

# DFI Pre-Post Intervention

Joanne Huang, PharmD

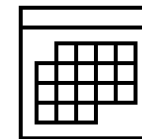
Sept 1, 2026

# Objectives

- Share DFI data from a single-center community hospital.
- Discuss strategies to make data visually interesting.

# Background

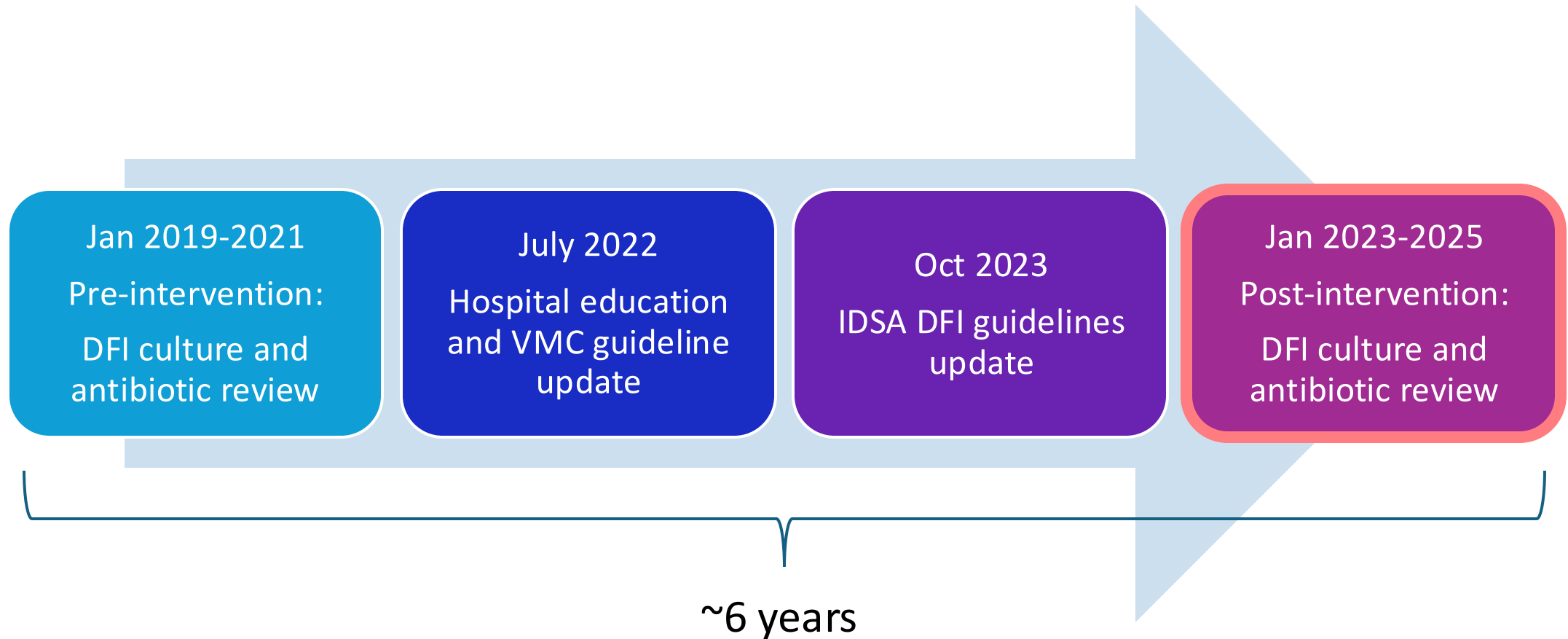
- DFI updates: See Whitney's lecture 1/27/26
- IDSA DFI 2012:
  - OPIDIA study – DFI outcomes in ~300 patients
    - 40% with prior DFI history
    - <30% infection free long term, ~50% requiring lower limb amputation
- Preventative care:
  - Diabetes management – BP, A1c, other modifiable goals
  - Annual foot exams at minimum
    - Higher risk – foot exams every 3-6 months



Richard JL, Lavigne JP, Got I, et al. Management of patients hospitalized for diabetic foot infection: results of the French OPIDIA study. Diabetes Metab. 2011 Jun;37(3):208-15.

McDermott K, Fang M, Boulton AJMet al. Etiology, Epidemiology, and Disparities in the Burden of Diabetic Foot Ulcers. Diabetes Care. 2023 Jan 1;46(1):209-221.

# Pre-Post Timeline



DFI = diabetic foot infection

# Methods

## Inclusion

- Adults w/ ICD-10 for both DFI and diabetes mellitus
- Admitted for DFI between Jan 1, 2023 – Jan 1, 2025

## Exclusion

- $\leq 72$ h empiric or total antibiotics
- Allergy to any penicillin or cephalosporin
- Concomitant infection in addition to DFI during admit
- Moved to comfort care or passed away during follow up
- Left AMA

# Outcomes

## Primary

- Adherence to VMC DFI guidance with use of anti-PSA
- Use of piperacillin-tazobactam and ceftriaxone hospital-wide

