If Not Us, Who? Managing Complex Infections in Individuals with Poverty, Housing Insecurity, and Addiction Diseases.

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Disclosures

- *Brian Chan:*
  - No disclosures
- *Luke Strnad:*
  - No disclosures
- *Both:*
  - Two good friends who think this stuff is really important and see it profoundly affect our patients

Lecture objectives

Primary Objectives: ***we will (try) to***

- To not be boring
- To be applicable to generalists (inpatient and outpatient)
- To be integrative and thought provoking

Secondary Objectives: ***you will (succeed at):***

- Describe and evaluate how an infection informs understanding about social determinants and addiction disease
- Understand why addressing addiction disease and social determinants of health is infectious disease prophylaxis
- See the complexities behind the infected patient in your hospital room or clinic and have some tools to address them

Who are we

Brian Chan, MD, MPH

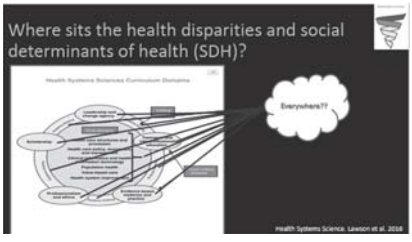
- General Internal Medicine
- Old Town Clinic (CCC)
- Primary Care Research
- High Risk Population Work
- Bad jokes

Luke Strnad, MD

- Infectious Diseases
- OHSU Inpatient Consults
- School of Public Health
- High Risk Population Work
- Even worse jokes

Structure of this talk

- Integrated
- Back and forth between us and between you and between all of us
- 10 min break at roughly 840-850am



Part 1: *what does infection tell you about addiction and social determinants of health (SDoH)*

A case:

24yr/o man with MRSA bacteremia is admitted to the OHSU ICU in septic shock. During work-up he is found to have tricuspid valve endocarditis with vegetations on all leaflets (largest 2.5 x 1cm).

His past medical history is notable for some poorly defined psychiatric diagnoses ("aspergers", "adjustment disorder with mixed emotional features", "behavioral disturbance"), as well as substance use with both IV use (IDU) of methamphetamines and heroin and recent diagnosis of hepatitis C.

Questions (3-5min small group discussion):

- *How did he get this bacterial infection?*
- *What does the infection tell you about his SDoH?*

Let's talk about substance using

https://ucsf-ahp.org/. Updated 2/2014. Accessed 9/2019.

Harm reduction jeopardy for intravenous drug use (IDU)

Injection Use Activity (ex)	Harm Reduction Intervention
Physical setting	Safe consumption spaces
"Works" / Syringes & Needles / filters	Needle exchange, bleach
Splitting Drugs	Separate drugs before preparation
Water	Sterile water, boil water 10 min
Injection Sites	Learn to inject drugs on own, change sites to allow healing, accurate injection: muscling or popping may cause abscesses
Overdose	Naloxone, recovery positioning

https://ucsf-ahp.org/. Updated 2/2014. Accessed 9/2019.

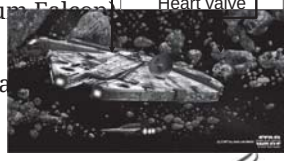
Let's talk in detail how people use intravenous substances

- With illegal or stigmatized substances, physical setting of use is challenging, especially for the marginally housed → impaired safety
- The "Works" in detail
  - Water: dissolve solid drugs
  - Cooker: spoon/cap to hold water/drug mix
  - An acid (Vit C): break down drug into H2O mixable form
  - Heat: dissolve this all together
  - Filter (cotton): strain out lumps before injecting
  - Swabs: alcohol to clean before, gauze to band aid after
  - Needle and syringe: draw up and inject mixture

https://ucsf-ahp.org/. Updated 2/2014. Accessed 9/2019.

The physiology of use tells you about the nature of the addiction for IDU-related bacterial infections

- Deep seeded bacterial infections are *not* the result of a one-time injection.
- The endocarditis example:
  - Repetitive valvular injury over time (asteroids hitting the Millennium Falcon)
  - Damaged valves susceptible
  - Repetitive transient bacteremia
  - Eventually: valve seeding



https://ucsf-ahp.org/. Updated 2/2014. Accessed 9/2019.

IDU-associated infections tell us something about the status of the substance use disorder

Table 1. Baseline Characteristics in First-Episode Endocarditis in 202 Persons Who Inject Drugs

Variable	No./Total No. (%)
Age, median (IQR), y	34 (28-42)
Sex	
Male	105/202 (52.0)
Female	97/202 (48.0)
HIV status	
Positive	16/202 (7.9)
Negative	141/202 (69.8)
Unknown	45/202 (22.3)
Hepatitis C status	
Positive	141/202 (69.8)
Negative	40/202 (19.8)
Unknown	21/202 (10.4)
Homeless	
Yes	35/202 (17.3)
No	165/202 (81.7)
Unknown	2/202 (0.99)
Substance use	
Opioid	19/202 (9.4)
Stimulant	46/202 (22.8)
Polysubstance	113/202 (55.9)
Unknown	24/202 (11.9)

Setting: 3 acute care hospitals in Ontario, Canada

Rodger et al. JAMA Network Open. 2018;1(7):e185220

IDU-associated infections tell us something about the status of the substance use disorder

OPTIoNS-DC:
OPaT and Impact Next Steps Discharge Conference

OPAT = outpatient parenteral antibiotic therapy
IMPACT = OHSU inpatient addiction medicine consult service

Table 1. Characteristics of patients who had an OPTIONS-DC conference

	All patients (N=50)
Demographics	
Mean age	40
Female, n (%)	22 (44)
Insecure housing, n (%)	26 (52)
Mental health diagnosis, n (%)	36 (72)
Working phone, n (%)	34 (68)
Substance use disorder	
Active SUD, n (%)	44 (88)
Primary substance, n (%)	
Opioids	34 (68)
Methamphetamines	14 (28)
Opioids and methamphetamines	2 (4)
Injection drug use, n (%)	42 (84)
Initiated MOUD, n (%)	32 (64)
Primary infection site	
Bone/joint, n (%)	24 (48)
Endovascular*, n (%)	10 (20)
Intra-abdominal, n (%)	3 (6)
Bacteremia without bone/joint or endovascular complications, n (%)	7 (14)
Other/multiple, n (%)	6 (12)

Complexity

13 Gore et al. Unpublished data – OHSU. Accepted poster at ID Week 2019.

IDU-associated infections tell us something about the complexity of the infection *and* the host

Table 2. Cardiac Valve Involvement, Cardiac Consultation, Surgery Performed, and Surgical Risk Stratification in Patients With Infective Endocarditis

Characteristics	IDU-IE n = 103 (%)	Non-IDU IE n = 287 (%)	PValue
Site of Infection			
No vegetation seen	12 (12)	16 (6)	.12
Left side	45 (44)	240 (86)	<.00001
Right side	36 (35)	15 (5)	<.00001
Both	10 (10)	7 (3)	.003

Surgical Mortality Risk: EuroSCORE II Calculated for Those With Absolute Surgical Indication	n = 45 (%)	n = 101 (%)
Low (0.5%–1.9%)	16 (36)	16 (16)
Mild (2.0%–3.1%)	8 (18)	18 (18)
Moderate (3.2%–5.5%)	7 (16)	19 (19)
High (5.6%–10%)	7 (16)	16 (16)
Very High (>10%)	7 (16)	32 (32)

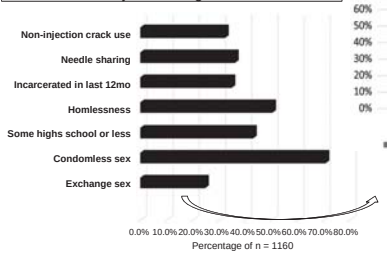
Clinical Outcomes	IDU-IE n = 103 (%)	Non-IDU IE n = 278 (%)	PValue
Re-admission for endocarditis	21 (20)	26 (9)	.004
Relapse or treatment failure	8 (8)	20 (7)	.85
Reinfection	13 (13)	6 (2)	<.0001
Death overall	25 (24)	70 (25)	.86
Death in hospital	6 (6)	25 (9)	.32
One-year mortality	16 (16)	37 (13)	.58

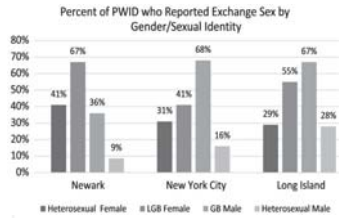
Retrospective cohort study of patients admitted between January 1, 2007 to June 30, 2015 at a tertiary care center in Boston, MA

14 Leahey et al. Open Forum Infect Dis. 2019 Mar 1;6(4):ofz089

When caring for an IDU-associated infection, what other unseen pathology is beneath the surface?

Characteristics of individuals who inject substances in NYC from the 2012 National HIV Behavioral Surveillance system cycle on injection drug use





- GB male refers to gay or bisexual identified males
- LGB female refers to lesbian, gay, or bisexual identified female

15 Walters et al. AIDS Behav. 2018 Sep;22(9):2773-2787

IDU-associated infections tell us something about the status of the substance use disorder, infection, and host…

- Given this, when you see these IDU bacterial infections infections:
  - Screen for things (STIs, SDoH, trauma, etc)
  - Believe things need supporting even if the patient doesn't tell you
  - Understand that this is a complex individual, and that effective treatment involves those complexities
  - The bacterial infection may not be the most important thing going on

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Part 2: *how addressing addiction disease and social determinants provides infection prophylaxis*

A case:

48yr/o woman with MSSA bacteremia and altered mental status is admitted to OHSU where she is found to have likely mitral valve endocarditis, confirmed MSSA meningitis and confirmed MSSA spinal osteomyelitis/discitis.

Her past medical history is notable for IV heroin use for which she has been on methadone at a local clinic although she continues to intermittently use. Her housing has been recently unstable due to discord with her partner.

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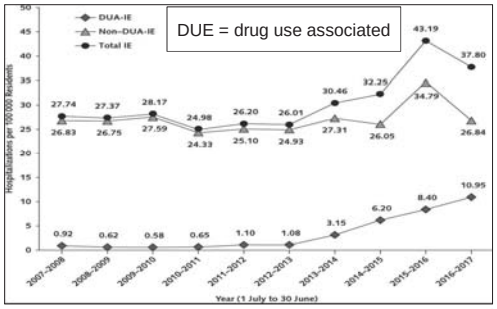
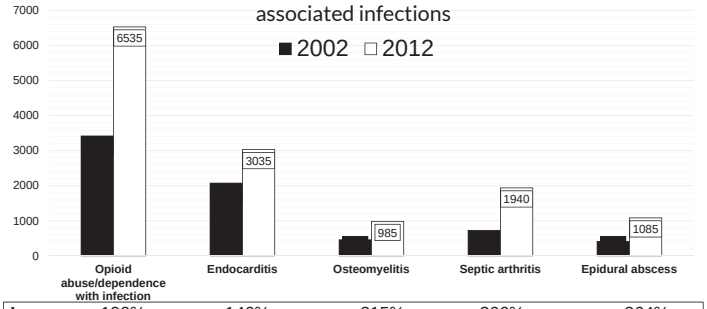
Injection drug use-associated infections are on the rise

Rates of hospitalization for infective endocarditis (IE) in North Carolina, by drug use status, *2007-2017*



18 Schranz et al. Ann Intern Med. 2019;170(1):31-40

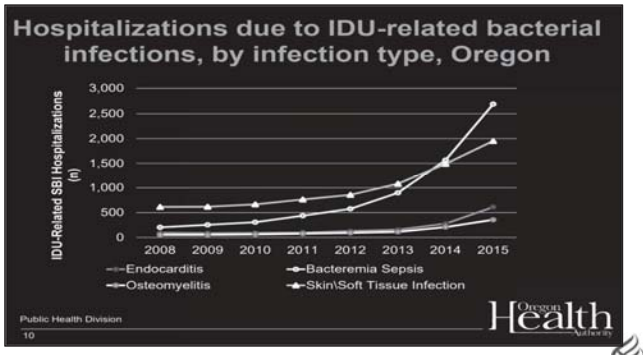
Injection drug use-associated infections are on the rise nationally



Increase:	190%	146%	215%	266%	264%

Ronan and Herzig. Health Aff (Millwood). 2016 May 01; 35(5): 832–837

Injection drug use-associated infections are on the rise in Oregon



https://www.oregon.gov/oha/. Accessed 9/2019.

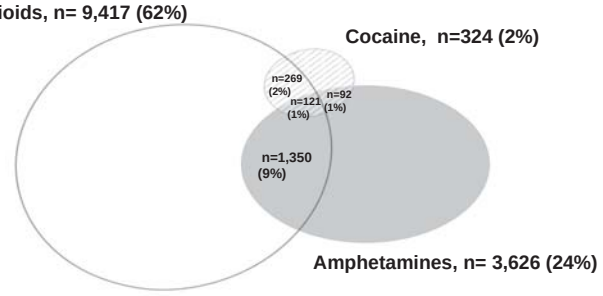
Injection drug use-associated infections are on the rise in Oregon

State database of all hospitalizations in Oregon, excluding VA & psychiatric hospitalizations, *2008-2015*
Hospitalization involving ≥ 1 ICD-9/10 codes for: substance use and sepsis/bacteremia/endocarditis/osteo

	IDU-Related (n = 65,783)	Non-IDU-Related (n = 725,156)
Mean Age (SD)	46 yrs (16.1)	63 yrs (20.7)
Female	51.2%	50.5%
Portland Metro residence	50.7%	36.6%
Insurance		
Private	17.1%	23.3%
Medicaid	27.2%	10.2%
Medicare	29.1%	56.4%
Uninsured	18.7%	5.4%
HIV-infected	2.2%	0.5%
Chronic HCV	26.1%	3.8%

Adapted from – conference abstract AMERSA, Nov 10, 2018; SF, CA: Capizzi J, Leahy J, Wheelock H, Thomas A, Garcia J, Schafer S, Korthuis T

Injection drug use-associated infections are on the rise in Oregon

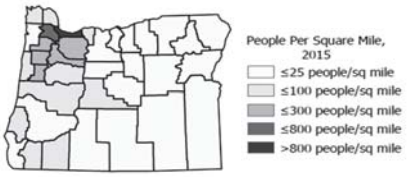


Large underestimate likely due to reliance on ICD 9/10 codes

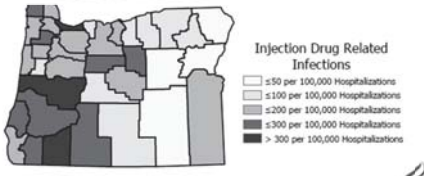
Adapted from – conference abstract AMERSA, Nov 10, 2018; SF, CA: Capizzi J, Leahy J, Wheelock H, Thomas A, Garcia J, Schafer S, Korthuis T

Injection drug use-associated infections are on the rise in Oregon

Oregon Population Density, by County



High rates of IDU-related skin and bloodstream infection hospitalizations in rural, low population density counties.



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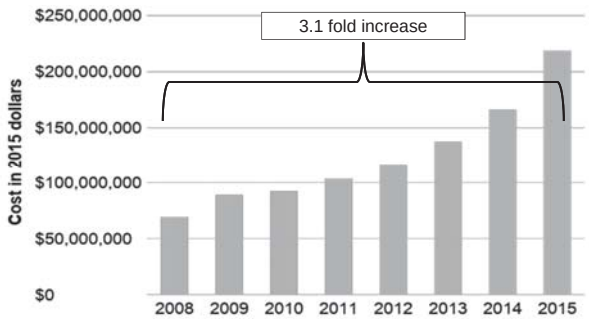


*Adjusted for charge-to-cost and inflation (2015 USD)

Adapted from – conference abstract AMERSA, Nov 10, 2018; SF, CA: Capizzi J, Leahy J, Wheelock H, Thomas A, Garcia J, Schafer S, Korthuis T

Addressing SDoH is part of (effectively) treating infections

- Remember our case: 48yr/o woman with active IDU (heroin) is admitted to OHSU where she is found to have likely MSSA mitral valve endocarditis, confirmed MSSA meningitis and confirmed MSSA spinal osteomyelitis/discitis.
- **Small group discussion (3-5min):**
  - Question to discuss: *what social determinants of health do you think influence infection treatment and relapse and what can we do to address this?*

What are Social Determinants of Health (SDoH)?

Social Determinants of Health

The complex, integrated, and overlapping social structures and economic systems that are responsible for most health inequities. These social structures and economic systems include the **social environment, physical environment, health services, and structural and societal factors**. Social determinants of health are shaped by the distribution of money, power, and resources throughout local communities, nations, and the world.

Commission on Social Determinants of Health (CSDH), 2008. World Health Organization: Geneva.

#Goldfarbchallenge

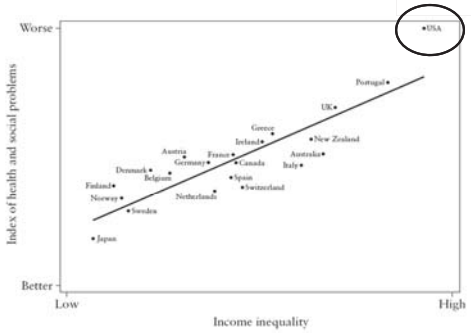
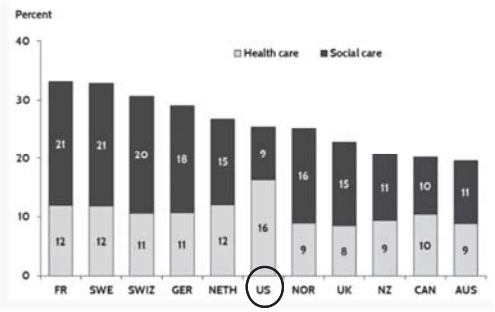


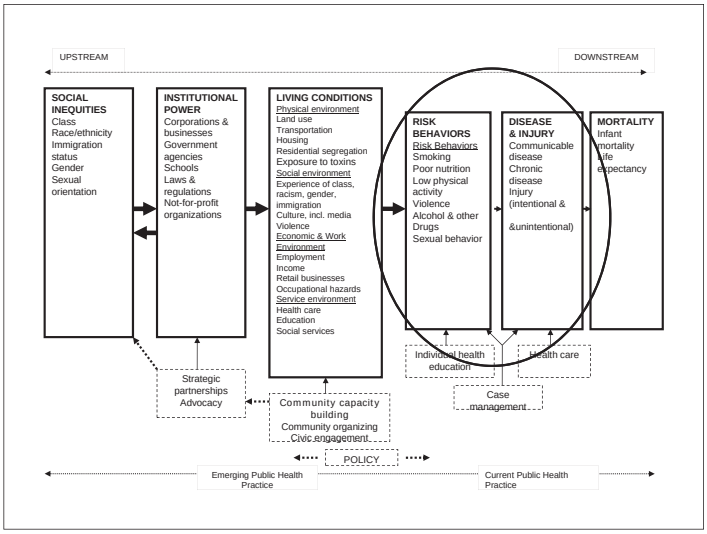
Figure 2.2 *Health and social problems are closely related to inequality among rich countries.*

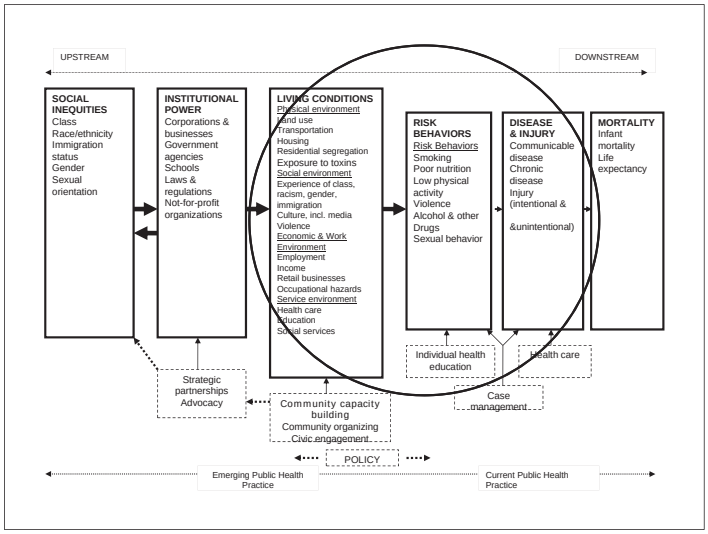
Used with permission, Wilkinson 2009

Healthcare: social spending

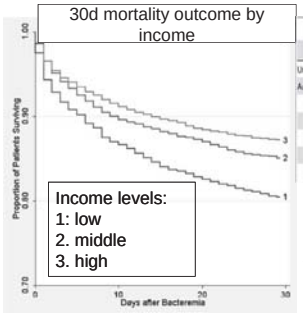


From : "Re-balancing medical and social spending to promote health: Increase state flexibility to improve health through housing" – Brookings Institute

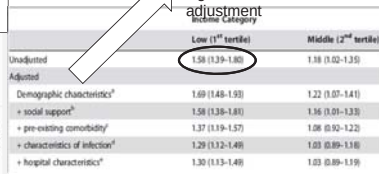




Suboptimal social determinants are highly associated with suboptimal infection outcomes



Worse outcomes in lowest tertile persisted with significance after adjustment



	Income Category: Low (1st tertile)	Middle (2nd tertile)
Unadjusted	1.58 (1.39–1.80)	1.18 (1.02–1.35)
Adjusted		
Demographic characteristics[a]	1.69 (1.48–1.93)	1.22 (1.07–1.41)
+ social support[b]	1.58 (1.38–1.81)	1.16 (1.01–1.33)
+ pre-existing comorbidity[c]	1.37 (1.19–1.57)	1.06 (0.92–1.22)
+ characteristics of infection[d]	1.29 (1.12–1.49)	1.03 (0.89–1.18)
+ hospital characteristics[e]	1.30 (1.13–1.49)	1.03 (0.89–1.19)

Population-based cohort study in two Danish regions. All patients 30 to 65 years of age with first time bacteremia 2000-2008 (n=8,653)

Does it matter that it's Denmark?

Koch et al. PLoS One. 2013 Jul 25;8(7):e70082

Part 3: *all the world's complexities and pathologies and some tools to address them*

A case #1:

55 yo homeless man with CAD, diabetes, recurrent soft-tissue infections, methamphetamine use disorder, now with another hospitalization for skin and soft tissue infection.

- Homelessness within past year, mother passed away
- Prior costly hospitalization, unable to make payments, loss of housing
- Work history – unskilled/ day-laborer, laid off 2015, never able to find work since
- Methamphetamine use < 6 months; "because others around me had it"
- Trauma, violence near daily basis

Post discharge plan #1:

- PCP appointment made for him in 1 week. Patient has no phone number, unable to confirm or remind patient of appointment
- Recommended daily wound care clinic – patient unable to get to clinic due to mobility impairment
- Referral to podiatry clinic across town- lack of transportation options
- Intake at outpatient substance use treatment program 7 AM in morning- lack of sleep/ poor sleep, misses intake
- Counseled on "diabetic diet" – no/little income for food, lacks healthy food options
- Started on new medications - inability to afford copays, loses AVS, lack of health literacy re: when to take, indication

- *How much do all these social complexities really influence health?*
- *What can we do on a large and individual scale to address these issues?*

The world's complexities & pathologies & some tools to address them

Case #2:

29 yo woman with history of R knee pain who transferred to the floor after hospitalization for MRSA tricuspid endocarditis complicated by pulmonary septic emboli, IV heroin use

- No income, some college, dropped out
- Prior to hospitalization, lived with family, some who use drugs, has social support from her mother
- Never hospitalized prior, no recent primary care
- Prior OUD recovery program history, "detoxed" with methadone and then abstinence based treatment

Post discharge plan #2:

- Found new PCP in Eugene, unsure whether they will continue prescribing buprenorphine initiated in hospital
- Cardiothoracic surgery appointment to discuss valve replacement, but hesitant to operate due to her substance use
- Patient concerned that returning to mother's home will trigger relapse
- Outpatient infusion center referrals requires transportation access
- Home infusion services- concern for grandfather's / family members ability to manage antibiotics; concern for PICC line safety in setting of OUD

- *How much do all these social complexities really influence health?*
- *What can we do on a large and individual scale to address these issues?*

The world's complexities & pathologies & some tools to address them

Case #3:

38 yo man with history of IV heroin and methamphetamine use disorder, chronic early homelessness, with recurrent soft tissue infection now admitted with R LE cellulitis c/b 4th metatarsal osteomyelitis

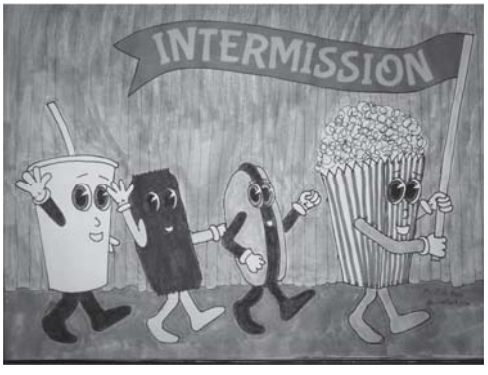
- Poor social support, homeless at 15
- Has housing voucher, but not sure how to access services
- History of recovery, with multiple relapses, associated with periods of homelessness/ instability

- *How much do all these social complexities really influence health?*
- *What can we do on a large and individual scale to address these issues?*

So what can we do to address the complex pathologies SDoH create for our patients?

