UPDATE IN HOSPITAL MEDICINE

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HOSPITALIST: MARTIN HEALTH SYSTEM, SELECT MEDICAL, ST JOSEPH HEALTHCARE

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FLORIDA CHAPTER, AMERICAN COLLEGE OF PHYSICIANS

GRAND HYATT TAMPA BAY

DISCLOSURE OF FINANCIAL RELATIONSHIPS

Ankush K Bansal

Has disclosed relationships with an entity producing, marketing, reselling, or distributing health care goods or services consumed by, or used on, patients.

- Hospitalist Employment: **Hospitalists Plus, Medicine Physicians Inc, Tiva Healthcare, Martin Health System**
- Telemedicine Independent Contractor: HealthTap, WellnessFX, WellVia Solutions, American Well, Salus Telehealth, KuraMD, MyTelemedicine
- Investments: Doximity, TelaDoc, iSelectMD

CASE 1

A 55-year-old male with BMI of 29 kg/m^2, pre-diabetes on no oral hypoglycemics, ACE-inhibitor-controlled hypertension, and diet-controlled hyperlipidemia presents with sudden onset of left-sided, crushing chest pain radiating to the left shoulder that began 2 hours prior while at work at his light-duty job. EMS was called and he was brought to your emergency department. Pulse enroute was 105 bpm, blood pressure was 135/90, respiratory rate was 18/min, temperature was 37.3°C, and oxygen saturation was 91%. EKG shows mild ST elevation in the inferior leads. Aspirin has been given. You recall the medical school mnemonic "MONA" for morphine, oxygen, nitrates, aspirin. However, you also recall reading the AVOID trial from 2015 suggesting that hyperoxygenation may cause coronary vasoconstriction leading to reactive oxygen species production resulting in worsening reperfusion injury. So, what do you do in this hemodynamically and mentally stable patient with presumed acute MI?

A. *Monitor oxygenation but provide no supplemental oxygen at this time*
B. *Apply supplemental oxygen initially at 6 L/min*
C. *Intubate and mechanically ventilate*
D. *Consult pulmonary medicine*

N Engl J Med 2017;377:1240-9.
DOI: 10.1056/NEJMoa1706222

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Oxygen Therapy in Suspected Acute Myocardial Infarction

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INTRODUCTION

• Unblinded, randomized, 35-center, parallel-group, open-label, clinical trial with intention to treat using patient data from national Swedish population registries. Over 6600 patients

• Those with suspected MI pre-hospital and in-hospital enrolled. Swedish citizens only (to ensure follow-up post-discharge through national registry). Oxygen saturation 90% or above.

• Randomly assigned to either 6 L/min oxygen or room air oxygenation

• Primary endpoint: death (any cause) within 365 days of randomization via intention-to-treat

• Secondary endpoints: death (any cause) within 30 days of randomization as well as 30 and 365 day assessments of rehospitalization with MI, rehospitalization with CHF, any cardiovascular death

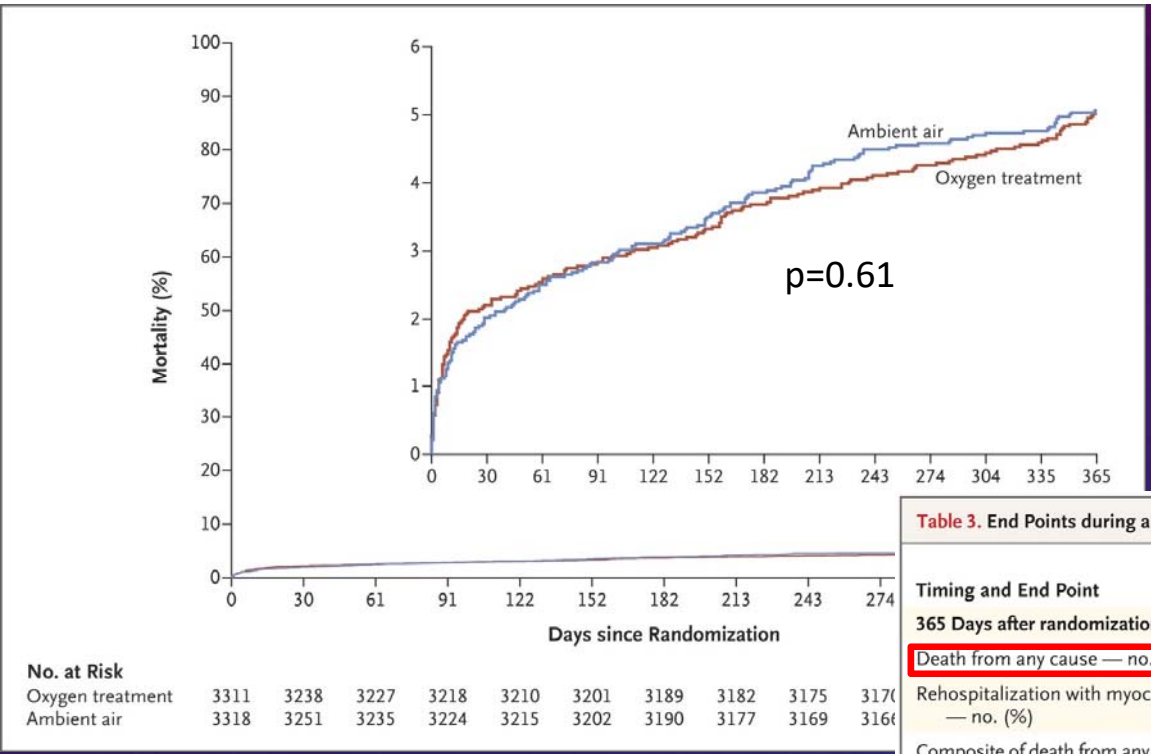


Table 3. End Points during and after Hospitalization.

Timing and End Point	Oxygen Group (N=3311)	Ambient-Air Group (N=3318)	Hazard Ratio (95% CI)	P Value
365 Days after randomization				
Death from any cause — no. (%)	166 (5.0)	168 (5.1)	0.97 (0.79–1.21)	0.80
Rehospitalization with myocardial infarction — no. (%)	126 (3.8)	111 (3.3)	1.13 (0.88–1.46)	0.33
Composite of death from any cause or rehospitalization with myocardial infarction — no. (%)	275 (8.3)	264 (8.0)	1.03 (0.87–1.22)	0.70
30 Days after randomization				
Death from any cause — no. (%)	73 (2.2)	67 (2.0)	1.07 (0.77–1.50)	0.67
Rehospitalization with myocardial infarction — no. (%)	45 (1.4)	31 (0.9)	1.46 (0.92–2.31)	0.11
Composite of death from any cause or rehospitalization with myocardial infarction — no. (%)	114 (3.4)	95 (2.9)	1.19 (0.91–1.56)	0.21
During hospital stay				
Median highest measured level of highly sensitive troponin T (IQR) — ng/liter*	946.5 (243.0–2884.0)	983.0 (225.0–2931.0)	—	0.97

* Data were available for 3976 (79.4%) of the 5010 patients with confirmed myocardial infarction: 1998 patients (80.4%) in the oxygen group and 1978 patients (78.3%) in the ambient-air group. The P value for the comparison was calculated with the use of a nonparametric Wilcoxon signed-rank test.

BOTTOM LINE

- Patients with suspected acute myocardial infarction without hypoxemia ($P_aO_2 \geq 90\%$) did not benefit from supplemental oxygen when compared to room air with respect to all-cause mortality at 1 year or rehospitalization for MI, regardless of baseline characteristics or final diagnosis.

CASE 2

A 75-year-old female, otherwise active, with history of medication-controlled hypertension, hyperlipidemia, remote history of breast cancer s/p treatment, osteopenia on pharmacotherapy, and BMI of 27 kg/m^2 presents with sudden onset shortly after waking 4 hours prior of dizziness, mild expressive dysphasia, and right arm numbness. She arrived in the emergency department via EMS and was evaluated. CT of the brain showed no acute findings. Neurology did not recommend thrombolytics. She was admitted for ischemic stroke. Her mental state is normal and her NIH Stroke Scale is 5 (for right arm drift, limb ataxia, mild sensory loss, mild aphasia, and mild dysarthria). She is not choking and is now speaking normally. She tells you that she is hungry and she is due for her daily medications. You wonder if delaying her the ability to eat and receiving her medications is necessary because of the mild nature of her stroke and whether it will have any significant effect on clinical outcomes in this patient. The nurse is able to do an informal bedside swallow evaluation. What do you do?

A. *Request the nurse to do a bedside swallow evaluation before giving the patient anything by mouth, including meds*
B. *Keep the patient NPO until a formal bedside swallow evaluation by a speech pathologist can be done tomorrow*
C. *See how she does with soft food and/or pills with water*
D. *Let her eat her usual diet.*

Stroke. 2017;48:900-906. DOI: 10.1161/STROKEAHA.116.015332.

