Numerous changes have occurred in the delivery of care to pediatric ESKD patients. The data describe an older and more Hispanic patient population, which when considered in the context of pediatric patients may point to several interesting Conclusion:s. First, increased age could very well relate to improvements in care, enabling a longer period of declining renal function prior to initiation of RRT. Secondly, the increased proportion of Hispanic patients, while expected in light of changing US demographics, may also be highlighting sociocultural disparities in access to ESKD care.

With regard to patients receiving renal transplant, Era 2 demonstrated dramatically increased organ viability coupled with a significantly shortened duration of time between first listing and renal transplant. This is truly a major improvement encompassing the entire renal transplant ecosystem.

Ultimately, care for pediatric ESKD patients have improved significantly, but much remains unknown regarding the causes of changes in the cohorts' race and age.

# California-Research-Poster Finalist

## Christopher Nguyen

**Title:** Cardiac output changes relate to UF volume during intermittent HD and to pre-HD volume in critically ill patients

**Authors:** Christopher D. Nguyen, Matthew J. Kaptein, John S. Kaptein, Elaine M. Kaptein

**Introduction:** The goal of volume management is to optimize intravascular volume and maximize cardiac output. Cardiac output tends to increase after volume administration in volume-depleted non-renal patients (1), to increase with ultrafiltration in volume-overloaded end-stage renal disease (ESRD) patients (2,3), and to decrease with ultrafiltration in ESRD patients prone to intradialytic hypotension (4). We postulate that similar changes may occur in critically ill (ICU) patients requiring hemodialysis.

**Methods:** We retrospectively studied 12 ICU patients in 29 intermittent hemodialysis (IHD) encounters who had relative intravascular volume assessed by respiratory changes in inferior vena cava diameter within 24 hours prior to IHD/ultrafiltration. Inferior vena cava collapsibility Index (IVC CI) =  $(IVC_{max} - IVC_{min}) / IVC_{max} * 100\%$ . Cardiac output for these encounters was assessed by thermodilution before and after IHD/ultrafiltration. Cardiac output change >10% was considered significant. Nursing notes were evaluated for net volume removed or administered during IHD.

**Results:** For encounters with IVC CI <10% (volume-overloaded), ultrafiltration -1.6 to -2.6L was associated with increased cardiac output (+14 to +66%). Larger (-3.0 to -3.2L) or minimal (-0.75 to +0.2L) ultrafiltration was associated with decreased cardiac output (-15 to -22%). With IVC CI >30% (volume-depleted) additional volume removal during IHD (-2.4 to -3.0L) may decrease cardiac output (-28 to -44%) whereas volume given may increase cardiac output. With IVC CI of 10 to 30% (euvolemia), cardiac output may decrease (-4 to -20%) upon volume removal.

**Limitations:** This is a retrospective study with a small sample size. Changes in cardiac output may be multifactorial.

**Conclusion:** These findings suggest that cardiac output increased in volume-overloaded patients after moderate volume removal (right side of the Frank-Starling curve), but decreased with larger volume removal (left side of the Frank-Starling curve). Cardiac output increased in volume-depleted patients with volume administration (left side of the Frank-Starling curve). Cardiac output decreased with volume removal in euvolemic patients (left side of the Frank-Starling curve).

Changes in cardiac output with respect to inferior vena cava collapsibility index and net volume change with intermittent hemodialysis and ultrafiltration may be consistent with changes in position along the Frank Starling curve, indicating that relative intravascular volume may be a primary determinant of inferior vena cava collapsibility index and cardiac output.

These data provide empiric evidence that “appropriate” volume management can improve cardiac output in critically ill patients requiring hemodialysis.

**References** Reference PMIDs: 1) 28261499, 2) 8420299, 3) 12059009, 4) 27539225

# California-Research-Poster Finalist

## Jin Sol Lee

**Title:** Building Relationships: An interprofessional team based effort to coordinate care for a cohort of patients with high health care utilization in western Los Angeles.

**Authors:** Jin Sol Lee, MD/MPH Candidate at David Geffen School of Medicine at UCLA, Dr. Nathan Samras MD, MPH

**Introduction:** One in five of the 11 million Medicare beneficiaries discharged from the hospital are readmitted within 30 days of discharge. Ninety percent of these readmissions are unplanned which translates to an estimated cost of \$17.4 billion and poor patient outcomes.<sup>2</sup> Moreover, this problem is disproportionately increased for super-utilizing patients or the top five percent of individuals who consume half of the healthcare resources due to complex medical, behavioral, and social needs.<sup>3</sup> In response, a variety of interventions have demonstrated reduction in 30 day readmissions as shown in a meta-analysis of 42 randomized controlled trials (overall pooled RR 0.82, 95% CI 0.72-0.91,  $p < 0.001$ ).<sup>4</sup> However, large heterogeneity exists among the interventions. Successful care delivery models have focused on the provision of multidisciplinary team based care, but questions about resource prioritization remains unanswered.<sup>1</sup>

To better understand strategies to reduce super-utilizers disproportionate use of costly healthcare resources, we formed a multidisciplinary student team with backgrounds in medicine, nursing, dentistry, pharmacy, physical therapy, podiatry, public health, and social work in order to provide comprehensive care that emphasizes patient engagement, promotion of self care, and effective care coordination.

**Methods:** This pilot project at UCLA aims to determine the highest contributing factors for inappropriate healthcare utilization. We prospectively follow a cohort of five patients with high medical and social complexity at the UCLA Venice Family Clinic and the Santa Monica Homeless Multidisciplinary Street Team who have at least two inpatient hospitalizations in the last twelve months. After establishing a baseline for risk factors and utilization, our multidisciplinary care team will accompany patients on medical and social visits, conduct home visits, and coach patients to navigate their healthcare. We will qualitatively and quantitatively investigate these factors using patient interviews, surveys of social determinants of health, and utilization trends in the rates of medical (e.g. hospitalizations), behavioral (e.g. substance abuse), social (e.g. case management) and legal services (e.g. police encounters). Time series data analysis will be used to track the change in these outcomes using control chart principles.

**Results:** This study has began in November 2017 and will have rolling data analysis at months 2, 4, and 6. Our hypothesis is that prior to April 2018 we will see a reduction in inappropriate utilization of acute care facilities and increase in appropriate, cost-effective outpatient medical, behavioral, and social services.

**Conclusion:** By providing coordinated multidisciplinary team based care for some of the highest utilizers of the healthcare system, we hope to improve patient outcomes, increase patient satisfaction, and generate cost savings. Additionally, we aim to identify gaps in the current continuum of care in an effort to help redesign a healthcare system that is accountable for its inefficiencies and its health disparities.

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# California-Research-Poster Finalist

## Jeffrey Duong

**Title:** Racial/Ethnic Differences in Health Care Access Deficits among Adults with Chronic Disease and Depression

**Authors:** Jeffrey Duong, MS3, UC Davis School of Medicine, Jaesu Han, MD, UC Irvine Medical Center

**Introduction:** Studies have shown that individuals with chronic disease and depression face significant barriers to care. Yet, less is known about racial/ethnic disparities in health care access among those with comorbid conditions. This study examines links between race/ethnicity and health care access deficits according to individuals' chronic disease and depression status.

**Methods:** Data from the CDC's 2014 Behavioral Risk Factor Surveillance System (BRFSS), an annual cross-sectional survey of adults asked about their health status and behaviors, were analyzed. Bivariate cross-tabulations were used to compute the prevalence of health care access deficits (e.g., did not have a personal doctor, chose to forgo care when needed due to cost in the past year, and did not have an annual routine checkup) among different racial/ethnic groups across four health status strata (no chronic disease or depression, chronic disease only, depression only, or both). Multiple group analyses in Mplus were used to model links between individuals' race/ethnicity and health care access deficits, and to determine whether health status moderated these associations.

**Results:** Our sample of 464,664 adults was racially/ethnically diverse (21.6% Nonwhite). Over half had been told they had chronic disease or depression (13.4% both, 38.3% chronic disease or 5.5% depression only). Health care access deficits were also common (15.3% no personal doctor, 10.6% forgone care and 25.4% no routine checkup). In multiple group analyses, associations between race/ethnicity and health care access deficits varied significantly by individuals' health status. For those never diagnosed with chronic disease or depression, the odds of not having a personal doctor compared to Whites were higher in American Indians/Alaskan Natives (OR=1.96;  $p<.001$ ), but lower in Blacks (OR=0.75;  $p<.001$ ). Yet, Blacks were more likely to forgo care (OR=1.23;  $p<.001$ ), even if previously diagnosed with chronic disease or depression. Both American Indian/Alaskan Natives and Hispanics/Latinos were more likely to not have a personal doctor and forgo care, especially if they had prior diagnoses of both chronic disease and depression. Forgoing care was especially more likely among Hispanics/Latinos who only had a previous depression diagnosis (OR=1.26;  $p=.015$ ). Lastly, Blacks and Hispanics/Latinos were less likely to miss routine checkups compared to Whites.

**Conclusion:** This study revealed patterns of health care access in individuals across race/ethnicity groups with chronic disease and depression. Our findings suggest the need to connect Hispanics/Latinos and American Indians/Alaskan Natives to consistent sources of care. Efforts to bolster means for Blacks and Hispanics/Latinos to access care also represent a priority. Providers may use annual checkups as potential opportunities to help these groups navigate possible barriers to accessing care.

# California-Research-Poster Finalist

## Mohammed Amer Swid

**Title:** CIRCADIAN VARIABILITY PATTERNS GUIDE AND PREDICT PREMATURE VENTRICULAR CONTRACTION CLINICAL DRUG RESPONSE

**Authors:** Mohammed Amer Swid;1 David Hamon;1 Albert Liu;1 Noel G Boyle; 1 and Jason S. Bradfield.1 ,  
1UCLA Cardiac Arrhythmia Center, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA.

**Introduction:** Frequent PVCs may lead to significant symptoms and possibly PVC-induced cardiomyopathy. Beta-blockers (BB) are often used as first line therapy to reduce PVC burden while response is unpredictable.

**Objective:** To determine whether PVC circadian variation could help predict drug (BB) response.

**Methods:** Patients (Pts) with frequent monomorphic PVC and detailed Holter monitoring before and on BB were retrospectively evaluated. BB success was defined as a 50% reduction in PVC burden with symptom improvement. Pts were divided into 3 groups based on hourly PVC count relationship to corresponding mean HR during each of the 24 hours on Holter: fast HR-dependent PVC (F-HR-PVC) type when they had a positive correlation (Pearson,  $P < 0.05$ ), slow HR dependent PVC (S-HR-PVC) type for a negative one and independent HR PVC (I-HR-PVC) when no correlation was found.

**Results:** 55.3% of the 47 pts had a F-HR-PVC, 27.7% an I-HR-PVC and 17.0% a S-HR-PVC. BB therapy was successful in 34.0% of pts overall. The percentage change in mean HR on BB did not predict success (AUC = 0.52  $P = 0.812$ ), while the correlation coefficient did (AUC = 0.84,  $P < 0.0001$  Se = 100%, Spe = 67.7%;  $r \geq 0.40$ ). F-HR-PVC pts had a decrease in PVC burden ( $18.8 \pm 10.4$  to  $9.3 \pm 6.6\%$ ,  $p < 0.0001$ , 62% success), I-HR-PVC had no change ( $18.4 \pm 17.9$  to  $20.6 \pm 17.9\%$ ,  $P = 0.175$ , 0% success), while burden increased for S-HR-PVC ( $14.6 \pm 15.3$  to  $20.8 \pm 13.8$ ,  $P = 0.016$ , 0% success).

In the F-HR-PVC subgroup all pts but 2 had a decrease (significant or not) in their PVC burden on BB. These 2 pts had no change and a 6.7% increase respectively in their (24h-Holter) mean HR "on" BB therapy and were therefore most likely not taking their medication. In this subgroup, the percentage change in Holter mean HR on BB (compared to the mean HR "off" BB) mildly predicted success (AUC = 0.69,  $P = 0.08$ , Se = 75%, Spe = 70% for a decrease  $\geq 5\%$ ), while the correlation coefficient did not (AUC = 0.51, 0.64[0.40-0.82] and 0.65[0.41-0.87] in the pts responding and those who did not, respectively,  $P = 0.916$ ).

**Conclusion:** •A simple analysis of Holter PVC circadian variability, that potentially can be included in Holter summaries, may provide incremental value to guide clinical PVCs management.

•Only pts displaying a F-HR-PVC profile ( $r \geq 0.40$ ) may benefit from BB (usually when mean HR decreases  $\geq 5\%$  on BB); while a different strategy should be considered for others.

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# Georgia-Research-Poster Finalist

## Robert Bragg

**Title:** Kynurenine increases cell death in bone marrow mesenchymal stem cells by disrupting the autophagic cell survival program

**Authors:** Robert Taylor Bragg, Ahmed Elmansi, Khaled Hussein, Galina Kondrikova, Tanner Mobley, William D. Hill., Department of Cellular Biology and Anatomy, Department of Orthopedic Surgery, Medical College of Georgia at Augusta University, Augusta, Ga

**Introduction:** With age, there is a loss of mesenchymal stem cells (MSCs) in the bone marrow (BM) niche. These osteogenic precursors are responsible for bone formation and maintenance. Dysfunction and loss of this population is increasingly understood to be responsible for osteoporosis and age-associated bone loss. Although the mechanisms responsible for this are poorly understood, it has been linked in part to increased inflammation and reactive oxygen species (ROS). A pathway has recently been identified that is up-regulated with ROS and age-associated increased Indoleamine\_2,3-dioxygenase (IDO) activity - the tryptophan metabolite kynurenine (KYN), which interferes with osteogenesis as well as potentially with cell survival.

KYN disrupts autophagy, a major cell survival pathway, increasing MSC vulnerability to cell death under stress.

**Methods:** Murine and human MSCs were treated with saline (control), or KYN 200 uM. To establish the rate of autophagic flux, the treatments were also repeated in the presence of 100 uM chloroquine (CQ). The cells were treated with CQ four hours before collection at 4, 12, 24, and 48 hours under normoxic (21% O<sub>2</sub>) and hypoxic (3% O<sub>2</sub>) conditions. Specific autophagy markers, such as LC3-II, and apoptotic markers including cleaved-PARP were quantified via western blot.

**Results:** Under normoxia, KYN disrupted autophagy blocking flux and apparently making the MSCs more vulnerable to initiation of programmed cell death (apoptosis) and necrotic cell death over time. Disruption of autophagy was even more evident both in terms of time and degree under hypoxic conditions, resulting in increased cell death with a shift from apoptosis to necrosis.

**Conclusion:** These Results: support the hypothesis and could help lead to a better understanding of osteoporosis and the mechanistic role age-associated kynurenine may play in MSC dysfunction, death and age-associated bone loss.

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# Georgia-Research-Poster Finalist

## Maha Elsebaie

**Title:** Management of Low and Intermediate Risk Adult Rhabdomyosarcoma: A Pooled Survival Analysis of 553 Patients

**Authors:** Maha Elsebaie<sup>1</sup>, Mohamed Amgad<sup>2</sup>, Ahmed Elkashash<sup>3</sup>, Ahmed Saber Elgebaly<sup>4</sup>, Gehad Gamal El Ashal<sup>3</sup>, Zeinab Elsayed<sup>5</sup>, 1 Faculty of Medicine, Ain Shams University, Cairo, Egypt., 2 Department of Biomedical Informatics, Emory University School of Medicine, Atlanta, GA, USA., 3 Kasr Al Ainy School of Medicine, Cairo University, Cairo, Egypt., 4 Faculty of Medicine, Al-Azhar University, Cairo, Egypt., 5 Adult Sarcoma Division, Clinical Oncology Department, Ain Shams University Hospitals, Cairo, Egypt.

**Introduction:** There are no universally-accepted guidelines for the management of adult rhabdomyosarcoma (RMS).[1] This is the second-largest retrospective analysis addressing the controversy of whether adult RMS should be treated with chemotherapy regimens adopted from pediatric RMS protocols or adult soft tissue sarcoma protocols? Moreover, we aim to identify prognosticators and explore the role of delayed surgery and adjuvant radiotherapy.

**Methods:** Through systematic search on PubMed, Medline-Ovid, Cochrane, EMBASE, Scopus and ISI web of science, we curated and analyzed a dataset of 553 RMS cases.[2] Included cases had to meet the following criteria: adults ( $\geq 16$  years old) with primary, pathologically-proven, non-metastatic RMS. Quality assessment was based on the clarity, availability and individualization of reported data. For intermediate quality articles (deficient reporting/short follow-up), the primary author(s) were contacted twice asking for missing data. The cox proportional-hazards survival models were performed using MATLAB's inbuilt '*coxphfit*' function. Harrell's concordance index (C-index) was used to measure the predictive accuracy and generalizability of the survival models.[3]

**Results:** Increasing age, intermediate-risk disease, no chemotherapy use, poor chemotherapy response and anthracycline-based chemotherapy (no cyclophosphamide/ifosfamide) were significant predictors of poor overall (OS) and progression-free survival (PFS); the progression-free hazard ratio for anthracycline-based chemotherapy was 2.73 (95%CI=1.154-6.475, C-index=70%). In contrast, cyclophosphamide-based, cyclophosphamide+anthracycline-based, or cyclophosphamide+ifosfamide+anthracycline-based regimens yielded significantly better outcomes (5y-PFS=64%, 74%, 80% vs. 47%;  $p=0.091, 0.016, 0.037$  respectively). Intermediate-risk disease was a significant predictor of poor chemotherapy response; overall response for intermediate-risk vs. low-risk: 59.7% vs. 90.9%,  $p=0.001$ . The highest risk of local recurrence was seen with IRS stage-II (unfavorable-tumor site; HR=2.54, 95%CI=1.31-4.894, C-index=73%), intermediate-risk disease (HR=2.61, 95%CI=1.47-4.64, C-index=72%) and residual tumors (IRS group II-III). OS of IRS group-III patients (gross residuals) was significantly improved if they underwent delayed complete resection. Non-parameningeal IRS group-I patients (complete resection with negative margins) achieved the best local control (HR=0.47, 95%CI=0.261-0.84, C-index=72%) and their local control wasn't affected by whether or not patients received adjuvant radiotherapy (5y-Local control 81% vs. 86%,  $p=0.448$ ).

**Conclusion:** This study highlights the superiority of combined chemotherapy regimens –adapted from pediatric RMS protocols- compared to anthracycline-based regimens in treating non-metastatic adult RMS.[4, 5] Development and assessment of novel chemotherapeutic agents is critical for patients with

intermediate-risk disease who couldn't benefit from conventional chemotherapeutic regimens.[6, 7] Delayed complete resection, instead of definitive chemoradiotherapy, seems to improve OS of group-III patients.[8] There is lack of data to support the routine use of adjuvant radiotherapy for non-parameningeal group-I patients. Nonetheless, intensive local therapy should be always considered for those at high risk for local recurrence, including intermediate-risk disease, advanced IRS stage, large tumors or narrow surgical margins.[9-11] Although practically difficult (due to tumor's rarity), there is a pressing need for high-quality randomized-controlled trials to further assess the applicability of pediatric RMS guidelines to the adult patient population.

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1. ***N.B. The dataset is not publicly available and only individuals with the above link can view the unpublished dataset. Available at the above link are: Full patient database, Steps to reproduce, Full search strategies for each Bibliographic database, Appendix containing guidelines and definitions for the patient database, Chemotherapy categorization system and the quality assessment tool.***
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# Georgia-Research-Poster Finalist

## Nitin Venugopal

**Title:** Comparison of gene expression alterations during early stages of lung adenocarcinoma and squamous cell carcinoma

**Authors:** Nitin Venugopal, Justin Yeh, Sai Kodeboyina, Ashok Sharma, PhD

**Introduction:** Non-small cell lung cancer (NSCLC) accounts for approximately 85% of lung cancers, a disease responsible for the greatest number of cancer deaths worldwide, and is divided into two histologic subtypes: adenocarcinoma (AD) and squamous cell carcinoma (SCC). Previous studies have revealed fundamental differences in the growth and spread of these two subtypes and have demonstrated the need for identification of differentially expressed genes (DEGs) in early stage AD and SCC [1]. To better understand differences at the molecular level, we examined gene expression alterations during early stages of these two subtypes.

**Methods:** The expression profiles of patients from The Cancer Genome Atlas (TCGA) were obtained from the Cancer RNA-Seq Nexus, which included 273 stage IA/IB AD and 239 stage IA/IB SCC samples compared to 59 and 51 adjacent normal controls, respectively [2]. The differentially expressed genes in stage IA and stage IB of both subtypes were identified by comparison to adjacent normal tissue samples. Comparisons between the two sets of DEGs were made to discover variation between these two subtypes at the molecular level. The Database for Annotation, Visualization and Integrated Discovery (DAVID) was used to annotate genes and to discover the biological processes, pathways and molecular functions that were enriched in the DEGs.

**Results:** A total of 563 upregulated and 372 downregulated genes were identified in stage IA/IB lung adenocarcinoma samples as compared with normal lung tissue samples, and a total of 745 upregulated and 544 downregulated genes were identified in stage IA/IB lung squamous cell carcinoma samples as compared with normal. Between stage IA/IB AD and stage IA/IB SCC there were a total of 416 common upregulated genes and 345 common downregulated genes. The top upregulated genes common to both AD and SCC were CST1, AKR1B10, TFF1, TF and CRABP2 and the top downregulated genes were ITLN1, SLC6A4, ANKRD1, ITLN2 and CSF3. The top upregulated genes unique to AD were ALB, SPINK1, FGB, APLP2 and PAEP, while the top upregulated genes unique to SCC were CALML3, SPRR2A, S100A7, KRT14 and KRT6A. The *cell cycle*, *p53 signaling*, *oocyte meiosis*, and *PPAR signaling* KEGG pathways were commonly enriched between the two subtypes. Additionally, the AD subtype was uniquely enriched in the *ECM-receptor interaction* pathway, while the SCC subtype had additional enrichment in the *metabolism of xenobiotics by cytochrome P450 pathway*. The AD subtype was distinctively enriched in the gene ontologies including *keratinocyte differentiation* and *peptide crosslinking*, while the SCC subtype had unique enrichment in the *calcium-independent cell-cell adhesion via plasma membrane cell-adhesion molecules* and *serine-type endopeptidase* ontologies.