- **Small group discussion (3-5min):**
  - Question to discuss: what interventions can you think of at either the bedside (individual level) or systems level (clinic/hospital/public health) to help some of these patients?
  - And on a scale of 1-10 (1 being poorly, 10 being superbly), how well do you think your current practice setting does this/supports your ability to do this?

Intermission: 10min break



Interventions to address SDoH

New Models of Care

Considerations for developing models of care that address high utilization

-Implementation: health plan level vs clinic vs community level

-Intensity– "stand alone" versus "wrap around" case management services vs consultative/navigation services

Clinic level interventions: Central City Concern (CCC)

- Federally Qualified Health Center (FQHC), Healthcare for the Homeless program site in Portland, OR
- Integrated primary and behavioral health care, pharmacy, specialty mental health, substance use disorder treatment services
- 5,000+ patients/yearly

CENTRAL CITY CONCERN
HOMES HEALTH JOBS

The CCC Ecosystem

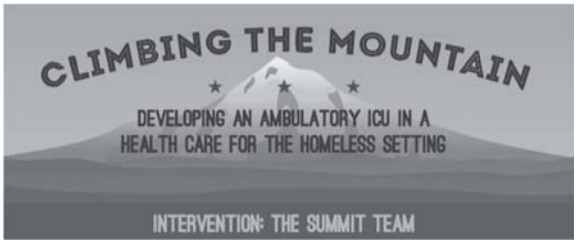
- 40% patients met "high-utilizer" criteria
- > 90% coming out of homelessness or unstable housing
- > 90% with mental illness or substance use disorder
- All patients have access to 'wrap-around' services
  - Substance use treatment, mental health care
- Certain patients have particularly complex needs

CareOregon

CENTRAL CITY CONCERN
HOMES HEALTH JOBS

SUMMIT Intervention

SUMMIT: Streamlined, **U**nified, **M**eaningfully **M**anaged, **I**nterdisciplinary care **T**eam



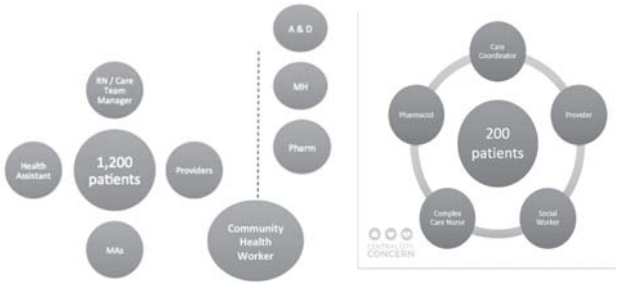
Chan, B., et al. (2018). "The SUMMIT ambulatory-ICU primary care model for medically and socially complex patients in an urban federally qualified health center: study design and rationale." Addict Sci Clin Pract **13**(1): 27.

SUMMIT Referral Criteria

- > 1 hospitalization in last 6 months
- 1+ of following medical conditions:
  - CKD III+
  - CHF
  - COPD, group C/D
  - Diabetes with A1c> 8
  - ESLD
  - Osteomyelitis/ severe soft tissue infection
- Mental health disease
- Substance use disorder
- Multiple missed appointments

"Usual Care" vs SUMMIT A-ICU

"Usual Care" SUMMIT Team



SUMMIT Core Activities

- Comprehensive patient assessment w/ social work, physician, and care coordinator
  - 90 minute intake with social work, care coordinator, provider
- Increase self-efficacy via low patient-to-staff ratio
  - Flexible appointments, outreach visits
  - Trust/rapport building through high touches with team
- Focus on reducing treatment burden
  - Simplifying care based on patient goals
- Focus on social determinants of health
  - Social work involved in patients care from day one to identify unmet need
  - Linkages to housing, insurance, social services

SUMMIT team room

Theme 1: *Patient-System Mismatch*

"He was homeless when we made the referral … and we see that with a lot of our folks…the rest of the healthcare systems are designed for these neat packages of people that are housed, have family support, have access to other resources, are not actively using substances … our clients look a lot riskier on paper and we are really having to advocate...They still deserve end of life care, even if they're homeless….it's frustrating to have to explain to the outside world why our patients need access to these services…the services aren't really designed for complex folks…" *(Social Worker)*

Theme 2: *Importance of Building Connection*

"I spent an hour with a patient last week and we didn't talk about medical problems… It literally was a therapeutic session. I'm not a trained therapist, but I know through years of experience … That's what it was. We didn't talk about diabetes. We didn't talk about her foot ulcers. We didn't talk about any of that … Alot of times we end up doing the work of social workers, but when you do primary care, you have to do that. It's not 'oh hold on, that's personal. I'm not getting into that. I'm only here for the medical stuff.' It all wraps up into one." *(Physician)*

Theme 3: *Everyone Is in It Together*

"I think we all have just built this together so, we inherently respect one another's clinical view of the situation … we all come at this from different backgrounds and feel like we get more out of our patient care experience if we hear what everyone else has to say … I think we have a very supportive and inclusive team environment" *(Physician)*

"They really listen and they really care and we all really feel it when someone does fail or fall or something bad happens" *(Nurse)*

Staff Do Not Define Success by Utilization

"I think we don't know what to measure to actually say we're impacting these people's lives…Does it feel like we are doing good work? Yes, let's continue to do that… we are dealing with a pretty sick population, so these are patients that maybe do need to be in the hospital … a hospitalization is not necessarily a bad outcome for a lot of these patients…" (*Physician)*

Patient perspectives

"Then when I was about 32 I got diagnosed with diabetes and then that's when everything started.. And then I got a doctor out in XXXX…it was just kind of like you are diagnosed with diabetes. Here's what you need to do. That was it. They just walked away,…. And when I got here, after my first incident, they did all kinds of different things like food programming, sitting with the pharmacist, going over my medications, understanding what my meds were for, why I felt a certain way after eating certain things or doing certain stuff, what I needed to cut out of my diet.

Patient perspectives

"It doesn't do any good to come in if you don't feel like you're getting what you need, you know, so it's kind of, you know, feel like a lost cause at that point in time. Especially when I've lost, you know, my job, my kid, my house, you know to these medical issues and its like they think it's a joke. It's not a joke, you know. I mean this is not where I wanted to be."

Original Investigation | Health Policy

September 18, 2019

Prevalence of Screening for Food Insecurity, Housing Instability, Utility Needs, Transportation Needs, and Interpersonal Violence by US Physician Practices and Hospitals

Taressa K. Fraze, PhD[1]; Amanda L. Brewster, PhD[2]; Valerie A. Lewis, PhD[3]; et al

Author Affiliations | Article Information

JAMA Netw Open. 2019;2(9):e1911514. doi:10.1001/jamanetworkopen.2019.11514

Editorial Comment

Key Points | Español | 中文 (Chinese)

Question What types of physician practices and hospitals self-report screening patients for food, housing, transportation, utilities, and interpersonal violence needs?

Methods:

- Cross-sectional nationally representative survey of physician practices and hospitals
  - National Survey Healthcare Organizations and Systems (NSHOS)
  - "Does your practice have a system in place to screen patients for food insecurity, **housing instability**, utility needs, transportation needs, interpersonal violence (yes/no)*
- Characterize response by type of ownership, Medicaid %, ACO participation, Academic/Non-academic, critical access, region, rural, etc

Fraze et al. JAMA Network Open. 2019 Sep 4;2(9)

Results:

- ~5000 surveyed, 2333 responded
  - 47% (757/1628) hospitals responded
- 24.4% of hospitals reported screening all 5 needs
- 8.0% of hospitals reported screening for none
  - Most common screened: *interpersonal violence*
- Characteristics associated with screening for all needs
  - Academic medical centers > non-academic
- Barriers noted
  - Lack of financial resources, time (competing priorities), incentives

Fraze et al. JAMA Network Open. 2019 Sep 4;2(9)

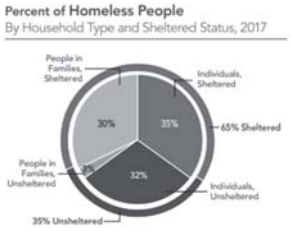
Implications:

- Create incentives to integrate and address social needs
- Oregon CCO – 2020, participants will need to implement addressing social need
- CMS Accountable Health Communities project
- Linking to community resources, food delivery programs,

Fraze et al. JAMA Network Open. 2019 Sep 4;2(9)

Housing Insecurity

- In 2017 in the USA, 550,000 experience homelessness on any given single night
  - 35% (193K) were unsheltered
- 17 per 10,000 people
- Increase from 2016: concentrated in US cities
- Since 2007, decline in chronic homelessness (86,000)
  - > 1 year continuous homeless
  - Or 4 episodes in last 3 years 12 mos
- Disproportionately African-American (40.6%), 14% of overall U.S. population compared to White (47%) despite ~61% of overall pop.
  - To be explicit: this is a racial health disparity



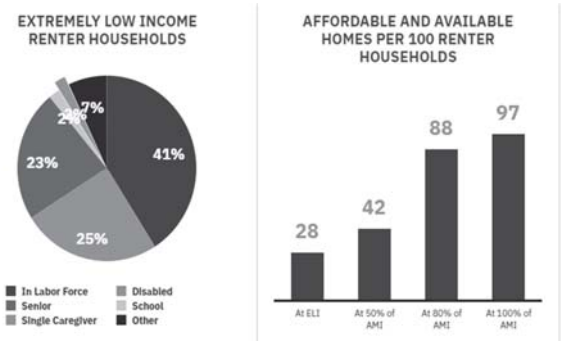
HUD Annual Homeless Assessment Report to Congress, Dec 2017

At risk homelessness

- Extremely low income (ELI)- income at or below poverty guideline in 30% of area median income
- Oregon renters at ELI: 135,746 (23%)
- -98,406 shortage of affordable housing for ELI

Website: https://nlihc.org/housing-needs-by-state/Oregon. Accessed Sept 2019

Oregon has a housing problem



National Low Income Housing Coalition, 2017

Hospital level interventions

- Hospitalized patients increasing high rates of SUD
  - 20% etoh, 8% illicit drug use
- 3 FDA approved medications for opioid use disorder (MOUD): methadone, buprenorphine, IM naltrexone – decrease substance use and mortality
- Lack of focus on inpatient initiation of MOUD
  - Lack of knowledge
  - Prescribing barriers (x-waiver)
  - Concerns for outpatient access to continue these medications

Hospital-based addiction medicine consultation and effect on addiction disease course

Inpatient Addiction Medicine Consultation and Post-Hospital Substance Use Disorder Treatment Engagement: a Propensity-Matched Analysis

Honora Englander, MD[1], Konrad Dobbertin, MPH[2], Bonnie K. Lind, PhD[2], Christina Nicolaidis, MD, MPH[1,3], Peter Graven, PhD[1], Claire Dorfman, BA[4], and P. Todd Korthuis, MD, MPH[1]

Table 1 Patient Characteristics: IMPACT Versus Controls

Characteristic	IMPACT, *N* = 208 *N* (%)	Controls, *N* = 416
Prior SUD treatment[b]	37 (17.8)	70 (16.8)
SUD type		
Non-opioid SUD[c]	146 (70.2)	292 (70.2)
Any opioid SUD[d]	62 (29.8)	124 (29.8)
Male	127 (61.1)	249 (59.9)
Age		
18–39 years	102 (49.0)	181 (43.5)
40–64 years	106 (51.0)	235 (56.5)
White non-Hispanic	160 (76.9)	341 (82.0)
Portland tri-county area[e]	172 (82.7)	295 (70.9)
MS-DRG category[f]		
Alcohol and related complications	44 (21.2)	86 (20.7)
Endocarditis, osteomyelitis, sepsis	65 (31.3)	116 (27.9)
Skin and soft tissue infections	16 (7.7)	10 (2.4)
Non-valvular cardiovascular	13 (6.3)	17 (4.1)
Orthopedic/joint	9 (4.3)	20 (4.8)

Methods:

18–64-year-old Oregon Medicaid beneficiaries with SUD, hospitalized at an Oregon hospital between July 1, 2015, and September 30, 2016. IMPACT patients (n= 208) were matched to controls (n=416) using a propensity score that accounted for substance use disorder, gender, age, race, residence region, and diagnoses.

Englander et al. J Gen Intern Med. 2019 Aug 13

Hospital-based addiction medicine consultation and effect on addiction disease course

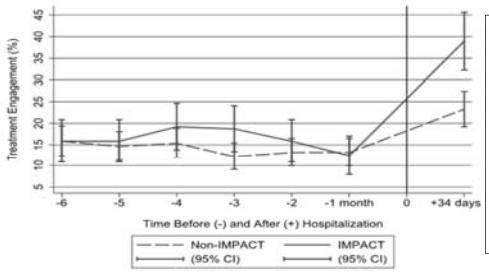


Figure 2 Substance use disorder treatment engagement over time, comparing IMPACT and controls.

IMPACT participation remained associated with SUD treatment engagement when limiting the sample to people who were not engaged in treatment prior to hospitalization **(aOR 2.63**; 95% CI 1.46–4.72)

Englander et al. J Gen Intern Med. 2019 Aug 13

Discharge with addiction care plan improves endocarditis outcomes

202 cases of endocarditis in people injecting drugs in Ontario, Canada:

- All-cause mortality: **34%**
- Cardiac surgery performed: **19%**
- Surgery ass

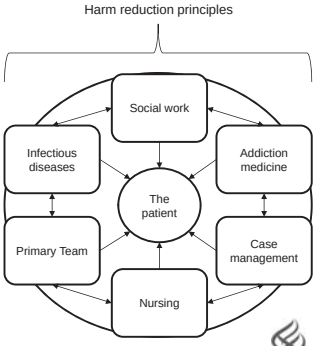
Adjusted hazards model for mortality in those who got surgery

Site of IE			
Right side	30 (44.1)		0.61 (0.45-0.81)
Left side	28 (41.2)	<.001	1.98 (1.28-3.08)
Bilateral	8 (11.8)		3.18 (1.08-9.31)
Left against medical advice	5 (7.4)	.01	0.34 (0.14-0.84)
Substance use			
Opioid	20 (29.4)		1.72 (1.06-2.80)
Stimulant	5 (7.4)	.11	0.79 (0.30-2.11)
Polysubstance	30 (44.1)		0.81 (0.62-1.06)
Opioid substitution therapy	9 (13.2)	.43	0.34 (0.43-1.33)
Referral to addiction treatment	5 (7.4)	.001	0.28 (0.12-0.69)

Rodger et al. JAMA Network Open. 2018;1(7):e185220

New Models of Care: OHSU *OPTIoNS-DC*

Options DC Conference Model



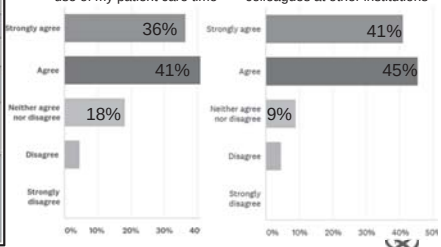
Gore et al and Strnad et al. Unpublished data – OHSU. Accepted posters at ID Week 2019.

New Models of Care: OHSU *OPTIoNS-DC*

Patients were included who had an OPTIONS-DC from February 2018 to July 2019 and whose antimicrobial course completion date fell prior to August 2019 (n=50)

	All patients (N=50)
OPTIONS-DC conference details	
Mean conference duration (minutes)	28
IMPACT, OPAT, ID, and primary team present at conference, n (%)	39 (78)
Any change in treatment plan in patients who had a conference (includes change in antibiotics, disposition, MAT), n (%)	30 (60)
Recommended antimicrobial route, n (%)	
IV	35 (70)
PO	1 (2)
Long acting	14 (28)
Recommended treatment course location, n (%)	
Hospital	15 (30)
Home	19 (38)
SNF	10 (20)
Homeless/shelter	2 (4)
Residential addiction treatment	2 (4)
Other	2 (4)

Pilot Acceptability Data (primary teams: n=22)



Gore et al and Strnad et al. Unpublished data – OHSU. Accepted posters at ID Week 2019.

New Models of Care: Dalbavancin and Oritavancin do *not* solve all your IDU infection problems

- Lipoglycopeptides with spectrum similar to vancomycin (no gram negative, but gets MRSA) but with very long half-lives which allows infrequent dosing
- Only approved for skin and soft tissue infections, but lots of off-label use
- **Study:** Retrospective eval of off-label dalbavancin as secondary therapy in 32 patients with serio

Demographics (N = 32)	
Age	38 (25-50)
Homeless	15 (47%)
HCV	15 (47%)
Ave abx prior	13 days
PICC avoided	15 (47%)

Results	
Completed recommended course	15 (53%)
Clinical response documented	18 (56%)
Clinical failure	4 (13%)
Lost to follow-up	10 (31%)
Readmissions	6 (19%)

Bryson-Cahn et al. Open Forum Infect Dis. 2019 Jan 30;6(2):ofz028

System level interventions

Impact of Social Needs Navigation on Utilization Among High Utilizers in a Large Integrated Health System: a Quasi-experimental Study

Adam Schickedanz, MD, PhD[1], Adam Sharp, MD, MS[2,3], Yi R. Hu, MS[2], Nirav R. Shah, MD, MPH[4], John L. Adams, PhD[2], Damon Francis, MD[5], and Artair Rogers, MS[5,6]

[1]Department of Pediatrics, David Geffen School of Medicine at UCLA, Los Angeles, CA, USA; [2]Research and Evaluation Department, Kaiser Permanente Southern California, Pasadena, CA, USA; [3]Department of Emergency Medicine, Kaiser Permanente Los Angeles Medical Center, Los Angeles, CA, USA; [4]Stanford University Clinical Excellence Research Center, Stanford, CA, USA; [5]Health Leads, Boston, MA, USA; [6]Kaiser Permanente Southern California, Pasadena, CA, USA.

BACKGROUND: Programs addressing social determinants of health for high-utilizing patients are gaining interest among health systems as an avenue to promote health and decrease utilization.

5.0%; $p < 0.001$) in the low-education area group, and −12.1% (− 18.1%, − 5.6%; $p < 0.001$) in the Medicaid group. ***CONCLUSIONS:*** Social needs navigation programs for high-utilizing patients may have modest effects on utili-

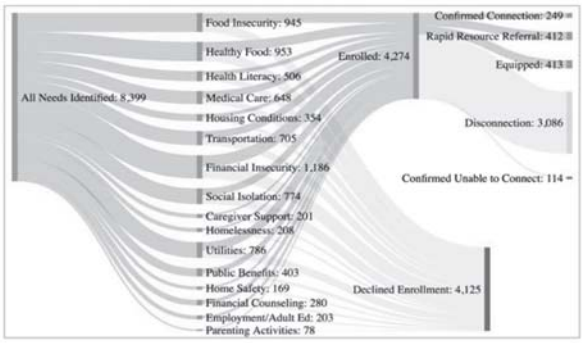
Schickedanz et al. J Gen Intern Med. 2019 Jun 21

Social needs navigation Results: *high need, low accessibility*

- 34,000 patients (7,000 intervention, 27,000 control)
  - Intervention patients more racially/ethnically diverse, more likely to live in low-income areas,
- 81% of intervention patients contacted,
  - 53% (1,984 screened+ for social need)
    - Financial strain (29%), food insecurity (29%)
- Intervention group had modest 2.2% utilization decline over 1 year post intervention (-0.06 ED visits, -0.08 inpatient hospitalization,-0.03 ambulatory care visits, p=.058)
- sub-group analyses- high-utilizers in low-income census tract: *greater declines -7% utilization, driven by decreased inpatient utilization (-16%)*

Schickedanz et al. J Gen Intern Med. 2019 Jun 21

Social needs navigation Results: *screening outcomes*



Schickedanz et al. J Gen Intern Med. 2019 Jun 21

Most of intervention group did not receive services *but still benefited*

- Low-income patients ~ more social needs that influence utilization but also more likely to be eligible for programs
- Barriers to connecting with resources
- Exploring patients' life circumstances may have measurable effects on health and health seeking behaviors, or prompts patients to seek out solutions themselves
- Limitations- non-randomization, selection bias
- BOTTOM LINE: IT IS WORTH SCREENING FOR SDoH

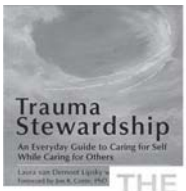
Schickedanz et al. J Gen Intern Med. 2019 Jun 21

SDoH: practical tools/tips:

- Assessing homelessness and <u>risk of homelessness</u>
  - Income below 30% of median income for area AND
  - Lack of social support or resources to prevent homelessness AND
  - Moved due to economic reasons 2+ times in last 60 days / living in home of another / eviction notice / motel / exiting system of care / housing that has characteristics associated with instability (HUD definition)
- Using "universal precautions" in communicating with or about hospitalized patients re: addictions care
  - Person-first language ("persons who use injection drugs" vs "heroin abuser/addict")
  - Addiction as a chronic disease and not a moral failing
  - MOUDs work and can be initiated in the hospital
- Sometimes, just asking patients about their social needs, expressing empathy and sitting with patients in their chaos is

A few thoughts on secondary trauma

- All the self-care stuff
- Engagement, trust, teamwork, and excellence is sustaining
  - In contrast, cynicism, anger, and isolation are not
- The news sucks, this work is your punching bag
- Couple references:
  - Trauma Stewardship (Lipsky)
  - The Age of Overwhelm (Lipsky)



Secondary trauma and the benefits of tackling this head on

ORIGINAL RESEARCH

"We've Learned It's a Medical Illness, Not a Moral Choice": Qualitative Study of the Effects of a Multicomponent Addiction Intervention on Hospital Providers' Attitudes and Experiences

Honora Englander, MD[1,2*], Devin Collins, MA[1], Sylvia Peterson Perry, MD, MPH[2], Molly Rabinowitz MD, MPH[2], Elena Phoutrides, MD, MPH[1], Christina Nicolaidis, MD, MPH[1,3]

[1]Oregon Health & Science University, Portland, Oregon; [2]Central City Concern, Portland, Oregon; [3]School of Social Work, Portland State University, Portland, Oregon.

- Qualitative exploration of the effect that integrating substance use disorder treatment and care systems has on providers' attitudes, beliefs, and experiences.
- Methods:
  - In-depth, semi-structured interviews and focus groups
  - Thematic analysis using an inductive approach

Englander et al. J Hosp Med. 2018 Nov 1;13(11):752-758

Secondary trauma and the benefits of tackling this head on

Results: "Before IMPACT, participants felt that hospitalization did not address addiction, leading to untreated withdrawal, patients leaving against medical advice, chaotic care, and staff "moral distress." Participants felt that IMPACT "completely reframes" addiction as a treatable chronic disease, improving patient engagement and communication, and humanizing care. Participants valued post-hospital SUD treatment pathways and felt having systems to address SUD reduced burnout and provided relief."

TABLE 1. Participant Characteristics

Variables	N (%)
Female	23 (67.6)
Non-Hispanic white	21 (87.5)*
Participant role	
Inpatient ward attending physicians	8 (23.5)
Social workers	6 (17.6)
Inpatient ward nurses	5 (14.7)
Residents	3 (8.8)
Patient advocates	3 (8.8)
Case managers	3 (8.8)
Pharmacists	2 (5.9)
Nurse managers	2 (5.9)
Infectious disease consultants	1 (2.9)
Cardiac surgeons	1 (2.9)

"We've been watching staff try to manage these patients for years without the experts and the resources and the skills that they need … As a result, there was a crescendo effect of moral distress, and [staff] bring in all of their past experiences which influence the interaction… Some staff are very skilled, but you also saw some really punitive responses."

"[Patients] ended up either dead or reinfected. Nobody wanted to do stuff because we felt it was futile. Well, of course it's futile …. you're basically trying to fix the symptoms. It's like having a leaky roof and just running around with a bunch of buckets, which is like surgery. You gotta fix the roof…otherwise they will continue to inject bacteria into their bodies."

