

National Center for Emerging and Zoonotic Infectious Diseases



# Leveraging Current Human Antibiotic-Use-Monitoring for AR Pandemic Surveillance

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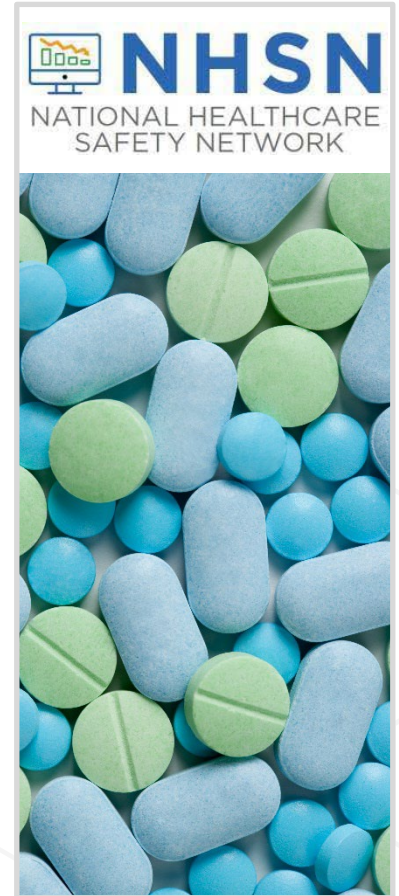
## Scenario Assumption

- This presentation will focus on hospital antibiotic use monitoring since the scenario focuses on hospitalized patients.
- There are also data sources for outpatient and nursing home antibiotic use.



## Background

- The CDC's National Healthcare Safety Network (NHSN) Antibiotic Use (AU) Option allows real time electronic submission of aggregate antibiotic use by hospital location along with hospital days present.
- Use data are risk adjusted for comparative benchmarking based on facility level characteristics (e.g., bed size, number of ICU beds, teaching status).
- More than 2,400 hospitals have submitted data.
- Reporting antibiotic use (and antimicrobial resistance) to NHSN will be required for all hospitals and critical access hospitals by 2024.
- We will use hospital antibiotic data from the COVID-19 pandemic to inform this discussion.