**Conclusion:** Early stage lung adenocarcinoma and squamous cell carcinoma showed different patterns of DEGs. These early stage expression profiles provide valuable insight to the differing pathogenesis of NSCLC subtypes, allowing for potential targeted prevention and treatment strategies.

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# Georgia-Research-Poster Finalist

## Zoe Kopp

**Title:** Grady Healthy Living: Examining Why Patients Do Not Come to Primary Care Appointments

**Authors:** Zoe M. Kopp, Tiffany Wang, Stacie R. Schmidt MD, Department of Medicine, Emory University, Atlanta, GA

**Introduction:** The impact of “no-show” clinic patients extends beyond the immediately wasted healthcare dollars and provider time. These patients are shown to have significantly poorer control of their medical conditions, with higher emergency department and hospital utilization. “No-show” rates are higher in clinics caring for underserved populations; addressing these patients presents an opportunity to reduce healthcare disparities. Grady Memorial Hospital, Atlanta’s safety net hospital, has a current “no-show” rate of 30% across all primary care clinics, yet no information is collected from or about these patients after the missed appointment. Grady Healthy Living (GHL) aims to understand the reasons why patients do not come to their appointments and provide patients the opportunity to easily re-access primary care.

**Methods:** GHL created a 2 question screening survey to collect information on both why the patient missed his/her appointment and what his/her perception of the primary care physician (PCP) is. Two medical students reviewed the Monday and Friday Purple Pod Primary Care clinic schedule between August and October 2017 and called all patients listed as “no-show.” Patients contacted were screened with the 2 question survey and provided the number for the Central Scheduling Line to reschedule a primary care appointment. Demographic data, ability to contact the patient (working phone number) and documented attempts at reaching the patient prior to the scheduled appointment were noted for all “no-show” patients.

**Results:** Of the 935 scheduled appointments analyzed between August and October 2017, 266 patients (28%) were listed as “no-show”. One-hundred and sixteen patients (62%) had documentation of contact with a Grady staff member, either a “Pre-Visit Encounter” or a comment in the “Notes” section of the provider’s schedule, before their appointment. Of the “no-show” patients, 233 (88%) had a working phone number, and 122 (46%) were successfully contacted. Of those contacted, 37 (30%) stated they forgot or were unaware of the appointment, 13 (11%) were hospitalized or too sick to come, 3 (2%) could not afford the copayment, 1 (1%) had a health problem that had resolved, 5 (4%) were late, 26 (21%) had another obligation, including work, 17 (14%) did not have suitable transportation, 1 (1%) had a previous negative experience, 6 (5%) tried to cancel, 1 (1%) was given an appointment with the wrong provider, 1 (1%) cited bad weather, and 7 (6%) stated the appointment was made in error. When asked whether their PCP listened carefully to them, 74 patients responded, and 48 (65%) stated “always,” 18 (24%) “sometimes,” and 8 (11%) “never.”

**Conclusion:** Majority of Grady “no-show” patients cite lack of awareness, other obligations, and transportation as the reasons for their missed appointment. Exploring these reasons is crucial to improving access to care and reducing health disparities and should direct hospital interventions and future investments.

# Georgia-Research-Poster Finalist

## Ashruta Patel

**Title:** Awareness of Heart Attack Signs and Symptoms and Calling 9-1-1 among US Adults: National Health Interview Survey (NHIS) 2008 and 2014

**Authors:** Ashruta Patel, MS<sup>1,2</sup>; Jing Fang, MD, MS<sup>1</sup>; Cathleen Gillespie, MS<sup>1</sup>; Erika Odom, PhD<sup>1</sup>; Cecily Luncheon, MD, MPH, DrPH<sup>1,3</sup>; Carma Ayala, RN, MPH, PhD<sup>1</sup>, <sup>1</sup>Division for Heart Disease & Stroke Prevention, National Center for Chronic Disease Prevention & Health Promotion, Centers for Disease Control & Prevention, Atlanta, GA, <sup>2</sup>Philadelphia College of Osteopathic Medicine – Georgia Campus, <sup>3</sup>IHRC, Inc., Atlanta, GA

**Background:** Early recognition of heart attack symptoms and knowing the importance of calling 9-1-1 influences the timeliness of appropriate emergency care. The objective of this study was to measure awareness of all five heart attack symptoms and calling 9-1-1 for emergency care (defined as recommended heart attack knowledge).

**Methods:** We analyzed data among 21,148 adults from 2008 and 35,808 adults from 2014 using the National Health Interview Survey (NHIS). The 2008 and 2014 NHIS included five questions about heart attack signs and symptoms, and one regarding the first action to take when someone is having a heart attack. We estimated the prevalence of awareness of each symptom, combined number of symptoms, the importance of calling 9-1-1, and recommended heart attack knowledge. We assessed the absolute change between 2008 and 2014 in the prevalence of awareness by selected demographic, access to care and chronic condition characteristics and disparities among these characteristics in 2014.

**Results:** In 2014, awareness of individual heart attack symptoms ranged from 60.7% (pain in jaw, neck, or back) to 91.2% (chest pain). Although 93.5% recognized at least one symptom, only 49.9% recognized all five symptoms, and 47.3% reported awareness of recommended heart attack knowledge, and 93.3% recognized the need to call 9-1-1 as the first step when witnessing heart attack symptoms. After adjusting for sex, age, and race/ethnicity, logistic regression models showed a significant absolute increase of 10.5% with recommended heart attack knowledge from 2008 (37.1%) to 2014 (47.3%). The absolute increase in awareness was observed across all subgroups ranging from 6.8% to 13.5%. In 2014, we also noted disparities in reported awareness of recommended heart attack knowledge by demographic, access to care and chronic condition characteristics.

**Conclusion:** Among US adults, those reporting the recommended heart attack knowledge increased from 2008 to 2014; however, disparities persisted. Health care providers and public health professionals could target educational interventions among those with lower awareness – including men, those living in households with lower income, individuals with lower educational attainment, racial/ethnic minorities, and those with limited access to health care.

# Georgia-Research-Poster Finalist

## Michael Scott

**Title:** Developing a Pamphlet Summarizing Key Information for Supporters of Athens Area Commencement Center Clients

**Authors:** Michael Scott<sup>1</sup>, Avi Aronov<sup>1</sup>, Nick Austin<sup>1</sup>, Chan Lee<sup>1</sup>, Abdalnasir Limay<sup>1</sup>, Arishna Patel<sup>1</sup>, Sabina Sorondo<sup>1</sup>, Richard Yi<sup>1</sup>, <sup>1</sup>Augusta University-University of Georgia Medical Partnership Athens, GA

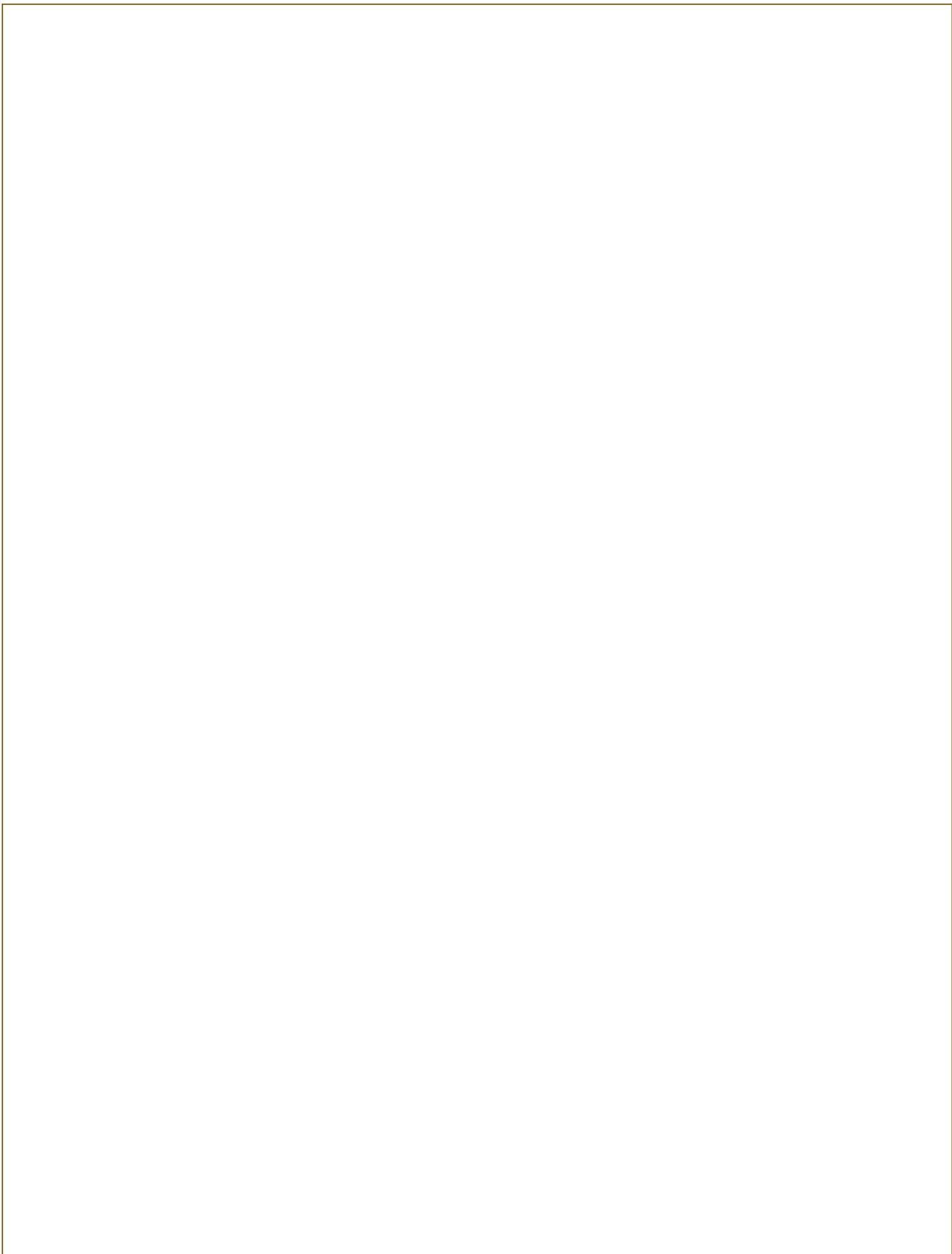
**Introduction:** Alcohol and drug abuse are major public health issues in the United States. Excessive alcohol consumption is estimated to cost \$223.5 billion each year through lost productivity and health care expenses. It is also an issue in Georgia with 17% of adults in Athens-Clarke County reporting excessive drinking compared to the national average of 12%. Substance abuse, especially of prescription opioids and heroin, is a growing problem with 52,404 deaths from drug overdose occurring nationally in 2015. Although there is no cure for the disease of addiction, long term recovery is possible. Studies have shown that support of the family unit is an important part of an addict's recovery, treatment retention, and long-term sobriety.

The Athens Area Commencement Center (AACC) is an outpatient addiction treatment center in Athens, GA. Although the AACC holds weekly sessions to educate supporters of clients about addiction and recovery, they do not provide any written resources for supporters to take home. Therefore, the goal of this project was to make a written educational resource to be used by supporters of current and potential clients of the AACC.

**Methods:** A review of 43 AACC client charts was conducted to assess family members' interest in attending Family Night. This was followed by interviews with AACC staff and a former client's family member in order to identify topics that would be helpful in an educational pamphlet. The topics identified in these interviews were supplemented by those found in resources provided by other treatment centers. Topics included medications that should be avoided by those in recovery, red flag behaviors that could indicate relapse, and additional resources for family members. Once completed, the pamphlets were distributed to family members who attended Family Night along with a survey to assess pamphlet usefulness, readability, and potential areas for improvement.

**Results:** All survey participants (n=13) were taught something new by the pamphlet. 33% learned something new from the Drug List, 33% from the Red Flag Behaviors list, 20% from the Background section, 7% from the Resources section, and 7% from the "other" option on the survey. 77% of participants selected that the pamphlet was "very easy to understand," and 23% selected that it was "sort of easy to understand." 83% of survey participants indicated they were "likely" to refer back to this pamphlet, and 17% responded "neutral" to the question.

**Conclusion:** In Conclusion:, supporters felt that the pamphlet taught them new material, was easy to understand, and will be likely referred to in the future. Ideally, this pamphlet will improve family support and lead to increased rates of program completion and long-term sobriety for AACC clients.



# Germany -Research-Poster Finalist

## Daniel Schuette

**Title:** Neuronal Calcium Sensor 1 (NCS1) Expression Levels Predict Survival in a Cohort of Asian Hepatocellular Carcinoma (HCC) Patients

**Authors:** Daniel Schuette, Tamar H. Taddei, Marie E. Robert, Barbara E. Ehrlich, *Yale School of Medicine, New Haven, CT.*

**Introduction:** The incidence of HCC is rising in the US but we have limited understanding of the biology of liver cancer and approaches to diagnosis and treatment<sup>1</sup>. Expression of NCS1, a Ca<sup>2+</sup>-dependent signaling molecule, correlates with disease outcome in breast cancer<sup>2</sup>, but its predictive value in other cancer types is unclear. Because increased Ca<sup>2+</sup>-signaling appears to be causally involved in disease progression and metastasis in HCC<sup>3-5</sup>, we examined the capacity of NCS1 expression to predict patient survival in The Cancer Genome Atlas (TCGA) Liver Hepatocellular Carcinoma (LIHC) Cohort.

**Methods:** The Results: are based upon data generated by the TCGA Research Network<sup>6</sup>. All data analysis was performed using R Statistical Programming Language, Version 3.4.0. The between-group comparisons of overall survival were performed by two-sided log-rank tests stratified according to dichotomized NCS1 expression levels. A cutoff value for dichotomizing continuous NCS1 expression (in FPKM units) to 'high' and 'low' was determined using Youden's J statistic. A Cox proportional-hazards model that included binary NCS1 as a single covariate was used to estimate hazard ratios (HR) and associated 95% confidence intervals. The Kaplan-Meier method was used to estimate survival curves, and a log-rank test was used to compare survival.

**Results:** First, we examined the relationship between NCS1 and clinical tumor stage for all 351 TCGA patients. Although advanced HCC did not show increased NCS1 expression in this cohort, the subgroup of Asian patients appeared to have a worse prognosis with higher NCS1 levels (corrected  $p < 0.05$ ). In addition, Asian patients had a higher mean NCS1 expression than white patients ( $p = 0.056$ ) and a significantly smaller proportion of NCS1<sup>low</sup> Asian patients died during the course of their disease (21.4% vs. 39.0% for Asian vs. white patients,  $p < 0.01$ ). We next examined the clinical significance of NCS1<sup>high</sup> vs. NCS1<sup>low</sup> status with regard to patient survival over time. Asians categorized as NCS1<sup>low</sup> showed a significantly lower probability of death (HR 0.32,  $p < 0.001$ ), whereas in white patients time to death was independent of NCS1 status.

**Conclusion:** NCS1 expression is predictive of survival status at the end of follow-up and time to death in Asian but not in white patients with HCC. Asians with NCS1<sup>high</sup> compared to those with NCS1<sup>low</sup> have a significantly worse prognosis. We conclude that NCS1 is a new prognostic biomarker for a subgroup of HCC patients.

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# Illinois-Research-Poster Finalist

## Candice Cuppini

**Title:** Investigating the cellular source of regenerated hair cells in the neonatal mouse cochlea

**Authors:** Candice L. Cuppini<sup>1</sup>, Melissa M. McGovern<sup>1</sup>, Michelle R. Randle<sup>1</sup>, Brandon C. Cox<sup>1,2</sup>

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**Introduction:** The hair cells (HCs) of the inner ear are essential to hearing yet are easily damaged. Cells of the mature mammalian cochlea, once damaged, do not regenerate and therefore hearing is lost. Recent research shows that neonatal mice can spontaneously regenerate HCs after damage at birth and newly formed HCs are derived from neighboring cells called supporting cells (SCs). This study focuses on investigating which types of SCs in the inner ear of the neonatal mouse cochlea can regenerate HCs after the original HCs have been killed. SCs can be divided into at least eight distinct subtypes: cells of the greater epithelial ridge (GER), inner phalangeal cells (IPhCs), border cells (BCs), inner pillar cells (IPCs), outer pillar cells (OPCs), Deiters' cells (DCs), Hensen cells (HeCs) and Claudius cells (CCs).

**Methods:** We fate-mapped three groups of SC subtypes to determine which SCs are the cellular source of regenerate HCs. We used three CreER lines specific to SC subtypes, paired with a reporter to label different groups of SCs. These mice were bred with the *Pou4f3<sup>DTTR/+</sup>* mouse, where the administration of diphtheria toxin kills HCs. *Prox1-CreER<sup>T2</sup>* was used to label IPCs, OPCs, and DCs, *Plp-CreER<sup>T2</sup>* for IPhCs and BCs, and *GLAST-CreER<sup>TM</sup>* for cells of the GER, IPhCs/BCs and HeCs. Tamoxifen was given at postnatal day 0 (P0) to induce expression of the reporter in SCs, then diphtheria toxin was administered at P1 to kill HCs and stimulate regeneration. At P7, the cochleae were collected and immunostaining was performed. The samples were co-labeled with anti-myosin VIIa antibodies to label HCs and anti-Sox2 antibodies to label all SCs and immature HC nuclei, while the reporter was detected by endogenous fluorescence. The cells co-labeled by myosin VIIa and the reporter were quantified to show how many regenerated HCs originated from each group of fate-mapped SCs. We also quantified the number of Sox2-positive, myosin VIIa-positive cells to estimate the number of regenerated HCs in each sample. In all groups a proportion of remaining HCs was calculated to determine if the amount of HC damage was consistent across all three groups.

**Results:** The amount of HC damage induced was consistent across all groups. The number of regenerated HCs detected when *Prox1-CreER<sup>T2</sup>* was used for fate-mapping was significantly more than the other two CreER lines. Therefore, the majority of spontaneously regenerated HCs in the neonatal mouse cochlea were derived from PCs and DCs.

**Conclusion:** Of the eight SC subtypes, PCs and DCs contribute the most regenerated HCs in the neonatal mouse cochlea. Further studies can be done with these cells to investigate the gene expression changes that occur during maturation to identify targets that prevent regeneration of HCs in adult mammals and may lead to therapeutic interventions for hearing loss.

# Illinois-Research-Poster Finalist

## Daniel Saca

**Title:** Bridging the Gap: Creation of the Spanish Ambassador Program (SAP)

**Authors:** Daniel Saca, Mike Nuñez, Elsa L. Vazquez Melendez, MD, FAAP, FACP, Matthew J. Mischler, MD, FAAP, FACP, University of Illinois College of Medicine at Peoria, OSF Saint Francis Medical Center

**Introduction:** Effective communication between health providers and patients is integral to medical care, having a direct impact in patient understanding of diagnosis/treatment, comfort disclosing information, addressing patient concerns, and patient satisfaction with care. According to the 2015 American Community Survey, 16.4 million Spanish-speaking US residents, self-reported as having Limited English Proficiency (LEP) and are vulnerable when seeking medical care due to a language barrier. Use of videoconference interpreting services (VIS), as used in our home institution, is an effective measure, but may have limitations in continued use throughout admission and regarded as impersonal. The Spanish Ambassador Program (SAP) is a consultation service comprised of medical students fluent in Spanish intended to supplement VIS by providing personalized, in person visits and enhance patient-provider relationship for LEP Hispanic patients. Preliminary consultations suggest the hypothesis that the SAP positively impacts our LEP Hispanic patients' understanding of their care during admission and overall health.

**Methods:** A needs assessment was performed to assess current gaps in patient communication and obtained administrative support for service dissemination. Consults are received via paging regarding questions the treatment team may have for patient, provide support, explain treatments/medications, clarify discharge plans, ensure patient understanding, etc. By request, daily visits can be performed to provide continuity in care with or without consulting party. A questionnaire was developed to appraise patient's understanding of hospitalization and assess role language barriers plays in their medical care. These questions were developed to uncover and help address issues that may hinder appropriate outpatient follow-up. In addition, patients are encouraged to communicate questions/concerns and for the Ambassadors to advocate for them. At the Conclusion: of visit, patients provide feedback regarding the effectiveness of visit at clarifying events regarding present admission and overall health. Responses are given from 1-10, with 10 being complete understanding. The Ambassador submits a note with the information requested by consulting party and other relevant information from visit.

**Results:** To date, the SAP has successfully completed 9 formal consults. All patient feedback received rated the effectiveness of the visit at 10 for both categories. Recent hospital-wide expansion of the service, which includes adult and pediatric services. Feedback responses will be collected for future analysis regarding program effectiveness, patient disposition to service, and hospital quality measures such as HCAPS scores.

**Conclusion:** Implementation of a cultural ambassador program, staffed by medical students with spanish language proficiency, to enhance care of LEP patients is feasible at a large, tertiary care medical center. This potentially provides a communication bridge for patients to their care team, while providing enhanced practice of patient centered care by medical students. Further research is needed to identify the impact of the program at the patient and hospital level, and to assess its long term feasibility.

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# Iowa-Research-Poster Finalist

## Perry Wu

**Title:** CRISPRi Knockdown of BAG3 Interactors in iPS-CM to Elucidate Mechanisms of BAG3-Related Dilated Cardiomyopathy

**Authors:** Perry Wu, University of Iowa Roy J. and Lucille A. Carver College of Medicine, Luke Judge, MD/PhD, Gladstone Institutes, Juan Perez-Bermejo, Gladstone Institutes, Mohammadali Mandegar, DPhil, Gladstone Institutes/Tenaya, Po-Lin So, PhD, Gladstone Institutes, Bruce Conklin, MD, Gladstone Institutes

**Introduction:** Recent biochemical and genetic studies clearly implicate BAG3 in certain genetic forms of dilated cardiomyopathy (DCM)<sup>1</sup>. BAG3 localizes to the Z-disk of cardiac and skeletal muscles, where we hypothesize it functions in maintaining sarcomeric integrity through strict regulation of critical steps of protein quality control including protein folding, proteasomal degradation, and autophagy. Both heterozygous and homozygous loss of BAG3 in induced pluripotent stem cell-derived cardiomyocytes (iPS-CMs) lead to irregular protein quality control with phenotypes of decreased force production, sarcomeric disarray, and increased sensitivity to toxic stressors such as bortezomib<sup>2</sup>. BAG3 is a stress-inducible co-chaperone that merely serves as a scaffold that binds and coordinates two classes of molecular chaperones: the HSP70s and tissue-specific small HSPs. We recently used AP-MS studies in iPS-CM to map out a cardiac-specific BAG3 interactome. By developing and utilizing a CRISPR interference (CRISPRi) expression system with potent and targeted knockdown activity in fully differentiated iPS-CM, we can identify specific BAG3 interactors that recapitulate the BAG3 phenotype to further elucidate mechanisms behind BAG3-related DCM.