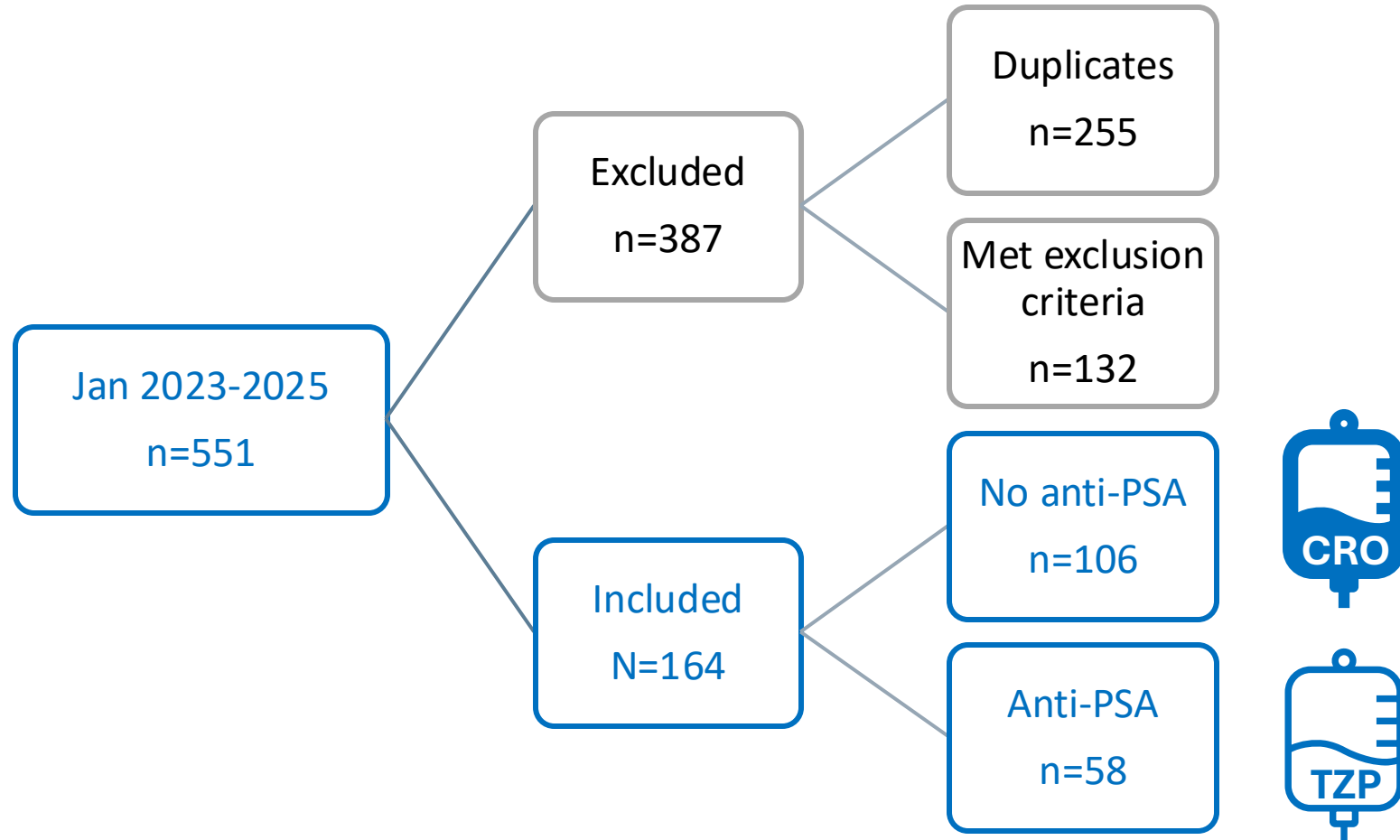
## Secondary

- Appropriate deviations from guidelines
- Culture-driven escalation
- CCU transfer
- 30 and 90-day readmission related to DFI

anti-PSA = anti-Pseudomonal

CCU = critical care unit

# Results



# Baseline Characteristics

|                                                      | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|------------------------------------------------------|-----------------------|-------------------|
| Male sex, n (%)                                      | 85 (80.2)             | 45 (77.6)         |
| Age, median (IQR)                                    | 60 (52-69)            | 61 (53-69)        |
| Immunosuppressed, n (%)                              | 2 (1.9)               | 2 (3.4)           |
| History of DFI, n (%)                                | 44 (41.5)             | 23 (39.7)         |
| History of PSA, n (%)                                | 12 (11.3)             | 9 (15.5)          |
| Antibiotics 90d before index admission, n (%)        | 48 (45.3)             | 35 (60.3)         |
| IV                                                   | 2 (4.2)               | 5 (14.3)          |
| PO                                                   | 29 (60.4)             | 18 (51.4)         |
| Both                                                 | 17 (35.4)             | 12 (34.3)         |
| Hospital admission 90d before index admission, n (%) | 22 (20.8)             | 18 (31.0)         |
| Surgery 90d before index admission, n (%)            | 13 (12.3)             | 9 (15.5)          |

# Baseline Characteristics, continued

|                     |          | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|---------------------|----------|-----------------------|-------------------|
| DFI severity, n (%) |          |                       |                   |
|                     | Mild     | 6 (5.7)               | 4 (6.9)           |
|                     | Moderate | 89 (84.0)             | 37 (63.8)         |
|                     | Severe   | 11 (10.4)             | 17 (29.3)         |

# Baseline Characteristics, continued

|                     |          | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|---------------------|----------|-----------------------|-------------------|
| DFI severity, n (%) |          |                       |                   |
|                     | Mild     | 6 (5.7)               | 4 (6.9)           |
|                     | Moderate | 89 (84.0)             | 37 (63.8)         |
|                     | Severe   | 11 (10.4)             | 17 (29.3)         |
| ID consult, n (%)   |          | 59 (55.7)             | 42 (72.4)         |

# Baseline Characteristics, continued

|                         | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|-------------------------|-----------------------|-------------------|
| DFI severity, n (%)     |                       |                   |
| Mild                    | 6 (5.7)               | 4 (6.9)           |
| <b>Moderate</b>         | <b>89 (84.0)</b>      | <b>37 (63.8)</b>  |
| Severe                  | 11 (10.4)             | 17 (29.3)         |
| ID consult, n (%)       | 59 (55.7)             | 42 (72.4)         |
| Surgery, n (%)          |                       |                   |
| None                    | 9 (8.5)               | 6 (10.3)          |
| I&D                     | 40 (37.7)             | 22 (37.9)         |
| Amputation              | 31 (29.2)             | 14 (24.1)         |
| <b>Major amputation</b> | <b>1 (0.9)</b>        | <b>3 (5.2)</b>    |
| Multiple                | 25 (23.6)             | 13 (22.4)         |