Englander et al. J Hosp Med. 2018 Nov 1;13(11):752-758

Concluding remarks

- A patient's bacterial infection can tell you a lot about their substance use and other SDoH → believe your eyes
- Addressing these SDoH is just as important in the effective management of the infection as antibiotics or I&Ds
- The SDoH that our infected patients experience are complex, interwoven, and influence a lot of health outcomes other than just the infection
- Engaging in this messy web is the only way to even attempt to treat their infections, address their addiction diseases, improve their overall health, and salvage ourselves and our system…

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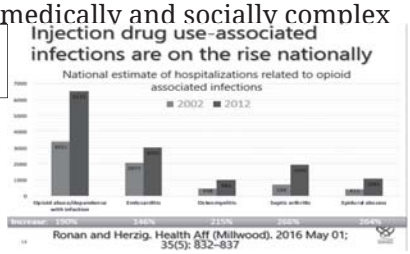
Why should we screen and address SDoH?

- Changes to hospitalized patient demographics
  - Increasingly serving low-income communities
- May reduce care utilization among high-utilizing, medically and socially complex

Remember how this is happening with infections…



Hospital-initiated buprenorphine and linkage to care intervention:

Original Investigation

Buprenorphine Treatment for Hospitalized, Opioid-Dependent Patients
A Randomized Clinical Trial

Jane M. Liebschutz, MD, MPH; Denise Crooks, MPH; Debra Herman, PhD; Bradley Anderson, PhD; Judith Tsui, MD, MPH; Lidia Z. Meshesha, BA; Shernaz Dossabhoy, BA; Michael Stein, MD

IMPORTANCE Buprenorphine opioid agonist treatment (OAT) has established efficacy for treating opioid dependency among persons seeking addiction treatment. However, effectiveness for out-of-treatment, hospitalized patients is not known.

OBJECTIVE To determine whether buprenorphine administration during medical hospitalization and linkage to office-based buprenorphine OAT after discharge increase entry into office-based OAT, increase sustained engagement in OAT, and decrease illicit opioid use at 6 months after hospitalization.

 Liebschutz et al. JAMA Intern Med. 2014 Aug;174(8):1369-76

Hospital buprenorphine and linkage Methods: *detox vs linkage*

- Buprenorphine-naloxone 2-0.5 mg up to 4x for 8 mg day 1
- Arm 1: Medically supervised withdrawal: 4d taper (8 mg day 2/ 6 mg day 3 / 4 mg day 4 / 2 mg day 5)
  - Patient discharged with blister pack if d/c prior to completion
- Arm 2: Linkage
  - Day 2: 12 mg buprenorphine; day 3: 16 mg remainder
  - Faciliated linkage to hospital-associated primary care buprenorphine program, admission procedures, and scheduled initial intake within 7 days of discharge.
- Outcomes:
  - Primary: entry into buprenorphine treatment ; # days of illicit opioid use last 30 days at 1-,3-, and 6- month interviews
  - Secondary: time to entry into program, # days prescribed MOUD, retention

 Liebschutz et al. JAMA Intern Med. 2014 Aug;174(8):1369-76

Hospital buprenorphine and linkage Results: *inpt start improved outcomes*

- 72.2% linkage group entered into program by 6 months vs 11.9% (p<.001)
  - Shorter time to entry
- 16.7% linkage participants were still retained in treatment at 6-month f/up vs 3.0%
- 16.4 days of MOUD use in past 30 days vs 6.4 days in detox group
- BOTTOM LINE: initiating buprenorphine and linkage to care during hospitalization improved OUD outcomes at a single site
- Requires 1) active referral network of buprenorphine prescribers able to accept patients on sh ort notice; 2) inpatient providers able to prescribe and provide bridge prescriptions

 Liebschutz et al. JAMA Intern Med. 2014 Aug;174(8):1369-76

Impact of social needs navigation - methods:

- Prospective cohort study of impact of social needs intervention on health care utilization
- Kaiser Permanente So. Cal patients who were predicted 1% utilizers
- Telephonic 14-question social needs screening tool for 3 clinics
  - 5-7 minutes to complete; if positive, 10-15 comprehensive intake conducted
  - Referred to community –based resources
  - Follpw-up phone calls once every 2 weeks
  - Documented in HER
- Outcome: total utilization = ED visits + outpatient and/or inpatient
- Analysis: propensity score matching for similar patients in

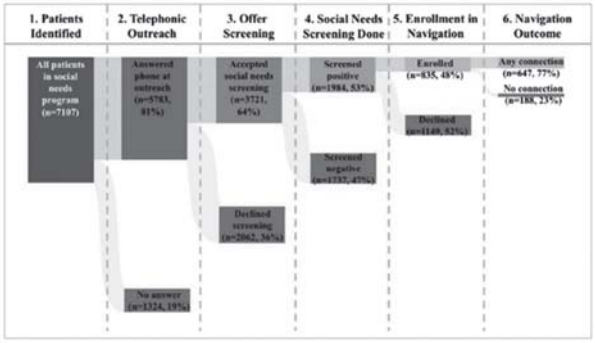
Schickedanz et al. J Gen Intern Med. 2019 Jun 21

Social needs navigation Results: social needs identified

- Amongst 7,000 intervention group; 1,984(53%) screened positive for at least 1 need
  - Average social needs assessed 3.75 (0-5)
  - Most common needs:
    - Financial strain 29.2%
    - Food insecurity 28.9%
    - Utilities affordability 19.3%
    - Social isolation 19.2%
    - Affordability of medical care 17.4%
    - Transportation 17.3%
    - Low health literacy 16.1%
    - Public benefits navigation 10.1%
    - Housing condition concerns 9.5%
    - Need for financial counseling 7.5%
    - Housing insecurity/homelessness 5.6%
    - Employment/adult education 5.4%

Schickedanz et al. J Gen Intern Med. 2019 Jun 21

Social needs navigation Results: *screening outcomes*



Schickedanz et al. J Gen Intern Med. 2019 Jun 21

Inpatient Glycemic Management

DATE: SEPTEMBER 26, 2019 PRESENTED BY: BETHANY KLOPFENSTEIN, MD

Objectives – to discuss:

- Approach to insulin management in the hospital:
  - Subcutaneous insulin regimens
  - Intravenous insulin infusions

Hyperglycemia in the Hospital

- Diabetes:
  - Previously diagnosed
  - Previously undiagnosed
- Hyperglycemia without diabetes diagnosis
  - Diabetes diagnosed on follow-up
  - Prediabetes with overt hyperglycemia during acute physiologic stress
  - Hyperglycemia due to physiologic stress without underlying metabolic abnormality
    - normal follow-up testing

Identifying Hyperglycemia in the Hospital

- **Inhospital hyperglycemia is defined as an admission or in hospital BG > 140 mg/dl.**
- HbA1c testing can be useful to:
  - assess glycemic control prior to admission
  - assist with differentiation of newly diagnosed diabetes from stress hyperglycemia
  - designing an optimal regimen at the time of discharge
- HbA1c > 6.5% can be identified as having diabetes, and HbA1C 5.7%-6.4% is consistent with prediabetes.

AACE/ADA Target Glucose Levels in Hospitalized Patients

- **ICU setting:**

Not recommended <110	Acceptable 110-140	Recommended 140-180	Not recommended >180

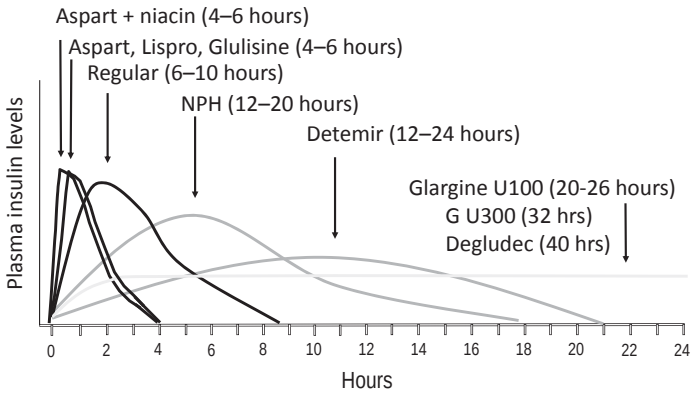
- **Non-ICU setting:**

Pre-Meal < 140	Random < 180

Hypoglycemia = BG <70 mg/dL
Severe hypoglycemia = BG <40 mg/dL

Moghissi ES, et al; AACE/ADA Inpatient Glycemic Control Consensus Panel. *Endocr Pract.* 2009;15(4). http://www.aace.com/pub/pdf/guidelines/InpatientGlycemicControlConsensusStatement.pdf.

Insulin Time-Action Profiles Duration



Inpatient Insulin Management: Tailor to the situation

- Patients that are eating (reliably or unreliably)
- Other nutrition (Tube feeds, TPN)
- Corticosteroids
- Procedures/surgery/NPO

- IV insulin
- Transition from IV to SC insulin

Inpatient Insulin Management: Tailor to the situation

- Patients that are eating (reliably or unreliably)

Case 1: Eating Reliably

70 year old man with type 2 diabetes is admitted to vascular surgery with a large necrotic foot ulcer. He is started on IV antibiotics and you are consulted to assist with glycemic management. He is currently on a regular diet and eating well.

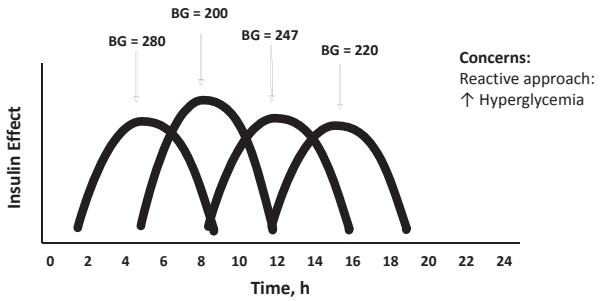
- Weight: 85 kg
- Home medical regimen: Glipizide 5 mg po BID, Metformin 1000 mg po bid, semaglutide 1 mg qwk
- Outpatient glucose control: HbA1c 2 months prior to admission was 7.1%. He does not check CBGs at home.
- Admission glucose is 352 mg/dL

How do you manage his diabetes?

Principles of Insulin Management In The Hospital

- **Use a physiologic basal-bolus regimen**
  - Plus supplemental insulin for correction
  - Avoid sliding scale insulin alone
- **Adjust the regimen daily to optimize control**
  - Use prior day results to adjust
- **Make careful transitions in insulin regimen**
  - Changes in nutrition
  - Insulin drip to SC treatment

Sliding-Scale Insulin Alone Not Recommended



Adapted from :
DeWitt DE, Dugdale DC. *JAMA*. 2003;289(17):2265-2269.
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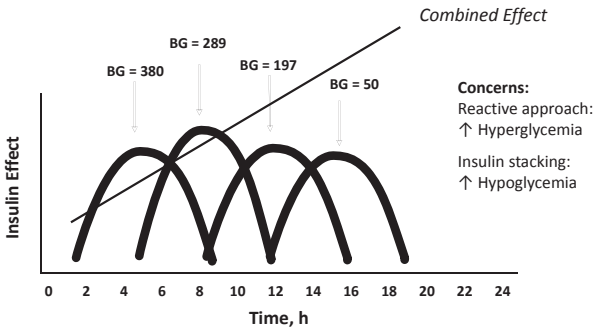
Sliding-Scale Insulin Alone Not Recommended



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Skyler JS. In: DeFronzo RA, ed. *Current Therapy of Diabetes Mellitus.* St Louis, MO: Mosby-Year Book, Inc;1998:36-49.

Inpatient Insulin Management: 5 Step Approach

STEP 1: Estimate the Total Daily Insulin Requirement: Basal + Nutritional Insulin = Total Daily Dose (TDD)

- Weight-based estimate:
  - TDD = 0.4-0.5 units/kg (for type 2 diabetes)
  - Adjust TDD down to 0.2-0.3 units/kg for those with hypoglycemia risk factors
    - Elderly, renal failure, liver disease, low body weight, type 1 or no history of diabetes
  - Adjust TDD up to 0.5-0.6 units (or more)/kg for those with hyperglycemia risk factors
    - Obesity, glucocorticoids
- Insulin drip-based estimate (for patients treated with an insulin infusion)
- For patients on insulin prior to admission, consider the patient's preadmission subcutaneous regimen TDD and glycemic control on that regimen

STEP 2: Assess the Patient's Nutritional Situation

- Eating meals predictably
- Eating meals but with unpredictable intake
- Enteral feeding
  - Continuous
  - Part of the day
  - Bolus
- TPN
- Combinations of above
- NPO

STEP 3: Divide the Total Daily Dose (TDD) into Basal and Nutritional Components

- Basal insulin can generally be estimated to be 50% of the TDD
  - Decrease to 40% if receiving AM corticosteroids
- Nutritional insulin can be estimated to be the remaining 50% of the TDD
  - Increase to 60% if receiving AM corticosteroids
  - If eating, divide boluses between meals

STEP 4: Decide Which Components of Insulin the Patient Will Require

- In the majority of cases, basal insulin should be provided
- When a patient is not receiving nutrition, nutritional insulin should not be given, however basal insulin should be continued
- Nutritional insulin needs must be matched to the actual nutritional intake (eating, tube feeds, TPN, etc.)
  - Patients with unpredictable PO intake: Bolus insulin can be given immediately after the meal, in a ratio determined by amount eaten
- Generally, well-designed correction insulin regimens should also be provided in addition to scheduled bolus insulin

STEP 5: Assess Blood Glucose Pattern Daily (at a minimum) and Adjust Insulin Doses

- Adjust basal and bolus doses based on glucose patterns
- If glucoses consistently >180-200, increase TDD by 20%
- If any glucose < 70, decrease TDD by 20%
- Improvement of hyperglycemia and avoidance of hypoglycemia can only be achieved via continuous management of the insulin regimen
- **There is no "autopilot" insulin regimen for a hospitalized patient**

Case 1: Eating Reliably

70 year old man with type 2 diabetes is admitted to vascular surgery with a large necrotic foot ulcer. He is started on IV antibiotics and you are consulted to assist with glycemic management. He is currently on a regular diet and eating well.

- Weight: 85 kg
- Home medical regimen: Glipizide 5 mg po BID, Metformin 1000 mg po bid, semaglutide 1 mg qwk
- Outpatient glucose control: HbA1c 2 months prior to admission was 7.1%. He does not check CBGs at home.
- Admission glucose is 352 mg/dL

How do you manage his diabetes?

Case 1: One possible Solution

- Change to consistent carbohydrate (diabetic) diet
- Discontinue oral agents
- Total daily dose 85 kg x 0.5 units/kg/day = 42.5 units
- Basal: Glargine 21 units daily
- Nutritional: Rapid-acting analogue 7 units with meals
- Correction: Rapid-acting analog per scale qac and qhs
  - (Note: Use correction insulin with caution at HS, reduce the daytime correction by up to 50% to avoid nocturnal hypoglycemia)

Inpatient SC Insulin Tips

- If a patient is only on long-acting insulin as an outpatient, it may be covering both basal and mealtime insulin requirements
  - For safety in the hospital, reapportion the insulin to long and short acting components
- Patients on U300 glargine or degludec as basal insulin can convert to U100 glargine at same dose (if well controlled)
- For patients eating unreliably, administer the mealtime insulin after meals in proportion to amount eaten

Inpatient Insulin Management: Tailor to the situation

- Patients that are eating (reliably or unreliably)
- Other nutrition (Tube feeds, TPN)

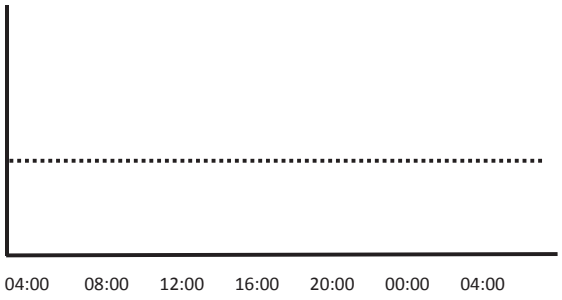
Case 2: Enteral Feeding

An 83 yo M with esophageal adenocarcinoma and Type 2 diabetes undergoes esophagectomy. Postoperatively he receives continuous tube feeds and the surgical team places him on an insulin infusion while the tube feeds are gradually increased to goal rate of 65 cc/hr. His glucose levels are stable on the insulin infusion, however they attempt to transition him to SQ insulin and he becomes hyperglycemic. You are consulted to assist with glycemic management.

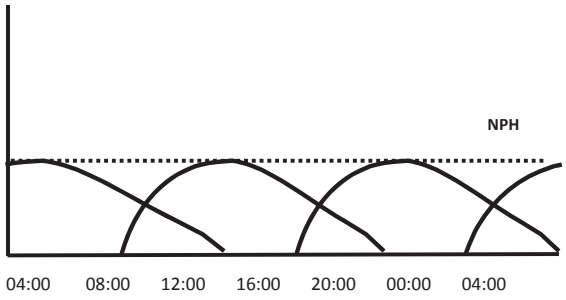
- Weight: 81 kg (BMI 27)
- HbA1c 5.9% 1 month before surgery
- Home regimen: glargine 16 units bid, glimepiride 2 mg qd, sitagliptin 100mg qd
- Current hospital regimen NPH 14 units bid

Case 2: Enteral Feeding

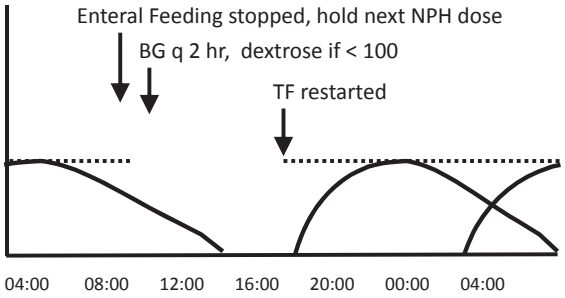
Insulin Requirement During Continuous Enteral Feedings or TPN



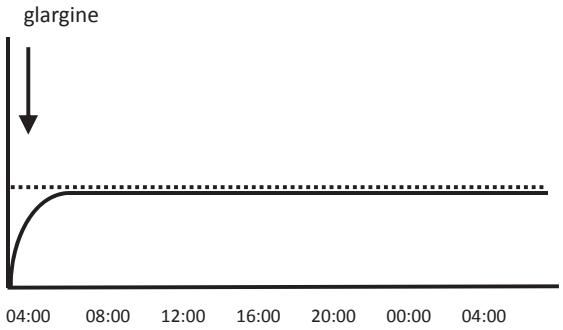
NPH q8 hours During Continuous Enteral Feedings or TPN



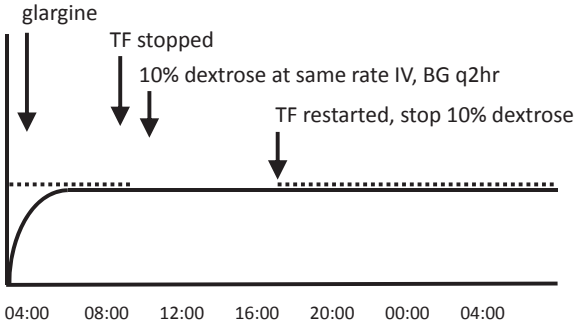
NPH q8 hours During Continuous Enteral Feedings (or TPN)



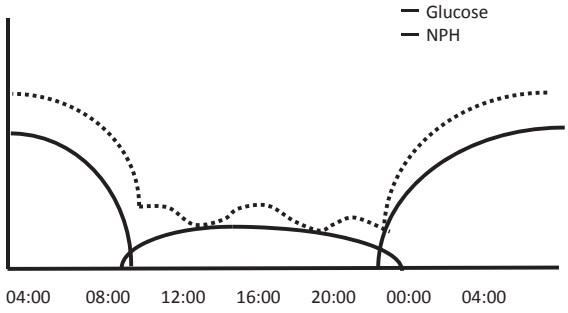
Glargine During Continuous Enteral Feedings (or TPN)



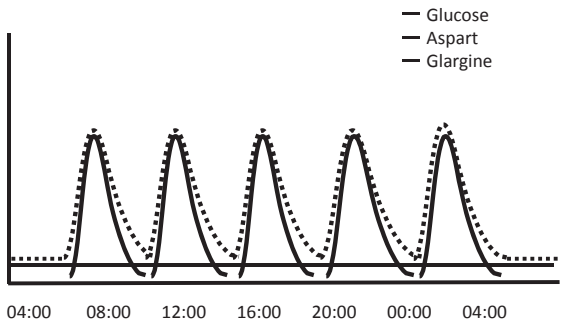
Glargine During Continuous Enteral Feedings (or TPN)



Overnight Enteral Feedings with Daytime Grazing



Bolus Enteral Feedings



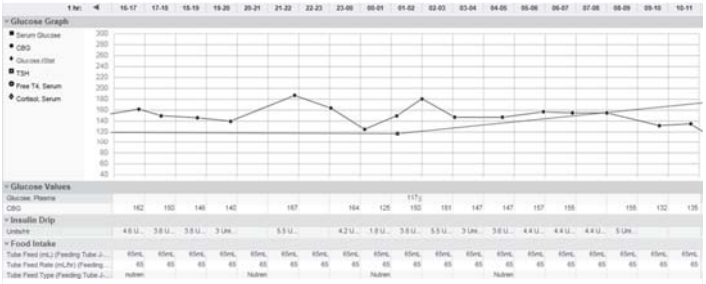
Case 2: Enteral Feeding

Case 2: Enteral Feeding

How do you manage this patient?

- Calculate insulin requirement from insulin infusion when TF at goal rate

Case 2: Enteral Feeding



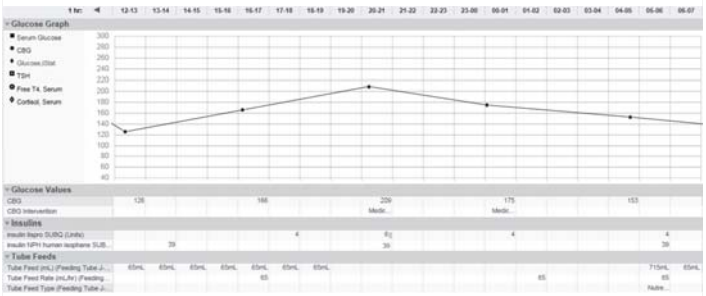
- Total insulin received over 24 hours = 130 units

Case 2: Enteral Feeding

How do you manage this patient?

- Calculate insulin requirement from insulin infusion when TF at goal rate (130 units)
- Consider decrease in the TDD 0-20% depending on glucose control on the infusion
- Administer as NPH q8hrs
  - 130 x 0.9 = 117 units
  - 117 / 3 = 39 units NPH q8hrs

Case 2: Enteral Feeding



Case 2: Enteral Feeding, continued

His clinical status starts to improve, and the surgical team decides to change him to bolus tube feeds, five times per day (same total volume of tube feed).

Glucoses have been stable on NPH 39 units q8 hours, ranging between 120-180.

What is the best option?

A. No change to his insulin regimen
B. Discontinue scheduled insulin, place on sliding scale
C. Discontinue scheduled insulin, place on home diabetes medications and sliding scale
D. Change his insulin to a rapid acting analog 23 units with each tube feed bolus, plus a correction insulin scale

- Total daily insulin on continuous TF: 39 x 3 = 117 units
- 117 units/5 boluses per day = 23 units/bolus

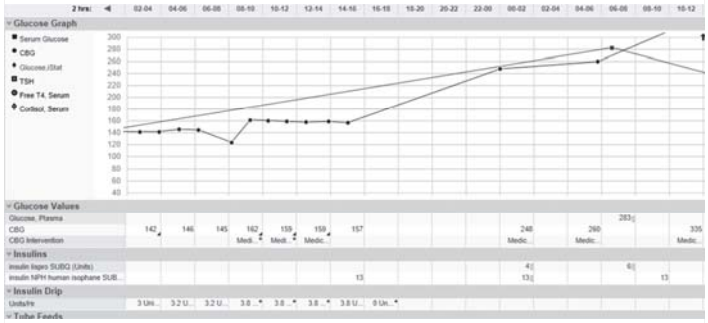
TPN

- Parenteral nutrition often causes hyperglycemia and often requires insulin treatment, even in patients who would not require insulin otherwise
- If patient is significantly hyperglycemic, consider IV insulin for first 1-2 days to gauge the insulin requirements
- Then place 80-100% of the insulin requirement in the TPN and use a supplemental insulin scale
- Or, could estimate insulin requirement using carb ratio of 1 unit:10 grams of carbohydrate in TPN, and put this amount in the TPN bag
- Redistribution strategy
  - add 75% of yesterdays correction therapy to today's bag

Case 3: TPN

- 75 yo F with Type 2 Diabetes is admitted for chronic mesenteric ischemia and undergoes a right iliac to SMA bypass.
- She is on TPN, and her glucose levels are stable on an insulin infusion.
- Her primary team attempts to transition off the infusion to SQ insulin. However, she develops hyperglycemia so you are consulted to assist with management.

