UWTASP tele-antimicrobial stewardship program | echo

November 8th, 2022

Agenda

- IDWeek 2022 Highlights 2: Will, Rupali, and John
- Coulee case

Project ECHO

SHEA Compendium Update: Implementation (Josh Schaffzin)

- Guidance is to help move info from science to practice (17 years is a problem)
- Implementation: "...systematic uptake of resea rch findings and other evidence-based practices into routine practice."
- Successful implementation matched to orgs context (resources)
- Education is not sufficient
- Regulatory expectation is to implement EB interventions

Update: Implementation (Josh Schaffzin)

- 4Es approach (engage, educate, execute, evaluate)
  - Engage: multidisciplinary team, local champions
  - Educate: provide education/materials, staff/patient/families, frequently
  - Execute: standardize care process, create redundancy
  - Evaluate: measure performance (formal, informal, frequent), provide feedback
- Think big and small, engage and envision,
- Eating an elephant, tackle one thing at a time, test and learn and change and repeat, 30K level

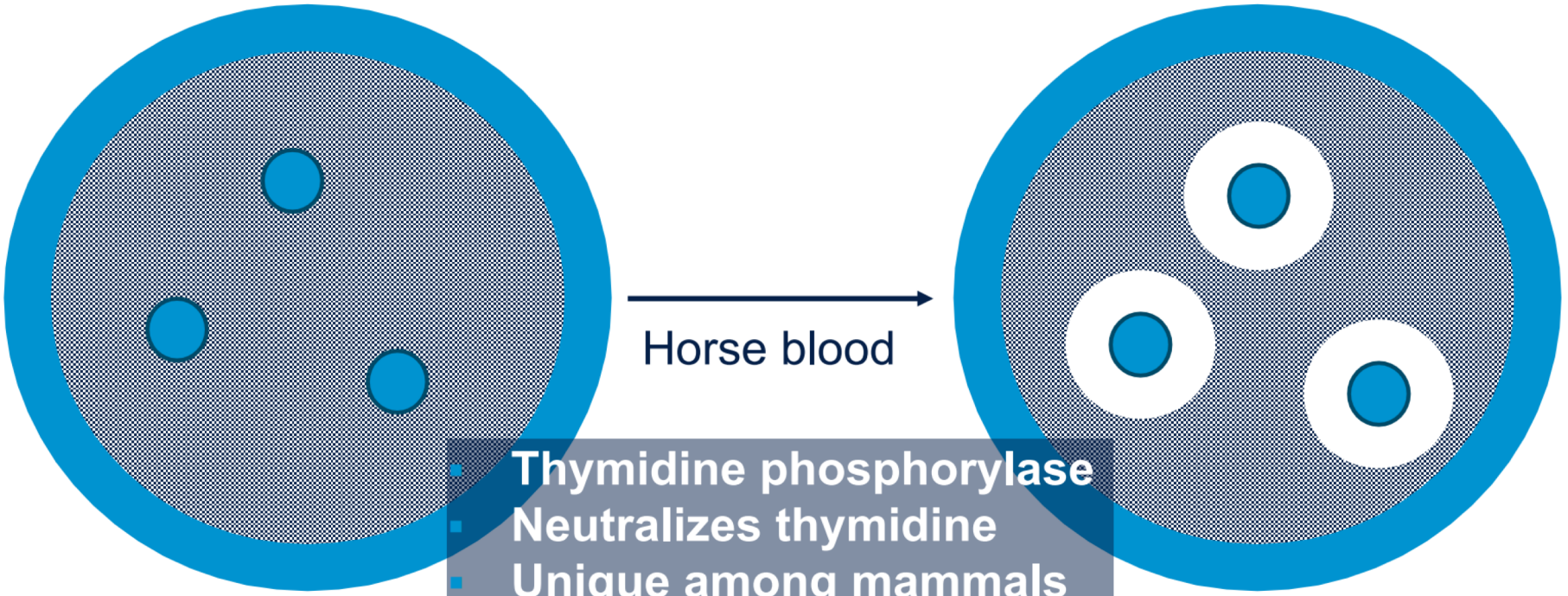
Update: Implementation (Josh Schaffzin)

- Leadership engagement
- Frontline engagement
- Technical work vs adaptive work
  - Tech: the evidence, clearly needs to be done
  - Adaptive: how work gets done in context, req learning, conscious and unconscious barriers, attitudes, beliefs, values, feedback, culture
- Process observation, gemba walk
- Purposeful design