Predictors and Outcomes of Dysphagia Screening After Acute Ischemic Stroke

Raed A. Joundi, MD, DPhil; Rosemary Martino, PhD; Gustavo Saposnik, MD, MSc; Vasily Giannakeas, MPH; Jiming Fang, PhD; Moira K. Kapral, MD, MSc

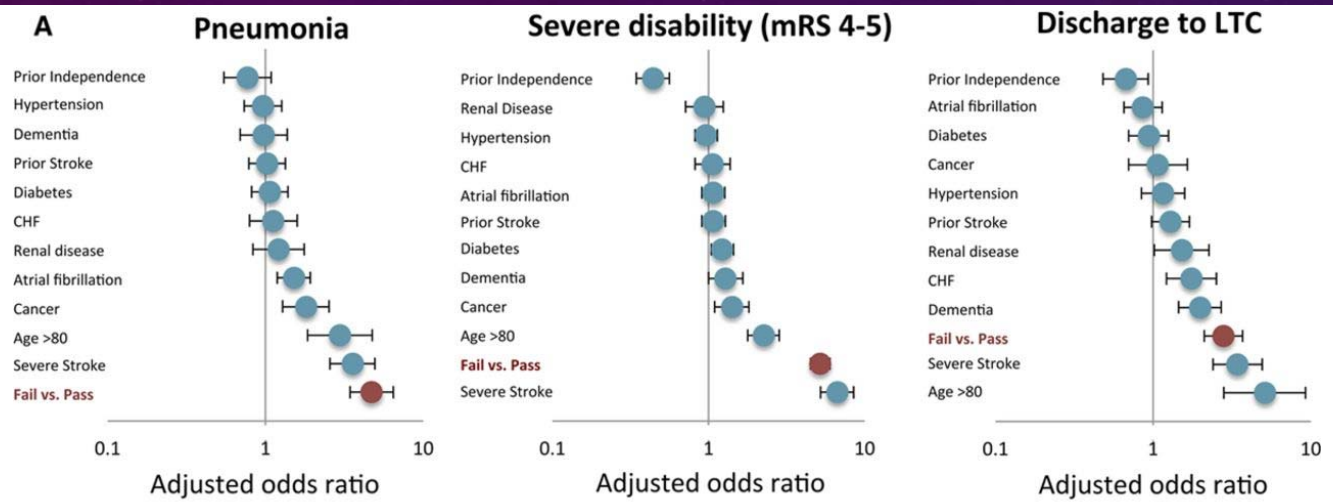
INTRODUCTION

- Records review of 11 regional stroke centers in Ontario via Ontario Stroke Registry for 3 years.
- 6677 patients admitted with acute ischemic stroke were evaluated for whether they received dysphagia screening and subsequent complications
- 19.2% of those with mild strokes (NIH Stroke Scale ≤ 8) received no dysphagia screening
- Dysphagia screening defined as informal bedside testing (e.g. by nurse) or formal dysphagia screening (e.g. by speech/swallow pathologist)
- Primary endpoints: in-hospital pneumonia (all-cause), severe disability at discharge (modified Rankin 4-5), all-cause mortality at 1 year
- Secondary endpoints: aspiration pneumonia within 30 days, development within 30 days of decubitus ulcer or GI bleed or MI, placement of PEG/PEJ during hospitalization, discharge to long-term care.
- Predictors of receiving dysphagia screening: age ≥ 80, admission to ICU/stepdown/stroke unit, weakness, speech deficits, thrombolysis

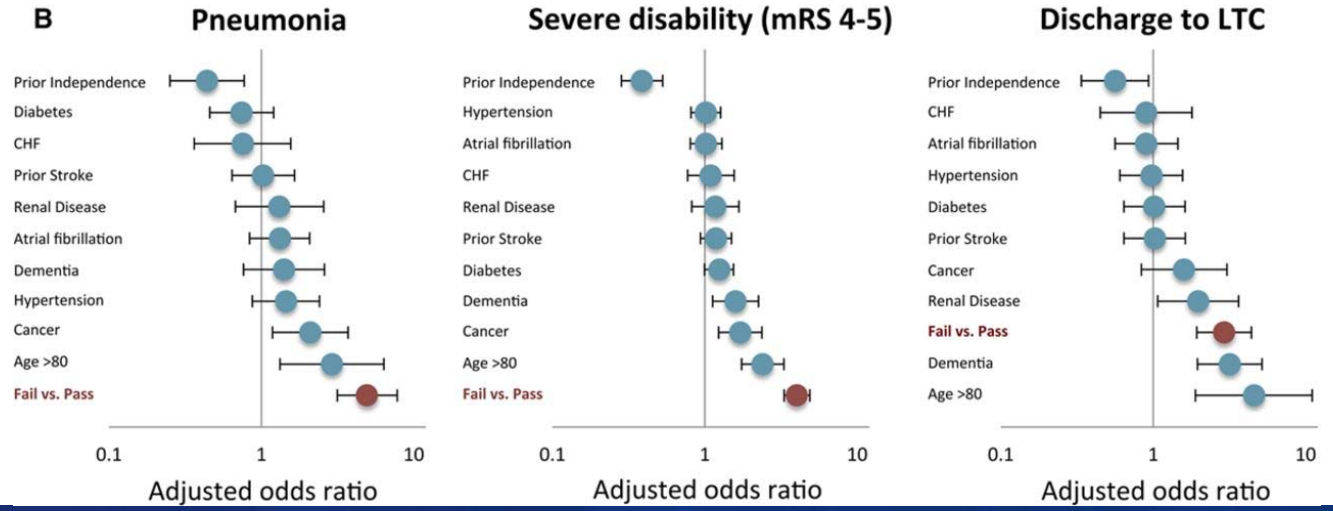
Variable	Dysphagia Screen Result		*P* Value
	Fail	Pass	
N (%)	2457 (47.8%)	2687 (52.2%)	
Neurological worsening*	638 (26.0%)	211 (7.9%)	<0.001
Seizure	71 (2.9%)	23 (0.9%)	<0.001
Cardiac arrest	107 (4.4%)	18 (0.7%)	<0.001
Decubitus ulcer	46 (1.9%)	<6 (<0.2%)†	<0.001
Any pneumonia	322 (13.1%)	52 (1.9%)	<0.001
Aspiration pneumonia	217 (8.8%)	26 (1.0%)	<0.001
Depression	82 (3.3%)	32 (1.2%)	<0.001
Deep vein thrombosis	36 (1.5%)	11 (0.4%)	<0.001
Myocardial infarction	64 (2.6%)	28 (1.0%)	<0.001
Gastrointestinal hemorrhage	60 (2.4%)	15 (0.6%)	<0.001
Palliative	490 (19.9%)	64 (2.4%)	<0.001
Length of stay, mean days	19.07	9.8	<0.001
Nasogastric tube	1017 (41.4%)	53 (2.0%)	<0.001
Percutaneous feeding tube	221 (9.0%)	<6 (<0.2%)†	<0.001

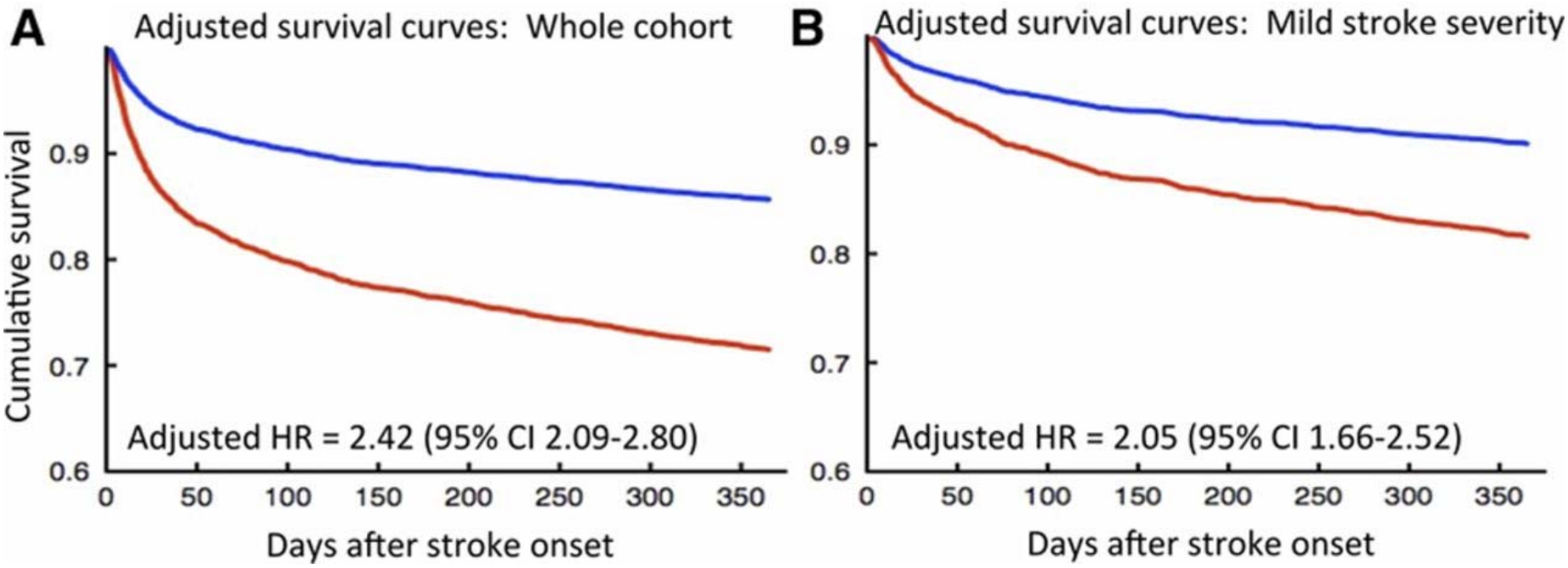
Variable	Dysphagia Screen Result		*P* Value
	Fail	Pass	
Disability at discharge—modified Rankin Scale score			<0.001
0–1	108/2396 (4.5%)	624/2616 (23.9%)	
2–3	624/2396 (26.0%)	1462/2616 (55.9%)	
4–5	1256/2396 (52.4%)	470/2616 (18.0%)	
Discharge location			<0.001
Home	423 (17.2%)	1439 (53.6%)	
Inpatient rehabilitation	941 (38.3%)	935 (34.8%)	
Long-term care	345 (14.0%)	116 (4.3%)	
Died in hospital	408 (16.6%)	60 (2.2%)	<0.001
30-day mortality	487 (19.8%)	69 (2.6%)	<0.001
1-year mortality	889 (36.2%)	274 (10.2%)	<0.001