**Methods:** iPS-CMs were generated from the differentiation of induced pluripotent stem cells with modifications of the WNT modulation method<sup>3</sup>. We generated a CRISPRi plasmid with constitutive expression of gRNA and dCas9/KRAB co-expressed with mCherry reporter. Plasmid was directly introduced in day >30 iPS-CM through nucleofection using Amaxa Nucleofector 4D system. RTPCR was used to quantify RNA levels and validate knockdown of target genes. Immunofluorescence (IF) was used to label sarcomeric proteins and other proteins of interest to observe changes in expression. Sarcomeric phenotypes resulting from knockdown of BAG3 and putative BAG3 interactors were evaluated by co-transfection of CRISPRi plasmid specific for each target with CAG-driven ACTN-GFP reporter delineating the Z-disk followed by a blinded, manual sarcomere scoring system developed in the lab using ANOVA with post-hoc Tukey's test for statistical significance.

**Results:** Nucleofection of CRISPRi expression system in iPS-CM resulted in mCherry-reported expression of dCas9/KRAB, with specific gRNA-targeted knockdown on RTPCR and IF using previously validated BAG3-targeting gRNA. Targeting of 10 BAG3 interactor genes by testing 5 guides per gene identified at least one targeting guide with potent knockdown activity at the RNA level. Validating knockdown with IF demonstrated significant loss of target protein expression in cells containing plasmid with CRISPRi expression system with guide specific for the corresponding target gene. Knockdown of BAG3 with CRISPRi plasmid resulted in recapitulation of previous BAG3 knockout findings including loss of HSPB8 on IF staining and significantly increased sarcomeric disarray with bortezomib drug treatment when compared to control.

**Conclusion:** The transient co-delivery of circular CRISPRi expression system with an ACTN-GFP reporter in terminally differentiated iPS-CMs is a high-throughput means of knocking down gene expression of BAG3 interacting partners to screen for the critical components that cause BAG3-related DCM.

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# Japan - Research-Poster Finalist

## Yuki Furukawa

**Title:** What influences women's willingness to undergo mammography screening? : A two-by-two factorial, allocation-concealed, quasi-randomized controlled trial.

**Authors:** Yuki Furukawa, Medical Student, Nagoya City University., Mano Soshi, Medical Student, Osaka Medical College.

**Introduction:** Regular mammography screening is recommended for those over 40 in Japan, but there is a concern that its promotions might be exaggerating its benefits and not telling its harms enough, thereby preventing people from making informed decisions. Previous research tends to focus more on how to get more women involved in the screening, than on how to help women make well-informed decision. In this study, we examined what influences women's willingness to undergo mammography screening.

**Methods:** This two-by-two factorial, allocation-concealed, quasi-randomized controlled trial recruited women aged 30 years and older on an online survey by an Internet survey company. Participants were assigned 1:1:1:1 to four groups by date of birth. The allocation process was concealed. Women were shown either sentences used in mammography screening campaigns or evidence-based information on both the benefits and harms, either with the term "mammography screening" or an alphabet "A." The primary outcome was the willingness to undergo the examination measured with 0-10 Likert scale. This study was registered with UMIN registry, number UMIN000030443.

**Results:** Between Dec 19, 2017, and Dec 20, 2017, we assigned 330 women to promotional sentences with "mammography" (n=88; Willingness to undergo the examination 7.3; SD 3.0), evidence-based information with "mammography" (n=80; 7.4; SD 2.8), promotional sentences with "A" (n=90; 7.5; SD 2.3), or evidence-based sentences with "A" (n=72; 6.3; SD 2.4). The interaction between the type of sentences and the use of the term "mammography" was statistically significant (Generalized linear model  $p=0.02$ ). When the alphabet "A" was used, mammography campaign's sentences increased women's willingness to undergo the examination compared with the evidence-based information (Cohen's  $d=0.56$ . 95% CI; 0.24 to 0.87. T-test;  $p<0.001$ ), but not among the groups where the term "mammography" was used ( $p=0.87$ ). When the evidence-based information was presented, the term "mammography" motivated women more than the alphabet "A" (Cohen's  $d=0.43$ ; 95% confidence interval; 0.12 to 0.75; T-test  $p<0.01$ ), while there was no significant difference among the groups where the promotional descriptions were used ( $p=0.32$ ).

**Conclusion:** Not only the sentences used in mammography screening campaigns but also the use of the term "mammography" itself could make women more willing to undergo the examination.

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# Kansas-Research-Poster Finalist

## Megan Watson

**Title:** The Relationship of Cigarette Smoking and Incident Heart Failure: Results: from the Multi-Ethnic Study of Atherosclerosis

**Authors:** Megan Watson, Mahmoud Al Rifai, Sina Kianoush, Michael E. Hall, Andrew P. DeFilippis, Rachel J. Keith, Emelia J. Benjamin, Carlos J. Rodriguez, Aruni Bhatnagar, Joao A. Lima, Javed Butler, Michael J. Blaha

**Introduction:** Cigarette smoking remains a major risk factor for cardiovascular diseases (CVD). Heart failure (HF) is an increasingly prevalent disease with high burden of morbidity and mortality. We aimed to conduct a detailed analysis of the association between cigarette smoking and risk of HF in a racially diverse and sex-balanced US cohort.

**Methods:** We included participants from the Multi-Ethnic Study of Atherosclerosis (MESA), a prospective cohort study of 6814 individuals free of CVD at baseline, with detailed information on self-reported and measured cardiovascular risk factors. We excluded participants with missing information on cigarette smoking status (n=22). Cigarette smoking was characterized by status (never, former, current), intensity (number of cigarettes per day among current smokers), burden (pack-years among current and former smokers), and time since quitting (among former smokers). Adjudicated outcomes included total HF cases and stratified by ejection fraction (EF) into HF with reduced EF (HFrEF) and preserved EF (HFpEF). Cox proportional hazards models examined the association of cigarette smoking with HF adjusting for traditional cardiovascular risk factors and accounting for competing risk of death and each HF type.

**Results:** Among 6792 MESA participants, mean age was 62±10 years, 47% were males, 39% were white, and 13% were current smokers. A total of 279 incident HF cases occurred over a median follow up of 12.2 years. The incidence rate of HFrEF was 2.15 cases per 1000 person-years and that of HFpEF was 1.86 per 1000 person-years. In multivariable-adjusted models, current smoking was associated with a higher risk of HF compared to never smokers (HR, 2.14; 95% CI, 1.40–3.26), while former smoking was not significantly associated with HF (HR, 1.19; 95% CI, 0.88–1.59). When stratified by EF, current smoking was significantly associated with HFpEF cases only (HR, 2.99; 95% CI, 1.40–6.38) (Figure). There was no significant association between smoking intensity, burden, or time since quitting and incident HF.

**Conclusion:** Current smoking is associated with a higher risk of HF, specifically HFpEF. Although our Results: cannot establish direct causality, efforts to reduce smoking may help decrease risk of HF.

# Kansas-Research-Poster Finalist

## Noria M McCarther

**Title:** Treating more, but making a difference? Assessing appropriate de-escalation of therapy for GI bleeds

**Authors:** Jesse Richards DO, Chris Streiler MD, Jarod Cullan MD, Michael Pritchett MD, Noria McCarther, Andrea Kieffer, Jessica Newman DO, Heath Latham MD

**Introduction:** Gastrointestinal hemorrhage is a common reason for inpatient hospitalization with over 500,000 admissions in 2012 at a cost of nearly 5 billion dollars. The current American College of Gastroenterology (ACG) guidelines clearly delineate appropriate therapy for suspected and endoscopically confirmed ulcer and other upper gastrointestinal (GI) bleeding, however adherence to current guidelines including appropriate de-escalation of therapy in low risk individuals has not been studied to date. Considering the crucial component of proton-pump inhibitor (PPI) therapy in the management of ulcers, in this study we analyze the adherence to current society guidelines with de-escalation of therapy post-endoscopy in low risk patients from IV therapy to oral PPIs.

**Methods:** An IRB-approved search was made using the HERON data repository for patients admitted during 2016 to KU Medical Center for GI bleeding and who underwent upper endoscopy. 897 patients were found, and 100 charts were randomly selected for analysis by a team of reviewers who used a pre-generated template for data recording. Pre-endoscopy PPI therapy, endoscopic findings and recommendations, and post-endoscopic PPI therapy were recorded and a separate reviewer compiled the Results: for review and analysis.

**Results:** Of the 897 patients screened, 100 randomized charts were reviewed and 67 were found to meet the criteria of admission for suspected upper GI bleed with endoscopy performed during admission. For empiric therapy, 100% of patients were started on PPI drip or intermittent IV pre-endoscopy, consistent with guidelines. Of the inpatient admissions, 57% (38 patients) were found to have low risk endoscopic findings, defined as flat or clean based ulcers with no active signs of bleeding. For these low risk patients 32% (12) were found not to have therapy de-escalated post endoscopy, with continuation of previous PPI drip being the main variance.

**Conclusion:** While guidelines are currently well-established for PPI therapy in upper GI bleeds, a lack of adherence to de-escalation of treatment regimens may lead to overtreatment and prolonged hospital stay. ACG clearly outlines that if no high-risk sequelae are found with healing ulcers then therapy can be de-escalated to oral medication and the patient discharged the same day. With nearly 900 admissions a year for GI bleeds and over 3,000 patient days, the inertia to overtreat with IV medications can keep patients in the hospital for an estimated 200 days a year, costing the hospital nearly half a million dollars and exposing patients to further complications from an extended stay. There is significant room for improvement in communication and education to ensure patients are adequately treated and appropriately discharged.

# Kentucky-Research-Poster Finalist

## Elizabeth Hart

**Title:** Attitudes, Perceptions, and Usage of Electronic Cigarettes: An Exploratory Investigation

**Authors:** E. Paige Hart, Clara G. Sears, Kandi L. Walker, & Joy L. Hart

**Introduction:** Electronic cigarettes (e-cigs) are increasing in popularity, especially among youth and young adults. Originally, e-cigs were marketed and sold primarily online. Now they are readily accessible in a variety of locations, including vape shops, specialty stores where employees communicate with customers and assist with purchases. Despite increasing popularity and cultural acceptance, too few studies have investigated communication promoting e-cig products and use. This study reports on college student perceptions of electronic cigarettes as well as their views of the communication advertising such products. Understanding these views can be beneficial in developing more informative health communication campaigns.

**Methods:** Participants (N=652) were enrolled at the University of Louisville, a large metropolitan mid-western public university. Participants voluntarily agreed to participate in the survey by completing and submitting the questionnaire electronically in RedCap. It took participants approximately 15 minutes or less to complete the 96 question survey including demographics and participants' knowledge, usage, attitudes and perception of e-cigs. Participants were gained by administering the questionnaire in required and elective communication courses, recruiting via flyers containing the URL link to the questionnaire in public places, as well as using the snowball procedure.

**Results:** Three different e-cig use groups were created: never tried, tried, and users; descriptive analysis (mean, standard deviation, median, and range) was used to compare groups. Results: characterize users of e-cigs as being relatively skewed toward males who have lower GPAs and somewhat more negative perceptions of their health. Current e-cig users were also described by their time spent outside of class which revealed that most were involved with Greek life, second to intermural sports, spent the most time exercising, and the least time studying. Overall participants believed that e-cigs were tobacco products. In general, participants viewed vape from e-cigs as unsafe to others, e-cigs as unsafe in general, and e-cigs as an unhealthy option.

**Conclusion:** Despite the growing popularity of e-cigs, this study found that 6% of the sample had not heard of e-cigs prior to the questionnaire. Results: from this study indicate that the students sampled have limited knowledge of e-cig and questions about their safety. However, these factors do not deter users from vaping and others from trying the products. This study sheds light on e-cigs views and use on one university campus and suggests avenues for future inquiry as well as factors to consider in future health campaigns (e.g. education on e-cig constituents). Given e-cigs' popularity, additional research is needed to better understand views and use of these products, as well as their overall safety.

# Louisiana-Research-Poster Finalist

## Kayla Hudson

**Title:** Choosing Telemetry Wisely: Assessing Awareness and Utilization of AHA Practice Standards

**Authors:** Kayla Hudson, Aaron Brug, Rebecca Moore MD, Chayan Chakraborti MD, Tulane University School of Medicine, New Orleans, LA

**Introduction:** The American Board of Internal Medicine Foundation's campaign, Choosing Wisely, includes five recommendations to reduce unnecessary healthcare spending. One of these is "Do not order continuous telemetry monitoring outside of the intensive care unit without using a protocol that governs continuation." The 2004 AHA Practice Standards for Electrocardiographic Monitoring reliably predict cardiac events and change patient management and thus, have the potential to act as such a protocol. However, a better understanding of current decision-making and usage of these guidelines is needed to assess whether they are practical.

**Methods:** A survey was distributed to Internal Medicine attendings, residents, and interns, at Tulane University Medical Center. The survey included 14 patient scenarios based on the 2004 AHA Practice Standards that required respondents to indicate whether they would "absolutely monitor", "consider monitoring", or "not monitor" each patient on telemetry. The survey also assessed awareness and use of the AHA Practice Standards, institutional guidelines, and the extent to which each physician relied on gestalt when deciding to use telemetry.

**Results:** There were 55 respondents - 23 interns, 16 residents, and 16 attendings. Physicians decided to use telemetry in accordance with AHA guidelines 54% of the time. Proper utilization of telemetry was not statistically correlated with level of training ( $p = 0.569$ ) and awareness of the AHA guidelines was not predictive of compliance ( $p = 0.414$ ).

The proportion of physicians aware of the AHA guidelines differs significantly based on level of training (Fischer's exact  $p=0.021$ ). There is no significant difference by level of training in those who agree that they utilize the AHA guidelines or their institution's guidelines (AHA  $p=0.104$ , 19.6% overall; Institutional  $p=0.278$ , 14.2% overall). Nearly all respondents rely on "previous clinical experience and physician gestalt" with no statistical significance when stratified by level of training ( $p=1.0$ ).

**Conclusion:** Awareness of 2004 AHA Practice Standards for Electrocardiographic Monitoring improves somewhat with training. However, utilization of the guidelines does not improve accordingly and clinical experience and gestalt dominate decision-making on the use of telemetry. Ultimately, these decisions do not reliably align with the AHA guidelines, suggesting the guidelines may not be the optimal tool for implementing the Choosing Wisely campaign recommendations.

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# Louisiana-Research-Poster Finalist

## Aaron Brug

**Title:** Homeless Health in New Orleans: Do student clinics connect patients to long-term care?

**Authors:** Aaron Brug, Maren Gregersen, Georgie Green, Scott Mayer, Joseph Kanter MD MPH, Catherine Jones MD, Department of Internal Medicine, Tulane Health Sciences Center, New Orleans, LA

**Introduction:** Tulane University School of Medicine operates Student Run Free Clinics (SRFCs) serving underserved populations throughout greater New Orleans. Patients are regularly referred to Health Care for the Homeless (HCH), a Federally Qualified Health Center (FQHC). The factors associated with referral and establishment of sustained care at HCH are unknown. This study aims to characterize Tulane SRFCs' role in linking New Orleans underserved to HCH.

**Methods:** Using a secure online database, students at SRFCs collect demographics, health risk factors, key objective findings, and treatment plans following each patient visit. This study included all individuals in the database from homeless shelter clinics between 10/2016 to 9/2017. In collaboration with HCH, patients referred to HCH were tracked for appointment attendance, both prior to referral and within 90 days of being referred. Study population was characterized; referral rates were assessed relative to a variety of disease and demographic variables.

**Results:** 146 patients met study criteria. The population was 93.9% homeless, 90.3% male, with an average age of 51.2 years ( $\pm 11.6$ ). Patients were 60.0% African American and 37.9% Caucasian. Of the 30.8% ( $n=45$ ) of patients referred to HCH, 22% ( $n=10$ ) had been to HCH prior and 31.1% ( $n=14$ ) followed up within 90 days. No patients who followed up within 90 days had been to HCH before. Successfully referred patients attended between 1 and 5 appointments within 90 days, an average of 1.76 appointments ( $\pm 1.01$ ) with 57.1% attending multiple appointments. Using a significance threshold of 0.1 and controlling for all other disease and demographic factors, patient with younger age ( $p=0.041$ ) and/or history of illicit drug use ( $p=0.067$ ) were less likely to receive a referral. Patients given Acetaminophen ( $p=0.065$ ) were more likely to receive a referral. Patients with a high-school diploma ( $p=0.019$ ), psychiatric diagnosis ( $p=0.010$ ) or prescribed Inhaled Bronchodilator/Corticosteroids (0.047) were more likely to attend follow-up appointments at HCH.

**Conclusion:** Despite barriers to care, some (31.1%) referred patients do attend appointments at HCH within 90s days. Although this proportion could be improved, the majority (57.1%) who successfully follow up achieved some degree of longitudinal care. This suggests that SRFCs can act as a bridge connecting underserved patient populations with long-term medical care. Predictive factors provide the opportunity to understand and improve patient SRFC patient care.

# Maryland-Research-Poster Finalist

## Joshua Yang

**Title:** Superhelicase-dependent isothermal amplification for point-of-care diagnostics

**Authors:** Joshua Y. C. Yang<sup>1</sup>, Taekjip Ha<sup>1</sup>, <sup>1</sup>Johns Hopkins University School of Medicine

**Introduction:** Isothermal DNA amplification Methods: have significant utility in applications such as diagnostics in low resource settings. While helicase-dependent amplification (HDA) has previously been described as one such method, existing implementations are limited by the lack of helicase processivity (1). Here we show that an engineered superhelicase can be used in concert with DNA polymerases to amplify DNA under isothermal conditions, enabling point-of-care diagnostic capabilities without the need for thermocyclers.

**Methods:** The Rep-X and PcrA-X superhelicases were generated from mutations and cross-linking of the *E. coli* Rep and the *B. stearothermophilus*\_PcrA helicases (2, 3). Klenow exo- and Bst 2.0 polymerases were purchased from NEB. *T. aquaticus* SSB was purchased from MCLab. Primers, oligonucleotides, and conjugated DNA constructs were purchased from Integrated DNA Technologies. For unwinding experiments, FRET efficiency of Cy3 and Cy5 dyes conjugated to a DNA substrate was determined by measurement of fluorescent emission intensity at 570 and 670 nm using a Cary Eclipse Fluorescence Spectrophotometer. Isothermal amplification reactions were performed by combining helicases, polymerases, SSB, template DNA, primers, and buffer into a microtube and allowed to incubate at 37C or 57C for 90 minutes. Amplification products were analyzed either using real-time fluorescence monitoring or purified using a QIAquick purification kit and subject to gel electrophoresis. The kinetics of the amplification were calculated using the log-linear method. Fitting of unwinding kinetics was done using Eureka (Nutonian).

**Results:** As a requirement for DNA amplification, blunt-ended DNA must first be separated. While wild-type helicases have been reported to lack this ability, both Rep-X and PcrA-X were able to unwind blunt-end DNA with marked kinetics, with the reactions running to completion within 3 minutes. Using yeast DNA as a template, a region of 196 base pairs was amplified in a manner dependent on the presence of superhelicase, polymerase, SSB, and ATP and could be done isothermally at both 37C and 57C within 90 minutes of incubation. At 57C, the reaction produced more amplification products and had greater specificity than did a comparable PCR reaction. Measurement of fluorescence during amplification showed that the reaction reached saturation by 30 minutes and that the kinetics of doubling were between 1.37 and 1.45 minutes per cycle, speeds that rival those of PCR and are faster than the 3 minutes reported by commercial HDA kits.

**Conclusion:** Here we present proof-of-concept of an isothermal DNA amplification method without the need for thermocyclers. Real-time fluorescence monitoring and gel electrophoresis analysis confirmed the specificity and speed of this approach compared to PCR and HDA. Because the reaction can be run at 37C, this approach is amenable for use in low-resource and point-of-care settings where inexpensive, quick diagnostic screening tools can make a significant impact on healthcare outcomes.

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# Massachusetts-Research-Poster Finalist

## Peter Natov

**Title:** Left Ventricular Pressure and Volume Reduction with a Trans-Valvular Axial-Flow Pump During Acute Myocardial Infarction Promotes Cardioprotective Signaling and Limits the Development of Ischemic Heart Failure

**Authors:** Peter S. Natov, Michele L. Esposito, Lara Reyelt, Xiaoying Qiao, Yali Zhang, Kevin J. Morine, Shiva Annamalai, Courtney Bogins, Ayan Patel, Ethan Rowin, Richard H. Karas, Navin K. Kapur, *The Molecular Cardiology Research Institute and The Cardiovascular Center at Tufts Medical Center and Tufts University School of Medicine, Boston, MA*

**Introduction:** The current standard of care for acute myocardial infarction (AMI) is immediate revascularization by percutaneous coronary intervention (Primary Reperfusion; PR). Despite PR, many patients either expire during their hospitalization or subsequently develop heart failure. We previously reported that using a trans-valvular axial-flow pump during AMI to reduce myocardial oxygen demand before reperfusion (Primary Unloading; PU) decreases infarct size compared to PR and increases myocardial levels of stromal cell-derived factor-1-alpha (SDF-1a), a cardioprotective chemokine. Yet, the mechanism underlying increased SDF-1a levels and the long-term impact of PU remain unknown. We hypothesize that PU reduces SDF-1a degradation and that increased SDF-1a levels are associated with late-term reductions in infarct scar following AMI.