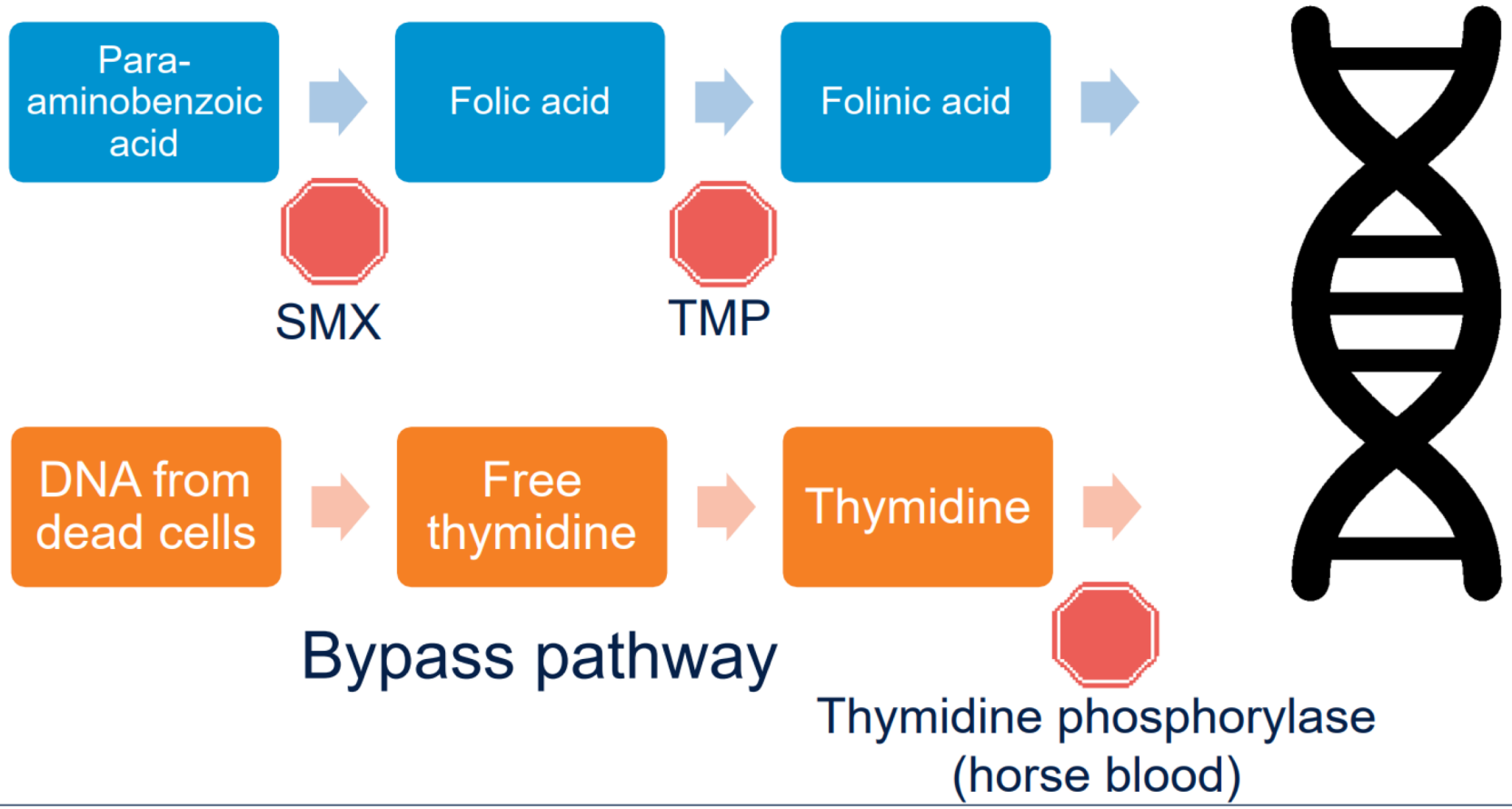
Sarah Doernberg, MD, MAS

Thymidine antagonizes effect of sulfa abx

AKA "Harper Cawston factor"



Resistance to TMP/SMX



Goldstein EJC and Proctor RA. Clin Infect Dis 2008; 46(4): 584-593. https://doi.org/10.1086/525536

Sarah Doernberg, MD, MAS

The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 MARCH 19, 2015 VOL. 372 NO. 12

Clindamycin versus Trimethoprim–Sulfamethoxazole for Uncomplicated Skin Infections