Case 3: TPN



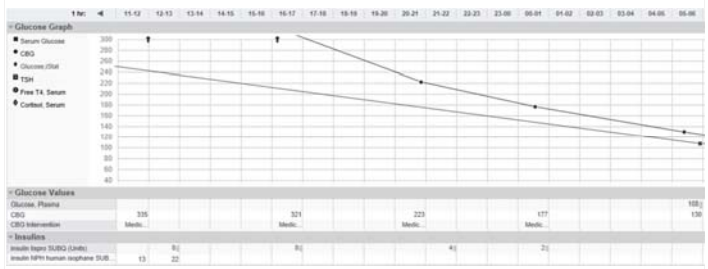
Case 3: TPN

How do you manage this patient?

- Calculate insulin requirement from insulin infusion (88 units/24 hours)
- Put 80% of this in the next TPN bag
  - 88 units x 0.8 = 70 units
- However it is currently 11am, and the next bag is not due to hang until 9pm
  - Give an injection of NPH to make up the difference in requirement

Case 3: TPN

- Calculated insulin requirement of 70 units for 24 hours is equivalent to NPH 35 units q12.
- Patient had received 13 units NPH. Give additional 22 units NPH.



NPH 13 units Give NPH 22 units for total 35 units to last until next TPN bag

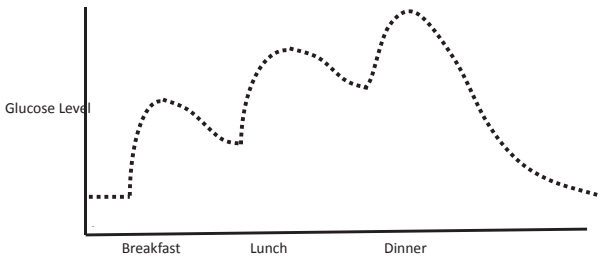
Case 3: TPN

- Five days later the dietician recommends increasing her caloric intake. The dextrose is increased from 165 grams to 205 grams per 24 hours. What change do you make?
- Increase the insulin proportionally to the amount of dextrose
  - 165g/70 units = carb/insulin ratio of 2.36 (1 unit of insulin for 2.36g dextrose)
  - Insulin in next bag should be increased to: 205g/(2.36 g/unit) = 87 units

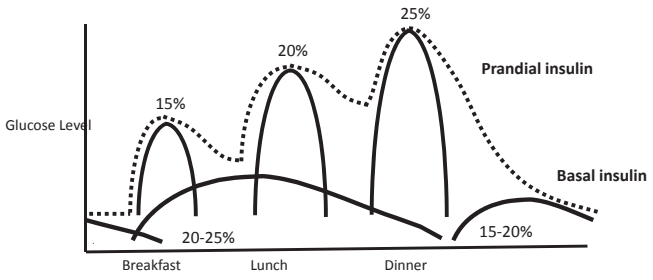
Inpatient Insulin Management: Tailor to the situation

- Patients that are eating (reliably or unreliably)
- Other nutrition (Tube feeds, TPN)
- Corticosteroids

Typical Blood Glucose Pattern With Morning Steroid Therapy



Inpatient Therapy of Patients on AM Corticosteroids



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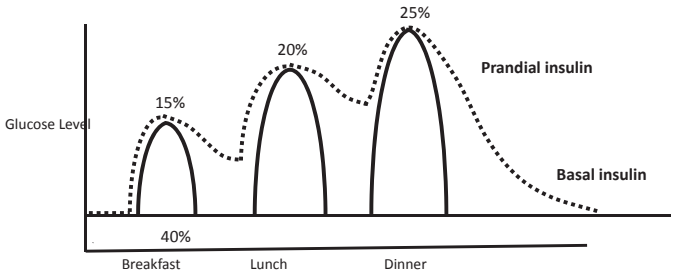
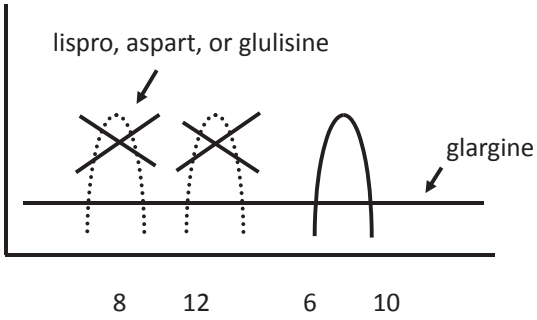


Inpatient Insulin Management: Tailor to the situation

- Patients that are eating (reliably or unreliably)
- Other nutrition (Tube feeds, TPN)
- Corticosteroids
- Procedures/surgery/NPO

For procedures or brief NPO status, hold the prandial insulin but maintain basal insulin



Inpatient Insulin Management

- Patients that are eating (reliably or unreliably)
- Other nutrition (Tube feeds, TPN)
- Corticosteroids
- Procedures/surgery/NPO

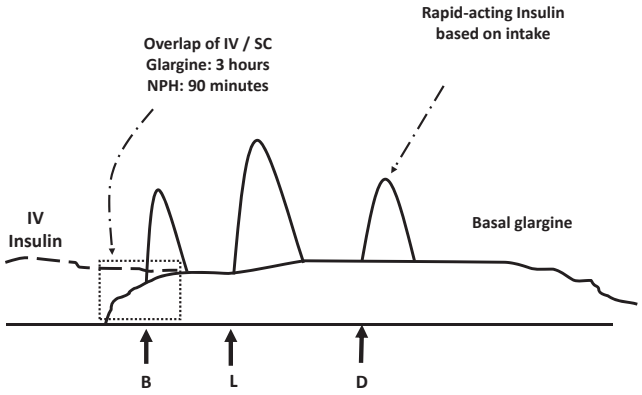
- IV insulin
- Transition from IV to SC insulin

Intravenous Insulin

- Many different protocols published
- There are several decision support software systems available that can help guide insulin infusion dosing

- Therapy of choice in the ICU
- Best (most stable) results in patients who are NPO
- in patients that are eating, if using a traditional insulin infusion protocol:
  - Use IV insulin as basal insulin
  - Add SC mealtime insulin
- Infusion software systems manage meals with IV or SQ boluses

Basics of SC Insulin After IV



Converting From IV Insulin Infusion to SC In The Hospital Without Rapid Medical Improvement

- Calculate the insulin requirement
  - Total Daily Dose = amount received IV + SC
    Or
  - Basal: Insulin delivered overnight for 4-6 hours (stability)
    - Extrapolate to get 24 hour basal requirement
- Multiply by **80%** to get a safe SC dose /24 hours
- Apportion into appropriate basal and nutritional components
- Adjust according to overnight glucose control

Converting From IV Insulin Infusion to SC In The Hospital With Rapidly Changing Medical Status

- When this applies:
  - After surgery as the patient rapidly improves each day
  - Acute medical illness where effective therapy can cause rapidly changing insulin sensitivity
  - Particularly in those without diabetes
- Use **60%** of recent IV basal insulin for calculation (rather than 80%)
- From that point, other calculations remain the same

Transition to Outpatient Care

Case 4: Discharge Regimen

65 yo M with type 2 diabetes admitted with multiple fractures after a MVA. His glucoses were in the 300's on admission, and during his hospitalization you have treated him with a basal/bolus regimen of glargine and novolog and achieved glucoses within target range. He will be discharged tomorrow.

- Wt 90 kg
- Current medications: glargine 28U qhs, aspart 9U TID with meals
- Outpatient medications: metformin 1000mg bid and dulaglutide 1.5 mg per week (both held)
- Pertinent labs: Cr 1.6 on admission, now 0.9
- HbA1c 9.2% on admission.

What do you send him home on?

A. Resume previous medications
B. Resume metformin and dulaglutide, add glargine once daily
C. Send home on current inpatient insulin regimen of glargine and aspart

Hospital Discharge Transition

- Stabilize blood glucose prior to discharge
- Obtain A_{1c} for discharge planning if result not available for the previous 2-3 months
- Provide inpatient education (survival skills)
- Refer patient for outpatient education
- Prepare for outpatient follow-up with PCP

Magee MF. *Hosp Physician.* 2006;2(4):17-28.
Clement S, et al. *Diabetes Care*. 2004;27(2):553-591.
Inzucchi SE. *N Engl J Med.* 2006;355(18):1903-1911.
Hassan E. *Am J Health Syst Pharm.* 2007;64(10 suppl 6):S9-S14.

AACE Discharge Recommendations For Patients with Type 2 Diabetes on Orals

HbA1c level	Recommended Actions
<7%	Return to previous therapy
7-8%	Increase dose of previous oral agents, or Add a third agent, or Add bedtime basal insulin
>8%	If already on 2 oral agents, add once daily basal insulin
10%	Consider discharging on basal-bolus regimen, continuing doses as started in the hospital

Summary

- Hyperglycemia in the hospital is best managed via physiologic insulin therapy (basal/nutritional), with additional supplemental insulin used if needed
- Choice of regimen needs to be individualized and account for source of nutrition, changing medical status, and factors increasing risk of hypoglycemia and hyperglycemia
- Insulin regimen should be adjusted daily depending on prior day's results

Thank you!

When to Worry: Which Anemias to Work up

Joseph J. Shatzel, MD
Oregon Health & Science University

GENERAL HEMATOLOGY

DISCLOSURE

Current Relevant Financial Relationship(s)

I receive consulting fees from Aronora INC, a start up pharmaceutical company with financial interests in targeting factor XI and XII for therapeutic purposes.

Objectives

- **Describe inpatient anemias of concern**
  - **Macrocytic – AIHAs, B12/Folate**
  - **Normocytic – TMAs, acute blood loss**
  - **Microcytic – IDAs**
- **Review anemias of chronic inflammation and other reassuring findings**

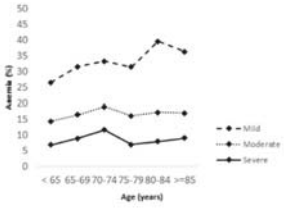
What is anemia

	Female (>15 years old)		Male (>15 years old)
	Non pregnant	Pregnant	
Non-anemia	≥12 g/dl	≤11 g/dl	≥13 g/dl
Mild anemia	11–11.9 g/dl	10–10.9 g/dl	11–12.9 g/dl
Moderate anemia	8–10.9 g/dl	7–9.9 g/dl	8–10.9 g/dl
Severe anemia	<8 g/dl	<7 g/dl	<8 g/dl

Hemoglobin levels to diagnose anemia at sea level (g/L)

Anemia common in hospitalized patients

- **Prevalence of 58.4%**
- **Increasing prevalence with age**
- **Most common causes:**
  - **Chronic inflammation**
  - **Chronic renal failure**



Prevalence of anemia in hospitalized internal medicine patients: Correlations with comorbidities and length of hospital stay

Carlo Zaninetti[a,b,c], Catherine Klersy[b], Concetta Scavariello[a], Raffaella Bastia[a], Carlo L. Balduini[a], Rosangela Invernizzi[a]

[a] Department of Internal Medicine, University of Pavia, and IRCCS Policlinico San Matteo Foundation, Pavia, Italy
[b] Service of Biometry and Clinical Epidemiology, Scientific Direction, IRCCS Policlinico San Matteo Foundation, Pavia, Italy
[c] PhD program in Experimental Medicine, University of Pavia, Pavia, Italy

Questions I ask my fellows for inpatient consults:

- **What is the MCV?**
- **Any other cytopenia?**
- **Has the patient required transfusion?**
- **What is the LDH?**

Macrocytic (MCV >100)

- Liver disease/heavy ETOH use
- Medications
- Reticulocytosis (AIHA)
- Malignant (MDS or myeloma)
- B12 or folate deficiency

Hemolysis

- Autoimmune Hemolysis
- G6PD
- PNH
- Drugs
- Valvular
- Spur cells
- Clostridial

AIHA

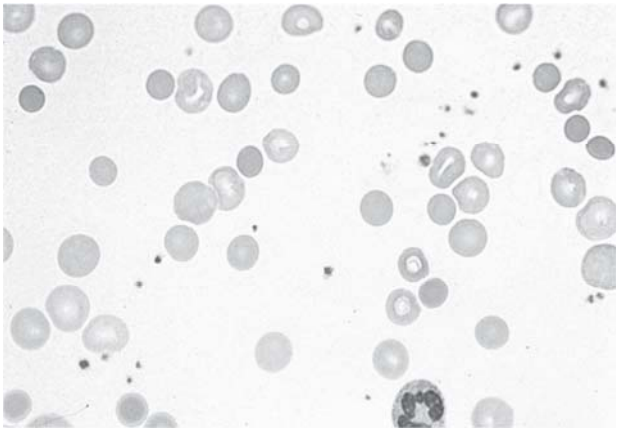
- Dropping Hgb. High LDH. +DAT

- Two Types
  - Warm – IgG
    - CLL, Lupus, Idiopathic
  - Cold – IgM
    - Lymphomas, post-viral, idiopathic

Warm AIHA

Always transfuse if you need to!

- Rapid onset
  - Dark urine, back pain, splenomegaly
- Positive DAT IgG (±C3)
- Responds to steroids
- Addition of rituximab better and more durable response
- Can take time to see response



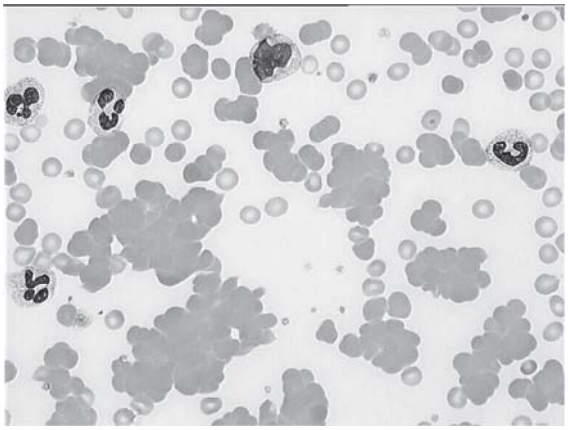
Peripheral smear in patient with warm AIHA

Cold AIHA

- Fast or subtle onset
- Usually older patients
- Cold sensitive
  - Acrocyanosis
  - Keep patient/IV/blood warm
- DAT + C3
- Less responsive to steroids
- Rituximab drug of choice

Cold AIHA

- Little things can matter
  - Keep warm
  - Hand/feet warmers
  - Avoiding sudden cold shocks



Peripheral smear in patient with cold AIHA

Transfusion in AIHA

- Always transfuse if you need to! (they will hemolyze it, but continue to give the blood and support patient)
- Cross match difficult → call blood bank early
- Infuse slowly at first
- If not recently (~ 90 days) transfused risk of reaction is low

B12 and Folate Deficiency

- Increasingly common cause of anemia
  - B12 - up to 10% of older folks deficient
  - Folate extremely rare
- Can also be associated with neurologic disease (B12)

Why Do People Get B_{12} Deficient?

- Diet: rare
- Failure to absorb
  - Lack of stomach acid
  - Lack of intrinsic factor
  - Lack of pancreatic enzymes
  - Lack of bowel
  - Something else eating B_{12}
- Metformin
- PPI

Why Do People Get Folate Deficient?

- Terrible diet
- Malabsorption
- Increased folate needs
  - Hemolytic anemia
  - Pregnancy
- Medications – hydroxyurea, MTX

Hematological Manifestations of B_{12} and Folate Deficiency

- Frequent: macrocytosis, hypersegmented neutrophils
- Rare: isolated thrombocytopenia and neutropenia, pancytopenia

B_{12} and Neurologic Disease

- Presenting sign of B_{12} deficiency in 30% of patients
- Not or only mildly anemic
  - Neuropathy
  - Myelopathy
  - Altered mental status
  - Paresthesias

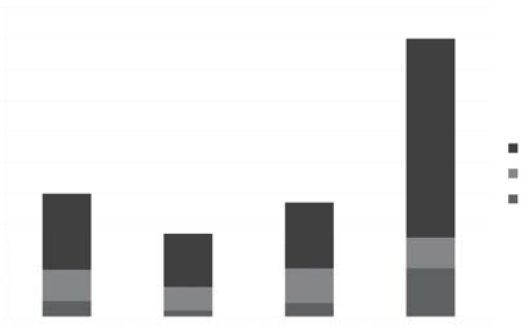
Problems with B12 levels

- Test does not measure physiological B_{12}
  - Measure TC I plus B_{12} bound to other proteins
  - Lack of consistency between tests and with *in vivo* measures of B_{12} levels

Methylmalonic Acid

- Only excreted in excess if tissue lack of B_{12}
- Elevated MMA correlates with *in vivo* assays of B_{12} lack
- Levels correlated with red cell and neurologic response to B_{12} therapy
- Much less technical problems with assay than B_{12}

B12 vs MMA



Bailey R L et al. Am J Clin Nutr 2011;94:552-561

Homocysteine (Folate level is useless)

- Elevated with both B_{12} and folate deficiency
- Decreased B_{12} stores often overlooked cause of Hcy elevation
- Lack of B_{12} plays major role in Hcy elevation of renal disease

MMA and Hcy as Diagnostic Tests

	MMA	Hcy
B_{12} Def	INC	INC
Folate	NL	INC

My Approach to macrocytosis

1. Look at old imaging of the Liver Ask about ETOH use
2. MMA and maybe homocysteine
3. Review Med list
4. TSH
5. Retic count/LDH
6. Think about Myeloma (SPEP) or MDS if the picture is reasonable.

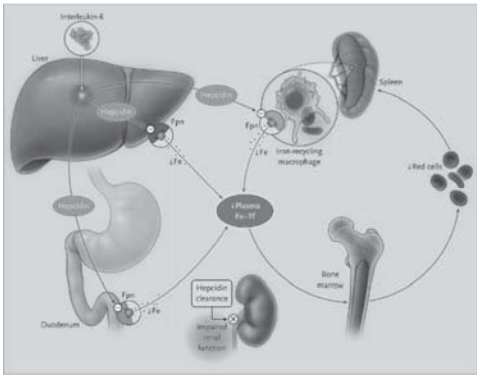
If all the workup is negative?

- For older patients with stable unexplained macrocytic anemia observation can be considered.
- BMB may be reasonable in cases of severe macrocytic anemia or if other cytopenias are present.

Normocytic anemia

- It can be all the things!
  - Inflammatory anemia
  - Acute blood loss anemia
  - Hemolysis: TMA and AIHA
  - Marrow failure/Malignancy
  - Early finding of any anemia

Inflammatory Anemia



Interpretation of Iron Studies

	Normal Values (adults)	Iron Deficiency Anemia (IDA)	Latent Iron Deficiency	Functional Iron Deficiency - Adequate stores		
				Renal disease Iron Deficiency Anemia	Iron Refractory Iron Deficiency Anemia (IRIDA)	Anemia of Chronic Disease (ACD)
Serum Iron (µmol/L)	10-30	↓	N/↓	↓	↓	↓
TSAT, %	17-44	<16	N/↓	<30	<10	N/↓
Serum Ferritin (µg/L)	20-200 (F) 40-300 (M)	<12-50	<30-50	<500	Variable	>100
Hb (g/dL)	>12 (F) >13 (M)	↓	N	<12 (F) <13 (M)	↓	↓

What causes a high ferritin??

- Acute/chronic inflammation
- Hepatic injury
- NASH, viral hepatitis
- Renal Failure
- Myocardial Infarction
- Metabolic syndrome
- Alcohol excess
- Malignancy
- Thyrotoxicosis

What causes a high ferritin??

- Usually not iron overload!
- Being sick.

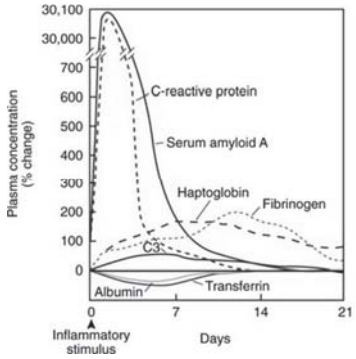
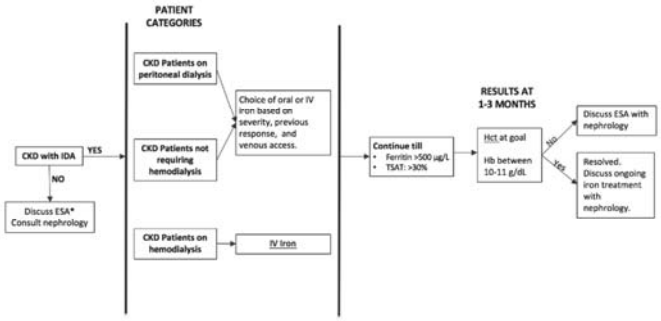


Table 3. Distribution of patients with elevated ferritin by disorder

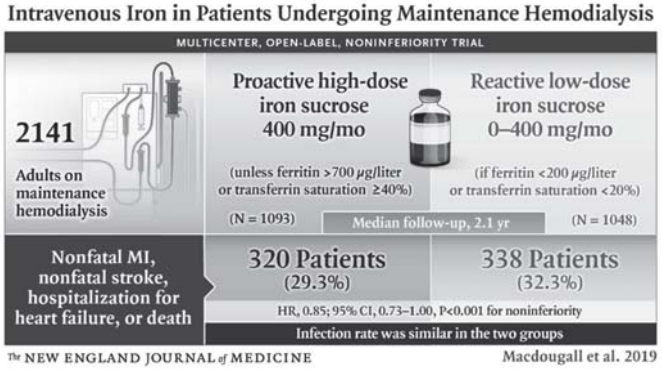
Disorder	N (% [90% confidence interval])	Ferritin (×10³ µg/L), median [range]
Renal failure	73 (65 [57-72])	84 [50-440]
Hepatocellular injury	61 (54 [46-62])	83 [50-440]
Infection	52 (46 [38-54])	87 [52-440]
Hematologic malignancy	36 (32 [25-40])	98 [52-233]
Rheumatologic/inflammatory	20 (18 [12-25])	68 [50-341]
HLH	19 (17 [11-24])	99 [52-233]
Iron overload	13 (12 [7-18])	101 [76-440]
Hemolytic anemia	5 (4 [2-9])	149 [80-203]
Solid tumor	5 (4 [2-9])	72 [52-95]
MAS	3 (3 [1-7])	61 [56-341]
None	2 (2 [0-4])	123 [118-127]

Retrospective analysis of 113 patients with serum ferritin levels higher than 50 000 mg/L.

Renal Disease



Proactive IV iron in HD



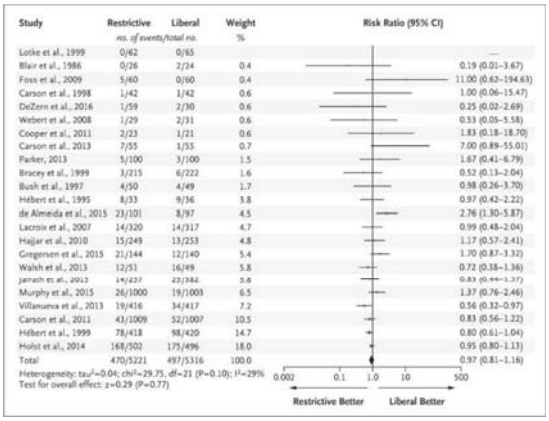
Blood loss anemia

Table 2. General guidelines from the AABB for red blood cell transfusions[3]

PATIENT	RECOMMENDATION	STRENGTH
Stable, hospitalized (including ICU)	Restrictive approach: Hb 7-8 g/dL	High quality of evidence; strong recommendation
Pre-existing cardiovascular disease	Restrictive approach: Hb 8 g/dL	Moderate quality of evidence; weak recommendation
Acute coronary syndrome or unstable angina	Transfusion decision influenced by symptoms as well as Hb concentration	Low quality of evidence; uncertain strength of recommendation
Symptoms of anemia regardless of Hb concentration		Low quality of evidence; weak recommendation

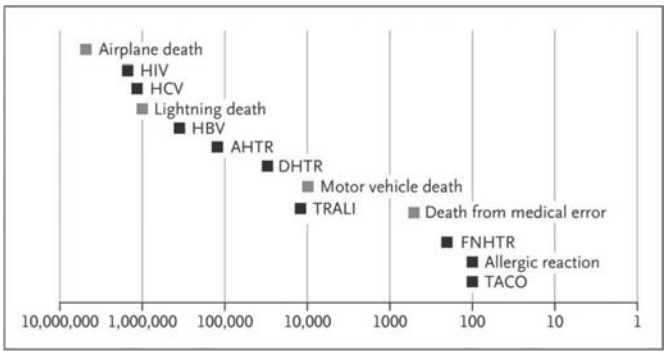
SOURCE: *Adapted from Carson JL, Grossman BJ, Kleinman S, et al. Red blood cell transfusion: a clinical practice guideline from the AABB. Ann Intern Med. 2012;157:49-58.*

Clinical Trials Comparing the Effect of Restrictive versus Liberal Transfusion on 30-Day Mortality.