**Methods:** AMI was induced by occluding the left anterior descending artery (LAD) for 90 min in male swine (n=4/group). In the PR group, the LAD was reperfused for 120 min. In the PU group, an Impella CP was operated during an additional 30 min of occlusion before reperfusing for 120 min. Whole-transcript expression analysis was performed on the infarct zone. Real-time polymerase chain reaction (RT-PCR), immunoblotting, and activity assays assessed SDF-1a expression and protease activity. To study the late-term effects of PU, 14 animals were randomized into either PR (control arm) or PU (intervention arm). After 28 days of monitoring, magnetic resonance imaging with late gadolinium enhancement was used to quantify infarct size. Following euthanasia, infarct size was determined by triphenyltetrazolium chloride staining. RT-PCR and immunoassays quantified indices of cardiac remodeling and circulating biomarkers.

**Results:** Within the infarct zone, compared to PR, PU acutely reduced transcription, translation, and activity of matrix-metalloproteinase-2 (MMP2), MMP9, and dipeptidyl-peptidase-4 (DPP4), which are associated with inflammation and fibrosis. Within the infarct zone, PU increased SDF-1a expression and reduced expression of CXCR7, an SDF-1a sequestration receptor. In the outcomes study, 2 PR group animals died shortly after reperfusion; 12 animals survived to 28 days (PR: n=6; PU: n=6). LV scar size as determined by CMR-LGE and TTC staining was smaller in the PU group compared to the PR group. The PU group exhibited greater cardiac output and LV stroke work. Within the non-infarct zone, PU reduced expression of beta-myosin heavy chain, sarco/endoplasmic reticulum calcium ATPase, calcineurin, brain natriuretic peptide (BNP), and type I collagen, which are associated with maladaptive cardiac remodeling. PU reduced circulating BNP levels and increased circulating and myocardial SDF-1a levels. Circulating SDF-1a at 28 days post-AMI inversely correlated with infarct size.

**Conclusion:** PU acutely decreased transcription, translation, and activity of inflammatory and fibrotic mediators and decreased SDF-1a degradation. At 4 weeks post-AMI, the PU cohort exhibited reduced LV scar size, improved LV function, attenuated HF-associated maladaptive cardiac remodeling, and decreased BNP levels. Thus, PU may be a novel approach to prevent ischemic HF following AMI.

# Michigan-Research-Poster Finalist

## Alexandra Ortiz

**Title:** *Impact of Free and Reduced-Cost Drug Programs on Type 2 Diabetes Outcomes*

**Authors:** Alexandra Ortiz<sup>1</sup>, Julie Wilson<sup>1</sup>, Mahmoud Zeidan<sup>1</sup>, Chin-I Cheng, PhD<sup>3</sup>, Juliette Perzhinsky, MD, MSc<sup>1,2,4</sup>, Bernard Noveloso, MD<sup>1,2</sup>, Sethu Reddy, MD, MBA<sup>1</sup>, 1. Central Michigan University (CMU) College of Medicine, Mt. Pleasant, MI; 2. CMU Partners, Saginaw, MI; 3. CMU – Department of Mathematics, Mt. Pleasant, MI; 4. Aleda E. Lutz VAMC, Saginaw, MI

**Introduction:** With the controversies surrounding drug affordability and insurance coverage, individuals with type 2 diabetes (T2DM) may need to rely on retail pharmacy-driven free and reduced-cost drug programs for long-term management. This study focuses on the impacts of these free and reduced-cost drug programs on patient disease outcomes and patient satisfaction with treatment.

**Methods:** This study consists of a retrospective chart review using outpatient data collected from an Electronic Medical Record (EMR) database and a patient survey collected from patients in waiting rooms at CMU Health Internal Medicine and Family Practice Clinics from June to August 2017. The primary outcomes of interest are whether patients who either receive their metformin for free or at a reduced cost have: 1) more significant improvements to their HbA1c values, 2) self-report higher adherence to treatment regimen, and are (3) more satisfied (assessed by validated instrument courtesy of Merck) with their treatment than their counterparts who pay full price for their metformin prescriptions. Secondary outcomes include the effects of demographic classes on disease outcomes and patient satisfaction. The primary variables of interest included: utilization of a free or reduced-cost drug program (determined via e-prescription to participating pharmacies), metformin prescription dosage and frequency, changes in HbA1c over the follow-up period, medication adherence, and patient satisfaction with treatment.

**Results:** Approximately 7,000 patients were labelled as type 2 diabetic and received care between October 2015 and August 2017; they were included in this study if: 1) the diagnosis date could be determined to be during or after October of 2015, 2) presence of metformin monotherapy, and (3) having both initial HbA1c and follow-up HbA1c taken at least three months after initiation of metformin. Of the 102 charts evaluated so far, 30 patients utilized a free drug program and 6 utilized a reduced-cost drug program. Average patient age was 57.44, average BMI was 36.34 kg/m<sup>2</sup>, and the population was 50.0% male. Interestingly, there was a higher mean (BMI = 38.24 kg/m<sup>2</sup>) in the full cost metformin group than in the lower cost groups (BMI = 32.28 kg/m<sup>2</sup> in the reduced cost group and 32.98 kg/m<sup>2</sup> in the free group) ( $p = 0.02$ ). There was no statistical difference in change to HbA1c between pharmacy groups ( $p=0.437$ ). Analysis of the 24 completed surveys from the clinic showed that approximately 82.6% of patients self-reported as adherent (missing doses twice per month or less), with no statistical difference detected between pharmacy groups ( $p=0.213$ ). There was also no statistical difference detected between groups with regards to overall patient satisfaction with treatment ( $p=0.557$ ).

**Conclusion:** Our preliminary analysis has shown that there do not appear to be differences in any of the primary outcomes of interest between groups of patients based differences in access to metformin. Our

study suggests that there are other factors beyond cost of medication which affect adherence and/or patient satisfaction with their treatment regimen.

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# Michigan-Research-Poster Finalist

## Stephanie Saravolatz

**Title:** Use of Antidepressants is Associated with Improved HIV Treatment Compliance

**Authors:** Stephanie Saravolatz MS-1, Susan Szpunar PhD, Leonard B. Johnson MD, FACP

**Introduction:** Psychiatric illnesses are prevalent among HIV patients. Depression is linked to lower adherence with HIV therapy; however, the association of antidepressant use and treatment adherence is not yet known.

**Methods:** This was a retrospective chart review of HIV patients seen at the Infectious Disease clinic at St. John Hospital and Medical Center during 6/1/14-5/31/16. Patients with at least two encounters and on HIV therapy were included. Data were collected on demographics, medications, CD4 counts, and viral loads. Immunologic failure (IF) was defined as at least two consecutive visits with CD4<200. Virologic failure (VF) was defined as at least two consecutive visits with viral load>100. Poor compliance was defined as having both IF and VF. A p-value < 0.05 indicated statistical significance.

**Results:** We assessed 163 patients with a mean age at diagnosis of  $36.5 \pm 10.8$  years; 73% male and 70.6% black. Overall, 19.6% of patients were taking an antidepressant. While 21.8% of patients without IF had used an antidepressant, none of the patients with IF had done so. Similarly, 21.6% of patients without VF had used an antidepressant compared to 8.7% of patients with VF ( $p=0.15$ ). Only 8.3% of patients on an antidepressant stopped therapy compared to 20.5% not on an antidepressant ( $p=0.31$ ). Patients on antidepressants were less likely to demonstrate poor compliance than those who had not used antidepressants (6.3% vs. 22.3% respectively,  $p=0.04$ ).

**Conclusion:** In our HIV clinic population, antidepressant use was associated with higher compliance with HIV therapy.

# Minnesota-Research-Poster Finalist

## Caleb J Murphy

**Title:** Self-perception of servant leadership and leadership self-efficacy among first-semester health students

**Authors:** Caleb Murphy<sup>1</sup>, Elizabeth Campbell<sup>2</sup>, Krista Soria<sup>3</sup>, Patrick Boland<sup>4</sup>, Brian Sick<sup>5</sup>, 1: University of Minnesota Medical School, Minneapolis, MN, USA, 2: Carlson School of Management, University of Minnesota, Minneapolis, MN, USA, 3: Office of Institutional Research, University of Minnesota, Minneapolis, MN, USA, 4: New York University School of Medicine, New York, NY, USA, 5: Department of Medicine, University of Minnesota, Minneapolis, MN, USA

**Introduction:** Interprofessional and leadership curricula teach healthcare-appropriate leadership skills to health professions students. However, little is known about the leadership competencies of entering students, which research has demonstrated yield important implications for curricular design and outcomes. Servant leadership (SL) and leadership self-efficacy (LSE) are two leadership concepts particularly relevant to healthcare, as SL has been frequently proposed as an ideal healthcare leadership model and LSE is associated with willingness to engage in active leadership, an increasingly crucial competency for all healthcare professionals.<sup>1,2</sup> The objective of this study was to evaluate the association of SL and LSE with degree program and demographic difference of first-semester health and allied health students.

**Methods:** A 35-item self-report survey measuring servant leadership (SL) and leadership self-efficacy (LSE) was administered to 1,014 students enrolled in the first semester of the University of Minnesota's interprofessional curriculum. SL was measured with Page and Wong's condensed 23-item instrument, while LSE was measured with Paglis and Dwyer's 12-item instrument.<sup>3,4</sup> Also captured were 15 demographic variables selected with input from two leadership researchers. Degree programs included in study were medicine, nursing, pharmacy, dentistry, physical therapy, and ten allied health programs. To determine significant score differences, ANOVA and Tukey's HSD were used to compare programs, while two-sample and linear regression t-tests were used to compare demographic variables.

**Results:** 453 of 1,014 students (45%) responded to the survey. ANOVA showed significant variation among programs for SL and LSE ( $p < 0.01$  and  $p = 0.05$ , respectively). Post-hoc testing showed higher SL scores for Medicine vs. Pharmacy and Dentistry vs. Pharmacy ( $p = 0.02$  for both); no LSE score differences were identified with pairwise comparison. SL and LSE scores were positively correlated with number of previous leadership roles ( $p < 0.01$  for both) and number of previous leadership trainings ( $p < 0.01$  for both). SL scores were higher for financially independent vs. dependent students ( $p = 0.02$ ) and correlated with lower household income ( $p = 0.03$ ) and lower socioeconomic status ( $p = 0.03$ ). No statistically significant differences in SL or LSE scores were found with respect to gender, race, sexual orientation, primary language, family college history, educational attainment, or political beliefs.

**Conclusion:** Our single-site, cross-sectional evaluation of leadership self-perception is notable for identifying higher SL scores in first-semester medical students compared to pharmacy students, as frequent collaboration between these two professions could presumably be influenced by differences in leadership approach. Although we cannot demonstrate causation, the dose-dependent increase in SL and LSE scores with additional leadership roles and training is consistent with prior studies supporting

the utility of these experiences and suggests a need for student leadership development opportunities. Next steps are to improve strength of findings and monitor for changes over time with multi-site and time series studies.

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# Minnesota-Research-Poster Finalist

## Garrett A Welle

**Title:** Optimizing Appropriate Utilization of Cardiac Telemetry on an Adult General Medicine Unit

**Authors:** Garrett A. Welle<sup>1</sup>, Sarah Koepp, MSN, RN<sup>2</sup>, Michael Rhodes, MD<sup>1,2</sup>, Kevin Shores, MA, MEd<sup>2</sup>

**Introduction:** M Health in collaboration with the University of Minnesota Medical School delivered a quality improvement solution to reduce the cost of healthcare spending based on the 'Choosing Wisely' campaign, an initiative of the American Board of Internal Medicine (ABIM) Foundation. Within their top recommendations was the need to address and avoid continuous telemetry monitoring in non-ICU patients without using a protocol that governs continuation. Optimizing the utilization of cardiac telemetry was based on revising current guidelines to incorporate the indications put forth by the American Heart Association and American College of Cardiology. These modifications were made in an effort to guide the appropriate ordering and discontinuation of telemetry. The project's aim was to reduce the non-indicated use of telemetry on an adult medical unit by 50% by February 1, 2017.

**Methods:** A process flowchart was devised using Six Sigma principles to show the procedure for a telemetry patient from admission to discharge. To avoid scope creep, three areas of opportunity were identified and used to elucidate the scope. The in-scope items included: registered nurses (RNs) unaware of the reason for telemetry, no set discontinuation protocol, and providers and RNs unknowledgeable about monitoring criteria. The interventions addressed these problems by creating a hard-stop indication line within the electronic medical record (EMR), revision of guidelines to evidence-based telemetry criteria, and increasing collaborative communication about telemetry criteria. We opted to monitor and implement changes on an adult general medicine unit at the University of Minnesota Medical Center. To analyze the pre- and post-intervention data, surveys were administered on a four-point Likert scale to guide RN perceptions of telemetry, a 2-sample T-test was used to evaluate the length of time patients were on telemetry, and a one sample T-test was used to explore the proportion of patients on telemetry daily.

**Results:** We found there was an increase in RN awareness of the telemetry criteria and increased collaborative communication. Additionally, there was a significant decrease of 18.5 hours ( $p = 0.009$ ) in average time on telemetry and a significant decrease of 2.9% ( $p = 0.025$ ) in the average number of patients on telemetry daily. Finally, we surpassed the original aim of reducing non-indicated telemetry by 50% to reducing non-indicated telemetry by 100% ( $n = 34$ ), as all patients had a documented indication for telemetry.

**Conclusion:** Through focused education, revision of guidelines for ordering and discontinuation with evidence-based criteria, and amendment of the EMR order set, we were able to optimize the use of cardiac telemetry and eliminate non-indicated use by 100%.

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# Mississippi-Research-Poster Finalist

## Amit B Reddy, MBBS

**Title:** B-ACUTE LYMPHOBLASTIC LEUKEMIA: RACE-SPECIFIC GENETIC ABERRATIONS IN CHILDREN

**Authors:** Amit Reddy<sup>1</sup>, Ingrid Espinoza<sup>1</sup>, Dana Cole<sup>1</sup>, Jason Schallheim<sup>2</sup>, Eldrin Bhanat<sup>1</sup>, Yunyun Zhou<sup>1</sup>, Jovanny Zabaleta<sup>3</sup>, Gail Megason<sup>1</sup>, Christian R. Gomez<sup>1</sup>, <sup>1</sup>University of Mississippi Medical Center, Jackson, MS, <sup>2</sup>Anne Arundel Medical Center, Annapolis, MD, <sup>3</sup>Louisiana State University, Health Sciences Center, New Orleans, LA

**Introduction:** The most common form of cancer in pediatric patients is B-acute lymphoblastic leukemia (B-ALL) and comprises more than 30% of all childhood malignancies. The patient survival was found to be significantly lower in African American (AA) children compared to European (EA) children in previous studies. This disparity is not related to socioeconomic variables, suggesting a molecular basis for the lower survival rates of AA. Here we present a study showing race-specific genetic aberrations (GA) that may play a role in health disparities in B-ALL in AA and EA children.

**Methods:** A total of 20 newly diagnosed pediatric patients were utilized in our study (5 AA and 15 EA). Ages ranged between 1 and 18 years. Clinical history, hemogram, flow cytometry, immunophenotypic, morphologic, cytogenetic and prior molecular data were reviewed. None of the patients in our study had a relapse. Median percent cellularity present in the bone marrow aspirates was 100% (70% - 100%). Median percent of blasts was 94.8% (64.5% - 99.0%). Following manufacturer protocol (Qiagen, QIAmp DNA blood kit), 200µl of frozen bone marrow aspirates were used to extract the DNA. Following quality control on a Qubit fluorometer and RNA bioanalyzer, the samples were submitted to a translational genomics core for library preparation and whole-exome sequencing. Bioinformatics analysis was performed and genetic variants for each sample were identified.

**Results:** We identified specific germ-line mutations within the most widely accepted cancer-related genes related to B-ALL. Most genetic aberrations (339) were shared between AA and EA, for example those present in the Anaplastic Lymphoma Receptor Tyrosine Kinase (*ALK*) gene. Some genes with genetic aberrations were specific of AA (58) such as, Lipoma Preferred Partner Gene (*LPP*) and others specific for EA (52) such as, Leukemia Inhibitory Factor Receptor (*LIFR*). The ingenuity pathway analysis revealed these genes clustered in race-specific canonical pathways. In AA, the specific pathways were related to telomerase signaling and cancer signaling. In EA, the specific pathways were related to stem cell pluripotency and hereditary cancers. Our findings suggest the value of whole exome sequencing as a tool for development of individual gene signatures and gene scores for AA and EA children afflicted by B-ALL.

**Conclusion:** Overall, the prevalence of genetic aberrations in B-ALL may contribute to differences in incidences and outcomes between AA and EA children. Aberrant biological networks revealed by our study, provide information on distinguishing genetic aberrations and signaling networks that may be involved in race-specific leukemogenesis. Our findings suggest that it may be possible to develop a whole-exome sequencing gene signature in B-ALL to help define a race-specific prognostic assay for B-ALL in bone marrow aspirates. These findings may ultimately impact targeted disease management and contribute to the elimination of the disparate outcomes in B-ALL among AA children.

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# Missouri-Research-Poster Finalist

## Hunter Faris

**Title:** Selective Modulation of Fyn Tyrosine Kinases by Muscarinic Acetylcholine Receptors in the Rat Striatum

**Authors:** Li-Min Mao, Hunter J. Faris, and John Q. Wang

**Introduction:** The Src family kinase (SFK) is a subfamily of non-receptor tyrosine kinases. SFK members, Src and especially Fyn, are expressed in the striatum. These SFK members are involved in the regulation of neuronal and synaptic activities and are linked to the pathogenesis of a variety of neuropsychiatric and neurodegenerative disorders. Given the fact that muscarinic acetylcholine (mACh) receptors are highly expressed in striatal neurons and are critical for the regulation of striatal function, we investigated the role of mACh receptors in the regulation of SFKs in the adult rat striatum in vivo.

**Methods:** Male and female Wistar rats were administered an intraperitoneal injection of 5 mg/kg of scopolamine and atropine separately. Rats were anesthetized, sacrificed and had brains removed for coronal slice cuts to be made into two subdivisions of the striatum, the caudate putamen and nucleus accumbens. Brain tissue was then homogenized, centrifuged and collected as a supernate for Western blot analysis. Src, Fyn, and phosphorylated Y416 levels were determined using rabbit antibody reactants. Separately, immunoprecipitation was completed for Src, Fyn, and phosphorylated Y416. Lastly, Fyn kinase activity was assayed using the Takara Universal Tyrosine Kinase Assay Kit. Data was evaluated using the statistical one-way analysis of variance followed by a Bonferroni (Dunn) comparison of groups using least squares-adjusted means. An acute injection of saline (1 mL/kg) was made in age-matched rats and served as our control.

**Results:** We found that pharmacological blockade of mACh receptors by systemic administration of the mACh antagonist scopolamine induced a marked increase in phosphorylation of SFKs in the striatum of male and female rats. This scopolamine-induced increase in SFK phosphorylation occurred in the two subdivisions of the striatum (caudate putamen and nucleus accumbens) and was time-dependent and reversible. Another mACh antagonist atropine was also effective in stimulating SFK phosphorylation. Between Fyn and Src proteins immunoprecipitated from striatal tissue, scopolamine selectively increased phosphorylation of Fyn. The increase in Fyn phosphorylation was accompanied by an increase in Fyn kinase activity in response to scopolamine.

**Conclusion:** These Results: reveal a significant role of mACh receptors in the regulation of SFKs (mainly Fyn) in striatal neurons. Under normal conditions, endogenous mACh receptors appear to exert an inhibitory effect on Fyn activity.

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# Missouri-Research-Poster Finalist

## Jordan Feltes

**Title:** Predicting Suicidal Ideation in Patients with Depression using Text Message Services and Machine Learning Models.

**Authors:** Zoe Lu, Medhavi Bhasin, William Tzeng, Robert Chen, Jordan Feltes, William Ross

**Introduction:** Suicide is a leading cause of death worldwide. There is currently no consistently effective model to predict suicide in clinical practice. Outside of clinic visits, there is negligible monitoring from clinicians of high risk patients before a suicide is first attempted. Attempts to assess for future suicidality in psychiatric patients using machine learning algorithms have historically been poor and required invasive screens, biological sampling, or robust integration of electronic tools with patient health records. Using a text-based mobile health service as our framework for data collection, we explored whether machine learning models could be utilized to predict future suicidal ideation in patients with Major Depressive Disorder.

**Case Presentation:** A total of 106 adults with a diagnosis of Major Depressive Disorder (65 women [61%] and 41 men [39%]) were enrolled in a mobile health tool through outpatient community mental health treatment services in a mid-sized US midwestern city and received text message queries about their mood daily as well as a biweekly text-message PHQ-9. For each individual patient, we used the variables of mood, response rate, number of alerts, response latency, user feedback, and PHQ-9 scores to predict 12 week suicidal ideation using supervised machine learning algorithms. Relevance of each predictor variable was determined.

Participants had a mean (SD) age of 48.2 (12.7). During 12 weeks of study, patients demonstrated a decrease in PHQ-9 score of 4.5 points ( $p=0.012$ ) but no change in mood scores. Mood scores of zero and one out of ten were associated with high rates of suicidal ideation (41% and 64% respectively) and a mood score of two or greater out of ten was highly specific (99% specificity) for lack of suicidal ideation within our population. Accuracy of machine learning models [Accuracy, ROC] was highest for naive bayes [85.7%, 0.900], followed by logistic regression [81.0%, 0.926], random forest [76.2%, 0.880], and linear SVM [76.2%, 0.833]. Predictor variables with the highest relevance included mood, 2nd PHQ-9 score, and response rate.

**Discussion:** Prediction of patient suicidality months before they report it can be achieved with high accuracy using machine learning algorithms built from data collected by mobile health SMS service. Key benefits of our method include: minimally time or resource intensive measurement, patients never needing to step foot in a clinic, and especially high sensitivity in some of our models. High sensitivity is an essential characteristic of this type of algorithm to prevent patients from slipping through the cracks as false negatives. Results: warrant future research into the external validity of machine learning models  
**Methods:** Patients with a history of DSM-IV Major Depressive Disorder ( $n=106$ ) were enrolled in a mobile health tool through outpatient community mental health treatment services in a mid-sized US midwestern city and received text message queries about their mood daily as well as a biweekly text-message PHQ-9. For each individual patient, we used the variables of mood, response rate, number of alerts, response latency, user feedback, and PHQ-9 scores to predict 12 week suicidal ideation using supervised machine learning algorithms. Relevance of each predictor variable was determined.

