


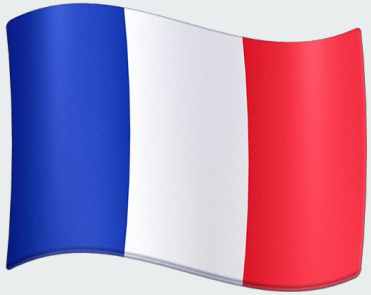

CLINID conference
Hunter Ratliff
06/12/2025

Ages, dates, and other identifying information may have been changed
I have no conflict of interest in relation to this presentation

Shortcuts

Case 1: Start
Case 2: Start
Discussion: Objectives

- **Guidelines** (review article on suppressive antibiotics generally)
- **Two French case series** - Bactrim??

Takeaway slide

Case #1

Case 1: HPI

A **60 y/o F** with PMH including ESRD (iHD via AVF), s/p TAVR, afib, severe pulm HTN & COPD p/w **chills**.

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- **Five days prior to admission** was having **chills** at dialysis center
  - They ordered blood cultures 3 days ago
- **Two weeks ago left ear fullness** (no pain, discharge, tinnitus, or hearing loss)
- **Chronic cough** (no dyspnea or change in quantity/quality of sputum)
- No issues with her RUE AVF (aside from **frequent bleeding at HD**, which is chronic)

Case 1: Medical history

A **60 y/o F** with PMH including ESRD (iHD via AVF), s/p TAVR, afib, severe pulm HTN & COPD p/w **chills**.

- Five days of chills & malaise
- Two weeks ago left ear fullness (resolved)
- Chronic cough
- No issues with her RUE AVF aside from chronic bleeding

Medical / Surgical History

- ESRD via RUE AVF (10+ years)
- Severe pulm HTN (PCWP 45)
  - Group 2 & 3 (from heart/lungs)
- COPD, HFpEF (5L home O2)
- Atrial fibrillation
  - Warfarin (bleeding on DOAC)
  - Also on dronedarone
- Hx TAVR (2021)
- DM (A1c 6.8)
- Mobility: Ambulates with walker

Case 1: Social history, exposures, & risk factors

Geographic & Travel	• Lives in West Virginia • No travel
Occupational	• Retired. Used to work at convenience store
Substance & needles	• No EtOH, tobacco, drugs • No needle exposures
Animals	• Pet dog at home • Daughter has kittens
Exposures & hobbies	• None

Case 1: Physical exam

Vitals: 115/65 | 93 bpm | 36.8 °C | 94% | **42.68** kg/m^2
Gen: alert and oriented, NAD
ENT: EOMI grossly, sclera color: anicteric sclerae; MMM
Resp: normal respiratory effort **on 5L O2**, symmetric chest rise
CV: irregular but **no murmurs**; extremities perfused
GI: non-distended; no rebound or guarding
Ext: no clubbing or cyanosis; **1+ BLE edema**; RUE AVF w/ thrill but **no TTP, calor, or discharge**

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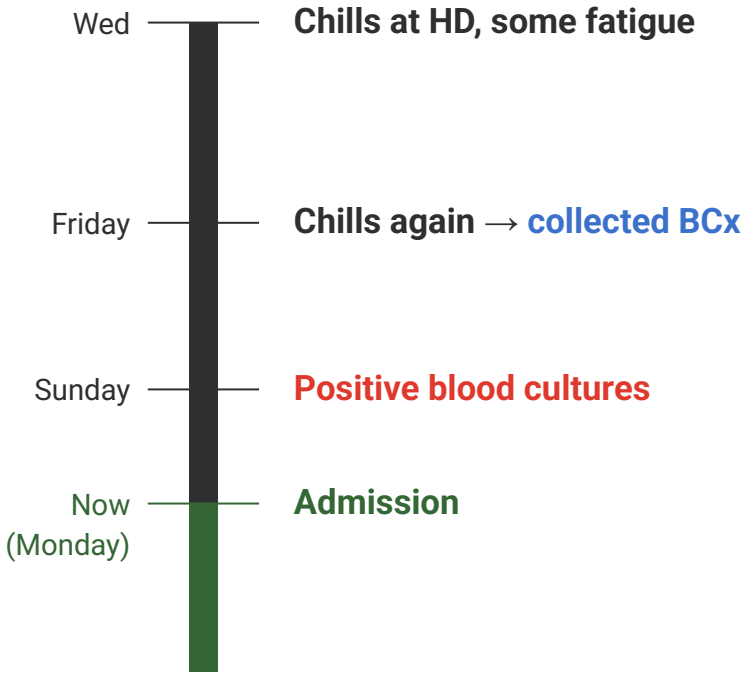
Blood cultures from HD were positive → Direct admission

Case 1: Summary

A **60 y/o F** with PMH including ESRD (iHD via AVF), s/p TAVR, afib, severe pulm HTN & COPD p/w **5 days** of **chills & malaise** and was admitted for **positive blood cultures**.

Info that may (or may not) be helpful:

- Left ear fullness (2 weeks ago, resolved)
- Chronic cough



Case 1: Micro data

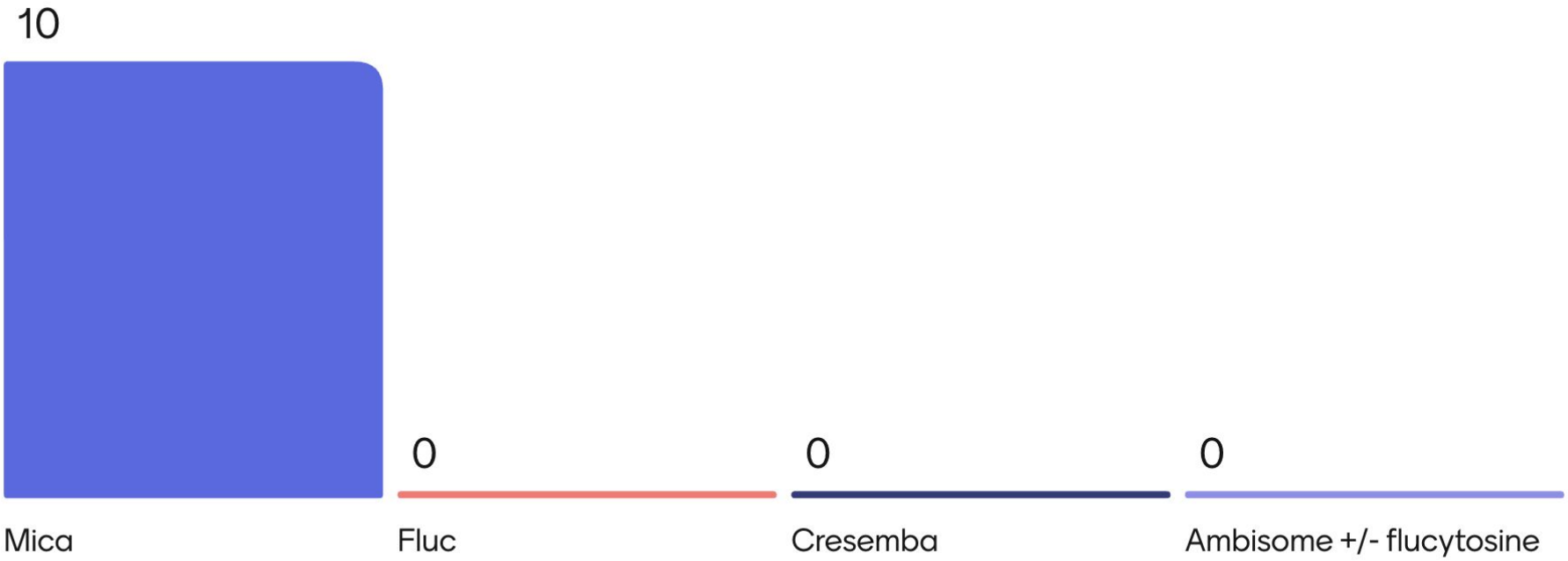
GRAM STAIN	! Yeast Aerobic Bottle

[Q1.1] Initial treatment

Initial treatment choice

(multiple choice)

[1.1] What would you use for initial treatment?



Case 1: Micro data

GRAM STAIN	! Yeast Aerobic Bottle

Case 1: Micro data

BLOOD CULTURE, ROUTINE	**Abnormal Stain !!** Candida glabrata ! For susceptibility, see previous report.
GRAM STAIN	! Yeast Aerobic Bottle

Case 1: Cardiac workup

Transthoracic echo

Quality: Technically difficult study due to limited acoustic windows

Indications: Fungemia

Mitral Valve: Anterior and posterior mitral valve leaflets appear calcified. Moderate mitral annular calcification. Moderate mitral stenosis. Mild mitral regurgitation

Aortic Valve: There is a 23 mm transcatheter valve (Sapien III) in the aortic position. The aortic prosthesis demonstrates a normal transvalvular gradient for valve type and size. There is no evidence of paravalvular aortic regurgitation.

Conclusions: No change was seen from previous echocardiogram.

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Conclusions: No change was seen from previous echocardiogram.

Medical / Surgical History

- ESRD via RUE AVF
- Severe pulm HTN, COPD, HFpEF
  - PCWP 45
  - On 5L home O2
- Hx TAVR (2021)

Do we need transesophageal echo?

Anesthesia + pulmonary hypertension = bad time

Case 1: Cardiac workup

Transesophageal echo

Quality: The study images were of technically good quality

- S/P #23 Sapien S3 Ultra Valve. Leaflet cusps are thickened and restricted. Mild transvalvular regurgitation. No paravalvular regurgitation. The is linear mobile density **measuring 1.1 x 0.2 cm** attached to the cusp in the right coronary position. In the setting of ~~bacteremia~~ fungemia this may represent vegetation.
- Mitral leaflets are calcified and restricted. Mild mitral stenosis. Moderate mitral regurgitation

Case 1: Surgical candidacy

All imaging was reviewed and discussed with the cardiac surgery team and the patient was seen and evaluated with Dr. [redacted] Based on TEE imaging low suspicion for vegetation on bioprosthetic aortic valve, however we are unable to definitely rule out in the setting of fungemia.

Given the patients multiple chronic medical conditions along with poor functional status she is a prohibitive risk for any cardiac surgical intervention. We recommend continuing antifungals per ID recommendations along with life long suppression. Can also consider follow up with cardiology after completion of IV antifungals with repeat TTE, no need for SCT follow up.

STS Risk Score: https://acsdriskcalc.research.sts.org/calculation
Isolated AVR
Mortality **18.5%**
Morbidity and Mortality **37.1%**

Case 1: Susceptibilities

BLOOD CULTURE, ROUTINE

Abnormal Stain !!

Candida glabrata !

We all agree on the IV therapy, but what about **after IV therapy**?