- Multicenter, blinded RCT
- Adults + peds outpt
- Large (> 5 cm) abscess (30%), cellulitis (53%), both (16%)
- Superiority (10%)

I+D (if indicated)

Randomization

TMP/SMX 2 DS BID
(n = 260)

10 days

Clindamycin
(n = 254)

7-10d post-Rx cure

77.7%

Diff -2.6% (-10.2% to 4.9%)

80.3%

ITT analysis (clinically evaluable population showed similar results)

UCSF

Miller LG et al. N Engl J Med 2015;372(12):1093-103. DOI: 10.1056/NEJMoa1403789

Sarah Doernberg, MD, MAS

Take-home

Intrinsic resistance of β-hemolytic strep to TMP/SMX is a myth

RCTs support TMP/SMX monotherapy for use in mild outpatient skin infections, including cellulitis

TMP/SMX monotherapy should not be used as first-line treatment for inpatients or those with severe infections

Sarah Doernberg, MD, MAS

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Oral Tebipenem Pivoxil Hydrobromide in Complicated Urinary Tract Infection

Paul B. Eckburg, M.D., Lori Muir, B.Sc., Ian A. Critchley, Ph.D., Susannah Walpole, Ph.D., Hanna Kwak, B.S., Anne-Marie Phelan, M.A., Gary Moore, M.S., Akash Jain, Ph.D., Tim Keutzer, B.A., Aaron Dane, M.Sc., David Melnick, M.D., and Angela K. Talley, M.D.

NEJM April 7, 2022

Preeti N. Malani, MD, MSJ

Table 2. Primary and Secondary Efficacy End Points (Microbiologic Intention-to-Treat Population).

End Point	Tebipenem Pivoxil Hydrobromide (N=449)	Ertapenem (N=419)	Treatment Difference (95% CI)*
	number (percent)		*percentage points*
Primary end point			
Overall response at test-of-cure visit†	264 (58.8)	258 (61.6)	−3.3 (−9.7 to 3.2)
Secondary end points			
Overall response at end-of-treatment visit†	437 (97.3)	396 (94.5)	2.8 (0.1 to 5.7)
Clinical response‡			
Clinical improvement at day 5	336 (74.8)	321 (76.6)	−1.9 (−7.6 to 3.8)
Clinical cure at end-of-treatment visit	446 (99.3)	410 (97.9)	1.4 (−0.1 to 3.4)
Clinical cure at test-of-cure visit	418 (93.1)	392 (93.6)	−0.6 (−4.0 to 2.8)
Sustained clinical cure at late follow-up	398 (88.6)	377 (90.0)	−1.5 (−5.7 to 2.6)
Microbiologic response§			
Response at day 5	427 (95.1)	397 (94.7)	0.3 (−2.7 to 3.4)
Response at end-of-treatment visit	439 (97.8)	403 (96.2)	1.5 (−0.8 to 4.1)
Response at test-of-cure visit	267 (59.5)	266 (63.5)	−4.5 (−10.8 to 1.9)
Sustained response at late follow-up	257 (57.2)	244 (58.2)	−1.5 (−7.9 to 5.0)