**Results:** A total of 106 adults (65 women [61%] and 41 men [39%]) were enrolled in the study across three community care sites. Participants had a mean (SD) age of 48.2 (12.7). During 12 weeks of study, patients demonstrated a decrease in PHQ-9 score of 4.5 points ( $p= 0.012$ ) but no change in mood scores. Mood scores of zero and one out of ten were associated with high rates of suicidal ideation (41% and 64% respectively) and a mood score of two or greater out of ten was highly specific (99% specificity) for lack of suicidal ideation within our population. Accuracy of machine learning models [Accuracy, ROC] was highest for naive bayes [85.7%, 0.900], followed by logistic regression [81.0%, 0.926], random forest [76.2%, 0.880], and linear SVM [76.2%, 0.833]. Predictor variables with the highest relevance included mood, 2nd PHQ-9 score, and response rate.

**Conclusion:** Prediction of patient suicidality months before they report it can be achieved with high accuracy using machine learning algorithms built from data collected by mobile health SMS service. Key benefits of our method include: minimally time or resource intensive measurement, patients never needing to step foot in a clinic, and especially high sensitivity in some of our models. High sensitivity is an essential characteristic of this type of algorithm to prevent patients from slipping through the cracks as false negatives. Results: warrant future research into the external validity of machine learning models in predicting suicidal ideation and suicide in other populations.

# Missouri-Research-Poster Finalist

## Sean Lacy

**Title:** Differentiating Hospital Outcomes Between Cystic Fibrosis and Asthma in Patients with Allergic Bronchopulmonary Aspergillosis

**Authors:** Sean Lacy, Kyle Yuquimpo, Quoc Tran, Jacob Baer, John Dobson III MD, Kansas City University of Medicine and Biosciences

**Introduction:** Allergic Bronchopulmonary Aspergillosis (ABPA) is a hypersensitivity reaction to *Aspergillus fumigatus* that occurs most commonly in patients with asthma and cystic fibrosis (CF). There is a paucity of data regarding hospital outcomes differentiating between these two concomitant conditions.

**Methods:** This retrospective cohort study utilizes information from the Healthcare Cost and Utilization Program Nationwide Inpatient Sample (NIS) to identify patients with ABPA (518.6) from 2012 to 2014 using ICD-9 codes. Within this group, asthma (493.0 - 493.9 and 493.00 – 493.92) and CF (277.0 and 277.00 - 277.09) patients were identified. Patients missing important clinical identifiers were excluded. Inpatient mortality, hospital length of stay (LOS), and cost of hospitalization were assessed.

**Results:** 4,306 patients with ABPA were identified (mean age 50.43 +/- 23.9, 44.3% male, 55.6% female) while 1,628 patients had concomitant CF (37.8%, mean age 42.13 +/- 24.7, 46.8% male, 53.1% female). 2,429 patients with ABPA and concomitant asthma were identified (56.4%, mean age 51.1 +/- 23.6, 42.6% male, 57.3 % female). CF patients had an increased LOS (7.47 vs. 5.82,  $p < 0.001$ ) and cost of inpatient hospitalization (\$72,166.84 vs. \$53,584.54,  $p = 0.001$ ) compared to asthma patients. No significant difference between the in-hospital mortality was found between the two groups.

**Conclusion:** Patients with ABPA and concomitant CF compared to those with asthma are associated with an increased LOS and cost of hospitalization. Involvement of multiple organs in CF may lead to increased complications in ABPA patients. For patients with ABPA, it is imperative to assess the systemic burden of disease and to recognize the importance of the addition of CF and/or asthma as they relate to clinical and economic outcomes.

# Missouri-Research-Poster Finalist

## Quoc Tran

**Title:** The Impact of Systemic Lupus Erythematosus and Rheumatoid Arthritis on Outcomes in Patients Undergoing Percutaneous Coronary Intervention

**Authors:** Quoc Tran - Kansas City University of Medicine and Biosciences, Kyle Yuquimpo- Kansas City University of Medicine and Biosciences, Catherine Mayer - Kansas City University of Medicine and Biosciences, Sean Lacy- Kansas City University of Medicine and Biosciences, Jake Baer- Kansas City University of Medicine and Biosciences, Christopher Buckley DO - University of Kansas Medical Center , Barth Wright PhD - Kansas City University of Medicine and Biosciences.

**Introduction:** Systemic lupus erythematosus (SLE) and Rheumatoid Arthritis (RA) promote chronic inflammation that accelerates coronary atherosclerosis. There is minimal data regarding the impact of SLE and RA on outcomes in patients undergoing percutaneous coronary interventions (PCI). This study aims to further examine the association of concomitant RA or SLE with hospital outcomes amongst patients undergoing PCI.

**Methods:** This retrospective cohort study utilizes information from the Healthcare Cost and Utilization Program Nationwide Inpatient Sample (NIS) to identify adult patients (>18 years) from 2012 to 2014 who underwent PCI. Patients with SLE and RA were identified using ICD-9 codes. Patients missing important clinical identifiers (age, gender, race, death) were excluded. Inpatient mortality, hospital length of stay (LOS), and inpatient costs were assessed.

**Results:** 4,222 patients with RA and 1,072 patients with SLE underwent PCI were identified. Both RA and SLE patients were predominantly female, Caucasian, and older. Concomitant SLE was associated with increased LOS (4.2 vs 3.7 days,  $p < .001$ ) and lower patient age (60.3 vs 64.6 years,  $p < .001$ ) than in patients without SLE. Concomitant RA was associated with increased LOS (4.2 vs 3.7 days,  $p < .001$ ). Neither SLE nor RA was associated with a significant difference in inpatient mortality or cost.

**Conclusion:** SLE and RA are associated with increased LOS in patients undergoing PCI, but were not associated with significant differences in inpatient mortality or total inpatient costs. Interestingly, the age of patients with concomitant SLE undergoing PCI was significantly lower than in those without SLE. Peri-procedural optimization of SLE or RA may be a potential avenue to reduce LOS in patients undergoing PCI. The presence of SLE should prompt clinicians to consider coronary artery disease at an earlier age than in patients without SLE.

# Missouri-Research-Poster Finalist

## Anastasia Evanoff

**Title:** Physicians-in-training are not prepared to prescribe medical marijuana

**Authors:** Anastasia B. Evanoff, Tiffany Quan, Carolyn Dufault, Michael Awad, Laura J. Bierut

**Introduction:** While medical marijuana use is legal in more than half of U.S. states, evidence is limited about the preparation of physicians-in-training to prescribe medical marijuana. We asked whether current medical school and graduate medical educational training prepare physicians to prescribe medical marijuana.

**Methods:** We conducted a national survey of U.S. medical school curriculum deans, a similar survey of residents and fellows at Washington University in St. Louis, and a query of the Association of American Medical Colleges (AAMC) Curriculum Inventory database for medical marijuana keywords.

**Results:** Surveys were obtained from 100 curriculum deans, and 258 residents and fellows. 145 schools were included in the curriculum search. 66.7% of deans reported that their graduates were not at all prepared to prescribe medical marijuana, and 25.0% reported that their graduates were not at all prepared to answer questions about medical marijuana. 89.5% of residents and fellows felt not at all prepared to prescribe medical marijuana, while 35.3% felt not at all prepared to answer questions, and 84.9% reported receiving no education in medical school or residency on medical marijuana. Finally, only 9% of medical school curriculums document content on medical marijuana in the AAMC Curriculum Inventory database.

**Conclusion:** Our study highlights a fundamental mismatch between the state-level legalization of medical marijuana and the lack of preparation of physicians-in-training to prescribe it. With more states on the cusp of legalizing medical marijuana, physician training should adapt to encompass this new reality of medical practice.

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# Nevada-Research-Poster Finalist

## Erika Mauban

**Title:** Number of imaging studies required to diagnose aortic dissection correlates with negative in-hospital outcomes

**Authors:** Erika Mauban, Daniel Montgomery, Eva Kline-Rogers, NP, Kim A. Eagle, MD

**Introduction:** Acute aortic dissection, a disease in which mortality rates increase by up to 1-2% per hour following the onset of symptoms, requires expeditious yet accurate diagnostic imaging for proper patient care. However, due to toxic agents associated with imaging such as iodinated contrast and gadolinium, excess imaging may be associated with complications. Thus, we explored how the number of imaging studies completed relates to negative in-hospital outcomes.

**Methods:** In this retrospective, non-randomized study, we analyzed 6387 patients enrolled in the International Registry of Acute Aortic Dissection and diagnosed using transesophageal echocardiogram, computed tomography, or magnetic resonance imaging. Patients were divided into type A dissection (n=4004) and type B dissection (n=1989), then subdivided by number of imaging studies completed in-hospital (type A: 1, n=1760, 2, n=1781, 3, n=183; type B: 1, n=1111, 2, n=707, 3, n=198). Chi-square analyses were used to evaluate the association between number of studies and delayed diagnosis, death, stroke, extension of dissection, and renal failure.

**Results:** There was a positive association between number of imaging studies and extension of dissection in type A patients (12.6% with 3 studies versus 6.3% with 1 study,  $p=0.002$ ) and renal failure in type B patients (23.9% with 3 studies versus 13.8% with 1 study,  $p<0.001$ ). Additionally, patients with more imaging studies had longer times to diagnosis, with a greater percentage diagnosed above the median time from admission to diagnosis in both type A ( $p<0.001$ ) and type B ( $p=0.013$ ) patients. No relationship was found between number of images and death or stroke.

**Conclusion:** While the number of studies was associated with negative outcomes, causation cannot be ascertained. Three hypotheses potentially explain this relationship: (1) exposure to iodinated contrast or gadolinium increases negative outcomes, (2) pre-existing or dissection-related conditions necessitate increased imaging to understand potential complications, (3) missed diagnoses of dissection delay treatment thus increasing risk of complications. Elucidating the rationale behind imaging may inhibit excess orders (minimizing exposure to toxic contrasts/radiation and cutting costs), decrease time to diagnosis, and improve aortic dissection outcomes.

# Nevada-Research-Poster Finalist

## Lazaro R Peraza

**Title:** Efficacy of Tympanostomy Tube Insertion in Adult Eustachian Tube Dysfunction

**Authors:** Lazaro Peraza MS2, Lauran Evans MS3, Anthony Zamboni MD

**Introduction:** Tympanostomy tube insertion is one of the most common pediatric procedures in the United States, but is performed much less often on adults; therefore minimal adult research is available. Eustachian tube dysfunction (ETD) is the primary indication for tympanostomy tube insertion in adults, and there is a lack of consensus on the efficacy of any treatment for adult ETD. Furthermore, the objective of this study is to evaluate symptom improvement and patient satisfaction after tympanostomy tube placement, with possible tube removal, in adults with ETD who have previously failed medical treatment.

**Methods:** Retrospective chart review using the electronic medical record at Nevada ENT clinic. Inclusion criteria entailed: diagnosis with ETD, over 18 years old, previously failed medical treatment, and tympanostomy tube insertion in office between June 16th, 2014 and September 6th, 2017. The tympanostomy tube insertion procedure entails administration of a local anesthetic followed by myringotomy and subsequent Richard's modified T-tube insertion into the tympanic membrane; it usually takes 5-10 minutes in office, under otolaryngology microscope magnification.

**Results:** 78 of 101 patients (136 of 178 ears) reported overall ETD symptom improvement after receiving tympanostomy tubes. Patients commonly reported improvement in ear pressure, hearing, otalgia, and dizziness. 60 patients elected to keep the tubes in, as these patients reported symptom improvement for the reasons above, and were satisfied with their Results. 25 patients had a tympanostomy tube removed due to preference: 19 patients disliked hearing changes, a 'hollow' sensation, or were unable to tolerate expected otorrhea, and 6 patients felt their ETD symptoms had been cured, wishing to attempt a trial without tubes.

**Conclusion:** The majority of patients reported symptomatic improvement with the insertion of tympanostomy tubes, following failed medical treatment for ETD. After receiving tympanostomy tubes, patients were either cured of ETD, dependent on life-long tubes, or were not satisfied with the tubes. Though these patient reports of symptomatic improvement remain subjective, this information is vital to determine the efficacy of this elective procedure.

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# New Mexico-Research-Poster Finalist

## Parisa Mortaji

**Title:** Gender Differences in Peer Reviewers Between Three Prestigious Medical Journals

**Authors:** Parisa Mortaji, B.S., Clare Batty, B.S., Eileen Barrett, M.D., MPH

**Introduction:** Women have been historically underrepresented in the field of science. Despite increasing female participation in scientific endeavors, gender disparities are still prevalent. One area of academic science shown to be vulnerable to gender bias is the selection of peer reviewers.

The purpose of peer review is to ensure production of high-quality, scholarly manuscripts. Peer reviewers also benefit from the process through career advancement.

The aim of this study is to assess whether gender differences exist between peer reviewers of three medical journals. We hypothesize that the proportion of female peer reviewers will not represent their proportion in the physician population.

**Methods:** In this retrospective analysis, we analyzed gender differences in peer reviewers for three medical journals: *New England Journal of Medicine*, *Annals of Internal Medicine* and the *Journal of the American Medical Association*. A compendium of 2001, 2006, 2011 and 2016 peer reviewers were retrieved for each journal by conducting a web search. Gender of peer reviewers was determined by inference, and if unknown, by an internet search. Unidentifiable genders were excluded from the analysis.

The number of female peer reviewers was controlled for the number of female physicians in the population for each journal to determine whether statistical significance was met. Binomial analyses were performed.

**Results:** For *New England Journal of Medicine* and *Annals of Internal Medicine*, in all years the proportion of female peer reviewers was significantly lower than the proportion of female physicians. For NEJM, the % females and p-values for the years 2001-2016 were 12.0%, p=0.000, 13.4%, p=0.000, 16.1%, p=0.000, and 18.4%, p=0.000, respectively. For Annals, the % females and p-values for the years 2001-2016 were 16.4%, p=0.000, 20.1%, p=0.000, 22.9%, p=0.000, and 26.9%, p=0.000, respectively.

However, for *JAMA*, the proportion of female peer reviewers matched evenly with the proportion of female physicians in the population for 2006 (%females=27.3%, p=0.410), but was significantly less for 2001 (%females=22.5%, p=0.005), 2011 (%females=27.3%, p=0.000), and 2016 (%females=28.5%, p=0.000), respectively.

**Conclusion:** Although the numbers and absolute percentages of female peer reviewers are increasing, they are still underrepresented in the previously mentioned journals. This difference can be reduced by inviting more female peer reviewers to provide recommendations on manuscripts and encouraging women to apply as peer reviewers. Having more female peer

reviewers may expand an untapped well of knowledge, promote more scholarship from female scientists, and promote more academic advancement for women. Limitations include utilization of only three medical journals and the inability to account for other professionals contributing as peer reviewers.

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# New York-Research-Poster Finalist

## Bassem Zeidan

**Title:** Association Between Cocaine Use and In-Hospital Mortality Among Ischemic Stroke Patients in Florida: A Historical Cohort

**Authors:** Bassem Zeidan B.S., Sushant Sunkaraneni B.S., Grettel Castro M.P.H., Juan Gabriel Ruiz-Peláez M.D. MMedSc

**Introduction:** Cocaine use is a drug that is most often associated with ED visits within the United States. Stroke is the 3rd most common cause of death in developed countries. Incidentally, there has also been a rise in the occurrence of Ischemic Strokes associated with cocaine abuse. Our research aim is to seek a potential relationship between history of cocaine exposure and an increase of in-hospital mortality in patients that developed an ischemic stroke in the state of Florida between the years 2008-2012.

**Methods:** We've assembled a historical analytical cohort of acute ischemic stroke patients within the 2008-2012 Florida Stroke Registry, a publicly available state collection of total stroke cases admitted to hospital in Florida, between 2008-2012. Cases were identified & organized in various ways using data elements like demographics, admission/discharge status, procedure billing codes, etc. Using, the operational billing codes of the International Classification of Disease, Ninth Revision (ICD-9), we identified specific principle diagnosis & secondary diagnosis of patients within this registry. The main exposure was cocaine use and the main outcome was in-hospital mortality. Confounders addressed include: demographics, habits and comorbidities. Our statistical analysis included the following: an Exploratory analysis assessing general distribution of variables, two Bivariate analysis, comparing variables to exposure & variables to outcomes, & collinearity assessment in order to see if variables were truly independent. Multivariable Logistic regression analysis was conducted to compute Odds Ratio (OR) & 95% Confidence Interval (C.I.) after adjusting for potential confounders. A p-value of  $<.05$  was considered statistically significant.

**Results:** In total, 35,910 patients between ages of 15-65, admitted for acute ischemic stroke in Florida during 2008-2012, were included in the study. Cocaine use was present in 1009 patients of that sample with a prevalence of 2.8% (95%CI 2.6 to 3.0). Overall, 691 patients died during hospital stay, for an in-hospital mortality of 1.9% (95% CI 1.8 to 2.1). There was statistically significant increase in odds of mortality in cocaine users compared to none cocaine use. Odds of mortality increased 76% in cocaine use when compared to none cocaine users (ADJ OR 85%, CI 95% 1.26-2.70,  $p = 0.02$ ).

**Conclusion:** Strong evidence supporting our hypothesis state, history of previous cocaine use is associated with higher acute mortality. Literature explains that dysfunctions in cerebral blood flow are seen in acute usage & and are also present in the withdrawal state 24-72 hrs after drug discontinuation leading to prolonged ischemia. This indicates that chronic users are more susceptible to increased odds of mortality. Incidentally, when assessing specific demographics within the sample, we found a significant increase of in hospital mortality among patients with a payment status of either Medicaid or Other. This also may play a role regarding quality, length & aggressiveness of treatment if one were labeled as such. These findings aspire further research of secondary outcomes of cocaine induced ischemic events such as prognosis and severity in those that survived.

# New York-Research-Poster Finalist

## Anthony Delicce

**Title:** Coronary Plaque Burden on Coronary Computed Tomographic Angiography in Diabetics vs. Non-Diabetics

**Authors:** Anthony V. Delicce BS<sup>1</sup>, Basem Alawneh BA<sup>2</sup>, Kyla D'Angelo DO<sup>3</sup>, David Bass DO<sup>3</sup>, Ofek Hai DO<sup>3</sup>, Daniel Chikvashvili MD<sup>3</sup>, Roman Zeltser MD<sup>123</sup>, and Amgad N. Makaryus MD<sup>123</sup>, <sup>1</sup>Donald and Barbara Zucker School of Medicine at Hofstra/Northwell, <sup>2</sup>American University of the Caribbean, <sup>3</sup>Nassau University Medical Center

**Introduction:** Coronary artery disease (CAD) remains the leading cause of morbidity and mortality in diabetic patients. Development of coronary computed tomographic angiography (CCTA) allows non-invasive imaging of both severity of CAD and qualitative plaque composition analysis at an early stage of the disease. Coronary artery calcium (CAC) scores are used as an independent risk stratification measure and are higher in diabetic vs. non-diabetic patients. However, the degree of different plaque morphology among diabetic patients has not been well characterized. We sought to examine coronary plaque distributions in diabetics vs. non-diabetics.

**Methods:** A total of 645 consecutive patients without known CAD who underwent 320-slice CCTA were evaluated. Coronary arteries were analyzed for the degree of stenosis and type of plaque. CAC was calculated as well as cumulative plaque (CP) score, a quantification of overall calcified, partially calcified, and non-calcified plaque burden, and compared between diabetics and non-diabetics. Results: were adjusted for demographic data and CAD risk factors.

**Results:** Diabetics had significantly more coronary artery segments that contain partially calcified plaque compared to non-diabetics (0.70 vs. 0.42,  $p=0.038$ ), higher CAC scores (171.3 vs. 72.8,  $p=0.023$ ), and higher CP scores (5.05 vs. 3.13,  $p=0.008$ ). CP scores were higher in diabetics even after adjusting for total CAC scores ( $p=0.045$ ). The number of coronary artery segments with non-calcified plaque, calcified plaque, and greater than 50% stenosis were similar between diabetics and non-diabetics ( $p=0.756$ ,  $p=0.079$ , and  $p=0.461$  respectively).

**Conclusion:** Diabetics have a greater overall plaque burden mainly due to partially calcified plaques. This suggests that CAC scores alone in diabetics may underestimate overall plaque burden. Use of CCTA to identify the total plaque burden and vulnerability may provide a better means to guide management and care of these patients.

# New York-Research-Poster Finalist

## Alexander Polyak

**Title:** Outcomes in Liver Transplant Patients on Renal Sparing Protocol

**Authors:** Alexander Polyak<sup>1</sup>, Daniel Ganger<sup>2</sup>, Aneesha Shetty<sup>2</sup>, <sup>1</sup>New York Medical College, Valhalla, NY; <sup>2</sup>Nephrology/Comprehensive Transplant, Northwestern University, Chicago, IL

**Introduction:** As liver transplant outcomes have improved, long term native kidney function has taken a critical role in patient survival. Calcineurin inhibitors (CNIs), such as Tacrolimus (FK), have been mainstays of immunosuppression (IS) after OLT; however, CNIs are also known to have nephrotoxic properties that can lead to irreversible and progressive tubule-interstitial injury and glomerulosclerosis. A renal sparing (RS) approach by delaying and minimizing CNI use by adding a non-CNI immunosuppressive agent such as mycophenelate mofetil (MMF) has been developed at our center for a pre-determined at risk population. We hypothesize that using this renal sparing immunosuppression for all liver transplants will increase renal outcomes at 1 year post-OLT.

**Methods:** This is a retrospective study of patients who underwent OLT at Northwestern Memorial Comprehensive Transplant Center (Chicago) from 1/2010-5/2016. Patients were divided into two groups- a renal sparing group (RS) and control group. The renal sparing therapy includes initiation of MMF and steroids on post-OLT day 1 with delayed initiation of FK with trough goal of 5-8 ng/mL. The control group received FK (trough goal 8-12 ng/mL) and steroids on post-OLT day 1, but was eventually given MMF and FK trough goal lowered to 5-8 ng/mL. The primary study outcome was GFR at one year post-OLT (eGFR measured using CKD-EPI).