Amphotericin B	0.5	None
Rezafungin	0.016	Suscept
Anidulafungin	0.03	Suscept
Micafungin	0.016	Suscept
Voriconazole	0.12	None
Isavuconazole	0.12	None
Posaconazole	1	None
Itraconazole	0.5	None
Fluconazole	4	SDD
Caspofungin	0.12	Suscept

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- Atrial fibrillation
  - Warfarin (bleeding on DOAC)
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QTC Calculation 450 ms

D Dronedarone
Fluconazole (QT-prolonging Moderate CYP3A4 Inhibitors (Moderate Risk))

D Warfarin (Vitamin K Antagonists)
Fluconazole

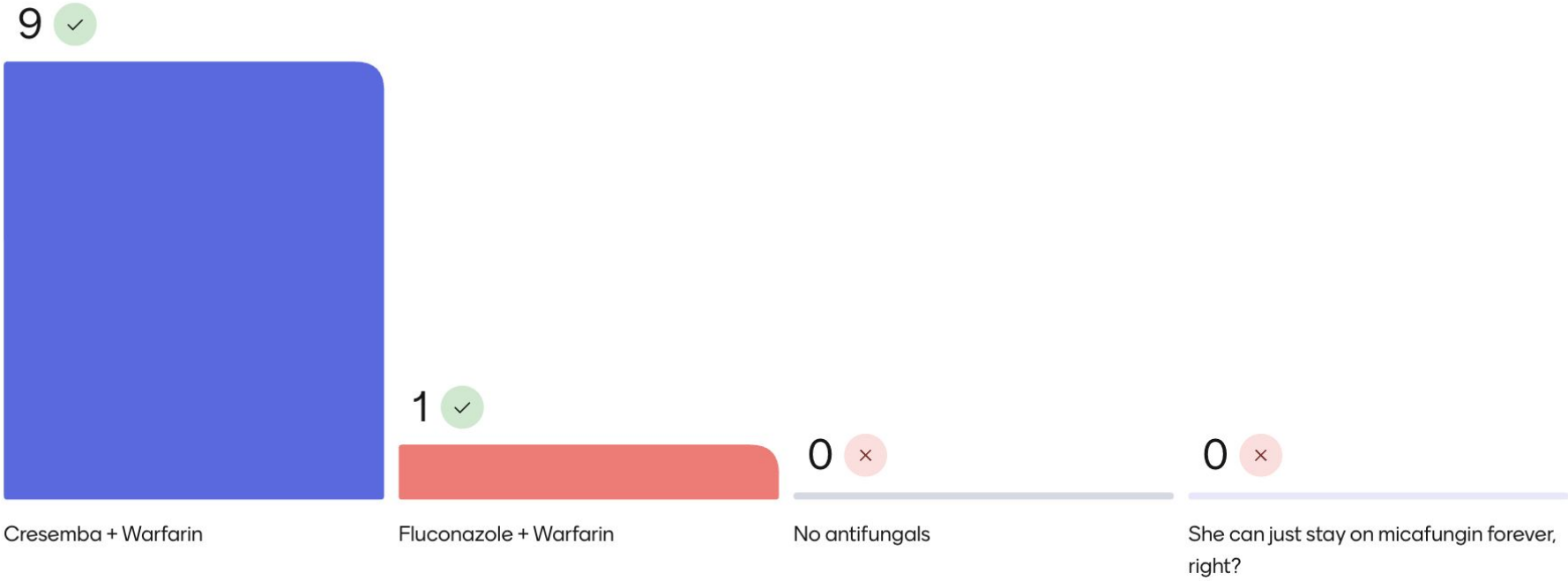
Coverage: Wv Medicaid i.e. paperwork

[Q1.2] What to do at the end?

PO transition

(multiple choice, has wrong answers)

[1.2] What about when the first 6 weeks is over?



Case 1: The transition to Cresemba

A **60 y/o F** with PMH including recent ***C glabrata* prosthetic aortic valve endocarditis**, afib (on warfarin & dronedarone), ESRD, severe pulm HTN (on 5L oxygen)

1. Talk with cardiology → **won't change their meds** (patient does not want to go off warfarin)

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    - And **some more paperwork**...

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    - And **some more** (she has **finished 6 weeks** at this point, but still getting OPAT)

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1. Talk with cardiology → won't change their meds (patient does not want to go off warfarin)
2. You do some paperwork
    - And some more paperwork...
    - And some more (she has **finished 6 weeks** at this point, but still getting OPAT)
3. **Cresemba approved**!!!

But then...

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60 y/o F with PMH including recent ***C glabrata*** **prosthetic aortic valve endocarditis**, afib (on warfarin & dronedarone), ESRD, severe pulm HTN (on 5L oxygen) s/p 6+ weeks of mica

Two weeks after starting Cresemba, developed profound **emesis**, followed by **persistent diarrhea**

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  - I can poop while I'm at dialysis (very reasonable)

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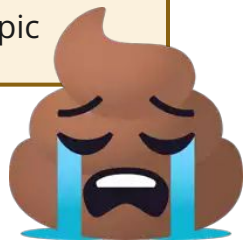
Warfarin management

- Warfarin can no longer be managed by Ruby pharmacist
- Her family medicine doc is doing the warfarin management now
- They don't use Epic

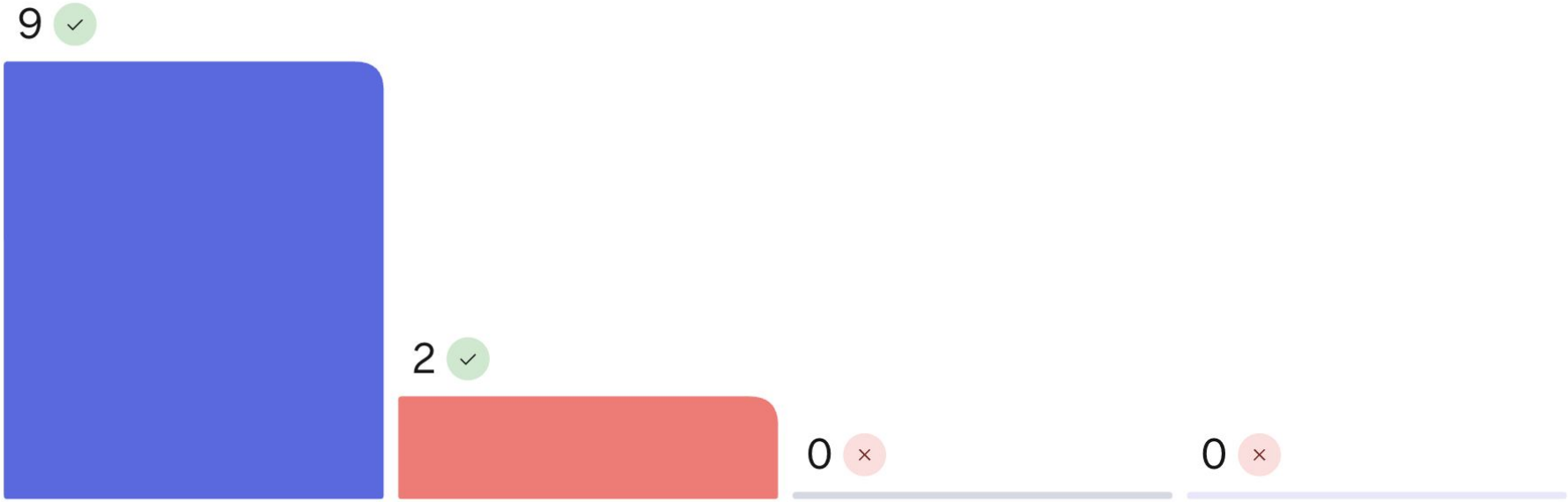


[Q1.3] Refractory diarrhea

GI intolerance

(multiple choice, has wrong answers)

[1.3] What to do now with these GI symptoms?



Case 1: The transition to ~~Cresemba~~ fluconazole

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- Order **C diff testing**
- Sent **fluconazole** to her pharmacy (on a Thursday)

Case 1: The transition to ~~Cresemba~~ fluconazole

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- Order **C diff testing** → PCR positive , Toxin negative
- Sent **fluconazole** to her pharmacy (on a Thursday)
    - **Medicaid denies fluconazole** (despite it being the *preferred formulary* option)

Case 1: The transition to ~~Cresemba~~ fluconazole

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- Tell her to **keep taking Cresemba** until gets fluconazole
  - Eventually gets **admitted to Ruby** because of symptoms & delay with the switch

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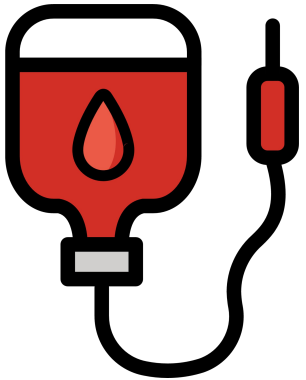
- Tell her to **keep taking Cresemba** until gets fluconazole
  - Eventually gets **admitted to Ruby** because of symptoms & delay with the switch
  - Got some **PO vanco**, but more importantly, got **PO fluconazole**
- Things got **better for her GI system**!!!

But then...

Case 1: Fluconazole doesn't play nice

60 y/o F with PMH including recent ***C glabrata*** **prosthetic aortic valve endocarditis**, afib (on **warfarin** & **dronedarone**), ESRD, severe pulm HTN (on 5L oxygen) s/p 6+ weeks of mica who **didn't Cresemba** (GI Sx) and is **now on fluconazole**

You can probably guess what happens...



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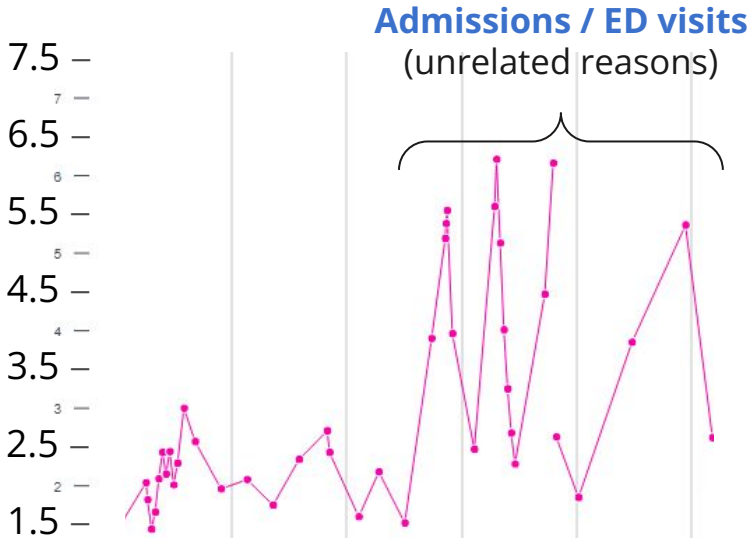

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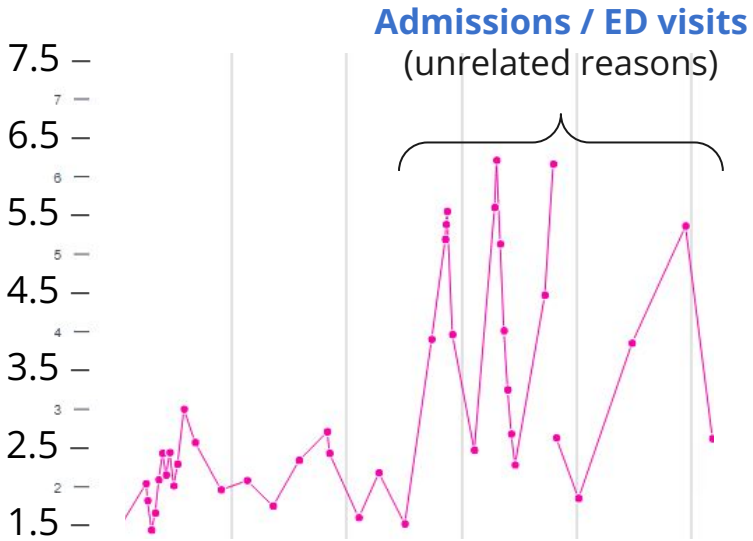
QTC Calculation	450	ms
QTC Calculation	486	ms



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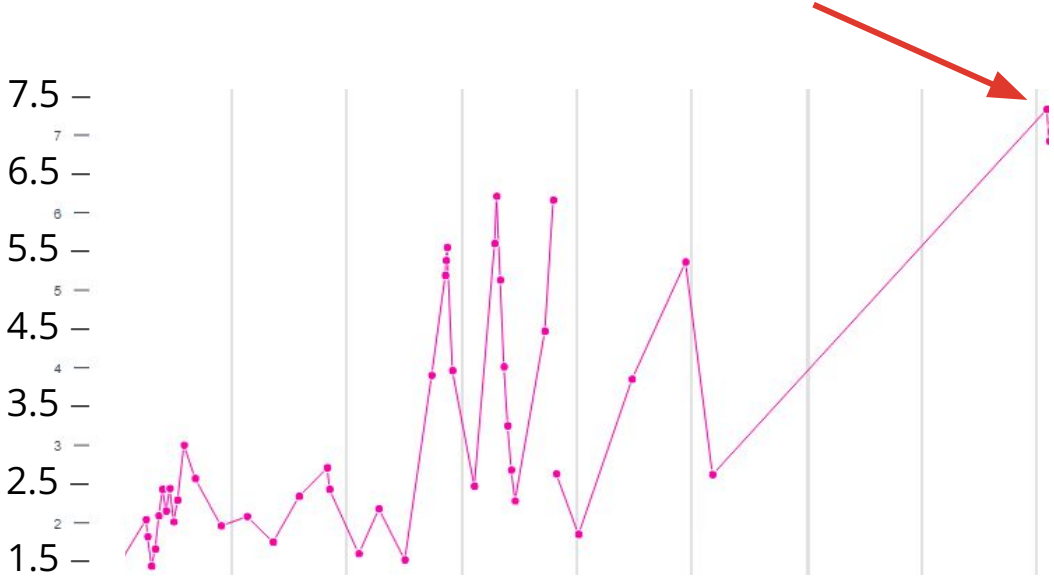
QTC Calculation	450	ms
QTC Calculation	486	ms
QTC Calculation	505	ms



