Tapering Opioids

Minnesota ACP Internal Medicine Meeting

October 11, 2019

Anne Pylkas, MD
Internal Medicine and Addiction Medicine
HealthPartners Pain Program
Sage Prairie Recovery

- No disclosures
- I will use some brand names and off label indications
  - Buprenorphine/naloxone for chronic pain syndromes

Outline

- Why should we taper?
- Who should we taper?
- When should we taper?
- Can we tell if someone is addicted?
- How fast should we taper?
- Which opioid should we use to taper?
- What about the pain?

Why should we taper?

- 2018 JAMA, Krebs et al, VA Study, SPACE Trial
  - 240 pts, chronic back or knee pain
  - Opioid vs non opioid
  - No improvement in pain or function over 12 mo
- 2017 Ann Int Med, Krebs et al, Discontinuation review
  - 67 studies, 11 RCTs, 56 Obs, 8 interventions including interdisp programs, bup, behavioral
  - Most study quality was low
  - Improvement reported in:
    - Pain severity (8/8 fair qual)
    - Function (5/5 fair qual)
    - QOL (3/3 fair qual)

Why should we taper?

- 2019, J Pain Research, Desai et al, Effect on QOL, HC utilization
  - 2011-2015, Retrospective review, CBP, n= 5,203
  - Opioids only (49%) vs NSAIDs only (28%) vs both (23%)
  - Op Only group had lower QOL scores, greater utilization of health services
- 2015, Ann Int Med, Chou et al, Risks of Opioid Therapy for CP
  - Annual incidence overdose increased
  - 256 ODs per 100 000 person-years vs 36 ODs per 100 000 person-years
  - Higher doses associated with increased risk
    - MED 1 to 19 mg/d, 1x
    - MED of 20 to 49 mg/d, 1.44x
    - MED $\geq$ 100 mg/d, 8.87x

Who should we taper?

- **Definite YES:** High risk, low benefit
  - >65 yo
  - ?100 MME (>50mg?)
  - Concurrent addiction to alcohol, opioids, sedative, stimulants, ?THC
  - Aberrant behaviors – is it addiction?
  - Concurrent sedative rx
  - Worsens psychiatric or medical issues, including falls
- **Probably YES:** Moderate risk, low benefit
  - Non-palliative
  - No improvement despite escalating dose
  - Non compliance with adjunctive modalities
- **Maybe NO:** Low risk, moderate benefit
  - Palliative/End of life
  - Low dose

When should we taper?

- When you figure out that the risks outweigh the benefits
- There is NO WRONG TIME.
  - When you inherit them
  - After the first inconsistent urine drug screen
  - When the dose just seems to be escalating with no benefit
  - When they overdose
  - When the psychiatrist gives them a benzo
  - When they fall right after a dose change
  - When they are in the ED with a BAC 0.10
  - When they just won't go to PT
  - When you find out that they are selling
  - When mom calls and says- I think they are addicted
  - When they just won't stop smoking pot

Can we tell if someone is addicted to opioids?

TABLE 4.4 *DSM-5* Criteria for Substance Use Disorder

A *mild* substance use disorder is diagnosed if 3 of the following criteria are met. People meeting 4 or 5 criteria are classified as having *moderate* substance use disorder, and *severe* substance use disorder is diagnosed in cases where 6 or more of the criteria are met.

1. Taking the substance in larger amounts or for longer than you meant to
2. Wanting to cut down or stop using the substance but not managing to
3. Spending a lot of time getting, using, or recovering from use of the substance
4. Cravings and urges to use the substance
5. Not managing to do what you should at work, home, or school because of substance use
6. Continuing to use, even when it causes problems in relationships
7. Giving up important social, occupational, or recreational activities because of substance use
8. Using the substance again and again, even when it puts you in danger
9. Continuing to use, even when you know you have a physical or psychological problem that could have been caused or made worse by the substance
10. Needing more of the substance to get the effect that you want (tolerance)
11. Development of withdrawal symptoms, which can be relieved by taking more of the substance

Source: American Psychiatric Association, 2013.

***THE MIND'S MACHINE 2e*, Table 4.4**

- Addiction = Substance use disorder
- Substance Dependence = Withdrawal/physical dependence

Can we tell if someone is addicted to opioids?

- 2018 Review, Martel et al, Substance-related disorders: A review of prevalence and correlates among patients with chronic pain
  - Higher doses
    - Higher risk OD, but not higher risk for addiction
  - Males, younger, personal or FH SUD
  - Weak association between pain “level” and misuse
  - Psychological factors
    - Negative affect is the strongest indicator
    - High levels anxiety
    - Catastrophizing
    - Personality disorders

How fast should we taper?

- Risk → Timeline of taper
  - Higher risk → faster
  - Lower risk → slower
- The risk can be mitigated with buprenorphine products, so the length of the taper can be extended…

Exit Strategy	Length	Risk	Example
Immediate	ASAP	HIGH/DANGER	Opioid addiction, sedative addiction, alcohol addition, and no ACUTE pain
Short term	10-30 days	HIGH	Multiple aberrant behaviors, but no known addiction, medical/psychiatric risk, other active addictions
Medium Term	1-6 months	Medium	Aberrant behaviors, no known addiction, less severe med/psych risks, frequent falls, cognitive issues, dose >100MEDS (get down to less and then slow)
Long term	1-2 years	Low	Age >65, <100 MEDs, low med/psych risks, minor CAD, chem cope, insomnia, little benefit, h/o addiction

Which opioid should we use?

- Considerations:
  - Safety
  - Age/Co-Morbid diagnoses
  - Cost
  - Diagnosis
    - OUD vs No OUD

Which opioid should we use?

- Short vs long acting
  - I always DC all short acting
    - Reinforcing
    - Cycles of withdrawal
  - Schedule vs prn
    - Prn reinforces pain:pill behavior
- Buprenorphine product vs full opioid agonist
  - Safety #1 consideration
    - Aberrant behaviors but not OUD
    - OUD
    - Age/Comorbid dx (OSA, COPD, etc)

Which opioid should we use?

- 1) Long acting, full agonist
  - Profile
    - Young
    - Healthy, no co morbid medical issues
    - Medium or low risk, None/few aberrant behaviors
    - Lower cost, in general than bup products
    - NO OUD diagnosis
  - Choice:
    - Extended release morphine- only lasts 6-8h, dose TID
    - Extended release oxycodone- only lasts 8h, dose TID
    - Methadone- extra caution, dose BID
    - Others: ER hydrocodone, tapentadol, tramadol, fentanyl patches
  - Procedure:
    - 24h dose requirement convert to only one long acting opioid
    - Initially decrease by 10-25%
    - DC all short acting/prns
    - Decrease by 10% q1-3 months

Which opioid should we use?

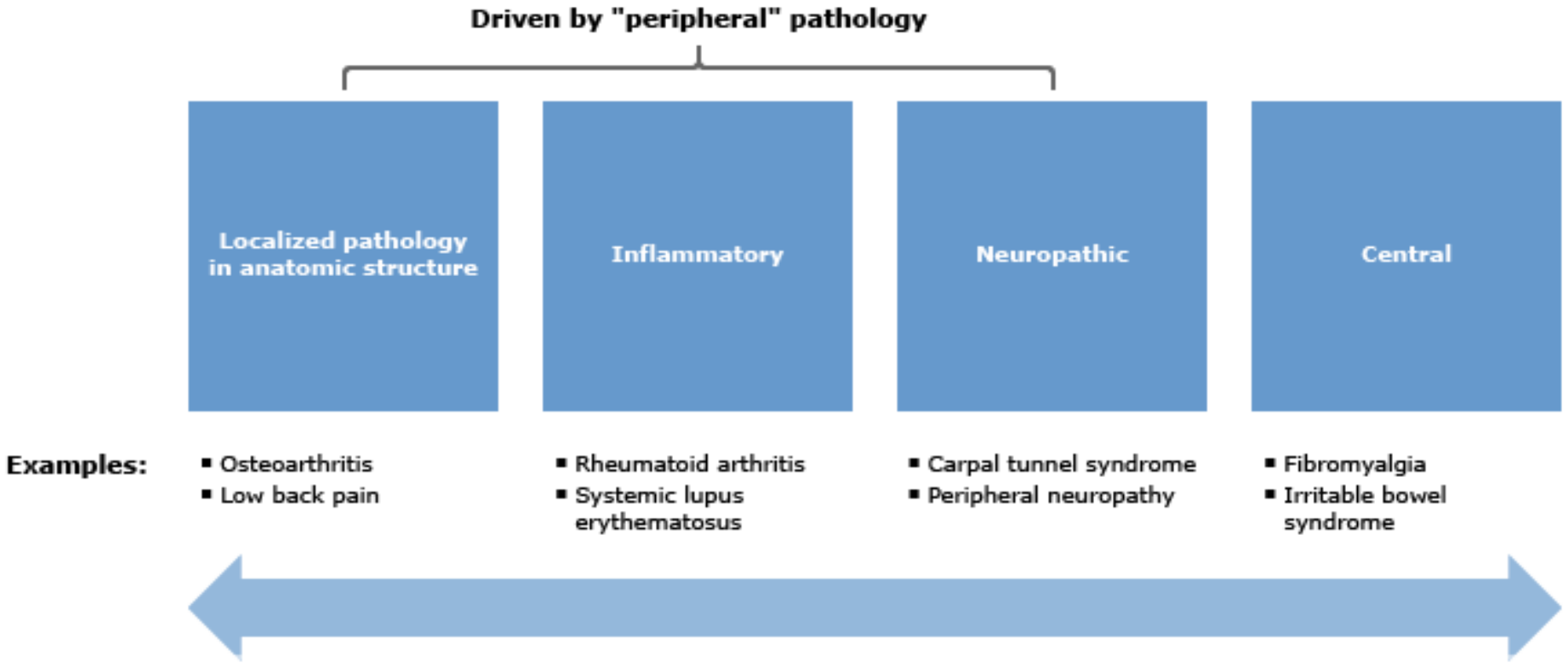
- 2) Partial agonist/Buprenorphine
  - Profile
    - Medium or high risk and OUD
    - Older, more co morbid dx (OSA, COPD, etc)
    - Higher cost, more PAs
  - Choice
    - Buccal Buprenorphine (Belbuca®)-
    - Transdermal Buprenorphine (Butrans®)-
    - Bup/Nal –
      - Generic Films
      - Generic Tabs
      - Suboxone Films®
      - Suboxone Tabs ®
      - Zubsolv Tabs®
      - Bunavail buccal Films®
    - Bup only

Name	FDA appr Dx	Dose Strengths	TDD Max
Buccal Bup (Belbuca®)	Pain	75-900mcg films	3.6mg
Transderm Bup (Butrans®)	Pain	5mcg/h-20mcg/h	0.48mg
SL Bup/Nal	OUD	2-8mg tabs	32mg
SL Bup	OUD	2-8mg tabs	32mg

Which opioid should we use?

- Partial agonist/buprenorphine
  - Procedure
    - Differs with product and dx
      - OUD: Induction as per protocol
      - Chronic pain
        - 24h dose requirement convert to only bup product (buccal or transdermal)
        - Initially decrease by 10-25%
        - DC all short acting/prns
        - Per package insert:
          - Buccal: Decrease to 30mg OME prior to starting
          - Transdermal: Taper current opioids to 30mg OME or less prior to starting
        - Experience: DC x 12-24h, no need for full withdrawal/full induction
        - Decrease by 10% q1-3 months

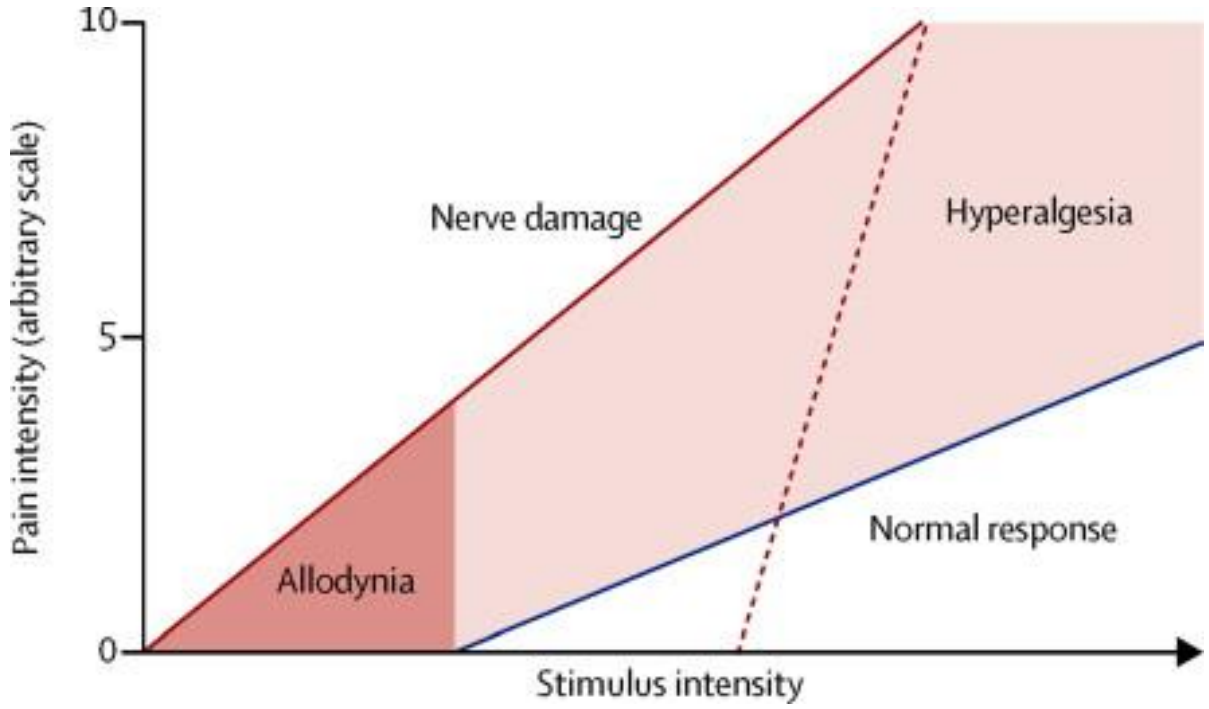
What about the pain?



General pain categories overlap with central pain a component in each
RA = Inflammatory synovitis, structural knee damage, pain response modified centrally

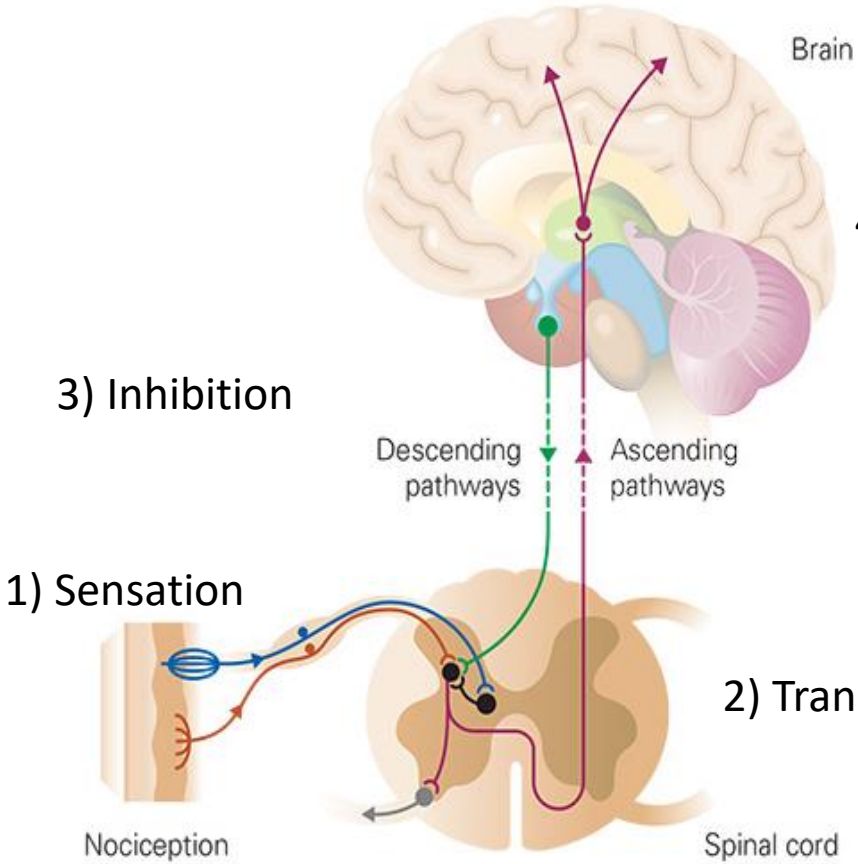
What about the pain?

- Central Sensitization:
  - Amplification of neural signaling in CNS
  - Allodynia and Hyperalgesia
- Coexisting symptoms
  - Fatigue
  - Sleep disturbances
  - Mood disturbances
  - Cognitive disturbances
  - Catastrophizing
  - Neuropathic symptoms



What about the pain?

- Chronification of pain
  - Changes occur in
    - 2) Transmission **(Going up)**
    - 3) Inhibition **(Coming down)**
    - 4) Interpretation **(What does it all mean?)**
      - Hyperactive Amygdala
      - Hypoactive Pre-Frontal Cortex
      - Mesolimbic reward center
        - Acute pain: Actives DA in mesolimbic DA reward center
        - Prolonged pain: Prolonged activation of DA in mesolimbic reward center
        - Decrease DA receptor availability in mesolimbic areas



These are the same neurobiological changes that occur in addictions from continued use of a substance!

https://www.change-pain.com/cms/cda/file/cp_com_content_pain_basics.jpg?fileID=310600089&cacheFix=14564959260000&__k=db9f24c77ea86cc78296d38ba1b4c126

What about the pain?

- Now lets give this CS patient some opioids
  - They already have an overstimulated amygdala, hypoactive prefrontal cortex and low mesolimbic DA
    - For a short period of time opioids “cure” these deficits
  - Over time they begin to reinforce these changes
    - But by this time, they are the cure and the affliction
  - Opioids also change transmission and inhibition:
    - Spinal dynorphin (k agonist) increases
    - Spinal glutamate/NMDA receptor activity increases

What about the pain?

- How do we reverse this in addiction (opioid use disorder)?
  - MAT= buprenorphine or methadone
  - Re-regulates the brain changes
    - Both very long acting
    - Limited tolerance
    - No dysregulation of HPA axis/cortisol
- How can we use this knowledge to help OIH/CS?
  - Bup and methadone can re-regulate the brain changes (same as in addiction)
  - They also can re-regulate transmission and inhibition
    - Buprenorphine is a κ-receptor antagonist and an NMDA antagonist
    - Methadone is a NMDA antagonist

What about the pain?

- LA opioids or bup products calm down the brain changes and the spinal cord changes
- Calm the hyperactive amygdala
  - EMDR, Somatic Experiencing, Somatosensory therapies, Hypnosis, Biofeedback, Yoga, Breathing, Acupuncture, Mindfulness, Meditation, Tai Chi, Qi Gong
  - Medications that decrease SNS activation: Propranolol, prazosin, clonidine
  - Medications that support serotonin system: SSRIs, duloxetine
  - Medications that support gaba system: Gabapentin, pregabalin, avoid benzos
- Retrain the hypoactive prefrontal cortex
  - CBT, DBT, learning from activities
- Give the mesolimbic DA pathways the ability to regenerate DA receptors
  - Time away from the offending agent/short acting
  - Support with natural reinforcers: nutrition, exercise, time outside/nature, family

Change the plan when stuff happens

- Overuse
  - Is this OUD?
  - Does the dx and therefore plan need to change?
  - Does this change the risk profile?
  - Does the product or taper length need to change?
- Overdose
  - CHANGE SOMETHING
- UDS: No prescribed meds in UDS, Un-Prescribed meds in UDS, Illicit drugs, Falsification
  - Is this SUD?
  - Does this change the risk profile?
  - Does the product or taper length need to change?
- Missed appts
  - No refills without appts
- Not following through with adjunctive therapies
  - Understand why, change plans if needed
  - Reinforce importance
- Flare pain
  - Be prepared to give advice and direct appropriately
- Flare anxiety, depression
  - Be prepared to treat!

Case:

- 68 year old female with chronic knee pain related to osteoarthritis and chronic back pain related to spinal stenosis, as well as depression and anxiety and COPD. She is on MS Contin 30mg BID and oxycodone 5mg QID (MME 80-90), here to see you to establish care. You inherited her from a partner that recently retired. She does not want to change anything. She has been on these medications for 14 years.
- She has not been to PT in 3 years, doesn't exercise. She quit smoking 5 years ago. Her anxiety is treated with lorazepam prn, takes it 1-3x per day, rx from psychiatrist, does not see a therapist. Hospitalization last year for fall, femur fracture. History of alcohol use disorder, but quit drinking 15 years ago.
- No UDS in 3 years, but today UDS shows: Opiates, oxycodone, benzos
- PMP shows refills on time, no providers other than previous PCP

Case

Question 1: Does she meet criteria for an opioid use disorder?

a) Yes
b) No

Question 2: Should she be tapered off opioids?

a) Yes
b) No

Question 3: Should a buprenorphine product be used to taper?

a) Yes
b) No

Question 4: How long should the taper take?

a) Immediately
b) 30 days
c) 6 months
d) 5 years

- Questions or references:

  Anne.M.Pylkas@healthpartners.com OR pylk0010@umn.edu

Supporting Women in Medicine

Anjali Bhagra MD FACP

Disclosures

- None
- Credits: Drs. Julia Files and Sharon Mulvagh and CWHHA

Learning Objectives

- To understand the role of gender in academics and leadership in medicine
- Learn approaches to establish and build networks to support women
- Recognize challenges/obstacles and ways to overcome

First generation gender bias (Overt)

Second Generation gender bias (Covert)

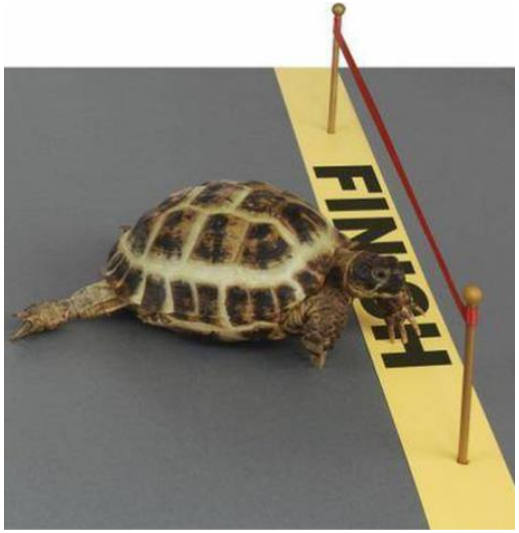
Second-generation gender bias refers to practices that may appear neutral or non-sexist, in that they apply to everyone, but which discriminate against women because they reflect the values of the men who created or developed the setting, usually a workplace

Elizabeth Blackwell MD 1821-1910

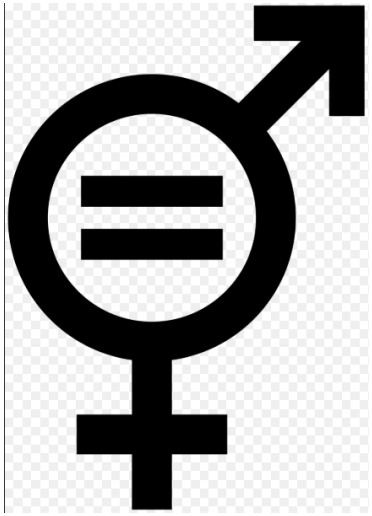
- First woman to graduate from US medical school first in class! 1849
- Inspired to pursue medicine by a dying friend who said her ordeal would have been better had she had a female physician.
- Rejected everywhere she applied
- Acceptance letter to Geneva College intended as a practical joke.
- Blackwell faced overt discrimination and obstacles in college:
  - professors forced her to sit separately at lectures
  - often excluded from labs
  - local townspeople shunned her as a “bad” woman for defying her gender role.

Women in Medicine

It has been 170 years since Elizabeth Blackwell graduated from medical school and we are STILL experiencing ***"firsts"*** for women.



…Between the no longer and the not yet



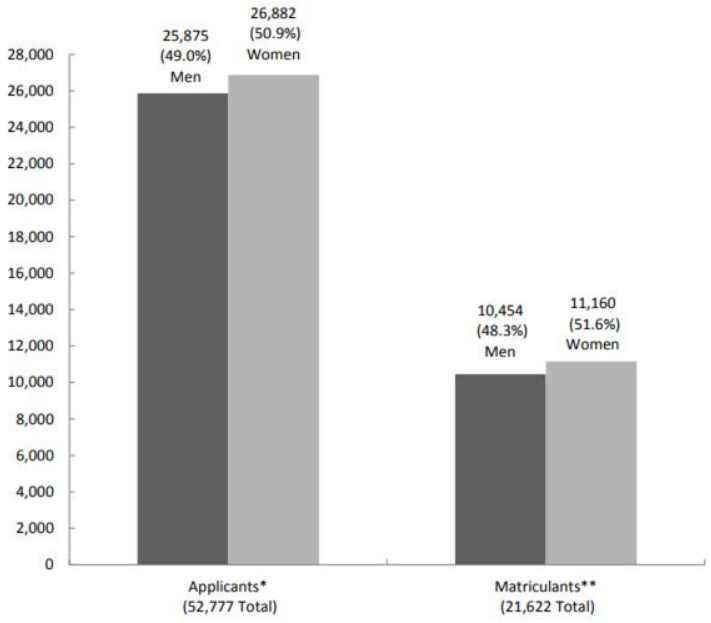
The story of Women in Medicine…

Historic first, AMA to have three consecutive female presidents

The photo features (L-R): Barbara L. McAneny, M.D., Patrice A. Harris, M.D., M.A., and Susan R. Bailey, M.D.

AAMC
Tomorrow's Doctors, Tomorrow's Cures®

Total Applicants and Matriculants to U.S. Medical Schools by Sex, 2018



*The total applicant number includes 20 applicants of unknown sex.

** The total matriculant number includes 8 matriculants of unknown sex.

Source: AAMC Applicant Matriculant Data File as of 11/26/2018

Association of
American Medical Colleges

For the second year in a row, the number of women enrolling in U.S. medical schools has exceeded the number of men

2018: 50.9%
2017: 50.7%
2016:49.8%

Residency

Women account for 45.6% of active residents training in the U.S.

Specialty	% Women	Income ranking
OB/GYN	83	20
Allergy and Immunology	73.2	*
Pediatrics	72.3	*
Medical genetics	67.1	
Psychiatry	66	*
Dermatology	64.5	6

Among the top specialty choices for female residents, only dermatology, with an annual average compensation of $392,000, ranks in the top 10 highest-paying
specialties, according to an online survey of physician compensation conducted by Medscape.

* One of 20 specialties with the LOWEST average annual compensation

Association of American Medical Colleges' 2017 Report

Residency

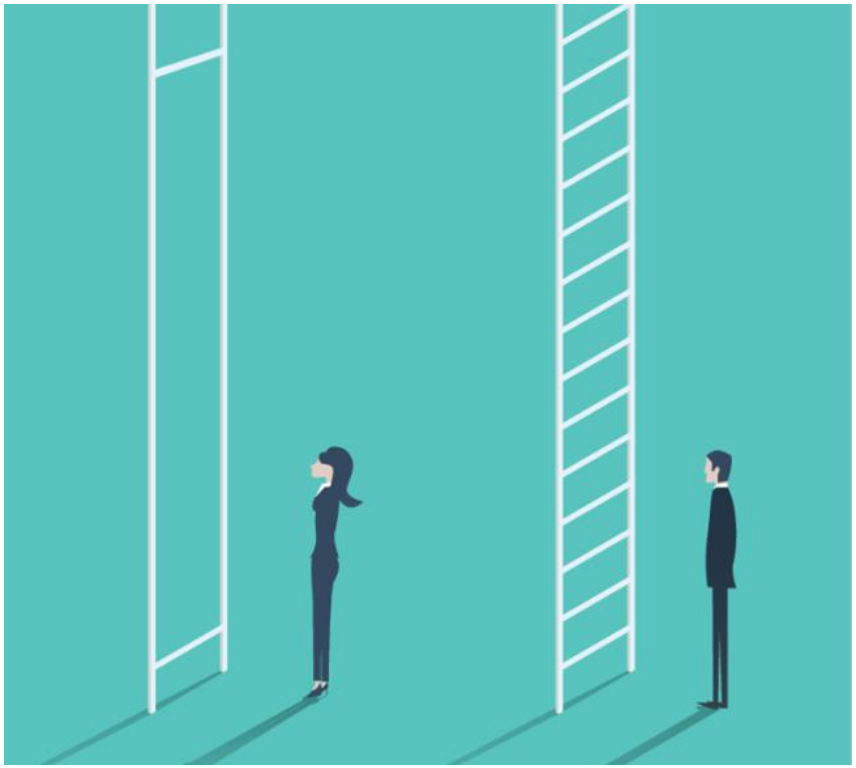
Men account for 54.4% of active residents training in the U.S.

Specialty	% Men	Income ranking
Orthopedic surgery	84.6	3
Neurologic surgery	82.3	1
Thoracic surgery	75.2	2
Radiology	73.5	9
Plastic surgery	71.8	8
Vascular surgery	65.2	5
Otolaryngology	63.8	14

Male physicians, more likely to relocate following their residency program. Figure varies by specialty, 51% of men who completed residency between 2007 and 2016 are practicing in the state where they did their residency, compared with nearly 59 percent of women.