nature climate change

ANALYSIS

https://doi.org/10.1038/s41558-022-01426-1

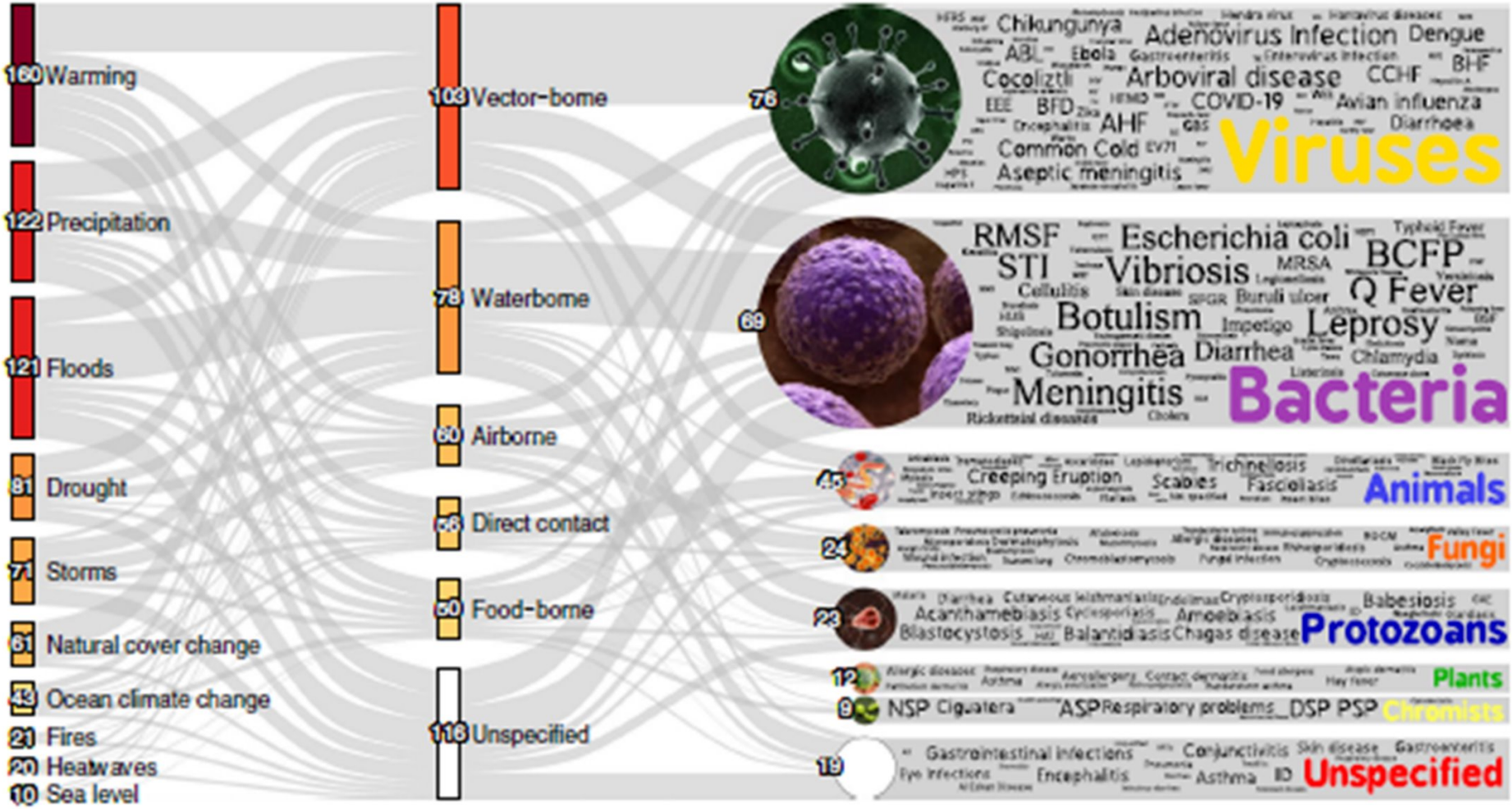
Check for updates

Over half of known human pathogenic diseases can be aggravated by climate change

Camilo Mora[1], Tristan McKenzie[2,3], Isabella M. Gaw[4], Jacqueline M. Dean[1], Hannah von Hammerstein[1], Tabatha A. Knudson[1], Renee O. Setter[1], Charlotte Z. Smith[5], Kira M. Webster[1], Jonathan A. Patz[6] and Erik C. Franklin[1,7]

It is relatively well accepted that climate change can affect human pathogenic diseases; however, the full extent of this risk remains poorly quantified. Here we carried out a systematic search for empirical examples about the impacts of ten climatic hazards sensitive to greenhouse gas (GHG) emissions on each known human pathogenic disease. We found that 58% (that is, 218 out of 375) of infectious diseases confronted by humanity worldwide have been at some point aggravated by climatic hazards; 16% were at times diminished. Empirical cases revealed 1,006 unique pathways in which climatic hazards, via different transmission types, led to pathogenic diseases. The human pathogenic diseases and transmission pathways aggravated by climatic hazards are too numerous for comprehensive societal adaptations, highlighting the urgent need to work at the source of the problem: reducing GHG emissions.