Carson JL et al. N Engl J Med 2017;377:1261-1272.

Infectious and Noninfectious Adverse Effects of Red-Cell Transfusions as Compared with Other, Unrelated Risks.



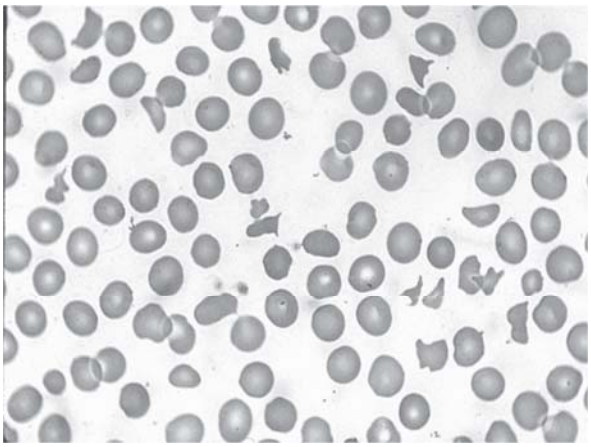
Carson JL et al. N Engl J Med 2017;377:1261-1272.

Thrombotic Microangiopathy (TMA)

Step 1. Are the platelets low?

Step 2. Is the LDH elevated (usually >400)

If 1+2 are true, look at the smear for Schitocytosis.



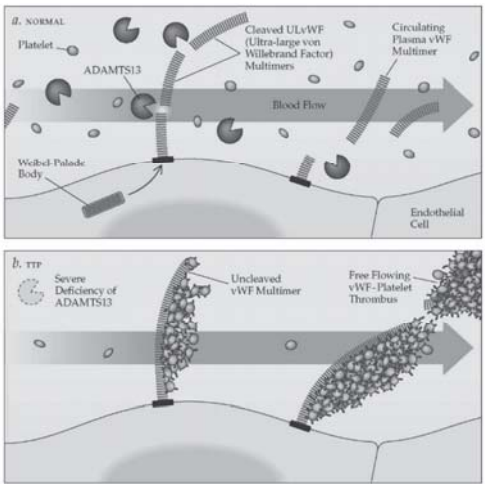
Peripheral smear in patient with warm TTP

TMA: DDX

- TTP
- HUS
  - Typical
  - Atypical
    - Primary
    - Secondary
      - Drugs
      - Transplant

TTP

- Universally fatal without therapy
- Plasma exchange dramatic improvement in outcomes
- Most autoimmune
- Congenital can present very late



The Pentad of TTP: Dead, Dead, Dead

- Thrombocytopenia
- MAHA
- Mental status changes: only seen in 40-50%
- Renal insufficiency: most often mild
  - Proteinuria most common
- Fevers: 20%

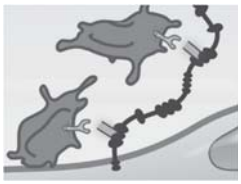
ADAMTS13 in TTP

- Low ADAMTS13
  - Acquired or classical (autoimmune)
  - Congenital (very rare but can be seen in adults)
- ADAMTS13 Normal in HUS

Disease	ADAMTS13 Level	ADAMTS13 inhibitor	Presentation
Acquired TTP	Low	High	Idiopathic
Congenital TTP	Low	None	Idiopathic (maybe family history)
Classic HUS	>10%	None	Diarrheal illness (May be toxin positive)
aHUS	>10%	None	Idiopathic (maybe family history)

Therapy of acquired TTP

- Steroids
- Plasma exchange
- Rituxumab in relapse
- Caplicizumab?



Plasma Exchange

- Start with 1.5 plasma volume exchange for at least 5 days
- Follow LDH + platelets
- Taper when LDH normal
- Plasma infusion if exchange is not available
  - 1 unit/4-6 hours

HUS

- TMA and prominent renal failure
  - Severe renal disease rare in TTP
- Two types
  - Typical
    - Post infectious (usually shiga toxin)
  - Atypical
    - Not post infectious

Typical HUS

- Preceding diarrheal illness
  - *E coli* 0157:H7 classic
  - Increase variant strains
- More common summer and autumn
- Outbreaks very common
- Dialysis ~ 50%

Etiology

- Shiga-toxin binds to endothelial globotriaosylceramide receptor
- Leads to EC destruction
- Complement may play a role?

HUS: Treatment

- Supportive care
  - Data negative for plasma exchange or more aggressive therapy

aHUS

- General definition
  - TMA
  - No infection
  - ADAMTS13 >10%
  - May eventually detect a genetic mutation.

Atypical HUS

- Very broad category
- Underlying complement regulatory mutations in about 50%.
- Drugs, pregnancy, organ transplant may trigger.

Primary Atypical HUS

- Idiopathic/recurrent HUS
  - Renal failure
  - Failure of renal transplants
  - Familial HUS
- Now all recognized as diseases of complement activation

Complement and aHUS

- Tied with coagulation cascade for most boring cascade
- ~ 50% of patients have defects in complement regulatory proteins
  - Course of those with defects same as those without

Diagnosis

- Thrombotic microangiopathy with:
  - Normal ADAMTS13
  - Predominant renal involvement
  - Gradually progressive with therapy
- Specific diagnosis
  - Genetic testing - Machaon Diagnostics
  - Remember 50% patients will NOT have defects!

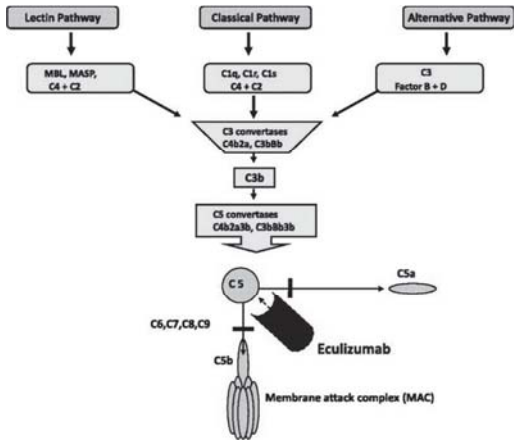
Complement and Atypical HUS

Protein	Gene	Source	Location	% of aHUS
Factor H	*CFH*	Liver	circulates	~ 15-30%
Factor I	*CFI*	Liver	circulates	~ 5-10%
Membrane Cofactor Protein	*MCP*	Widespread	Membrane bound	~ 10-15%
Factor B	*CFB*	Liver, ?	circulates	<5%
C3	*C3*	Liver, ?	circulates	~ 5-10%
Anti-FH-Ab	*CFHR1/ CFHR3*	Lymphocyte	circulates	~ 10%
Unknown				~ 40-50%

slide: Jeffrey M. Saland, M.D

Treatment

- Plasma exchange temporizing but insufficient
- Renal disease progressive and can recur after renal transplant
- Indefinite therapy with eculizumab in idiopathic cases.



Brodsky, R. A. Blood 2009;113:6522-6527

Eculizumab

- Humanized monoclonal antibody against complement component C5.
- Binds and inhibits C5
  - Terminal stages of complement are halted
  - Must administer Meningococcal vaccine
- Relapse rates ~30% If stopped

Microcytic Anemia

- Iron Deficiency
- Thalassemia
- Inflammatory anemia

- Rare things:
  - Sideroblastic anemia, lead.

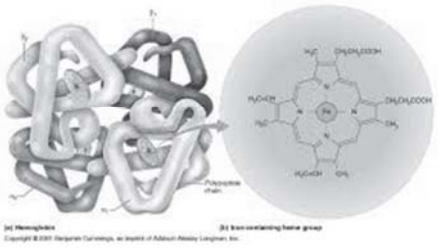
Thalassemia

- 1. Look back at old CBCs. Has the patient always had microcytosis +/- anemia
- 2. Is ferritin >50

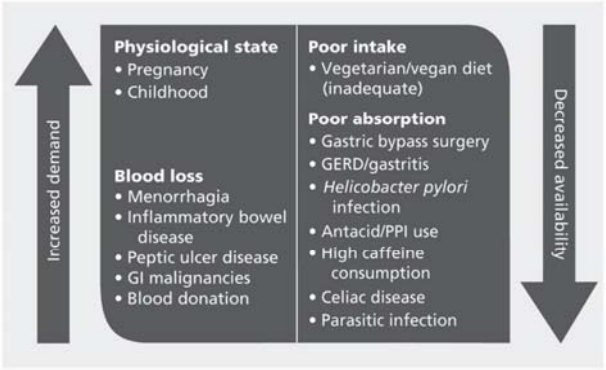
- If 1+2 are true it could be thalassemia trait. Hgb electrophersis may detect it.

Iron Deficiency

- What is the purpose of iron?



Causes of Adult Iron Deficiency Anemia

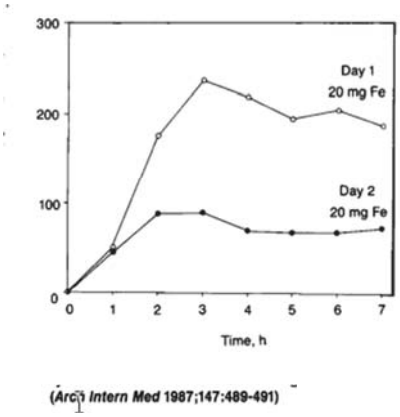


Symptoms of Iron Deficiency Anemia

- **Fatigue**
- **Difficulty in concentrating,**
- **Hair thinning**
- **Pica.**
- **Restless leg syndrome**
- **Poor pregnancy outcomes (Increased risk of preterm labor, low neonatal weight, and neonatal anemia).**
- **Poor QOL in heart failure**

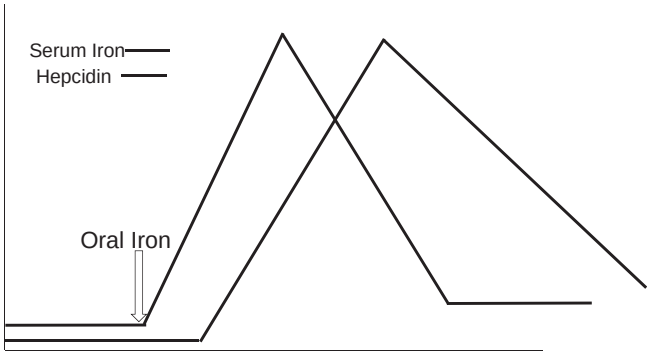
Oral Iron Pills

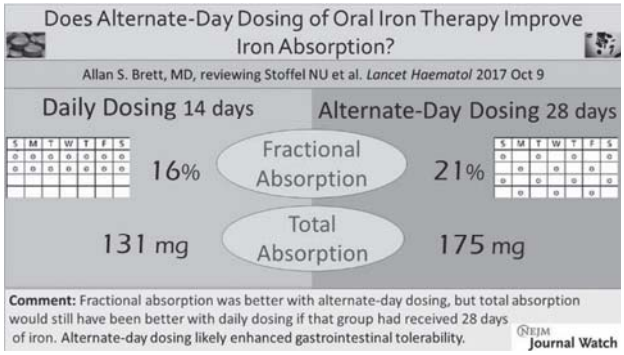
- **Gut can only absorb a limited amount of iron**
- **Maxed out at ~ 10mg**
  - **Higher in 3rd trimester**



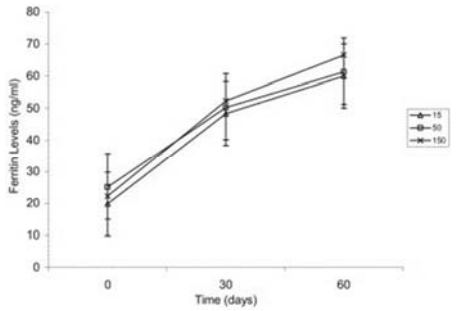
(*Arch Intern Med* 1987;147:489-491)

Hepcidin Response to Iron





15 vs 50 vs 150mg Oral Iron



Am J Med. 2005 Oct;118(10):1142-7.

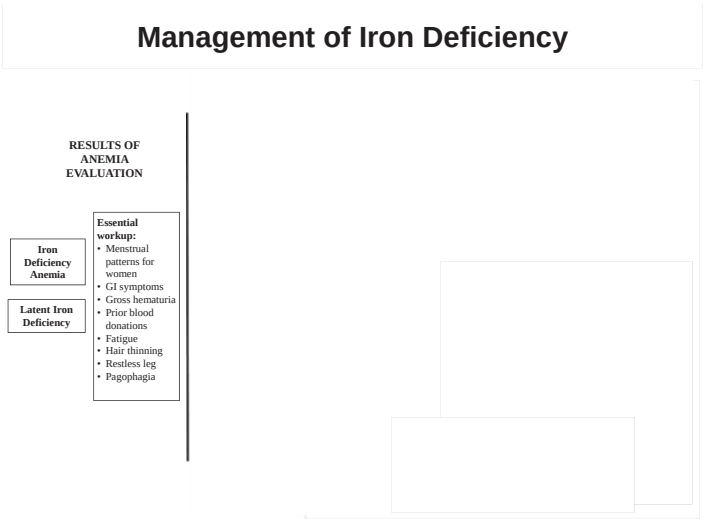
Parental Iron Therapy

- When to use
  - Refractory to oral iron
  - Unable to take oral iron
  - Inflammatory bowel disease
  - Cannot keep up with blood loss
    - Bariatric surgery
    - Chronic GI bleeding

IV Iron: Preparations

- Iron MW Iron Dextran: INFeD
- Iron Sucrose: Venofer
- Iron Gluconate: Ferrlecit
- Ferumoxytol: FeraHeme
- Ferric carboxymaltose: Injectafer

Management of Iron Deficiency



Remember!

- Iron is good!
- Ferritins > 50 ng/mL are good
- Oral iron
  - One pill/day
  - With vitamin C
  - With meat if feasible
- IV iron safe and effective
  - LMWID 1 gm in 1 hr

GENERAL HEMATOLOGY
OHSU

Thank You!

High (and low) Value Care for the Hospitalist

September 26, 2019
Adam Obley, MD, FACP
Associate Professor of Medicine

Disclosures

- I have no financial disclosures
- I am jointly employed by the VHA and OHSU Center for Evidence-based Policy
- I sit on the ACP High Value Care Committee

MORNING CONSULT

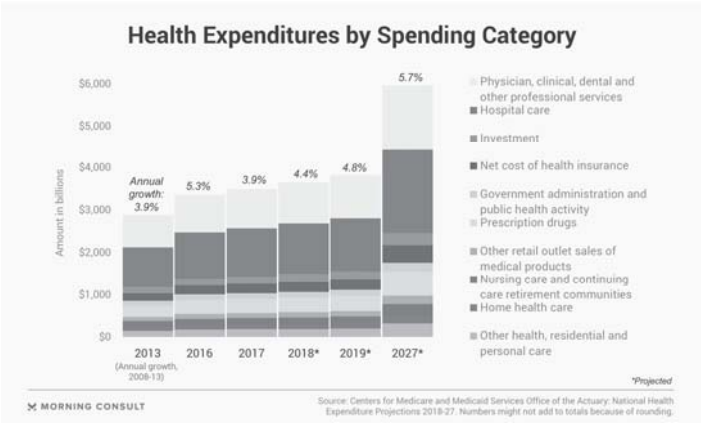
NEWS INTELLIGENCE LOGIN

HEALTH COSTS

CMS Estimates Annual U.S. Health Care Spending to Hit $5.96 Trillion by 2027

In 2018-2027, health expenditure growth seen outpacing annual GDP growth by average of 0.8 percentage points

BY YUSRA MURAD
February 20, 2019 at 5:05 pm ET



Healthcare Waste

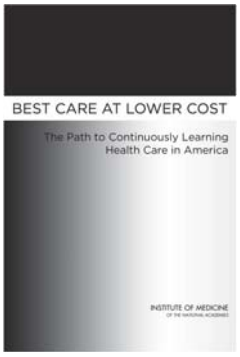
Evidence to Practice

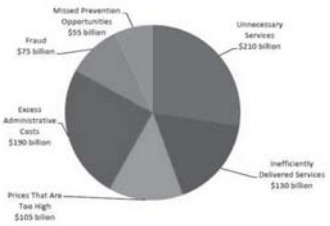
Calculating Health Care Waste in Washington State First, Do No Harm

Table. Summary of the Services by Care Category

Category of Care	No. (%) Services	Total Budget, $ Millions
Necessary: likely appropriate care	825 677 (54)	502.8 (64)
Likely wasteful: a need to very seriously question appropriateness	19 694 (1)	23.9 (3)
Wasteful: very likely unnecessary and should not have occurred	674 227 (44)	258.0 (33)

Healthcare Waste





= $750 billion or more than 1/3 of all health care spending

Case 1

- 65 y/o man with HTN presents to the ED with hematemesis
- Meds: Lisinopril 5 mg/day, ASA 81 mg
- Labs notable for Hgb 10, o/w normal
- GI endoscopy confirms peptic ulcer disease with 2 clean based ulcers in the antrum
- Which of the following would you use following endoscopy?
  - A. IV pantoprazole for 24 hours then PO esomeprazole BID
  - B. IV pantoprazole for 24 hours then PO omeprazole BID
  - C. PO esomeprazole BID
  - D. PO omeprazole BID
  - E. Omeprazole daily
  - F. Esomeprazole+omeprazole+ranitidine+sucralfate

Case 1: Anti-secretory secrets

- Ulcers with flat pigmented spots or a clean base require only daily oral PPI therapy
- Ulcers with acting bleeding, visible vessel, or adherent clot should receive 72 hours of IV PPI
- Oozing bleeding remains an area of controversy

L Laine, et al. AJG 2012. DOI: 10.1038/ajg.2011.480

Case 1: Easy on the esomeprazole

OBSERVATION: BRIEF RESEARCH REPORT

Medicare Part D Spending on Single-Enantiomer Drugs Versus Their Racemic Precursors

- When head-to-head studies are done (rarely) enantiomers don't perform better than their racemic precursors
- Medicare Part D spending on 12 single-enantiomer drugs between 2011 and 2017 totaled $19.3 billion and substitution of racemates would have saved over $16.5 billion
- Esomeprazole accounted for over $13 billion of that spending and substituting omeprazole would have saved $12.7 billion
  - Those estimates don't include patient out-of-pocket spending (which the authors estimate would be $690 million or about $18/Rx)

A Egilman et al. Ann Intern Med 2019. DOI: 10.7326/M19-1085

Case 1, cont…

- Pt remains in the hospital for observation for 24 hours
- BPs (x8!) while admitted consistently 160-170/90-100 mmHg
- Which of the following (in addition to 6 weeks of daily omeprazole) would you recommend at d/c?
  - A. Increase lisinopril to 10 mg daily, cont ASA 81
  - B. Cont both lisinopril 5 mg daily and ASA 81
  - C. Increase lisinopril to 10 mg daily, stop ASA 81
  - D. Cont lisinopril 5 mg daily and stop ASA 81
  - E. Refer for renal artery denervation, incr ASA to 325

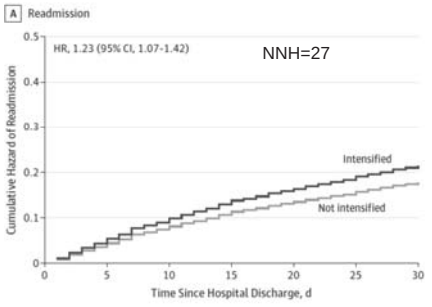
Case 1: BP med intensification

- Well-done propensity matched retrospective cohort of hypertensive adults hospitalized for non-cardiac reasons
- Propensity matching was based on over 50 characteristics including demographics, co-morbid conditions, baseline BP, medications, admission diagnosis, etc…
- Ultimately compared 2028 patients who had their BP meds intensified in the hospital to 2028 matched patients who did not

T Anderson et al. JAMA IM 2019. DOI: 10.1001/jamainternmed.2019.3007.

Case 1: BP med intensification

Figure. Cumulative Hazard Plots Comparing Outcomes With Exposure to Antihypertensive Regimen Intensifications at Hospital Discharge



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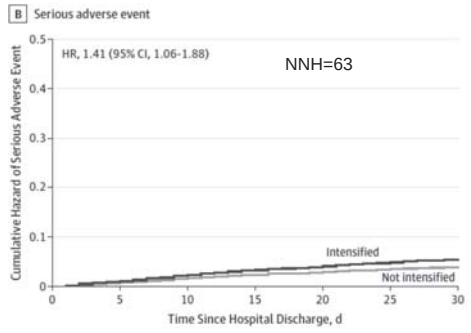

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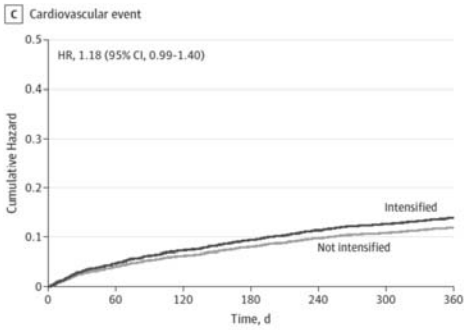
Case 1: BP med intensification



T Anderson et al. JAMA IM 2019. DOI: 10.1001/jamainternmed.2019.3007.

Case 1: ASA for primary prevention

Aspirin vs no aspirin (placebo or no treatment) in adults without CV disease*

Outcomes	Number of trials (n)	Events/10 000 person-y		At a median 5.0 y	
		Aspirin	No aspirin	RRR (95% CI)	NNT (CI)
Composite CV outcome†	11 (157 864)	57	61	10% (5 to 14)	265 (182 to 512)
CV mortality	13 (161 680)	19	20	5% (−3 to 13)	NS
All myocardial infarction	13 (161 680)	28	31	14% (3 to 24)	361 (211 to 1837)
Total stroke	13 (161 680)	24	25	6% (−1 to 13)	NS
Ischemic stroke	10 (129 068)	18	21	13% (4 to 20)	540 (334 to 1686)
All-cause mortality	13 (161 680)	69	70	3% (−2 to 7)	NS
				RRI (CI)	NNH (CI)
Major bleeding‡	11 (147 858)	23	16	42% (30 to 55)	210 (160 to 293)
Intracranial bleeding	12 (160 404)	6.7	5.1	33% (13 to 57)	927 (545 to 2297)
Major gastrointestinal bleeding	10 (140 801)	13	8.2	55% (37 to 77)	334 (241 to 505)

*CV = cardiovascular; NS = not significant; other abbreviations defined in Glossary. RRR, RRI, and CI calculated from risk ratios and CIs in article supplement using a random-effects model. NNT, NNH, and CI provided by author.

†CV mortality, nonfatal myocardial infarction, or nonfatal stroke.

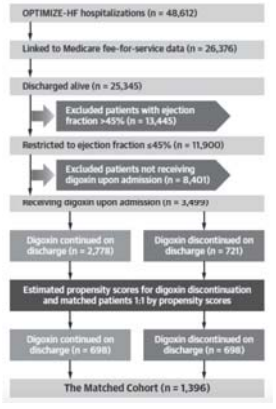
‡Event rates confirmed by author.

A Atencio et al. Ann Intern Med 2019. DOI: 10.7326/ACPJ201905210-053

Case 2

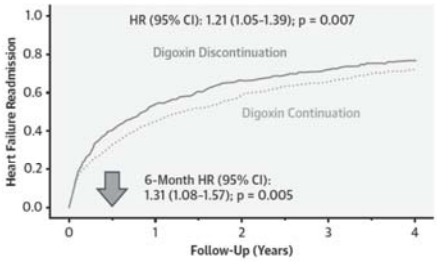
- 70 y/o man with ischemic HFrEF (EF 35%) and pAF is admitted for ADHF
- Meds: Furosemide, Lisinopril, Metoprolol, Digoxin, ASA, statin, apixaban
- Admitting physician stops digoxin since HR 55, pt c/o nausea, and no mortality benefit in HF
- Pt diureses well, HR remains 50s-60s during admission off of digoxin
- Would you restart digoxin at discharge?
  - A. Yes
  - B. No
  - C. No, but will refer to EP for consideration of some device…any device

Case 2: Hot diggety dig



Malik et al. JACC 2019. DOI: 10.1016/j.jacc.2019.05.064.