Association of American Medical Colleges' 2017 Report on Residents

Academic Medicine



Wage gap

- Multiple studies over 20 years demonstrated salary inequities disadvantaging female faculty in academic medical careers compared with their male counterparts
- attributed to factors known to be the major determinants of compensation, including part-time status, specialty choice, and work distribution between administrative, teaching, research, and clinical work
- even controlling for these differences, women continue to be compensated less for the same work compared to men.
- Recent data suggest that for new faculty, even those with similar academic backgrounds and research funding success, gender gaps in compensation early in their careers are already present

Acad Med. 2016 August ; 91(8): 1068–1073

25.7 % of all professors are female
74.9% of all professors are male

Table 9: U.S. Medical School Faculty by Sex and Rank, 2018

AAMC

The table below displays the number of full-time faculty at all U.S. medical schools as of December 31, 2018 by sex and rank.

Rank	Male	Female	Unreported	Total
Professor	28,573	9,501	43	38,117
Associate Professor	22,248	13,642	42	35,932
Assistant Professor	43,031	38,151	87	81,269
Instructor	6,364	9,156	26	15,546
Other	2,237	2,786	2	5,025
Total	*102,453*	*73,236*	*200*	*175,889*

Source: AAMC Faculty Roster, December 31, 2018 snapshot, as of April 30, 2019.

27% of all male faculty achieve full professor
12.9% of all female faculty achieve full professor

https://www.aamc.org/data/facultyroster/reports/494946/usmsf18.html

1979-2019

We have still not achieved the % of Full Professors that our male colleagues had achieved in 1979

Leadership inequity

10 /39 specialty societies had equitable or better representation of women among years of presidential leadership.

Causes of Leadership Inequity

- These factors encompass the institutional barriers that women face because of the divergent ways in which men and women are perceived and treated by others

- Differences in the perceptions held, decisions made, or behaviors enacted by men and women themselves that contribute to gendered outcomes.
  - For example, men are more likely than women to engage in dominant or aggressive behaviors, to initiate negotiations and to self-select into competitive behaviors likely to facilitate professional advancement.

Demand-side factors
(interpersonal effects)

Supply-side factors
(intrapersonal effects)

Leadership Gap and Women leaving academic medicine:

- lack of career/professional advancement,
- salary inequity

- chairman/departmental leadership issues
  - including harassment and discrimination.[37]
  - In a survey on workplace discrimination women were more likely than men to file a complaint of discrimination (14.6% vs 8.1%) but were more likely to report a worsening situation following the complaint as compared to men (26.7% vs 5.3%).[38]

37.Cropsey KL, Masho SW, Shiang R, Sikka V, Kornstein SG, Hampton C. Why do faculty leave? Reasons for attrition of women and minority faculty from a medical School: four-tear results. J Womn Hlth. 2008; 17:1111-1118.
38.Tolbert Coombs AA, King RK, Workplace discrimination: experiences of practicing physicians. J of the NMA 2005;97:467-477

I belong to the following number of medical professional groups:

A. none
B. 1-2
C. 3-5
D. 6-7
E. ≥ 8

I belong to a women-focused medical professional group

A. Yes
B. No, and not interested
C. No, but would like to

Interventions and Strategies

- Organizational and Individual
- Physician Engagement Group (Mayo sisterhood)
- Engaging all stakeholders
  - Men as allies (#HeforShe)

Sisterhood PEG

Sisterhood PEG

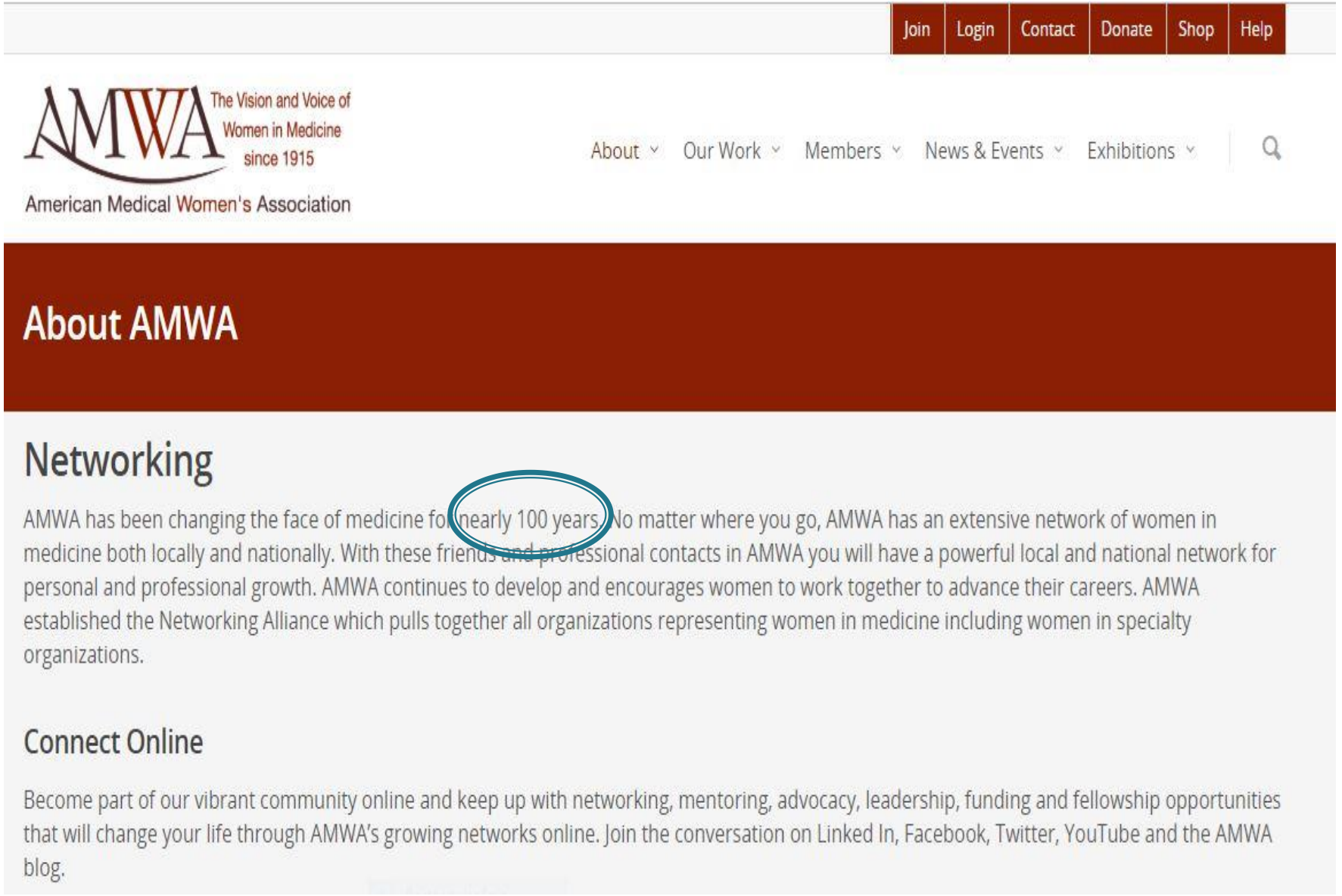
CONCEPTS	DETAILS
Identify members	Diverse specialties Various stages of career Motivated to pursue gender equity Establish policy for adding new members
Meeting specifics	Commit to meeting frequency Establish meeting location (ensure privacy) Identify group organizer
Establish ground rules	Confidentiality ('Vegas rules') Consider how to handle egregious scenarios (e.g. sexual misconduct) Commit to being solution oriented
Provide framework for discussions that are based on personal experiences	Characterize the principles at play (e.g. gender bias, micro-inequities, communication/language, advocacy, unconscious bias etc.) Identify resources to augment or contextualize discussion (books, articles, TED talks, pod-casts, speakers, etc)
Actively cultivate trust	Honor the ground rules Balance validation and objectivity Celebrate member successes Foster resilience in the face of setbacks Encourage members to reach for stretch assignments

Impact

- Skill acquisition
  -difficult conversations
  -recognize and combat micro-inequities
  -create space to address challenges
- Antidote to isolation
- Trust
- Enhanced resilience
- Contextualization

Impact

- All members were promoted
- All members attributed career advancement in part related to the group



https://www.amwa-doc.org/about-amwa/networking/

WOMEN PHYSICIANS

About the Women Physicians Section (WPS)

The purpose of the AMA Women Physicians Section (WPS) is to increase the number and influence of women physicians in leadership roles.

There are nearly 90,000 female members of the AMA.

As an advocate for women's health, the WPS identifies issues and communicates through a network of women leaders identified by their state or specialty societies to serve in the role of WPS Associate.

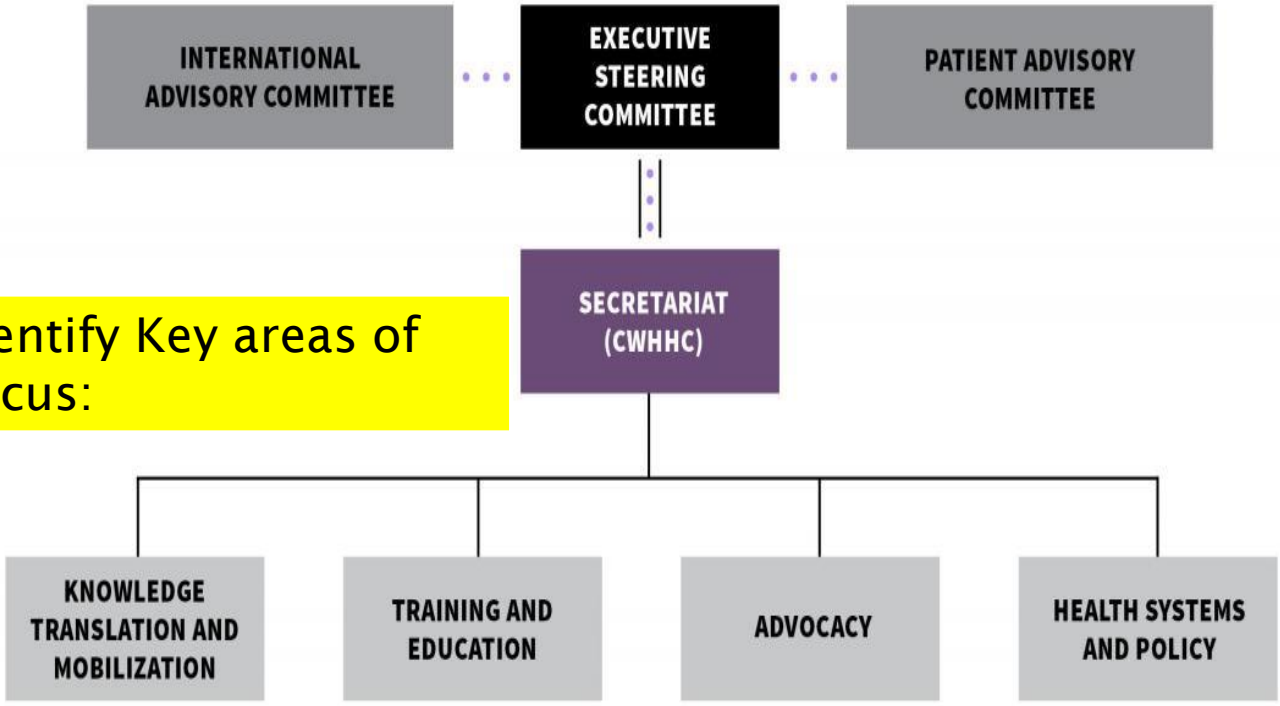
Annual and Interim Business Meetings

Read highlights from the WPS Annual Business Meeting. The WPS Interim Meeting will be held Nov. 14-15 in San Diego, California. Registration for the Interim Meeting will open soon.

Women in Medicine Month

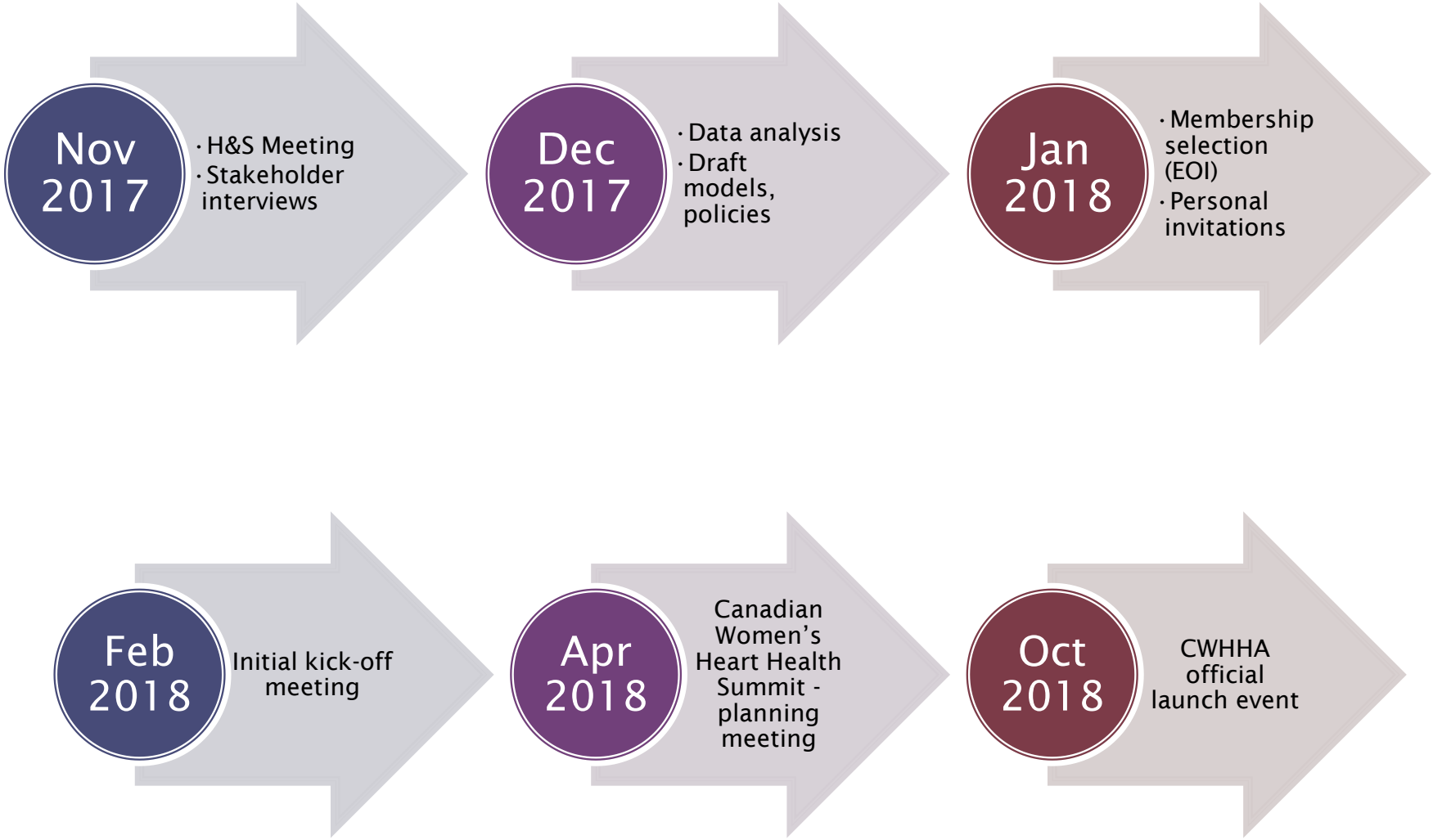
https://www.ama-assn.org/member-groups-sections/women-physicians/about-women-physicians-section-wps

Establish a Governance



Identify Key areas of Focus:

Establish Membership, Deliverables and Timelines


Nov 2017
· H&S Meeting
· Stakeholder interviews
Dec 2017
· Data analysis
· Draft models, policies
Jan 2018
· Membership selection (EOI)
· Personal invitations
Feb 2018
Initial kick-off meeting
Apr 2018
Canadian Women's Heart Health Summit - planning meeting
Oct 2018
CWHHA official launch event

Development of the Canadian Women's Heart Health Alliance

Women's Heart Health Summit 2016

Priorities for Action:

CANADIAN WOMEN'S **HEART HEALTH** ALLIANCE

KICKOFF MEETING HIGHLIGHTS

APRIL 4, 2018 | 10:00 A.M. – 4:30 P.M.

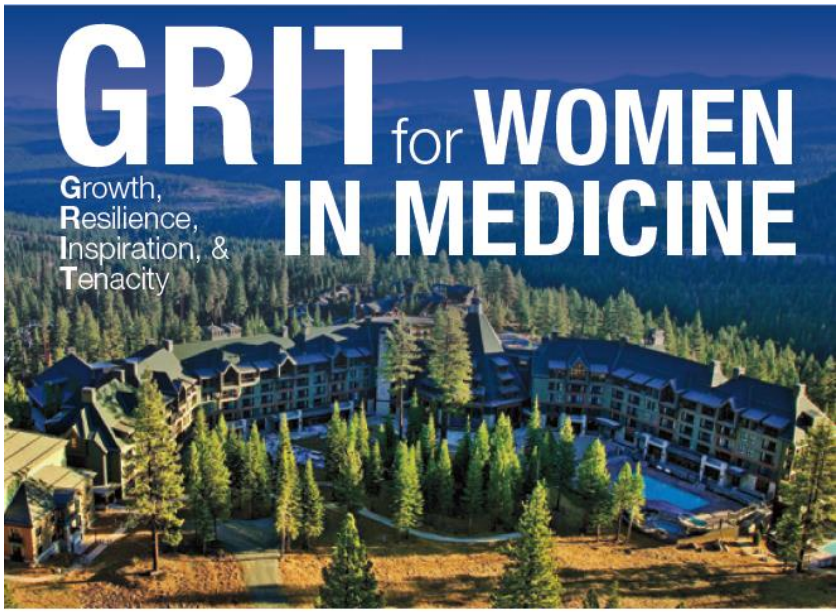
WESTIN OTTAWA HOTEL

#1: Establish a formal Alliance of experts and advocates in Women's Heart Health to promote partnership, collaboration and implementation of best practices across Canada

Growth **R**esilience **I**nspiration **T**enacity

Intervention

- 3 day leadership conference

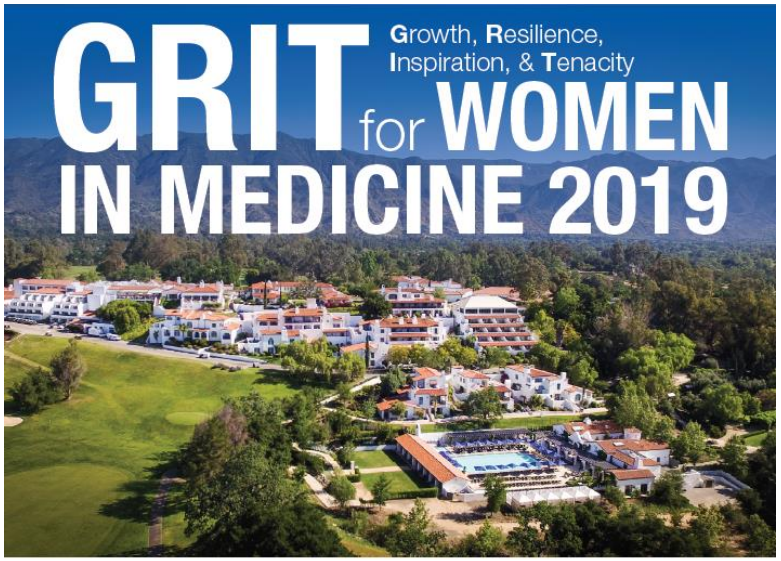


THE RITZ-CARLTON, LAKE TAHOE
TRUCKEE, CALIFORNIA
SEPTEMBER 20–22, 2018

SAVE THE DATE

COURSE DIRECTORS: ANJALI BHAGRA, MD & SUSAN MOESCHLER, MD

Course Description
This course will empower women and men in medicine with the skills and resources to remove barriers and bias of women in leadership positions specific to the challenges in healthcare. Leaders in business and healthcare will present evidence-based strategies to promote professional development and enhance personal wellbeing. Nationally, there is large number of female clinicians reporting burnout which has a potential effect on patient experience, compliance, and outcomes. This course will address the growing need for improved clinician wellness and development for a gender balanced leadership healthcare team.



OJAI VALLEY INN
OJAI, CALIFORNIA
SEPTEMBER 19–21, 2019

SAVE THE DATE

COURSE DIRECTORS: ANJALI BHAGRA, MD & SUSAN MOESCHLER, MD

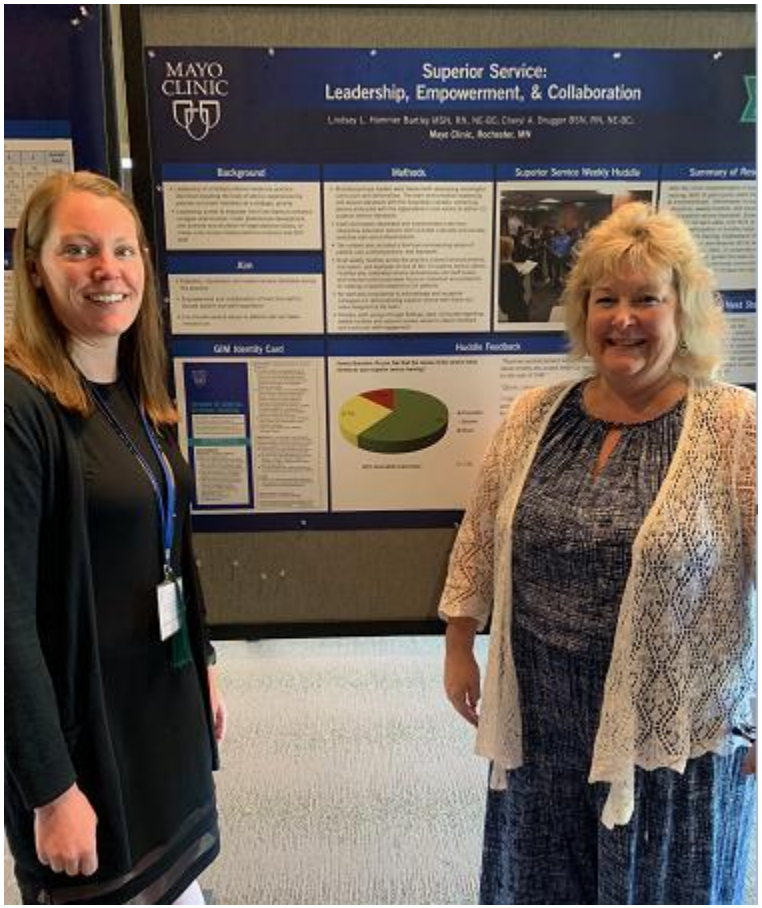
Course Description
This course will empower women and men in medicine with the skills and resources to remove barriers and bias of women in leadership positions specific to the challenges in healthcare. Leaders in business and healthcare will present evidence-based strategies to promote professional development and enhance personal wellbeing. Nationally, there is large number of female clinicians reporting burnout which is has a potential effect on patient experience, compliance, and outcomes. This course will address the need for improved provider wellness and development of women for a gender balanced leadership team in healthcare.


GRIT for WOMEN IN MEDICINE
CLINIC
GRIT for WOMEN IN MEDICINE

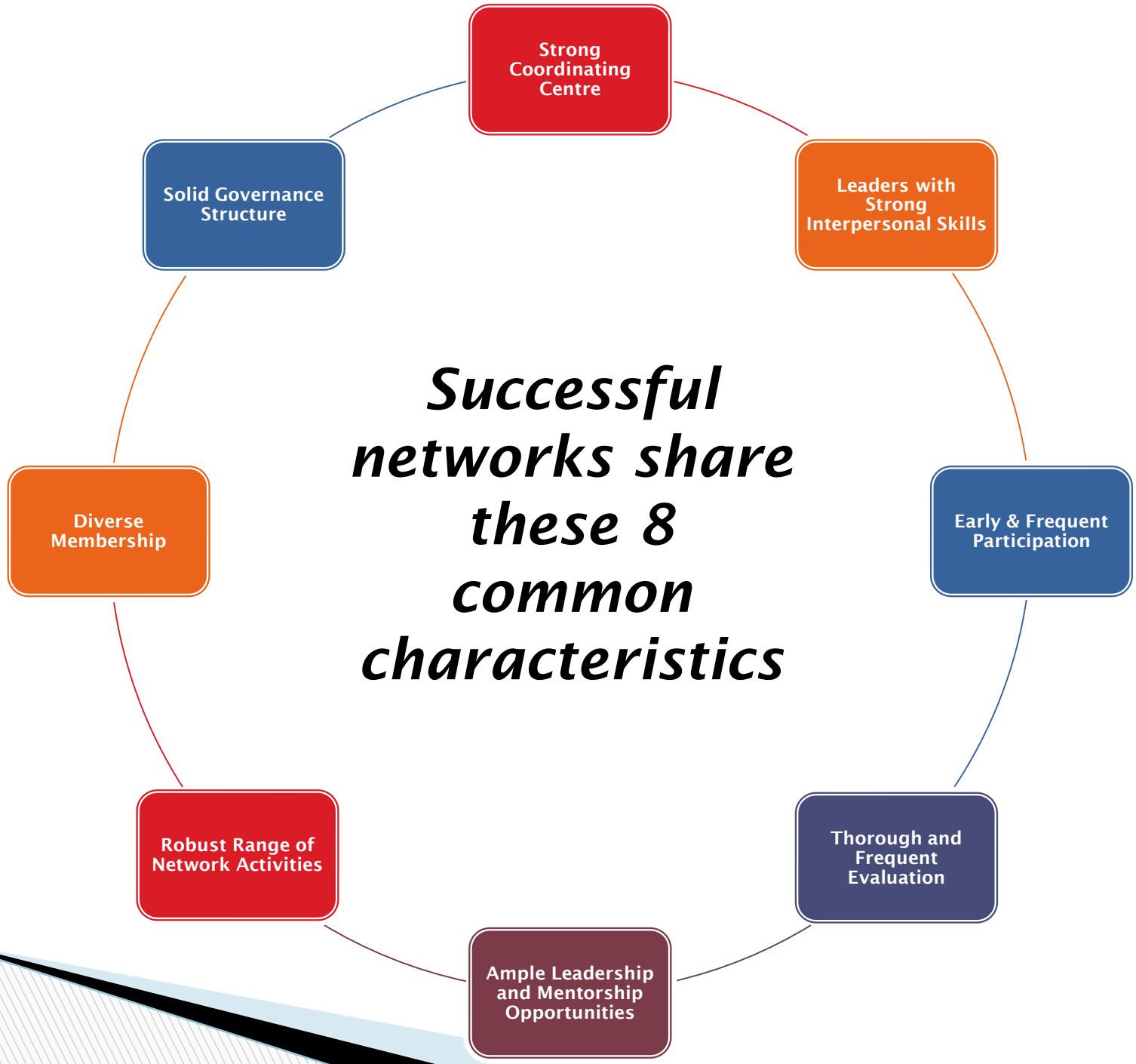

WOMEN IN MEDICINE
WOMEN IN MEDICINE
Girl Power
BOOM!
WOW!

@MayoGRIT

#MayoGRIT


MAYO CLINIC
Superior Service:
Leadership, Empowerment, & Collaboration
Mayo Clinic, Rochester, MN
Background
Methods
Superior Service Weekly Huddle
Aim
GIM Identity Card
Huddle Feedback


MAYO


Strong Coordinating Centre
Leaders with Strong Interpersonal Skills
Early & Frequent Participation
Thorough and Frequent Evaluation
Ample Leadership and Mentorship Opportunities
Robust Range of Network Activities
Diverse Membership
Solid Governance Structure
Successful networks share these 8 common characteristics

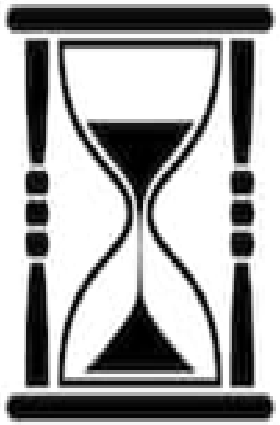
Identifying the membership of your network

- “Passive” – Reaching Out:
  - Publications
  - Meeting presentations
  - Research collaborations
- “Active” – Extending Out, Casting the Net:
  - EOI: calls for “Expression of Interest”
  - Personal contact/networking
- Engage “Men as Allies”

Potential detractors from network success

- Lack of
  - **time** for member participation
  - **collaborators** and **support** staff
  - **mentorship** opportunities
- Inadequate **training in research** methods
- Institutional review board **hurdles**
- **Slow adoption** of evidence into policymaking
- Community **resistance to research**

Obstacles



- TIME!!
  - All volunteer effort
  - Requires passion
- DISTANCE
  - e-communication
- ADMIN SUPPORT
  - mission/deliverables
- FUNDING
  - maintenance/growth/su
- POLITICAL

Keys to Success:

- Identify & Engage Passion
- Be:
  - Visible
  - Accessible & Accountable
  - Inclusive & Diverse
- Have a common Vision and Mission
- Develop organizational structure
- Seek and obtain funding
- *Avoid Politicization*

FIRED UP!