Nature Climate Change, September 2022



Preeti N. Malani, MD, MSJ

nature microbiology

ARTICLES

https://doi.org/10.1038/s41564-022-01216-7

Check for updates

OPEN

Colonization dynamics of extended-spectrum beta-lactamase-producing Enterobacterales in the gut of Malawian adults

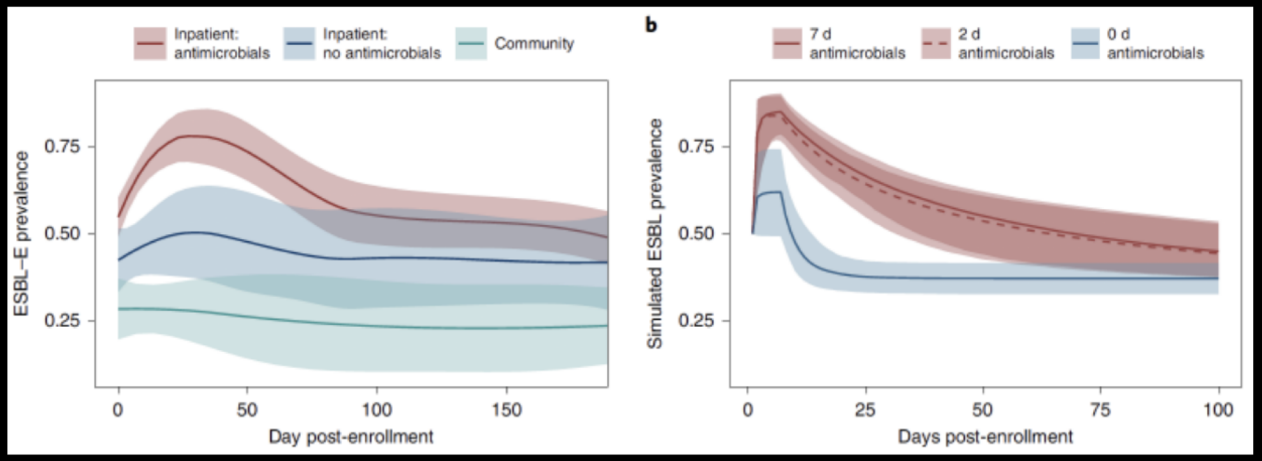
Joseph M. Lewis[1,2,3,4]✉, Madalitso Mphasa[1], Rachel Banda[1], Mathew A. Beale[4], Eva Heinz[2], Jane Mallewa[5], Christopher Jewell[6], Brian Faragher[2], Nicholas R. Thomson[4,7] and Nicholas A. Feasey[1,2,7]

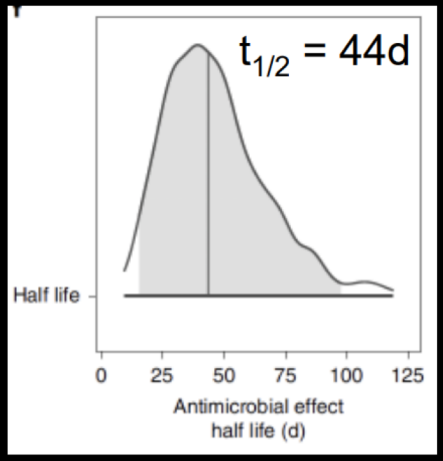
Drug-resistant bacteria of the order Enterobacterales which produce extended-spectrum beta-lactamase enzymes (ESBL-Enterobacterales, ESBL-E) are global priority pathogens. Antimicrobial stewardship interventions proposed to curb their spread include shorter courses of antimicrobials to reduce selection pressure but individual-level acquisition and selection dynamics are poorly understood. We sampled stool of 425 adults (aged 16–76 years) in Blantyre, Malawi, over 6 months and used multistate modelling and whole-genome sequencing to understand colonization dynamics of ESBL-E. Models suggest a prolonged effect of antimicrobials such that truncating an antimicrobial course at 2 days has a limited effect in reducing colonization. Genomic analysis shows largely indistinguishable diversity of healthcare-associated and community-acquired isolates, hence some apparent acquisition of ESBL-E during hospitalization may instead represent selection from a patient's microbiota by antimicrobial exposure. Our approach could help guide stewardship protocols; interventions that aim to review and truncate courses of unneeded antimicrobials may be of limited use in preventing ESBL-E colonization.

Whence and how are ESBL Enterobacterales acquired and retained?