# Baseline Characteristics, continued

|                                   |                         | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|-----------------------------------|-------------------------|-----------------------|-------------------|
| DFI severity, n (%)               |                         |                       |                   |
|                                   | Mild                    | 6 (5.7)               | 4 (6.9)           |
|                                   | <b>Moderate</b>         | <b>89 (84.0)</b>      | <b>37 (63.8)</b>  |
|                                   | Severe                  | 11 (10.4)             | 17 (29.3)         |
| ID consult, n (%)                 |                         | 59 (55.7)             | 42 (72.4)         |
| Surgery, n (%)                    |                         |                       |                   |
|                                   | None                    | 9 (8.5)               | 6 (10.3)          |
|                                   | I&D                     | 40 (37.7)             | 22 (37.9)         |
|                                   | Amputation              | 31 (29.2)             | 14 (24.1)         |
|                                   | <b>Major amputation</b> | <b>1 (0.9)</b>        | <b>3 (5.2)</b>    |
|                                   | Multiple                | 25 (23.6)             | 13 (22.4)         |
| Duration of therapy, median (IQR) |                         |                       |                   |
|                                   | IV                      | 7 (4-16)              | 7 (4-16)          |
|                                   | PO                      | 9 (2-13)              | 8 (0-15)          |
|                                   | Total                   | 20 (13-31)            | 19 (13-31)        |

Most w/ moderate DFI severity with surgical debridement. A mix of IV and PO antibiotics were given.

# Baseline Characteristics: Cultures

|                      |                     | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|----------------------|---------------------|-----------------------|-------------------|
| Culture types, n (%) |                     |                       |                   |
|                      | <b>Surgical</b>     | 89 (84.0)             | 44 (75.9)         |
|                      | <b>Non-surgical</b> | 34 (32.1)             | 12 (20.7)         |
|                      | <b>No cultures</b>  | 13 (12.3)             | 7 (12.1)          |

# Baseline Characteristics: Cultures, continued

|                      |                      | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|----------------------|----------------------|-----------------------|-------------------|
| Culture types, n (%) |                      |                       |                   |
|                      | <b>Surgical</b>      | 89 (84.0)             | 44 (75.9)         |
|                      | <b>Non-surgical</b>  | 34 (32.1)             | 12 (20.7)         |
|                      | <b>No cultures</b>   | 13 (12.3)             | 7 (12.1)          |
| Culture yield, n (%) |                      |                       |                   |
|                      | <b>No growth</b>     | 17 (16.0)             | 8 (13.8)          |
|                      | <b>Monomicrobial</b> | 20 (18.9)             | 13 (22.4)         |
|                      | <b>Polymicrobial</b> | 62 (58.5)             | 32 (55.2)         |
|                      | <b>No cultures</b>   | 7 (6.6)               | 5 (8.6)           |

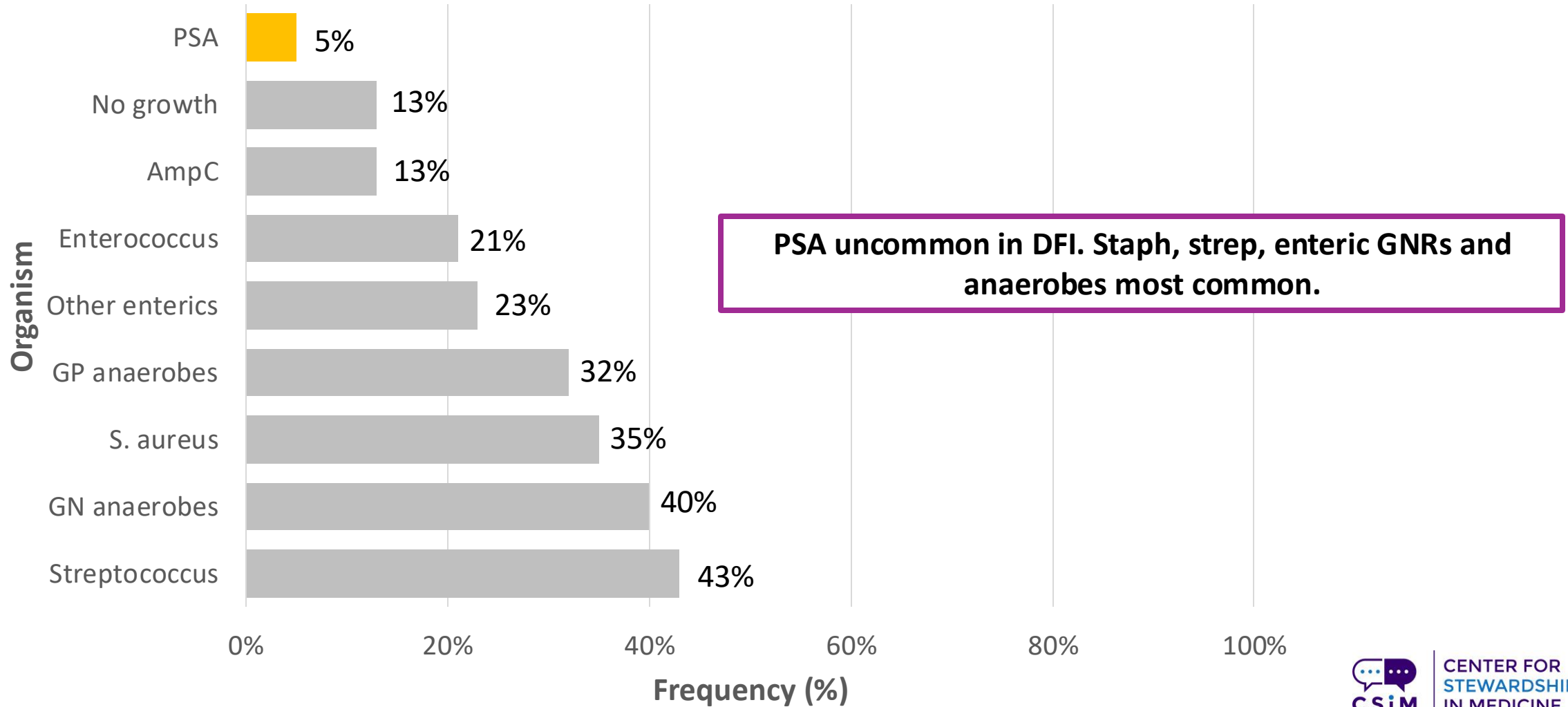
# Baseline Characteristics: Cultures, continued