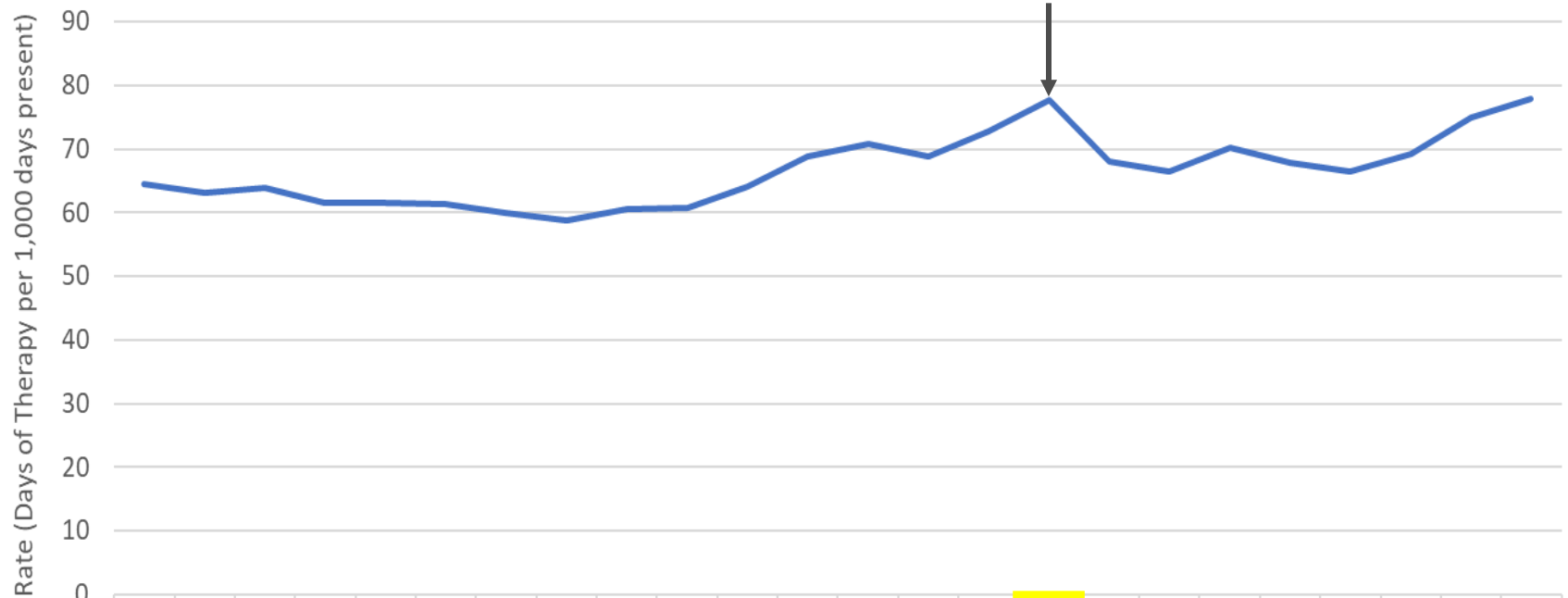


## What are ways we can leverage current human antibiotic use reporting? What might we want to know?

- Is use of individual agents changing- and what might that tell us?
- Is overall antibiotic use changing? For example, is it shifting to broader spectrum agents?
- Might we encounter shortages of any agent because use is going up so much?
- What's the uptake of new agents that might be brought on-line during a pandemic?
- Is antibiotic use aligned with antibiotic resistance?
  - That might help us explore opportunities for improvement

# Ceftriaxone Use Rates by Month, Hospital-wide

Facilities Reporting Data for All Months, 2019-2020



|                        | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | 11      | 12      | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | 11      | 12      |
|------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                        | 2019    |         |         |         |         |         |         |         |         |         |         |         | 2020    |         |         |         |         |         |         |         |         |         |         |         |
| Sum of Pooled Rate     | 64.462  | 63.126  | 63.98   | 61.515  | 61.442  | 61.411  | 59.891  | 58.69   | 60.549  | 60.656  | 64.014  | 68.836  | 70.85   | 68.772  | 72.834  | 77.779  | 68.068  | 66.448  | 70.152  | 67.921  | 66.387  | 69.269  | 74.872  | 77.838  |
| Sum of Days of Therapy | 387646  | 346072  | 385289  | 353155  | 362708  | 347483  | 348928  | 343926  | 346353  | 362342  | 363859  | 406774  | 430230  | 390045  | 386217  | 327282  | 338881  | 350551  | 394453  | 384217  | 367352  | 401269  | 418651  | 453693  |
| Sum of Days Present    | 6013558 | 5482268 | 6021976 | 5740991 | 5903237 | 5658335 | 5826066 | 5860020 | 5720231 | 5973759 | 5684093 | 5909359 | 6072444 | 5671543 | 5302728 | 4207858 | 4978590 | 5275551 | 5622837 | 5656859 | 5533503 | 5792896 | 5591533 | 5828672 |