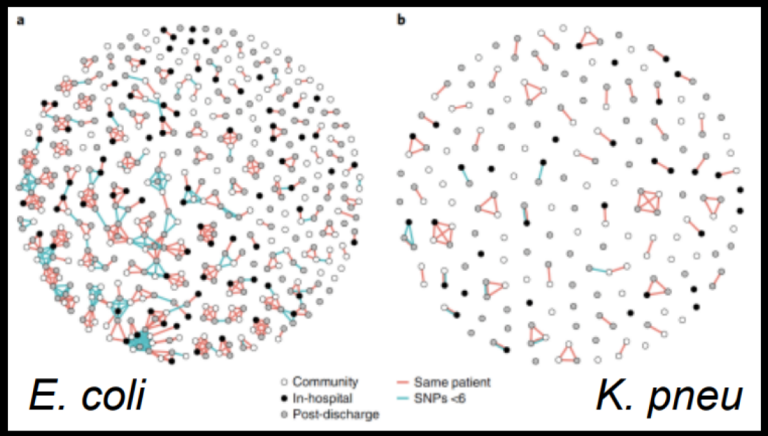
Longitudinal study of ESBL-E carriage in 425 adults in Malawi. As long as 180 days. WGS of isolates. Inpatients and outpatients, with and without antibiotic Rx.

Nature Microbiology 7, 1593-1604, (Nov) 2021





Hospitalization and especially antimicrobial exposure increase ESBL-E prevalence, but duration of antimicrobial exposure doesn't matter!



Strain sharing not just within hospital

- Implications for stewardship: avoidance more important than shortened course
- Need more robust characterization of intra-host strain evolutionary dynamics