All Ischemic Strokes



Mild Ischemic Strokes




A
Adjusted survival curves: Whole cohort
Cumulative survival
0.9
0.8
0.7
0.6
Adjusted HR = 2.42 (95% CI 2.09-2.80)
0
50
100
150
200
250
300
350
Days after stroke onset
B
Adjusted survival curves: Mild stroke severity
0.9
0.8
0.7
0.6
Adjusted HR = 2.05 (95% CI 1.66-2.52)
0
50
100
150
200
250
300
350
Days after stroke onset

BOTTOM LINE

- Screening failure is a strong and independent predictor of pneumonia, disability, and death.
- Those with mild stroke have moderate rate of screening failure and high risk of complications if fail screening.
- Current guidelines from American Heart and Stroke Associations recommend early screening of stroke patients before oral intake.

- **Universal dysphagia screening is crucial to identifying at-risk patients.**
- **Prophylactic antibiotics do not reduce risk of aspiration pneumonia according to STROKE-INF trial.**

The important thing is not to stop questioning.

- Albert Einstein

CASE 3

A 45-year-old male was hospitalized for cellulitis requiring incision and drainage. His medical history was unremarkable except for ongoing tobacco use disorder of 1.5 ppd x 27 years. The hospitalization was uneventful and on day 3, he was ready for discharge. During hospitalization, he received tobacco cessation counseling including the Quit Helpline and education on evidence-based tobacco cessation aids (e.g. patch, gum). He asks you about e-cigarettes/vaping since he's seen a lot of TV commercials about this and vaping stores everywhere. You tell him that there is no clear evidence that e-cigarettes work in tobacco cessation. However, you wonder if there is any harm in him using it along with standard cessation aids. Your advice on whether it works for tobacco cessation post-discharge is:

A. *Go for it. It's cool and there are no harmful combustion products like in standard cigarettes.*
B. *It is unlikely to help you quit smoking, even with another aid like the patch or gum, and may hinder success.*
C. *Try it instead of other aids like the patch or gum.*
D. *Consult psychiatry.*

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For author affiliations, see end of text.
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Annals of Internal Medicine

ORIGINAL RESEARCH

Association of E-Cigarette Use With Smoking Cessation Among Smokers Who Plan to Quit After a Hospitalization

A Prospective Study

Nancy A. Rigotti, MD; Yuchiao Chang, PhD; Hilary A. Tindle, MD, MPH; Sara M. Kalkhoran, MD, MAS; Douglas E. Levy, PhD; Susan Regan, PhD; Jennifer H.K. Kelley, RN, MA; Esa M. Davis, MD, MPH; and Daniel E. Singer, MD

INTRODUCTION

- E-cigarettes do not burn tobacco but the heated aerosol may contain propylene glycol (antifreeze) or vegetable glycerine, nicotine, flavoring agents, and small amounts of VOCs and heavy metals.
- Most adults use them to quit smoking or reduce their health risks. But does it really help in quitting smoking? Past studies conflict.
- Secondary analysis of an RCT of hospitalized smokers who planned to quit smoking post-discharge – Helping HAND 2 trial
- Question: Does e-cigarette use within 3 months post-discharge result in more abstinence at 6 months than standard treatment?
- Standard care group: called free quitline to get personalized recommendation on cessation aid to use
- Sustained care group: Free 30-90 day supply of cessation medication of choice and 5 phone calls over 90 days with counseling
- Primary endpoint: biochemically-validated tobacco abstinence in past 7 days at 6 months + saliva sample at 6 months to verify nicotine abstinence + expired air-carbon monoxide sample at 6 months to verify use of nicotine replacement therapy and/or e-cigarettes
  - Abstinence: saliva cotinine concentration < 10 ng/mL and CO level < 9 ppm

Table 3. Propensity Score Analysis for Biochemically Verified Tobacco Abstinence at 6-Month Follow-up, by E-Cigarette Use

E-Cigarette Use	E-Cigarette Users, *n*		Biochemically Confirmed Tobacco Abstinence in the Past 7 Days at 6-Month Follow-up			
	Full Sample	Matched Sample*	E-Cigarette Use, %		Risk Difference (95% CI), %	*P* Value
			Yes	No		
Before hospitalization						
Use in the past 30 d	224	223	19.7	18.4	1.3 (−5.9 to 8.6)	0.72
At 3 mo						
Any use since discharge	286	237	10.1	26.6	−16.5 (−23.3 to −9.6)	<0.001
Use in the past 30 d	164	162	11.7	18.5	−6.8 (−14.6 to 1.0)	0.088
Use in the past 7 d	117	117	13.7	17.9	−4.3 (−13.6 to 5.1)	0.37
At 1 and 3 mo						
Use in the past 30 d	92	91	14.3	24.2	−9.9 (−21.3 to 1.5)	0.091
Use in the past 7 d	58	57	17.5	21.1	−3.5 (−18.0 to 11.0)	0.64

PHQ-4 = Patient Health Questionnaire-4.

* Matching was based on study group and participants' propensity to use e-cigarettes after discharge. Variables in the propensity score model were age, sex, race/ethnicity, education level, number of cigarettes per day, time to first cigarette after awakening, e-cigarette use in the 30 d before hospitalization, perceived importance of quitting, confidence in ability to quit, alcohol use, marijuana use in the past year, smoking-related disease as primary discharge diagnosis, baseline PHQ-4 score, length of hospital stay, use of medication or counseling after discharge, and study site.

Table 4. Propensity Score Analysis for Biochemically Verified Tobacco Abstinence at 6-Month Follow-up, by E-Cigarette Use: Stratified by Study Group

E-Cigarette Use	Standard Care (Control)				Sustained Care (Intervention)				*P* Value*
	Matched Pairs, *n*	Biochemically Confirmed Tobacco Abstinence in the Past 7 Days at 6-Month Follow-up, %		Risk Difference (95% CI), %	Matched Pairs, *n*	Biochemically Confirmed Tobacco Abstinence in the Past 7 Days at 6-Month Follow-up, %		Risk Difference (95% CI), %	
		Yes	No			Yes	No		
Before hospitalization									
Use in the past 30 d	117	17.9	14.5	3.4 (−6.0 to 12.9)	106	21.7	22.6	−0.9 (−12.1 to 10.2)	0.53
At 3 mo									
Any use since discharge	113	12.0	24.1	−12.0 (−21.2 to 2.9)	104	7.7	29.8	−22.1 (−32.3 to −11.9)	0.143
Use in the past 30 d	93	14.0	18.3	−4.3 (−14.9 to 6.3)	69	8.7	18.8	−10.1 (−21.5 to 1.2)	0.39
Use in the past 7 d	66	16.7	19.7	−3.0 (−16.2 to 10.1)	51	9.8	15.7	−5.9 (−18.8 to 7.0)	0.66
At 1 and 3 mo									
Use in the past 30 d	53	15.1	26.4	−11.3 (−26.6 to 4.0)	38	13.2	21.1	−7.9 (−24.7 to 8.9)	0.86
Use in the past 7 d	33	17.1	17.1	0 (−17.7 to 17.7)	22	18.2	27.3	−9.1 (−33.7 to 15.5)	0.59

* For interaction between study group and e-cigarette use measure.

BOTTOM LINE

- **Those who used an e-cigarette at discharge were less likely to be abstinent from tobacco at 6 months than those who didn't use e-cigarettes. Furthermore, this negative association was quite large.**

- Smokers in the intervention group (free 30-90 days of medications) were less likely to use e-cigarettes in the month after discharge than those in the control group (only given recommendation for which aid/medication to use).

UPDATE FROM JULY 2018

- **The flavoring from e-cigarettes has been shown to directly cause endothelial dysfunction, another reason to NOT recommend e-cigarettes at all, much less for tobacco cessation.**

- "[Nine of the most common flavorings] impair stimulated nitric oxide production and inflammation suggestive of endothelial dysfunction across a range of concentrations likely to be achieved in vivo. All flavorings tested impaired nitric oxide production. . . The toxicity data. . . provide quantitative support for the regulatory prohibition or establishment of limitations on allowable levels of these flavorings in electronic liquids and other tobacco products."

- ". . . data suggest that short-term exposure of endothelial cells to flavoring compounds used in tobacco products have adverse effects on endothelial cell phenotype that may have relevance to cardiovascular toxicity."

[*Arterioscler Thromb Vasc Biol.* 2018;38: 1607-1615. DOI: 10.1161/ATVBAHA.118.311156.