- **F**ind your passion
- **I**dentify your vision and mission
- **R**each out and recruit members
- **E**ngage system support
- **D**evelop organizational structure, timelines, deliverables

- **U**nderstand obstacles
- **P**repare for challenges

Thank You

@anjalibhagramd

bhagra.anjali@mayo.edu

MAYO CLINIC

American College of Physicians
Minnesota Fall Conference

Neurology Pearls

Jeremy Cutsforth-Gregory, MD
Assistant Professor of Neurology

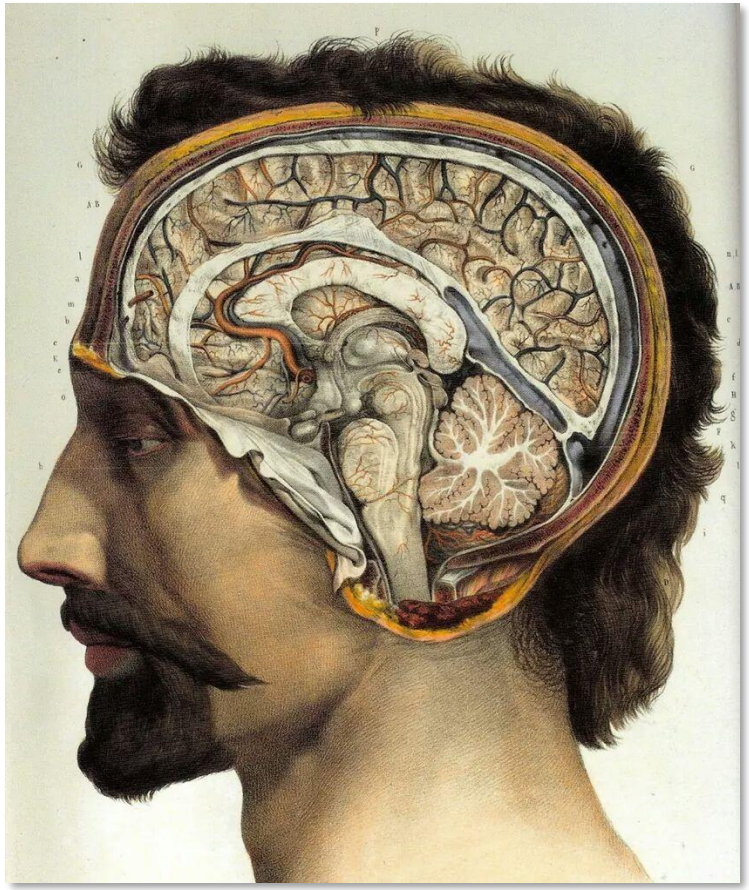


Image by JM Bourgery, in Wikimedia Commons

Relevant Financial Relationships

Royalties for textbook, *Mayo Clinic Medical Neurosciences*

Off-Label Uses

Medications for orthostatic hypotension and POTS

Case 1

A 16-year-old woman with longstanding migraine headaches reports 6 months of feeling dizzy and tipsy when upright. She also describes episodes of pounding heart, shaky hands, and sweating that usually occur while she is standing but have also woken her from sleep. She had the “flu” with low-grade fever and diffuse myalgias for 1 week before onset of the orthostatic symptoms. Her neurologic examination is normal, though she has generalized joint hypermobility.

Which feature suggests hyperadrenergic postural tachycardia syndrome?

A. Age younger than 20 years
B. Comorbid migraine headaches
C. Shaky hands and sweating from sleep
D. Fever and myalgias prior to onset
E. Generalized joint hypermobility

Case 1 – Answer

C. Shaky hands and sweating from sleep

Postural Tachycardia Syndrome

- HR increment ≥30 bpm (often to ≥120 bpm) within 10 minutes of head-up tilt or standing

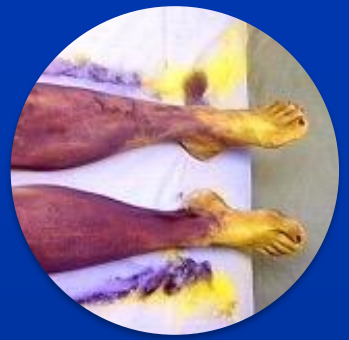
  AND

- Symptoms of OI without OH

≥40 bpm if
12-19 years old

Freeman et al. *Auton Neurosci* 2011;161:46-48

POTS subtypes are not mutually exclusive



Neuropathic

Sudomotor denerv.

Adrenergic denerv.

α_3-AChR Ab

Hyperadrenergic

↑ Standing NE

Autonomic storms

Chronic Deconditioning Fibromyalgia Fatigue

Hypovolemia / Venous Pooling / Joint Hypermobility

Non-pharmacologic strategies

Physical countermaneuvers	Leg crossing, bending forward at waist, slow marching in place, squatting
Fluid	2 L total daily 500 mL boluses
Salt	5-10 g table salt daily = 2-4 g sodium daily (less if cardiac or renal disease)
Compression	Abdominal binder ± waist-high stockings
Exercise	Aerobic + lower limb resistance training

Low and Tomalia. *J Clin Neurol* 2015;11:220-226
Jordan et al. *Circulation* 2000;101:504-509
Smit et al. *Clin Auton Res* 2004;14:167-175

Medications to ↓ heart rate or ↑ blood pressure

Drugs* (beneficial in short term; unproven in long term)

- β-blockers (propranolol) for hyperadrenergic POTS
- Low-dose midodrine or droxidopa for neuropathic POTS
- Ivabradine for POTS with inappropriate sinus tachycardia
- Pyridostigmine
- Fludrocortisone

* off-label use

Images from Wikimedia Commons

Cardio

- 30-45 min, 3-5 days/wk
- Long cool down

Weights

- 2 sets x 12 reps, 2-3 days/wk
- Lower limbs and core

George et al. *Heart Rhythm* 2016;13:943-950
Images from Wikimedia Commons

Case 1 – Clinical Pearl

Hyperadrenergic POTS is characterized by episodes of prominent palpitations, hand tremulousness, and sweating, even from sleep, and is the subtype of POTS most likely to improve with low-dose propranolol

Benarroch. *Mayo Clin Proc* 2012;87:1214-1225
Moon et al. *Neurotherapeutics* 2018;15(3):785-795

Case 2

A 64-year-old man with transthyretin amyloidosis is seen for lightheadedness upon standing. He recognizes immediate relief with sitting and can usually avoid fainting. He also reports early satiety and urinary retention. Blood pressure is 150/94 mmHg when supine and 102/82 mmHg after standing for 1 min. Heart rate rose only from 70 bpm to 74 bpm upon standing. Neurologic examination reveals absent reflexes at the ankles and reduced sensation in a stocking and glove distribution.

Which of the following is the most appropriate intervention for his orthostatism?

A. Fludrocortisone
B. Inotersen
C. Midodrine
D. Patisiran
E. Pyridostigmine

Case 2 – Answer

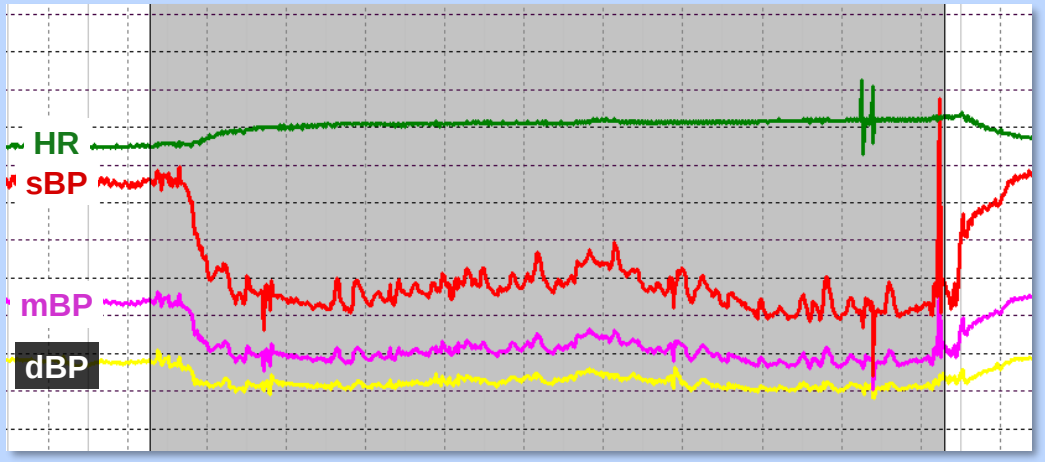
E. Pyridostigmine

Orthostatic Hypotension

Sustained reduction of BP…

≥20 mmHg systolic

≥10 mmHg diastolic



…within 3 min of standing or head-up tilt

Medications to ↑ blood pressure

Medication	Mechanism	Adverse Effects
Midodrine 2.5-15 mg TID	Peripheral α_1-agonist causes vasoconstriction	Supine hypertension, scalp paresthesias, urinary retention
Pyridostigmine* 30-60 mg TID	Cholinesterase inhibitor amplifies ganglionic signal	Diarrhea, abdominal pain, muscle twitches
Fludrocortisone* 0.05-0.2 mg daily	Mineralocorticoid expands plasma volume	Supine hypertension, hypokalemia, headache, myocardial fibrosis
Droxidopa 100-600 mg TID	Norepinephrine precursor causes vasoconstriction	Supine hypertension

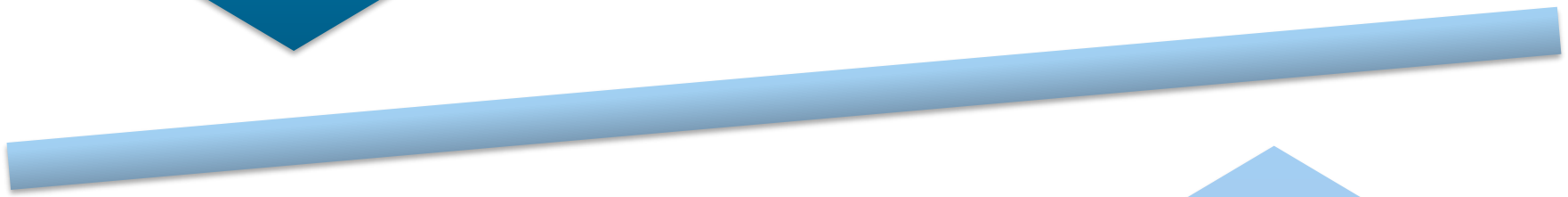
* off-label use

Byun et al. *Neurology* 2017;89:1078-1086
Low and Tomalia. *J Clin Neurol* 2015;11:220-226
Singer et al. *J Neurol Neurosur PS* 2003;74:1294-1298

Management of Supine Hypertension

Do not lie flat ≥4 h after midodrine or droxidopa

Reduce fludrocortisone

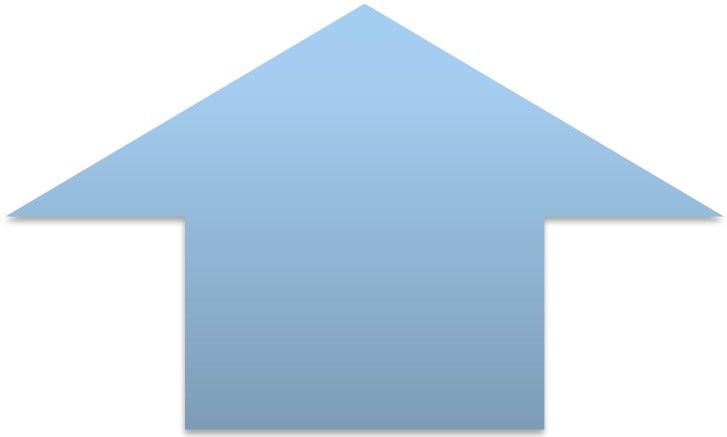


Elevate head of bed

Bedtime snack or alcohol

Losartan 50 mg, Hydralazine 25 mg

Nifedipine 10 mg, Nitroglycerin patch 0.1mg/h



Case 2 – Clinical Pearl

Pyridostigmine improves orthostatic hypotension without causing supine hypertension via amplification of the cholinergic signal at the autonomic ganglia

Singer et al. *Arch Neurol* 2006;63:513-518

Case 3

A 22-year-old woman is seen after 3 spells of transient loss of consciousness. Each time she has suddenly fallen from a standing position, followed by 5 or 6 jerks of her arms prior to regaining consciousness. Each spell lasted 5-10 seconds. After the spells, she felt tired and did not recall falling, though she was otherwise not confused. She once bit her tongue and lost bladder continence. Neurologic exam, cardiac exam, and electrocardiogram are normal.

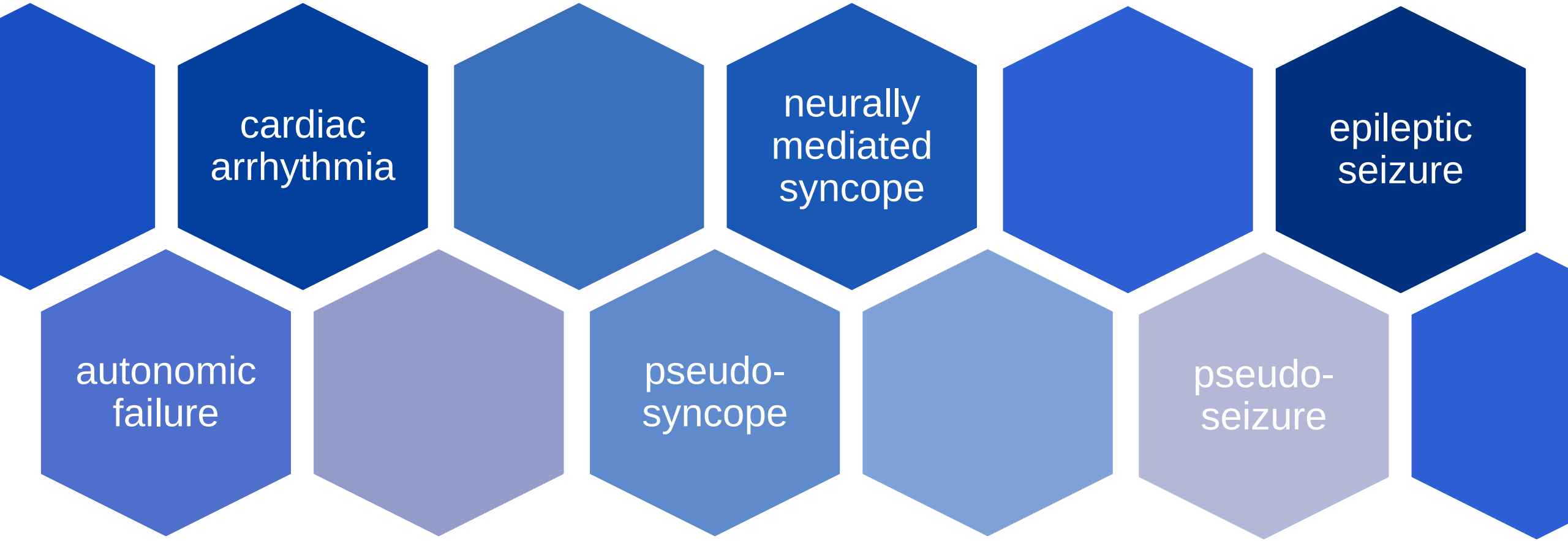
Which of the following would suggest epileptic seizure rather than convulsive syncope?

A. Onset only from standing position
B. 5-6 myoclonic jerks of the arms
C. Spell duration 5-10 seconds
D. Lateral tongue bite
E. Urinary incontinence

Case 3 – Answer

D. Lateral tongue bite

Transient Loss of Consciousness



Feature	Convulsive Syncope	Epileptic Seizure
Loss of tone	Immediate	At end
Onset of myoclonus	Follows loss of consciousness	Immediate
Tempo	Arrhythmic jerks	Rhythmic jerks
Jerks per event	<10	>20
Duration	1-15 sec	30 sec – 2 min
Eye deviation	Upward	Lateral
Tongue bite	Occasional, tip of tongue	Frequent, side of tongue
Urinary incontinence	May occur	May occur
Postictal period	Fatigue	Confusion




Cheshire. *Continuum (Minneapolis Minn)* 2017;23:335-358
Shmuely et al. *Neurology* 2018;90:e1339-e1346

Case 3 – Clinical Pearl

Convulsive syncope can be distinguished from epileptic seizures by the timing and frequency of myoclonic jerks and location of tongue bite

Cheshire. *Continuum (Minneapolis Minn)* 2017;23:335-358
Shmuely et al. *Neurology* 2018;90:e1339-e1346

Case 4

A 55-year-old woman with Parkinson disease takes regular carbidopa/levodopa 25/100 mg tablets and reports that 1.5 tablets every 4 hours during the waking day allows her to function well. A slight tremor appears in her right hand if she is more than 15 minutes late with a levodopa dose.
She continues to work as an engineer, though her contract is due for renegotiation. She falls asleep easily at 10 p.m. but often wakes between 2 and 3 a.m. and struggles for at least an hour to fall back to sleep despite feeling tired. Her wife denies hearing snoring, talking, or yelling during the night.

Which intervention is most likely to improve this patient's sleep?

A. Carbidopa/levodopa 1.5 tabs at bedtime

B. Cognitive behavioral therapy

C. Diphenhydramine 25 mg at bedtime

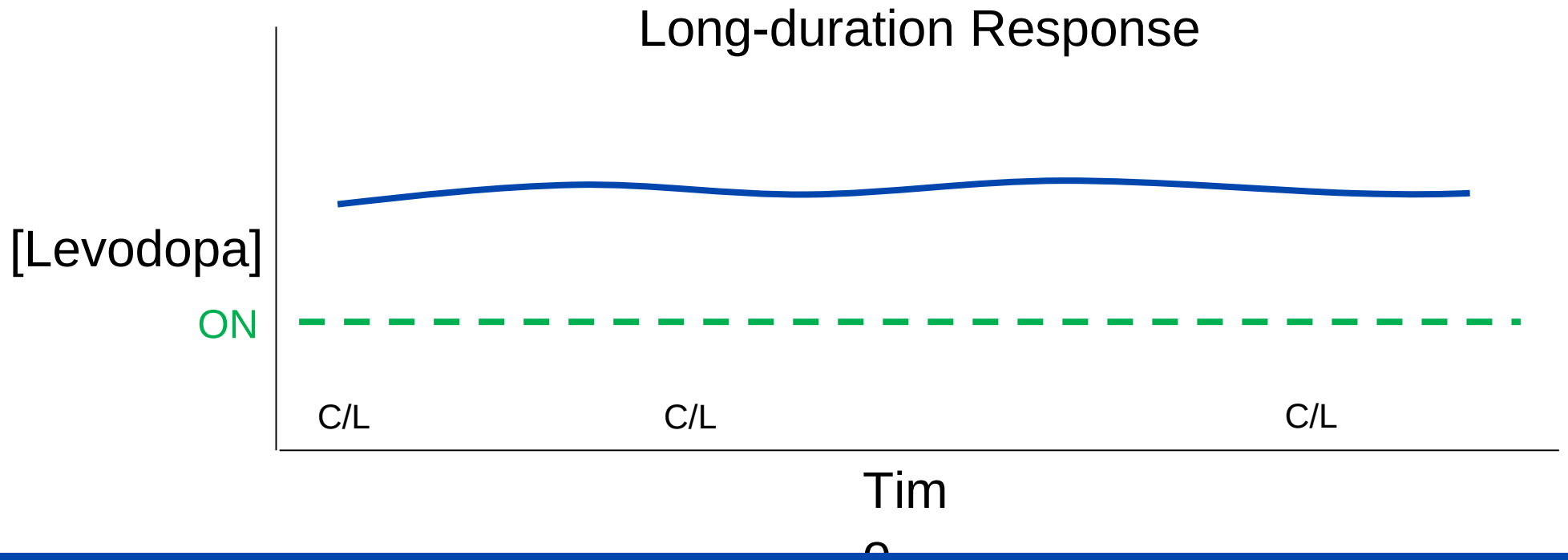
D. Melatonin 5 mg at bedtime

E. Ropinirole 1 mg an hour before bed

Case 4 – Answer

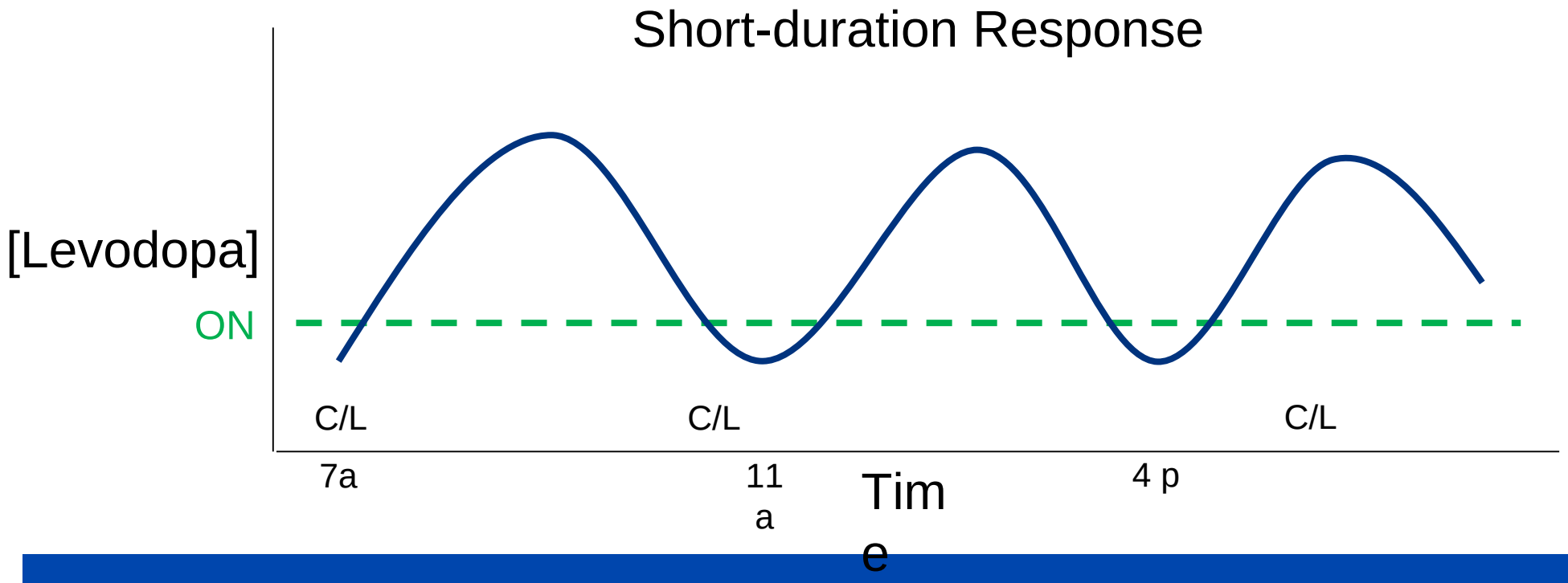
A. Carbidopa/levodopa 1.5 tabs at bedtime

Levodopa Honeymoon



During early years, levodopa timing or missed doses matter little because the brain can still buffer the fluctuating blood concentration

Motor Fluctuations
ON-OFF cycles



When patients notice kick-in and wear-off, shorten the levodopa interval to match the short-duration response

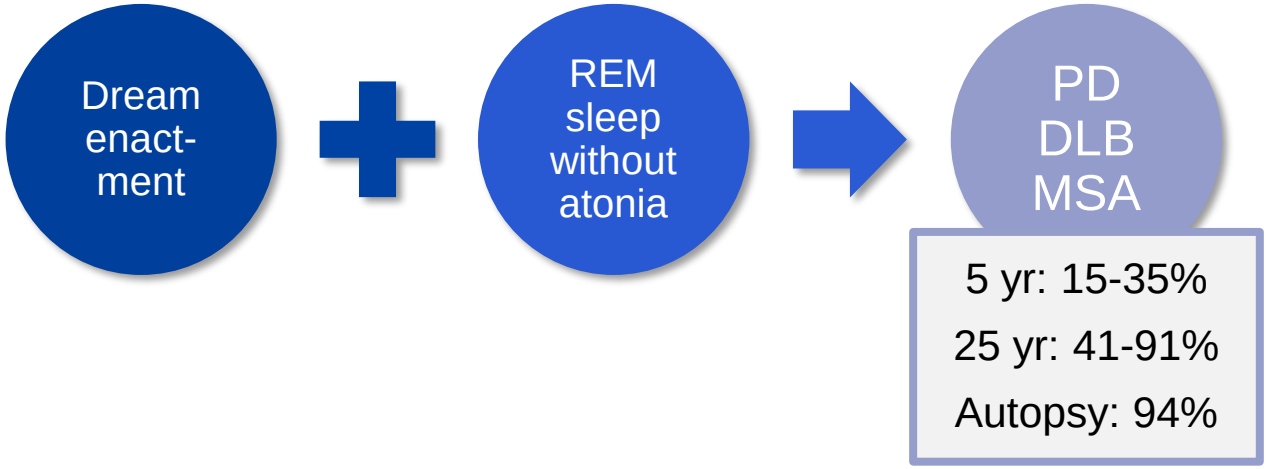
Insomnia
overnight wearing OFF

- May or may not be aware of other OFF symptoms at night
- “Cannot get comfortable”

If patients wake and struggle to fall back to sleep, add a bedtime dose of controlled-release or an early-morning dose of regular levodopa equivalent to the daytime dose

Ahlskog, *Mayo Clin Proc* 2014;89:997-1003

REM Sleep Behavior Disorder



Treat RBD with bedroom safety and melatonin 3-12 mg (or clonazepam 0.5-2 mg) to reduce patient and bed partner injury

Restless Legs Syndrome
Willis-Ekbom Disease

1. Urge to move the legs, usually accompanied by discomfort
2. Begins or worsens during periods of rest or inactivity such as lying or sitting
3. Partially or totally relieved by movement, such as walking or stretching
4. Worse in the evening or night

Ropinirole and pramipexole are first-line therapy for RLS, which is a frequent comorbidity with Parkinson disease

McCarter et al. *Sleep Med* 2013;14:237-242
St Louis and Boeve. *Mayo Clin Proc* 2017;92:1723-1736
Kurllan et al. *J Gen Intern Med* 2006;21:C1-C4
Szatmari et al. *Sleep* 2017;40: epub

Case 4 – Clinical Pearl

If patients with Parkinson disease wake and struggle to fall back to sleep, add a bedtime dose of levodopa equivalent to their daytime dose to maintain a levodopa ON state

Ahlskog. *Mayo Clin Proc* 2014;89:997-1003
McCarter et al. *Sleep Med* 2013;14:237-242

Case 5

A 78-year-old man began to notice problems walking 1 year ago. His wife describes his gait as stiff and slow. The problem has been progressive, and he began using a cane 3 months ago. Recently he has also noticed weakness in his left hand and urinary urgency.

Which of the following has the greatest sensitivity for detecting cervical myelopathy in this patient?