Nature Microbiology 7, 1593-1604, (Nov) 2021

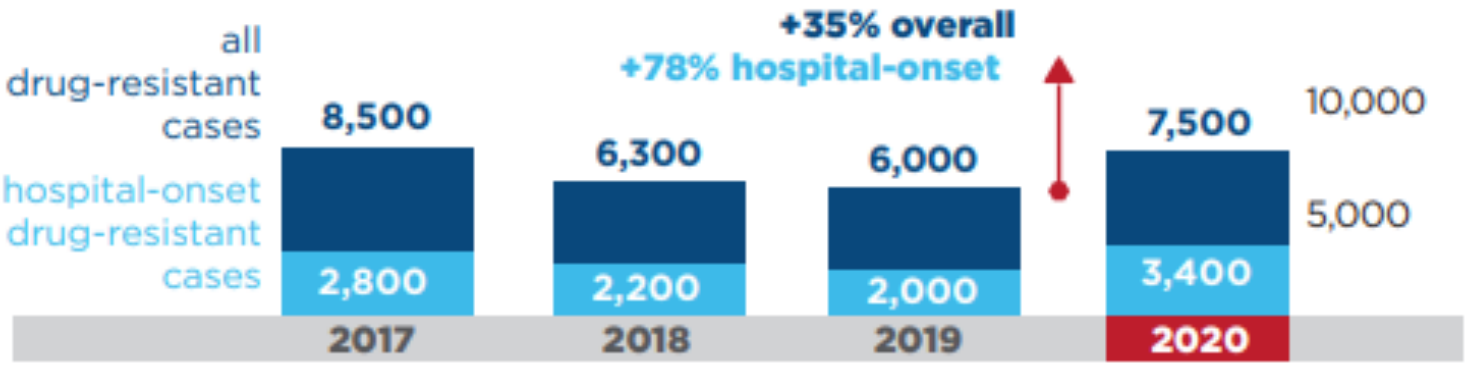
David A. Relman, MD

Antimicrobial stewards

Clinical microbiologists

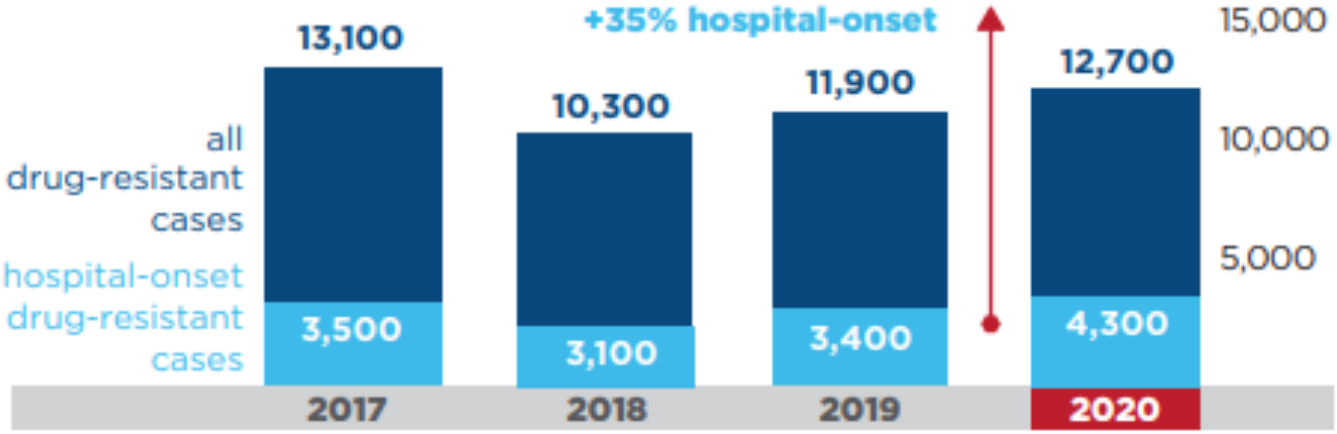
Well, at least we'll be busy

Carbapenem Resistant *Acinetobacter Baumanii* (CRAB)



Data from 2018–2020 are preliminary.

Carbapenem Resistant *Enterobacterales* (CRE)



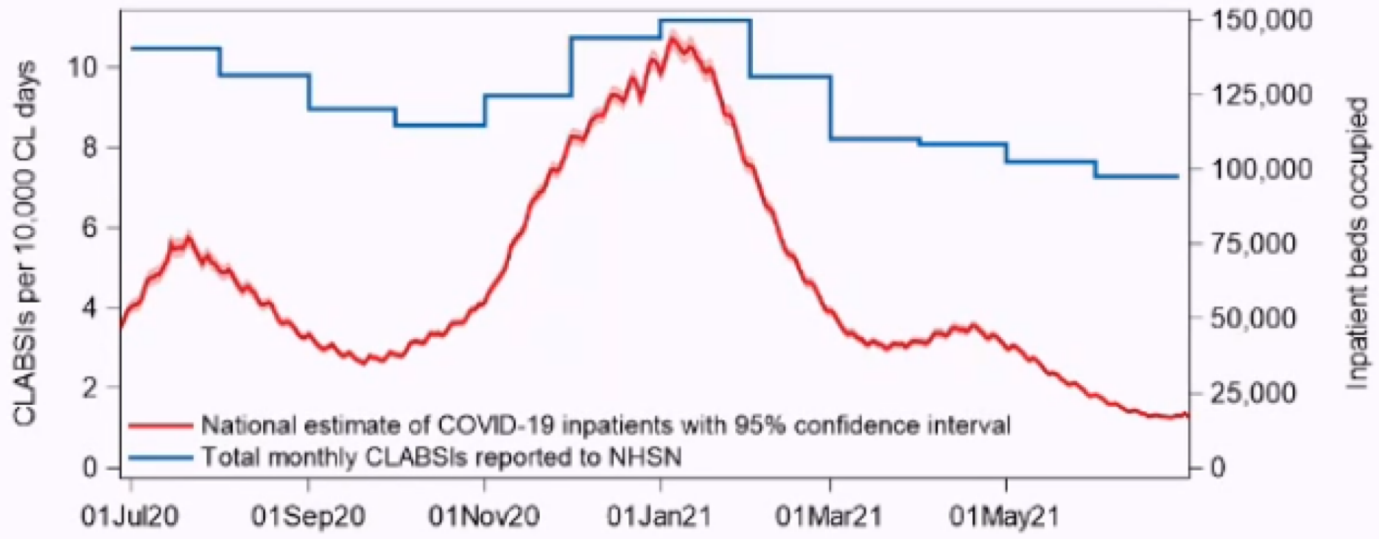
Why?

- Longer hospitalizations with COVID
- Secondary infections from lines/vents also COVID complications
- Lots of antibiotic use too
- Burnout

Hospitalization rate = CLABSIs

Temporal changes in CLABSI rates tracked with changes in estimated COVID-19 hospitalizations.

Time series of CLABSI rate[1] and national estimate of inpatient beds occupied by a patient with confirmed or suspected COVID-19[2] (with 95% confidence band; right axis) from July 1, 2020 to June 30, 2021.