Case 2: Hot diggety dig



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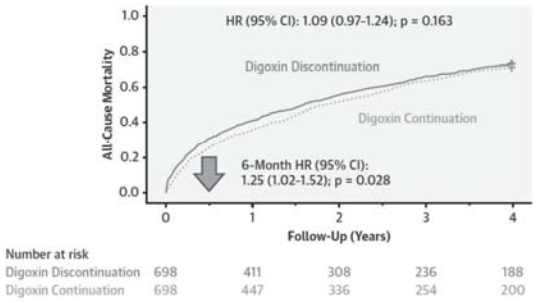

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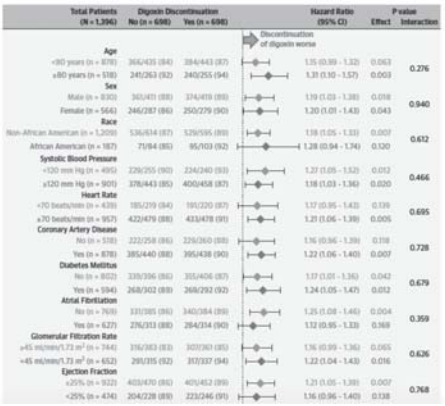
Case 2: Hot diggety dig



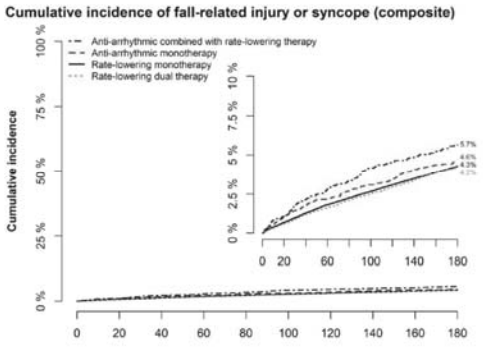
A Malik et al. JACC 2019. DOI: 10.1016/j.jacc.2019.05.064.

Case 2, cont

- Pt discharges on his usual home meds minus digoxin, but is readmitted 2 weeks later for AF with RVR
- Meds: Furosemide, Lisinopril, Metoprolol succinate 100, ASA, statin, apixaban
- Admitting physician increases metop to 150, and starts oral amiodarone
- Pt converts to NSR
- Would you continue amiodarone at discharge?
  - A. Yes
  - B. No
  - C. Yes, and will refer to EP for consideration of some device…any device

21

Case 2: Amio-no!



22 F Dalgaard et al. JAGS 2019. DOI: 10.1111/jgs.16062.

Quick Hit

- 65 y/o man is admitted from the ED with syncope
- What is the pre-test probability of PE for this patient?
  - A. <5%
  - B. 5-10%
  - C. 10-15%
  - D. 15-20%
  - E. So high we should just start the LMWH now

23

Quick Hit: PE prevalence in syncope

- In contrast to the PESIT study, recent large registry studies have suggested that the prevalence of PE in patients hospitalized for syncope is in fact much lower than the 17% they reported
- One study, based on a cohort of all gen med patients admitted for syncope at the four hospitals of the University of Toronto system concluded that the **prevalence of any VTE was 1.4%**
- A second retrospective cohort including over 1.6 million patients (in 5 countries) presenting to the ED with syncope found the **prevalence of PE at 90 days of follow-up ranged from 0.14% to 0.83% in all patients and 0.35% to 2.63% among patients hospitalized for syncope**

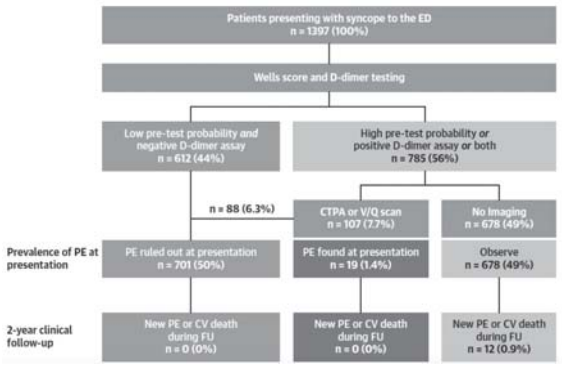
A Verma et al. JAMA IM 2017. DOI: 10.1001/jamainternmed.2017.1246.
G Costantino et al. JAMA IM 2017. DOI: 10.1001/jamainternmed.2017.8175

Quick Hit: PE prevalence in syncope

- Now we can add a third study showing low prevalence of PE in patients with syncope
- 2-year follow-up of about 1,500 older people presenting to the ED with syncope at 13 hospitals in 8 countries

P Badertscher et al. JACC 2019. DOI: 10.1016/j.jacc.2019.06.020.

Quick Hit: PE prevalence in syncope



P Badertscher et al. JACC 2019. DOI: 10.1016/j.jacc.2019.06.020.

Case 4

- 45 y/o man admitted for AKI with sCr 2.5
- Recently tx'd for CAP with levofloxacin
- Afebrile, appears euvolemic on exam, no rashes
- FENa 5%, UA bland, PVR normal, CBC(d) normal
- You suspect FQ-related AIN. Would you order urine eos?
  - A. Yes
  - B. No
  - C. Let's go ahead and call nephro for a biopsy

Rue Noise

JAMA Internal Medicine | Teachable Moment

Overuse of Urine Eosinophils in the Diagnosis of Acute Interstitial Nephritis
A Teachable Moment

Reliance on UEs can lead to misdiagnoses, delayed treatment, and unnecessary costs. In the case of the present patient, had the negative UEs decreased the suspicion for fluoroquinolone-induced AIN, he may have been reexposed to fluoroquinolones, putting him at risk for further renal injury, or undergone an unnecessary renal biopsy. Given that they provide minimal diagnostic information, UEs should not be used in the consideration of AIN.

offending agent

A Strasma et al. JAMA IM 2019. DOI: 10.1001/jamainternmed.2019.1755.

Case 5

- You're running your hospitalist group quality meeting
- One of your colleagues suggests that implementing a standard CAP bundle with antibiotics, steroids, early mobilization, and nutrition screening would reduce LOS and CAP mortality
- Do you think this bundle will achieve those goals?
  - A. Yes
  - B. No
  - C. Yes, and bring me more bundle suggestions!

Badly bungled bundles

- Double-blind stepped-wedge, cluster-randomized trial of CAP bundles at 2 hospitals in Melbourne
- Bundle included
  - Routine use of 50 mg prednisolone x 7 days
  - Predefined criteria for switching to oral abx
  - Early mobilization
  - Screening for malnutrition
- Pts excluded if they had a contraindication to steroids or early mobilization

M Lloyd. JAMA IM 2019. DOI: 10.1001/jamainternmed.2019.1438

Badly bungled bundles

Table 2. Compliance With Evidence-Based Interventions by Exposure Group

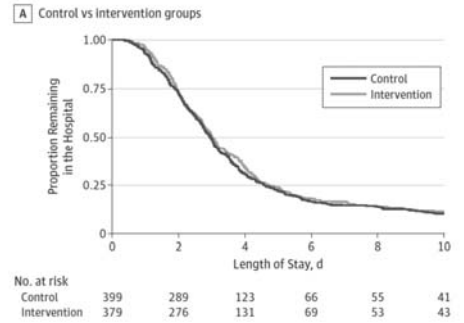
Intervention Component	Participants, No. (%)	
	Control (n = 415)	Intervention (n = 401)
Corticosteroids		
Prescription of 50 mg of corticosteroids daily within 36 h of arrival in ED	105 (25.3)	292 (72.8)
Minimum 7-d duration of corticosteroid prescription	14 (3.4)	225 (56.1)
Compliant with protocol dosage and duration	8 (1.9)	214 (53.4)
Ineligible (met prespecified criteria for corticosteroid prescription contraindicated)	15 (3.6)	16 (4.0)
Antibiotics		
Switch from parenteral to oral therapy made within 24 h of stability criteria reached	287 (69.2)	310 (77.3)
Early mobilization		
SOOB for >20 min with physiotherapist in first 24 h of admission	119 (28.7)	299 (74.6)
Progressive movement achieved with physiotherapy on >70% of eligible days	98 (23.6)	329 (82.0)
Compliant with early mobilization protocol	80 (19.3)	287 (71.6)
Ineligible (SOOB day 1 contraindicated)	77 (18.6)	74 (18.5)
Nutrition		
MST score documented within 24 h of admission	328 (79.0)	387 (96.5)
Appropriate nutrition therapy initiated in response to MST score	228 (54.9)	333 (83.0)
Patients receiving all interventions	0	115 (28.7)

Abbreviations: ED, emergency department; MST, malnutrition screening tool; SOOB, sit out of bed.

M Lloyd. JAMA IM 2019. DOI: 10.1001/jamainternmed.2019.1438

Badly bungled bundles

Figure 2. Primary Outcome



M Lloyd. JAMA IM 2019. DOI: 10.1001/jamainternmed.2019.1438

Case 6

- After deciding not to go with the CAP bundle, another member of your quality committee suggests an EHR alert to reduce the overuse of telemetry
- What would you say to this suggestion?
  - A. Yes, anything to reduce the massive overuse of tele
  - B. No, EHR alerts are useless and widely ignored
  - C. OMG, anything but another EHR alert that I have to click through

Have we reached peak tele?

- Descriptive study of tele appropriateness at Ochsner in New Orleans
- 250 consecutive ward patients undergoing tele monitoring were identified during the study
- Appropriateness of tele was assessed based on the AHA Practice Standards for ECG Monitoring in Hospital Settings

R Chong-Yik et al. Am J Card 2018. DOI: 10.1016/j.amjcard.2018.07.016

Have we reached peak tele?

Table 3
Telemetry monitoring appropriateness and significant clinical events

Appropriate telemetry days	334 (23.8%)
Inappropriate telemetry days	1065 (76.5%)
Arrhythmias on appropriate telemetry day	16 (100%)
Arrhythmias on inappropriate telemetry day	0 (0%)
Code calls on appropriate telemetry day	4 (80%)
Code calls on inappropriate telemetry day	1 (20%)
Clinical decisions on appropriate telemetry day	18 (94.7%)
Clinical decisions on inappropriate telemetry day	1 (5.3%)

Elimination of inappropriate telemetry days could have resulted in a conservatively-estimated savings of $36,540 for these 250 patients, and for the entire hospital population an annual savings of $528,648.

R Chong-Yik et al. Am J Card 2018. DOI: 10.1016/j.amjcard.2018.07.016

Have we reached peak tele?

- Cluster randomized trial of a single-component EHR alert to reduce unnecessary tele monitoring
- Done over 6 months on 12 inpatient teams at UCSF
- Half the teams received an alert when they tried to re-order tele for a ward patient whose order exceeded the recommended duration of monitoring for a given indication
- Half the teams did not receive the alert

N Najafi et al. JAMA IM 2018. DOI: 10.1001/jamainternmed.2018.5859

Have we reached peak tele?

Table 1. Telemetry Monitoring Indications and Recommended Duration

Duration	Indication/Event
24 h	Critical electrolyte abnormality
	Severe sepsis
48 h	Rule out myocardial infarction
	Syncope
	Other (long QT syndrome, myocarditis, drug overdose, etc)
72 h	After cardiac arrest
	Acute coronary syndrome or after percutaneous coronary intervention
	Acute pulmonary embolism
Indefinitely	After stroke to rule out arrhythmia
	Cardiothoracic or vascular surgery
	Pulmonary hypertension or advanced heart failure
	Arrhythmia as primary reason for hospitalization

N Najafi et al. JAMA IM 2018. DOI: 10.1001/jamainternmed.2018.5859

Have we reached peak tele?

Table 4. Physician Responses to Expired Telemetry Alert

Action	Alerts (n = 200), No. (%)
Dismissed the alert with no action taken	14 (7)
Continued the current telemetry order	21 (11)
Discontinued current order and did not reorder	124 (62)
Reordered telemetry with a new indication	41 (21)

Table 3. Primary Outcome and Potential Adverse Outcomes

Per Hospitalization	Intervention (n = 499)	Control (n = 567)	Effect Size (95% CI)	*P* Value
Telemetry hours, mean (SD)	41.3 (40.2)	50.0 (51.7)	−8.7 (−14.1 to −3.5)	.001
Rapid-response call, No. (%)	30 (6.0)	32 (5.6)	0.004 (−0.01 to 0.01)	.90
Medical emergency event, No. (%)	2 (0.4)	2 (0.4)	0.0005 (−0.5 to 0.9)	> .99[a]

N Najafi et al. JAMA IM 2018. DOI: 10.1001/jamainternmed.2018.5859

Take Home Points

Summary

- Daily oral PPI is acceptable for peptic ulcer bleeds with low risk endoscopic features
- We spend a ton of money on enantiomer drugs with no proven benefit beyond their racemates
- Reconsider intensifying BP meds in patients admitted for non-cardiac reasons
- Few older patients will benefit from ASA for primary prevention and bleeding risk slightly outweighs the small benefits in ASCVD reduction for most
- Don't routinely stop digoxin in patients with HFrEF

Summary

- Combining of anti-arrhythmic drugs (especially amio) with rate lowering drugs increasing syncope and injurious falls
- PESIT was definitely wrong…prevalence of PE in patients with syncope is probably on the order of 1-3%
- I beg you to stop checking urine eos
- CAP bundles are better in theory than in practice and routine use of steroids in CAP may increase GI bleeding
- We have reached peak tele, and simple interventions like an EHR alert can reduce

Thank You
Questions and Examples?

SoF Table 7: Comparison 7 - Esomeprazole compared to Omeprazole for patients with peptic ulcer

Patient or population: 5 RCTs in 1553 patients with peptic ulcer
Intervention: Esomeprazole
Comparison: Omeprazole
Settings: Outpatient

Outcomes	Illustrative comparative risks* (95% CI) Assumed risk Omeprazole	Corresponding risk Esomeprazole	Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
H. pylori eradication at 6 to 8 weeks	Study population		RR 1.03 (0.98 to 1.07)	1481 (5 studies)	⊕⊖⊖⊖ very low[1,2,3]	
	830 per 1000	855 per 1000 (813 to 888)				
Total symptomatic relief	Not reported					
Relief of epigastric pain	Study population		RR 0.84 (0.56 to 1.26)	833 (2 studies)	⊕⊖⊖⊖ very low[1,2,3,4]	
	111 per 1000	93 per 1000 (62 to 140)				
Relief of heart burn	Study population		RR 0.97 (0.70 to 1.35)	833 (2 studies)	⊕⊖⊖⊖ very low[1,2,3,4]	
	147 per 1000	143 per 1000 (103 to 198)				
Time to first resolution of symptoms	Not reported					
Endoscopic healing of ulcer at 4 weeks	Study population		RR 0.99 (0.93 to 1.05)	397 (1 study)	⊕⊖⊖⊖ very low[1,2,3,4]	
	922 per 1000	913 per 1000 (857 to 968)				
Recurrence or relapse of symptoms	Not reported					
Mortality	1 RCT reported no deaths.					

Patients are more robust than we think

Given Choice, Parents Pick Cheaper Medical Procedure for Children

OCT. 1, 2014

Dr. Eric Scaife and Dr. Katie Russell are authors of a study finding parents' cost awareness to the type of appendectomy they choose for their children. Jim McIsaac for The New York Times

Elisabeth Rosenthal

It is common wisdom that patients don't like to think about cost when it comes to health care. But what if the problem is that they're so rarely even

Patients are more robust than we think

It is common wisdom that patients don't like to think about cost when it comes to health care. But what if the problem is that they're so rarely even given that information? A recent study in the Annals of Surgery found that parents who were asked to decide which form of surgery their children should undergo and told about the price difference tended to select the cheaper option.

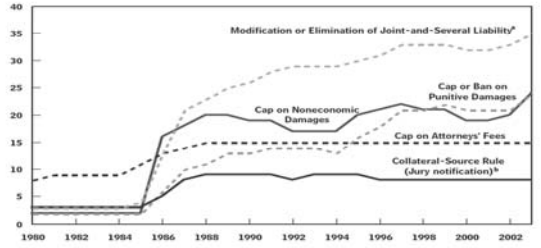
An appendix can be removed in two ways: via open surgery or using a laparoscope, in which the inflamed organ is removed with the aid of a fiber optic scope, with only tiny incisions. The average total cost of the traditional open surgery is about $2,000 less, said Dr. Eric Scaife, of the University of Utah Health Sciences, who helped conduct the study.

Though American surgeons almost always favor the minimally invasive procedure, the results of the two types of procedures are similar in children, studies show. "Cost is really the only difference — there's no difference in outcome," Dr. Scaife noted in a telephone interview.

When told that and given the price quotes, nearly two-thirds of the parents selected the cheaper open procedure. Parents given price information were 1.8 times as likely to choose the cheaper option than others. In fact, 31 percent of parents given the information said it had been a primary influence in their decision. And 90 percent said they liked having a choice.

Tort reform

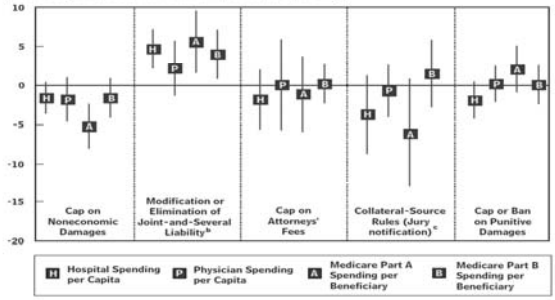
Figure 1.
Number of States with Tort Limits in Place, by Year, 1980 to 2003



Source: Congressional Budget Office.

Tort reform

Figure 2.
Summary of Findings on Tort Limits
(Percentage impact of tort limit on per capita spending)[a]



More is better?

Original Investigation | December 22, 2014

LESS IS MORE

Mortality and Treatment Patterns Among Patients Hospitalized With Acute Cardiovascular Conditions During Dates of National Cardiology Meetings

ONLINE FIRST

Anupam B. Jena, MD, PhD[1,2,3]; Vinay Prasad, MD[4]; Dana P. Goldman, PhD[2,5,6]; John Romley, PhD[5,6]

[+] Author Affiliations

JAMA Intern Med. Published online December 22, 2014. doi:10.1001/jamainternmed.2014.6781

More is better?

Results Patient characteristics were similar between meeting and nonmeeting dates. In teaching hospitals, adjusted 30-day mortality was lower among high-risk patients with heart failure or cardiac arrest admitted during meeting vs nonmeeting dates (heart failure, 17.5% [95% CI, 13.7%-21.2%] vs 24.8% [95% CI, 22.9%-26.6%]; $P < .001$; cardiac arrest, 59.1% [95% CI, 51.4%-66.8%] vs 69.4% [95% CI, 66.2%-72.6%]; $P = .01$). Adjusted mortality for high-risk AMI in teaching hospitals was similar between meeting and nonmeeting dates (39.2% [95% CI, 31.8%-46.6%] vs 38.5% [95% CI, 35.0%-42.0%]; $P = .86$), although adjusted percutaneous coronary intervention (PCI) rates were lower during meetings (20.8% vs 28.2%; $P = .02$). No mortality or utilization differences existed for low-risk patients in teaching hospitals or high- or low-risk patients in nonteaching hospitals. In sensitivity analyses, cardiac mortality was not affected by hospitalization during oncology, gastroenterology, and orthopedics meetings, nor was gastrointestinal hemorrhage or hip fracture mortality affected by hospitalization during cardiology meetings.

Conclusions and Relevance High-risk patients with heart failure and cardiac arrest hospitalized in teaching hospitals had lower 30-day mortality when admitted during dates of national cardiology meetings. High-risk patients with AMI admitted to teaching hospitals during meetings were less likely to receive PCI, without any mortality effect.

OHSU

Hospital Medicine Literature Review Part II

Kyle Kent, MD
VA Portland Health Care System
Oregon Health & Science University
September 27, 2019

Disclosures:

- None

General Principles:

- Practice Changing
- Practice Reinforcing
- Misleading Headlines

Objectives:

- Appraise the evidence guiding initiation of sacubitril-valsartan in hospitalized patients with HFrEF
- Identify appropriate patients with HFpEF for sacubitril-valsartan or spironolactone
- Recognize the potential benefit of lung point-of-care ultrasound in diagnosing patients with acute dyspnea

Objectives:

- Select the appropriate anti-thrombotic therapy for patients with AFib and stable CAD
- Describe contraindications and potential risks of using sodium polystyrene sulfonate (SPS - kayexalate) to treat hyperkalemia

Case #1

- 60 yo M with HFrEF
- Wt gain, progressive dyspnea, orthopnea
- T 37, HR 90, BP 120/70, RR 22, 91% on RA
- Breathless speaking, elevated JVP, crackles, le edema bilat, warm
- NT-proBNP 9000 (higher than when last checked)
- CXR: pulmonary vascular congestion

What is the most appropriate therapy to initiate before discharge after stabilization from decompensated HFrEF (already on a beta blocker)?

a. Enalapril (ACEI)
b. Valsartan (ARB)
c. Sacubitril-valsartan (ARNI)
d. Spironolactone (MRA)

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Angiotensin–Neprilysin Inhibition in Acute Decompensated Heart Failure

Eric J. Velazquez, M.D., David A. Morrow, M.D., M.P.H., Adam D. DeVore, M.D., M.H.S., Carol I. Duffy, D.O., Andrew P. Ambrosy, M.D., Kevin McCague, M.A., Ricardo Rocha, M.D., and Eugene Braunwald, M.D., for the PIONEER-HF Investigators*

February 2019
N Engl J Med
PIONEER-HF

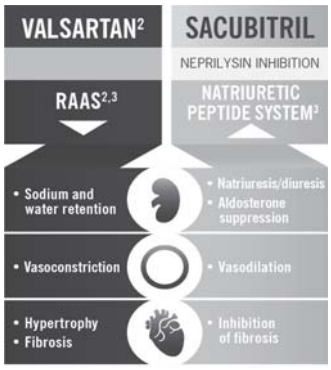
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 SEPTEMBER 11, 2014 VOL. 371 NO. 11

Angiotensin–Neprilysin Inhibition versus Enalapril in Heart Failure

John J.V. McMurray, M.D., Milton Packer, M.D., Akshay S. Desai, M.D., M.P.H., Jianjian Gong, Ph.D., Martin P. Lefkowitz, M.D., Adel R. Rizkala, Pharm.D., Jean L. Rouleau, M.D., Victor C. Shi, M.D., Scott D. Solomon, M.D., Karl Swedberg, M.D., Ph.D., and Michael R. Zile, M.D., for the PARADIGM-HF Investigators and Committees*

Sept 2014
N Engl J Med
PARADIGM-HF



PARADIGM-HF:

- Death from cardiovascular causes or heart failure hospitalization
  - Hazard Ratio 0.80 (0.73-0.87)
- More symptomatic hypotension

Pharmacological Treatment for Stage C HF With Reduced EF

Renin-Angiotensin System Inhibition With ACE-Inhibitor or ARB or ARNI

COR	LOE	Recommendations	Comment/ Rationale
I	ARNI: B-R	In patients with chronic symptomatic HFrEF NYHA class II or III who tolerate an ACE inhibitor or ARB, replacement by an ARNI is recommended to further reduce morbidity and mortality.	NEW: New clinical trial data necessitated this recommendation.

Question:

- In patients hospitalized for acute decompensated HFrEF, is initiation of ARNI after hemodynamic stabilization safe and effective as compared with enalapril?

Methods:

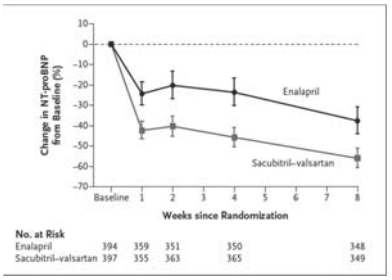
- Prospective, multicenter, randomized, double-blind trial
- n = 800
- LVEF < 40%
- Enalapril vs ARNI
- Hemodynamic stability
  - SBP >100, no increase in dose of IV diuretics, no vasodilators for 6 hours
  - No IV inotropes for 24 hours

Methods:

- Received 3 doses of medication in the hospital then discharged
- Followed for 8 weeks
- Funded by Novartis

Results:

- Primary efficacy outcome
  - Change in NT-proBNP
    - 0.71 (0.63-0.81)
- Primary safety outcomes
  - Worsening renal function
  - Hyperkalemia
  - Symptomatic hypotension
  - Angioedema



Results:

- Exploratory clinical outcome
  - Rehospitalization for heart failure
    - Hazard Ratio 0.56 (0.37-0.84)

Discussion:

- Should we really change practice based on a surrogate endpoint?
- Should we really change practice based on an exploratory outcome?