A. Ankle clonus
B. Babinski sign
C. Hoffmann sign
D. Interosseous atrophy
E. Brachioradialis hyperreflexia

Case 5 – Answer

C. Hoffmann sign

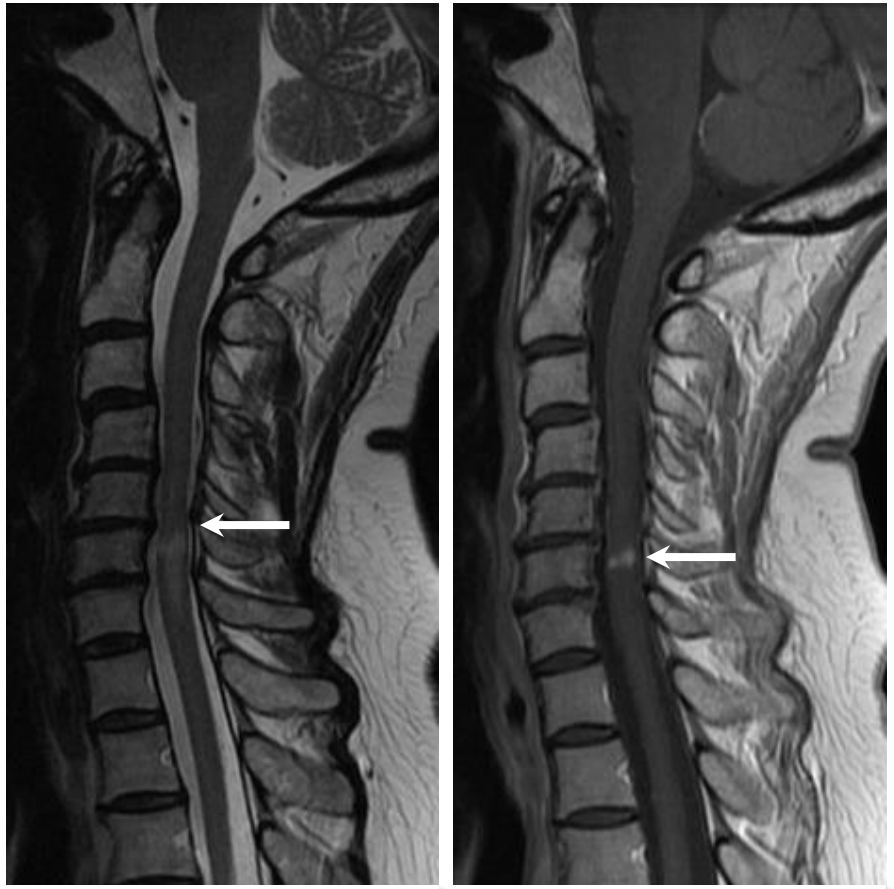
Cervical Myelopathy

Sign	Sensitivity	Specificity
Hoffmann	68%	84%
Biceps hyperreflexia	62%	49%
Babinski	33%	100%
Knee hyperreflexia	33%	76%
Brachioradialis hyperreflexia	21%	89%
Ankle clonus	13%	100%

Nouri et al. *Spine (Phila Pa 1976)* 2015;40:E675-93
Rhee et al. *Spine (Phila Pa 1976)* 2009;34:890-895

Advanced Imaging for Suspected Myelopathy

MRI is indicated upper motor neuron signs are detected in the setting of progressive gait impairment or urinary incontinence



T2 hyperintensity | Pancake contrast

Transverse pancake-like gadolinium enhancement at or just below level of maximal stenosis suggests spondylosis as the cause of myelopathy

Flanagan et al. *Ann Neurol* 2014;76:54-65
Images courtesy Dr. Nick Zalewski

Case 5 – Clinical Pearl

In a patient with progressive gait impairment, Hoffmann sign is the most sensitive finding for cervical myelopathy and should prompt advanced imaging of the cervical spine

Nouri et al. *Spine (Phila Pa 1976)* 2015;40:E675-93
Rhee et al. *Spine (Phila Pa 1976)* 2009;34:890-895

MAYO CLINIC

JeremyCG@mayo.edu

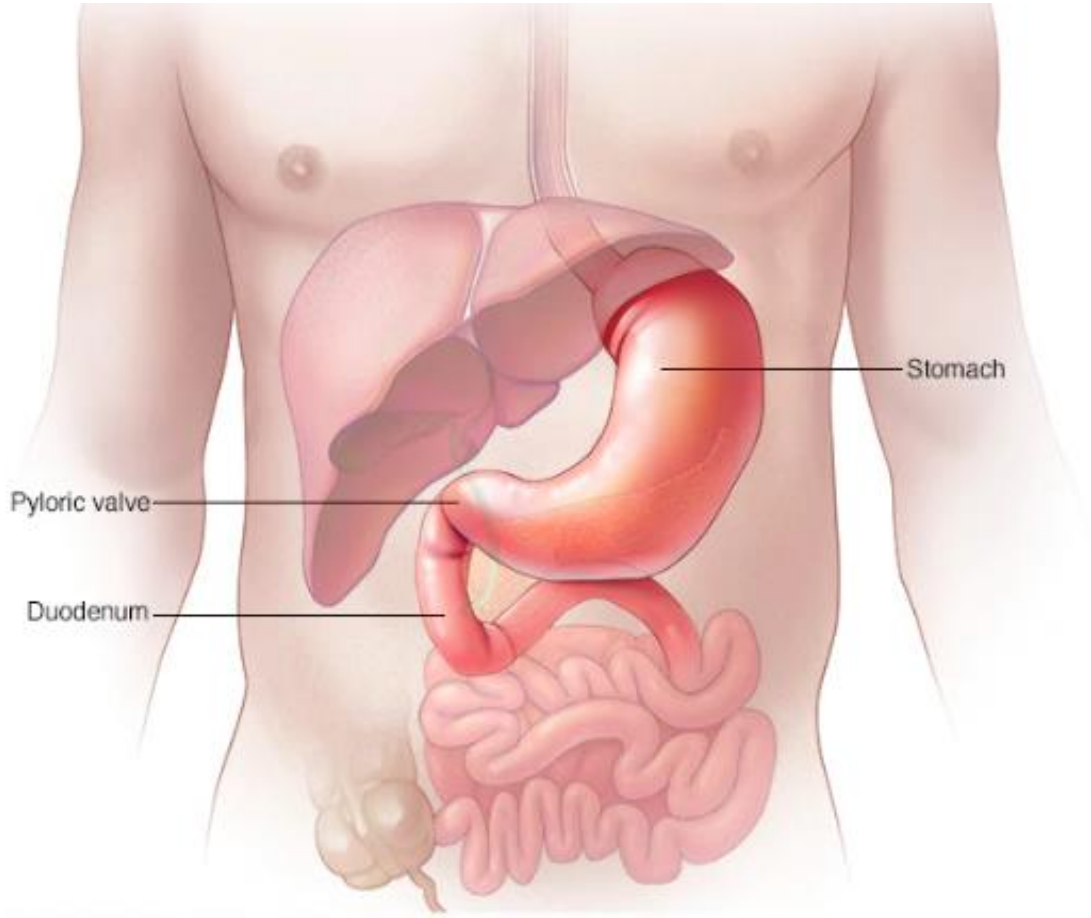
Parenteral Iron

Any discussion of parenteral iron starts with a discussion of oral iron

- Sir William Osler

How Things Should Work

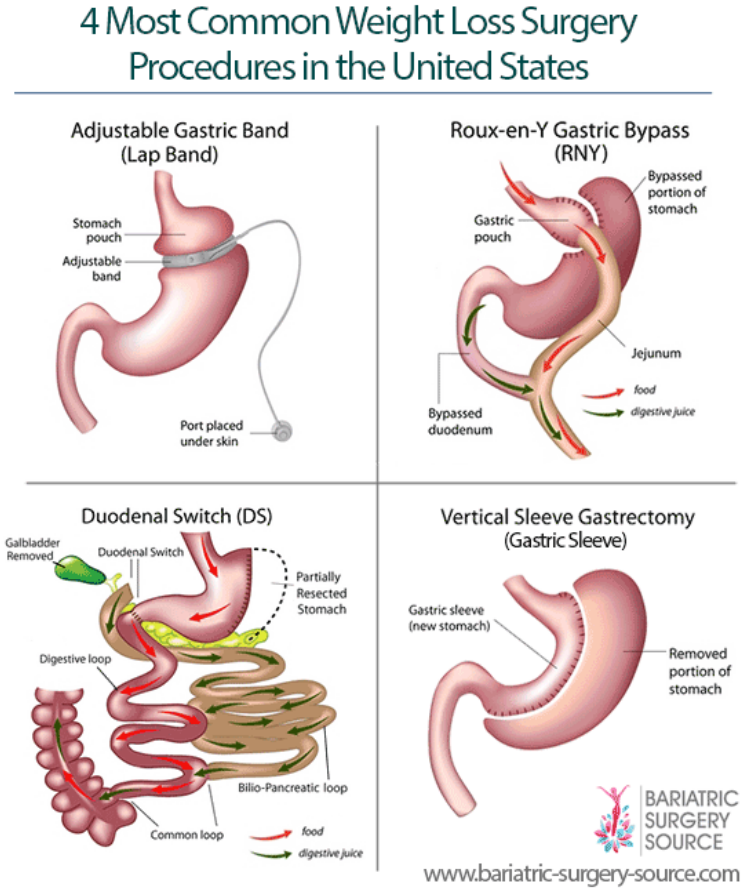
- Daily diet contains 10-20 mg iron
  - Daily absorption 1-2 mg
- Different iron bioavailability
  - 30% heme-bound
  - 10% non-heme-bound
- Passengers affect absorption
  - Help: pH, vitamin C
  - Hurt: calcium, cereals, teas
- Duodenal, proximal jejunem absorption 90+%



mayoclinic.com

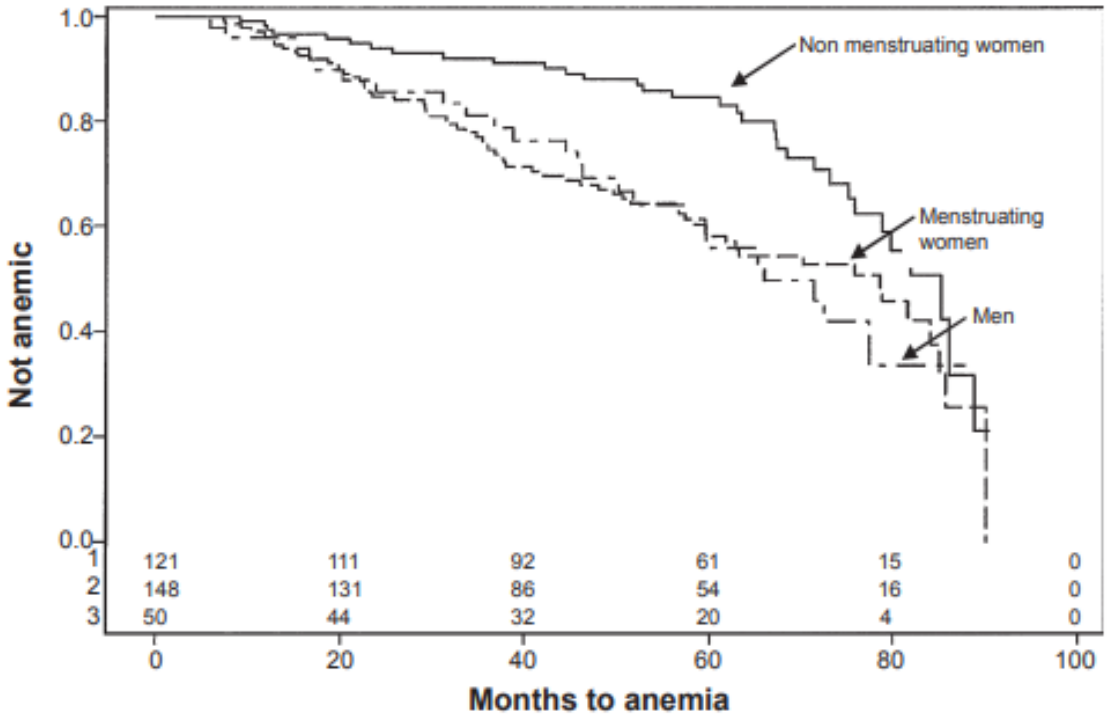
Gastric Bypass:
The Tale of Road Construction and Missed Exits

- Pre-op, 20-50%patients w/ IDA
- Post-op mechanisms
  - Lack of duodenal iron access
  - Lack of parietal cell pH
  - Dumping syndrome
  - Oral iron intolerance
  - Ongoing menstrual losses



IDA is Common and Ongoing Issue After Gastric Bypass

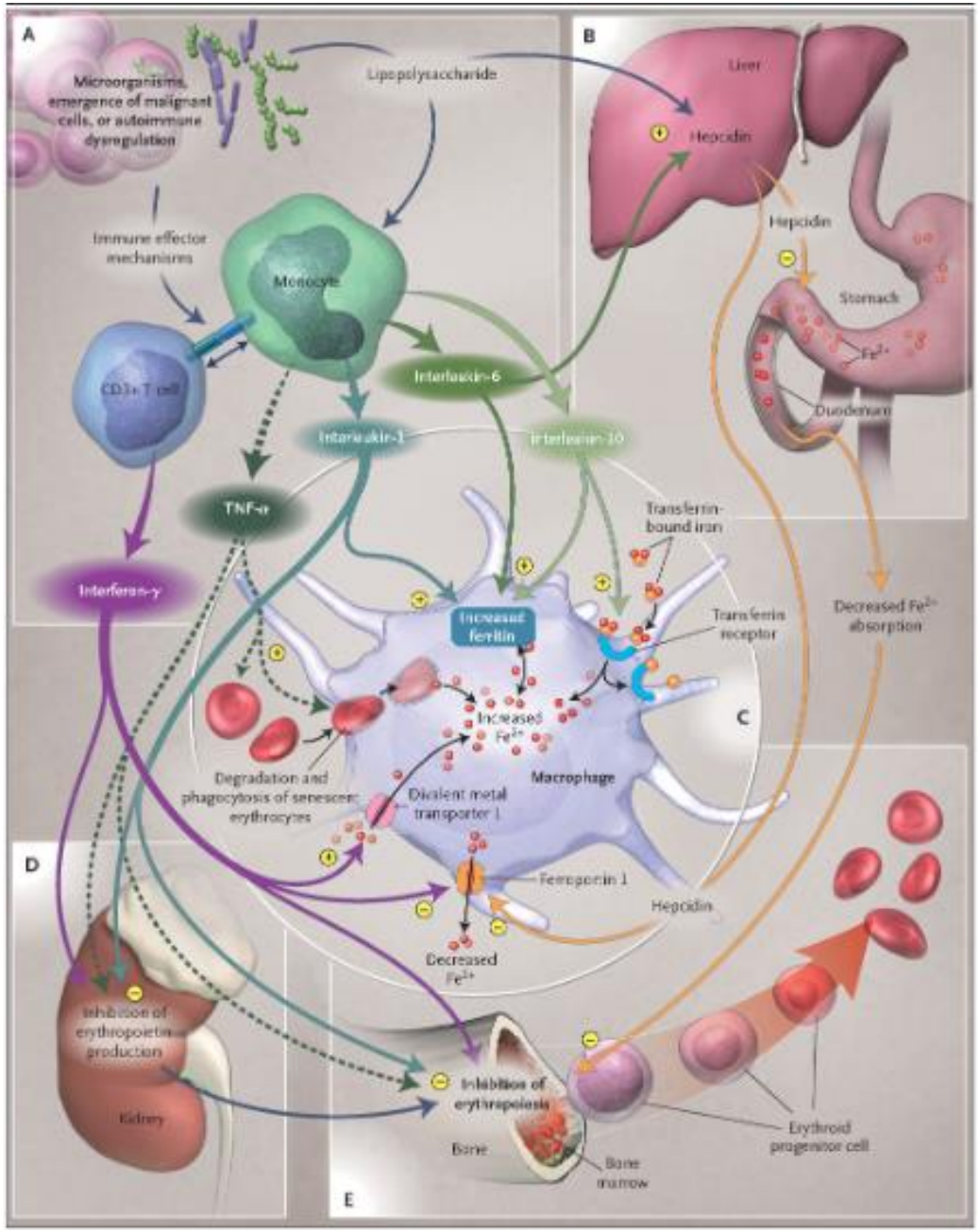
- 319 patients w/ RYGB 1999-2006 Penn State Hershey
- 58% iron deficiency anemia
  - Hemoglobin <12 W: <14 M
  - Ferritin <10
- 22% required parenteral iron
  - 100% response rate
- Multivariate analysis
  - Menstruating women
  - Pre-operative IDA



Kotkiewicz et al, Libertas Academica 2015

Anemia of Chronic Disease; The Tale of Frozen Bank Accounts

- Inflammation triggers cytokines (IL-6)
  - Infections
  - Cancer
  - Autoimmunity
- Cytokines trigger hepcidin
- Hepcidin “destroys” ferroportin
  - Iron “locked in” marrow macrophages
  - Iron “locked out” from duodenum
- Impaired erythropoiesis



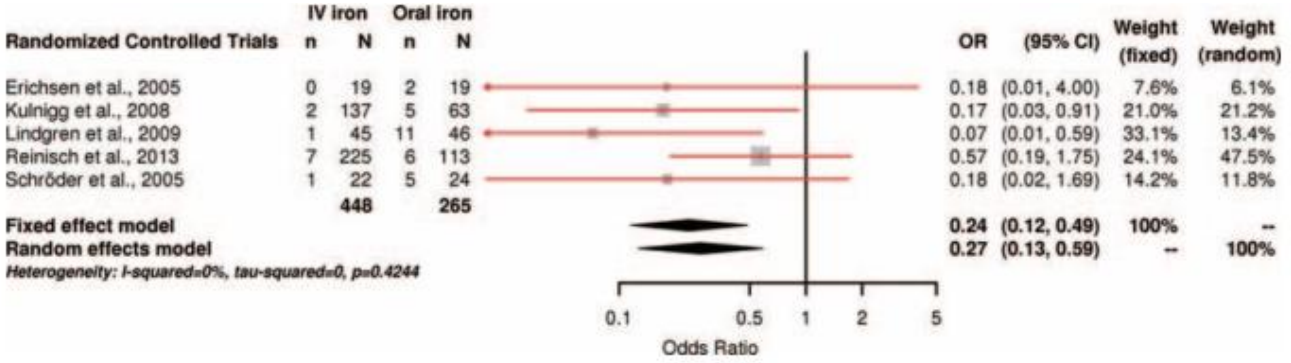
Weiss et al, NEJM 2005

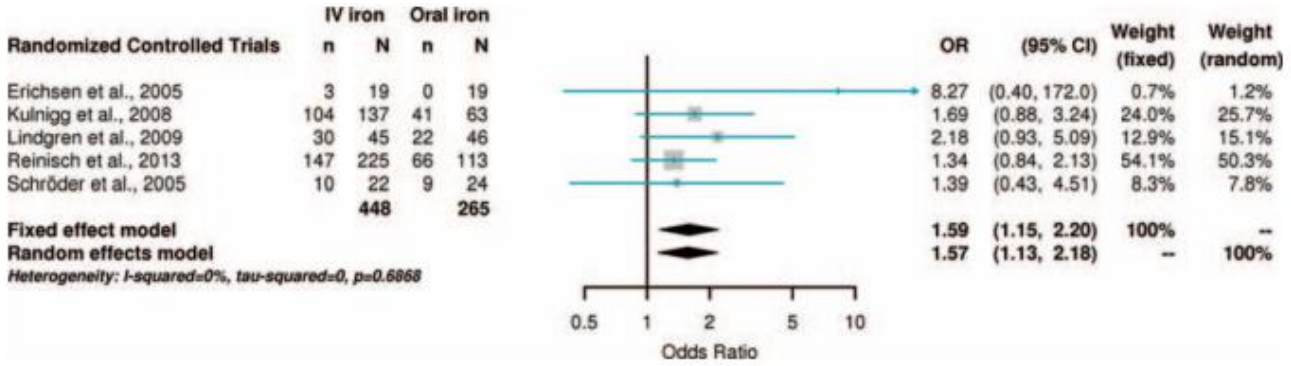
Inflammatory Bowel Disease (IBD) and Parenteral Iron

- 25-80% IBD patients affected
- Multiple mechanisms
  - Poor oral iron absorption
  - Chronic blood loss
- Difficult diagnosis of IDA
  - Ferritin inflammatory marker
- Who really needs it?
  - Active disease
  - Severe anemia

Parenteral Improved Outcomes and Tolerance vs Oral Iron in IBD Patients

- Meta-analysis of 5 RCTs
- 694 patients
- Oral iron more often discontinued due to AEs (OR 0.27; 0.13-0.59)
- IV iron improved Hgb more often ≥ 2.0 (OR 1.57; 1.13-2.18)





Bonovas et al, Medicine 2016

Cautionary Tales About Oral Iron in IBD?

- Small crossover study; 19 patients w/ IBD and IDA
  - Randomized to ferrous fumarate 120 mg daily or venofer 200 mg x 3 over 2 weeks
  - IBD patients receiving oral iron experienced worse disease activity (p=0.037), worse well being (p=0.027) and more abdominal pain (p=0.027)
- Role of the microbiota and oxidative stress

Erichsen et al, Scand Journal of Gastro 2005

Some Cautionary Tales Regarding ACD

- ACD is not “refractory IDA”
  - Like IDA, ACD is a sign and NOT a diagnosis
  - Think autoimmunity, malignancy, smoldering infections
  - Requires “proof of inflammation”
- Treatment
  - Oral iron will almost never work
  - Parenteral iron may work w/ IDA
  - Treat the underlying cause

Distinguishing ACD from IDA

- Soluble transferrin receptor
  - Proportional to erythropoiesis
  - Inversely proportional to iron
- ACD: Normal
- IDA: High
- Can have both conditions

Table 3. Serum Levels That Differentiate Anemia of Chronic Disease from Iron-Deficiency Anemia.*

Variable	Anemia of Chronic Disease	Iron-Deficiency Anemia	Both Conditions†
Iron	Reduced	Reduced	Reduced
Transferrin	Reduced to normal	Increased	Reduced
Transferrin saturation	Reduced	Reduced	Reduced
Ferritin	Normal to increased	Reduced	Reduced to normal
Soluble transferrin receptor	Normal	Increased	Normal to increased
Ratio of soluble transferrin receptor to log ferritin	Low (<1)	High (>2)	High (>2)
Cytokine levels	Increased	Normal	Increased

Weiss et al, NEJM 2005

Heavy Uterine Bleeding: The Tale of Overdraft Bank Accounts

- Iron loss exceeds iron gains
- Menstrual losses can exceed 40-50 mg per month
- RCT; 477 women w/ IDA and HUB
  - Randomized to 1000 mg IV ferric carboxymaltose vs. 325 mg ferrous sulfate TID x 6 weeks
  - 82% hemoglobin response (≥2) w/ parenteral iron vs 62% oral iron ($p<0.001$)
  - 73% hemoglobin normalized w/ parenteral iron vs 50% oral iron ($p<0.001$)
  - Subjective improvements in QOL and function

Van Wyck et al, Transfusion 2009

So Where Does that Leave Us?

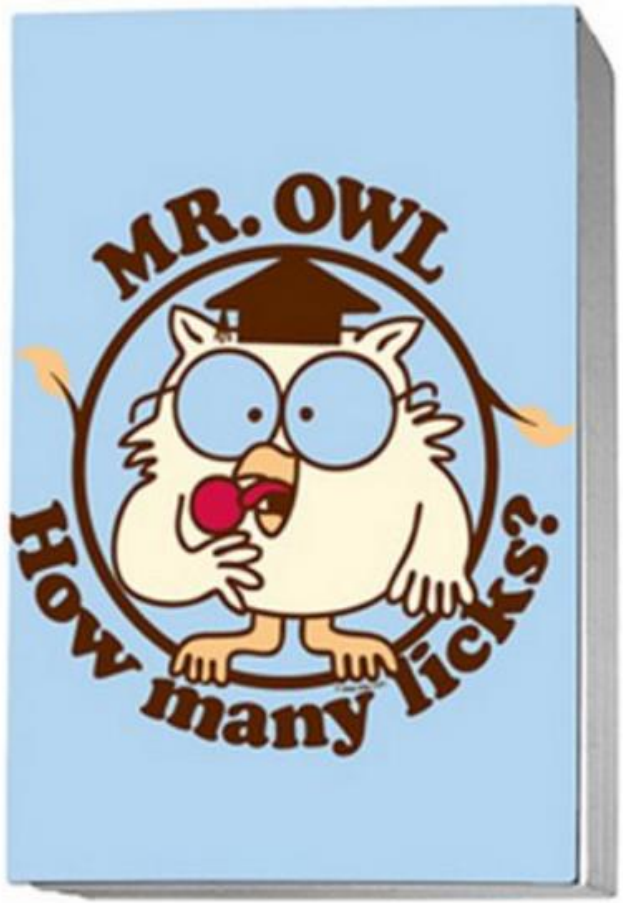
- Cannot tolerate oral iron
  - Exhaust all oral iron forms and solutions
- Quick repletion
  - Pre-operative, pregnancy, borderline transfusion need
- Pregnancy
  - Third trimester; good for baby
- Iron loss exceeds iron intake
  - Chronic GIB
- Anatomic changes
  - Gastrectomy, celiac, IBD
- Inflammation / ACD
  - IBD, autoimmunity; not chronic infections

Some Thoughts on Various Forms

- All forms are created equal
- All forms are equally safe (except IM)
- Reactions are rare (like really rare)
  - GI, HA, dizziness, hypotension, urticarial / rash, arthralgias < 1%
  - Benadryl likely responsible for some “iron reactions”
  - Premeds unnecessary unless prior reaction

What is Parenteral Iron Anyway?

- Iron core and sugary shell
- 1st generation:
  High-molecular weight dextran
- 2nd generation:
  Iron gluconate and iron sucrose
- 3rd generation:
  Ferumoxytol



Many Parenteral Iron Forms Exist

	Ferumoxytol	Iron Carboxymaltose	Iron Isomaltoside 1000	Low Molecular Weight Iron Dextran	Iron Sucrose	Iron Gluconate
Brand name	Feraheme®	Ferinject®	Monofer®	Cosmofer®	Venofer®	Ferlixit®
Maximum single dose	510 mg	1000 mg	20 mg/kg	20 mg/kg	200 mg	125 mg
Minimum administration time (minutes)	15	15	15	60	30	30–60
Replacement dose possible in a single infusion	No	Yes	Yes	Yes	No	No

Bhandari et al, Pharmaceuticals 2018

Determining Just How Much Iron to Give

- Fancy algorithm to determine iron deficit
  - Iron deficit (mg) = weight (kg) x (14 - Hgb) x (2.145)
  - But… the usual deficit requires 1000-1500 mg

Imagine Anemia Strikes the Set of Jumanji 2

- Kevin Hart (Hgb 7)
- 64 kg x 7 x 2.145 = 960 mg

- Duane Johnson (Hgb 8)
- 118 kg x 6 x 2.145 = 1518 mg

Joe.io

What About Oral Iron?

- Oral iron for vast majority of IDA
- Use every trick in the book for oral iron
- Many oral iron formulations w/ gimmicks and angles
  - Check the elemental iron content
  - Prove that it works; recheck retic, hemoglobin, ferritin
- Non-adherence is #1 reason for failure to improve

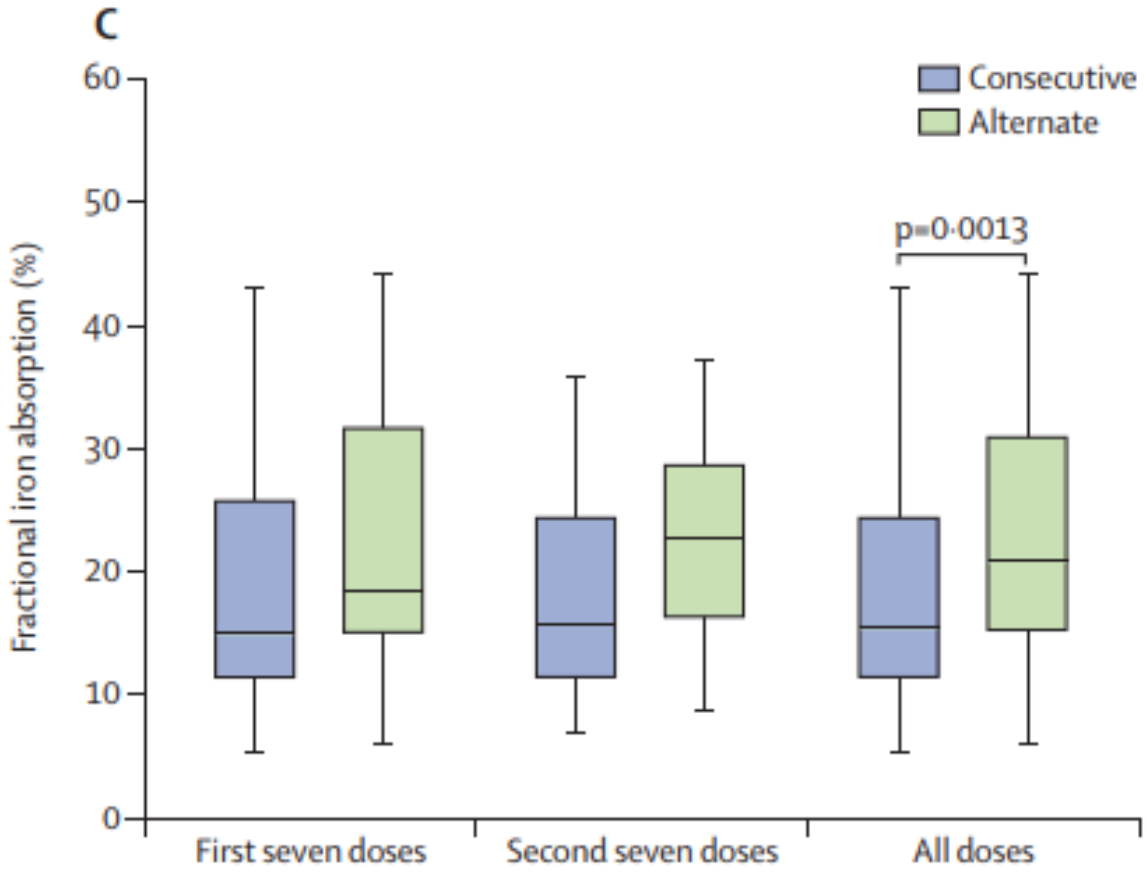
What is the Optimal Dosing and Frequency of Oral Iron Therapy?

- 40 women w/ mild iron deficiency (ferritin <25) without anemia
- Study 1 (frequency):
  - 60 mg QAM x 14 days
  - 60 mg every other AM x 28 days
- Study 2 (dosing):
  - 120 mg QAM x 14 days
  - 60 mg BID x 14 days
  - 2 week washout then crossover
- Measured iron absorption w/ radiolabeled iron
  - Fractional iron and total iron

Stoffel et al, Lancet Haematology 2017

Alternate-day Dosing Improves Iron Absorption vs. Consecutive-day

- Fractional iron absorption
  - Alternate day superior
  - 21.8% vs 16.3% (p=0.0013)
- Total iron absorption
  - Alternate day superior
  - 175 mg vs 131 mg (p=0.001)
- Less GI symptoms w/ alternate-day dosing!