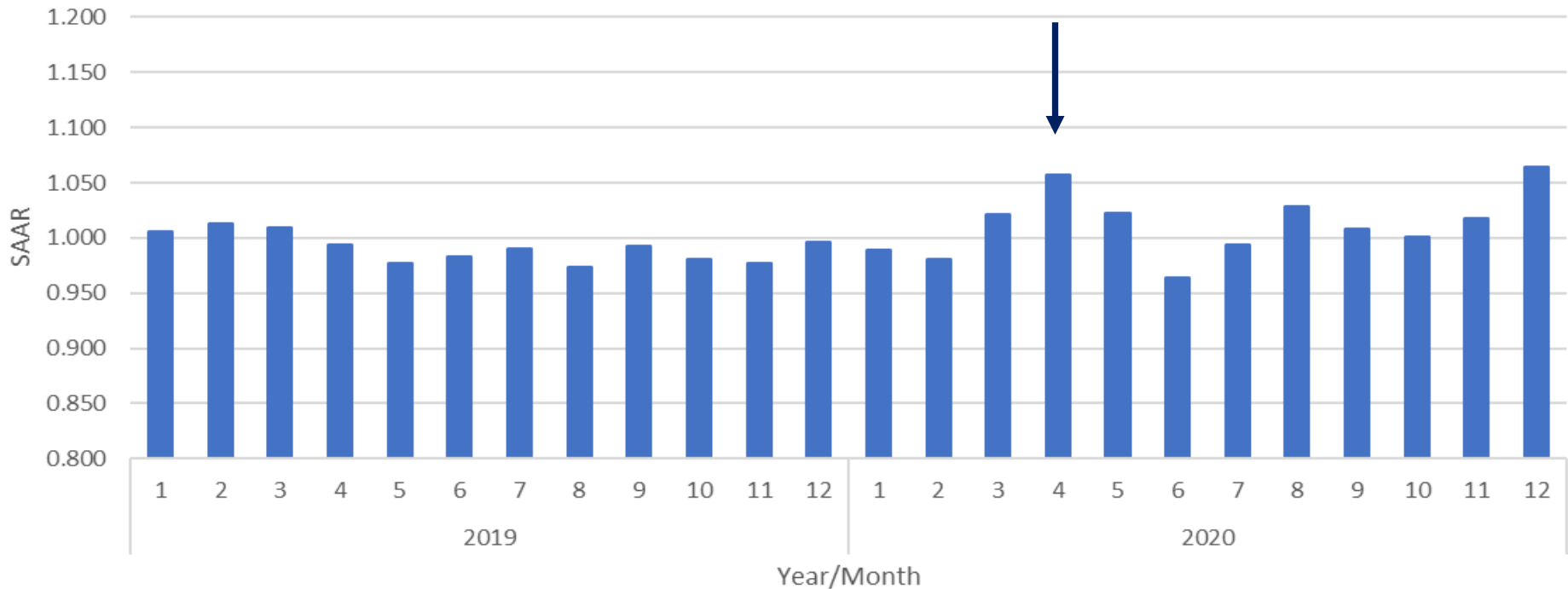
Year/Month

Note ~20% drop in patient days

# Standardized Antimicrobial Administration Ratio (SAAR)

Broad Spectrum Antibacterial Agents Predominantly Used for Hospital-Onset Infections

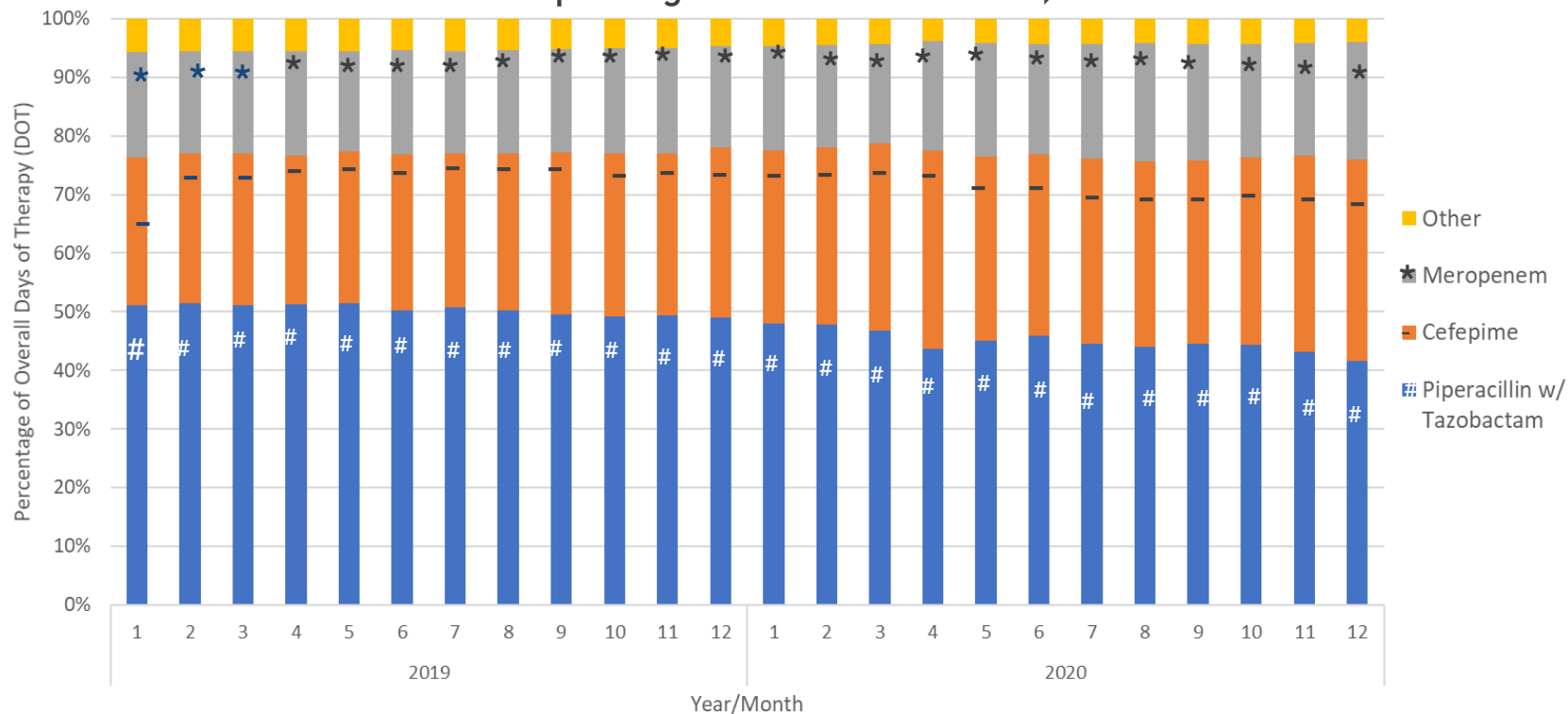
Adult SAAR ICU Locations | Facilities Reporting Data for All Months, 2019-2020