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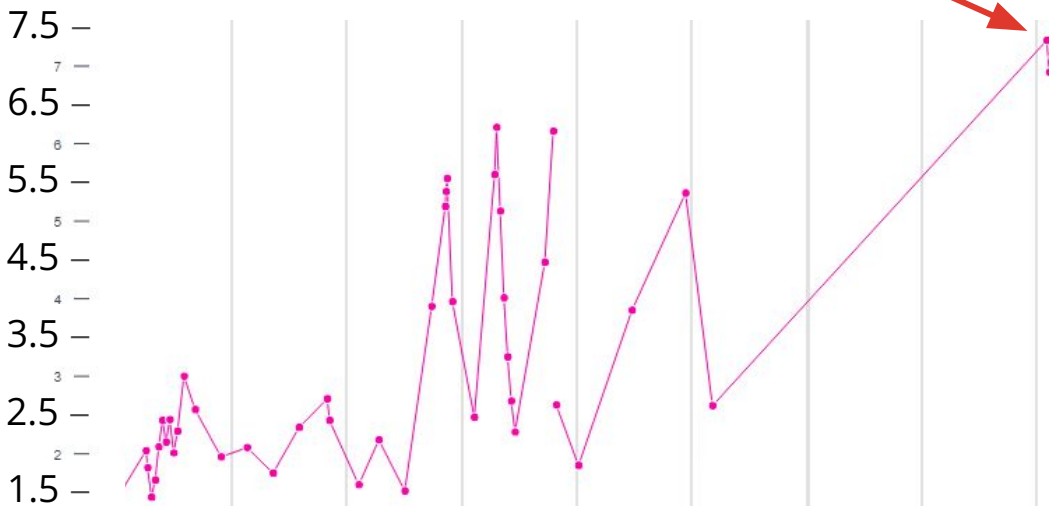
- Inpatient team switched **back to Cresemba**
- **Tolerated it well**



Case 1: Hospital course

Later in that admission, had a rapid clinical decline prompting **MICU transfer**

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- Acute on chronic **respiratory failure** → hypotension **requiring pressors**
  - Resp Biofire: **coronavirus HKU1**
  - All **other micro data was unrevealing** (including **negative blood cultures**)

Case 1: Hospital course

Later in that admission, had a rapid clinical decline prompting **MICU transfer**

- Acute on chronic **respiratory failure** → hypotension **requiring pressors**
  - Resp Biofire: **coronavirus HKU1**
  - All **other micro data was unrevealing** (including **negative blood cultures**)
- Given comorbidities, patient/family did not want escalation of care
- Eventually **CMO**

Case #2

Case 2: HPI

A **30 y/o F** with PMH including **substance use**, Hx tricuspid endocarditis **transferred with…**

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Case 2: Medical Hx

A **30 y/o F** with PMH including **substance use**, Hx tricuspid endocarditis **transferred with**

5 years ago - Ruby

- MRSA bacteremia
- 1.4 cm TV vegetation
- Left AMA (but came back later)
- Got TV repair (but then left AMA again)

MRSA native TV IE s/p repair

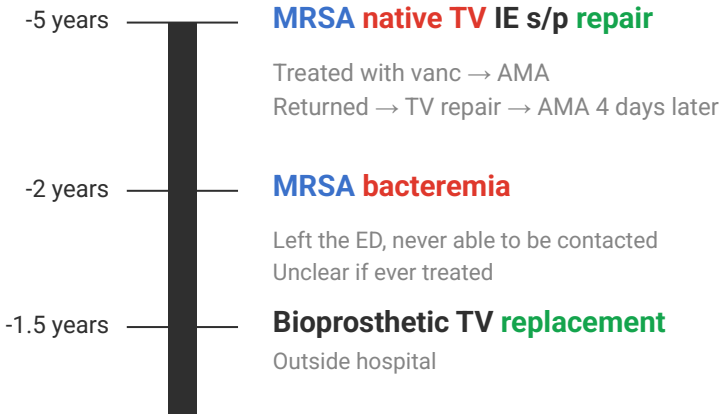
Treated with vanc → AMA
Returned → TV repair → AMA 4 days later

Case 2: Medical Hx

A **30 y/o F** with PMH including **substance use**, Hx tricuspid endocarditis **transferred with**

24 months ago - Satellite ED
- BCx in the ED grew MRSA
- Patient left before being admitted
- Never was able to get in contact with her

18 months ago - OSH
- Got Bioprosthetic TV replacement
- Details unclear

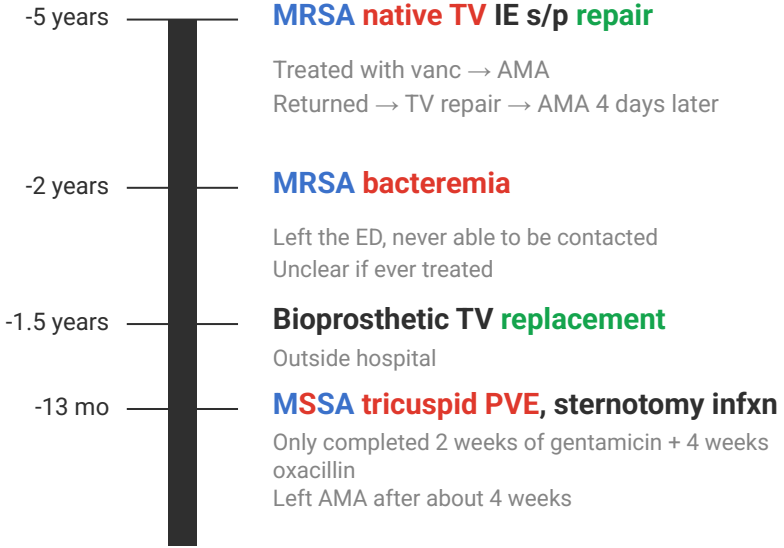


Case 2: Medical Hx

A **30 y/o F** with PMH including **substance use**, Hx tricuspid endocarditis **transferred with**

13 months ago - Ruby

- Sternotomy got infected
- MSSA bacteremia
  - TEE showed TV veggie
  - Also septic arthritis
- Plan for 6 week DOT
  - 2 weeks gentamicin + oxacillin
  - 4 weeks of oxacillin
- Left AMA before finishing last 2 weeks of oxacillin

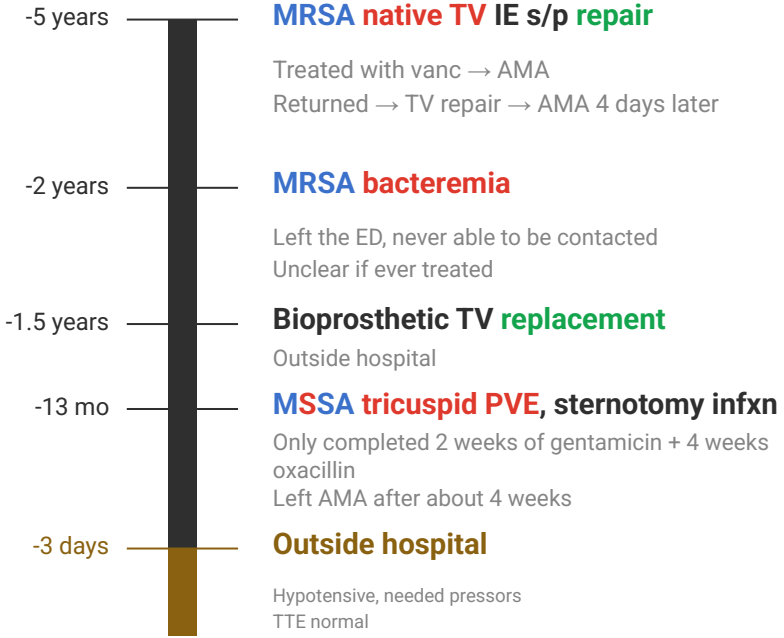


Case 2: Outside hospital

A **30 y/o F** with PMH including **substance use**, Hx tricuspid endocarditis **transferred with**

Review of outside records

- P/W chest pain
  - "Felt like prior episodes" of IE
- Admitted for 3 days
- Hypotensive, only needed levophed
- TTE normal
- Persistent fevers
- Blood cultures positive for…



Case 2: Micro data

30 y/o F with PMH including hx PWID, Hx native TV S. aureus IE **s/p TV replacement** (-1.5 yr), HCV who p/w "**feeling like prior IE**" and was admitted to OSH for 3 days with **MRSA bacteremia** & septic shock

	MRSA MIC	INTERP
AMP/SULBACTAM	<8/4	R*
AMOX/K CLAV'ATE	>4/2	R*
AZITHROMYCIN	>4	R
CEFAZOLIN	<8	R*
CEFTAROLINE	<0.5	S
CLINDAMYCIN	0.5	S
ERYTHROMYCIN	>4	R
GENTAMICIN	<4	S
LEVOFLOXACIN	<1	S
OXACILLIN	<0.25	R*
PENICILLIN(a)	>8	R*
RIFAMPIN(b)	<1	S
TETRACYCLINE	<4	S
TRIMETH/SULFA	<0.5/9.5	S
VANCOMYCIN	2	S

Case 2: Micro data

30 y/o F with PMH including hx PWID, Hx native TV S. aureus IE **s/p TV replacement** (-1.5 yr), HCV who p/w "**feeling like prior IE**" and was admitted to OSH for 3 days with **MRSA bacteremia** & septic shock

Fevering despite…

- Vancomycin
- Gentamicin
- Rifampin
- Ceftaroline

MRSA	MIC	INTERP
AMP/SULBACTAM	<8/4	R*
AMOX/K CLAV'ATE	>4/2	R*
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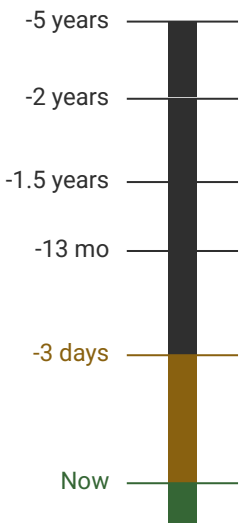
VANCOMYCIN	2	S

Case 2: Summary

30 y/o F with PMH including hx PWID, Hx native TV S. aureus IE **s/p TV replacement** (-1.5 yr), HCV who p/w "**feeling like prior IE**" and was admitted to OSH for 3 days with **MRSA bacteremia** & septic shock

Fevering despite...