Stoffel et al, Lancet Haematology 2017

Once-daily Dosing Equivalent Iron Absorption vs. Twice-daily

- Fractional iron absorption
  - Daily equivalent to BID
  - 11.8% vs 13.1% (non-sig)
- Total iron absorption
  - Daily equivalent to BID
  - 44.3% vs 49.4% (non-sig)

Stoffel et al, Lancet Haematology 2017

Conclusions and Concerns

- Conclusions
  - Alternate-day dosing improved iron absorption vs. consecutive-day
  - Daily dosing similar iron absorption as BID
  - Alternate-day dosing decreased GI symptoms
- Concerns
  - Small sample size
  - Restricted patient population
  - Adherence concerns

Final Thoughts…

- Parenteral iron is NOT scary
- Many patients will feel SO MUCH better with it
- Little is known about cost benefit ratio
- Shout out to Greg Vercellotti (U of Mn)
  - Iron man

Thank You
Questions, Comments

Bryan Trottier, MD

October 11th, 2019

CLIMATE HEALTH EMERGENCY:
FROM AWARENESS TO ACTION

Dr. Vishnu Laalitha Surapaneni, MD,MPH
Assistant Professor, General Internal Medicine
ACP Minnesota Conference, October 11, 2019

UNIVERSITY OF MINNESOTA
Driven to Discover®

PLURALISTIC IGNORANCE LEADS TO SELF-SILENCING

Image Credit: Getty Images Data Source: Nathaniel Geiger, Janet K. Swim, Journal of Environmental Psychology, 2016

Disclosure Information

Disclosure of Relevant Financial Relationships

I have no financial relationships to disclose

CLIMATE CHANGES HEALTH

> Climate change is the biggest global health threat of the 21st Century. Climate change will have its greatest impact on those who are already the poorest in the world: it will deepen inequities and the effects of global warming will shape the future of health among all peoples.

THE LANCET

May 2009

OBJECTIVES

Objective 1:

Identify Health Impacts of Climate Damage in the Mid-West

Objective 2:

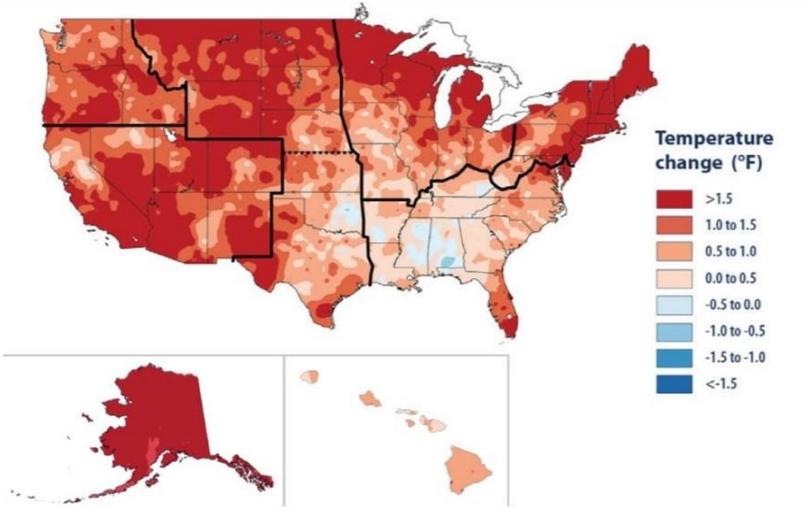
What can health professionals do about it?

Objective 1:

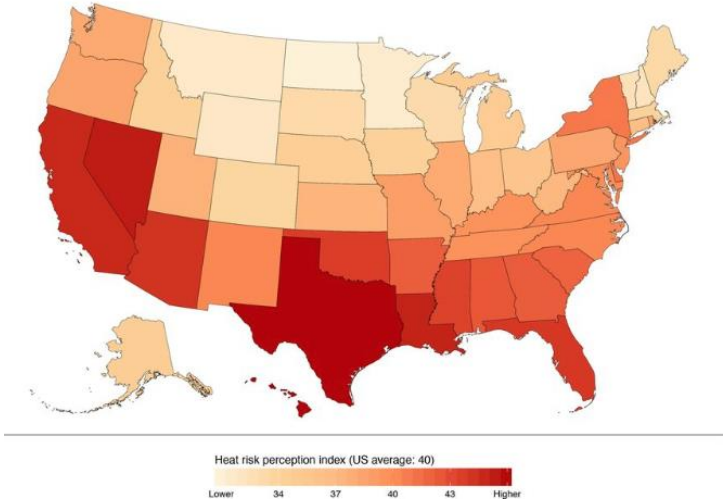
Identify Health Impacts of Climate Damage in Mid-West

- Extreme Heat
- Air Quality & Asthma
- Allergies
- Vector Borne Illness
- Water Borne Illness
- Mental Health Impacts

1. Climate Damage & Extreme Heat



Extreme Heat, EPA & CDC, Melillo et al, 2014



Public Perceptions Howe, Leiserowitz 2019

2. Climate Damage & Allergies

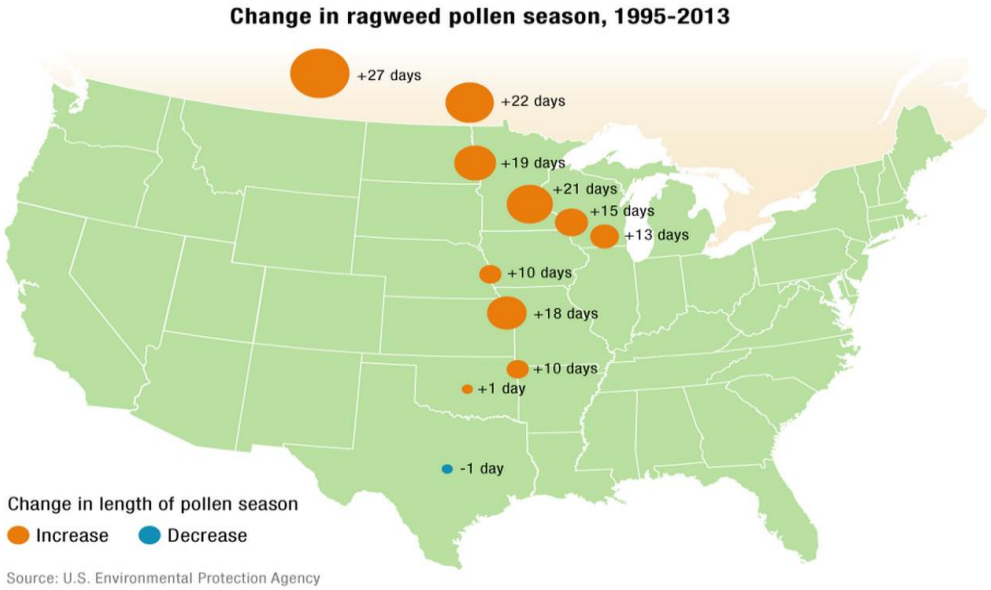
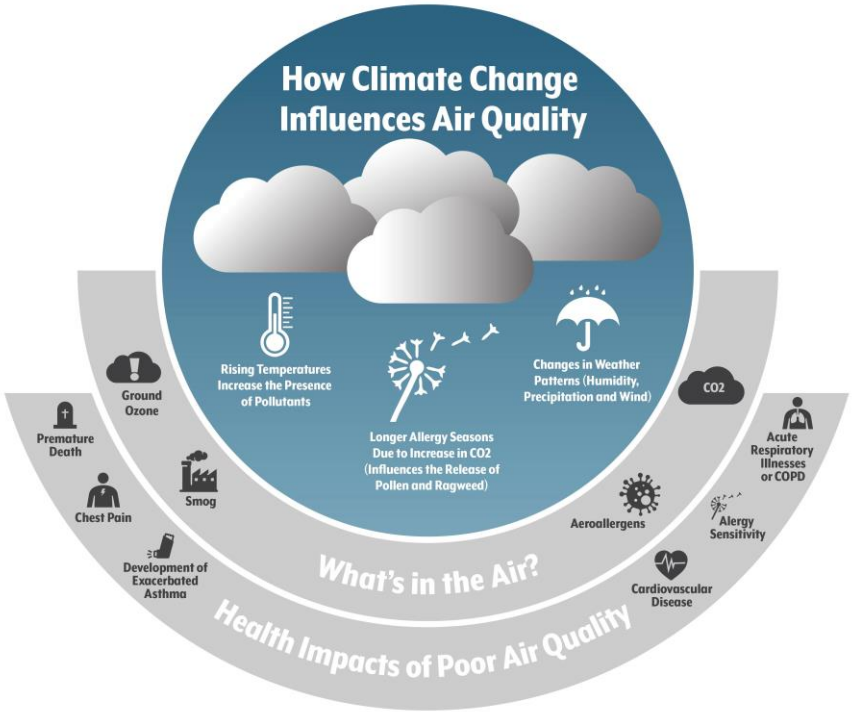
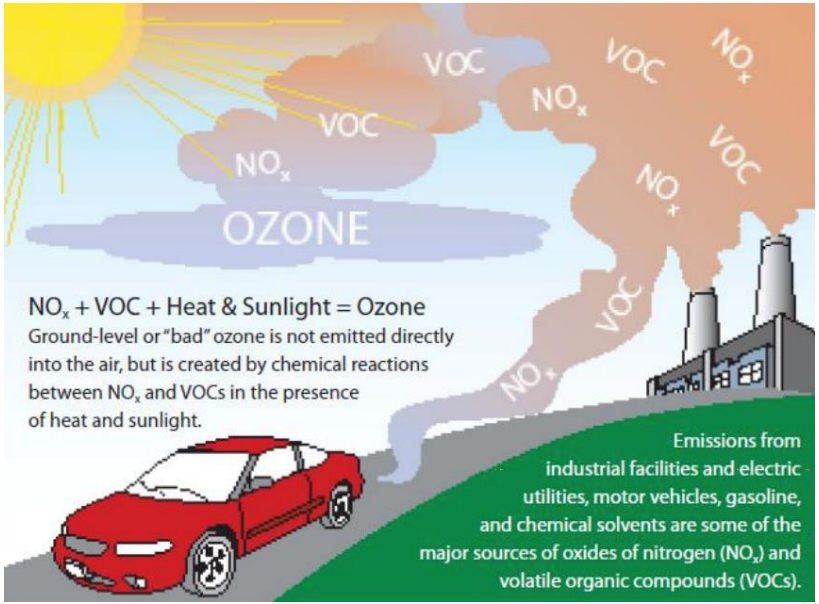


Image Source: Global Health.gov & EPA,2016

3. Climate Damage, Air Quality & Asthma

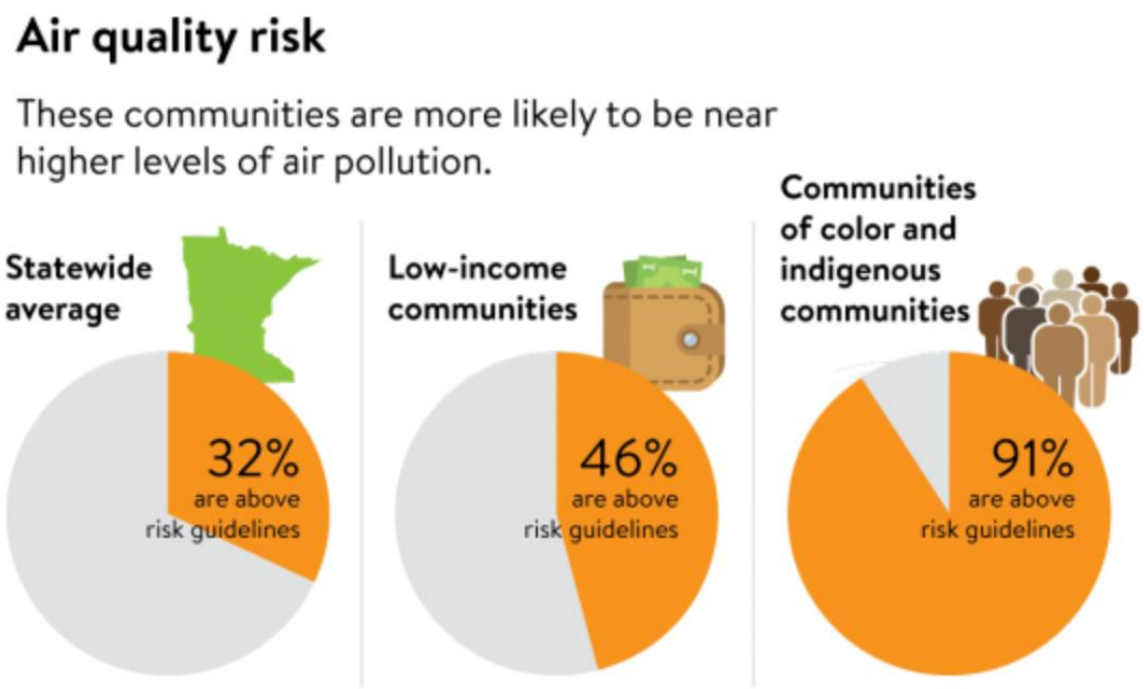


Colorado's Health & Colorado's Climate- Examining the Connection, 2017



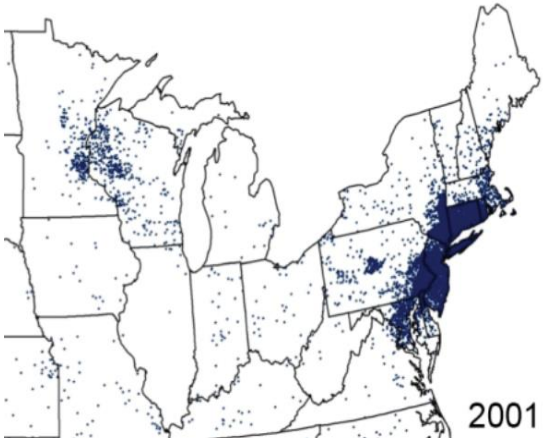
EPA 2016 Archive, Climate Penalty

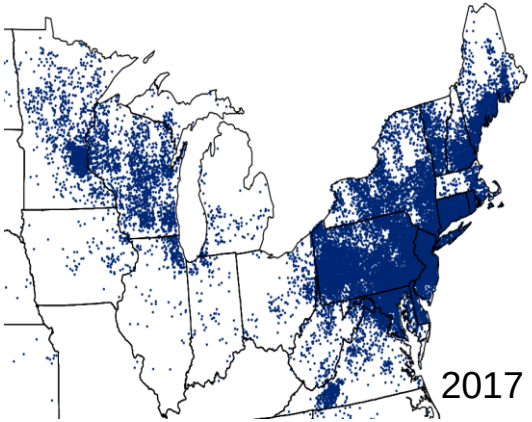
Environmental Injustice & Air Quality



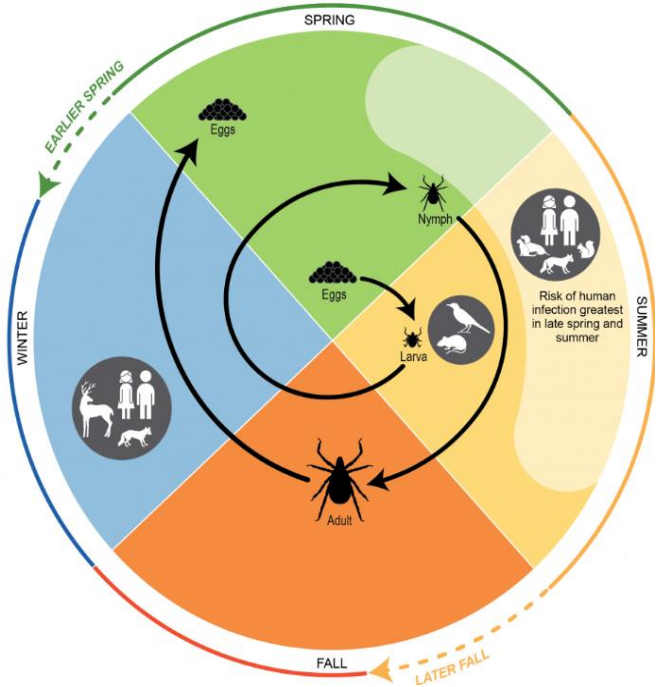
Air We Breathe, 2019 Report, MPCA

4. Climate Damage & Vector Borne Illness





Lyme Disease Reported Cases, Historical Maps, CDC



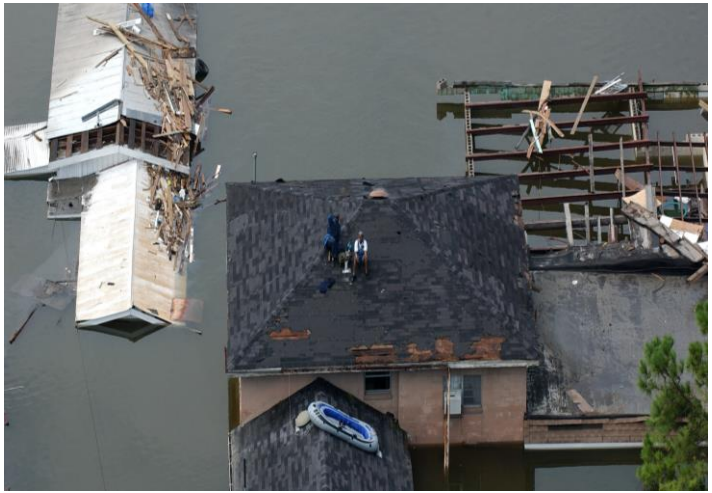
Source: Globalchange.gov

5. Climate Damage & Water-Borne Illness

Hamburg, Iowa. Floods of 2019
Photo Credit :Tim Gruber Copyright: New York Times

Mold in a home after Hurricane Katrina,
Credit:Getty Images/iStockphoto Copyright:DarrenTownsend

6. Climate Damage & Mental Health



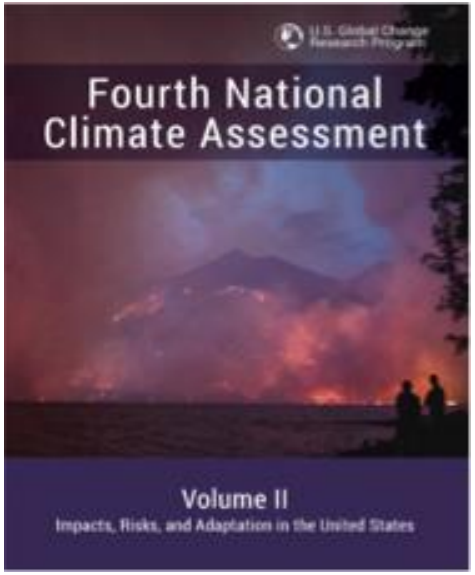
PTSD after natural disasters

Farmer suicides in drought

RESOURCES


2017
DEPARTMENT OF HEALTH
CLIMATE AND HEALTH 101


LANCET COUNTDOWN:
TRACKING PROGRESS
ON HEALTH AND
CLIMATE CHANGE
NRDC
JANUARY 2019
IB: 18-09-A
ISSUE BRIEF
CLIMATE CHANGE AND HEALTH
IN MICHIGAN


U.S. Global Change Research Program
Fourth National
Climate Assessment
Volume II
Impacts, Risks, and Adaptation in the United States

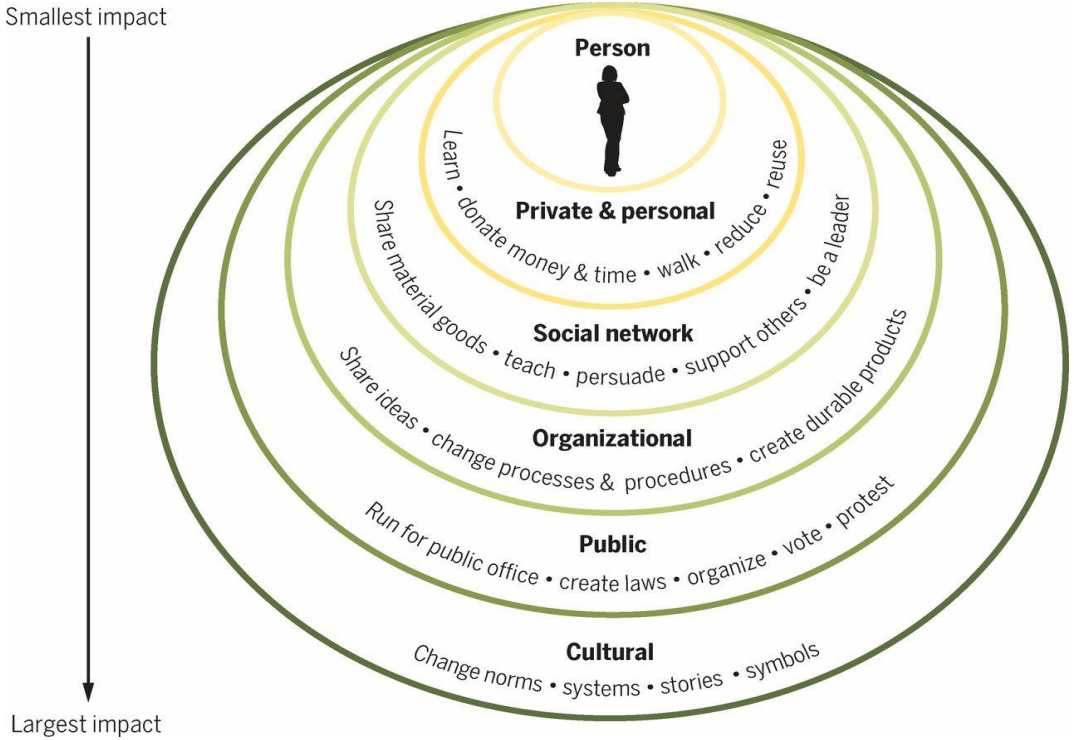

EPA United States Environmental Protection Agency
August 2016
EPA 430-F-16-017
What Climate Change
Means for Iowa

In one word, how does the current climate crisis make you feel?

Objective 2:

How can health professionals take climate action?

Individual's Sphere of Influence



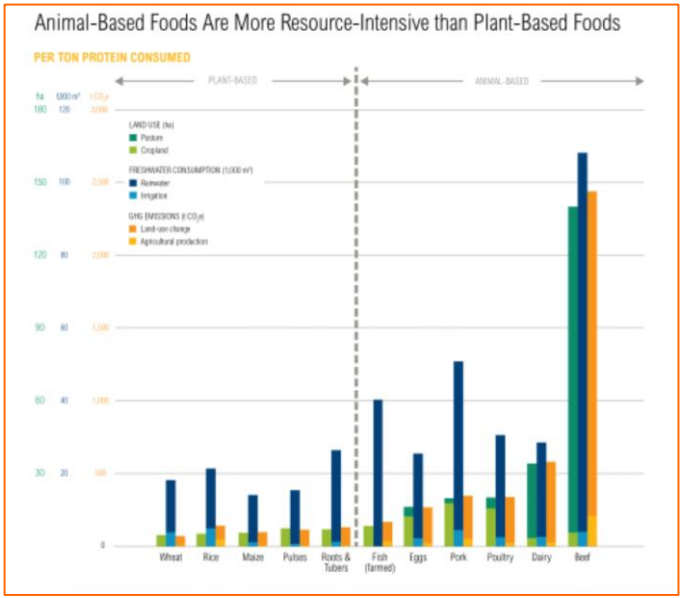
Source: Elise Amel et al. Science 2017

MITIGATION & ADAPTATION

Source: Calgary City, Climate Plan

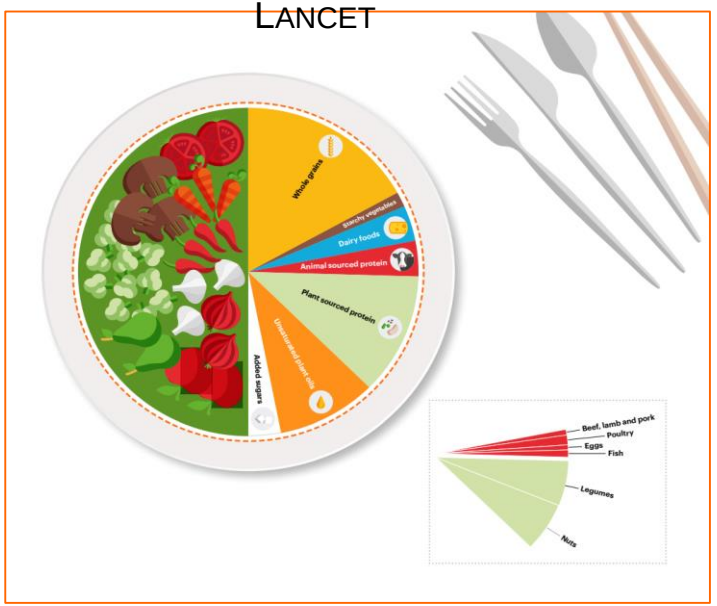
DIET

GHG/ TON OF PROTEIN



Source: World Resource Institute

EAT LANCET



Source: EAT-Lancet Commission

A planetary healthy diet will prevent 11 million deaths per year globally (19% to 24% of total deaths)

EXERCISE

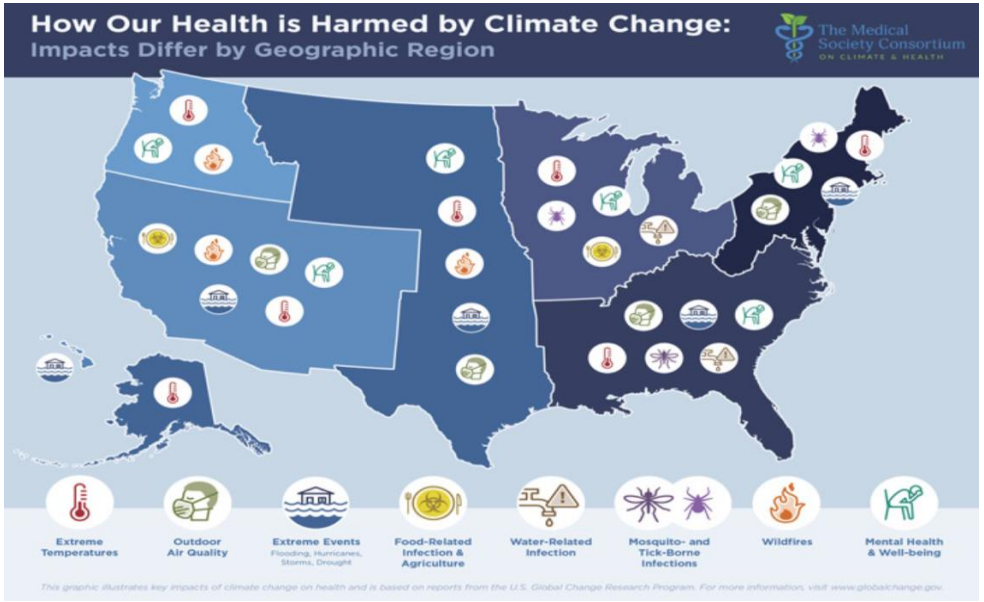
Trip Distance	Vehicle Trips		
	Sample Size	Sum (Millions)	Percent
Less than 0.5 miles	31,851	11,063	5.0
1 mile	98,955	36,078	16.4
2 miles	84,856	30,430	13.8
3 miles	64,205	22,820	10.4
4 miles	48,361	17,357	7.9
5 miles	37,449	13,276	6.0
6 - 10 miles	106,830	38,153	17.3
11 - 15 miles	50,791	18,597	8.4
16 - 20 miles	28,913	10,999	5.0
21 - 30 miles	27,860	10,747	4.9
31 miles or more	31,228	10,895	4.9

Source: NHTS 2017 Survey

35% of Car Trips are </= 2 miles & only 53% of US adults meet 2008 physical aerobic activity guidelines

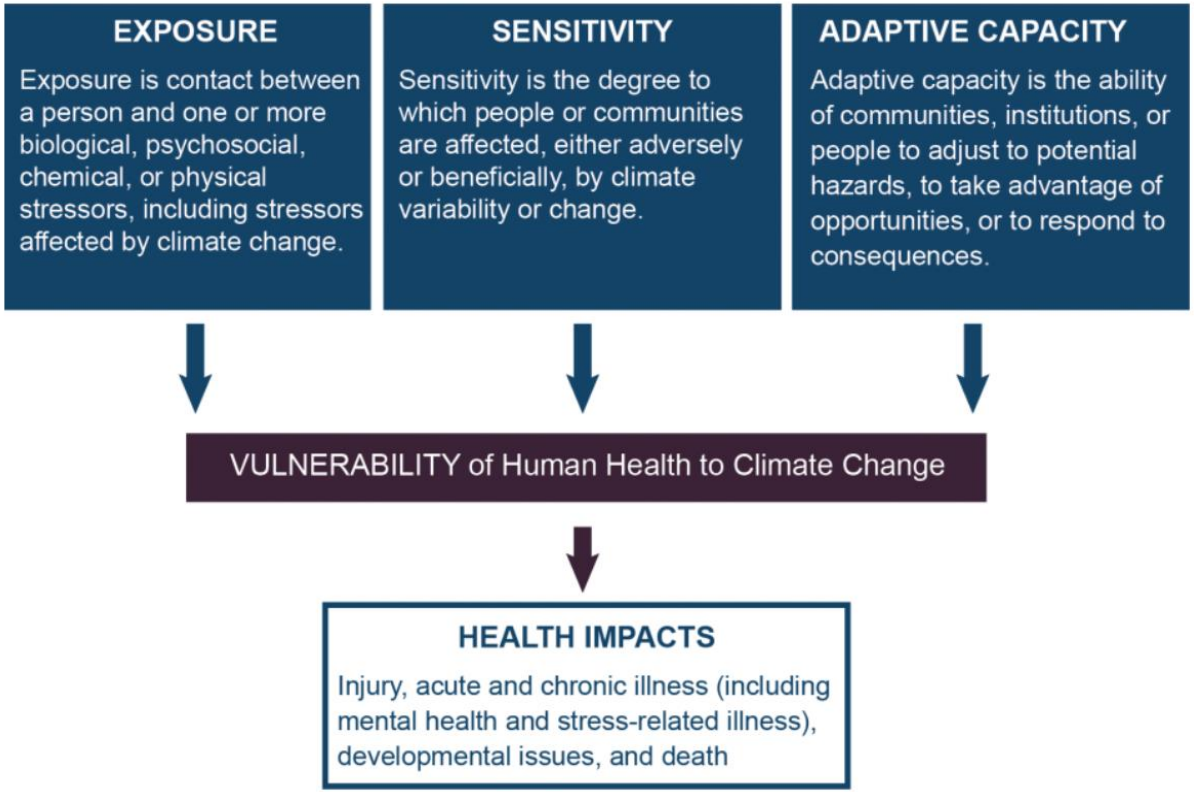
RIGHT HERE, RIGHT NOW

The health and well-being of Americans are already affected by climate change (very high confidence)



Text- 4th NCA, Image: Medical Society Consortium

VULNERABILITY ASSESSMENT

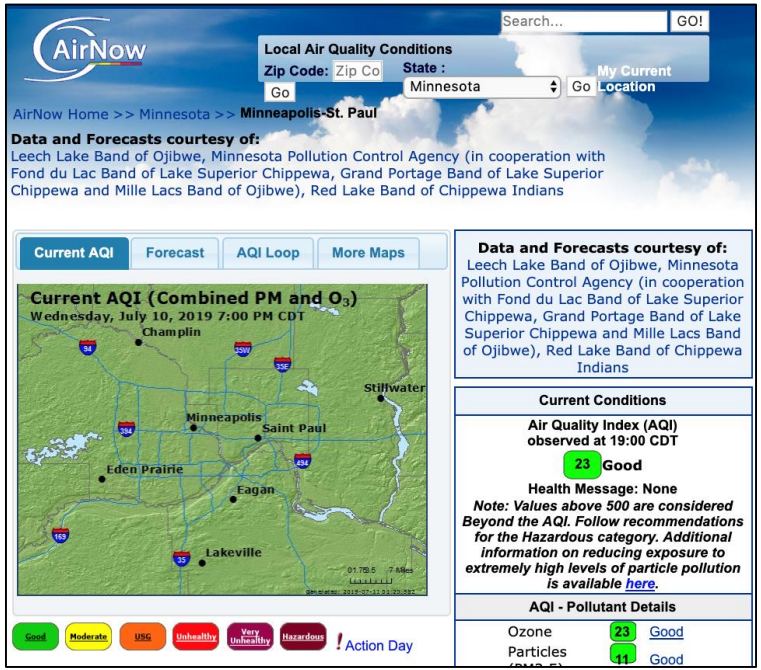


Global Change 2016

Case Study

An **8yr** male is presenting to the ER with an asthma exacerbation. It is his 5th admission this year. He lives in North Minneapolis, **55411**, **next to busy streets,** and loves to **play in his backyard**. He **has not been able to fill his inhalers** due to financial reasons and mom reports **not being able to pay utility bills** for two months.