|                             | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|-----------------------------|-----------------------|-------------------|
| <b>Culture types, n (%)</b> |                       |                   |
| <b>Surgical</b>             | <b>89 (84.0)</b>      | <b>44 (75.9)</b>  |
| <b>Non-surgical</b>         | <b>34 (32.1)</b>      | <b>12 (20.7)</b>  |
| <b>No cultures</b>          | <b>13 (12.3)</b>      | <b>7 (12.1)</b>   |
| <b>Culture yield, n (%)</b> |                       |                   |
| <b>No growth</b>            | <b>17 (16.0)</b>      | <b>8 (13.8)</b>   |
| <b>Monomicrobial</b>        | <b>20 (18.9)</b>      | <b>13 (22.4)</b>  |
| <b>Polymicrobial</b>        | <b>62 (58.5)</b>      | <b>32 (55.2)</b>  |
| <b>No cultures</b>          | <b>7 (6.6)</b>        | <b>5 (8.6)</b>    |
| <b>Bacteremia, n (%)</b>    | <b>13 (12.3)</b>      | <b>5 (8.6)</b>    |
| <b>Pseudomonas, n (%)</b>   | <b>6 (5.7)</b>        | <b>4 (6.9)</b>    |

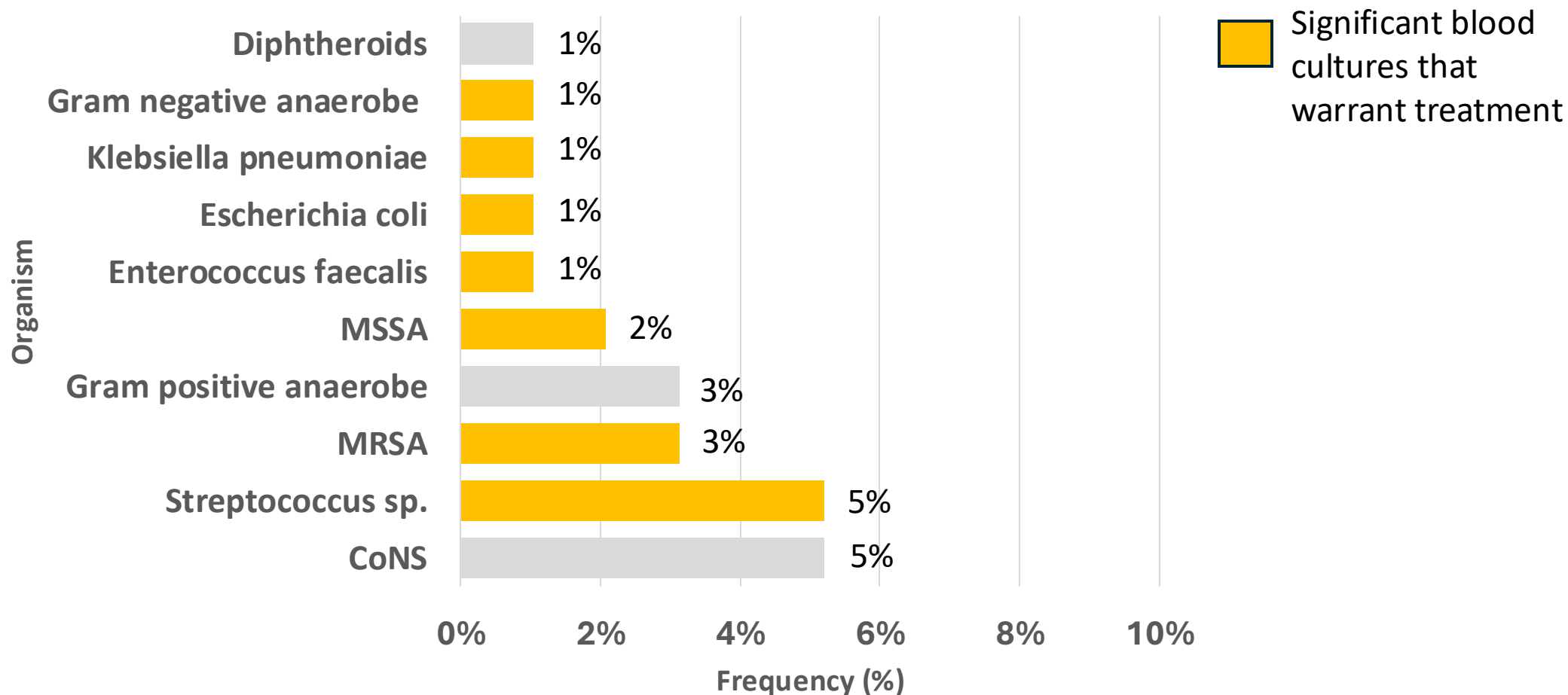
2022 PSA prevalence ~5%

Most w/ polymicrobial cultures, bacteremia infrequently noted. PSA prevalence remains stable.