- Vancomycin
- Gentamicin
- Rifampin
- Ceftaroline



MRSA

	MIC	INTERP
CEFTAROLINE	<0.5	S
CLINDAMYCIN	0.5	S
ERYTHROMYCIN	>4	R
GENTAMICIN	<4	S
LEVOFLOXACIN	<1	S
OXACILLIN	<0.25	R*
PENICILLIN(a)	>8	R*
RIFAMPIN(b)	<1	S
TETRACYCLINE	<4	S
TRIMETH/SULFA	<0.5/9.5	S
VANCOMYCIN	2	S

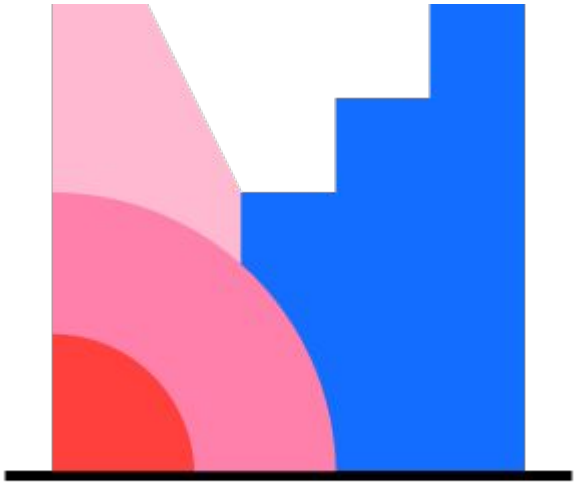
[Q2.1-3] Initial treatment

Initial treatment choice

(multiple choice)

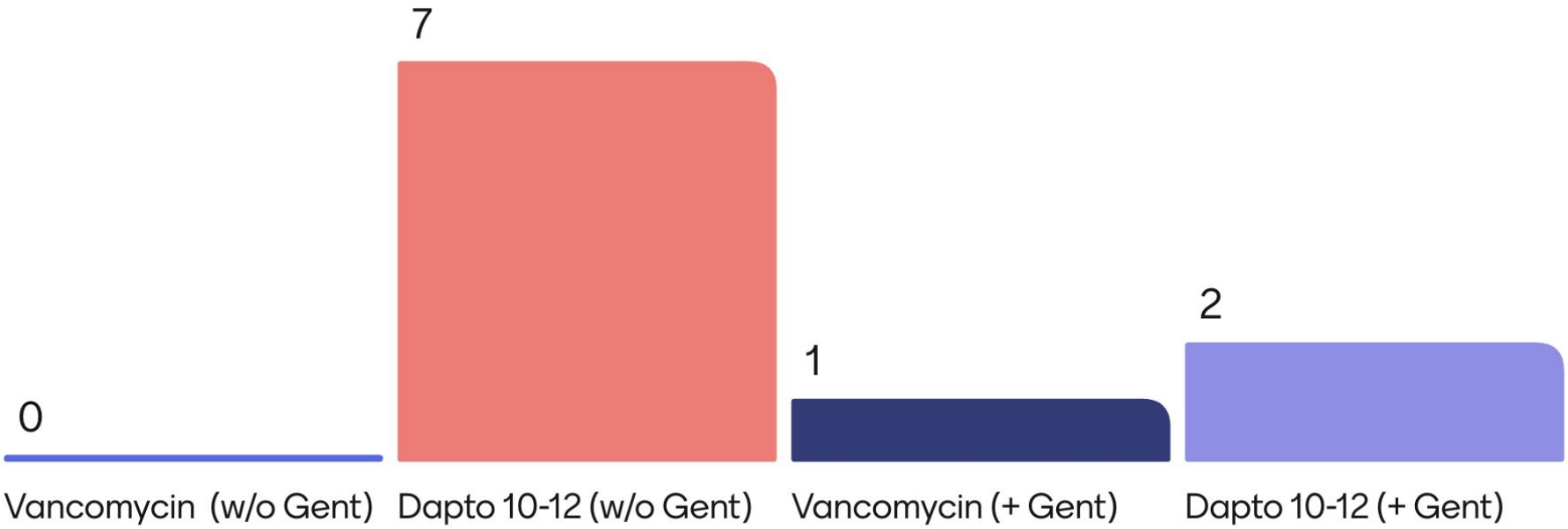
Part A: (vanc vs dapto) (+/- gent)

Part B: Additional agents (stratified by part A)



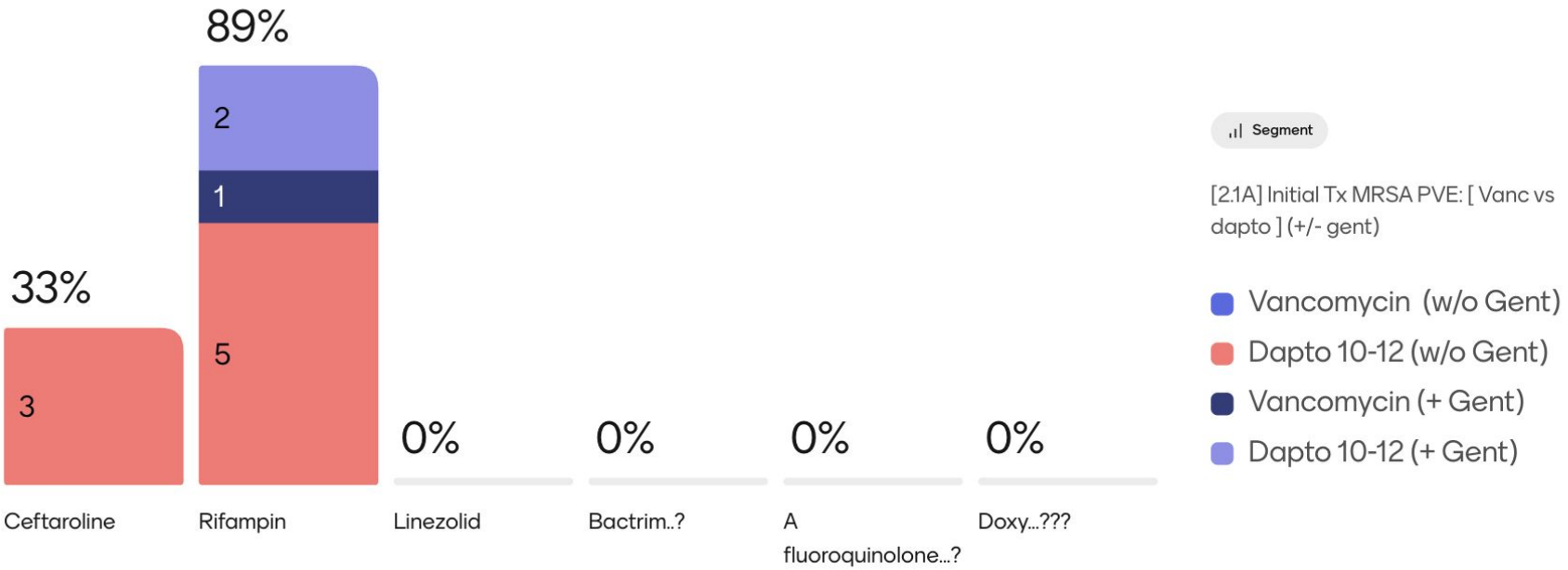
Recall: **Vanc MIC is 2**, we don't know about dapto MIC

[2.1A] Initial Tx MRSA PVE: [**Vanc vs dapto**] (**+/- gent**)



We don't know **if cultures have cleared**, assume no drug interactions

[2.1B] **Initial Tx** MRSA PVE: Any sides with your meal?

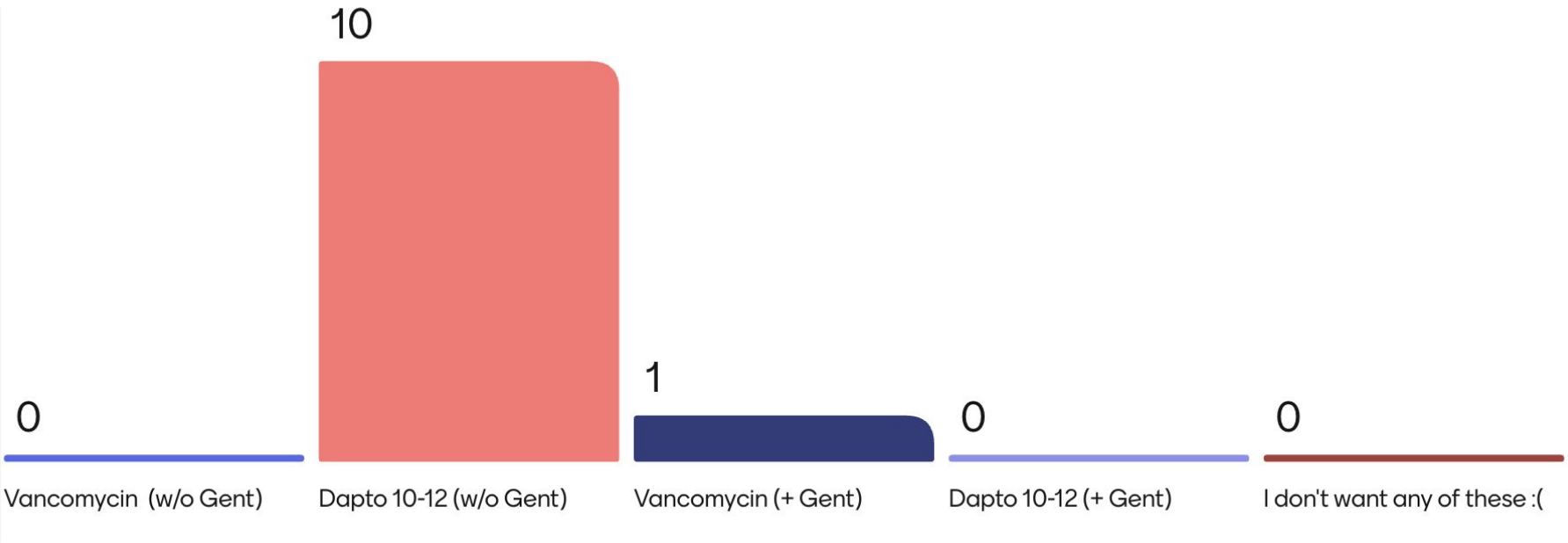


Oh I forgot one, minor detail

Did I mention that her **creatinine was 3.7**?

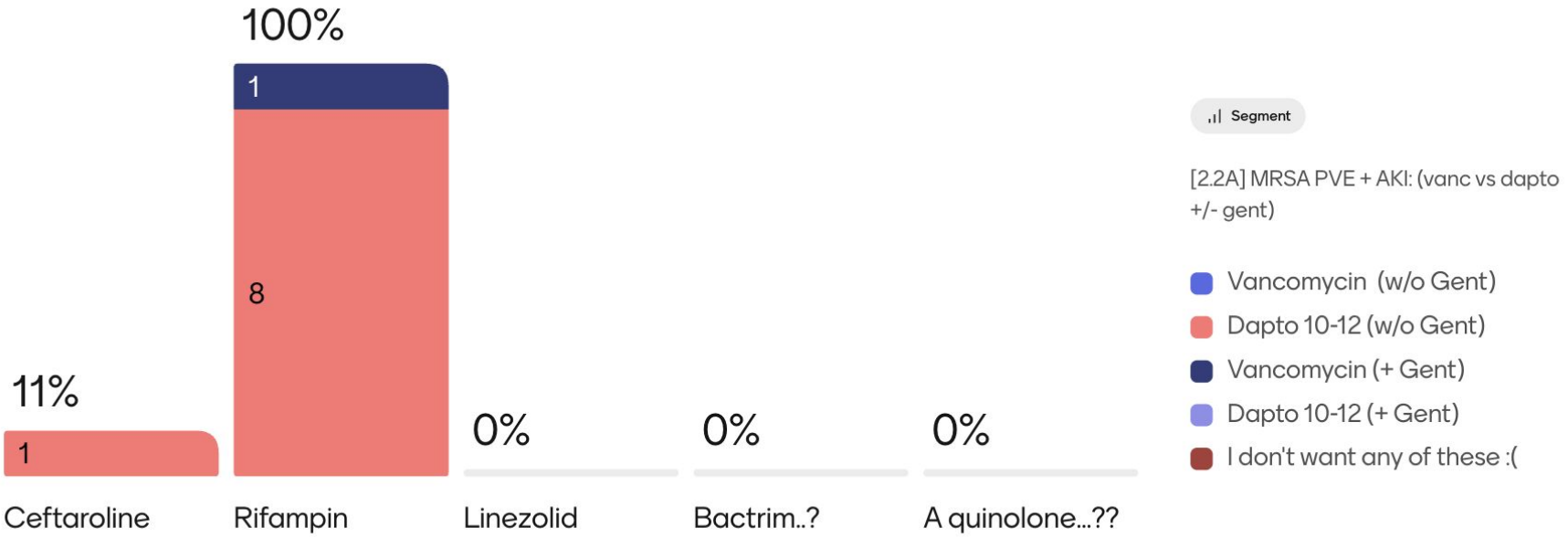
Recall: **Vanc MIC is 2**, we don't know about dapto MIC

[2.2A] MRSA PVE **+ AKI**: (vanc vs dapto +/- gent)



We don't know **if cultures have cleared**, assume no drug interactions

[2.2B] MRSA PVE + AKI: Any sides with your meal?