Air Quality & Asthma



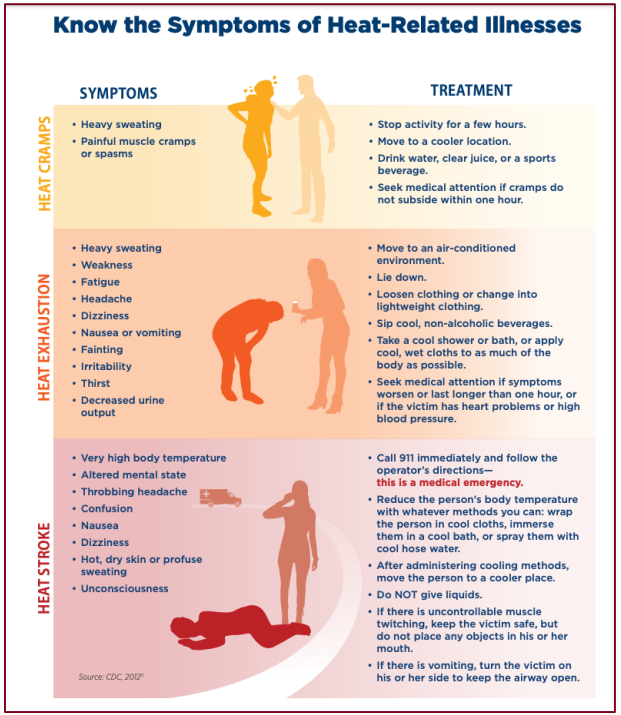
Source: AirNow

Case Study

- Bemidji, MN

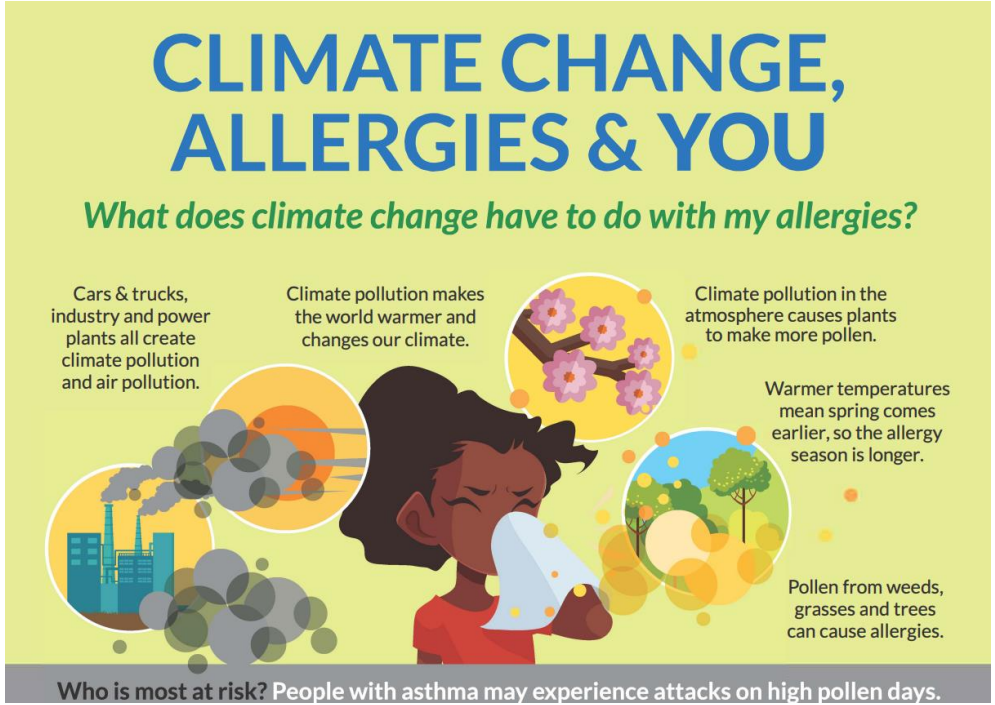
A **78yr** female presents to the ER (in **June**) with syncope while **she was gardening**. She is admitted for observation. **She is on HCTZ** and Lisinopril. Labs significant for AKI of 1.8 that resolved with IVF. Orthostatic vitals positive in ER. ECHO is normal, tele for 24 hours is normal. She is discharged w close PCP follow-up.

Extreme Heat
Avoid, Spot, Treat



Source: Climate Change and Extreme Heat, 2016, CDC

RESOURCES



Center for Climate Change & Health, Public Health Institute

Medical Consortium on Climate & Health

US Healthcare's Impact

479.7 Mt Co2

Source: Peter-Paul Pichler et al 2019 Environ. Res. Lett

422 Mt Co2

Source: UK Dept of Energy & Climate Change, 2014

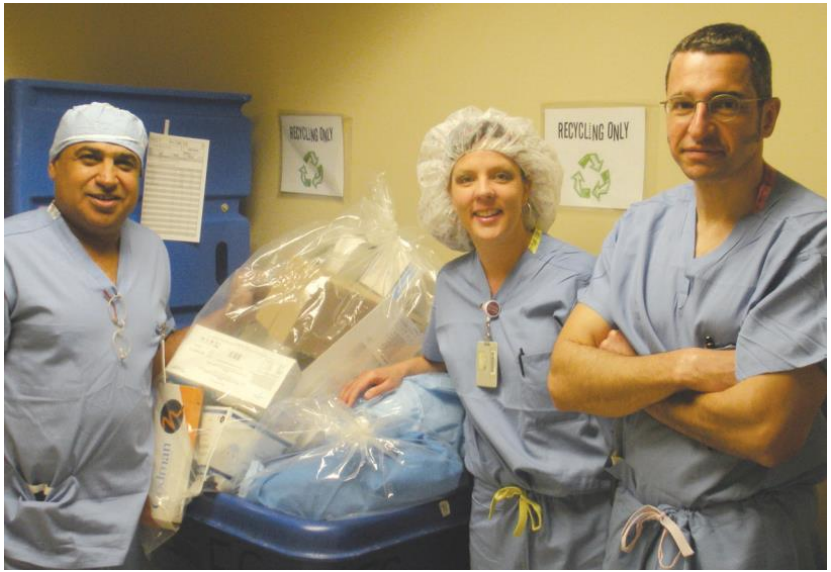
Healthier Food

Rooftop Garden, Boston Medical Center

Proyecto Jardín- UCLA

GREENING THE OR

Practice Green Health



University of Minnesota Medical Center Team

Lean & Clean Energy

Gundersen Health Care System

1st healthcare system in the US to be energy independent

Gundersen, LaCrosse, WI

LED lights- Mayo Clinic, Phoenix

Image credit: Mayo Clinic

ORGANIZATIONAL- ADAPTATION

Spaulding Rehabilitation Hospital, Boston

Southeast Louisiana Veterans Health Care Center

Shorefront Rehabilitation Center, Brooklyn, NY

Healthy Hospitals Initiative

CHALLENGE AREAS

Advancing Sustainability in Health Care, Practice Green Health,

RESOURCES


PRACTICE Greenhealth
WHY SUSTAINABILITY
ABOUT
TOPICS
RESOURCES
MEMBERSHIP
SUSTAINABILITY SOLUTIONS FOR HEALTH CARE
Practice Greenhealth is the leading membership and networking organization for sustainable health care, delivering environmental solutions to hospitals and health systems across the United States.
SEE HOW WE CAN HELP YOU:
CO2
OR

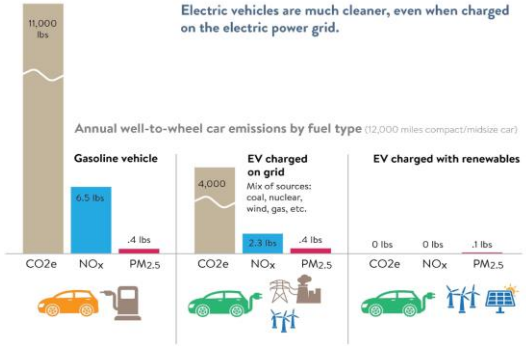
Why Legislative Advocacy?

Source: Frieden T.Am J Public Health; 2010; 100 (4) Image source: Live Healthy Douglas

U.S. Call to action:
Climate, Health and Equity Policy Action Agenda

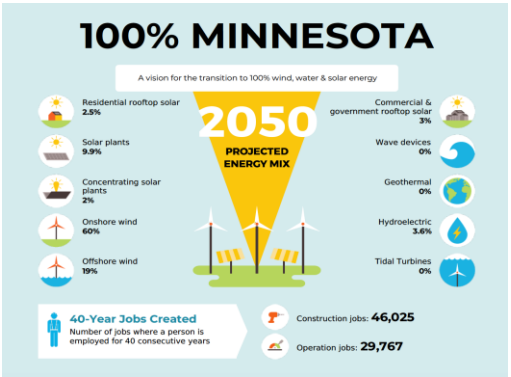
Climate Advocacy Issues in Minnesota

Active transport + Zero-Carbon Transport



MPCA, Air We Breathe, 2019

MPR News Graphic, William Lager

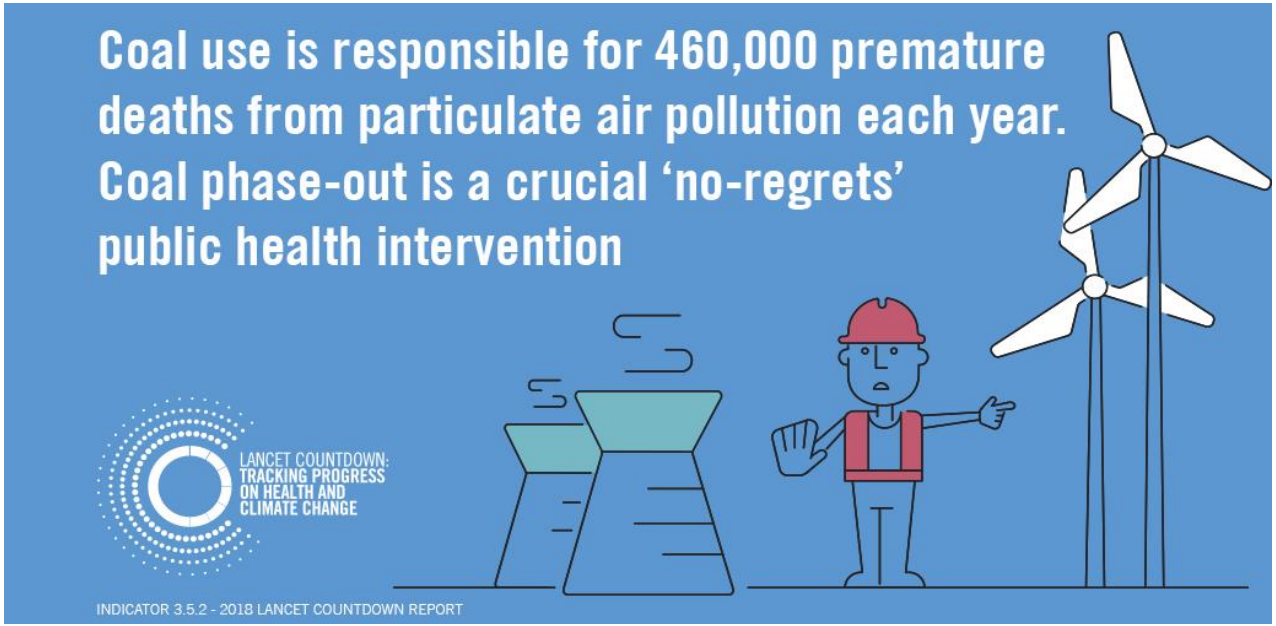


Solutions Project

Transition rapidly away from the use of Fossil Fuels

Transition to renewable energy

Physicians as Climate Advocates



Source: Lancet Countdown, 2018

ADVOCACY

CONTACT POLICYMAKERS

WRITE EDITORIALS

GIVE TALKS

Source: Medical Consortium

RESOURCES

MINNESOTA

Health Professionals for a HEALTHY CLIMATE

Honored Recipient of the 2017 Minnesota Climate Adaptation Partnership Award

OHIO

OCCA
Ohio Clinicians for Climate Action

NATIONAL

ACP American College of Physicians®
Leading Internal Medicine, Improving Lives

The Medical Society Consortium
ON CLIMATE & HEALTH

Traveling to conferences adds to the carbon footprint of academics. Which would you prefer in the future?

In-person conference attendance

Live streaming option for all sessions

UNIVERSITY OF MINNESOTA

Driven to Discover®

Crookston Duluth Morris Rochester Twin Cities

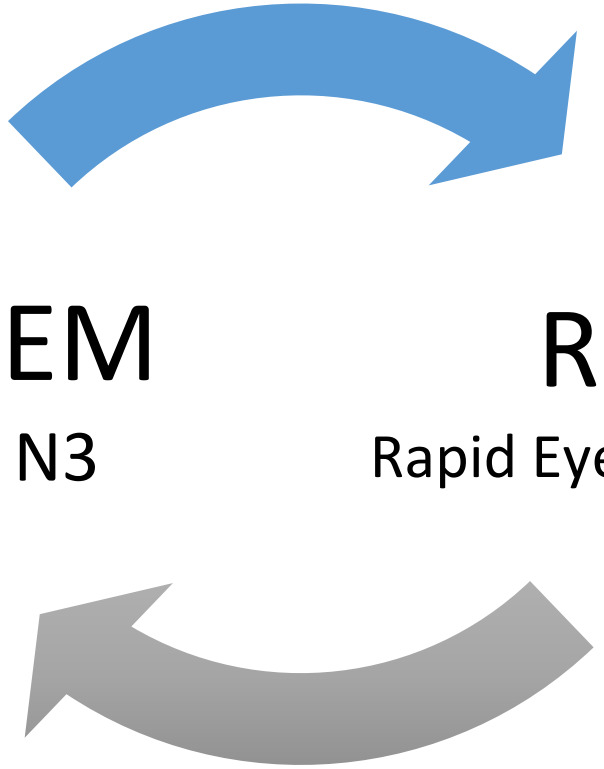
Sleep Tips

Ranji Varghese, MD
Medical Director, Minnesota Regional Sleep Disorders Center, HCMC
Assistant Professor, University of Minnesota
October 11, 2019, ACP Minneapolis

Disclosure of Relevant Financial Relationships

- None

Stages of Sleep



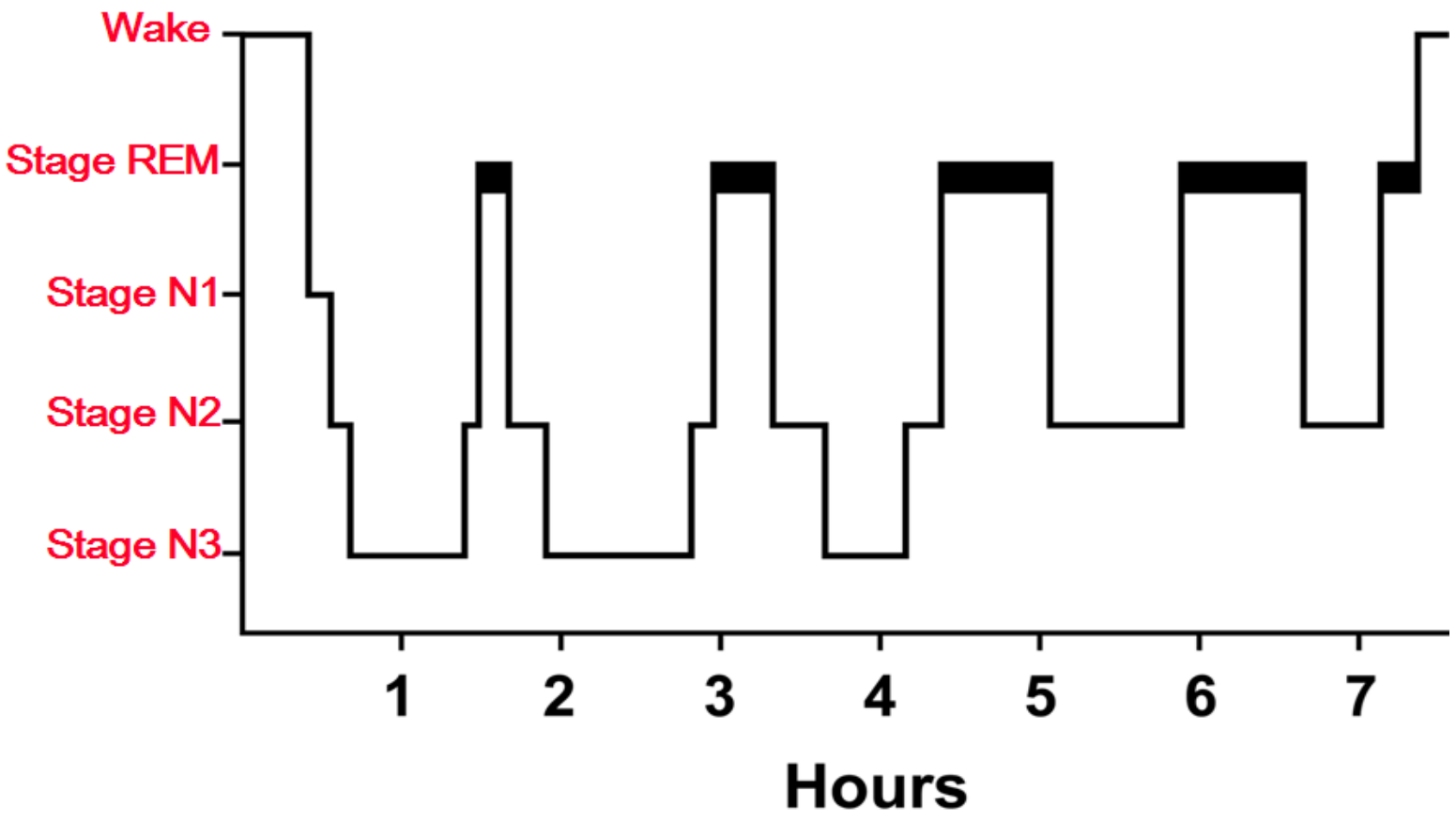
Non REM

N1, N2, N3

REM

Rapid Eye Movement

Sleep Architecture



Function of Sleep

Restoration

Learning & Unlearning

Immune Competence

Brain Detox

Obstructive Sleep Apnea (OSA)

OSA (Obstructive Sleep Apnea)

	Men	Women
• Habitual snoring	45%	25%
• Mild	24%	9%
• Moderate	9%	4%
• Symptoms + Mild OSA	4%	2%

- OSA is undiagnosed in more than 90% of women

Young T. NEJM 1993; 328:1230

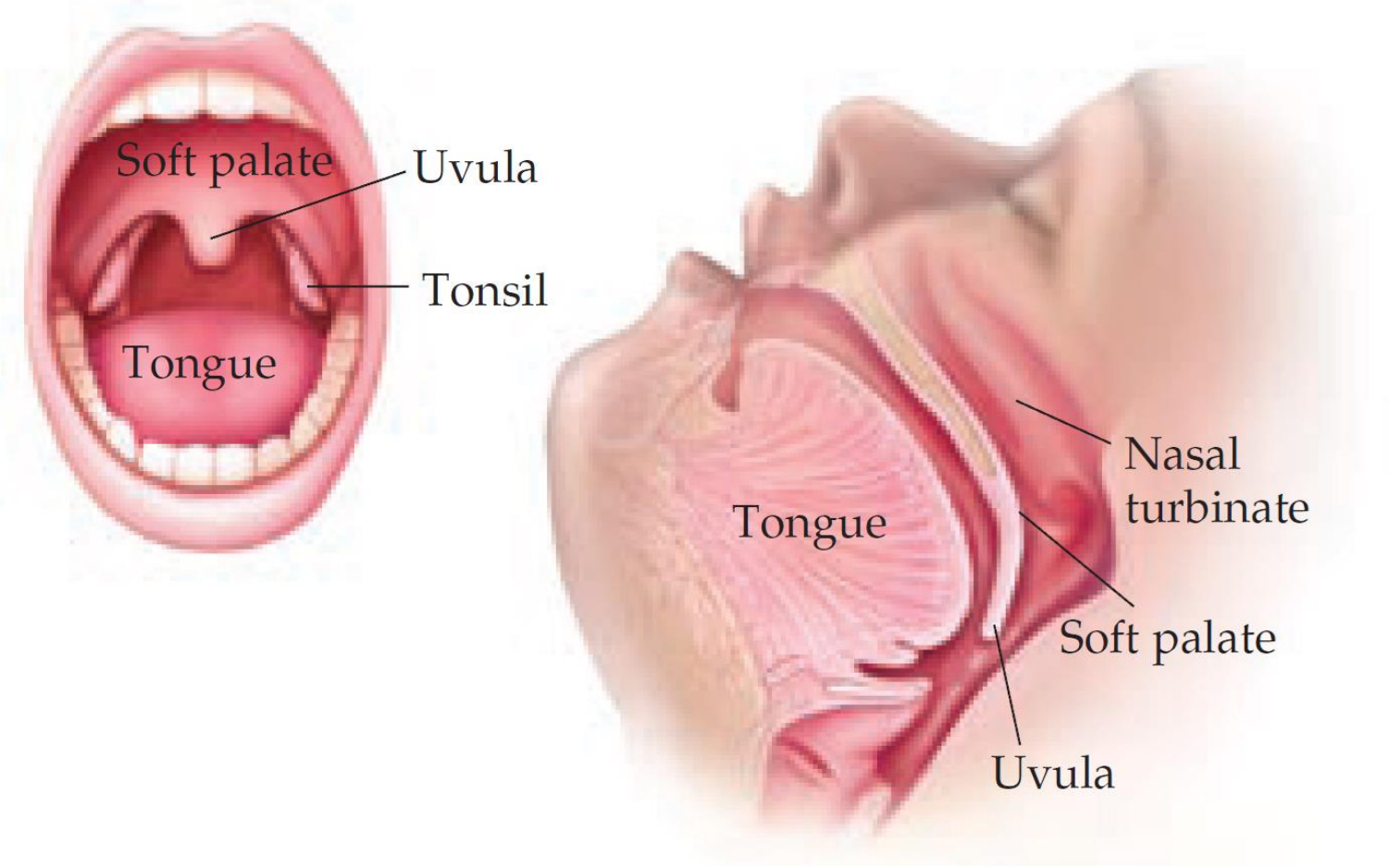
Signs and Symptoms

- Snoring
- Witnessed Apneas
- Nonrestorative sleep or daytime sleepiness
- Morning dry mouth
- Morning headache
- Mood, concentration, memory

Predisposing Factors

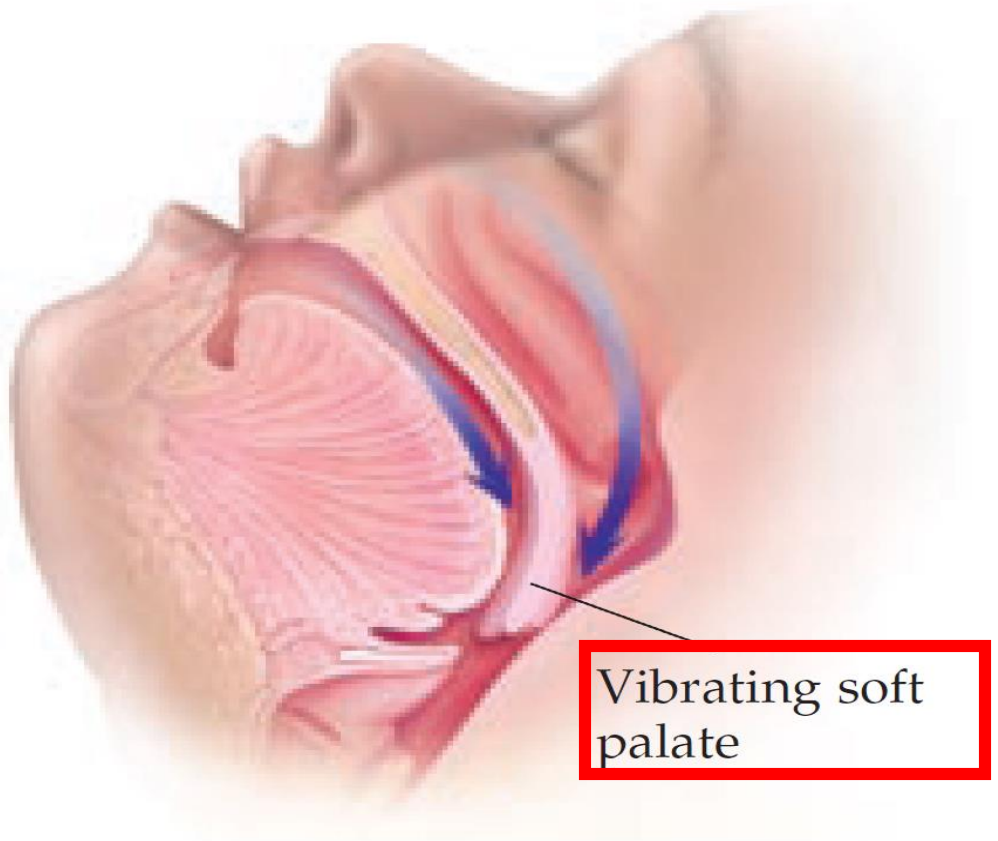
- Male Gender
- Post Menopausal
- Obesity **
- Body Position in Sleep
- Alcohol, Sedatives
- Narrowed airway