# Percentage of Days of Therapy per Drug by Month

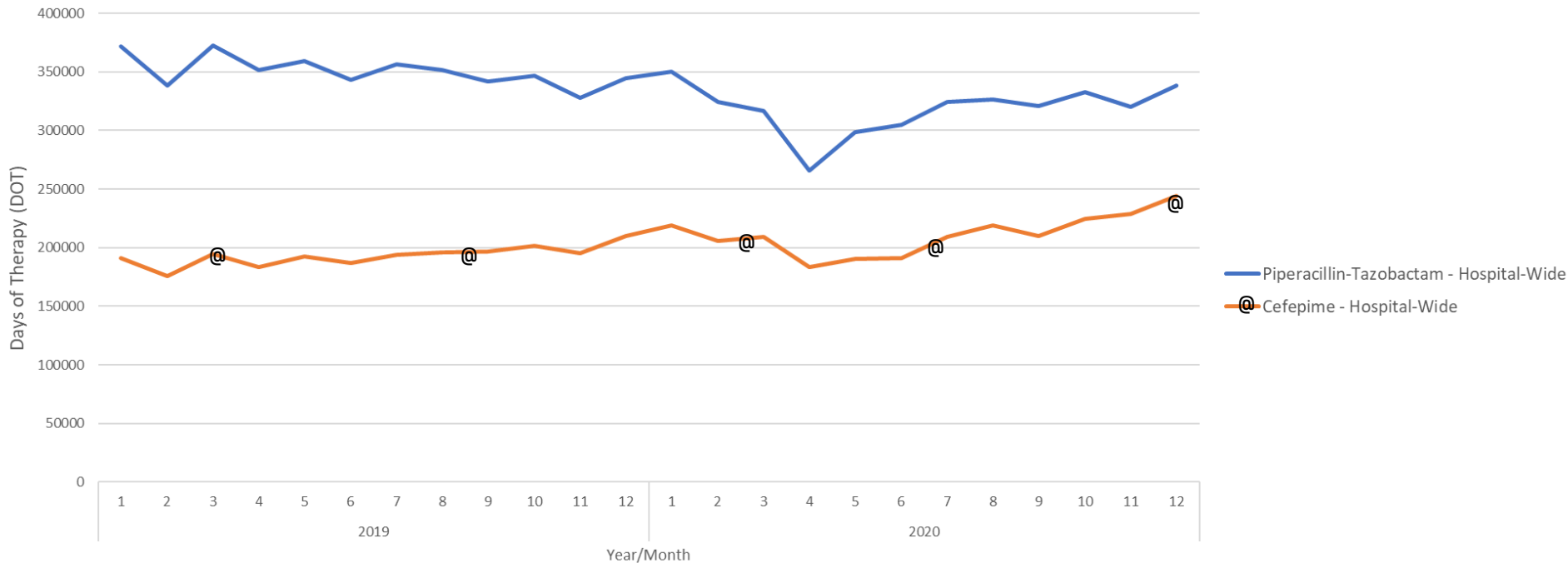
Broad Spectrum Antibacterial Agents Predominantly Used for Hospital-Onset Infections