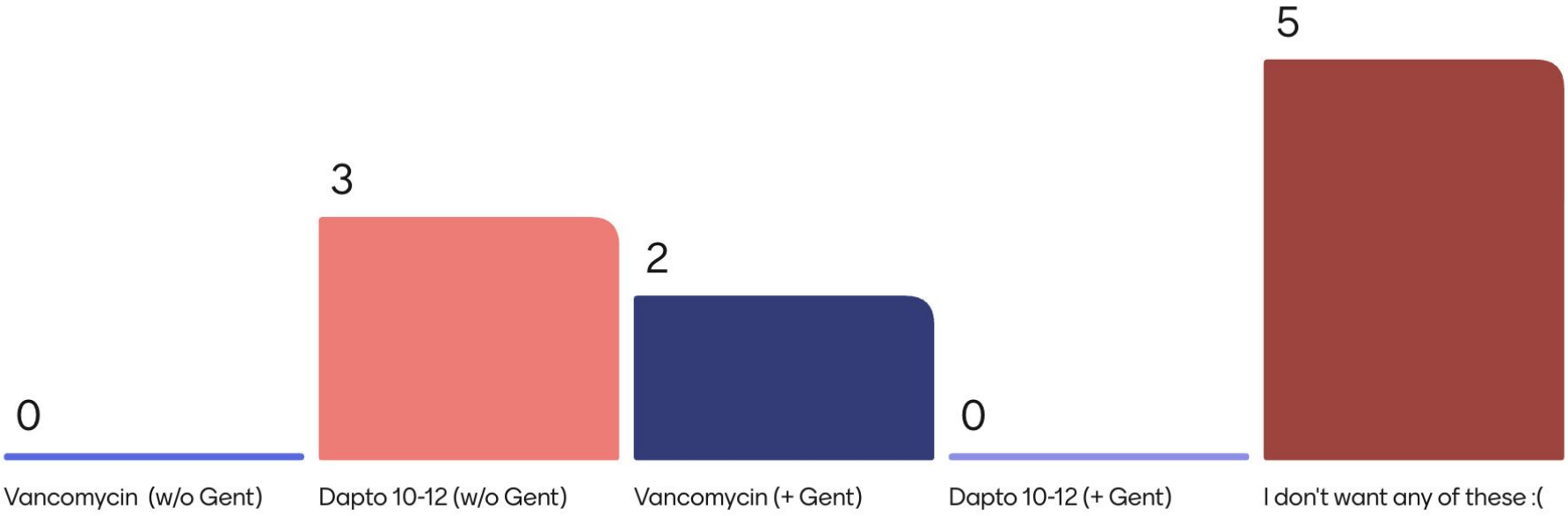
Sorry, I defiantly didn't chart review enough

What are we going to do about the **lobar pneumonia**?

The BAL had >100k cfu of MRSA...

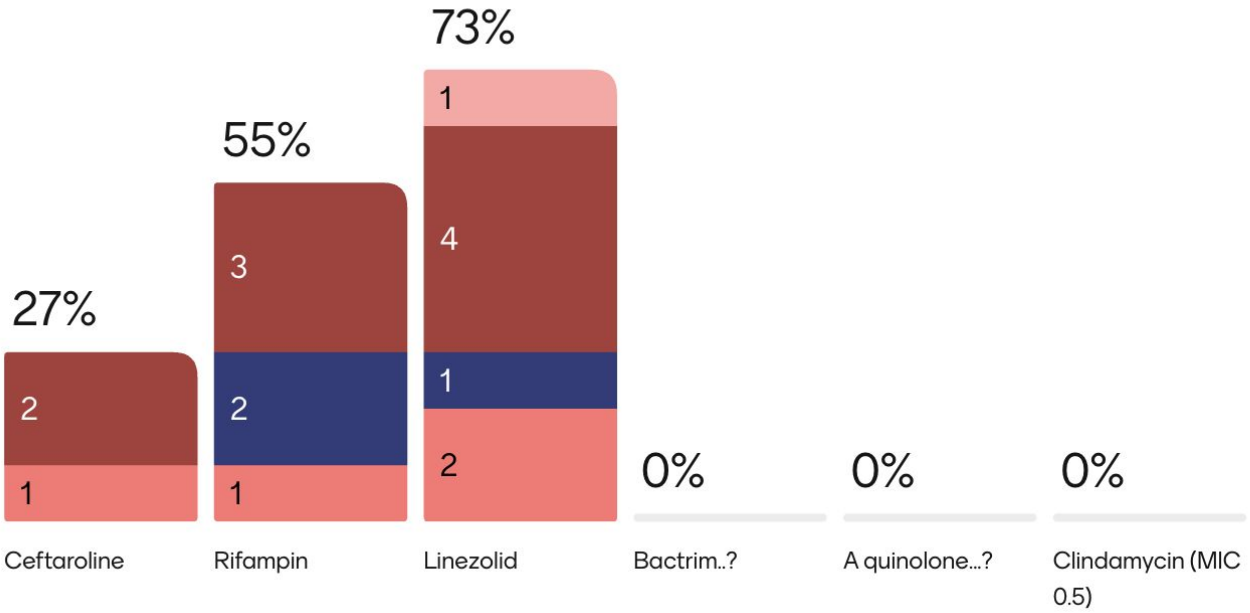
Recall: **Vanc MIC is 2**, we don't know about dapto MIC

[2.3A] MRSA PVE **+ AKI & PNA**: (vanc vs dapto +/- gent)



We don't know **if cultures have cleared**, assume no drug interactions

[2.3B] MRSA PVE **+ AKI + PNA**: Any sides with your meal?



Case 2: Hospital course

- Started on **vancomycin** & **gentamicin** on transfer to Ruby
    - Okay, so I may have **lied about the AKI** (but did have septic pulmonary emboli)

Case 2: Hospital course

- Started on **vancomycin** & **gentamicin** on transfer to Ruby
- Blood **cultures did clear** at OSF (on cultures collected prior to transfer)
    - I guess the kitchen sink approach does work!

Case 2: Hospital course

- Started on **vancomycin** & **gentamicin** on transfer to Ruby
- Blood **cultures did clear** at OSF (on cultures collected prior to transfer)
- **Added on rifampin** once blood cultures cleared

Ruby's lab	MIC	Susceptibility
Ceftaroline	KB	Susceptible
Daptomycin	1	Susceptible
Vancomycin	2	Susceptible
Linezolid	KB	Susceptible

Case 2: Hospital course

- Started on **vancomycin** & **gentamicin** on transfer to Ruby
- Blood **cultures did clear** at OSF (on cultures collected prior to transfer)
- **Added on rifampin** once blood cultures cleared
- TTE: Inconclusive

Case 2: Hospital course

- Started on **vancomycin** & **gentamicin** on transfer to Ruby
- Blood **cultures did clear** at OSF (on cultures collected prior to transfer)
- **Added on rifampin** once blood cultures cleared
- TEE: **Vegetation** on bioprosthetic *tricuspid* valve
  - Interestingly **no left sided endocarditis**

Case 2: Hospital course

- Started on **vancomycin** & **gentamicin** on transfer to Ruby
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- TEE: **Vegetation** on bioprosthetic *tricuspid* valve
  - Interestingly **no left sided endocarditis**
- Transferred to **Hospitalist 7**

But then...

Case 2: Hospital course

Transferred to **Hospitalist 7** → **AKI** on vanco + gent

Case 2: Hospital course

Transferred to **Hospitalist 7** → **AKI** on vanco + gent

- **Gentamicin stopped** **3 days early** due to AKI (see, I didn't totally lie!)

Case 2: Hospital course

Transferred to **Hospitalist 7** → **AKI** on vanco + gent

- **Gentamicin stopped 3 days early** due to AKI (see, I didn't totally lie!)
- Vanco switched to **dapto** (**at week 2.5** of Tx) for AKI as well
- **Rifampin stopped** here as well

Case 2: Hospital course

Transferred to **Hospitalist 7** → **AKI** on vanco + gent

- **Gentamicin stopped 3 days early** due to AKI
- Vanco switched to **dapto** (**at week 2.5** of Tx)
- **Rifampin stopped** here as well
- She **stayed for the full treatment** this time
- Discharged to Hope & Healing

Case 2: Hospital course

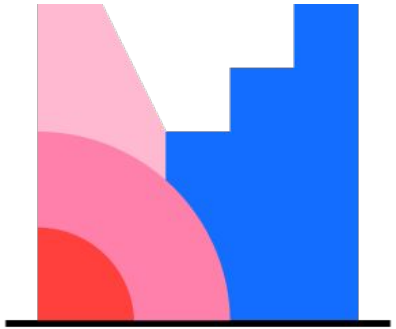
Transferred to **Hospitalist 7** → **AKI** on vanco + gent

- **Gentamicin stopped 3 days early** due to AKI
- Vanco switched to **dapto** (**at week 2.5** of Tx)
- **Rifampin stopped** here as well
- She **stayed for the full treatment** this time
- Discharged to Hope & Healing
- One week Zyvox → **PO suppressive doxycycline**

Case 2: A counterfactual

What would you do if doxycycline were *not* an option for suppression?

For the sake of argument, assume this applies to doxy & mino too



Mentimeter

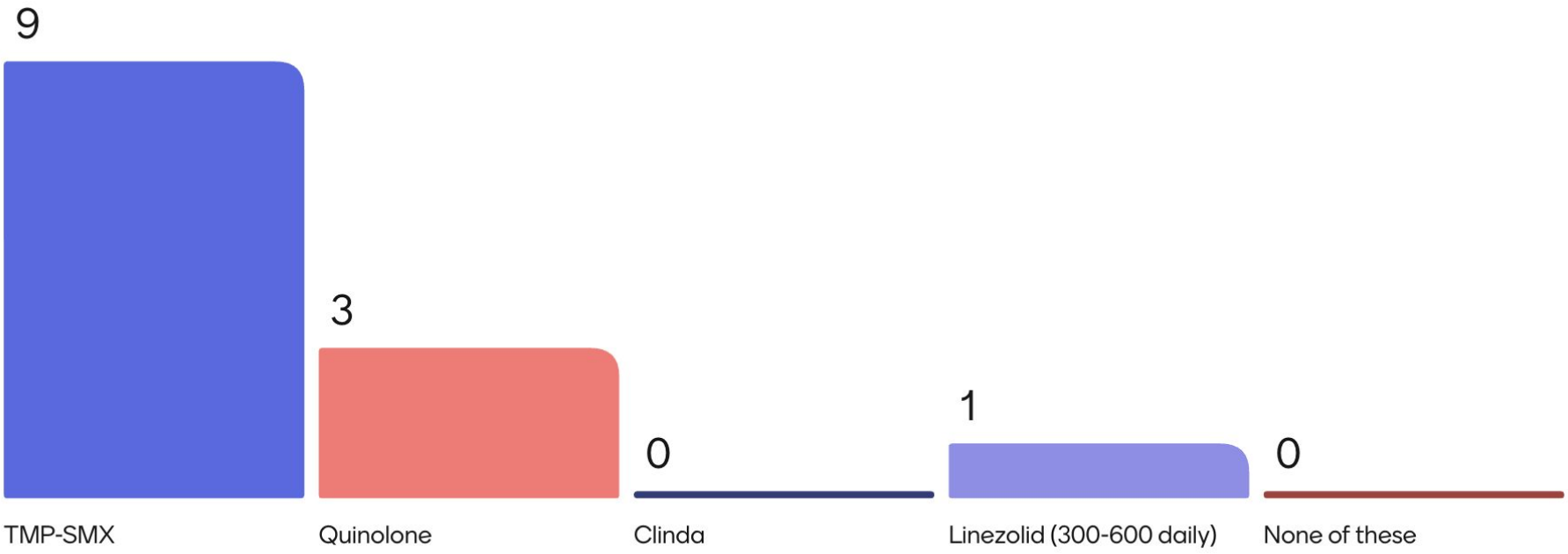
	MRSA MIC	INTERP
AMP/SULBACTAM	<8/4	R*
AMOX/K CLAV'ATE	>4/2	R*
AZITHROMYCIN	>4	R
CEFAZOLIN	<8	R*
CEFTAROLINE	<0.5	S
CLINDAMYCIN	0.5	S
ERYTHROMYCIN	>4	R
GENTAMICIN	<4	S
LEVOFLOXACIN	<1	S
OXACILLIN	<0.25	R*
PENICILLIN(a)	>8	R*
RIFAMPIN(b)	<1	S
TETRACYCLINE	>16	R
TRIMETH/SULFA	<0.5/9.5	S
VANCOMYCIN	2	S

[Q2.4] Suppression

MRSA suppression for endovascular infections

(multiple choice, all that apply)

[2.4] Oral suppression for MRSA endovascular infection



Discussion

Links to articles discussed here

Suppressive antimicrobial therapy in endocarditis

- Review the **current guidelines** for suppressive antimicrobial therapy (SAT) in endocarditis
  - This won't take long
- Examine **RCT & large prospective cohort studies** of SAT in endocarditis
- Appraise some **studies from France**

AHA / IDSA guidelines [1]

AHA / IDSA (2015)

A 2-phase treatment of fungal IE has evolved. The initial or induction phase consists of control of infection. Treatment includes a combination of a parenteral antifungal agent, usually an amphotericin B–containing product, and valve surgery. Valve surgery should be done in most cases of fungal IE. Results of a meta-analysis that included 879 cases of *Candida* IE demonstrated a marked reduction in death (prevalence odds ratio, 0.56; 95% confidence interval, 0.16–1.99) among those who underwent adjunctive valve surgery.[244] In addition, patients who were treated with combination therapy including amphotericin B and flucytosine had reduced mortality compared with those who received antifungal monotherapy.