Normal Anatomy



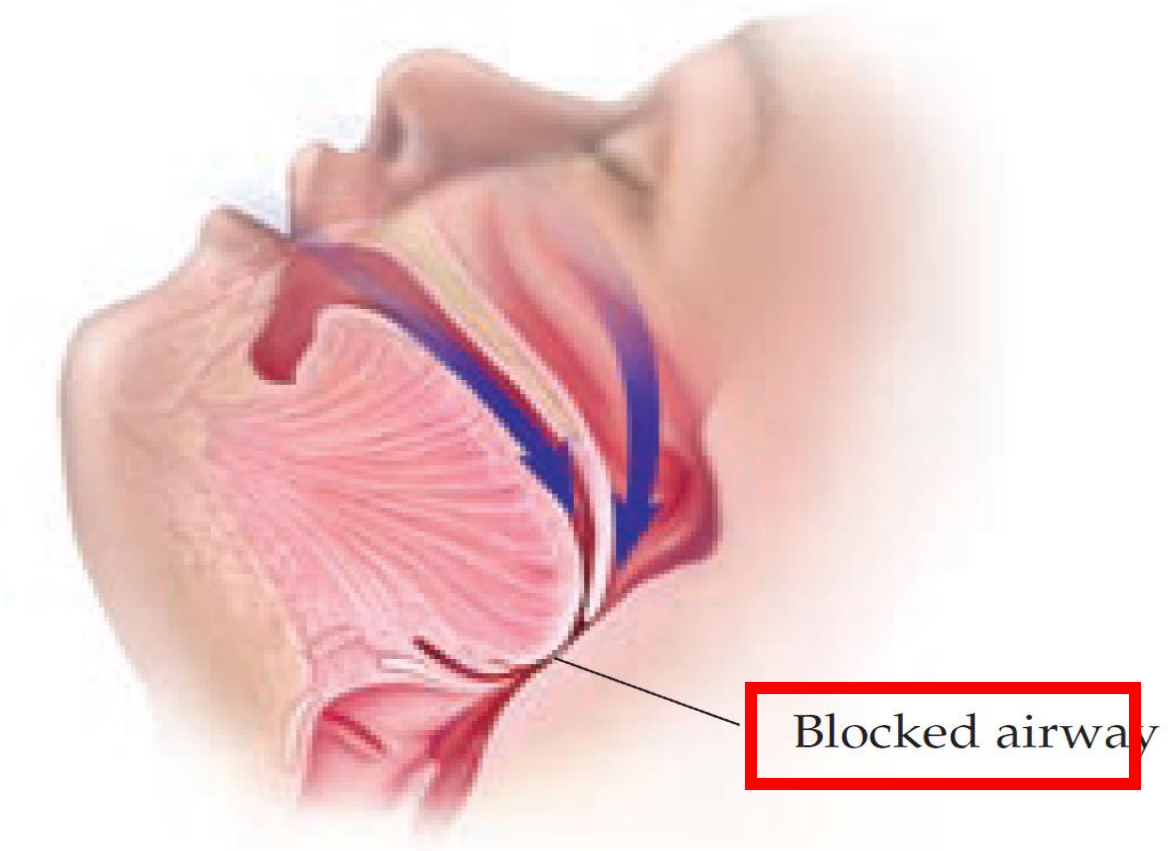
Mayo Clinic

Snoring



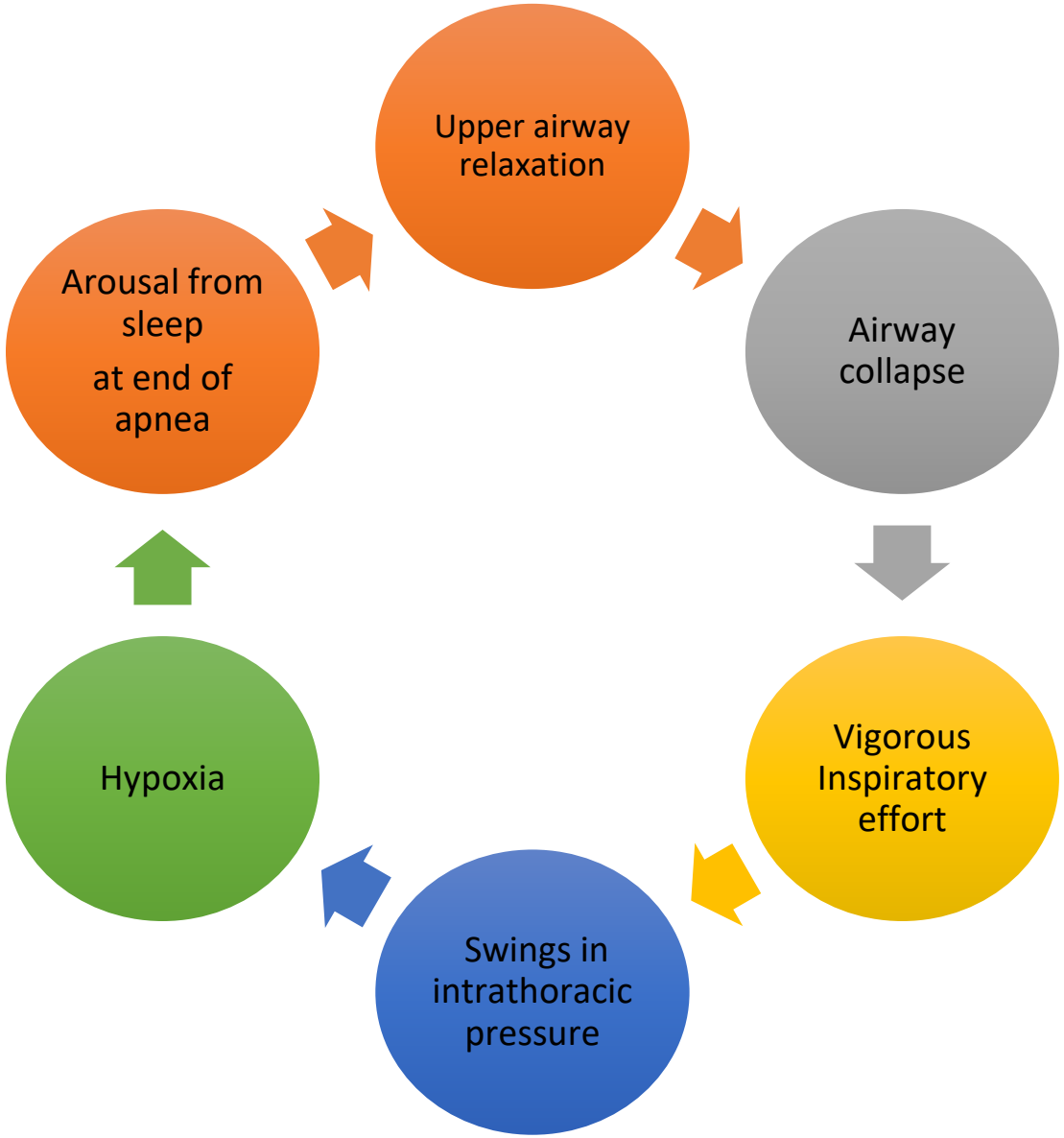
Mayo Clinic

Obstructive Sleep Apnea

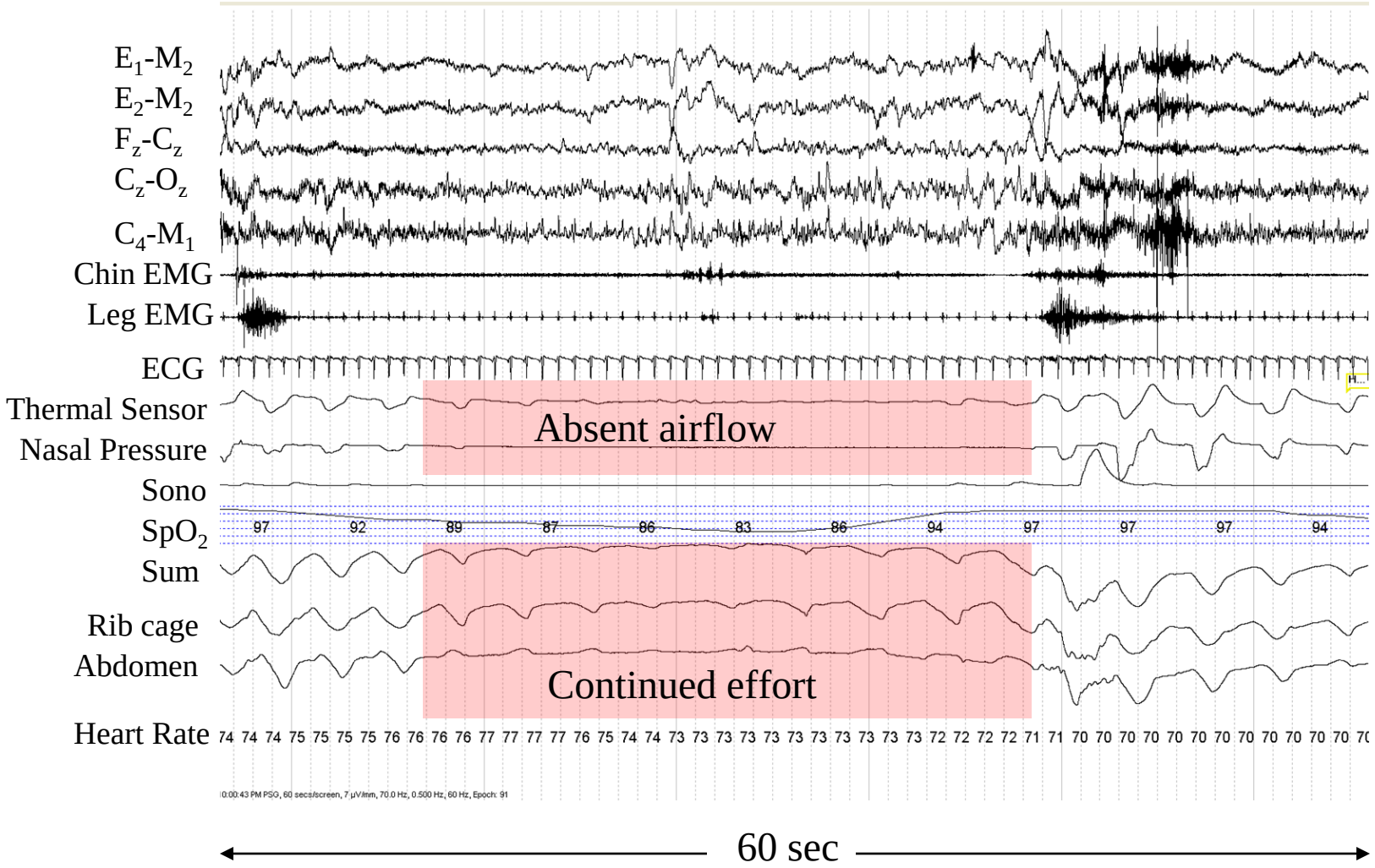


Mayo Clinic

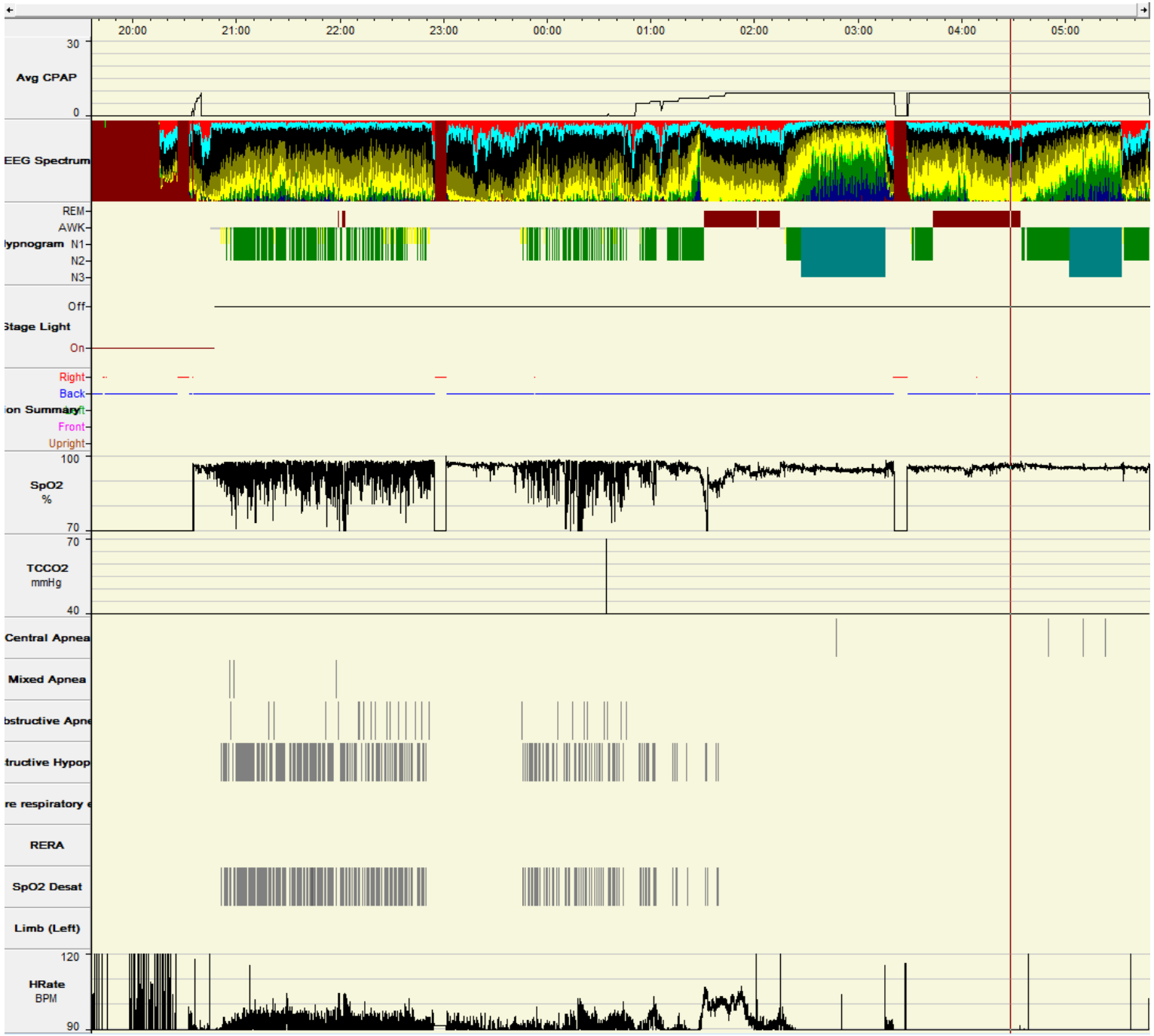
The Cycle of an Obstructive Apnea



Anatomy of an Obstructive Apnea



Mayo Clinic


20:00
21:00
22:00
23:00
00:00
01:00
02:00
03:00
04:00
05:00
30
Avg CPAP
0
EEG Spectrum
REM
AWK
ypnogram N1
N2
N3
Off
Stage Light
On
Right
Back
on Summary
Front
Upright
100
SpO2
%
70
70
TCCO2
mmHg
40
Central Apnea
Mixed Apnea
bstructive Apne
tructive Hypop
re respiratory e
RERA
SpO2 Desat
Limb (Left)
120
HRate
BPM
90

AHI (Apnea/Hypopnea Index)

Mild	5-14/hr
Moderate	15-29/hr
Severe	>30/hr

**Degree of oxygen desaturations considered in the severity

OSA and Coronary Artery Disease

- Associated with nocturnal angina
- Nocturnal ST-T segment depression
- Mechanism:
  - Increased myocardial oxygen demand during post-apneic surges in BP and HR
  - Occurring in an oxygen deprived situation

Nightly Variation of Sudden Cardiac Death in OSA

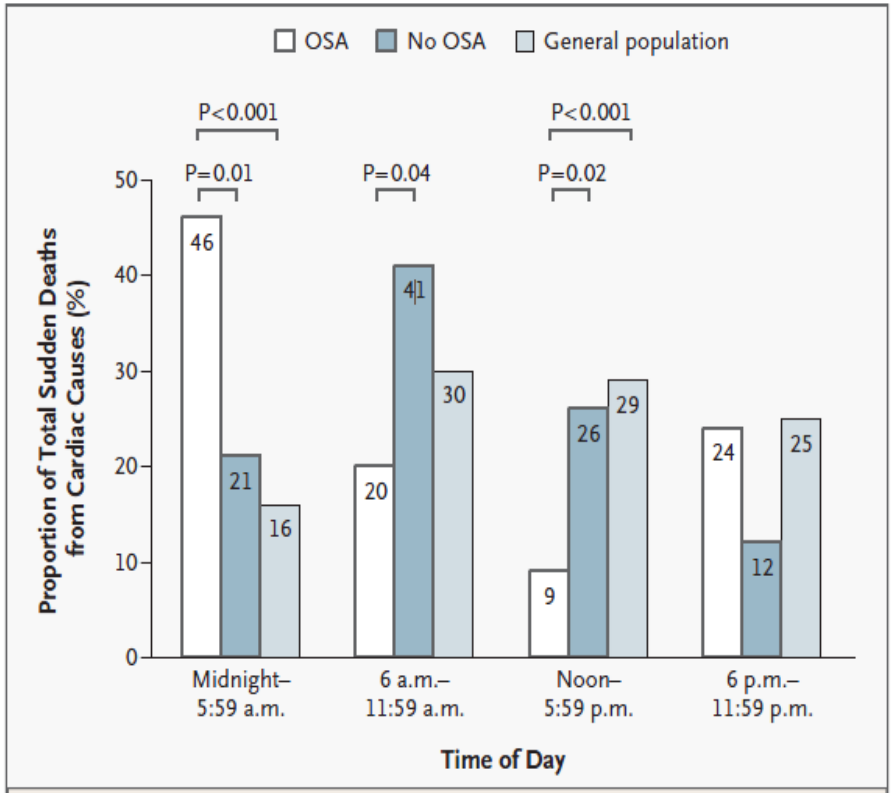


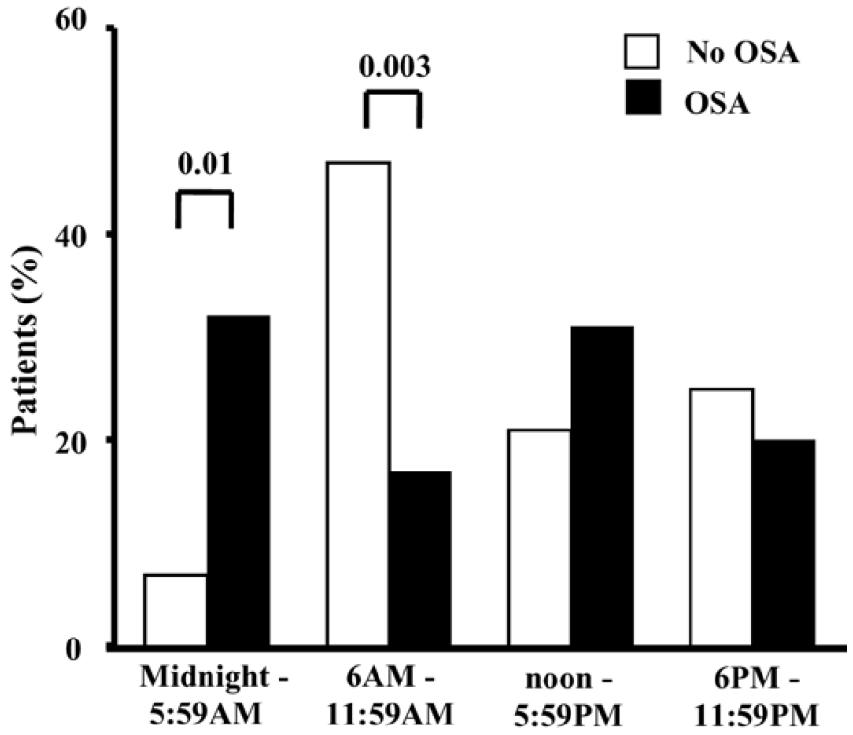
Figure 1. Day–Night Pattern of Sudden Death from Cardiac Causes in 78 Persons with and 34 Persons without Obstructive Sleep Apnea (OSA) and in the General Population.

Data for the general population were derived from Cohen et al.[1]

- NEJM
- Retrospective
- 46% of OSA died between 12-6am vs 21% of No OSA, vs. 16% in general population
- Dose Dependent; based on AHI
- Relative risk of sudden death from cardiac causes from midnight to 6 a.m. was 2.57

Gami, Somers et al NEJM 2005 352;12

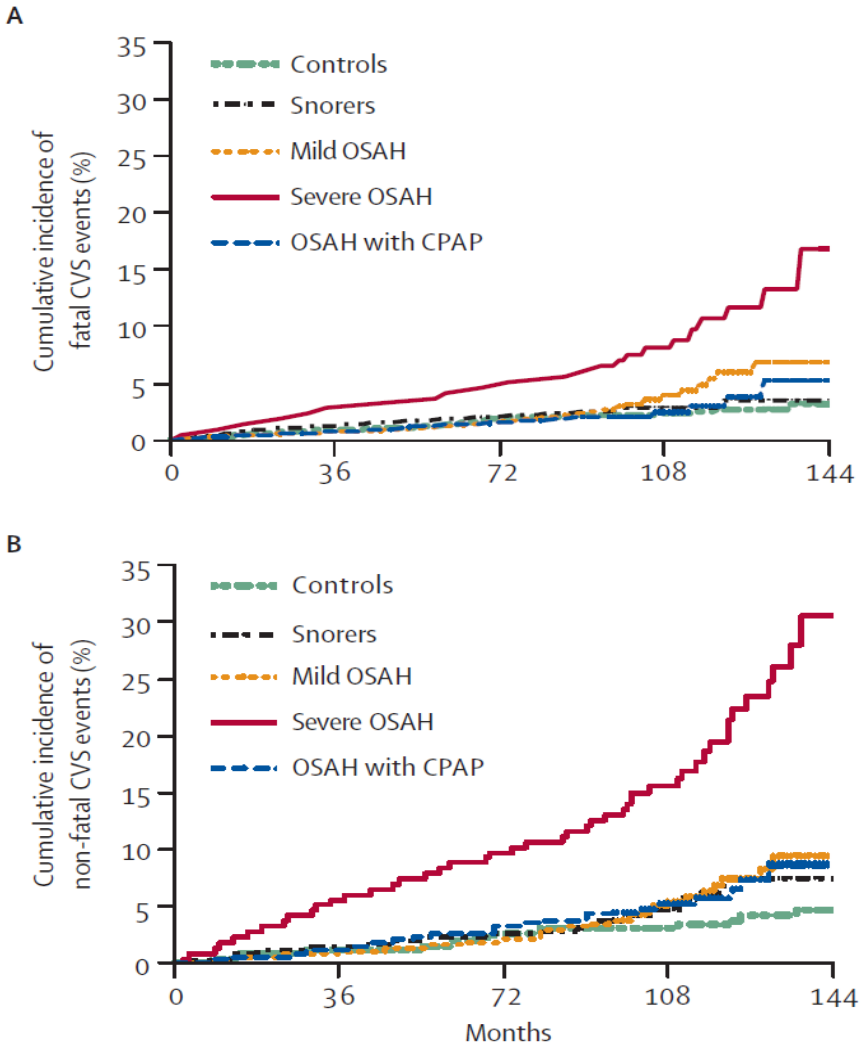
Nightly Variation of MI in OSA



- N=92, prospective
- Matched for co-morbidities, meds, age
- Odds ratio of 6 for having OSA if MI between 12-6am

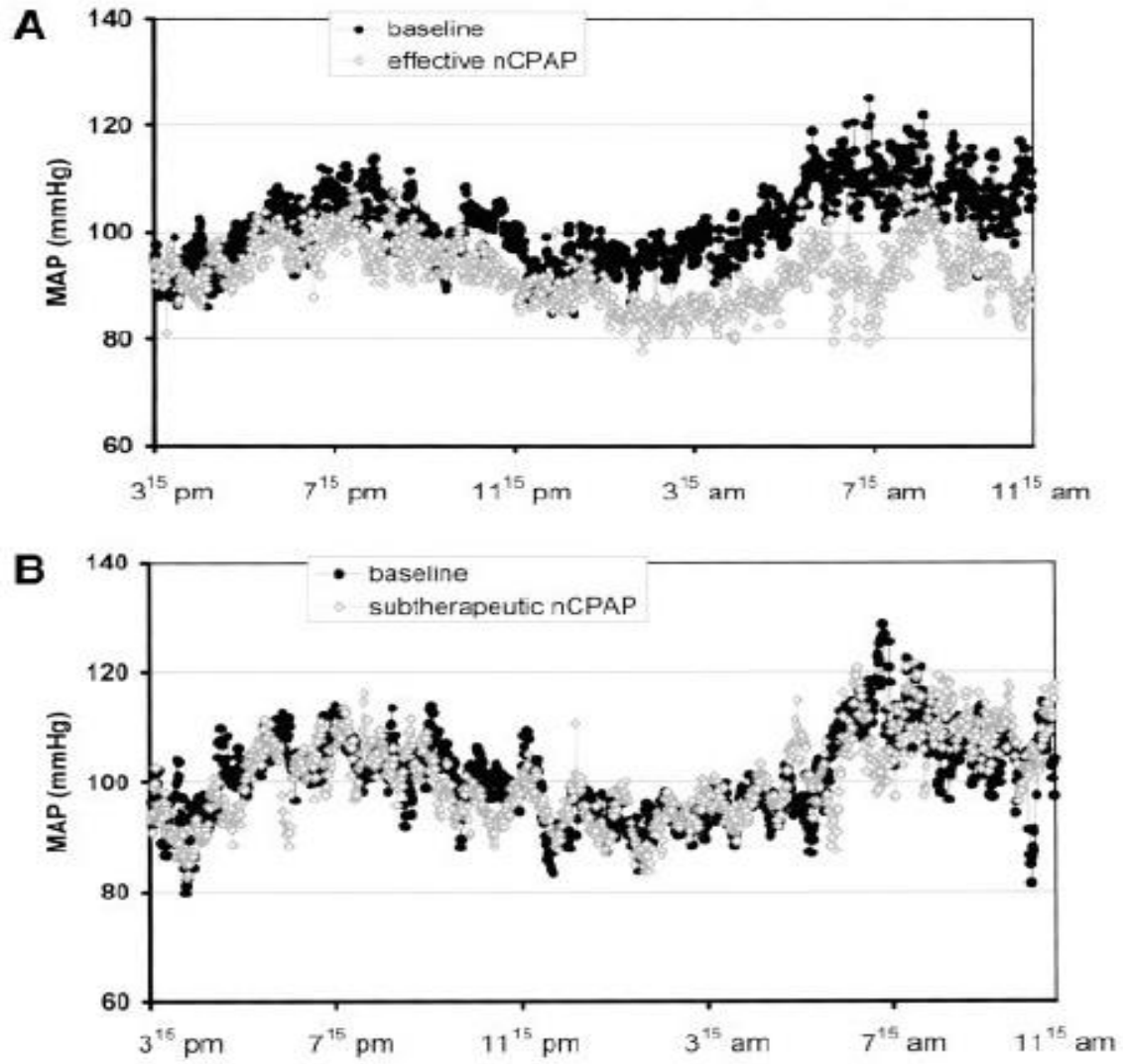
Kuniyoshi, et al, Journal of the American College of Cardiology 2008 52:5

Outcomes



- Population based sample
- Age, BMI matched
- 10 year follow up
- Odds ratio for untreated OSA
  - **Fatal CV**
    - (2·87, 95% CI 1·17–7·51)
  - **Non Fatal CV**
    - (3·17, 95% CI 1·12–7·51)

Hypertension Intervention



- Nocturnal and daytime mean, arterial pressures all reduced by 10 mm Hg

(Becker et al, Circulation 2003; 107)

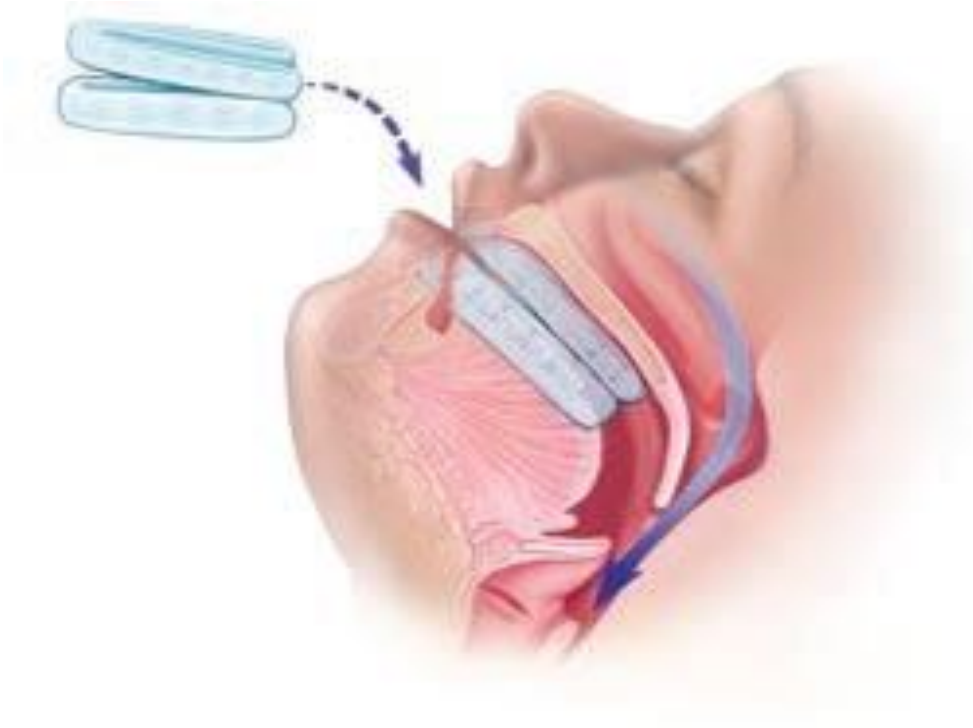
Therapy

- Weight loss, position therapy

- MAD Mandibular Advancement Device
- CPAP Positive Airway Pressure
- Surgical: -MMA (Maxillary Mandibular Advancement)