What is the most appropriate therapy to initiate before discharge after stabilization from decompensated HFrEF (already on a beta blocker)?

a. Enalapril (ACEI)
b. Valsartan (ARB)
c. Sacubitril-valsartan (ARNI)
d. Spironolactone (MRA)

What is the most appropriate therapy to initiate before discharge after stabilization from decompensated HFrEF (already on a beta blocker)?

a. Enalapril (ACEI)
b. Valsartan (ARB)
c. Sacubitril-valsartan (ARNI)
d. Spironolactone (MRA)

Conclusion:

- Hospitalists shouldn't feel pressured to start ARNI
- If patients are on ARNI and tolerating it, keep them on it
- Collaboration with Cardiology
  - Start ARNI
    - Dosing protocol
    - Monitor for hypotension

Case #2

- 66 yo F with HFpEF (LVEF 50%)
- 20 lb wt gain, progressive dyspnea, leg swelling
- T 37, HR 90, BP 120/70, RR 22, 91% on RA
- Breathless speaking, elevated JVP, no crackles
- Le edema bilat, warm

What is the most evidence based therapy for this patient with HFpEF ?

a. Enalapril
b. Metoprolol
c. Sacubitril-valsartan (ARNI)
d. Spironolactone

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Angiotensin–Neprilysin Inhibition in Heart Failure with Preserved Ejection Fraction

S.D. Solomon, J.J.V. McMurray, I.S. Anand, J. Ge, C.S.P. Lam, A.P. Maggioni, F. Martinez, M. Packer, M.A. Pfeffer, B. Pieske, M.M. Redfield, J.L. Rouleau, D.J. van Veldhuisen, F. Zannad, M.R. Zile, A.S. Desai, B. Claggett, P.S. Jhund, S.A. Boytsov, J. Comin-Colet, J. Cleland, H.-D. Düngen, E. Goncalvesova, T. Katova, J.F. Kerr Saraiva, M. Lelonek, B. Merkely, M. Senni, S.J. Shah, J. Zhou, A.R. Rizkala, J. Gong, V.C. Shi, and M.P. Lefkowitz, for the PARAGON-HF Investigators and Committees

September 2019
N Engl J Med
PARAGON-HF

Question:

- In patients with HFpEF does ARNI improve total hospitalizations for heart failure and death from cardiovascular causes as compared with valsartan?

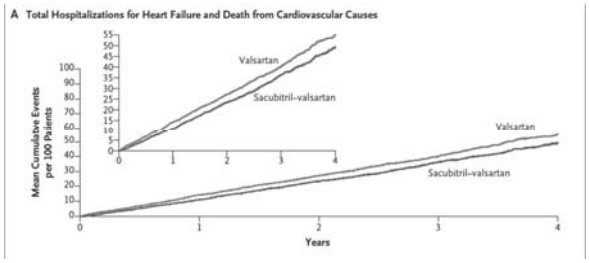
Methods:

- Prospective, randomized, double-blind trial
- n = 4800
- LVEF > 45%
- Valsartan vs ARNI

Methods:

- 4 year follow up
- Funded by Novartis

Results:



RR 0.87 (0.75-1.01)

Results:

- Adverse events
  - More hypotension and angioedema with ARNI
  - More hyperkalemia and renal dysfunction with valsartan

Results:

- Subgroups
  - Age > 65
  - Women
  - LVEF 45-57 %

Discussion:

- No difference in clinical outcomes
  - Heterogeneous condition?
  - Not enough patients? (4000 vs 8000)
  - Harder to beat valsartan max dose instead of mod dose enalapril?
- Should we change practice based on subgroups?

Discussion:

Cochrane Library

Cochrane Database of Systematic Reviews

Beta-blockers and inhibitors of the renin-angiotensin aldosterone system for chronic heart failure with preserved ejection fraction (Review)

Martin N, Manoharan K, Thomas J, Davies C, Lumbers RT

2018

Cochrane Database Syst Rev

Discussion:

- 12 studies
- n = 4400
- Mineralocorticoid antagonists reduced heart failure hospitalizations
  - RR 0.82 (0.69-0.98)
  - NNT 41
  - Hyperkalemia
    - 16% MRAs vs 8% controls

What is the most evidence based therapy for this patient with HFpEF ?

a. Enalapril
b. Metoprolol
c. Sacubitril-valsartan
d. Spironolactone

What is the most evidence based therapy for this patient with HFpEF ?

a. Enalapril
b. Metoprolol
c. Sacubitril-valsartan
d. Spironolactone

Conclusion:

- Utilize spironolactone or eplerenone for your patients with HFpEF to help reduce heart failure hospitalizations
- ARNI might be an option for some patients with HFpEF in the future, but wouldn't change practice based on PARAGON-HF subgroups

Quick Hit:

JAMA Network | Open.

Original Investigation | Emergency Medicine

Diagnostic Accuracy of Point-of-Care Lung Ultrasonography and Chest Radiography in Adults With Symptoms Suggestive of Acute Decompensated Heart Failure

A Systematic Review and Meta-analysis

Anna M. Maw, MD, MS; Ahmed Hassanin, MD; P. Michael Ho, MD, PhD; Matthew D. F. McInnes, MD, PhD; Angela Moss, MS; Elizabeth Juarez-Colunga, PhD; Nilani J. Soni, MD, MS; Marcelo H. Miglioranza, MD, MHSC, PhD; Elke Platz, MD, MS; Kristen DeSanto, MSLS, MS, RD; Anthony P. Sertich, MD; Gerald Salame, MD; Stacie L. Daugherty, MD, MSPH

March 2019
JAMA Network Open

Quick Hit:

- Lung POCUS vs CXR
  - Cardiogenic pulmonary edema in patients presenting with acute dyspnea
- n = 1800
- Systematic review and meta-analysis
  - 6 prospective cohort studies
    - 4 ED
    - 2 IM wards

Quick Hit:

Diagnostic tests	*Sensitivity (95% CI)*	*Specificity (CI)*	*LR+*	*LR−*
Lung ultrasonography	0.88 (0.75 to 0.95)	0.90 (0.88 to 0.92)	8.6	0.14
Chest radiography	0.73 (0.70 to 0.76)	0.90 (0.75 to 0.97)	7.4	0.30

Conclusion:

- Start or continue to hone your POCUS skills
- Lung POCUS perhaps better for diagnosing cardiogenic pulmonary edema in patients presenting with acute dyspnea than CXR
  - Rapid
  - Bedside
  - Potentially lower cost

Case #3

- 65 yo M with AFib (CHADS-VASC 4) and CAD s/p PCI 18 months ago
- Productive cough, fever, dyspnea
- T 39, HR 100, BP 120/70, RR 22, 94% on 2 L
- Ill-appearing, crackles right lung
- WBC 18
- CXR: RLL consolidation

In addition to treating this patient's pneumonia, what is your recommendation for his anti-thrombotic therapy (AFib CHADS-VASC 4, PCI 18 months ago)?

a. Aspirin
b. Rivaroxaban
c. Aspirin + Rivaroxaban
d. Warfarin

September 2019
N Engl J Med
AFIRE

Question:

- Is rivaroxaban non-inferior to combination therapy with rivaroxaban plus antiplatelet agent in patients with AFib and stable CAD?

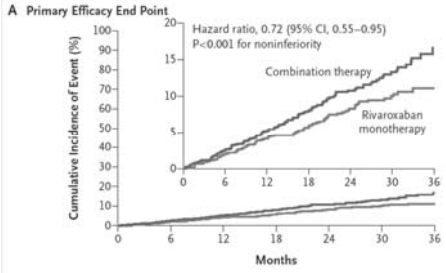
Methods:

- Prospective, multicenter, randomized trial
- Japan
- n = 2200
- AFIB, CHADS ≥ 1
- Stable CAD
  - PCI or CABG at least 1 year before enrollment
  - Stenosis of ≥ 50% not requiring revascularization

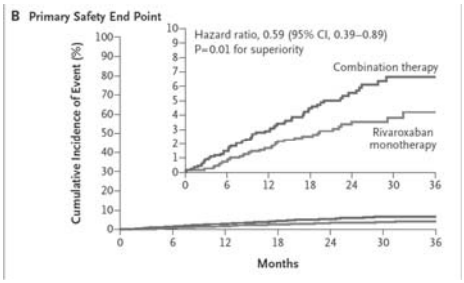
Methods:

- Rivaroxaban vs Rivaroxaban + Anti-Plt
  - ASA (70%)
  - P2Y12 inhibitor (30%)
- Stopped early at 2 years
  - Higher risk of death from any cause in the combination-therapy group
- Japanese Cardiovascular Research Foundation - contract with Bayer
  - Bayer had no role in trial design, interpretation, or writing of the manuscript

Results:



Results:



Discussion:

- High risk patients
- Unclear why more patients had ischemic strokes and died in the combination group
- Rivaroxaban dose
  - 15 mg daily
- Pharmacokinetic modeling study
  - 15 mg daily Japanese patients = 20 mg daily Caucasian patients

In addition to treating this patient's pneumonia, what is your recommendation for his anti-thrombotic therapy (AFib CHADS-VASC 4, PCI 18 months ago)?

a. Aspirin
b. Rivaroxaban
c. Aspirin + Rivaroxaban
d. Warfarin

In addition to treating this patient's pneumonia, what is your recommendation for his anti-thrombotic therapy (AFib CHADS-VASC 4, PCI 18 months ago)?

a. Aspirin
b. Rivaroxaban
c. Aspirin + Rivaroxaban
d. Warfarin

Conclusion:

- Rivaroxaban monotherapy for AFIB and stable CAD
  - Non-inferior – cardiovascular events or death
  - Superior – bleeding
- 20 mg daily dose probably safe in Caucasian patients

Quick Hit:

Quick Hit:

- What's New – UpToDate
  - August 2019
  - GI toxicity associated with SPS

Quick Hit:

"These studies support UpToDate's preexisting recommendation that SPS should not be used to treat hyperkalemia, except in rare circumstances in which other options have failed or are unavailable."

Quick Hit:


Research

JAMA Internal Medicine | Original Investigation

Risk of Hospitalization for Serious Adverse Gastrointestinal Events Associated With Sodium Polystyrene Sulfonate Use in Patients of Advanced Age

J. Ariana Noel, MD; Sarah E. Bota, BSc; William Petrcich, MSc; Amit X. Garg, MD; Juan Jesus Carrero, PhD; Ziv Harel, MD; Navdeep Tangri, MD; Edward G. Clark, MD; Paul Komenda, MD; Manish M. Sood, MD

August 2019
JAMA Internal Medicine

Quick Hit:

- Retrospective cohort study
- Adults > 66 years old dispensed SPS in an outpatient setting
- n = 50,000
- Ontario, Canada

- Use of SPS vs nonuse - GI adverse events within 30 days
- Propensity score matching

Quick Hit:

- Adverse GI events
  - Hazard ratio 1.94 (1.10-3.41)
    - 37 events SPS group (0.2%)
    - 18 events nonusers (0.1%)
- Limitations
  - Unknown dose or route
  - Dispensed but unclear if people took it
  - SPS group - higher proportion of K > 6, sicker?
  - Authors - Astra Zeneca (sodium zirconium cyclosilicate) and Vifor Pharma (patiromer)

Conclusion:

- Risk of GI toxicity with SPS based on large observational data
- Save for true emergencies
  - Symptoms (weakness, paralysis, conduction abnormalities/arrhythmias)
  - K > 6.5-7
- Avoid in highest risk patients
  - Post-op
  - Ileus or bowel obstruction
  - Underlying bowel disease (i.e. UC or C Diff)

Conclusion:

- Nephrologists still use SPS
  - Acutely
  - Chronically - keep pts with CKD on ACEI/ARB
  - No large doses or per rectum
  - Not if post-op, ileus, underlying bowel disease

Take Home Points:

- DON'T feel pressured to start ARNI in the hospital for patients with HFrEF
- UTILIZE spironolactone for patients with HFpEF

Take Home Points:

- INVEST in honing your POCUS skills to improve your diagnostic accuracy for patients presenting with dyspnea
- STOP anti-platelet agent and continue rivaroxaban monotherapy for patients with AFib and stable CAD

Take Home Points:

- CONSIDER GI toxicity from SPS when treating hyperkalemia, try to save it for symptomatic and severe presentations and avoid in those with underlying bowel disease or risk for ileus/obstruction

The Virtual Hospital – How Can Technology Support My Growing Clinical Workload as a Physician?

Breakout Session A

DATE: September 26, 2019 PRESENTED BY: Matthias Merkel, MD PhD

Disclosure

- *No Financial Conflicts*
- *I'm NOT a hospitalist – thanks for inviting me anyway*

Can we show hands?

- How many family medicine hospitalist?
- How many internal medicine hospitalists?
- How many Advanced Practice Providers?
- Anyone else?

Can we show hands?

- How many working in acute care and ICU settings?
- How many practice in inpatient & outpatient setting?

Health care is changing….

EMS in Bavaria

2001

1991

2019

2019

Drivers for Change

Clinician Patient

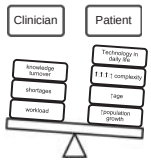
Drivers for Change

Clinician Patient

knowledge turnover
shortages
workload

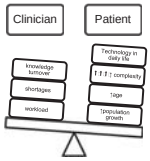
Technology in daily life
↑↑↑↑↑ complexity
↑age
↑population growth

Drivers for Change



https://www.visualcapitalist.com/internet-minute-2018/

Drivers for Change

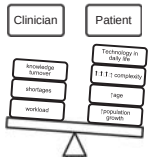


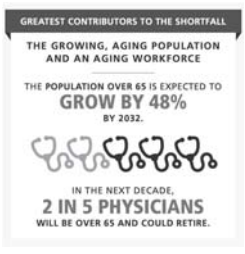
	YEAR	1950	1980	2020
Doubling of Medical Knowledge		50 years	7 years	**0.2 years (73 days)**

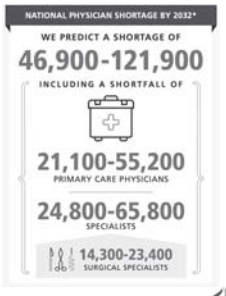
→ What was learned in the first 3 years of medical school will be just 6% of what is known at the end of the decade from 2010 to 2020

TRANSACTIONS OF THE AMERICAN CLINICAL AND CLIMATOLOGICAL ASSOCIATION, VOL. 122, 2011

Drivers for Change

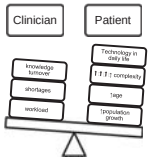




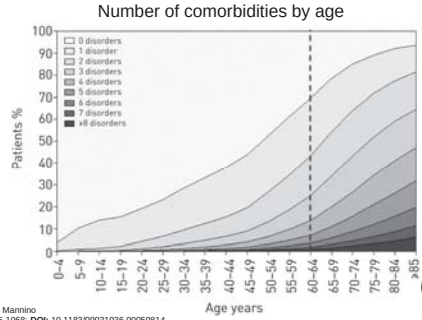


 https://aamc-black.global.ssl.fastly.net/production/media/filer_public/8f/62/8f623240-8bb7-488f-a724-e4411e41dea2/workforce_projections_through_2032_-_infographic.pdf

Drivers for Change

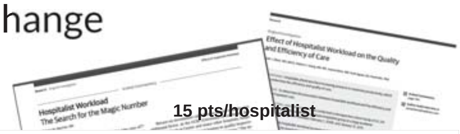


Number of comorbidities by age

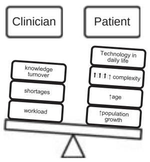


 Miguel J. Divo, Carlos H. Martinez, David M. Mannino
European Respiratory Journal 2014 44: 1055-1068; **DOI:** 10.1183/09031936.00059814

Drivers for Change



15 pts/hospitalist



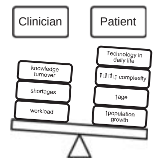
- 12h shift
- 15 patients

TASKS:
- 1h handoff (AM/PM)
- 1h care conference (1-2 patients)
- 1h transfer call/care coordination
- 1h total break time (15 min AM/PM break; 30 min lunch)

→ **32 min/patient** for rounds, chart review, documentation

Drivers for Change

- ➢ Transit time in between patients --> 2-5 min x 13 = 26-65 min
- ➢ Login idle time for EMR → total 5-15 min
- ➢ Meetings → 30 min



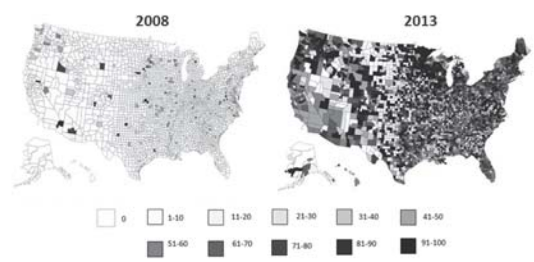
- 12h shift
- 15 patients

TASKS:
- 1h handoff (AM/PM)
- 1h care conference (1-2 patients)
- 1h transfer call/care coordination
- 1h total break time (15 min AM/PM break; 30 min lunch)

25-28 min/patient for rounds, chart review, documentation

Key changes in medicine using (remote) technology…

ePrescribing 2008 to 2013 Trend



Percent of Physicians e-Prescribing through an Electronic Health Record

http://dashboard.healthit.gov – September 21, 2019

Radiology Reading Room 1990-92

http://www.erogersphd.com/EMorePages/VIARADiviaradUpdated.html

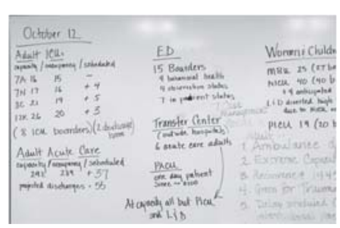
Radiology Reading Room 2015

https://www.itnonline.com/content/redrick-technologies-releases-new-planning-guide-radiology-reading-rooms

Team needed to go to radiology → Need a computer and login

OHSU Inpatient Capacity Management

2016



2019

A different scenario….

Case Scenario

64 year old man drives himself to ED at 10PM in severe dyspnea and suffers cardiac arrest shortly after ED arrival

→ ACLS → ROSC within <5 min

You arrive in the ED:
→ Now intubated, on mechanical ventilation, SaO_2 78% on 100% PEEP 5
→ Requiring intermittent epinephrine bolus to maintain BP

Case Scenario

You recommend:

- ❑ Recommend CTA?
- ❑ Admit to your ICU?
- ❑ ED physician and you want to transfer to… but patient is unstable?

And your census is already at 18 patients with 2 admissions waiting to be seen

Would it be helpful to have?

- ❑ A second physician who could take calls and place orders?
- ❑ An intensivist joining you in the ED and assists in getting patient stabilized prior to transfer?
- ❑ A second physician who manages the ventilator, hemodynamics, sedation with the RN team while you (or the ED physician) place a central line and A line?

What if we would add more telemedicine capabilities?

What are things we could manage remotely?

- ❑ Chart review
- ❑ Lab/image follow up
- ❑ Orders
- ❑ Documentation
- ❑ Care conference
- ❑ Patient education
- ❑ Multidisciplinary rounds
- ❑ Consult requests
- ❑ Transfer calls
- ❑ IP glycemic team

?

Concept

ICU Benefit Levels

Model Benefits	Status Quo	Tele-Consult	vICU
Critical care RN at bedside	✓	✓	✓
Fellowship-trained intensivist	✓ ?	✓	✓
Patient may remain local		✓	✓
Affordable staffing model		✓	✓
Provider satisfier		✓	✓
Scalable		✓	✓
Proactive care model			✓
Critical care RN (from OHSU)			✓

Does it work?

Case Scenario

52 year old man with h/o DVT/PE (>20 years ago brought to your ED with EMS with acute onset dyspnea & weakness

Off anticoagulation 2-3 weeks due to loss of insurance

BP 150/76 HR 151 T 36.7 SaO_2 low 90s on 10 l O_2 FM

Cr 1.7 D-dimer 18 Hct 30.8

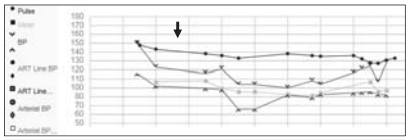
→ ED consults you after starting heparin infusion?

Case Scenario

Your Input:

- ❑ Recommend CTA?
- ❑ Admit to your ICU?
- ❑ Recommend transfer to…?

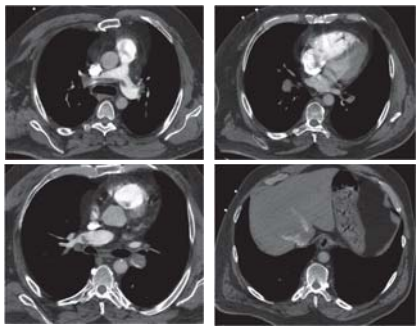
ED Course



Admission VBG: 7.25 / 48, HCO3: 21, LA: 4.8

- Started on heparin given clinical concern for PE
- Risks / benefits of CTA weighed given renal function (Cr of 1.7).

CT Findings



- Large saddle embolus with occlusive clot extending into lower lobes & RML
- Large RV
- Reflux of contrast to hepatic veins

Case Scenario

Large PE, stable hemodynamic, on heparin and O2

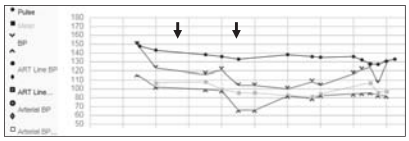
Your Decision Making:

- ❑ Admit at your hospital (ICU or Intermediate Care)?
- ❑ Prescribe thrombolysis?
- ❑ Recommend transfer to…?

Would you like to call a friend?

Let's reply this scenario….

ED Course



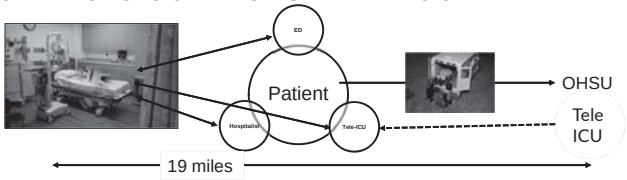
Admission VBG: 7.25 / 48, HCO3: 21, LA: 4.8

Tele-ICU repeat lab request (2 hours later)

VBG: 7.25 / ***28*** HCO3: ***13*** LA: ??

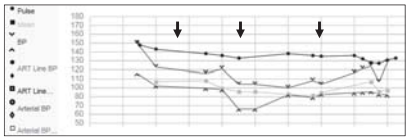
- Started on heparin given clinical concern for PE
- Risks / benefits of CTA weighed given renal function (Cr of 1.7).
- TeleICU physician consulted, and repeat labs obtained.

Care Escalation & Coordination



- Tele-ICU physician recognized worsening shock despite lack of hypotension
- Shared decision to activate PE Response Team at OHSU:
  - PERT (IR attending, MICU attending)
  - Added ECMO Team (ECMO attending, CT surgeon)
- Decision was made to proceed with systemic thrombolytics at referring ED.
- Transfer for possible mechanical clot removal

Outcome



Admission VBG: 7.38 / 43, HCO3: 25, LA: 1.8

- ✓Patient was observed in ICU x24 hrs
- ✓Transitioned to rivaroxaban and discharged 24 hours after leaving ICU

Does it work?

What does the literature say?

Virtual/Tele/eICU

...trends of increasing age and acuity, **higher rates of adherence** to best practice, use of noninvasive mechanical ventilation, and decreased use of antimicrobials, transfusions, and duration of renal replacement therapies. **Acuity-adjusted LOS and in hospital mortality decreased**.

- Reduced LOS
- Saved $$$
- Eased provider shortage
- Night coverage as daytime work

Elements of Success

Effectiveness of ICU Telemedicine programs:

- ✓ **Leadership** (tele-ICU, receiving ICU and health system)
- ✓ **Staff perception of value** (availability, impact, interpersonal relationship)
- ✓ **Organizational characteristics** (staffing models, protocols, orientation)

Virtual Hospital can provide…

- Nighttime staffing support
- Access to additional expertise
- RN support
- Access to key services on available 24/7
- Interface into post acute care (SNF)
- Interface into home health
- reduce work overload

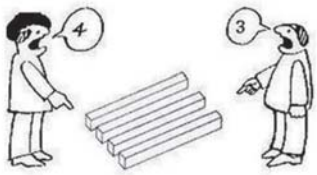
Thank You

Tough Conversations

How to make them a little less tough

DATE: 9/27/2019 PRESENTED BY: Jessica Bordley, MD and Patricia Ritze, MD

Dr. Bordley and Dr. Ritze
have no conflicts to disclose.



Tough Conversations

- Why this topic?
- Case of "Do everything"
- Framework, language, pearls
  - The Miracle
  - The Recommendation
  - The Meeting
- Case conclusion
- Open discussion

What makes conversations difficult?

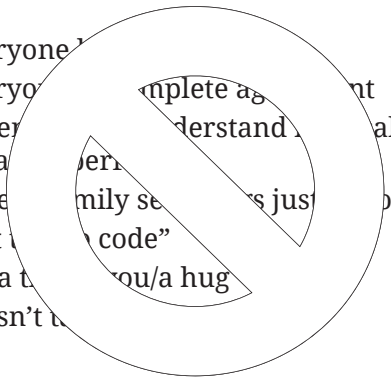
- Life and death
- Medical/prognostic uncertainty
- Things moving fast/urgency
- Conflict within family
- Conflict within medical team
- Family with different values/culture/faith than yours
- Insufficient training/practice
- Emotion (ours and patient/family's)
- No two the same/the unexpected

What makes a conversation successful?