AHA / IDSA guidelines [1]

AHA / IDSA (2015)

Antifungal therapy usually is given for >6 weeks. After completion of this initial therapy, long-term (lifelong) suppressive therapy with an oral azole is reasonable.[243,244,246] Suppressive therapy has been used in 2 populations. First, because of the high relapse rate of fungal IE and the prolonged

AHA / IDSA guidelines [1]

AHA / IDSA (2015)
Suppressive therapy has been used in 2 populations. First, because of the high relapse rate of fungal IE and the prolonged delay (years in some cases) in relapse, oral azoles have been administered after combined medical and surgical induction therapy. In a second population with fungal IE, lifelong oral

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AHA / IDSA (2015)

Suppressive therapy has been used in 2 populations. First, because of the high relapse rate of fungal IE and the prolonged delay (years in some cases) in relapse, oral azoles have been administered after combined medical and surgical induction therapy. In a second population with fungal IE, lifelong oral antifungal suppressive therapy has been given to patients who respond clinically to induction medical therapy but are not deemed appropriate surgical candidates for valve replacement for attempted infection cure. Anecdotal case series[243,245] indicate that IE has been successfully suppressed for months to years. A meta-analysis that included 64 reported patients with

European Society of Cardiology [2]

ESC (2023)

7.11. Fungi

Fungi are most frequently observed in PVE and in IE affecting PWID or immunocompromised patients.[386] *Candida* and *Aspergillus* spp. predominate, the latter resulting in BCNIE.[387,388] Mortality is very high (>50%), and treatment necessitates combined antifungal administration and with a low threshold for surgery.[278,387,388] Antifungal therapy for *Candida* IE in-

European Society of Cardiology [2]

ESC (2023)

and treatment necessitates combined antifungal administration and with a low threshold for surgery.[278,387,388] Antifungal therapy for *Candida* IE includes an echinocandin at high doses or liposomal amphotericin B (or other lipid formulations) with or without flucytosine. for *Aspergillus* IE, voriconazole is the drug of choice. Some experts recommend the addition of an echinocandin or amphotericin B.[278,387–390] Suppressive long-term treat-

European Society of Cardiology

ESC (2023)

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European Society of Cardiology [2]

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Strong wording!

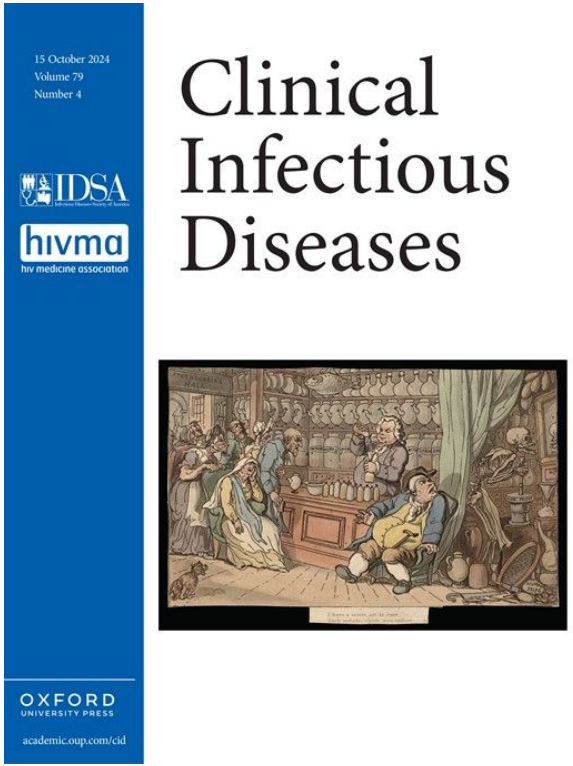
Suppressive antimicrobial therapy in endocarditis

- Review the **current guidelines** for suppressive antimicrobial therapy (SAT) in endocarditis
- Examine **RCT & large prospective cohort studies** of SAT in endocarditis
    - This won't take long either as **there aren't any**
- I guess we are left talking about **large case series** then...

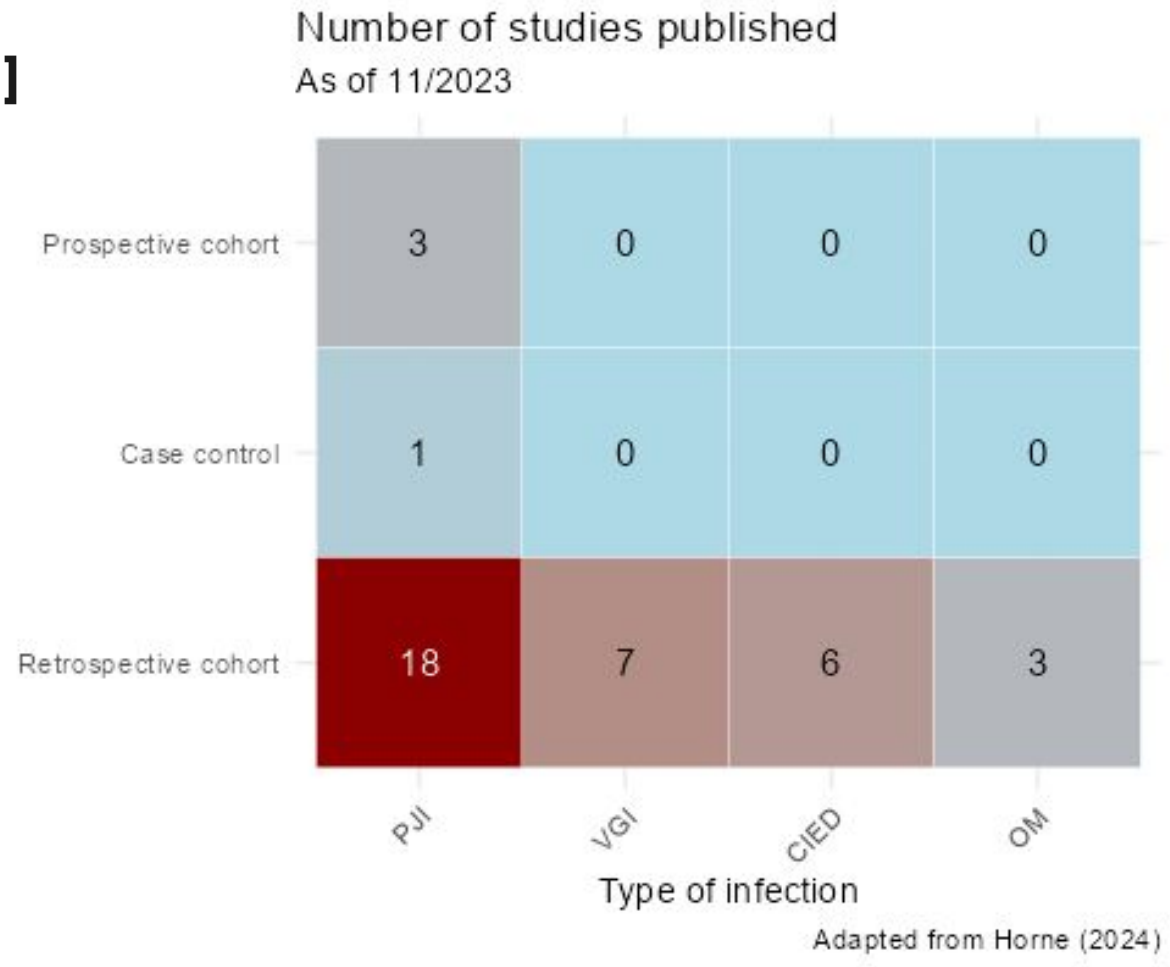
Horne et al, 2024 [3]

Good review on “The Use of Long-term Antibiotics for Suppression of Bacterial Infections”

- It won’t tell you anything you don’t already know
- It’s a review, not a *systematic* review



Horne et al, 2024 [3]

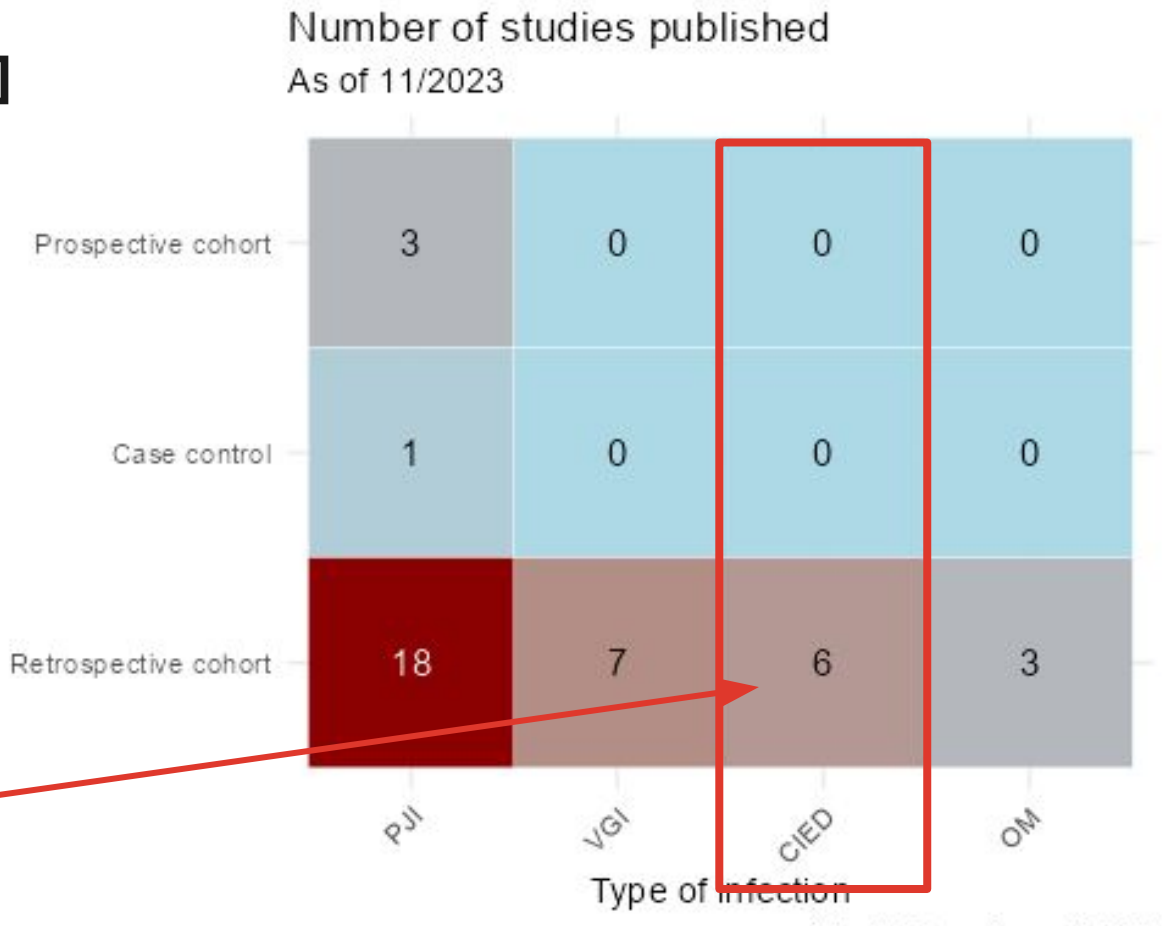


Adapted from Horne (2024)

Abbreviations:

- **PJI** = Periprosthetic Joint Infections
- **VGI** = Vascular Graft Infections
- **CIED** = Cardiac Implantable Electronic Device Infections
  - ***Most are LVADs***
- **OM** = Osteomyelitis and Spinal Hardware Infections

Horne et al, 2024 [3]



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Suppressive antimicrobial therapy in endocarditis

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- Examine **RCT & large prospective cohort studies** of SAT in endocarditis
- I guess we are left talking about **large case series** then…

French studies (Beaumont, Lemmet)

In France, they have **multidisciplinary endocarditis teams** (METs) at many of their tertiary care centers

- Comprised of infectious diseases, cardiology, surgery, radiology, pharmacy, and other specialists (e.g. microbiology, neurology)
- Have regularly scheduled meetings (like **tumor board for IE**)

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- Comprised of infectious diseases, cardiology, surgery, radiology, pharmacy, and other specialists (e.g. microbiology, neurology)
- Have regularly scheduled meetings (like **tumor board for IE**)

functional status she is a prohibitive risk for any cardiac surgical intervention. We recommend continuing antifungals per ID recommendations along with life long suppression. Can also consider follow up with cardiology after completion of IV antifungals with repeat TTE, no need for SCT follow up.