# Surgical Cultures (n = 133)



# Blood Cultures (n = 96)



**Bacteremia secondary to DFI is uncommon. If present, Gram-positive bacteremia was more common.**

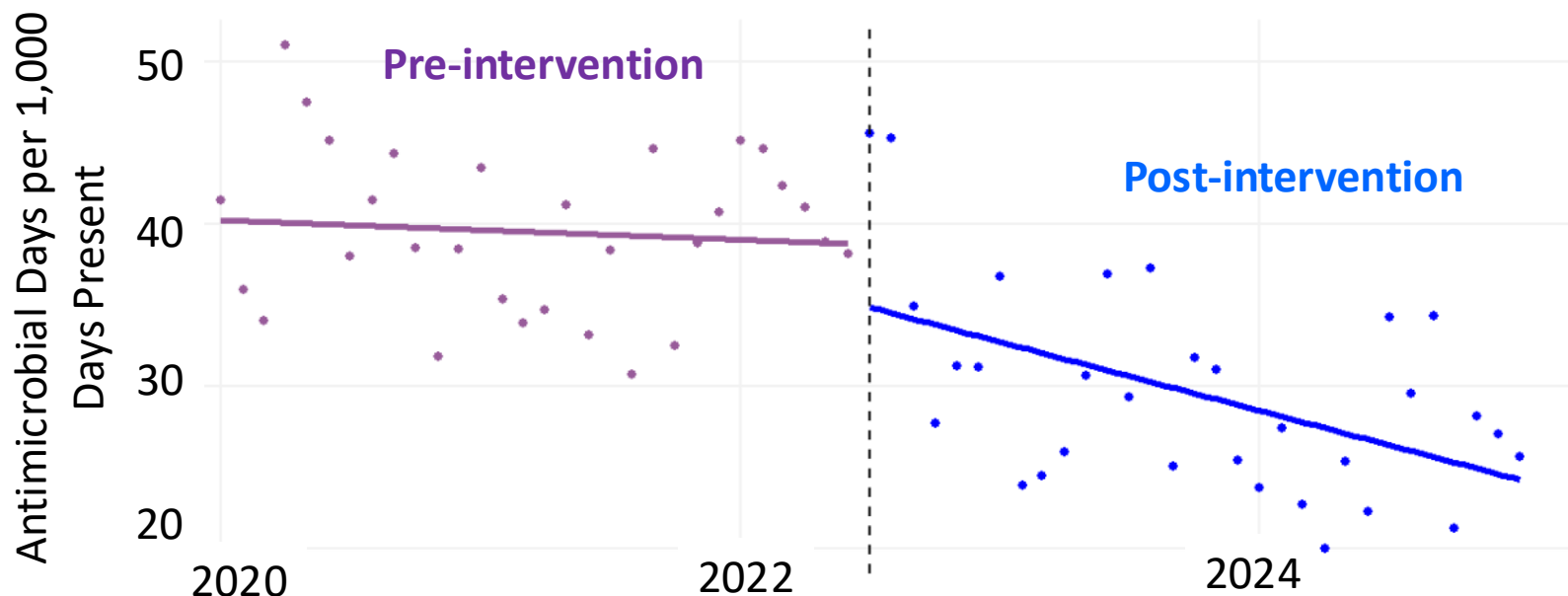
# Primary outcome

## Pre-intervention

- 82% started on pip-tazo
- 5% PSA

## Post-intervention

- 23% started on pip-tazo (59% ↓)
- 6% PSA
- 63% adherence to VMC guidelines w/o deviation



# Secondary Outcomes

| 63%                                 |             |                 |
|-------------------------------------|-------------|-----------------|
| Adherence to guidelines (n=104)     | No anti-PSA | Anti-PSA        |
| Adherence with no deviations, n (%) | 73 (69)     | 31 (53.4)       |
| Nonadherence to guidelines (n=60)   | No anti-PSA | Anti-PSA (n=60) |
| Appropriate deviation, n (%)        | --          | 17 (28.3)       |
| Culture history                     | --          | 4 (23.5)        |
| Provider discretion                 | --          | 10 (58.8)       |
| Additional PSA risk factor          | --          | 3 (17.6)        |
| 74%                                 |             |                 |

Appropriate abx selection  
(adherence to guidelines + appropriate deviation) = 74%

# Secondary Outcomes, continued

|                              | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|------------------------------|-----------------------|-------------------|
| Antibiotic escalation, n (%) | 36 (34)               | 10 (17.2)         |
| AmpC                         | 6 (16.7)              | 0 (0)             |
| ESBL                         | 2 (5.6)               | 3 (30)            |
| Lack of clinical improvement | 2 (5.6)               | 2 (20)            |
| Other bug-drug mismatch      | 21 (58.3)             | 4 (40)            |
| Inadequate coverage          | 2 (5.6)               | 1 (10)            |
| Provider discretion          | 3 (8.3)               | 0 (0)             |

# Secondary Outcomes, continued

|                                | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|--------------------------------|-----------------------|-------------------|
| Antibiotic escalation, n (%)   | 36 (34)               | 10 (17.2)         |
| AmpC                           | 6 (16.7)              | 0 (0)             |
| ESBL                           | 2 (5.6)               | 3 (30)            |
| Lack of clinical improvement   | 2 (5.6)               | 2 (20)            |
| Other bug-drug mismatch        | 21 (58.3)             | 4 (40)            |
| Inadequate coverage            | 2 (5.6)               | 1 (10)            |
| Provider discretion            | 3 (8.3)               | 0 (0)             |
|                                | No anti-PSA (n = 21)  | Anti-PSA (n = 4)  |
| Other bug-drug mismatch, n (%) |                       |                   |
| Anaerobe                       | 16 (76.2)             | 3 (75)            |
| PSA                            | 1 (4.8)               | 0 (0)             |
| Other organism                 | 1 (4.8)               | 1 (25)            |
| Anaerobe+PSA                   | 3 (14.3)              | 0 (0)             |

Most common reason for bug-drug mismatches due to lack of anaerobic coverage.