- Everyone happy
- Everyone in complete agreement
- Patient/family understand medical situation perfectly
- Patient/family see things just as you do
- "Get the no code"
- Get a thank you/a hug
- Doesn't take too long

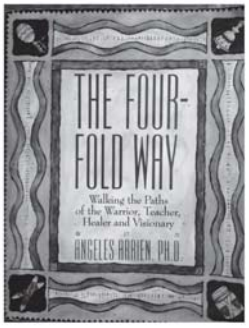
What makes a conversation successful?

- Everyone
- Everyo nplete a nt
- Patie derstand al situa er
- Patie mily se s jus u do
- "Get code"
- Get a t ou/a hug
- Doesn't t



What actually matters:

- The four-fold way:
  1. Show up
  2. Pay attention
  3. Tell the truth
  4. Don't be attached to the outcome
- RELATIONSHIP



A recent case

A 73 year old woman with ESLD (MELD 34), encephalopathy, refractory ascites, widely metastatic HCC, and hepatorenal syndrome is repeatedly hospitalized, with few treatment options. Complex psychosocial background. Many family meetings later…

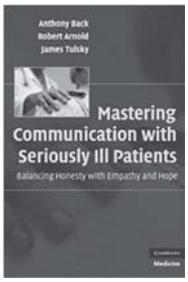
- The patient is saying "do everything"
- The family is saying "stop repeating this conversation"
- They are hoping for a miracle
- Nurses are saying "we need another family meeting"
- House staff are saying "let's get to DNR"
- I am thinking….

Reflections…

There was a lot of provider distress in that moment, from nurses, to residents, to myself:

- Would she really want "everything" if she knew what that meant? Will it cause unnecessary suffering?
- I'll admit it: my heart often sinks when the conversation turns to miracles
- Is there a framework to help me with situations like these?

Favorite Resources



Mastering Communication with Seriously Ill Patients

by Anthony Back, Robert Arnold, and James Tulsky

Discussing Treatment Preferences with Patients Who Want "Everything."

Quill et al. Ann Intern Med 2009; 151:245-349.

Annals of Internal Medicine

Discussing Treatment Preferences with Patients Who Want "Everything"

Timothy E. Quill, MD; Robert Arnold, MD; and Anthony L. Back, MD
Ann Intern Med. 2009; 151:245-349.

STEPS	
Step 1	**Understand what "Doing Everything" means to the patient**

Annals of Internal Medicine

Discussing Treatment Preferences with Patients Who Want "Everything"

"don't give up on me"

"I'm scared of dying"

"I don't want to leave my family"

Potential meanings of "everything"…

I would feel like I'm giving up

"I really want every treatment that has a chance of helping me live longer"

"I will go through anything, regardless of how hard it is"

I don't really understand how sick I am

"Do everything you think as a doctor is worthwhile"

"I will leave my fate in God's hands; I am hoping for a miracle; only He can decide when it's time to stop"

What "Everything" might mean	Questions to Ask
"I don't want to leave my family"	"What does your Oncologist say about your prospects?"
"I'm scared of dying"	"What is the hardest part for you?"
"Do everything you think as a doctor is worthwhile"	"What is your understanding of your condition/prognosis?"
"I will leave my fate in God's hands; I am hoping for a miracle"	"How might we know when God thinks it is your time?"
"I value every moment of life, regardless of the pain and suffering"	"Does your faith provide any guidance in a situation like yours?"
"I can't bear the thought of leaving my children / wife / husband"	"How is your family handling this?"
"I would feel like I'm giving up"	"What are you hoping for?"
"I really want every possible treatment that has a chance of helping me live longer"	"What have they said the impact of these treatments would be?"

Timothy E. Quill, MD; Robert Arnold, MD; and Anthony L. Back, MD. Discussing Treatment Preferences with Patients Who Want "Everything."Ann Intern Med. 2009; 151:245-349.

What "Everything" might mean	Questions to Ask
"I don't want to leave my family"	"What does your Oncologist say about your prospects?"
"I'm scared of dying"	"What is the hardest part for you?"
"Do everything you think as a doctor is worthwhile"	"What is your understanding of your condition/prognosis?"
"I will leave my fate in God's hands; I am hoping for a miracle"	"How might we know when God thinks it is your time?"
"I value every moment of life, regardless of the pain and suffering"	"Does your faith provide any guidance in a situation like yours?"
"I can't bear the thought of leaving my children / wife / husband"	"How is your family handling this?"
"I would feel like I'm giving up"	"What are you hoping for?"
"I really want every possible treatment that has a chance of helping me live longer"	"What have they said the impact of these treatments would be?"

Timothy E. Quill, MD; Robert Arnold, MD; and Anthony L. Back, MD. Discussing Treatment Preferences with Patients Who Want "Everything."Ann Intern Med. 2009; 151:245-349.

Researchers at the Mayo Clinic concluded: Most studies have shown that religious involvement and spirituality are associated with <u>better health outcomes</u>:

- *greater longevity*
- *coping skills*
- *health-related quality of life (even during terminal illness)*
- *less anxiety, depression, and suicide*

While <u>medical community may think it inappropriate to ask patients about beliefs and faith, patients disagree</u>.

- *77% of patients thought physicians should consider patients' spiritual needs*
- *48% welcomed or desired that their physicians pray with them*
- *68% of patients claimed their physician had never broached the topic of religion with them*

Faith and Miracles: Language

- What gives you strength?
- Are you worried? Are you scared?
- How might we know when God thinks it is your time?
- Does your faith provide any guidance in a situation like yours?
- Are there any particular decisions regarding your health that my be affected by your beliefs?

Quill TE, Arnold R, Back AL. Ann Intern Med. 2009.
Puchalksi CM. BUMC Proceedings 2001.

Faith and Miracles

Discussing Treatment Preferences with Patients Who Want "Everything"

Timothy E. Quill, MD; Robert Arnold, MD; and Anthony L. Back, MD
Ann Intern Med. 2009; 151:245-349.

STEPS	
Step 1	Understand what "Doing Everything" means to the patient
Step 2	**Propose a philosophy of treatment**

Five treatment philosophies

Most people fall into one of these five categories:

1. Try any medical treatment that has **any possibility of prolonging life**, even a small amount, **regardless of whether it causes suffering**.
2. Try any medical treatment that has **a reasonable chance of prolonging life** even a small amount, **regardless of whether it causes suffering**.
3. Try any medical treatment that has **a reasonable chance of prolonging life**, even if it may cause a **modest increase in suffering**.
4. Try any medical treatment that has **a reasonable chance of prolonging life**, but **not if it would increase your suffering**.
5. Use medical treatments that will provide **maximum relief of suffering** even if it **might unintentionally shorten life**.

Timothy E. Quill, MD; Robert Arnold, MD; and Anthony L. Back, MD. Discussing Treatment Preferences with Patients Who Want "Everything."Ann Intern Med. 2009; 151:245-349.

Language

"Susan, I want to make sure I understand your philosophy about medical care, so that I can recommend a treatment plan that is the best fit for you. Based on what you just shared, it sounds like you'd like to…

(#4) …"try everything we can that has a reasonable chance of prolonging life, but not if it would increase your suffering. Does this sound right to you?"

Timothy E. Quill, MD; Robert Arnold, MD; and Anthony L. Back, MD. Discussing Treatment Preferences with Patients Who Want "Everything."Ann Intern Med. 2009; 151:245-349.

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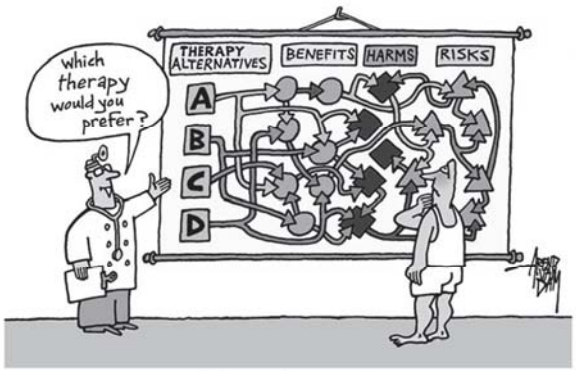
STEPS	
Step 1	Understand what "Doing Everything" means to the patient
Step 2	Propose a philosophy of treatment
Step 3	**Recommend a plan of treatment**



informed consent

Make a recommendation: Example

"Based on your goal of prolonging John's life, but avoiding treatments that would increase his suffering, and based on what I know about his medical treatment options, I would suggest…

… "that we continue the mechanical ventilator for now, and the IV antibiotics. But in the event his heart were to stop, I would suggest that we avoid CPR, because it would be very unlikely to succeed in helping him live longer, and could increase his suffering."

Make a recommendation

- Paternalism vs Autonomy
  - Paternalism: physician substitutes own judgement for patient based on what they think is in patient's best interest
  - Autonomy: physician objectively presents options and odds, withholding own recommendation and experience to avoid undue influence on decision
  - Maternalism?

Quill TE, Brody H. Ann Intern Med 1996.
Specker Sullivan L. J Med Ethics 2016.

Make a recommendation: Maternalism

1) In line with an autonomous patient's will/values
2) Motivated by a desire to improve the welfare of the patient
3) Is not necessarily based on the patient's express consent or assent
4) Predicted on RELATIONSHIP

Specker Sullivan L. J Med Ethics 2016.

Discussing Treatment Preferences with Patients Who Want "Everything"

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Ann Intern Med. 2009; 151:245-349.

STEPS	
Step 1	Understand what "Doing Everything" means to the patient
Step 2	Propose a philosophy of treatment
Step 3	Recommend a plan of treatment
Step 4	**Support emotional responses**

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STEPS	
Step 1	Understand what "Doing Everything" means to the patient
Step 2	Propose a philosophy of treatment
Step 3	Recommend a plan of treatment
Step 4	Support emotional responses
Step 5	**Negotiate disagreements**

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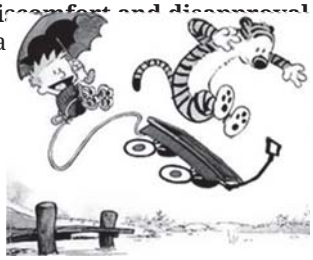
STEPS	
Step 1	Understand what "Doing Everything" means to the patient
Step 2	Propose a philosophy of treatment
Step 3	Recommend a plan of treatment
Step 4	Support emotional responses
Step 5	Negotiate disagreements
Step 6	**Harm reduction**

Harm reduction

- Acknowledge the patient's treatment philosophy, and **adhere**
- **Stop** repeatedly discussing limits on treatment, unless the patient or family raises it
- **Address di[illegible] and disapproval** on the medical tea



Multidisciplinary meetings: Pitfalls

- Do you even need a meeting?
- Forgetting the pre-game
- Forgetting to let the family talk

Family satisfaction with family conferences about end-of-life care in the intensive care unit: Increased proportion of family speech is associated with increased satisfaction*

Jonathan McDonagh, MD; Tricia B. Elliott; Ruth A. Engelberg, PhD; Patsy D. Treece, RN, MN; Sarah E. Shannon, PhD, RN; Gordon D. Rubenfeld, MD, MSc; Donald L. Patrick, PhD, MSPH; J. Randall Curtis MD, MPH. Crit Care Med 2004 Vol. 32, No. 7

51 conferences were analyzed…

	Mean	Range
Conference duration	32 min	7 to 74 min
Physician opening monologue	4.2 min	0 to 14.4 min
Family speech	29%	3% to 67%

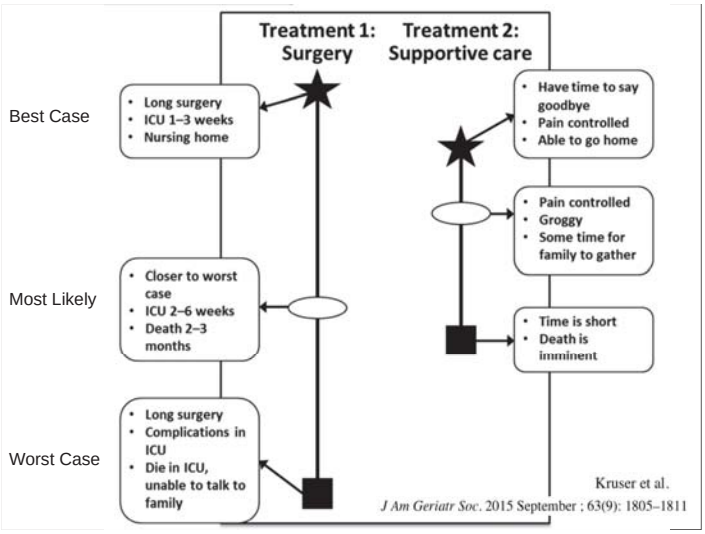
The proportion of family speech during family conferences correlated with family satisfaction with communication

Multidisciplinary meetings: Pitfalls

- Do you even need a meeting?
- Forgetting the pre-game
- Forgetting to let the family talk
- Prognostic information that is vague or unhelpful

"Best Case / Worst Case" : Qualitative evaluation of a novel communication tool for difficult in-the-moment surgical decisions

Jacqueline M. Kruser, MD, Michael J. Nabozny, MD, Nicole M. Steffens, MPH, Karen J. Brasel, MD, MPH, Toby C. Campbell MD, Martha E. Gaines, JD, LLM, and Margaret L. Schwarze MD, MPP. *J Am Geriatric Soc.* 2015 September ; *63*(9): 1805—1811.



Language Pearls

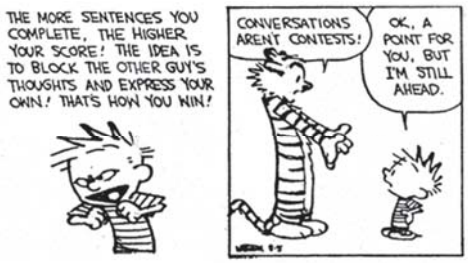
- "We don't expect any decision right now."
- "This is a test of us as your medical team, not you"
- Withdraw "life support" (not "care")
- "Allow natural death" (not "DNR")
- "Prolong dying" (vs "prolong living")
- "AND" (not "but")
- "Is there anything we <u>are</u> doing right now that we <u>shouldn't</u> be?" and "Can you think of anything that we <u>aren't</u> doing that we <u>should</u> be doing?"

Other Pearls

- Most patterns of thinking and behavior existed within a family long before you met them
- If you're not sure you should say something, ask permission
- Explain what you're watching for, set intervals for next check-ins
- Relieve as much burden as possible

A not-so-unhappy ending

Thoughts? Questions?



Thanks!

References

- Arrien, Angeles. The Four-Fold Way: Walking the paths of the warrier, teacher, healer and visionary. Harper San Francisco. 1993.
- Back A, Arnold R, Tulsky J. Mastering communication with seriously ill patients: Balancing honesty with empathy and hope. Cambridge University Press. 2009.
- Kruser JM et al. "Best Case/Worst Case": Qualitative evaluation of a novel communication tool for difficult in-the-moment surgical decisions. J Am Geriatr Soc 2016 September; 63(9):1805-1811.
- McDonagh J et al. Family satisfaction with family conferences about end-of-life care in the intensive care unit: Increased proportion of family speech is associated with increased satisfaction. Crit Care Med 2004 Vol. 32, No. 7.
- Quill TE, Arnold R, Back AL. Discussing Treatment Preferences with Patients Who Want "Everything." Ann Intern Med 2009; 151:245-349.
- Quill TE, Brody H. Physician Recommendations and Patient Autonomy: Finding a Balance between Physician Power and Patient Choice. Ann Intern Med 1996;125(9):763-769.
- Puchalksi CM. The role of spirituality in health care. BUMC Proceedings 2001; 14:352-357.
- Specker Sullivan L. Medical maternalism: Beyond paternalism and antipaternalism. J Med Ethics 2016; 42:439-444.

A Round of Pain

Presented by: Kimberly Mauer, M.D.
Date: September 26, 2019

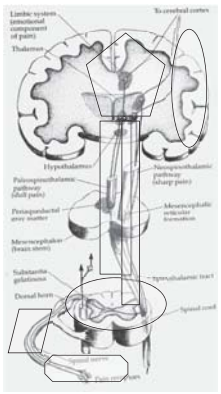
What is Pain?

- An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage

Merskey H, Bogduk N (eds). Classification of Chronic Pain, 2nd ed. IASP Press, Seattle, 1979.

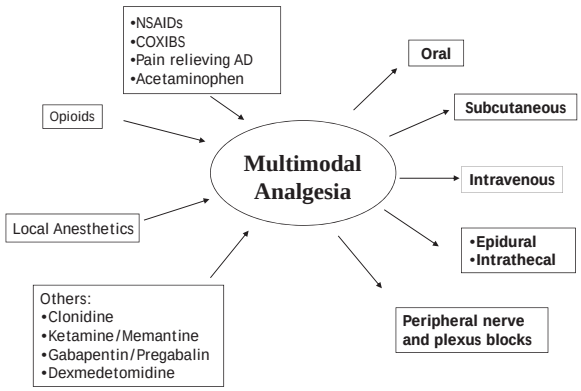
Pain Transmission

- Reception
- Transmission
- Modulation
- Transmission
- Processing & Prioritizing Meaning
- Descending inhibition



Sibell, David. CHSU.

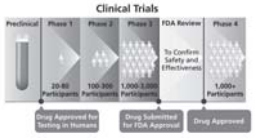
Pharmacologic Treatment



Where did opioid go wrong?

- No defined pathology
- Opioids as focus of treatment
- Mal-alignment of goals: "no pain" vs ?
- No assessment of mental health
- Acute pain short term treatment evolved into chronic escalating opioid therapy
- No patient responsibility, she was a passive recipient of pain meds
- No escape clause

The Marijuana products



1985 Nabilone

1992 Dronabinol

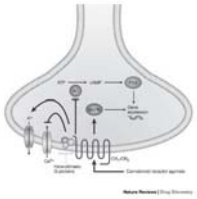
Dronabinol Liquid 2017

Epidiolex® (CBD) 2018

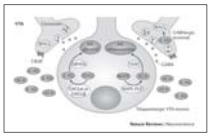
Why do Drugs and Botanicals Fail ?
Lack of Statistically Significant evidence to support Efficacy, Safety in adequately controlled Multi-center Clinical trials

Drugs inspired by Natural Products (including Botanicals) **tend to be approved as "single-element" drugs or extracts**

Endogenous Cannabinoids (Endocannabinoids)

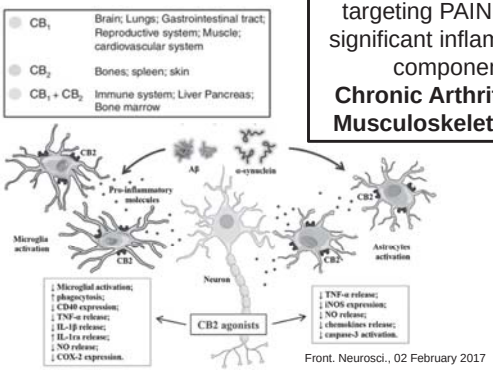


- **CB_1** receptors are primarily located on **presynaptic neurons** to **inhibit neurotransmitter** release
- **CB_2** receptors are primarily located on **immune cells**, periphery and on **microglia**



Anti-inflammatory potential of CB2 receptors

Potential significance in targeting PAIN with a significant inflammatory component
Chronic Arthritic and Musculoskeletal Pain



Front. Neurosci., 02 February 2017

Low Dose Naltrexone

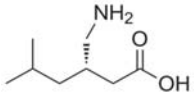
- Naltrexone has been FDA approved since 1984
- Opiate antagonist
- Used in treatment of opioid misuse and alcohol use
- A standard dose was between 50-300 mg/day
- Typically naltrexone is free of side effects
- At 4.5 mg per day (taken before bed) we avoid substantial blockade of anything by mu receptors.

Low Dose Naltrexone

- Chronic pain is thought to be an abnormal inflammatory immune response
- This paradoxical effect has not been seen with higher dosages (50mg)
- Adaptive increase in endorphins and enkephalins
- Increase in endorphins normalizes immune response
- We think that it is a balance of mu and delta opioid receptor stimulation that affect immune systems
- Just blocking mu can help restore some balance to delta

Pregabalin : better than gabapentin?

- Same binding site as gabapentin– binds more avidly
- More potent
- Linear absorption
- Longer elimination ½ life, BID or TID dosing
- Begins working in 24 hours or less
- Excellent evidence: 7 prospective trials published in PHN, DPN, spinal cord injury
- Use in treatment resistant patients



Stacey BR, et al, presented at ADA 2005. Durso de Cruz E, et al presented at ADA 2005

Ketamine

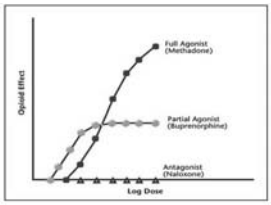
- Wide safety profile
- Can be used pre-hospital, as an adjunct to opioids and other analgesics, has a role in chronic opioid dependence, and hyperalgesia
- Anesthetic in doses > 2 mg/kg
- Analgesic at 10-15 times less, concurrent with a significant decrease in side effects
- "Resets" the NMDA receptors.

Muscle Relaxants

- Not a lot of evidence for long term use
- In the pain center, we like tizanidine and cyclobenzaprine
- Tizanidine- Alpha-2 agonist that has evidence for musculoskeletal pain
- Typical starting dose is 2 mg at night
- Can be titrated on a three times daily schedule with a typical target dose of 4-8 mg tid

Buprenorphine

- Partial opioid agonist: a drug that blocks opioids by attaching to the opioid receptors without completely activating them
- Formulations: Suboxone [buprenorphine/naloxone sublingual tablet] and Subutex (buprenorphine sublingual tablet). This formulation most commonly seen in treatment of opioid use disorder.



My patient is on Suboxone- What now?

- Dose buprenorphine BID or TID and/or increase overall dose – Usually do not exceed buprenorphine 24mg/day
- Additional opioid ON TOP of buprenorphine
  - Choose opioid with high affinity for the mu receptor (hydromorphone, sufentanil, fentanyl)
  - Dose hydromorphone at higher dose to compete at the mu receptor
    - Example: Buprenorphine 24mg per day, add hydromorphone PO 4-6mg every 3 hours rather than 2-4 mg.
- Use scheduled adjuvant therapies (ketamine, nerve block, NSAID, acetaminophen, gabapentin, SNRI, etc.)
- Taper additional opioids after tissue healing

Duloxetine (Cymbalta®)

- Serotonin/Norepinephrine Reuptake Inhibitor
- FDA approved for painful diabetic neuropathy, Fibromyalgia, post herpetic neuralgia, major depressive disorder, generalized anxiety disorder
- Chronic musculoskeletal pain: chronic osteoarthritis and chronic low back pain
- Start at 30 mg. PO QHS, increase to 60 mg. PO QHS

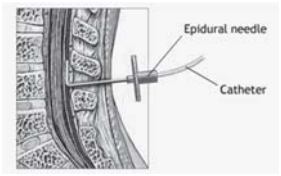
Goldstein DJ. Pain 2005;116:109-18

Liposomal Bupivacaine

- Longer-acting bupivacaine
- Exparel
- Studies have not revealed what we hoped
- Single-dose administration
- Surgeons like it better than anesthesiologists/pain physicians

Epidural Catheters

Involves administration of medications (local anesthetics, opioid) as a single injection or a continuous infusion via an epidural pump into the epidural space

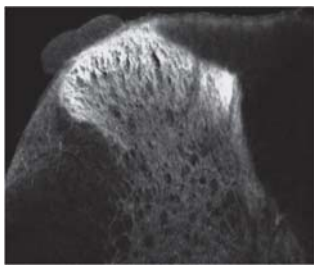


Potential space that lies superficial to the dura mater surrounding the spinal cord.

Peripheral Nerve Blocks

- Used for a variety of surgical procedures both inpatient and outpatient. Some blocks can provide surgical anesthesia
- Upper and lower extremity blocks are used commonly in orthopedic procedures.
- Patients can often take these blocks home and remove catheters themselves in a day or two.

Neuraxial Analgesic Infusion



Spinal GABA B Receptors

- 10-1000 fold reduction in dose compared to oral or IV opioid
- Reduced adverse effects
- Improved analgesia
- Use of medications unavailable *via* other routes
  - local anesthetics
  - clonidine
  - ziconotide
- Percutaneous or totally Implanted

Take Home Points

- Multimodal care is the key
- Use lower dosing of opioids
- Integrative care is becoming standard

- Thank You!
- mauer@ohsu.edu

"They call it a medicine ball because if you catch it, you'll need pain killers."