French studies (Beaumont, Lemmet)

In France, they have **multidisciplinary endocarditis teams** (METs) at many of their tertiary care centers

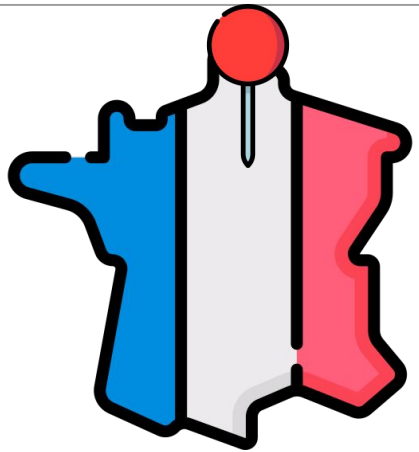
- Comprised of infectious diseases, cardiology, surgery, radiology, pharmacy, and other specialists (e.g. microbiology, neurology)
- Have regularly scheduled meetings (like **tumor board for IE**)

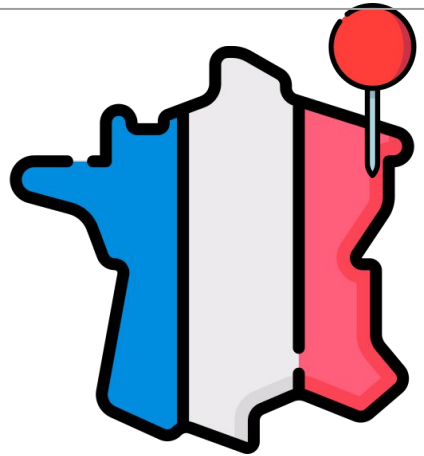
Relevance for this literature review:

- They keep **large registries** of their patients
- **Less intra-consultant variability** on management decisions

French studies

	Beaumont, 2024	Lemmet, 2024
Timeframe	**Paris**, France (2016-2022)	**Strasbourg**, France (2020-2023)
Design	**Descriptive** case series from **single referral centers** in France	





French studies

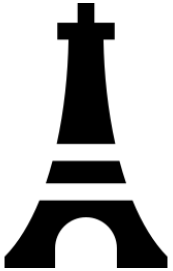
	Beaumont, 2024	Lemmet, 2024
Timeframe	**Paris**, France (2016-2022)	**Strasbourg**, France (2020-2023)
Design	**Descriptive** case series from **single referral centers** in France	
Inclusion	**Finished initial therapy**, were recommended to start **SAT** (& started it); Could be native -or- prosthetic valve IE -or- CIED	
Dx criteria	Definite or possible IE via 2023 Duke-ISCVID criteria	IE based on 2023 ECS criteria
Exclusion	LVADs, vascular graft, Q fever	---

Abbreviations
SAT = Suppressive antimicrobial therapy
IE = Infective endocarditis
CIED = Cardiac implantable electronic device

French studies

	Beaumont (Paris, 2016-2022)	**Lemmet** (Strasbourg, 2020-2023)
Patients	IE or CIED (**n=42**)	IE or CIED (**n=22**)
Outcomes	Mortality Relapse (infection with same pathogen) Side effects of SAT	
Duration of follow up	3 years	2 years
Other notes	Supplemented **mortality analysis with a national database** to capture out of hospital deaths (but couldn't ascertain reason for death)	

Beaumont (2024): Demographics [4]

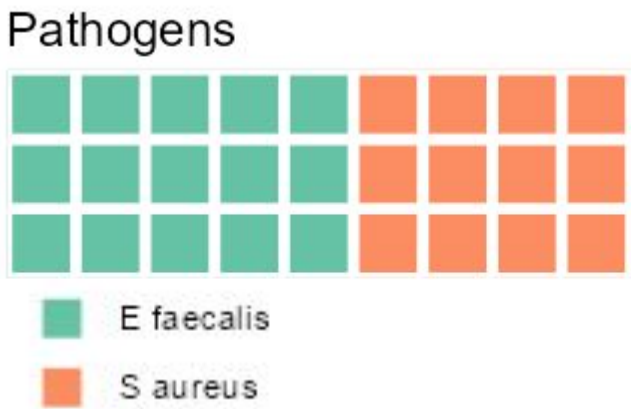


- **42 patients** included
  - Majority **male** (86%)
  - Median **age 73** (IQR 61-82)
  - High charlson comorbidity index **median = 3**
- **95%** had at **least one prosthetic** cardiac device
- Only **one PWID** (person who injects drugs)

Beaumont (2024): Pathogens [4]

All 42 cases were **community-acquired**

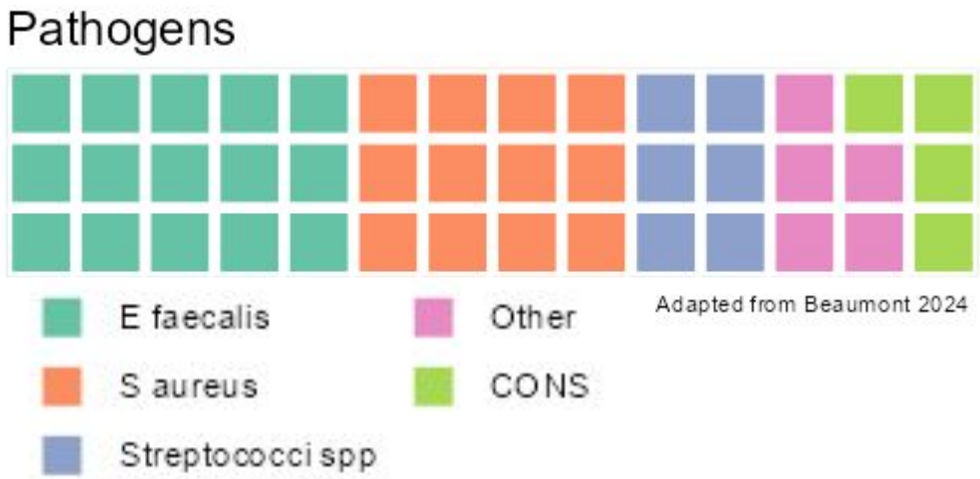
- Enterococcus faecalis (36%)
- Staphylococcus aureus (29%)
    - **11 of these 12 cases** were **MSSA**



Beaumont (2024): Pathogens [4]

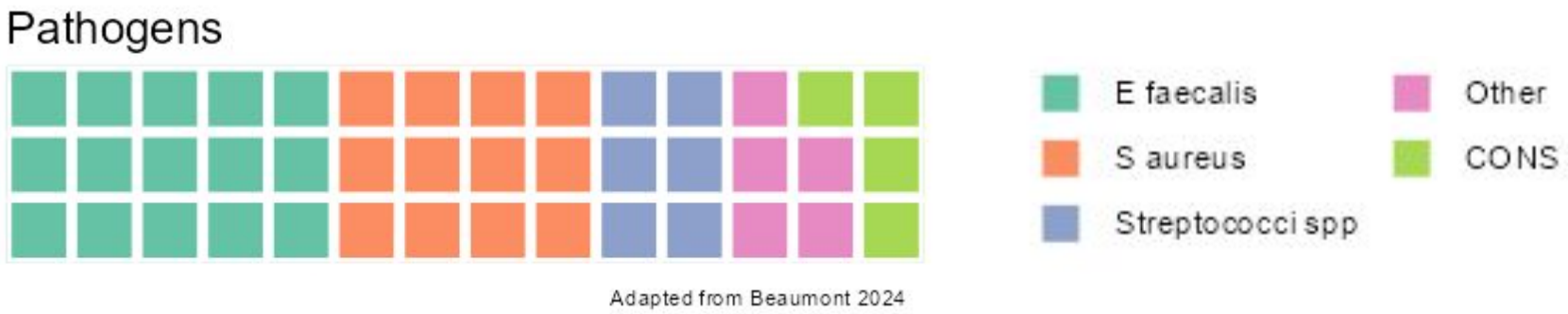
All 42 cases were **community-acquired**

- Enterococcus faecalis (36%)
- Staphylococcus aureus (29%)
  - **11 of these 12 cases** were **MSSA**
- Streptococci spp (14%)
- Coagulase-negative staph (9%)
- Other (12%)
  - Only one (2%) fungal (C albicans)
  - Only one (2%) gram negative (ESBL E cloacae; Tx w/ mino)

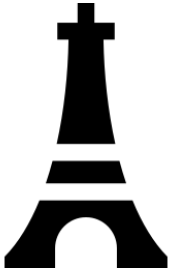


Beaumont (2024): Suppressive agents [4]

- Doxycycline (**45%**)
- Amoxicillin (**45%**)
- Bactrim (**5%**, n=2)
- Fluconazole & minocycline (**2%**, n=1)



Beaumont (2024): Surgical indications [4]



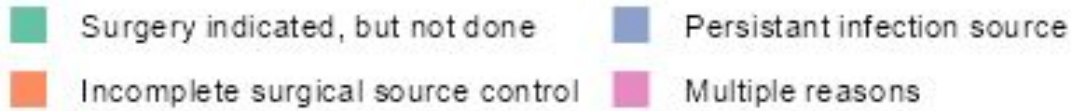
38/42 cases (**90%**) had a theoretical **indication for surgery**

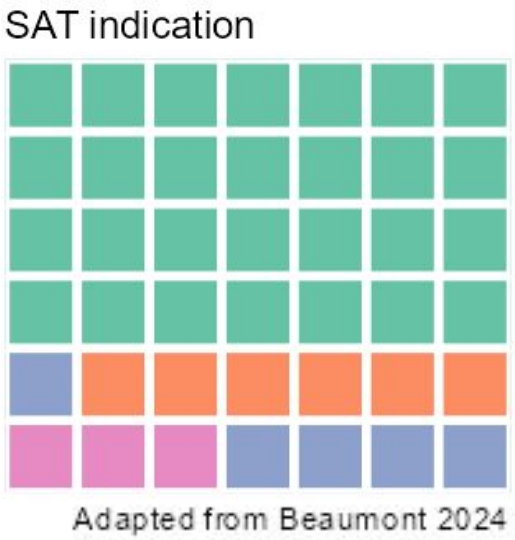
- 50% of the indicated surgeries were valvular
- 42% CIED extraction
  - Extraction considered surgical as ¾ had material implanted ≥4 years
  - High risk of conversion to sternotomy
- 8% had both indications

Beaumont (2024): SAT indications [4]

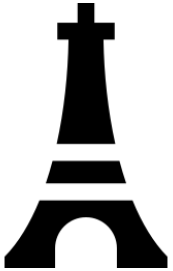
Suppressive antimicrobial therapy (**SAT**) indications:

- Surgery theoretically indicated but not done (**67%**)
- Had surgery, but incomplete source control (**14%**)
- Persistent infection source (**12%**)
- Multiple reasons (**7%**)





Beaumont (2024): Side effects [4]



12% had **adverse events** of SAT **at 1 year** (Kaplan-Meier estimator)

- Most **side effects were mild**, without therapy interruption

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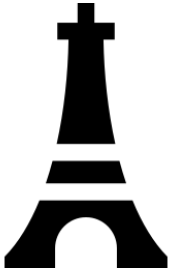

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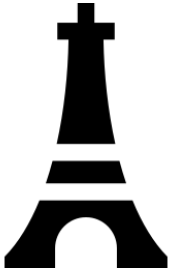

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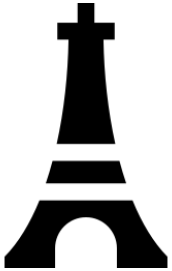
Severe AEs