# Secondary Outcomes, continued

|                           | No anti-PSA (n = 106) | Anti-PSA (n = 58) |
|---------------------------|-----------------------|-------------------|
| CCU transfer, n (%)       | 6 (5.7)               | 3 (5.2)           |
| 30-day readmission, n (%) | 12 (11.3)             | 8 (13.8)          |
| 90-day readmission, n (%) | 16 (15.1)             | 5 (8.6)           |

**No significant safety concerns with narrowing coverage empirically.**

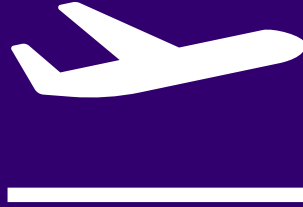
# Limitations

- Reasons for deviations limited to chart review.
- Escalation of antibiotics may be irrelevant to clinical status.
- VMC-specific PSA risk factors not well defined.

# Conclusions

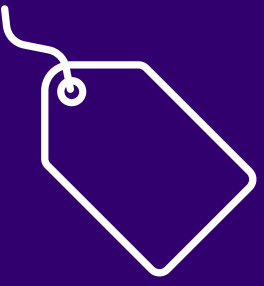
- Empiric pip tazo use for DFI decreased by 59% post intervention.
  - Temporary hospital-wide decrease in pip tazo usage.
- 74% started on appropriate empiric therapy.
- PSA prevalence remains low.
- Additional areas for review – PSA risk factors, PO dose optimization, other anti-PSA use (ie. cefepime).

# Each piece of data should have a takeaway



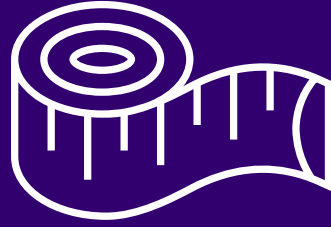
- Provide a 1-2 sentences under a table, figure, graph summarizing the data.

# Figures, tables, charts



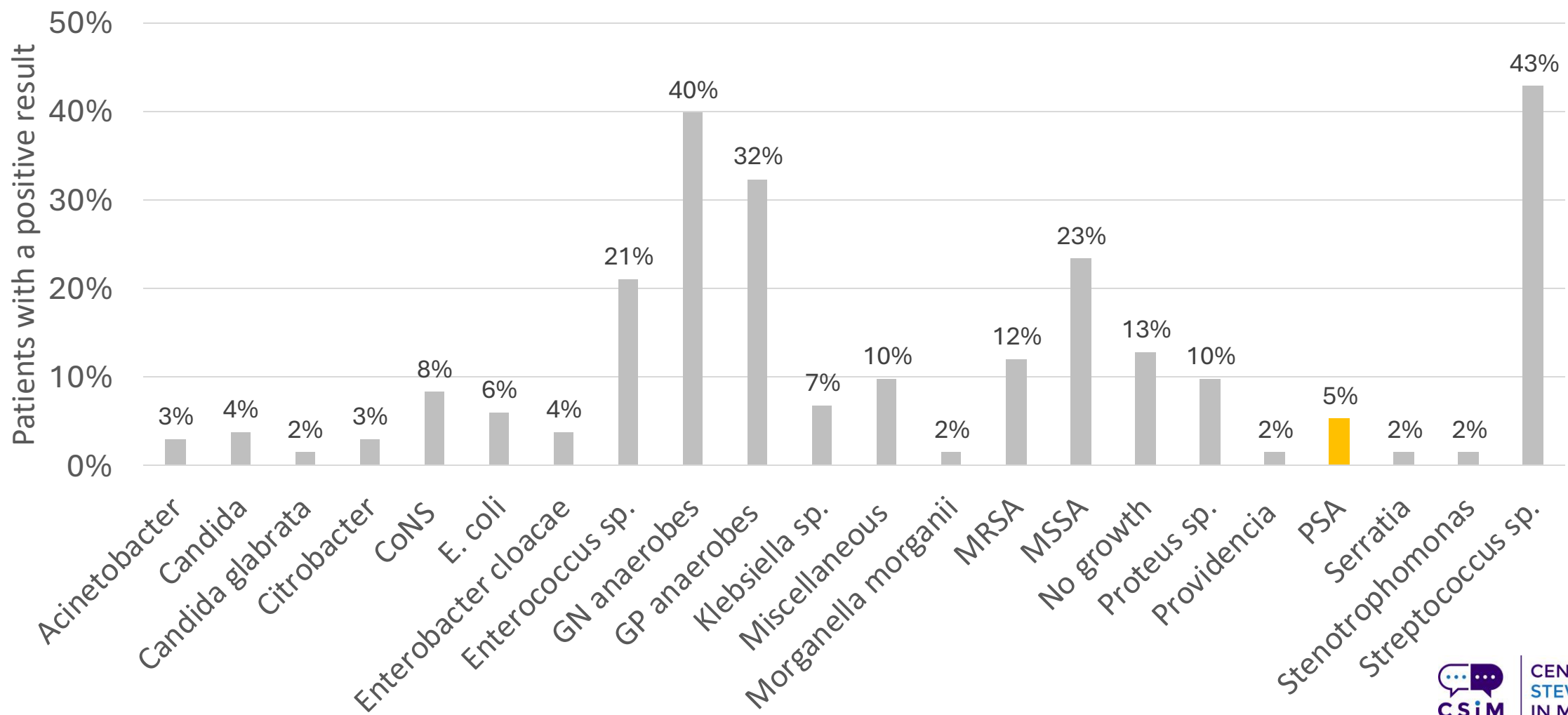
- Use **clear labeling**. This includes *font choice*, font *size*, **bolding**.
- Use distinct **colors**.
- **Sort** your data in a way that makes sense (ex. highest to lowest).