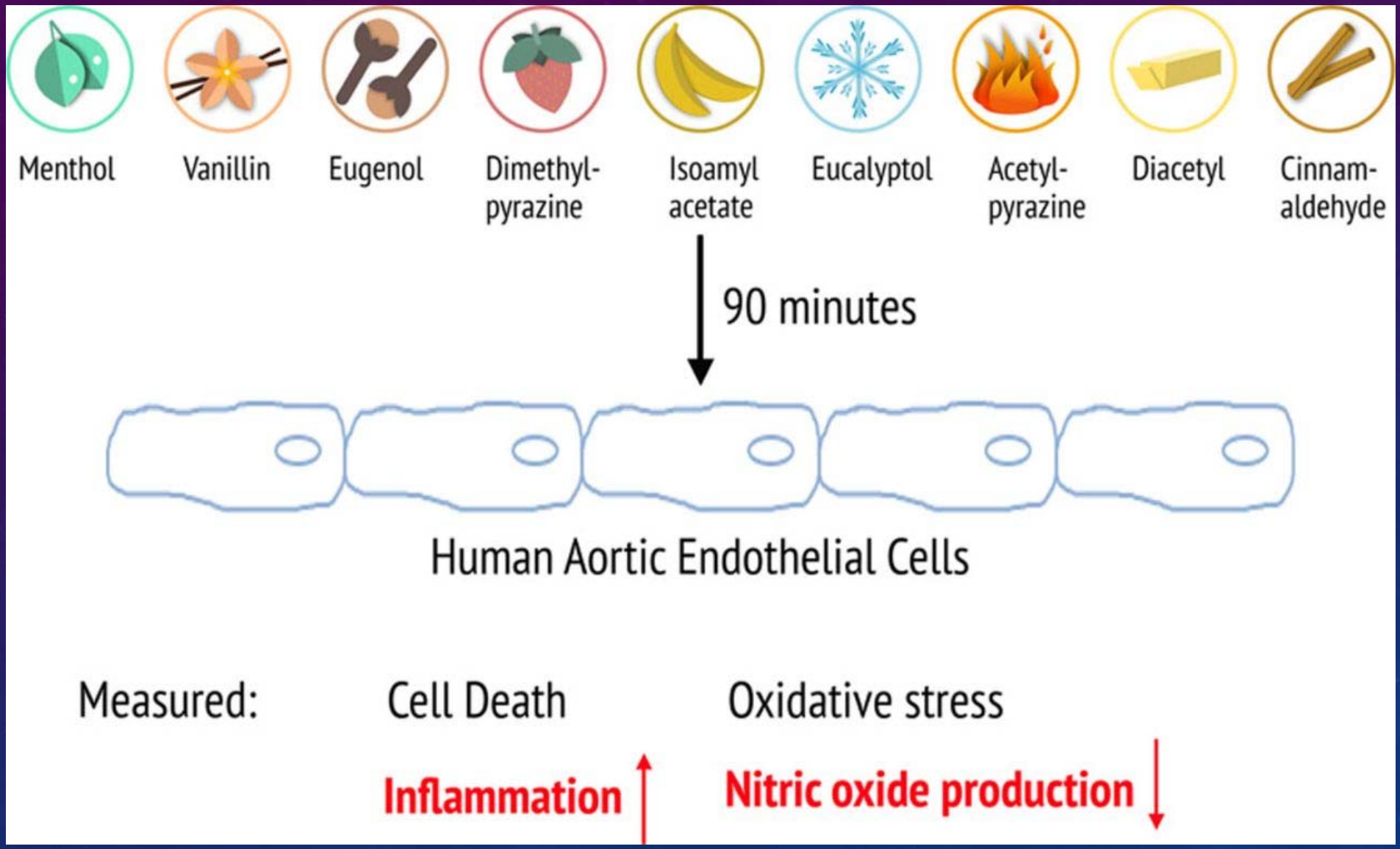
Translational Sciences

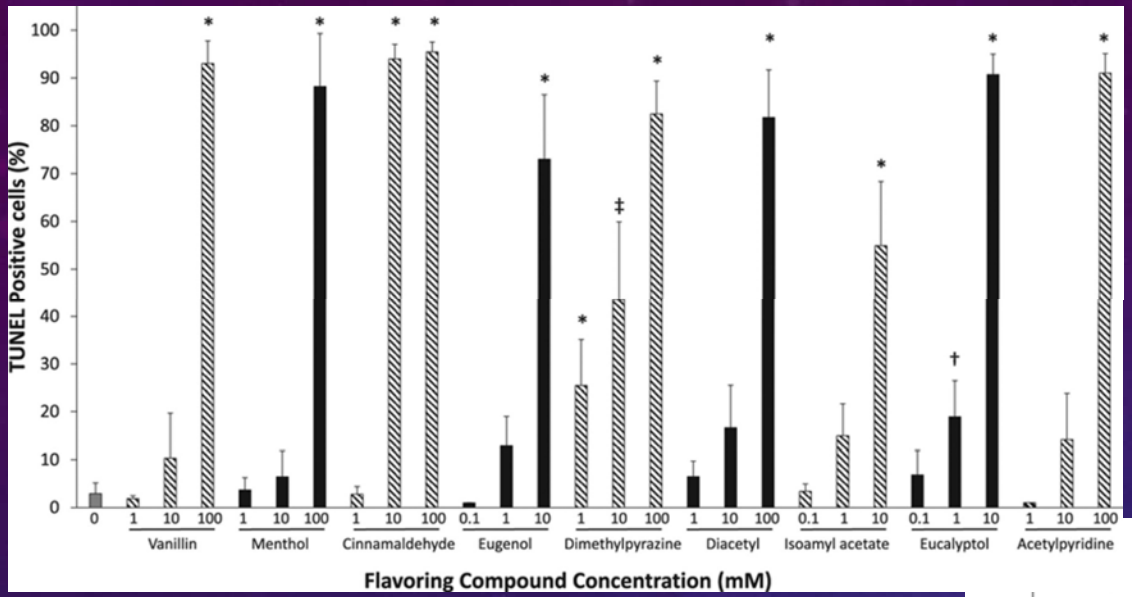
Flavorings in Tobacco Products Induce Endothelial Cell Dysfunction

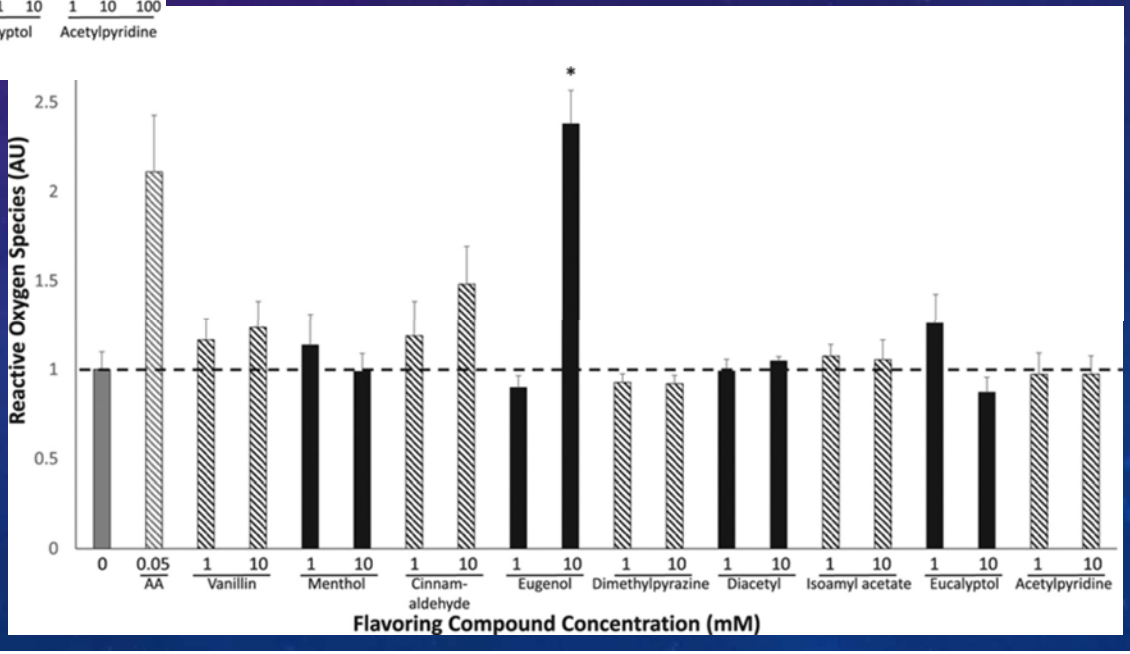
Jessica L. Fetterman, Robert M. Weisbrod, Bihua Feng, Reena Bastin, Shawn T. Tuttle, Monica Holbrook, Gregory Baker, Rose Marie Robertson, Daniel J. Conklin, Aruni Bhatnagar, Naomi M. Hamburg