**Results:** A total of 114 liver transplant patients at NU were reviewed for this study-43 were in the RS group and 71 in the control group. GFR on day of transplant in the RS group ( $44.06 \pm 31$  mL/min/1.73m<sup>2</sup>) was lower ( $p=0.000003$ ) than in the control group ( $75.1 \pm 28$  mL/min/1.73m<sup>2</sup>); however, GFR at 1 year in the two groups was similar ( $p=0.403$ ). The change in GFR from the day of transplant to 1 year in the RS group ( $9.62 \pm 41$  mL/min/1.73m<sup>2</sup>) was significantly greater ( $p=0.0009$ ) than the control group ( $-16.9 \pm 29$  mL/min/1.73m<sup>2</sup>). Baseline characteristics such as age, gender, race, and BMI were statistically similar ( $p>0.5$ ) between the two groups. Pre-OLT comorbidities DM, HTN, and CAD were statistically similar ( $p>0.5$ ), but more subjects needed RRT pre-OLT in the RS group (6/43) than the control (2/71). Year round FK levels in the RS group ( $7.22 \pm 4.7$  ng/mL) were statistically similar to the control group ( $7.39 \pm 3.6$  ng/mL). Adverse events post-OLT such as biopsy proven rejection, NODAT, Malignancy, CMV, bacteremia, and death (6 patients died in control group) were statistically similar ( $p>0.5$ ). Neutropenia in the RS group (20/43 patients) occurred significantly more ( $p=0.017$ ) than in the control group (17/71 patients).

**Conclusion:** Delayed initiation of calcineurin agents post OLT, along with a lower target FK trough may lead to improved renal outcomes at one year for all OLT patients, with no change in risk of graft rejection or infectious complications when MMF is used as additional immunosuppression. Further prospective investigation with a larger sample size and longer follow up is warranted.

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# New York-Research-Poster Finalist

## Justina L Ray

**Title:** INCREASING INSULIN SENSITIVITY IN PREDIABETIC PATIENTS BY INHIBITING SOLUBLE EPOXIDE HYDROLASE (sEH)

**Authors:** Justina L. Ray B.S.<sup>1</sup>, Dawei S. Wei B.S.<sup>2</sup>, Nancy J. Brown M.D.<sup>2</sup>, <sup>1</sup>SUNY Downstate College of Medicine, Brooklyn, NY; <sup>2</sup>Vanderbilt University School of Medicine, Nashville, TN.

**Introduction:** One third of American adults are afflicted with prediabetes (Hb1Ac 5.7-6.4%), which increases their risk of developing diabetes mellitus type 2, as well as comorbidities including cardiovascular and renal diseases. Recently, epoxyeicosatrienoic acids (EETs), cytochrome P450 metabolites of arachidonic acid, have been shown to increase insulin sensitivity in rodents. Unfortunately, EETs are rapidly hydrolyzed by the enzyme soluble epoxide hydrolase (sEH) into functionally less active dihydroxyeicosatrienoic acids (DHETs), so this beneficial property is short-lived. Inhibition of sEH is known to increase endogenous EET concentrations and our group recently found that a loss-of-function mutation in the gene encoding sEH, *EPHX2*, increases insulin sensitivity in humans. While DHETs, EETs and sEH activity have been characterized in rodent tissues and human plasma, these metabolites have never before been measured in human insulin-sensitive tissues.

**Methods:** EETs, DHETs, EpOMEs\* and DiHOMEs\* (\*metabolites of linoleic acid, also hydrolyzed by sEH) were extracted from plasma, adipose tissue and muscle of overweight or obese, prediabetic individuals and quantified by negative ESI-LC/MS/MS using stable isotope labeled internal standards. sEH activity in these samples was measured as the rate of conversion of pharmacological EETs to DHETs, and EpOMEs to DiHOMEs.

**Results:** Our assays successfully measured three isomers of EETs and DHETs (14,15-, 11,12- and 8,9-) and two isomers of EpOMEs and DiHOMEs (10,11- and 12,13-) in human adipose tissue and muscle. The metabolite concentrations were measurable in pmol/g adipose, and consistent with studies in human plasma, EpOMEs and DiHOMEs were measured in concentrations 100-1000x greater than EETs and DHETs. EET and DHET concentrations in human adipose were comparable to concentrations in mice adipose, with significant differences only in 8,9-EET and 14,15-DHET ( $p < 0.05$ ). We found a positive correlation between DHET/EET ratios and sEH enzymatic activity for all isomers, except 8,9-DHET/EET, and we observed a strong positive correlation between human plasma and adipose tissue, with regards to both metabolite concentrations and sEH enzymatic activity. Lastly, we observed a direct correlation between patient BMI and sEH activity in adipose tissue.

**Conclusion:** In this study, we successfully quantified DHET, EET, DiHOME and EpOME concentrations and sEH activity in human insulin-sensitive tissue for the first time. We found a positive correlation between metabolite concentrations in plasma and adipose, suggesting that sEH activity in plasma can serve as a biomarker of its activity in insulin-sensitive tissues. The positive correlation observed between patient BMI and sEH activity in adipose suggests that sEH activity may be related to increased insulin resistance seen in overweight individuals, and is consistent with our knowledge that obesity is a risk factor for the development of prediabetes. While metabolite concentrations and enzymatic activity were measurable in human muscle, Conclusion:s were not drawn due to small sample size (n=2). The Results: from this

study indicate that sEH activity in insulin-sensitive tissues can be successfully measured and monitored and have implications for future clinical trials.

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# New York-Research-Poster Finalist

## Mohan Satish

**Title:** Trends in Usage and Impact of Echocardiography in Hospitalized Patients with Syncope

**Authors:** Mohan Satish<sup>1</sup>, Ryan Walters<sup>1</sup>, Venkata Alla<sup>1</sup>, [1] Creighton University School of Medicine, Omaha, NE

**Introduction:** Syncope is a common medical problem accounting for 1-2% of emergency room visits. Of these, 40 % are admitted with an estimated annual cost of \$2.4 billion based on Medicare data. Prior research suggests that the yield of routine echocardiogram in the evaluation of syncope is low. We sought to assess the trends and predictors in use of echocardiography, and its impact on in-hospital mortality using a large national database.

**Methods:** Utilizing the Nationwide Inpatient Sample (NIS) database from 2001 to 2013, we identified patients (> 18 years) with a primary discharge diagnosis of syncope and use of echocardiogram was ascertained. Logistic regression models using a linear time effect were used to estimate the year-over-year trends and predictors of echocardiography use, and whether it associates independently with mortality. Linear time effects in log-normal regression models were performed for length of stay and inflation-adjusted hospital cost. SAS v. 9.4 was used for all analyses;  $p < .05$  was considered statistically significant.

**Results:** A total of 2,440,624 patients with a primary discharge diagnosis of syncope were identified, of which 148,076 (6.1%) underwent an echocardiogram. After adjusting for patient and hospital characteristics, the adjusted trend in use was significant, such that the odds of receiving an echocardiography increased by 2.7% per year ( $p_{\text{trend}} = .024$ ). Predictors of use were cardiac disorders, hypertension, diabetes, peripheral vascular disease, or renal failure. Caucasians and those admitted on the weekend were less likely to have an echocardiogram. Use of echocardiography was not associated with in-hospital mortality after adjusting for patient and hospital characteristics (OR = 0.827,  $p = .155$ ). Echocardiography was associated with a 14.6% increased adjusted length of stay and a 22.6% adjusted hospital cost compared to no echocardiography use (both  $p < .001$ ).

**Conclusion:** The use of echocardiography for hospitalized patients with syncope is appropriately low but appears to be increasing. Given the lack of any favorable impact on mortality and the finding of increased costs, there is a continued need to emphasize evidence based use and identify high-risk patients where echocardiography could be beneficial.

# North Carolina-Research-Poster Finalist

## Camilla Powierza

**Title:** Improving COPD Care at the University of North Carolina Internal Medicine Outpatient Clinic

**Authors:** Camilla S. Powierza; Brenna K. McManus; Amy W. Shaheen, MD, MSc.  
Department of Internal Medicine, University of North Carolina School of Medicine, Chapel Hill, North Carolina

**Introduction:** The Global Initiative for Chronic Obstructive Lung Disease (GOLD) has encouraged symptom assessment for all COPD patients and pulmonary rehabilitation for COPD patients with high symptom burden and risk of exacerbations.<sup>1</sup> Pulmonary rehabilitation has been shown to improve these symptoms, quality of life, exercise tolerance, and reduction in readmissions and mortality in patients with a recent exacerbation ( $\leq 4$  weeks from prior hospitalizations)<sup>2-3</sup>. However, many patients never have the opportunity to take advantage of this cost-effective strategy for improving symptoms in COPD because systematic ways of assessing symptoms, identifying symptomatic patients, and referring those who would benefit from pulmonary rehabilitation are lacking. In our general medicine clinic, symptom assessments and pulmonary rehabilitation referrals were not done prior to this effort. We aimed to systematically screen for dyspnea symptoms during all COPD patient encounters, with secondary goals of improving rates of screening for hypoxia, referrals to pulmonary rehabilitation in symptomatic patients, and documentation in the electronic health record.

**Methods:** A quality improvement team was formed including a medical student, patient educator, front desk staff member, and a physician, with the goal of implementing a new process to screen COPD patients for symptoms of dyspnea. A staff member flagged charts for patients due for symptom assessment. The front desk responded to the flag and handed out a paper copy of the Modified Medical Research Council (mMRC) dyspnea scale to the patients at check-in. Patients self-scored their degree of dyspnea (grades 0-4). After filling out the form, patient scores 2 or higher prompted algorithmic responses by members of the health care team. Nurses checked oxygen saturations for symptomatic patients. Provider algorithms included escalating inhaler therapy and placing pulmonary rehabilitation referrals.

**Results:** Over the span of 42 weeks, there were 571 COPD patient encounters, of which 497 patients were screened for symptoms of dyspnea with an mMRC questionnaire (497/571=87%). Of these patients, 233 were found to be highly symptomatic (mMRC  $\geq 2$ ) and qualified for pulmonary rehabilitation, with a total of 30 referrals to pulmonary rehabilitation made (30/233=13%). Oxygen saturation was checked in 181 of these symptomatic patients (181/233=78%). mMRC scoring was documented with a note template available to all providers, and during the 42 weeks, scores were documented 126 times (126/571= 22%), from a baseline of 0%.

**Conclusion:** Overall, we have improved COPD symptom assessment using an mMRC questionnaire and introduced an algorithm of care followed with good fidelity by both providers and nurses. The rate of pulmonary rehabilitation referrals increased significantly over 42 weeks and there was an overwhelming increase in awareness of pulmonary rehabilitation as a treatment option in symptomatic COPD patients. Future directions include improving ease of documentation and provider actions and rates of referral to pulmonary rehabilitation.

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# North Carolina-Research-Poster Finalist

## Kyle Admire

**Title:** Anti-tNASP antibodies are a potential diagnostic marker for malignant tumors

**Authors:** Julia Brogdon, Brian Gorman, Oleg Alekseev

**Introduction:** In 2012, there were 14 million new cases and 8.2 million cancer-related deaths worldwide. The outcome of the disease greatly depends on the timely early diagnostics. This project offers an exploration of a new line of diagnostics for most common cancers. It is based on the expression of tNASP protein in cancer cells and its high auto-immunogenicity. The NASP gene (Nuclear Autoantigenic Sperm Protein) encodes two protein isoforms: the somatic form (sNASP), which is expressed in all mitotic cells, and the testicular form (tNASP), which is expressed in embryonic tissues, tumor cells, and in the testes. tNASP is an extremely autoantigenic protein that is normally sequestered in an immunologically privileged compartment behind the blood-testis barrier. Aberrant expression of tNASP protein in cancer tissues induces the development of a robust humoral immune response, which could be easily detected by ELISA. We hypothesized that ELISA-based detection of anti-tNASP antibodies in the serum could be used to screen for a variety of malignant tumors.

**Methods:** We had identified and expressed recombinant tNASP protein-specific epitope, which was used for the production of anti-tNASP IgG and as bait for ELISA detection of anti tNASP antibody in human serum. We tested sera of patients diagnosed with the following malignant tumors: brain cancers (oligodendroglioma, glioblastoma, astrocytoma), renal cell carcinoma (clear cell, papillary, chromophobe), breast cancers (invasive ductal and lobular, papillary, mucinous), gastro-intestinal tract cancers (colon/rectum adenocarcinoma), lung cancers (adenocarcinoma, squamous, small, and large cell carcinomas), bladder cancers (urothelial and squamous cell carcinoma), endometrial cancer (adenocarcinoma), a variety of sarcomas, ovarian cancers (adenocarcinoma, serous and clear cell carcinomas), melanomas (nodular, spindle cell, superficial malignant), thyroid carcinomas (papillary, follicular, and medullary). Total number of patient tested was 104. The number of negative control patients was 15. Association between biomarkers was assessed with Spearman rank correlation analysis.

**Results:** ELISA measurements demonstrated significantly higher levels of serum anti-tNASP antibody in all investigated malignant tumors compared to control group. Sera of glioblastoma and astrocytoma demonstrated the highest level ( $1349 \pm 50$  ng/mL) followed by breast tumors ( $1241 \pm 49$  ng/mL). The lowest level of antibody was detected in melanoma patients ( $684 \pm 72$  ng/mL). Control level in cancer-free patients was  $326 \pm 124$  ng/mL.

**Conclusion:** Detection of serum anti-tNASP antibodies is a feasible approach for screening or early diagnostics of malignant tumors.

# North Carolina-Research-Poster Finalist

## Emily Lupez

**Title:** "I'll take Gender Identity for 500"- Changing knowledge and comfort in the care of LGBTQ patients with a novel training approach

**Authors:** Taylor R. Lammert BA, Gwenyth L. Davis BA, Nancy M. Denizard-Thompson MD

**Introduction:** Patients who identify as LGBTQ experience many health disparities, including higher rates of cancer, tobacco use, and anxiety/depression.<sup>1,2,3,4,5</sup> These have been linked to providers' insufficient knowledge of appropriate terminology and relevant health inequities.<sup>6,7,8</sup> We developed a student-run training program to educate providers about LGBTQ terminology and health disparities. Our program utilizes application of material through a jeopardy-like game, role-play, patient narratives, and reflection on bias, privilege, and the intersection between LGBTQ identities, race, and socioeconomic status. This study assessed the efficacy of our training in changing comfort and knowledge surrounding LGBTQ patients.

**Methods:** A 2-hour training including pre/post-training surveys was administered to 229 students, residents, faculty, and staff at Wake Forest Baptist Medical Center. Surveys assessed self-reported comfort in caring for LGBTQ patients and knowledge of LGBTQ terminology; responses were scored on a 5 and 10 point scale respectively. Pre/post scores were compared across all participants and stratified by training-level. The surveys also assessed stage of life when trainees became aware of others' LGBTQ identities.

**Results:** Wilcoxon-Mann-Whitney analysis demonstrated statistically significant changes in knowledge and comfort after training overall, and within stratified groups, except for comfort in faculty/staff (knowledge: overall  $p < 0.0001^*$ , student  $p = 0.02^*$ , resident  $p = 0.02^*$ , faculty/staff  $p = 0.0003^*$ ; comfort: overall  $p < 0.0001^*$ , student  $p = < 0.0001^*$ , resident  $p = 0.05^*$ , faculty/staff  $p = 0.7$ ). Kruskal Wallis analysis showed statistically different pre-training knowledge scores between groups ( $p = 0.001$ ), but no difference between groups in post-training knowledge, pre-training comfort, nor post-training comfort scores. There was a correlation between training-level and stage of life data regarding awareness of orientation ( $p = 0.0029$ ), and gender identity ( $p = 0.0001$ ), and a correlation between stage of life and pre-training knowledge in only faculty ( $p = 0.002$ ). There was no statistically significant correlation between pre nor post training comfort and knowledge scores overall or within training-level groups.

**Conclusion:** Our innovative curriculum led to significant increases in comfort and knowledge of LGBTQ patient care.. Pre-training data suggests that earlier awareness of the LGBTQ community may influence pre-training knowledge, but analysis suggests our training was able to equilibrate knowledge and comfort across groups. The lack of correlation between comfort and knowledge suggests comfort arises from alternative sources such as clinical experience, which was simulated through our scenario Discussion:s. Our approach effectively increased knowledge and comfort in participants regardless of training-level or past experience with LGBTQ patients, demonstrating its ability to be effective in other environments.

# North Dakota-Research-Poster Finalist

## Brett Johnson

**Title:** Effects of a Novel CYP3A4 Single-Nucleotide Polymorphism on Tacrolimus Pharmacokinetics in African American Kidney Transplant Patients

**Authors:** Brett M. Johnson<sup>1</sup>; Amarjit Chaudhry<sup>2</sup>, PhD; Erin G. Schuetz<sup>2</sup>, PhD; T. Alp Ikizler<sup>3</sup>, MD; and Kelly A. Birdwell<sup>3</sup>, MD, MSCI <sup>1</sup>University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND; <sup>2</sup>Department of Pharmaceutical Sciences, St. Jude Children's Research Hospital, Memphis, TN; <sup>3</sup>Division of Nephrology, Vanderbilt University Medical Center, Nashville, TN

**Introduction:** Tacrolimus is a calcineurin inhibitor commonly used for immunosuppression following kidney transplantation, but improper dosing can damage the graft long-term. Therapeutic dosing of tacrolimus is complex due to high inter- and intra-individual variability determined in part by genetic variations in the enzymes that metabolize the drug, such as CYP3A4. We hypothesize that a novel single-nucleotide polymorphism (SNP) of *CYP3A4* found predominantly in African populations, rs140702888-DEL, is associated with higher clearance of tacrolimus as evidenced by lower blood trough concentrations corrected for daily dose of the drug. Additionally, we hypothesize a second *CYP3A4* variant, rs2737418, which is in partial linkage disequilibrium with rs140702888-DEL, is also associated with lower blood trough concentrations corrected for daily dose of the drug.

**Methods:** To test these hypotheses, we assembled a retrospective cohort by consulting the de-identified electronic medical record Synthetic Derivative and DNA biorepository BioVU for African American kidney transplant patients over the age of 18 at the time of transplant with at least three (3) tacrolimus blood trough concentrations beginning at one (1) month post-transplant. Clinical covariates were abstracted from health records in addition to genotypic information for the SNPs rs2687103, rs2737418, and rs776746. The SNP rs2687103 was recorded for rs140702888-DEL due to it being in perfect linkage disequilibrium with the desired SNP. After the exclusion criteria, a final cohort of n=104 (46 women, 58 men) was further analyzed using Spearman's correlation and multiple linear regression.

**Results:** Spearman's correlation analysis revealed a moderate, statistically significant, positive correlation (coefficient=0.442, p value=6.5455x10<sup>-45</sup>) for rs776746; a weak, statistically significant, negative correlation (coefficient=-0.148, p value=0.000007) for rs2687103; and a weak, statistically significant, negative correlation (coefficient= -0.285, p value=1.9307x10<sup>-18</sup>) for rs2737418 in respects to tacrolimus concentrations adjusted for dose. Multiple linear regression analysis revealed our SNPs of interest and clinical covariates explained 29.4% of the variance in tacrolimus concentrations corrected for dose, with the largest, significant impact from SNPs on variance coming from rs776746 (unstandardized b=0.167, p value=8.0965x10<sup>-38</sup>) and rs2737418 (unstandardized b= -0.082, p value=2.0725x10<sup>-7</sup>). This is compared to the 2.6% of variance explained by the clinical covariates alone.

**Conclusion:** These data suggest that both rs2687103 and rs2737418 are associated with faster tacrolimus clearance as evidenced by lower concentrations corrected for dose, although rs2737418 may have the larger effect. Future studies should include a larger cohort to better characterize the effect of these SNPs.

# Ohio-Research-Poster Finalist

## Cristina Ortiz

**Title:** Effects of early mobility on delirium and length of stay in the intensive care unit

**Authors:** 1. Cristina Ortiz, 2. Resham Rahat, 3. Bo Hu, PhD, 1. Janet Mason, MD, and 4. Faith Factora, MD  
<sup>1</sup>The Ohio State University College of Medicine, <sup>2</sup> University of Mississippi School of Medicine, <sup>3</sup> Cleveland Clinic Foundation Quantitative Health Sciences, <sup>4</sup> Cleveland Clinic Foundation Department of Anesthesiology Critical Care

**Introduction:** Muscle strength in a healthy person can decrease 1.3-3% for each day spent on bedrest (Topp 2002). However, effects are more pronounced in older patients and those with critical illnesses (Yende 2006). The A-F Bundle is a new guideline for care that incorporates important aspects of intensive care unit (ICU) expertise, including pain management, supervision of sedation and respiration, delirium, exercise, and family engagement. Use of the A-F Bundle has reduced mortality and improved long-term cognitive and functional outcomes (Balas 2014). This particular study focused analyzing the effect of the “E” element of the A-F Bundle (early mobility and exercise) on delirium and length of stay (LOS) due to the tremendous impact of ICU-acquired physical weakness on mortality and morbidity.

**Methods:** The Cleveland Clinic Foundation (CCF) Surgical ICU (SICU) began to incorporate the features of the Bundle in 2016. Previously, ICU physicians put referrals for a physical and occupational therapist (PT and OT), most often for patients with orthopedic procedures. Upon implementation of the research design, the PT and OT presence became continuous in the SICU during the work week and an automatic assessment and individualized plan was made for all patients. For 165 patients, delirium was measured using the standardized Confusion Assessment Method for the ICU (CAM-ICU) (Ely 2001) along with ICU and hospital LOS, then analyzed with Chi square testing.

**Results:** We observed an increase in early mobility and exercise between January-June of 2015 compared to January-June 2016 post-Bundle implementation. Analysis of the outcomes of patients before and after these changes indicated a trend towards a decreased rate of delirium (-0.195 [0.431],  $p=0.650$ ) and ICU LOS (0.83 [1.36],  $p\text{ value}=0.544$ ), particularly when adjusted to the patients’ severity of illness. For the power of the study, we need 600 patients to see a statistical significance in a decreased rate of delirium from 60-50%.