# Keep things clear and clean

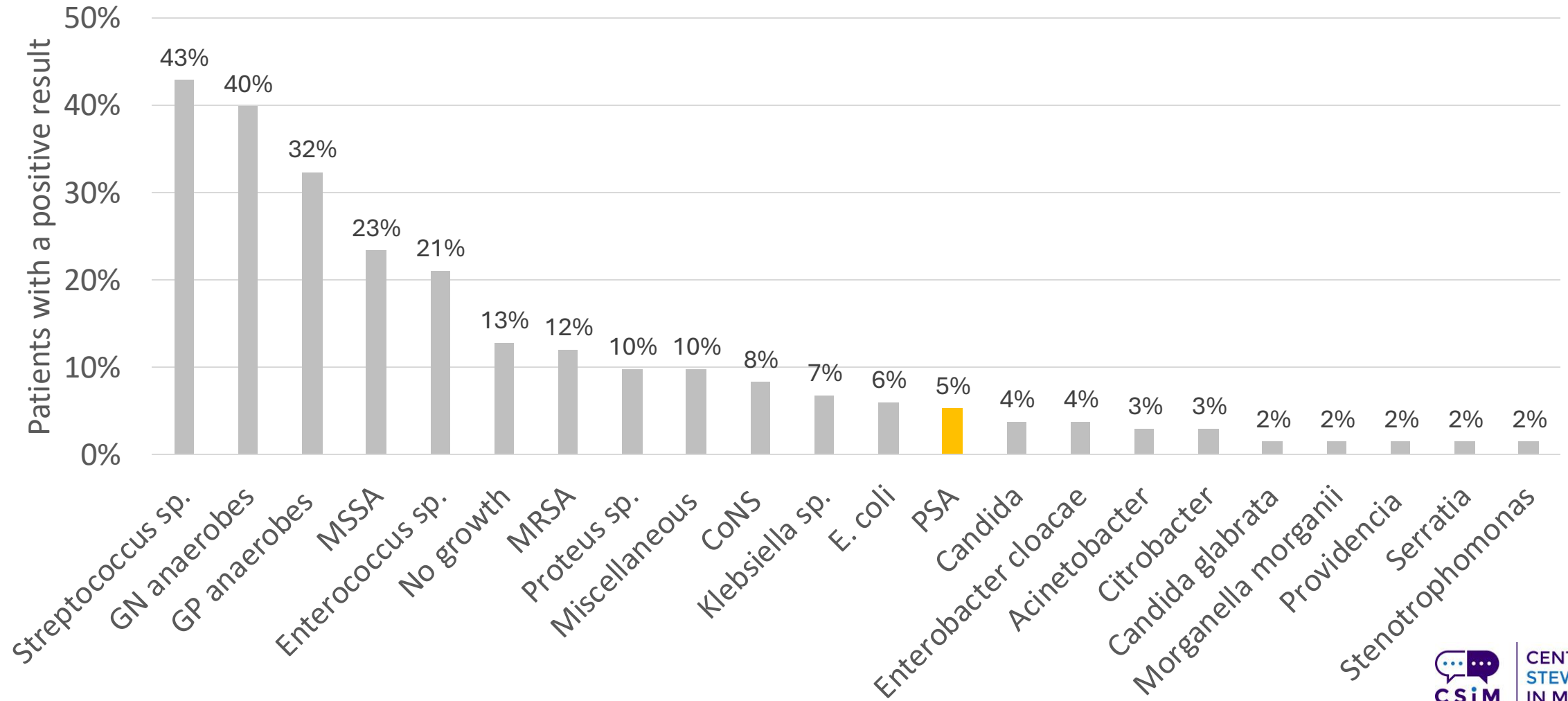


- Avoid busy figures. Keep things **trim and focused**.
- Make sure slides can be **easily referenced** after a talk.