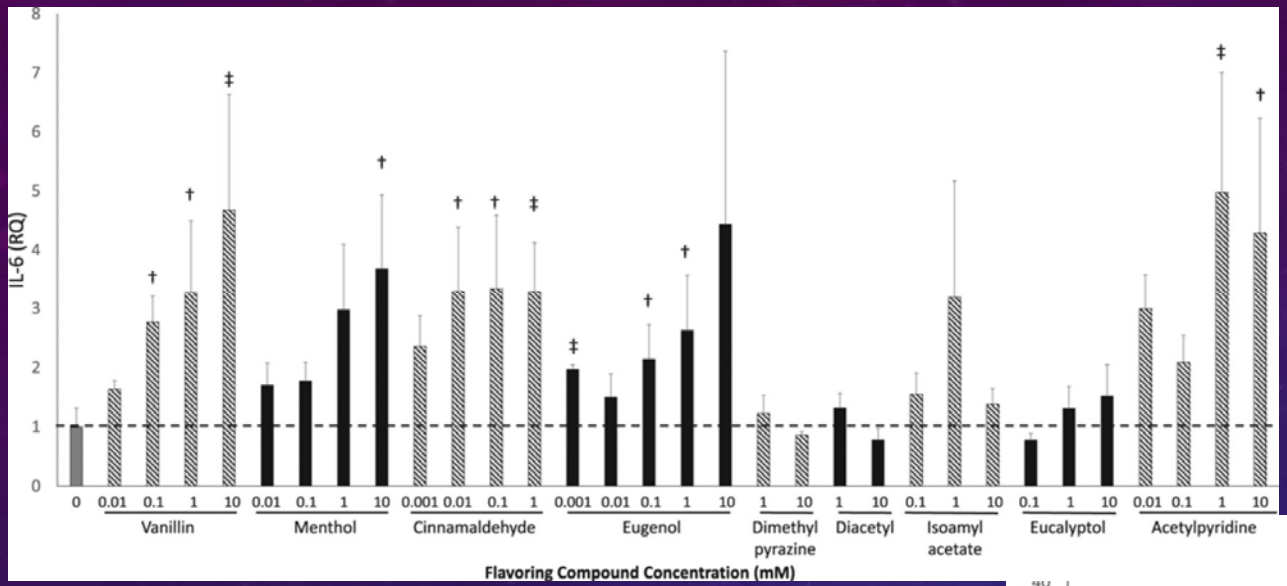
Table 1. Tobacco Product Flavorings Tested

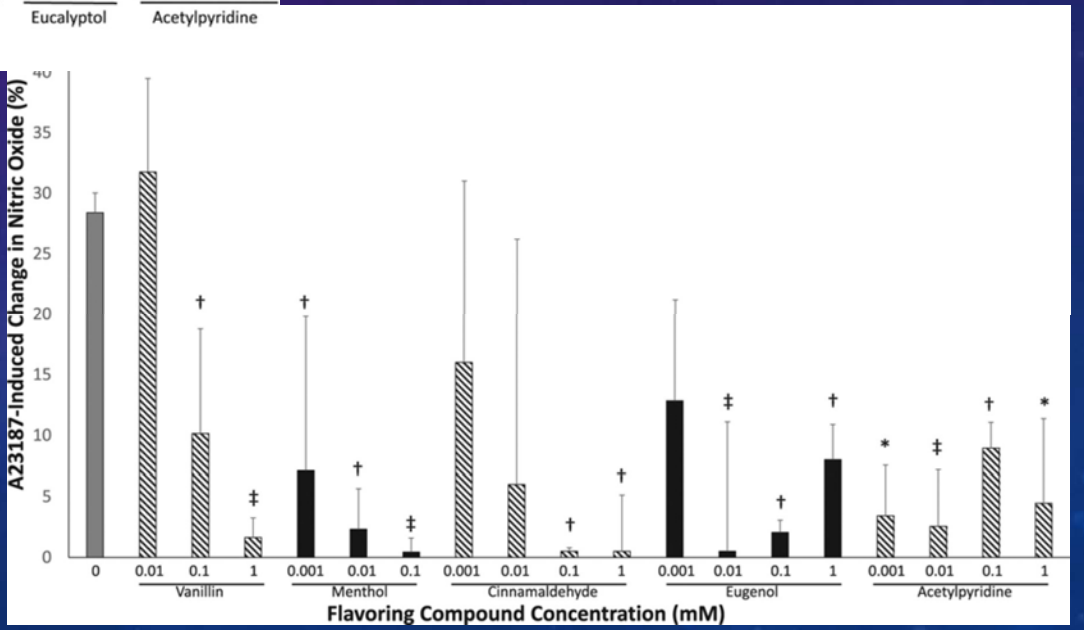
Tobacco Product Flavoring	Class	Subgroup	Characterizing Flavor
Eugenol	Alcohols, phenols	Phenol	Clove
Vanillin	Aldehyde	Aromatic aldehyde	Vanilla
Cinnamaldehyde	Aldehyde	Aromatic aldehyde	Cinnamon
Menthol	Alcohols, phenols	Cyclic terpene	Mint, cooling effect
2,5-dimethylpyrazine	Pyrazine	Alkyl pyrazine	Strawberry
Diacetyl	Ketone	Diketone	Butter
Isoamyl acetate	Ester	Aliphatic esters	Banana
Eucalyptol	Ether	Ether	Spicy, cooling effect
Acetylpyridine	Pyridine	Pyridine	Burnt


Menthol
Vanillin
Eugenol
Dimethyl-pyrazine
Isoamyl acetate
Eucalyptol
Acetyl-pyrazine
Diacetyl
Cinnam-aldehyde
90 minutes
Human Aortic Endothelial Cells
Measured:
Cell Death
Oxidative stress
Inflammation
Nitric oxide production


TUNEL Positive cells (%)
100
90
80
70
60
50
40
30
20
10
0
0
1
10
100
Vanillin
Menthol
Cinnamaldehyde
0.1
Eugenol
Dimethylpyrazine
Diacetyl
Isoamyl acetate
Eucalyptol
Acetylpyridine
Flavoring Compound Concentration (mM)


Reactive Oxygen Species (AU)
2.5
2
1.5
1
0.5
0
0
0.05
AA
1
10
Vanillin
Menthol
Cinnam-
aldehyde
Eugenol
Dimethylpyrazine
Diacetyl
Isoamyl acetate
Eucalyptol
Acetylpyridine
Flavoring Compound Concentration (mM)


IL-6 (RQ)
0
1
2
3
4
5
6
7
8
0 0.01 0.1 1 10 0.01 0.1 1 10 0.001 0.01 0.1 1 0.001 0.01 0.1 1 10 1 10 1 10 0.1 1 10 0.1 1 10 0.01 0.1 1 10
Vanillin
Menthol
Cinnamaldehyde
Eugenol
Dimethyl pyrazine
Diacetyl
Isoamyl acetate
Eucalyptol
Acetylpyridine
Flavoring Compound Concentration (mM)


A23187-Induced Change in Nitric Oxide (%)
0
5
10
15
20
25
30
35
0 0.01 0.1 1 0.001 0.01 0.1 0.001 0.01 0.1 1 0.001 0.01 0.1 1 0.001 0.01 0.1 1
Vanillin
Menthol
Cinnamaldehyde
Eugenol
Acetylpyridine
Flavoring Compound Concentration (mM)

To myself I am only a child playing on the beach,
while vast oceans of truth lie undiscovered before me.

~ Sir Isaac Newton

CASE 4

A 75-year-old woman resides in assisted living. While walking to the bathroom, she tripped and fell to the ground. She did not hit her head, her vitals are stable, and her mental state remains at baseline. She complains of pain in the right shoulder but has good ROM with only a contusion on the proximal right upper arm. The ALF nurse now calls you, the attending physician, while you are rounding at the hospital, to ask whether the patient should be sent to the emergency department for evaluation or not. What do you do?

A. Give the order to send the patient to the emergency department right away.

B. Tell the nurse that you will see the patient tomorrow when you round there.

C. Have the nurse call EMS to evaluate the patient according to objective criteria and then to call you if there are questions.

D. Ask the nurse to call another doctor to make that decision.

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For author affiliations, see end of text.
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Annals of Internal Medicine

ORIGINAL RESEARCH

Improving Decisions About Transport to the Emergency Department for Assisted Living Residents Who Fall