**Conclusion:** These data demonstrate the potential beneficial value of applied implementation of early mobilization and exercise in the ICU. Upon analysis of all components of the A-F Bundle, we hope to see a statistical significance of the entire Bundle on patient care. Future direction involves a continuous PT and OT presence including during the weekend. Additionally, many PT and OT’s had limited training in a critical setting with multiple comorbidities and medical conditions, a barrier being overcome with increased awareness and specialized teaching. These benefits of early mobilization are generalizable and have been shown to shorten ICU LOS, the risk of delirium, days on mechanical ventilation, and improve overall physical functioning (Morris 2008 and Schweickert 2009). Each day of delirium in the ICU increases the risk of 1-year mortality by 10% (Pisani 2009) and increases the length of hospitalization; thus early mobility may have broad benefits.

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# Ohio-Research-Poster Finalist

## Grace Kim

**Title:** How Aware Are We? Antibiotic Stewardship in the Setting of Acute Rhinosinusitis

**Authors:** Eun Hye Kim<sup>1,2</sup>, James Campbell<sup>2</sup>, Christopher Chiu<sup>1,2</sup>, <sup>1</sup>The Ohio State University College of Medicine; <sup>2</sup>The Ohio State University Wexner Medical Center

**Introduction:** Patients presenting with acute rhinosinusitis symptoms who do not meet diagnostic criteria for bacterial rhinosinusitis are prescribed antibiotics inappropriately. A national study analyzing antibiotic usage from 2010-2011 showed that sinusitis was associated with the most antibiotic prescription, with a 70.9% rate of antibiotics prescription for sinusitis in ages 20-64<sup>1</sup>. Furthermore, the study depicted that there were 55 antibiotic prescription per 1000 sinusitis visits, but only 27 were deemed appropriate.<sup>1</sup> The CDC has promoted antibiotic stewardship as early as 1995 through National Campaign for Appropriate Antibiotic Use in Community, which was renamed as the Get Smart program in 2003 to further campaign against antibiotic misuse. Numerous studies have concluded that antibiotics in an acute setting of upper respiratory infection are not necessary for acute rhinosinusitis, especially because there is no difference in clinical improvement.<sup>2</sup> Smith et al. analyzed national data from 2006 to 2009 which reflected this finding, especially in the primary care settings, with the most common antibiotic prescribed for acute rhinosinusitis being azithromycin, followed by (the currently recommended) amoxicillin.<sup>3</sup> This prompted an investigation to assess the current antibiotic stewardship on a local level, focusing on The Ohio State University's primary care clinics.

**Methods:** Outpatient visits at OSU with ICD-9 and ICD-10 codes for "sinusitis" or "acute rhinosinusitis" from March 5, 2015 to February 27, 2017 were obtained by a data specialist. An Excel sheet with columns delineating the dates, visit type, specific name of medicine prescribed, and pharmacologic class was created, and the frequency of the medications prescribed was analyzed via filter mode on Excel.

**Results:** There were 2683 outpatient visits for acute rhinosinusitis at The Ohio State University's outpatient primary care facilities. Nine different pharmacologic classes were present: penicillin, anti-histamine, anti-tussive, macrolide, steroid, fluoroquinolone, tetracycline, cephalosporin, and vitamins. The most commonly prescribed pharmacologic class was penicillin, namely amoxicillin or amoxicillin-clavulanate, with 819 patients (30.53%) receiving it. Anti-histamines were second most common with 524 patients (19.53%) receiving the medication, the third most common was antitussives with 304 patients (11.33%). Over half of the patients with acute sinusitis received antibiotics (54.97%). After amoxicillin, the second most common antibiotics prescribed was azithromycin (11.14%).

**Conclusion:** The high rates of inappropriate antibiotic use for acute rhinosinusitis prompted an establishment of a new, evidence-based clinical practice guideline on acute rhinosinusitis to be implemented at The Ohio State University (OSU) Wexner Medical Center in order to educate physicians with point-of-care application of the established recommendation and algorithm for upper respiratory infections<sup>2,3</sup>. This project aims to increase the awareness of antibiotic stewardship not only on a local level in the OSU community but also in the national level, to encourage physicians to stay proactive with antibiotic stewardship to maximize high value care and minimize unnecessary cost.

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# Ohio-Research-Poster Finalist

## Akaansha Ganju

**Title:** Efficacy of Alternative 28 day Capecitabine Dosing Schedule in Metastatic Breast Cancer

**Authors:** Akaansha Ganju, Anupama Suresh, Julie Stephens MS, Marilly Palettas MPH, Michael J Berger PharmD, Raquel Reinbolt MD, Robert Wesolowski MD, Anne M. Noonan MD, Jeffrey Bryan VanDeusen MD, Sagar Sardesai MD, Maryam Lustberg MD, Bhuvanewari Ramaswamy MD, Nicole Williams MD., The Ohio State Comprehensive Cancer Center, Columbus OH

**Introduction:** Capecitabine is an oral chemotherapy indicated for the management of metastatic breast cancer (MBC). The approved schedule of capecitabine in MBC is day 1 through 14 of a 21-day cycle, but many patients have difficulty with this schedule due to side effects. It has been shown that an alternative 28-day schedule (7 days on, 7 days off) allows for more tolerability. Due to limited data on efficacy of the alternative 28 day schedule, the primary objective of this study was to compare the efficacy and tolerability of the different schedules of capecitabine in patients with MBC.

**Methods:** A retrospective chart review of patients who received capecitabine as monotherapy between 2002 and 2014 at The Ohio State University James Cancer Hospital was performed. Patients were classified by these dosing schedules: Arm A (21 day), B (28 day), and C (changeover from 21 day to 28 day). Time to treatment failure (TTF) and overall survival (OS) were compared between dosing schedules using Kaplan Meier curves and Log-rank tests.

**Results:** We identified 166 MBC patients (Arm A: n = 104, Arm B: n = 24, Arm C: n = 38) treated with capecitabine. There were 145 Caucasian and 21 African American women. 113 patients were ER positive and 53 ER negative. Patients with HER2 positive disease were excluded as they all received concurrent HER2 therapy. A significant difference was seen in TTF (Arm A: 2.7 months, Arm B: 2.7 months, Arm C: 7.1 months,  $p = 0.001$ ) when comparing all dosing schedules as well as in OS (Arm A: 5.2 years, Arm B: 9.6 years, Arm C: 8.0 years,  $p = 0.002$ ). Patients with ER positive breast cancer had improved TTF (4.5 months vs 2.4 months,  $p=0.002$ ) and OS (7.3 years vs 3.7 years,  $p < 0.001$ ) compared to those with ER negative breast cancer. Caucasians had improved TTF compared to African Americans and other races ( $p = 0.003$ ), however there was no significant difference in OS.

**Conclusion:** Our study supports that a 28-day schedule of capecitabine is better tolerated and potentially more effective. It is also striking that the African American/other race category had worse TTF on capecitabine when compared to Caucasians – this points to the importance of increasing minority accruals to clinical trials to better address the dose and efficacy of cancer drugs in this patient population.

# Ontario-Research-Poster Finalist

## Joey A Mercier

**Title:** The neutrophils times platelets to lymphocytes ratio: A new prognostic marker in metastatic colorectal cancer

**Authors:** Joey Mercier<sup>1</sup>, Ioannis A. Voutsadakis<sup>1,2</sup>, <sup>1</sup>Northern Ontario School of Medicine, Division of Clinical Sciences, Sudbury, Ontario, Canada and <sup>2</sup>Algoma District Cancer Program, Sault Area Hospital, Sault Ste. Marie, Ontario, Canada

**Introduction:** The cancer micro-environment is recognized as having an increasing importance in cancer progression. Immune cells originating from the peripheral blood are important elements of this environment. Thrombocytosis, neutrophilia and lymphocytopenia have been found to be negative prognostic indicators in many cancers. This study aims to evaluate the potential of the use of a novel hematological marker, the platelet-neutrophil to lymphocyte ratio (PNLR) as a practical, reliable, and inexpensive prognostic tool in metastatic colorectal adenocarcinomas.

**Methods:** Charts from 305 patients with colorectal cancer were retrospectively reviewed. Of these, 152 had metastatic disease with complete follow-up data on progression and survival. Data was extracted and stratified by a PNLR cut-off point of 2000. Baseline parameters of the two groups were evaluated and compared with the  $\chi^2$  test. Univariate and multivariate Cox proportional-hazards regression analyses were performed on variables of interest.

**Results:** Patients with a PNLR above 2000 had a shorter median PFS (6.5 months vs 13.3 months, HR of 2.05; 95% CI 1.32 – 3.19,  $p = 0.001$ ) with a median difference of 10.77 months (95% CI 5.26 – 15.45) than in patients with a PNLR below the threshold. Similar Results: were observed for median OS (9.6 months vs 21.8 months, HR of 2.33; 95% CI 1.44 – 3.79,  $p = 0.001$ ), with a median difference of 6.34 months (95% CI 3.29 – 9.47). PNLR had a higher predictive HR than ECOG PS.

**Conclusion:** In this retrospective analysis of metastatic colorectal cancer patients, PNLR had prognostic value for both OS and PFS. While other variables held significance for poorer prognosis, PNLR had the highest HR and the highest significance in multivariate analysis for both PFS and OS. Thus, it represents a powerful and objective prognostic tool in the evaluation of metastatic colorectal cancer patients that is readily available and does not require any additional expenses.

# Oregon-Research-Poster Finalist

## James Stanek

**Title:** Morpholino probes for rapid pathogen detection

**Authors:** Stanek, J. MS, Powell, J. BS, Mata, J. PhD, McQuistan, T. BS, Smythe, C. BS, Summerton, J. PhD, Squier, T. PhD, Xiong, Y. PhD

**Introduction:** Rapid detection of infection is essential for diagnosis and preventing the spread of disease, which can be particularly difficult in areas lacking adequate medical and scientific facilities. Pathogen identification is currently time consuming and costly, presenting a barrier for in-the-field early diagnosis. Low concentration of pathogens in blood and saliva samples, the need for a PCR lab, and the requirement for a cold chain presents additional challenges for In-field diagnosis. These limitations inhibit first responder's ability to prevent a pathogen spread during quarantine situations.

**Methods:** Phosphorodiamidate morpholino oligonucleotide (PMO) probe pairs engineered to bind to proximal sequences on unique target nucleic acid sequences enable rapid, in-field detection of specific viral or bacterial DNA/RNA in human blood or saliva. PMO probe pairs are stable under harsh environmental conditions and are capable of detecting a specific pathogen in blood or saliva samples within 20 minutes. Using PMO probe pairs, one bearing a fluorescence resonance energy transfer (FRET) acceptor (tetramethylrhodamine; TMR) and the other a FRET donor (Alexa 488), enables specific pathogen detection of fluorescence changes only when both probes are bound to the respective complementary pathogen DNA/RNA strand. Probe binding was tested under physiological salt conditions as well as low salt conditions.

**Results:** PMO probe pairs are highly specific to binding only target DNA/RNA even with lysed human saliva cells providing alternative targets. Our PMO probe assay can detect as little as 20 pM of target sequence which is low enough to detect Ebola in a patient who is asymptomatic. This low detection limit is possible due to the uncharged backbone of PMO probes. Our detection assay takes advantage of the ability of PMO probes to hybridize with nucleic acid targets at low ionic strength conditions that disrupt target secondary structures and enhance binding affinity. Under these conditions DNA probes do not hybridize with target oligonucleotides.

**Conclusion:** Detection using a fluorometer is fast, it can be done without a lab, and is inexpensive. PMO probe pairs reliably detect both single stranded and double stranded target nucleic acids with no off target binding in human saliva. This assay will allow for rapid lab free detection of specific pathogens increasing the ability of first responders to diagnose, quarantine, and contain the spread of disease.

# Oregon-Research-Poster Finalist

## Talitha Wilson

**Title:** Understanding Barriers and Facilitators to a Medically Enhanced Residential Treatment (MERT) Model Integrating Antibiotics and Residential Addiction Treatment

**Authors:** Talitha Wilson BS, Devin Collins MA, Christina Nicolaidis MD MPH, Melissa Weimer DO MCR, P. Todd Korthuis MD MPH, Honora Englander MD. Oregon Health & Science University

**Introduction:** Hospitalizations for severe infections among people with substance use disorders (SUD) have doubled over the past decade in the United States. Treatment for such infections typically require weeks of intravenous (IV) antibiotics. While many people can complete a course of IV antibiotics at home, people with SUD are often deemed unsafe to return home or are denied admission to skilled nursing facilities; they must remain in hospital for weeks to months. Typically hospitals do not initiate SUD treatment and residential SUD treatment facilities do not administer intravenous antibiotics. Thus there is a significant gap in post-hospital care for patients with SUD. We developed a medically enhanced residential treatment (MERT) pilot program to integrate residential SUD treatment and long-term IV antibiotics as a component of a hospital-based addiction medicine service, the Improving Addiction Care Team (IMPACT). MERT recruitment and retention was lower than expected and MERT ended after six months. The goal of this study was to understand barriers to MERT and explore future directions.

**Methods:** The MERT model was a collaboration between a university hospital, a community SUD treatment program, and a specialty infusion pharmacy. Patients with SUD needing long-term IV antibiotics were recruited for MERT if they met residential treatment criteria and required no more than once daily antibiotic infusions. We performed a mixed-Methods: study with sequential explanatory research design to define outcomes from the MERT program. The study included all IMPACT patients requiring long-term ( $\geq 2$  weeks) IV antibiotics discharged from February 1 to August 1, 2016. We used chart review to determine hospital diagnosis, antibiotic treatment location, and antibiotic completion rates. We conducted key informant interviews with patients and MERT providers to deepen our understanding of the quantitative Results:.

**Results:** Of 45 patients needing long-term IV antibiotics, 20 declined MERT and 18 were ineligible. Those patients either remained in hospital (24), discharged to a skilled nursing facility (SNF) (11), or discharged home (3). Seven enrolled in MERT and three completed their recommended IV antibiotic course. There were no significant differences in antibiotic completion rates across sites, and MERT saved 101 hospital days. Primary recruitment and retention barriers included patient ambivalence towards residential treatment, restrictive practices in residential, and perceptions by staff and other residents that MERT patients “stood out” as “different.” Despite these challenges, key informants felt that MERT was a positive construct.

**Conclusion:** Although MERT has many theoretical advantages over the current standard of care, it was more challenging to implement than anticipated. Recruitment and retention barriers highlight ongoing silos between physical and behavioral health care. Future models must take patient preferences into consideration, and might integrate SUD treatment into post-acute care settings or adapting physical health treatment plans to accommodate behavioral health needs.

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# Oregon-Research-Poster Finalist

## Katherine Runkel

**Title:** Hospitalist Perceptions of Fall Prevention: a Comparison of Two Healthcare Systems

**Authors:** Katherine Runkel<sup>1</sup>, Rebecca Rdesinski, MPH, MSW<sup>1</sup>, Lisa Miura, MD<sup>2</sup>, <sup>1</sup> Oregon Health & Science University, <sup>2</sup> Portland VA Medical Center

**Introduction:** Falls are the leading cause of injury among adults 65 and older in the United States. There is a mean of 1.4 falls per inpatient beds annually. There is a dearth of literature regarding the physician's perceived role in inpatient fall prevention. We aimed to assess hospitalists' perceptions of fall prevention in the inpatient setting and if it differed in two Portland, Oregon area hospital systems.

**Methods:** Hospitalists were given surveys in a primarily 1-5 Likert scale format regarding their attitudes about fall prevention. The surveys were completed voluntarily by hospitalists at the Veterans Affairs (VA) medical center as well as a 5-hospital community-based program (CBS). Ten of the VA hospitalists filled out the survey in person on a paper form during their monthly meeting. All other responders filled out an emailed electronic survey via SurveyMonkey.

**Results:** 42 total responses were collected: 19 from VA hospitalists and 23 from the CBS hospitalists between April and May, 2017. For VA responders, the average age was 36.6, 47.1% female, with an average of 6.1 years worked as a hospitalist. For the CBS responders, the average age was 41.8, 39.1% female, with an average of 8.7 years worked as a hospitalist. Hospitalists in both groups agreed that all admitted patients should be assessed for fall risk assessments (FRA) (mean of 4.4 at the VA and 3.9 at CBS). Notably, both groups disagreed that hospitalists are responsible for conducting FRAs (mean of 2.3 at the VA and 2.4 at CBS) but both agreed that other medical staff are responsible for conducting them (mean of 4.3 at the VA and 3.9 at CBS). 79.0% of responders at the VA reported nursing as other medical staff responsible for FRAs and 57.9% indicated physical therapy as also being responsible. In contrast, 95.7% of the CBS responders designated nursing, and 100% felt that physical therapists were responsible for conducting FRAs.

The statistically significant Results: between these hospital groups include perceptions if hospitalists are responsible for conducting medication reviews for side effects related to falls ( $P=.03$ ) and if non-physician medical staff are responsible for notifying the hospitalist about patients who are at high risk of falls ( $P=.005$ ).

**Conclusion:** Hospitalists agree that patients should have fall risk assessments but do not necessarily view themselves as responsible for conducting them. Since the hospitalist role on inpatient multidisciplinary teams may be unclear, hospitalists likely view their roles differently depending on the culture of their institution.

# Pennsylvania-Research-Poster Finalist

## Martha Dillon

**Title:** Molecular Targeting of HDM-2 Oncoprotein in Human Stem-Like Colonic Epithelium-Derived Progenitor and Stem-Like Colon Cancer Cells

**Authors:** Martha Dillon; DaMarcus Ingram; Patrice Love, MS<sup>1</sup>; William F. Morano, MD<sup>1</sup>; Marian Khalili, MD<sup>1</sup>; Mohammad F. Shaikh, MD<sup>1</sup>; Rebecca Platoff, BS<sup>1</sup>; Michaela Simoncini, BS<sup>1</sup>; Elizabeth Gleeson, MD, MPH<sup>1</sup>; Jerry Shay, PhD<sup>2</sup>; Matthew R. Pincus, MD, PhD<sup>3, 4</sup>; Wilbur B. Bowne, MD<sup>1</sup>, <sup>1</sup>Drexel University College Of Medicine, Department Of Surgery, Philadelphia, PA; <sup>2</sup>Department of Cell Biology, University of Texas Southwestern Medical Center, Dallas, TX; <sup>3</sup>Department of Microbiology and Anatomy and Cell Biology, SUNY Downstate Medical Center, Brooklyn, NY; <sup>4</sup>Department of Pathology, SUNY Downstate Medical Center, Brooklyn, NY

**Introduction:** Cancer stem cells represent a unique therapeutic target, owing to their ability to self-renew, with implications toward cancer recurrence and metastasis. We investigated HDM2 oncoprotein expression on stem-like progenitor and stem-like colon cancer cell membranes as a potential target for anti-cancer therapy.

**Methods:** Western Blot and fluorescence-activated cell sorting (FACS) analysis of membrane HDM-2 expression on SW1222, 1CTA and 1CTP (stem-like cells expressing CD44, CD133 with *APC* and *p53* knockdowns, respectively), and CF (normal colonic fibroblasts) was performed. Cells were treated with a p53-derived-HDM2-binding peptide, PNC-27, or control peptide, PNC-29, for 24 hrs. Anti-cancer activity and mechanism were analyzed for cell viability (MTT), necrosis (LDH), apoptosis (Caspase-3) and co-localization with HDM-2 (immunofluorescence).

**Results:** SW1222, 1CTA, and 1CTP demonstrated overexpression of HDM-2 via FACS analysis, as compared to CF. Importantly, multiple HDM2 splice variants (range, 30 – 90 kDa) were detected on these stem-like cell membranes via Western Blot. A dose-dependent loss of cell viability in PNC-27-treated SW1222, 1CTA, and 1CTP cells was determined by MTT assay ( $p < 0.05$ ). Significant cell death occurred by necrosis in these stem-like cells but not normal cells, otherwise not observed with control peptide ( $p < 0.05$ ). Caspase-3 activity was not detected. Confocal microscopy revealed specific co-localization of PNC-27 and HDM-2 on stem-like plasma cell membranes.

**Conclusion:** HDM2 overexpression on membranes of human stem-like colonic epithelium-derived progenitor and stem-like colon cancer cells is a potential target for anti-cancer therapy. Presence of multiple HDM2 splice variants correlates with increased susceptibility to HDM-2 targeted molecular therapy.

# Pennsylvania-Research-Poster Finalist

## Cameron Incognito

**Title:** Impact of Palliative Care Consultations on End-of-Life Care Outcomes in the Intensive Care Unit: A Retrospective Analysis

**Authors:** Incognito, CI; Lehman, EB; Interrante, J; Harris, S; Van Scoy, LJ

**Introduction:** Approximately one-fifth of deaths in the United States occur in the intensive care unit (ICU). Many of these patients may benefit from Palliative Care consultation (PCC). While 14-20% of patients admitted to the ICU meet established triggers for PCC, only approximately 5-8% receive consultation. This study aims to examine the impact of PCC on ICU outcomes.

**Methods:** This retrospective cohort study utilized chart abstraction to compare end-of-life outcomes including severity of illness at admission (APACHE-II), use or withdrawal of life-sustaining therapies (LST), code status changes, and hospital/ICU length of stay (LOS) between those who received a PCC and those who did not. Inclusion criteria included patients who died in the MICU or within 72 hours after discharge between December 2013-2014. Statistical analysis included Chi-square tests, two-sample t-tests, logistical regression, and odds ratios with a significance level of 0.05.