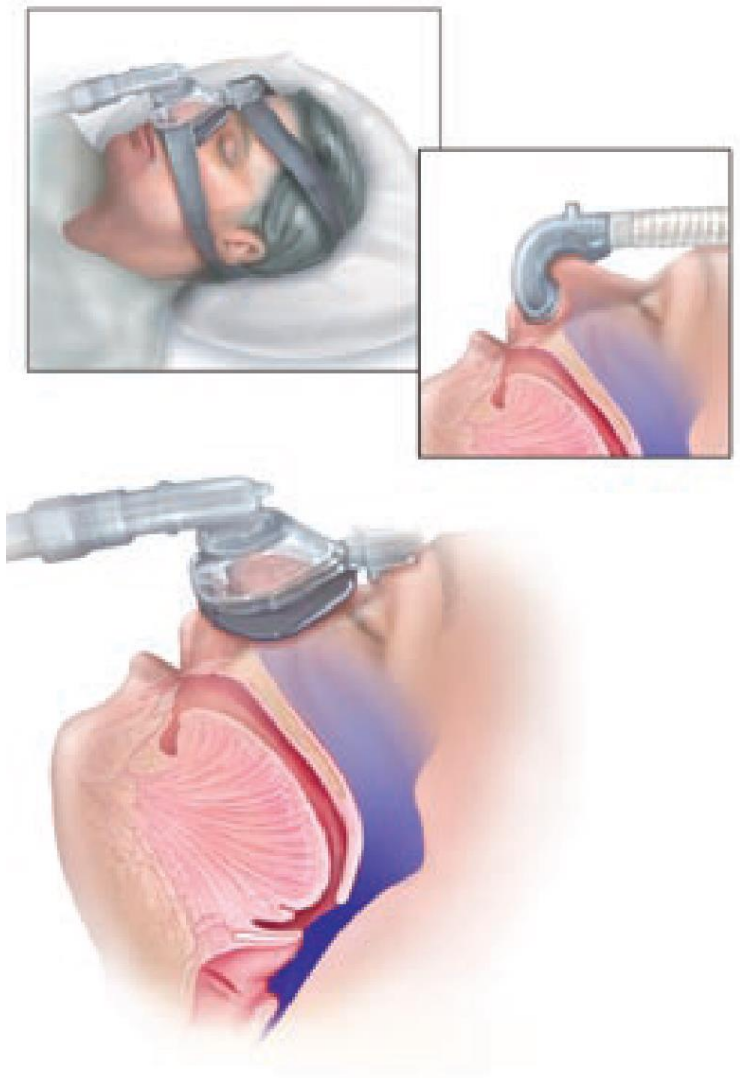
  -Neurostimulation

Mandibular Advancement Device (MAD)



Mayo Clinic

CPAP



C = Continuous

P = Positive

A = Airway

P = Pressure

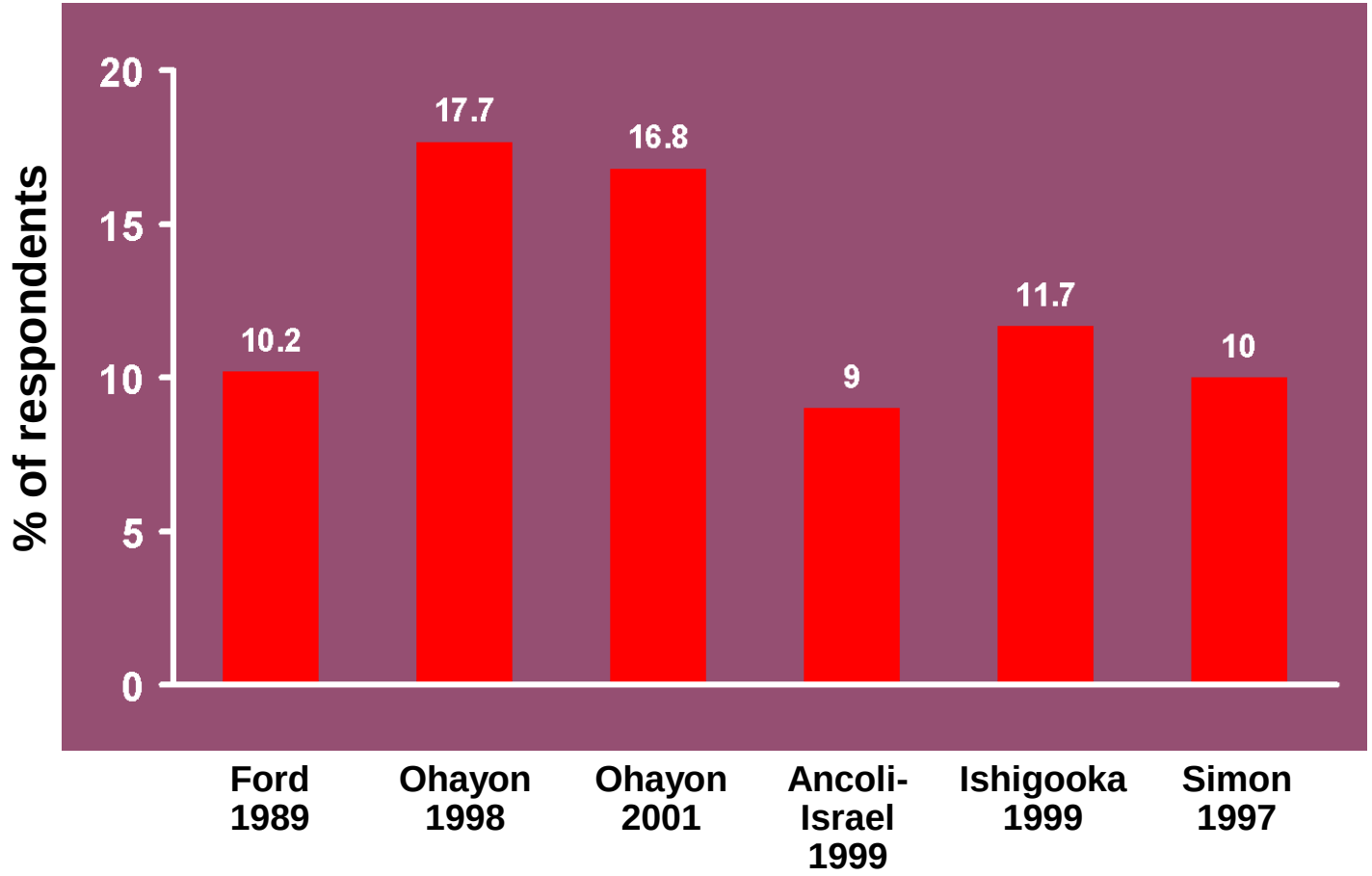
Mayo Clinic

Insomnia

Insomnia

- Trouble getting to sleep or falling back to sleep after awakening
- Waking up frequently through the night
- Nonrestorative sleep

Prevalence of Chronic Insomnia in the General Adult Population



*Sleep disturbance every night for 2 weeks or more, or more stringent criteria.

Ford and Kamerow. *JAMA*. 1989;262:1479; Ohayon et al. *Compr Psychiatry*. 1998;39:185; Ohayon and Roth. *J Psychosom Res*. 2001;51:745; Ancoli-Israel and Roth. *Sleep*. 1999;22(suppl 2):S347; Ishigooka et al. *Psychiatry Clin Neurosci*. 1999;53:515; Simon and VonKorff. *Am J Psychiatry*. 1997;154:1417.

Risk factors

- Female 2:1 (particularly post- and peri-menopausal)
- Middle age to elderly
- Previous episodes difficulty sleeping in times of stress
- Previous episodes of depression

- Modifiable
  - Medical and Psychological Co-morbidities
  - Acute Insomnia
  - Stress***

Insomnia Management

- **Insomnia is largely a problem of a hyperarousal state**
- Behavioral changes are more powerful, longer-lasting than medications
- Behavioral changes do not have side effects
- Medications are useful in combination with good sleep habits

Good Sleep Habits

-Go to bed and wake up at the same time every day.

-Make sure that your bedroom is comfortable.

-Use your bed only for sleep

-Exercise regularly

-Consider cutting out all caffeine (coffee, chocolate, tea)

-Avoid alcohol before bedtime

-Avoid looking at illuminated screens (phones, computers, TV) in the 3 hours before bedtime.

-Expose yourself to bright light during the day

CBT-I (Cognitive Behavioral Therapy - Insomnia

- Relaxation Therapy
- Cognitive Therapy

- Stimulus Control
- Sleep Hygiene
- Sleep Restriction

**Difficult to be done in a primary care setting

Insomnia

CBT- I Providers

www.behavioralsleep.org

Benzodiazepine Hypnotics

	Half-Life (h)	TMAX (h)*	Dose (mg)	Indication
Triazolam (Halcion)	2–6	1–2	0.125–0.25	SOI
Quazepam (Doral)	48–120	2–3	7.5–15	SOI, SMI
Temazepam (Restoril)	8–20	1–2	15–30	SOI, SMI
Flurazepam (Dalmane)	48–120	1.5–4.5	15–30	SOI, SMI
Estazolam (ProSom)	8–24	1.5–2	1–2	SOI, SMI

SOI = Sleep Onset Initiation

SMI = Sleep Maintenance Insomnia

FDA APPROVED

Non-benzodiazepine Hypnotics

	Half-Life (h)	TMAX (h)*	Dose (mg)	Indication
Ramelteon	1–2.6	0.75 (0.5–1.5)	8	SOI
Doxepin	15 (10–30)	3.5 (1.5–4)	10-50 (generic) 3-6 (Silenor)	SMI
Suvorexant	12	0.5–6.0	10–20	SOI, SMI

FDA APPROVED

Z-Drugs Hypnotics

	Half-Life (h)	**TMAX (h)***	**Dose (mg)**	**Indication**
Zaleplon (Sonata)	(0.8–1.3)	(0.5–2)	5–10	SOI
Zolpidem: Oral tablet (Ambien)	2.5 (1.4–4.5)	1.6 (0.5–1.5)	5 (>65 yr) 5–10 (<65 yr)	SOI
Zolpidem: Ext. release (Ambien CR)	2.8 (1.6–4.5)	1.5 (1.5–2.0)	6.25–12.5	SOI, SMI
Eszopiclone (Lunesta)	6 (5–8)	1.5 (0.5–2)	2–3 (<65 yr) 1–2 (>65 yr)	SOI, SMI

FDA APPROVED (Black Box)

Parasomnias

Things that go bump in the night

Parasomnia

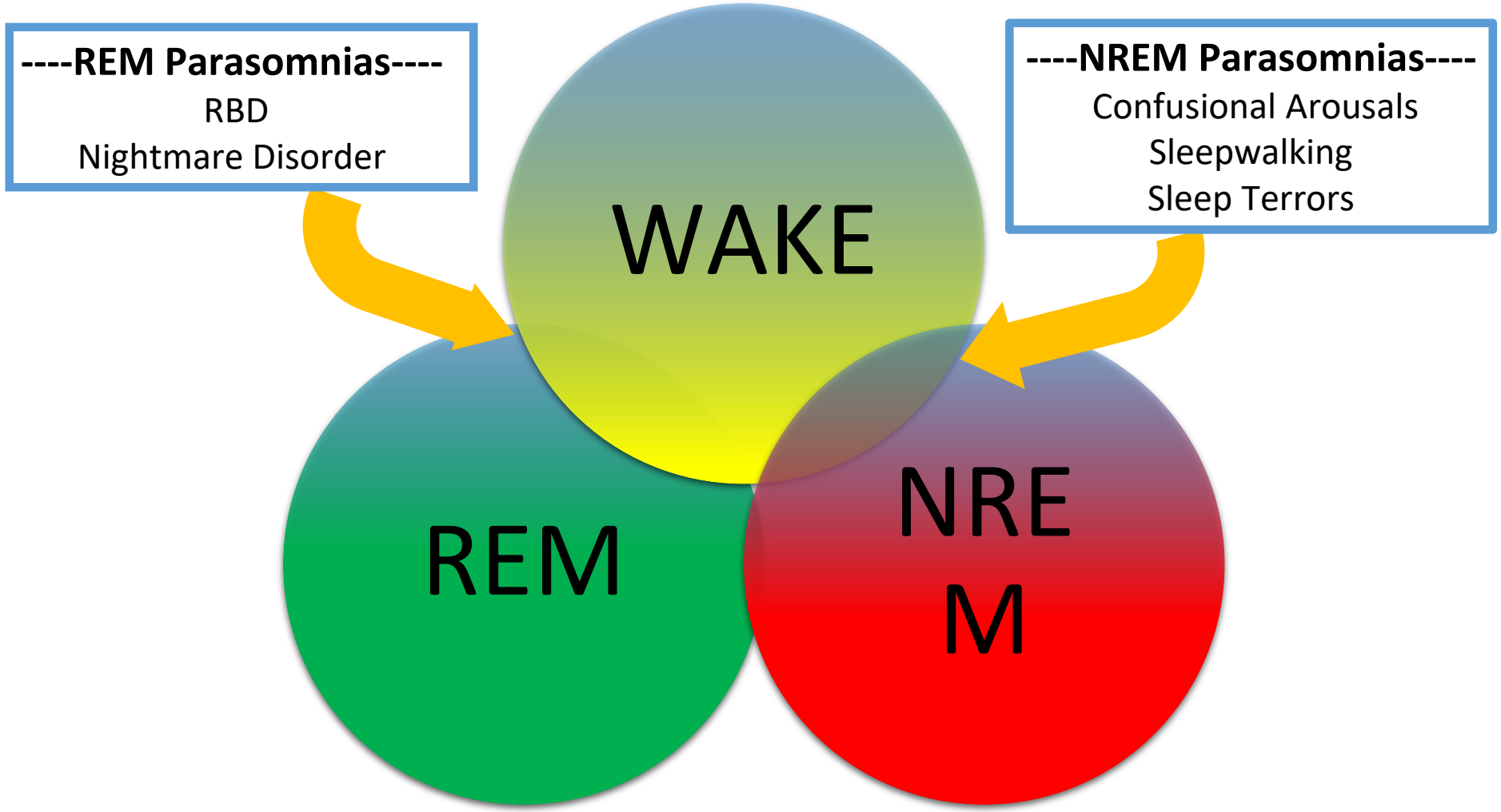
Undesirable behaviors or experiences that arise exclusively upon entry into, during, or arousing from the sleep period

NREM

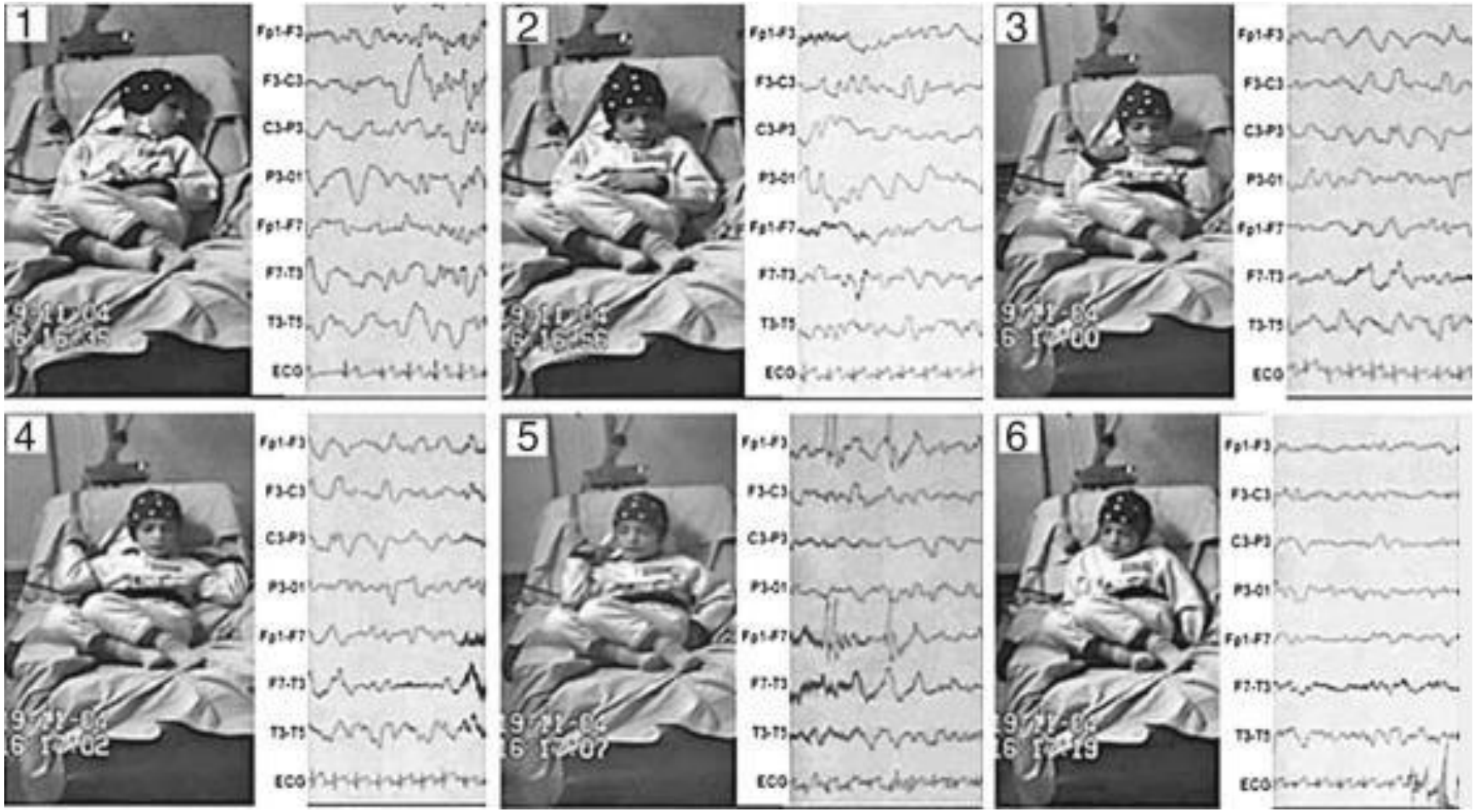
REM

Miscellaneous

Sleep State Dissociation



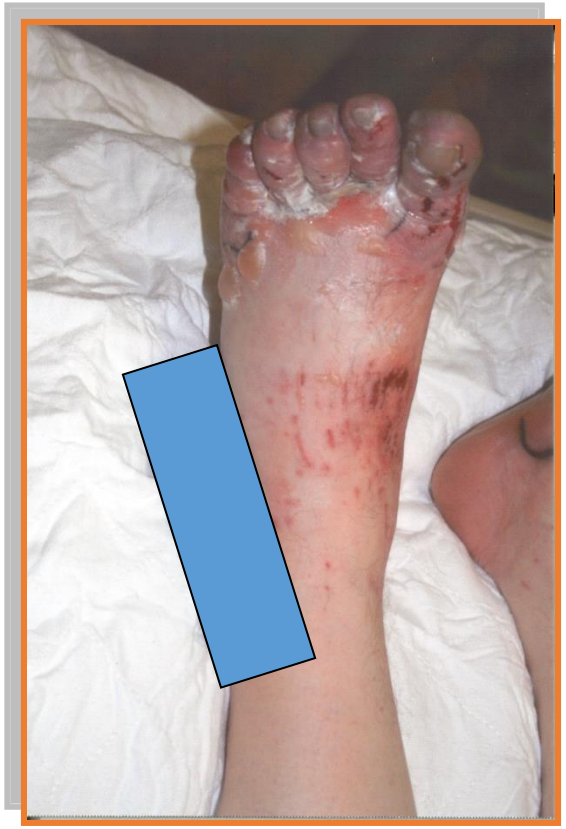
Sleep State Dissociation

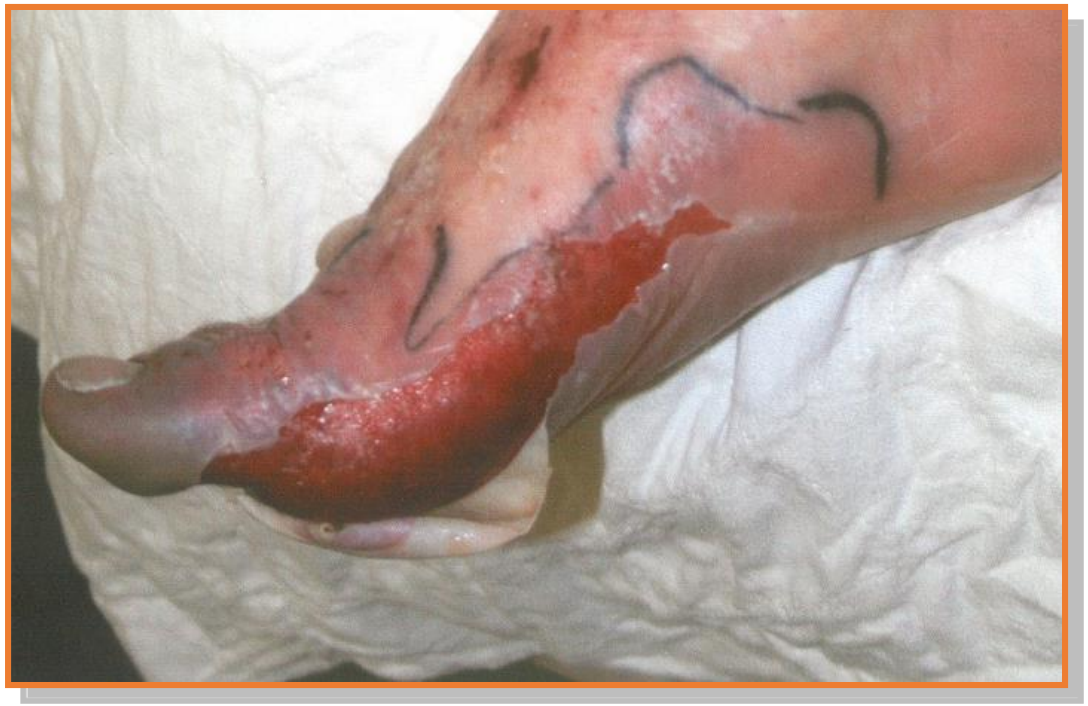


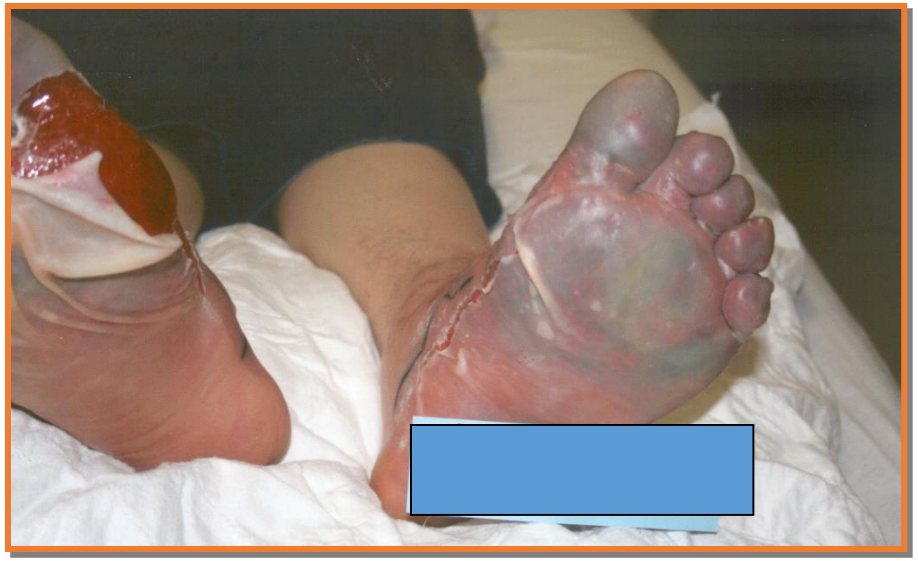
Epilepsia 2012;53[Suppl. 7]:12–9.)

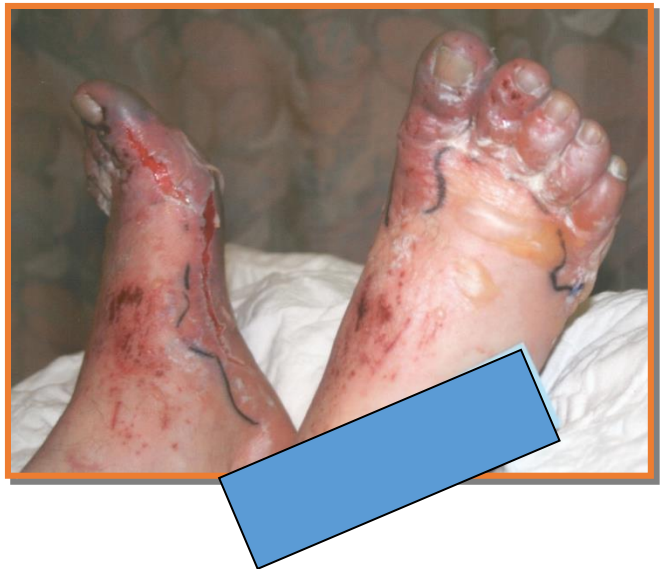
Patient X

When things go wrong









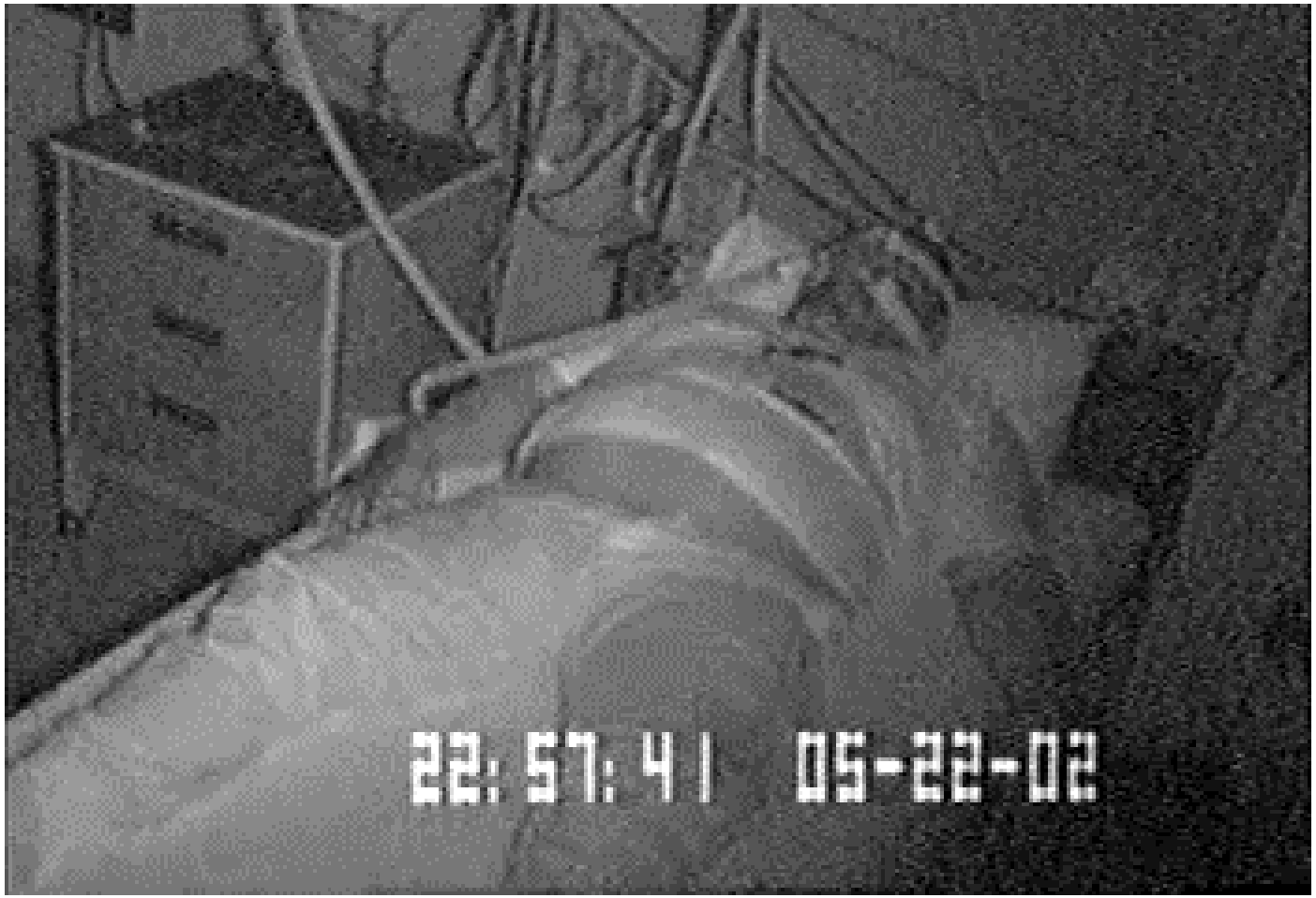
REM Parasomnia

- REM Sleep Behavior Disorder (RBD)
  - REM sleep exclusive
  - Identified and formally recognized first at HCMC in mid 1980’s by Schenck and Mahowald
  - Early marker for Lewy Body Dementia, Parkinson's Disorder, Multiple System Atrophy

REM Sleep Behavior Disorder

- Elevated muscle tone during REM (abnormal), documented by Polysomnography
- Dream enactment behavior
- If awakened, patient is usually alert and coherent
- Vocalizations and or complex motor behaviors that can be injurious

REM Parasomnia (RBD)



REM Parasomnia (RBD)

Thank you

Dr. David Hilden

ACP