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INTRODUCTION

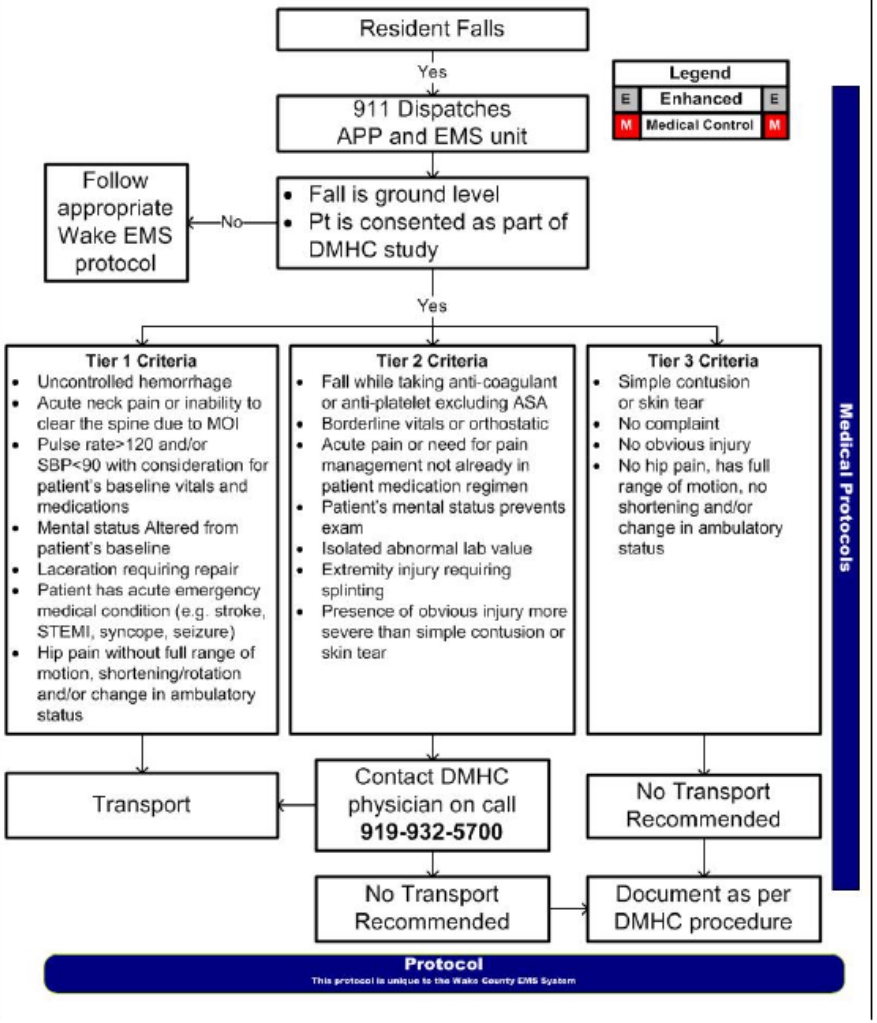
- Unintentional falls are the #1 cause of non-fatal injury in those age ≥ 65 treated in U.S. emergency departments
- Most don't require admission – 70% are discharged from the emergency department

- Some assisted living facilities have arbitrary policies that patients who suffer a fall, regardless of circumstance or injury, be transferred immediately to an emergency department.

- Wake County, NC – 1 physician group, 1 EMS for all 22 ALFs in the county created a protocol for EMS to use to determine need/appropriateness of transport to the emergency department versus treatment in the facility and follow-up evaluation by the attending physician within 18 hours
- Prospective study utilizing protocol
- Three Tiers: 1 – immediate transport to emergency department, 3 – manage in facility, 2 – discuss with attending physician

- Primary endpoint: time-sensitive condition – wound requiring repair, any fracture, admission to ICU, need for OR or cardiac catheterization, death from any cause within 72 hours of fall.

Doctors Making House Calls
Falls in Assisted Living



Tier 1 Criteria

- Uncontrolled hemorrhage
- Acute neck pain or inability to clear the spine due to MOI
- Pulse rate>120 and/or SBP<90 with consideration for patient's baseline vitals and medications
- Mental status Altered from patient's baseline
- Laceration requiring repair
- Patient has acute emergency medical condition (e.g. stroke, STEMI, syncope, seizure)
- Hip pain without full range of motion, shortening/rotation and/or change in ambulatory status

Tier 2 Criteria

- Fall while taking anti-coagulant or anti-platelet excluding ASA
- Borderline vitals or orthostatic
- Acute pain or need for pain management not already in patient medication regimen
- Patient's mental status prevents exam
- Isolated abnormal lab value
- Extremity injury requiring splinting
- Presence of obvious injury more severe than simple contusion or skin tear

Tier 3 Criteria

- Simple contusion or skin tear
- No complaint
- No obvious injury
- No hip pain, has full range of motion, no shortening and/or change in ambulatory status

VARIABLE FIELD	RESPONSE
Patient Identifier Number	XXXXX
Patient Written Consent	Yes / No
Ground level Fall	Yes / No
Uncontrolled hemorrhage	Yes / No
Acute neck pain or inability to clear the spine due to MOI	Yes / No
Pulse rate>120 and/or SBP<90	Yes / No
Altered mental status from baseline	Yes / No
Laceration requiring repair	Yes / No
Patient has acute emergency medical condition	Yes / No
Hip pain w/o full ROM change in ambulatory status	Yes / No
Fall while taking anti-coagulant or anti-platelet excluding ASA	Yes / No
Borderline vitals or orthostatic	Yes / No
Acute pain/need for pain management not in patient med regimen	Yes / No
Patient's mental status prevents exam	Yes / No
Isolated abnormal lab value	Yes / No
Extremity injury requiring splinting	Yes / No
Presence of injury more severe than simple contusion/skin tear	Yes / No
Simple contusion or skin tear	Yes / No
No complaint	Yes / No
No obvious injury	Yes / No
No hip pain/full ROM/no shortening/change in ambulatory status	Yes / No
PCP Contacted	Yes / No
PCP Name	Dr. XXXXX
Follow-up Scheduled	Yes / No
Date/Time for Follow up	MM/DD/YY TIME
Note entered into PCP system	Yes/No
Patient Transported	Yes, Tier 1 Yes, PCP Recommended Yes, Patient Request No, Not Required No, Patient Refused
If Transported to which Hospital	XXXXX

Table 2. Outcomes Stratified by Protocol Recommendation and Actual Transport

Outcome	Fall Encounters (n = 840)	Protocol Recommendation		Actual Transport	
		Transport (n = 287)	No Transport (n = 553)	Yes (n = 299)	No (n = 541)
Time-sensitive conditions, *n (%)**	149 (17.7)	138 (48.1)	11 (2.0)	136 (45.5)	13 (2.4)
Catheterization laboratory	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Operating room	7 (0.8)	5 (1.7)	2 (0.4)	6 (2.0)	1 (0.2)
ICU admission	5 (0.6)	5 (1.7)	0 (0)	5 (1.7)	0 (0)
72-h mortality	3 (0.4)	2 (0.7)	1 (0.2)	2 (0.7)	1 (0.2)
Wound repair	70 (8.3)	69 (24.0)	1 (0.2)	67 (22.4)	3 (0.6)
Fracture	79 (9.4)	70 (24.4)	9 (1.6)	70 (23.4)	9 (1.7)
Successfully managed onsite†	7 (0.8)	4 (1.4)	3 (0.5)	NA	7 (1.3)
Other outcomes					
Hospitalized, *n (%)*	76 (9.0)	72 (25.1)	4 (0.7)	72 (24.1)	4 (0.7)‡
Median hospital stay (IQR), *d*	4 (3–6)	4 (3–6)	3 (2–5)	4 (3–6)	4 (2–7)
Median follow-up interval (IQR), *h*§	10 (2–15)	6 (1–14)	10 (2–15)	NA	10 (2–15)
Follow-up delay >18 h, *n (%)*‖	25 (3.0)	0 (0)	25 (4.5)	NA	25 (4.6)

ICU = intensive care unit; IQR = interquartile range; NA = not applicable.
* Patients may have met criteria for >1 outcome component.
† Defined as fracture or wound repair with follow-up within 18 h that did not require a subsequent emergency department visit.
‡ Only 1 nontransported patient subsequently hospitalized was not otherwise classified as having a time-sensitive condition.
§ Missing for 10 nontransported falls (including 2 patients who missed their follow-up appointment because they had other appointments and 1 who declined follow-up).
‖ Missing for 3 patients (excluding those who missed or declined their follow-up appointment).

BOTTOM LINE

- In this study, transports from ALF to ED were cut 62.9% with 98-99% of non-transported patients receiving appropriate care.

- Policy by the National Association of EMS Physicians states that unnecessary transports to ED can be avoided by allowing EMS providers and physicians to triage patients appropriately. However, studies on this conflict partly because there is no objective criteria available.

- **Use of objective criteria such as this protocol may cut down on unnecessary transfers from subacute facilities to EDs thereby reducing unnecessary costs, iatrogenic complications, nosocomial infections, and burden on physicians and systems.**

CASE 5

A 60-year-old non-African-American woman with history of diabetes mellitus type 2 on metformin and insulin (A1c 8.1%), hypertension, hyperlipidemia, obesity (BMI 35 kg/m^2), CKD stage 3 (at baseline) with creatinine 2.0 mg/dL and eGFR of 27.0 ml/min/1.73 m^2 (by MDRD) presents to the emergency department with 5 days of diffuse abdominal pain with now-resolved diarrhea, nausea without vomiting, loss of appetite, and no fever. Because of the hesitancy of the ED physician to do a contrast-enhanced CT of her abdomen, she is admitted to you. You order NPO status and start IV fluids but wonder if there is really an evidence-based reason not to do contrast-enhanced CT in a CKD 3 patient. You know there has been controversy on this in the past but wonder if more recent studies clarify this issue, particularly considering the newer, non-ionic agents now mostly used in radiology departments. What should you do?

A. *Do not give contrast with the CT because it will cause AKI, possible CIN, and/or risk need for dialysis.*
B. *Give non-ionic contrast (iohexol or iodixanol) with IV fluid hydration because there is no increased risk.*
C. *Consult nephrology to decide.*
D. *Do no CT scan despite the patient not improving with conservative management.*

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Risk of Acute Kidney Injury After Intravenous Contrast Media Administration

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Is Intravenous Administration of Iodixanol Associated with Increased Risk of Acute Kidney Injury, Dialysis, or Mortality? A Propensity Score–adjusted Study[1]

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INTRODUCTION

- There is a perception that IV contrast media in CT scans will cause AKI, CIN, or lead to dialysis. However, recent studies put this obsolete notion into question. They show that the rate of these complications is no different between those who receive and those who don't receive IV contrast in those with baseline CKD 3-5.
- Currently, two non-ionic, iodinated, contrast media are most often used for CT scans: iohexanol (Omnipaque 350) and iodixanol (Visipaque 320). The old ionic contrast agents are rarely used due to multiple other side effect risks.
- Two studies in 2017 looked at this: one in Radiology and the other in Annals of Emergency Medicine
- Radiology: Did the rate of AKI, emergent dialysis, or short-term mortality increase in patients who got CT scans with iodixanol than those who did not get any contrast enhancement?
- Annals of EM: Did either iohexanol or iodixanol increase the risk of AKI, new CKD, dialysis, or renal transplant at 6 months when compared to either non-contrast-enhanced CTs and those without any CT scans (2 controls)?
- Both: retrospective studies. No past RCTs because it was considered unethical to give renal patients IV contrast despite conflicting data.