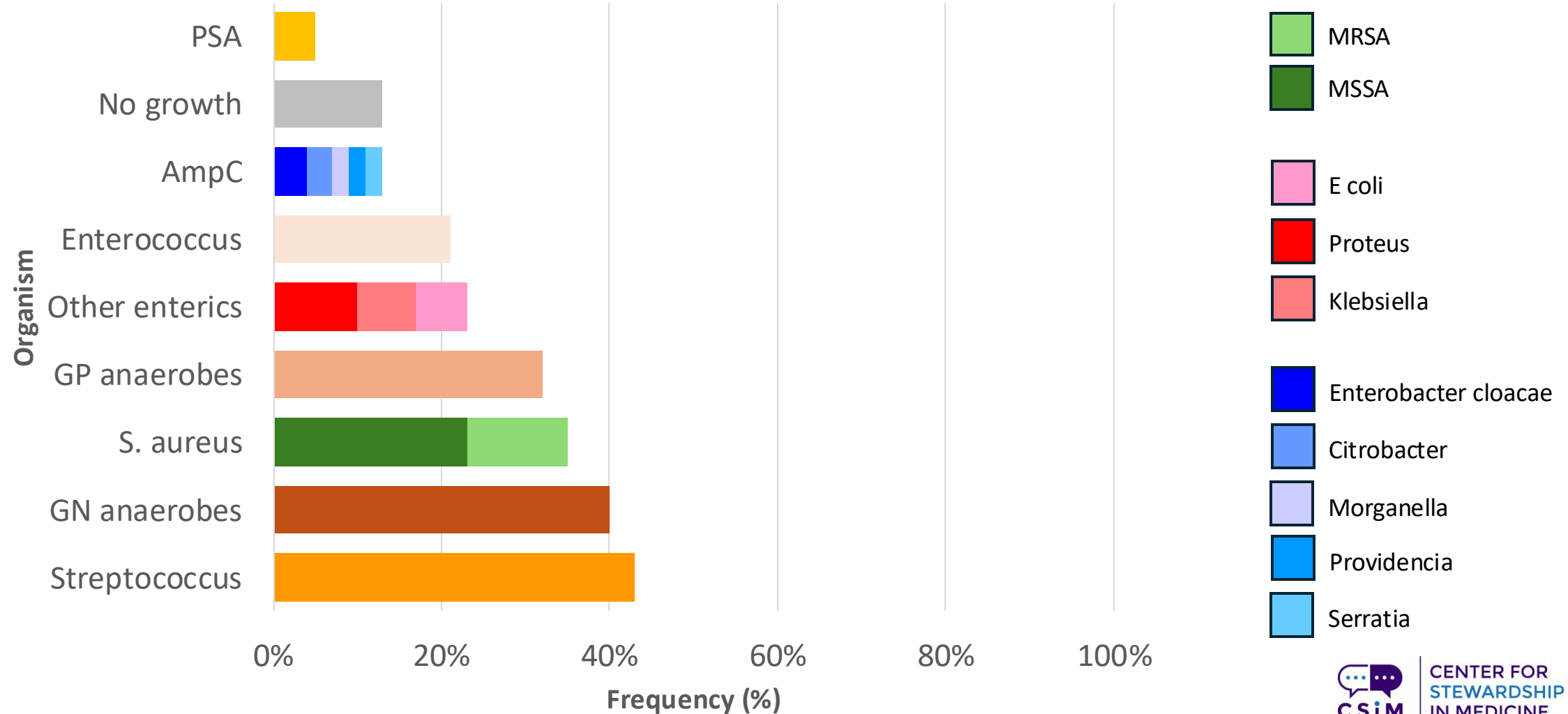
# Version 1: No clear ordering of data



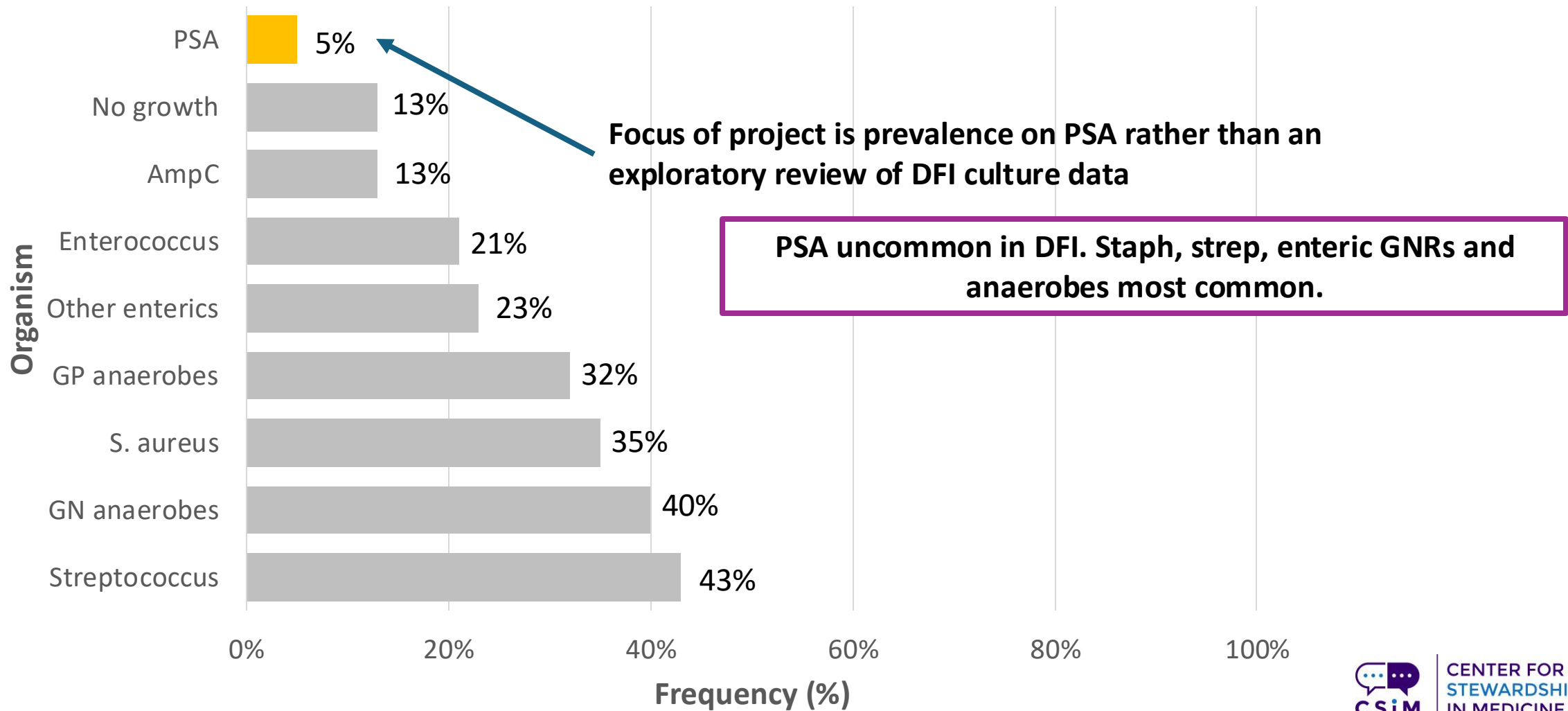
# Version 2: Ranking but lacks readability



# Version 3: Ranking + colors to group organisms



# Version 4: Focused on PSA



# Other resources

- Prior TASP lectures
  - Martina Clarke, PhD, ACHIP: Effective Data Communication Through Visualization
- Make NHSN data more useful and pretty
  - WA DOH: [ams@doh.wa.gov](mailto:ams@doh.wa.gov)
- AI tools (ex. ChatGPT, Google Gemini etc.)
  - Ask in plain language for step-by-step guidance

# Takeaways

- Nursing/Clinicians:
  - Many patients with DFI have history of recurrence. Successful DFI prevention depends on chronic disease management.
- Pharmacy:
  - Drug selection can be narrowed even in the empiric setting. Use clinical judgement when anaerobic coverage may be needed.
- All:
  - Create visually thoughtful graphics to emphasize your takeaway points.