**Results:** A total of 584 patients were reviewed; 120 patients met inclusion criteria and 51 (42.5%) received a PCC. Mean age was 62.1 years, with 39.2% female and 88.6% Caucasian patients. Of the 120 patients, 62 (51.7%) had withdrawal of LST, 45 (37.5%) had no escalation of care, 13 (10.8%) were full code at time of death, and 97 (80.8%) had a change in code status. Ninety-seven patients (80.8%) received intubation, 79 (65.8%) received vasopressors, 38 (31.7%) received CRRT, and 22 (18.3%) received CPR. Those with 'no escalation of care' had significantly higher odds of having received a PCC compared to those who were full code status (OR=16.42, 95% CI 1.96-137.34, p=0.013). For every 10-point increase in APACHE-II score, the likelihood of receiving a PCC was reduced by 48% (OR=0.52, 95% CI 0.32-0.84; p=0.007). Patients receiving PCC had lower APACHE-II scores at admission compared to those without (32 vs. 36, p=0.007). With the exception of vasopressors (OR=0.37, 95% CI 0.17-0.80, p=0.012), there was no statistical association between having received a PCC and use of LST (intubation, CRRT, and CPR). Those with PCC had longer hospital LOS (11 vs. 5 days, p=0.009), ICU LOS (7 vs. 3 days, p=0.011), and time period from ICU admission to change in code status (9 vs. 5 days, p=0.026). No significant associations were found between PCC and rates of withdrawal of LST and frequency of code status changes.

**Conclusion:** Patients who received PCC in the ICU were more likely to pursue 'no escalation of care' and had lower severity of illness at time of admission. There was no significant association between PCC and withdrawal/use of LST, with the exception of decreased use of vasopressors in patients who had PCC. Future studies can focus on the effect of PCC on patient/family satisfaction and communication concerning use of LST and establishment of goals of care.

# South Carolina-Research-Poster Finalist

## Alexa Bianchi

**Title:** If Time Stood Still: Assessing Barriers to Implementing Shared Decision Making

**Authors:** ENS Alexa Bianchi, MS; Brittany Crum, MD; Meenu Jindal, MD

**Introduction:** The patient physician encounter has progressed from a paternal mindset where the physician prescribed a treatment plan and the patient adhered, to a shared decision making model highly valued among the medical community and shown to increase patient adherence to treatment plans, among other positive outcomes. Various studies have been conducted to analyze the actual use of shared decision making across the nation, with a surprisingly lower rate of implementation than expected with such an effective model. We are curious what is preventing physicians from interacting with their patients using a shared decision making approach specifically at our internal medicine clinic at the Greenville Memorial Hospital in Greenville, SC.

**Methods:** Internal medicine residents at the Greenville Memorial Hospital were invited to fill out a pre-survey that subtly assessed their knowledge of shared decision making. The residents then listened to a lecture that outlined shared decision making, gave examples, and explained the clinical importance. The residents took a post test to reassess their actual implementation of shared decision making and their perceived barriers to implementing this type of patient-physician interaction.

**Results:** In the pre-survey, residents felt they 'sometimes to always' had the opportunity to present multiple treatment options, but reported in the post-survey that in spite of presenting multiple treatment options, they 'sometimes to often' used shared decision making. The residents identified specific benefits that would come from using a shared decision making model, with increased patient adherence and increased patient understanding of treatment options as the two greatest benefits. In the pre-test, residents expressed that the greatest barriers were time, insurance knowledge, and reimbursement, and in the post-test, agreed time was a huge barrier, but recognized patient education and lack of efficient decision making aids were also large barriers to implementing shared decision making.

**Conclusion:** We found that a portion of our residents were not implementing the shared decision making method of engaging a patient and saw how our presentation increased awareness for this effective interaction. We also understood our clinics own barriers to be time, followed by the experience that patients lacked education and understanding of various treatment plans, and finally that residents felt there was a shortage of effective shared decision making aids available for use.

# Tennessee-Research-Poster Finalist

## Ahmad Mohammadi

**Title:** Mitochondrial Dysfunction in Glucose Metabolism

**Authors:** Ahmad W. Mohammadi<sup>1,3</sup>, Jorge Gamboa<sup>2</sup>, James M. Luther<sup>1,2</sup>,<sup>1</sup>Division of Nephrology, <sup>2</sup>Division of Clinical Pharmacology, Department of Medicine, Vanderbilt University Medical Center, Nashville, TN, <sup>3</sup>Lincoln Memorial University-DeBusk College of Osteopathic Medicine, Harrogate, TN

**Introduction: and background:** Previous studies have suggested that mitochondrial defects might be involved in the pathogenesis of type II diabetes. We hypothesize that there is a positive correlation between mitochondrial dysfunction and insulin secretion and sensitivity.

**Methods:** The study uses peripheral blood mononuclear cells (PBMCs) obtained from metabolic syndrome patients during hyperglycemic clamp studies. The mitochondrial DNA (mtDNA) copy number to nuclear DNA ratio is obtained through qPCR using NADH dehydrogenase 1 (ND1) gene for mtDNA and nuclear DNA lipoprotein lipase gene (LPL).

**Results:** Overall, the majority of participants were Caucasian (88.2%) and African-American (11.8%) with the mean age of 49.1 ( $\pm 10.4$ ) years, 52.9% male, and 47.1% female. A lower insulin sensitivity index was associated with a lower mtDNA to nuclear DNA ratio. Likewise, a lower disposition index was associated with lower mtDNA. There was no association between the acute insulin response and mtDNA to nuclear DNA ratio.

**Conclusion:** Mitochondrial dysfunction is associated with lower insulin sensitivity. This could potentially serve as an indicator for progression into type II diabetes. Further studies are required to understand the association between mitochondrial dysfunction and the acute insulin response (insulin secretion).

# Tennessee-Research-Poster Finalist

## Jason Gandelman

**Title:** A Pilot Study: The Impact of Transdermal Nicotine on Late Life Depression

**Authors:** Jason A. Gandelman BA<sup>1</sup>, Hakmook Kang, PhD<sup>2</sup>, Warren D. Taylor, MD, MHSc<sup>3,4</sup>, <sup>1</sup>Vanderbilt University School of Medicine, Nashville, TN, United States., <sup>2</sup>Department of Biostatistics, Vanderbilt University Medical Center, Nashville, TN, United States., <sup>3</sup>The Center for Cognitive Medicine, Department of Psychiatry, Vanderbilt University Medical Center, Nashville, TN, United States., <sup>4</sup>Geriatric Research, Education and Clinical Center, Department of Veterans Affairs Medical Center, Tennessee Valley Healthcare System, Nashville, TN, United States.

**Introduction:** Late Life Depression (LLD) is characterized by a poor response to currently available antidepressants, with greater than 50% failing to respond to initial treatments. LLD is further characterized by poorer cognitive performance than age-matched peers. Nicotine plays a widespread neuromodulatory role in the brain through agonism of nicotinic acetylcholine receptors, affecting serotonergic and noradrenergic systems. Pre-clinical and clinical trials have suggested that nicotine may improve mood in depressed mid-life adults, while separate studies suggest it may improve cognitive performance in pre-Alzheimer's Disease populations. Given these studies, we conducted a pilot trial to determine whether transdermal nicotine might benefit mood and subjective cognitive performance in LLD.

**Methods:** In a 12-week open-label study, transdermal nicotine was given to 15 older adults (14 completers). Participants met: a) DSM-5 criteria for Major Depressive Disorder, defined as a  $\geq 15$  score on the Montgomery-Asberg Depression Rating scale (MADRS); and b) Subjective Cognitive Impairment, defined as endorsing  $> 20\%$  on the Cognitive Complaint Index. Participants were seen every three weeks with dose titration dependent on individual tolerability. Transdermal nicotine patches were applied daily and titrated to a maximum dose of 21.0 mg/day. The primary mood outcome was MADRS measured every 3 weeks. The primary subjective cognitive outcome was Memory Frequency Questionnaire (MFQ) measured at baseline and week 12. Values measured every 3 weeks were trended over time using a linear mixed effects model and values at baseline and week 12 were compared using paired t-test analysis.

**Results:** The mean decrease in MADRS from baseline to week 12 was 18.29 (SD = 6.15), with a statistically significant decrease over time (linear mixed effects model, slope = -1.51,  $p < 0.001$ ). MADRS differed from baseline as early as week 3 (Bonferroni-adjusted  $p$ -value = 0.0036). Using a last-observation carried forward approach, 13 of 15 participants were responders ( $\geq 50\%$  MADRS decrease) and 8 of 15 participants were remitters (final MADRS  $\leq 7$ ). Mean MFQ increased from baseline to week 12 by 23.64 (SD = 40.96, paired t-test,  $t = 2.16$ ,  $p = 0.0500$ ). Changes in MADRS and MFQ were highly correlated (PCC = -0.75,  $p = 0.002$ ). The most commonly reported side effects were nausea ( $n = 7$ ), dizziness ( $n = 4$ ), and headache ( $n = 4$ ), with 1 of 15 participants discontinuing due to tolerability. Participants also exhibited a mean weight decrease of 6.7 pounds ( $p = 0.0007$ ).

**Conclusion:** Nicotine may be a promising therapy for depressed mood and cognitive performance in LLD. It may also have a more rapid onset of action, as many currently used antidepressants can require 4-6 weeks for clinical effect. However, because this is an open-label pilot study, a definitive placebo-controlled trial is necessary before nicotine's clinical usage for LLD.

# Tennessee-Research-Poster Finalist

## Rochelle Wong

**Title:** *Improving Primary Care Provider (PCP) Referral Practices of Medical Student Health Fairs*

**Authors:** Rochelle Wong, BS<sup>1,2</sup>, Jiun-Ruey Hu, MPH<sup>1,2</sup>, Antonia Silva-Hale, MD<sup>1</sup>, Andre Churchwell, MD<sup>1</sup>, Scott Watkins, MD<sup>1</sup>, Tamala Bradham, PhD<sup>1</sup>, and the Chapter Volunteers of APAMSA

1. Vanderbilt University Medical Center, Nashville, TN
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**Introduction:** Although health fairs provide free resources to communities, they may be unintentionally detrimental to the communities they claim to serve. At present, the majority of health fairs are not patient-centered, but student-centered endeavors. Students attend one-time events to practice medical skills and patients receive free screenings. But, the Results: of these screening tests are useful only if followed-up by an interpretation from a physician and/or treatment with appropriate medication. Leaving patients with abnormal screening Results: without counseling or treatment has been shown to increase patient distress and reduce quality of life. This quality improvement (QI) project aimed to assess current primary care provider (PCP) referral practices of medical student health fairs and to improve these PCP referral rates by 50%.

**Methods:** This QI project was conducted using the Institute for Healthcare Improvement's Model for Improvement with plan-do-study-act (PDSA) cycles. Asian Pacific American Medical Student Association (APAMSA) is a national organization of medical students committed to addressing the unique health challenges of Asian Pacific Islander communities. APAMSA chapters organize health fairs on a regular basis to screen their local Asian communities for diabetes, hypertension, and Hepatitis B. We surveyed 13 community health fair screenings across eleven chapters to provide insight into their clinical microsystems and develop an understanding of baseline PCP referral practices. Referral rate was calculated by number of referred patients over the number of patients with abnormal screening values.

Our first PDSA cycle implemented a Health Fair Patient Referral Reminder Card, with detachable portions to give to patients and to keep with health fair workers to then follow-up as necessary. This cycle excluded high-referring health fairs and focused on distributing the intervention to those that did not already have a referral process in place.

**Results:** We found two latent classes of referral patterns in a bimodal distribution. Of those chapters that made referrals at health screenings, their referral rates were 97%. Of those chapters that did not refer, referral proportions were 0% in every case. After the first PDSA cycle, these chapters increased their referral rate to 75%.

**Conclusion:** Our study highlights an area for improvement in health fair ethics and patient-centered care. Low rates of referrals from health fairs are not due to inefficiencies in process flow, but because these health fairs have no referral process in place. Subsequent PDSA cycles and interventions will aim to establish and optimize a referral system, by providing a reference card of normal screening values so all volunteers can make appropriate referrals accordingly. Our study is limited by the patients on diabetes or antihypertensive therapy whose target values are slightly above normal at baseline. Further

work will need to be done to optimize new referral workflows and ensure they are established sustainably for future health fairs.

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# Texas-Research-Poster Finalist

## Timothy Lin

**Title:** HPV Status in Oropharyngeal Cancer Patients: A Correlation between Tumor Biology and Metabolic Imaging Parameters

**Authors:** Timothy Lin, BA<sup>1,2</sup> Hesham Elhalawani, MD, MS<sup>1</sup>, Stefania Volpe, MD<sup>1,3</sup>, Amit Jethanandani, BS<sup>1,4</sup>, Rachel Ger, BS<sup>5,6</sup>, Calvin B. Rock, BS<sup>1,7</sup>, Pei Yang, MD, MPH<sup>1,8</sup>, Baher Elgohari, MD, MS<sup>1,9</sup>, Abdallah S.R. Mohamed, MD, MS<sup>1,10</sup>, Clifton D. Fuller, MD, PhD<sup>1,11</sup>, 1. Department of Radiation Oncology, The University of Texas MD Anderson Cancer Center, Houston, TX, 2. Baylor College of Medicine, Houston, TX, 3. Department of Oncology and Hemato-Oncology, University of Milan, Milan, Italy, 4. University of Tennessee Health Science Center, Memphis, TN, 5. Department of Radiation Physics, The University of Texas MD Anderson Cancer Center, Houston, TX, 6. Graduate School of Biomedical Sciences, Houston, TX, 7. University of Texas San Antonio School of Medicine, San Antonio, TX, 8. Hunan Cancer Hospital, the affiliated cancer hospital of Xiangya School of Medicine, Central South University, China, 9. Clinical Oncology and Nuclear Medicine Department, University of Mansoura, Mansoura, Egypt, 10. Department of Clinical Oncology and Nuclear Medicine, Faculty of Medicine, University of Alexandria, Alexandria, Egypt, 11. Medical Physics Program, The University of Texas Graduate School of Biomedical Sciences, Houston, TX

**Introduction:** In cancer management, imaging biomarkers, such as clinical TNM stage, aid oncologists in making critical treatment decisions (1). Hence, integrating data from functional (i.e. 18F-fluorodeoxyglucose positron emission tomography, or FDG-PET) and anatomical (i.e. computed tomography, or CT) imaging modalities, to better predict underlying tumor biology and clinical outcomes, represents a developing frontier in cancer research and management. As part of a wider research initiative on MIBs, we evaluated the correlation between metabolic tumor volumes (MTV) as well as standardized uptake value (SUV) metrics found on PET/CT, and human papillomavirus (HPV) status in a homogenous cohort of oropharyngeal cancer (OPC) patients.

**Methods:** Data were retrospectively collected from an Institutional Review Board (IRB) approved cohort. Clinical data were retrieved from past medical records; clinical staging was updated per American Joint Committee on Cancer (AJCC) 8th edition. HPV status was assessed by DNA in situ hybridization or p16 immunohistochemistry and subsequently classified as either positive or negative. Pre-treatment FDG-PET/CT images were retrieved using Velocity AI software (Velocity Medical Solutions, Atlanta, GA); semi-automated contouring of the primary gross tumor volume (GTVp) was performed directly on PET scans. PET metrics (SUVmax, SUVmean, SUVmin) as well as MTV were extracted. Statistical analysis was run using JMP<sup>®</sup> Pro Version 12.1.0 (SAS Institute Inc., Cary, NC, 1989-2007). Nonparametric one-way analysis of Variance (ANOVA) using Wilcoxon test was performed. Univariate analysis was done to correlate the quantitative uptake parameters with oncologic and survival outcomes.

**Results:** One hundred twenty-eight predominantly male patients constituted our cohort; 104 (81%) were HPV+ OPC, and 24 (19%) were HPV- OPC. We outlined the different FDG-PET-related metrics in terms of mean and standard deviation, after HPV-based subgrouping. The MTV in the HPV+ subset was 11.89cc (Std: 10.95) in contrast to 25.94cc (Std: 27.09) in the HPV- subset. Similarly, SUVmin was 3.34 (Std: 1.25) versus 4.13 (Std: 1.59), SUVmean was 6.97 (Std: 2.51) versus 8.33 (Std: 2.7) and SUVmax was 14.54 (Std: 6.2) versus 17.72 (Std: 5.78) in the HPV+ and HPV- subsets, respectively.

Higher MTV volumes were significantly correlated with HPV- status compared with HPV+ (25.9 vs. 11.9 cc,  $p=0.01$ ). Similar statistically significant HPV discriminatory trend was maintained across all GTVp-derived PET metrics (SUVmin,  $p=0.02$ ; SUVmean,  $p=0.01$ ; SUVmax,  $p=0.01$ ).

No statistically significant correlation was found between the quantitative metabolic uptake parameters and subsequent treatment-related outcomes, e.g. overall survival, local control or freedom from distant metastasis.

**Conclusion:** There was a statistically significant association between GTVp-derived PET metrics and HPV status in our cohort of OPC patients. While further testing and validation are required, our findings support the emerging role of quantitative metabolic imaging parameters as reliable representations of underlying tumor biology. Such insight further promotes the ongoing initiatives of developing metabolic imaging biomarkers to aid in cancer treatment decision-making.

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# Utah-Research-Poster Finalist

## Andrew Stephens

**Title:** Evaluation of the Likelihood of Specific Press Ganey® Outpatient Medical Practice Survey Questions to Receive a Perfect Score

**Authors:** Andrew R. Stephens BA, Angela P. Presson PhD, Danli Chen MS, Andrew Tyser MD, Nikolas H. Kazmers MD MSE

**Introduction:** Assessment of outpatient satisfaction has received increased attention in recent years, and satisfaction scores may be directly linked to physician reimbursement in certain practice settings. The Press Ganey® Outpatient Medical Practice Survey (PGOMPS) is a common patient-reported questionnaire used to measure satisfaction with outpatient healthcare in the United States. The PGOMPS is composed of 25 questions: 10 are specific to the interaction and perception of the care provider, 7 specifically rate the nursing and office staff, and 8 relate to the practice in general. Our aim was to determine the frequency of patient satisfaction with each individual question to highlight potential areas for improvement in outpatient satisfaction. Our null hypothesis was that the frequency of satisfaction would be similar for each PGOMPS question.

**Methods:** We reviewed all PGOMPS total scores for new patient visits between 1/2014 and 12/2016 for all specialties at a tertiary academic health center. Due to large ceiling effects in the PGOMPS, satisfaction was defined as a perfect total score. The percent of perfect scores for each question was calculated.

**Results:** 95,026 patients met inclusion criteria. The 5 questions with the lowest percent of perfect scores were, wait time, information about delays, ease of getting on the phone, ability to get desired appointment, and convenience of office hours (56%, 57%, 59%, 60%, and 61% respectively). The 5 questions with the highest percent of perfect scores were friendliness of provider, the provider spoke using clear language, confidence in the provider, likely to recommend provider, and likely to recommend practice (84%, 83%, 83%, 83%, and 82% respectively).

**Conclusion:** Press Ganey® Outpatient Medical Survey is comprised of 25 questions in which 8 directly relate to the provider, and the remainder relate to the practice and staff. Our Results: suggest that the majority of patients who complete the PGOMPS are satisfied with their provider, demonstrating that room for improvement is limited with provider-specific portions of the clinic interaction. The majority of dissatisfaction, or low-scoring questions, pertain to aspects of the clinic that may not be directly within the control of providers. Administrators and leaders of health care teams should consider these Results: when seeking ways to improve patient satisfaction scores.

# Virginia-Research-Poster Finalist

## Shipra Maheshwari

**Title:** Molecular Mechanisms of Heightened Cellular Stress and Increased Cellular Death in Response to Oncogenic ERBB/K-RAS Inhibition in Human Cancer Cells

**Authors:** Shipra Maheshwari, Monicah Njogu, and Amy Tang

**Introduction:** Metastatic cancer kills more than 0.6 million Americans each year. Effective therapies to control and eradicate metastatic cancer have remained elusive. Oncogenic, EGFR/HER2/K-RAS pathway activation is a major driving force in promoting tumor growth and rapid metastasis in a many locally advanced and metastatic cancers. SIAH, an E3 ubiquitin ligase, is an essential downstream component of the undruggable EGFR/HER2/K-RAS pathway, that functions as a “gatekeeper” for proper ERBB/RAS signal transduction. In preclinical studies, anti-SIAH therapy is effective at blocking oncogenic K-RAS activation, tumorigenesis, and metastasis. This novel discovery points to the importance of elucidating the mechanisms by which SIAH inhibition acts against metastatic cancer. Our previous research findings suggest that SIAH inhibition increases cellular stress and induces cell death in many aggressive cancer cells. Understanding how cellular stress and death are increased in response to a SIAH blockade is important in developing new and potent therapies against metastatic cancer.

The objective of this study was to delineate the molecular mechanism by which anti-SIAH-based anti-K-RAS therapy functions as an antitumor agent. In particular, we aimed to understand how such an anti-RAS agent induces heightened cellular stress and increased cellular death in multiple types of aggressive human cancer cells *in vitro*.

**Methods:** A549, a human lung cancer cell line, and HEK293T, Human Embryonic Kidney 293 cells, were cultured according to standard protocol. These cells were then infected with high-titer lentiviruses and transfected with plasmids to induce SIAH2 deficiency, SIAH2 wild type, and empty vector controls. Western blot was performed to detect the expression of key proteins involved in cellular stress and death. Immunofluorescence detected the cellular location of proteins involved in cellular stress and death. Cellular glutathione levels were also assessed to detect cellular redox state. Finally, Fluorescence Activated Cell Sorting was conducted to determine whether cells were dying in early or late phase of cell apoptosis.

- **Results:** SIAH2 expression positively correlated with xCT expression, an oxidative stress regulator.
- SIAH2 knockdown reduced xCT expression.
- Loss of xCT expression induced by SIAH2 deficiency led to decreased cellular glutathione levels, Two tailed t-test at  $p < 0.001$ ,  $n = 5$
- SIAH2 inhibition led to a marked increase of apoptosis in a subset of human cancer cells.
- SIAH2-deficient cells were dying due to increased apoptosis and autophagy, compared to control cells.

**Conclusion:** SIAH2 played a key role in cellular stress and cell death.

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- The interaction between SIAH2 and xCT demonstrated how SIAH2 inhibition was important in inducing oxidative stress in some cancer cells, by reducing glutathione levels and increasing ROS levels (as found in our previous unpublished Results:).
- SIAH2 knockdown induced cellular death by two mechanisms, apoptosis and autophagy.
- A novel anticancer approach that targets SIAH2 (and xCT activities) may offer a good alternative in therapy.

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