Table 4

CKD Stage 1–2 Cohort Outcomes after Propensity Score Analysis

Parameter	IOCM Group	Noncontrast Group	Odds Ratio*	*P* Value
Unadjusted	637	901		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	57 (9.0)	83 (9.2)	0.97 (0.68, 1.38)	.86
≥0.5 mg/dL SCr	28 (4.4)	37 (4.1)	1.07 (0.65, 1.77)	.78
Dialysis within 30 days after scanning	6 (0.9)	4 (0.4)	2.13 (0.60, 7.59)	.23
Death within 30 days after scanning	52 (8.2)	59 (6.6)	1.27 (0.86, 1.87)	.23
Stratified	637	901		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	…	…	0.78 (0.52, 1.18)	.28
≥0.5 mg/dL SCr	…	…	0.76 (0.42, 1.37)	.45
Dialysis within 30 days after scanning	…	…	1.75 (0.45, 6.76)	.63
Death within 30 days after scanning	…	…	1.40 (0.91, 2.15)	.13
1:1 Matched	476	476		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	37 (7.8)	38 (10)	0.74 (0.46, 1.17)	.20
≥0.5 mg/dL SCr	18 (3.8)	22 (4.6)	0.81 (0.43, 1.54)	.52
Dialysis within 30 days after scanning	4 (0.8)	2 (0.4)	2.00 (0.37, 10.9)	.42
Death within 30 days after scanning	39 (8.2)	32 (6.7)	1.24 (0.76, 2.03)	.39

Note.—Unless otherwise specified, data are numbers of patients, with percentages in parentheses.

* Odds in IOCM group versus noncontrast group. Data in parentheses are 95% confidence intervals.

Table 5

CKD Stage 3 Cohort Outcomes after Propensity Score Analysis

Parameter	IOCM Group	Noncontrast Group	Odds Ratio*	*P* Value
Unadjusted	1234	1665		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	185 (15)	284 (17)	0.86 (0.70, 1.05)	.14
≥0.5 mg/dL SCr	87 (7.1)	133 (8.0)	0.87 (0.66, 1.16)	.35
Dialysis within 30 days after scanning	7 (0.6)	25 (1.5)	0.37 (0.16, 0.87)	.0173
Death within 30 days after scanning	119 (9.6)	208 (12)	0.75 (0.59, 0.95)	.0165
Stratified	1234	1665		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	…	…	0.84 (0.67, 1.06)	.16
≥0.5 mg/dL SCr	…	…	0.89 (0.65, 1.23)	.53
Dialysis within 30 days after scanning	…	…	0.86 (0.32, 2.26)	.94
Death within 30 days after scanning	…	…	1.10 (0.85, 1.44)	.50
1:1 Matched	850	850		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	129 (15)	150 (18)	0.83 (0.64, 1.08)	.16
≥0.5 mg/dL SCr	61 (7.2)	67 (7.9)	0.91 (0.64, 1.29)	.59
Dialysis within 30 days after scanning	7 (0.8)	5 (0.6)	1.40 (0.44, 4.42)	.57
Death within 30 days after scanning	99 (12)	101 (12)	0.98 (0.73, 1.31)	.88

Note.—Unless otherwise specified, data are numbers of patients, with percentages in parentheses.

* Odds in IOCM group versus noncontrast group. Data in parentheses are 95% confidence intervals.

Table 6

CKD Stage 4–5 Cohort Outcomes after Propensity Score Analysis

Parameter	IOCM Group	Noncontrast Group	Odds Ratio*	*P* Value
Unadjusted	90	1231		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	14 (16)	347 (28)	0.47 (0.26, 0.84)	.0094
≥0.5 mg/dL SCr	9 (10)	264 (21)	0.41 (0.20, 0.82)	.0096
Dialysis within 30 days after scanning	1 (1.1)	63 (5.1)	0.21 (0.03, 1.52)	.09
Death within 30 days after scanning	19 (21)	195 (16)	1.42 (0.84, 2.41)	.19
Stratified	90	1231		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	…	…	0.51 (0.28, 0.93)	.0362
≥0.5 mg/dL SCr	…	…	0.40 (0.19, 0.83)	.0157
Dialysis within 30 days after scanning	…	…	0.80 (0.10, 6.18)	.83
Death within 30 days after scanning	…	…	2.01 (1.11, 3.64)	.0311
1:1 Matched	76	198		
PC-AKI				
≥0.3 mg/dL or ≥ 50% SCr	13 (17)	49 (25)	0.88 (0.47, 1.65)	.69
≥0.5 mg/dL SCr	8 (11)	42 (21)	0.81 (0.38, 1.70)	.58
Dialysis within 30 days after scanning	1 (1.3)	4 (2.0)	0.74 (0.10, 5.26)	.76
Death within 30 days after scanning	16 (21)	24 (12)	1.15 (0.63, 2.09)	.65

Note.—Unless otherwise specified, data are numbers of patients, with percentages in parentheses.

* Odds in IOCM group versus noncontrast group. Data in parentheses are 95% confidence intervals.

Table 3. Risk of acute kidney injury after intravenous contrast administration with subgroup analysis stratified by initial estimated glomerular filtration rate.

Control 1 Control 2

eGFR subgroup, mL/min per 1.73 m^2	CECT	Unenhanced CT	No CT	Contrast vs No Contrast	CECT vs Unenhanced CT*	Contrast vs No Contrast (Propensity-Score Matched)†	CECT vs Unenhanced CT (Propensity-Score Matched)*
	Rate of AKI by CIN Criteria (%)‡			ORs of AKI by CIN Criteria (95% CI)‡			
Overall	766/7,201 (10.6)	559/5,499 (10.2)	569/5,234 (10.9)	1.01 (0.92–1.12)	1.05 (0.94–1.18)	0.99 (0.98–1.00)	1.00 (0.98–1.01)
≥90	510/4,127 (12.4)	261/2,039 (12.8)	304/2,360 (12.9)	0.96 (0.84–1.09)	0.96 (0.82–1.13)	1.00 (0.98–1.02)	1.00 (0.98–1.02)
60–89	179/2,176 (8.2)	111/1,337 (8.3)	133/1,374 (9.7)	0.91 (0.74–1.11)	0.99 (0.77–1.27)	1.01 (0.99–1.03)	1.01 (0.98–1.03)
45–59	59/575 (10.3)	68/714 (9.5)	59/589 (10.0)	1.06 (0.76–1.47)	1.09 (0.75–1.57)	1.02 (0.99–1.06)	1.02 (0.98–1.06)
30–44	12/241 (5.0)	57/768 (7.4)	44/550 (8.0)	0.63 (0.34–1.17)	0.65 (0.34–1.24)	1.00 (0.95–1.04)	0.96 (0.90–1.01)
15–29	6/78 (7.7)	53/599 (8.8)	27/345 (7.8)	0.90 (0.38–2.13)	0.86 (0.36–2.07)	0.99 (0.91–1.07)	1.03 (0.95–1.11)
<15	0/4	9/42 (21.4)	2/16 (12.5)				
	Rate of AKI by AKIN/KDIGO Criteria (%)§			ORs of AKI by AKIN/KDIGO Criteria§ (95% CI)			
Overall	488/7,201 (6.8)	488/5,499 (8.9)	426/5,234 (8.1)	0.78 (0.70–0.88)	0.75 (0.66–0.85)	1.00 (0.99–1.01)	1.00 (0.99–1.01)
≥90	225/4,127 (5.5)	115/2,039 (5.6)	115/2,360 (4.9)	1.05 (0.87–1.26)	0.96 (0.77–1.22)	1.00 (0.98–1.01)	1.00 (0.99–1.02)
60–89	161/2,176 (7.4)	98/1,337 (7.3)	112/1,374 (8.2)	0.95 (0.77–1.18)	1.01 (0.78–1.31)	1.00 (0.98–1.02)	1.01 (0.98–1.03)
45–59	71/575 (12.3)	88/714 (12.3)	73/589 (12.4)	1.00 (0.74–1.35)	1.00 (0.72–1.40)	1.02 (0.97–1.06)	1.03 (0.99–1.08)
30–44	22/241 (9.1)	91/768 (11.8)	73/550 (13.3)	0.71 (0.44–1.13)	0.75 (0.46–1.22)	1.01 (0.96–1.06)	0.97 (0.91–1.04)
15–29	8/78 (10.3)	86/599 (14.4)	50/345 (14.5)	0.68 (0.32–1.44)	0.68 (0.32–1.47)	0.97 (0.89–1.07)	0.96 (0.86–1.08)
<15	1/4 (25.0)	10/42 (23.8)	3/16 (18.8)	1.15 (0.11–12.05)	1.07 (0.10–11.43)		

*Absolute increase ≥0.5 mg/dL or ≥25% increase over baseline SCr at 48 to 72 hours.
†OR of developing AKI in patients who underwent CECT versus patients who underwent CT without contrast enhancement.
‡OR of developing AKI in patients who underwent CECT versus all patients who did not receive contrast.
§Absolute increase ≥0.3 mg/dL or ≥1.5 times increase over baseline SCr at 48 to 72 hours.