- The only severe adverse event was AKI
  - From **Bactrim** (big surprise)
- Resolved after stopping (switched to doxy + Augmentin)
- Recall, *only two patients received bactrim*

Beaumont (2024): Interruption & compliance [4]



13% had **interruption** of SAT **at 1 year** (Kaplan-Meier estimator)

- **Two thirds were inadvertent** (SAT was discontinued because of oversight regarding the indication)
- None resulted in recurrence

12% of patients had **poor compliance** (judged by the EMR)

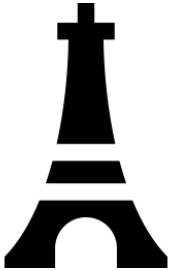
Beaumont (2024): Recurrence [4]

Two had reinfections (4.8%, 1 in 21)

1. One was a transplant patient
    - CRBSI with S epi → switched to mino
2. One was the PWID
    - Reinfected with group B strep

Terms used here

Relapse = Infection with same pathogen
Reinfection = Infection w/ another pathogen
Recurrence = Relapse + reinfection



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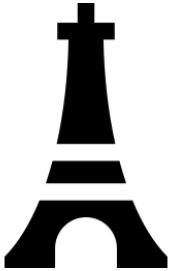

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PWID (only one in this cohort)

- Had an index infection with *S epi*
- Tx with Bactrim
  - Not the AKI patient
- PVE (aortic & mitral) + CIED
- They were the only death that could be attributed to infection
  - *More on this later*

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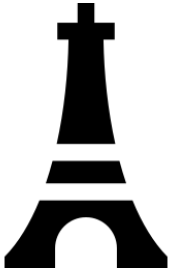

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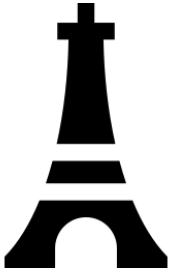

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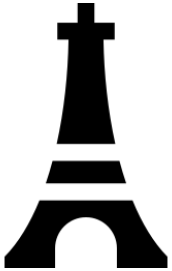

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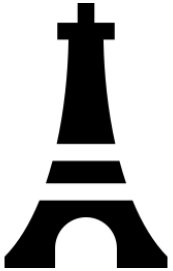

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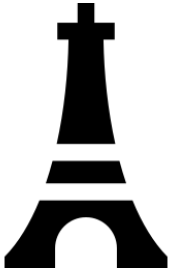

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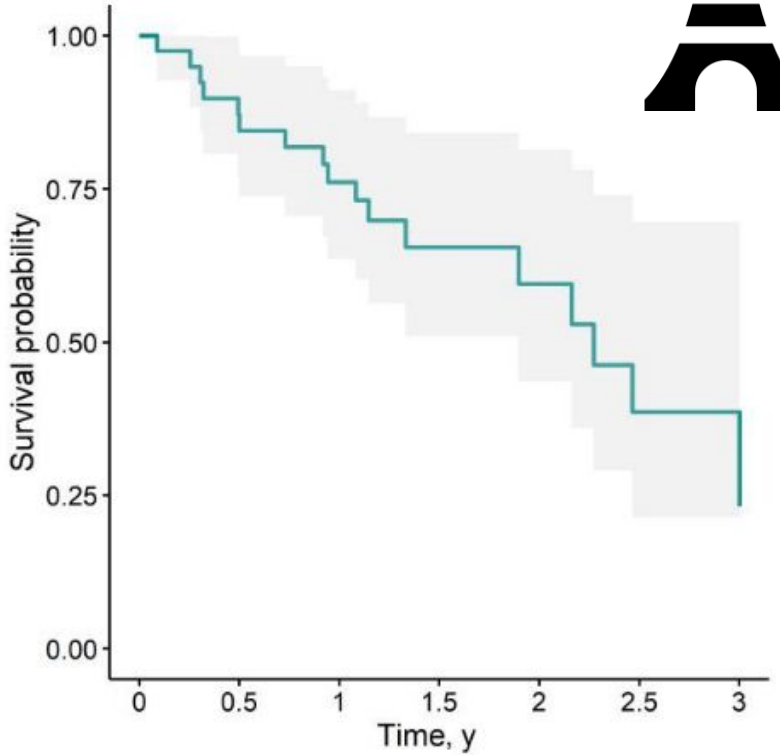
Strange thing is…

All of the isolates from **relapses** were **still susceptible to their SAT**, but had developed **resistance** to the **induction therapy**

Beaumont (2024): Mortality [4]

84.3% 1 year survival (Kaplan-Meier estimator)

- **One in three died** during follow-up
  - Median time to mortality **13.5 months** (IQR 6.7 - 25.3)



Beaumont (2024): Mortality [4]

84.3% 1 year survival

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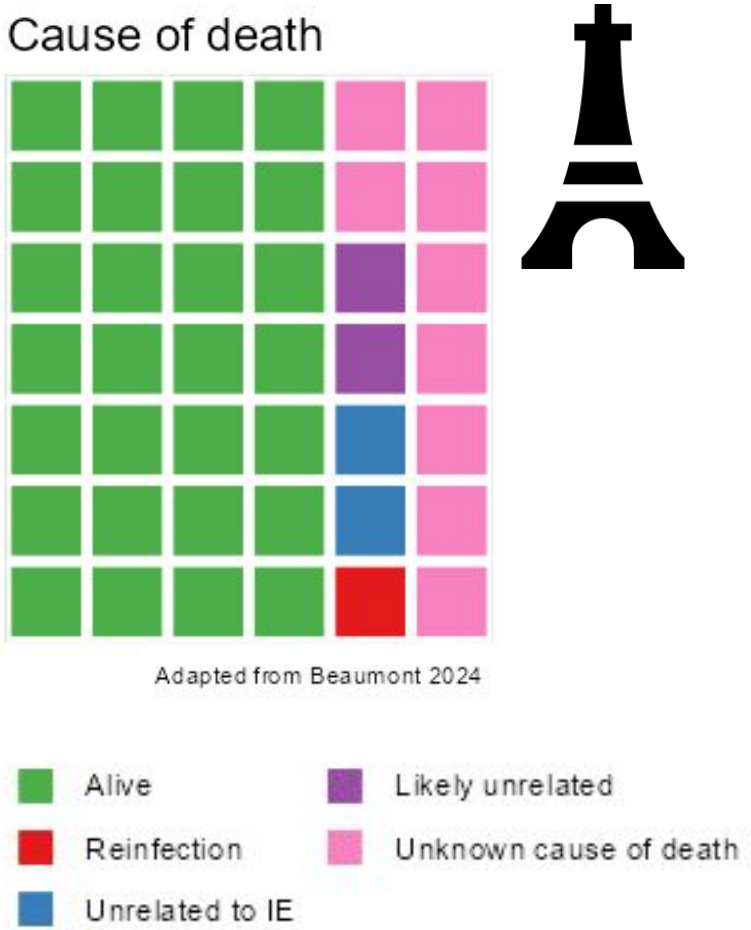
  - Median time to mortality **13.5 months**

Of the **five deaths documented** in EMR (9 unknown causes of death)

- **One** died from **reinfection** (PWID)
- **Two** died from **unrelated causes**
- **Two** died from **likely unrelated causes**
  - i.e. end-stage heart failure, without any bacterial documentation on blood cultures



French studies

	Beaumont (Paris, ‘16-22) **n=42**	**Lemmet** (Strasbourg, ‘20-23) **n=22**
Timeframe	**Paris**, France (2016-2022)	**Strasbourg**, France (2020-2023)
Design	**Descriptive** case series from **single referral centers** in France	
Inclusion	**Finished initial therapy**, were recommended to start **SAT** (& started it); Could be native or prosthetic valve	
Dx criteria	Definite or possible IE -or- CIED via 2023 Duke-ISCVID criteria	IE based on 2023 ECS criteria
Follow up	3 years	**2 years**
Outcomes	Mortality Relapse Side effects of SAT	

Lemmet (2024): Similarities & differences [5]

Similarities

- Similar rates & types of prosthetic devices
- Same rate of surgery being indicated but not done (90%)
  - For similar reasons
- Similar rates of inadvertent disruption in SAT

Differences

Lemmet had:

- Higher CCI: Mean of 6.6 (vs median of 3)
- About 5 years older
- **No PWID**

Pathogens	Beaumont	Lemmet
Enterococcus spp	15 (36%)	6 (27%)
Staph aureus	12 (29%)	6 (27%)
Streptococcus spp	6 (14%)	5 (23%)
CONS	4 (9%)	4 (18%)
Fungal	1 (2%)	0
Gram negative	1 (2%)	1 (4.5%)

Lemmet (2024): Suppressive agents [5]

Amoxicillin (**41%**) - Used for all *E faecalis* (n=4) & *Strep spp* (n=5)

Doxy (**13%**) - Staph (both S aureus & S epi)

Clinda (**4.5%**, n=1) - Staph aureus

Parenteral agents (**4.5%**, n=1) - Teicoplanin (given after HD for *E faecium*)

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Parenteral agents (**4.5%**, n=1) - Teicoplanin (given after HD for *E faecium*)

Bactrim (**32%**, n=7) - Mainly for Staph (both S aureus & S epi)

- The **median age** for Bactrim patients is **88 years old**!
- They've have a 88 years old on 1 DS BID for over 14 months
- Over half of their cohort has CKD (not on HD)

Lemmet (2024): Side effects [5]

14% (n=3) had **side effects** from SAT

1. **Rash** attributed to **Bactrim** (non-severe) at day 8
    - Switched to Doxy
2. **Elevated LFTs** attributed to **Bactrim**
3. **Tooth discoloration** attributed to **amoxicillin**
    - Switched to Bactrim

Lemmet (2024): Recurrence & Mortality [5]

Two patients (**9%**) had **recurrence**

1. **E. faecium** (native MV) on **Bactrim SS daily** @16 months
    - Thought to be from cholangitis
2. **MSSA** (CIED) on **Bactrim SS daily** @10 months

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75% 1 year survival (Kaplan-Meier estimator)

- **Four deaths** were **unrelated** to IE
- One was unknown

Learning points & take aways

Learning points & take aways

- **Data on SAT** (suppressive antimicrobial therapy) for **prosthetic valve endocarditis is lacking**, to say the least
- **Multidisciplinary Endocarditis Teams** (METs) are used in France, would maybe not be a bad idea here too
- Observational data implies **high mortality risk** in these **comorbid patients**
  - **Often unrelated to their endocarditis** (but perhaps related to why they are not surgical candidates)
- **Side effects & disruptions in SAT** are common
  - Side effects often mild
  - Disruptions often unintentional, but some folks do fine off of SAT
- Some places in **France must really like Bactrim** (Cotrimoxazole)
  - They gave Bactrim 1 DS BID to an **88 year old** (who likely had CKD!)

Slides available on hunterratliff1.com/talk/; Citations available via QR code or via the "citations" button on the website

Case #3

Case 3: HPI

A **35 y/o M** with PMH including opiate use disorder (PWID, with recent relapse), multiple episodes of mitral valve endocarditis (MRSA **8 years ago** s/p repair of native MV; E faecalis s/p repair & annuloplasty **2.5 years ago**)

- Clinic follow up for ***Serratia marcescens*** **bacteremia**
- TEE: 1.5 cm vegetation on **prosthetic MV ring**, c/w a prosthetic ring vegetation

Allergies
Sulfa: Urticaria

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Worried about long term side effects from antibiotics (understandably)

Susceptibility

	Serratia marcescens			
	MIC SUSCEPTIBILITY		PHENO MIC SUSCEPTIBILITY	
Amikacin			<=4 mcg/mL	Sensitive
Amoxicillin/clavulanate		Resistant		
Ampicillin		Resistant		
Aztreonam			2 mcg/mL	Sensitive
Cefazolin		Resistant		
Cefepime			<=1 mcg/mL	Sensitive
Ceftazidime			<=1 mcg/mL	Sensitive
Ceftriaxone			1 mcg/mL	Sensitive
Ciprofloxacin			<=0.25 mcg/mL	Sensitive
Gentamicin			<=1 mcg/mL	Sensitive
Levofloxacin	<=0.12 mcg/mL	Sensitive		
Piperacillin/Tazobactam			<=4 mcg/mL	Sensitive
Tetracycline	>=16 mcg/mL	Resistant		
Tobramycin			8 mcg/mL	Intermediate
Trimethoprim/Sulfamethoxazole	<=20 mcg/mL	Sensitive		