CDC NHSN unpublished data

Sapiano M, et al. *Infection Control & Hospital Epidemiology*. 2022;43(1):32-39

Homegrown and coming to visit

- Many of the risk factors that drove antibiotic resistance were things that are happening everywhere
- But travel has restarted, and terrible things are happening
- One global review found 81% Klebsiella resistance to cefepime…

So what do we do: Priya Nori MD

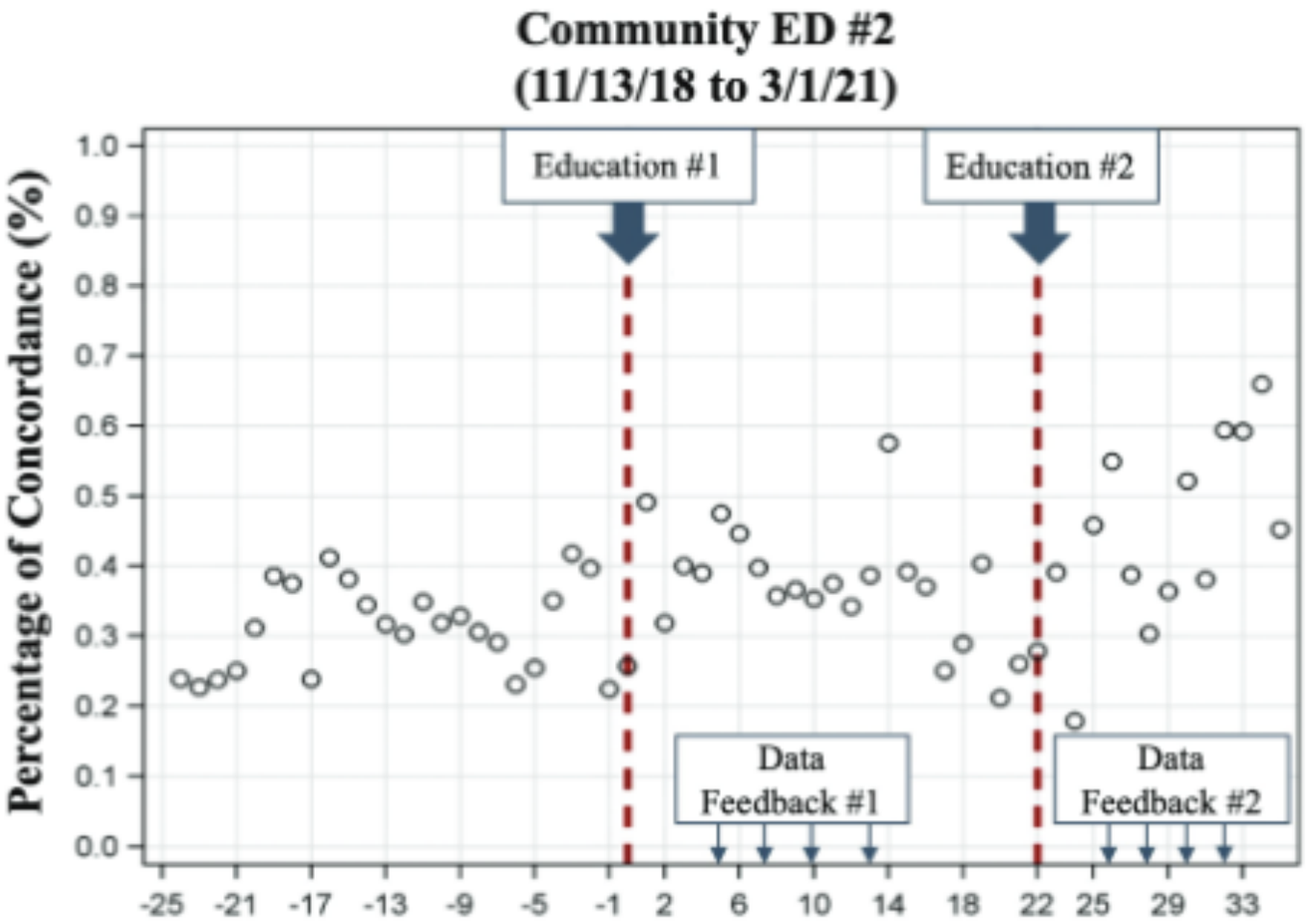
1. Create LOCAL guidelines with clear de-escelation
2. Share antibiotic usage and best practices with neighbors (collaboratives decrease usage)
3. Lean on rapid, evidence based diagnostics (MRSA swab!)
4. Procalcitonin is not to be trusted, can be high in viruses
5. Steward resources and ABX (take things out of ordersets
6. Continue outpatient stewardship

Barlam et al, 2022 Infect control and hosp epi

Keep it simple…

- Randomized trial of 9600 patients w/ sepsis on the floor on ABX
- 23 point safety checklist to make sure ok to de-escalate
- Only 8% of patients were eligible
- Only 15% of providers agreed to stop antibiotics

Bother people in person



Bring them facts