BOTTOM LINE

- Rates of AKI, dialysis, and mortality were not significantly different in those who got iodixanol contrast compared to those who got no contrast in all CKD groups. This is despite the fact that those needing contrast-enhanced CT scans had higher rates of diabetes, hypertension, CKD, and use of nephrotoxic medications like vancomycin than those needing only non-contrast-enhanced CT scans. This included correcting for pre-scan IV fluid administration for those at lower GFRs.

- **Thus, for patients for whom we think have the highest risk of post-contrast AKI, IV iodixanol was not an independent risk factor for AKI, dialysis, or mortality.**

- For all contrast media, the rates of AKI were similar among all groups (including 2 controls).

- **Therefore, IV contrast was not associated with increased frequency of AKI at all stages, even after correcting for baseline renal function and whether direct or propensity-matching comparisons were made. So, the concern for contrast-precipitated renal dysfunction as a result of contrast needs to reconsidered.**

If we knew what is was we were doing,

it would not be called research, would it?

- Albert Einstein

CASE 6

A 70-year-old man with AML who just completed his 3rd round of consolidation chemotherapy presents to the emergency department with weakness, fatigue, and diffuse ecchymoses. He is pancytopenic due to his chemotherapy. His ANC is 300/mm^3 but has no signs of acute infection. He is admitted for transfusion. When writing the admission orders, the admitting physician orders a neutropenic diet. Was this appropriate and based on actual evidence?

A. *The neutropenic diet was appropriate because he is neutropenic with ANC < 500/mm^3 and he is at increased risk of infection from raw fruits/vegetables.*
B. *The neutropenic diet was appropriate because he is at increased risk of mucositis which requires a neutropenic diet to avoid infectious complications.*
C. *The neutropenic diet was NOT appropriate because proper food handling prevents any increased risk of infection for such patients. Furthermore, the patient who is malnourished from his condition is now being restricted on necessary nutrients.*
D. *Consult the oncologist.*

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ONLINE FIRST MAY 30, 2018 – *CHOOSING WISELY*®: THINGS WE DO FOR NO REASON

Things We Do For No Reason: Neutropenic Diet

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ANALYSIS

- A neutropenic diet generally is one that limits intake of fresh fruits, vegetables, raw or undercooked meat and fish, and cheese from unpasteurized milk. But there are no standardized guidelines on this so there is wide variation among hospitals in the U.S. and the rest of the world.

- The rationale is to limit bacteria introduced to the gut. *Enterobacter, Pseudomonas*, and *Klebsiella* have been found on food. Cooking should destroy this. Mucositis often accompanies neutropenia and allows an additional entry point for bacteria directly to the blood. Thus, cooking food should theoretically decrease this infection risk.

- But it doesn't!
  - One study of AML and MDS patients showed no difference in infection rates between those on cooked-foods diet and raw fruits & vegetables diet (29% in cooked, 35% in raw, p=0.6) and no difference in mortality.
  - In pediatric patients, when comparing neutropenic diets vs diets following the tenets of the FDA Safe Food Handling guidelines, there was no difference in infection rates (35 vs 33%, p=0.78)
  - In a meta-analysis of trials on SCT patients, the hazard ratio for any infection and fever was higher in those on neutropenic diets (RR 1.18, p=0.07)
  - In a Dutch prospective RCT looking at gut flora, there was no difference in presence of pathogenic bacteria in the gut or infection rates between those on neutropenic diets and standard diets.

BOTTOM LINE

- **There is no benefit of the neutropenic diet in any clinical scenario or patient population.**

- Follow the FDA Safe Handling guidelines in all clinical settings:
  - Properly wash fresh fruits and vegetables
  - Clean lids of canned foods before opening them
  - Separate raw meats from other foods
  - Cook to the right temperature (e.g. cook eggs until yolk and whites are firm)
  - Refrigerate food
- Same guidelines recommended by American Dietetic Association (RDs)

SUMMARY

- Your patient with suspected AMI and $P_aO_2 \geq 90\%$ does not need and will not benefit from supplemental oxygen. In fact, it may cause harm.
- All patients with suspected ischemic stroke (mild or otherwise) should have dysphagia screening (formal or informal/bedside) in the hospital to reduce risk of pneumonia, disability, and death.
- E-cigarettes/vaping is not a reasonable approach to tobacco cessation post-discharge, regardless of adjunctive use with other proven cessation aids. Furthermore, any flavored, e-cigarette use increases endothelial dysfunction and, likely, cardiovascular toxicity.
- Utilization of an objective set of validated criteria may significantly cut down on the number of unnecessary transfers from assisted living facilities to emergency departments from falls.
- Non-ionic IV contrast for CT scans has no effect on risk of AKI, dialysis, or mortality in patients with CKD. Presence of CKD should not preclude contrast-enhanced CT scans when otherwise medically indicated.
- Stop ordering neutropenic diets. It's pointless and harmful.

Questions?

Thank You.

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But nothing is more estimable than a physician who, having studied nature from his youth, knows the properties of the human body, the diseases which assail it, the remedies which will benefit it, exercises his art with caution, and pays equal attention to the rich and the poor.

- Voltaire

MOC QUESTION 1

A 61-year-old male presents to the emergency department with sudden left-sided chest pressure radiating to the left side of the neck/jaw and to the left shoulder which started 90 min prior while sitting at his desk at work. He has obesity, diabetes mellitus type 2, hypertension, and hyperlipidemia. He takes insulin, an ACE-inhibitor, furosemide, and a statin. His vitals are notable for pulse of 110, blood pressure of 150/95, and oxygen saturation of 90%. Lungs are clear. Troponin is elevated to 1.5 ng/mL and his EKG shows marginal (1 mm) elevation of ST segments in the lateral leads. Before going to the cardiac catheterization lab, you place admission orders. At this time, does he require oxygen?

A. Yes, because he is below the standard 92% and he needs oxygenation for reperfusion.
B. Yes, because he is likely to desaturate even with a suspected lateral lesion.
C. No, it may actually cause harm due to increased oxidation. Ongoing monitoring of oxygen saturation is warranted, however.
D. No, he has adequate oxygenation because of his age wherein the minimum oxygenation is 88%.

ANSWER

C. No, it may actually cause harm due to increased oxidation. Ongoing monitoring of oxygen saturation is warranted, however.

ANSWER EXPLANATION

Patients with suspected acute myocardial infarction without hypoxemia ($P_aO_2 \geq 90\%$) did not benefit from supplemental oxygen when compared to room air with respect to all-cause mortality at 1 year or rehospitalization for MI. There is no need for supplemental oxygenation in this patient with clear lungs and no evidence of respiratory compromise.

1. **Hofmann, Robin, *et al*. Oxygen therapy in suspected acute myocardial infarction. *NEJM* 2017; 377 (13): 1240-1249.**

MOC QUESTION 2

A 50-year-old non-African-American man with history of diabetes mellitus type, hypertension, hyperlipidemia, obesity, COPD not in acute exacerbation, and CKD stage 4 (at baseline) with creatinine 2.5 mg/dL and eGFR of 29.2 ml/min/1.73 m^2 (by MDRD) presents with sudden dyspnea. He is tachycardic at 105 and oxygen saturation is 87% on room air. His d-dimer is elevated to 1.8 mcg/mL. He is generally sedentary and has not traveled by airplane or long car/bus ride in the last week. He has no previous thromboembolic history. Because of his symptoms, history, and labs, you order a CT angiogram of the chest which requires IV contrast. The emergency physician and radiologist push back on this because of his creatinine and GFR. What do you do?

A. Order the CT angiogram with contrast because it's necessary to rule out PE with a Well's score indicating moderate risk. The risk of AKI, dialysis, or mortality is not likely increased due to the contrast.
B. Order the CT angiogram because you're the attending physician.
C. Order a non-contrast CT scan of the chest to avoid contrast-induced side effects.
D. Order a ventilation-perfusion (V/Q) scan instead even though it will not happen until tomorrow and may not yield definitive results because of the history of COPD.

ANSWER

A. Order the CT angiogram with contrast because it's necessary to rule out PE with a Well's score indicating moderate risk. The risk of AKI, dialysis, or mortality is not likely increased due to the contrast.

ANSWER EXPLANATION

IV contrast was not associated with increased frequency of AKI, dialysis, or death at all stages of CKD. In this patient, the risk of not diagnosing a PE and/or cardiac strain outweighed any perceived but unsubstantiated increased risk of contrast-induced nephropathy.

1. McDonald, Jennifer, et al. Is intravenous administration of iodixanol associated with increased risk of acute injury, dialysis, or mortality? A propensity score-adjusted study. Radiology 2017; 285 (2): 414-424.
2. Hinson, Jeremiah, et al. Risk of acute kidney injury after intravenous contrast media administration. Annals of Emergency Medicine 2017; 69 (5): 577-586.