Facilities Reporting Data for All Months, 2019-2020



# Antimicrobial Use in Days of Therapy (DOT), by Antimicrobial Agent and Location

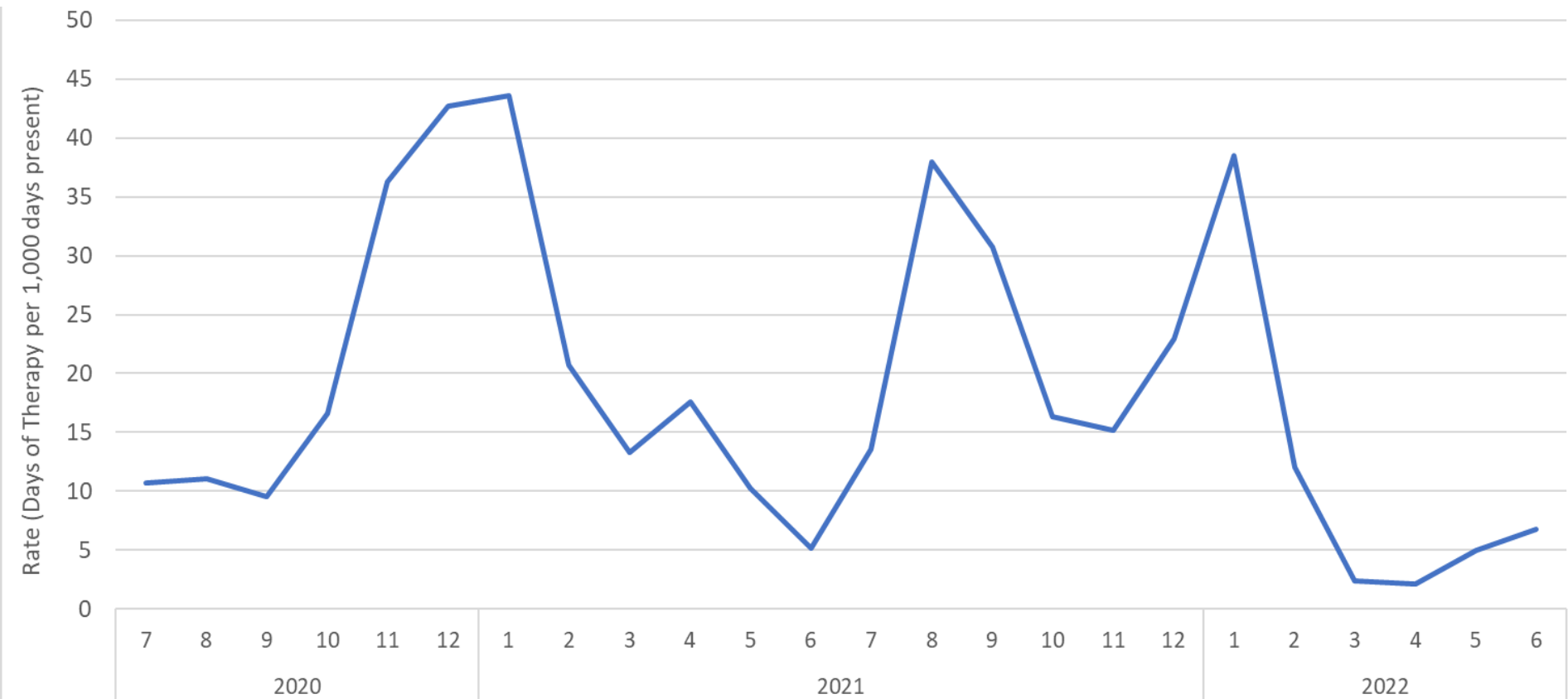
## Facilities Reporting Data for Months, 2019-2020





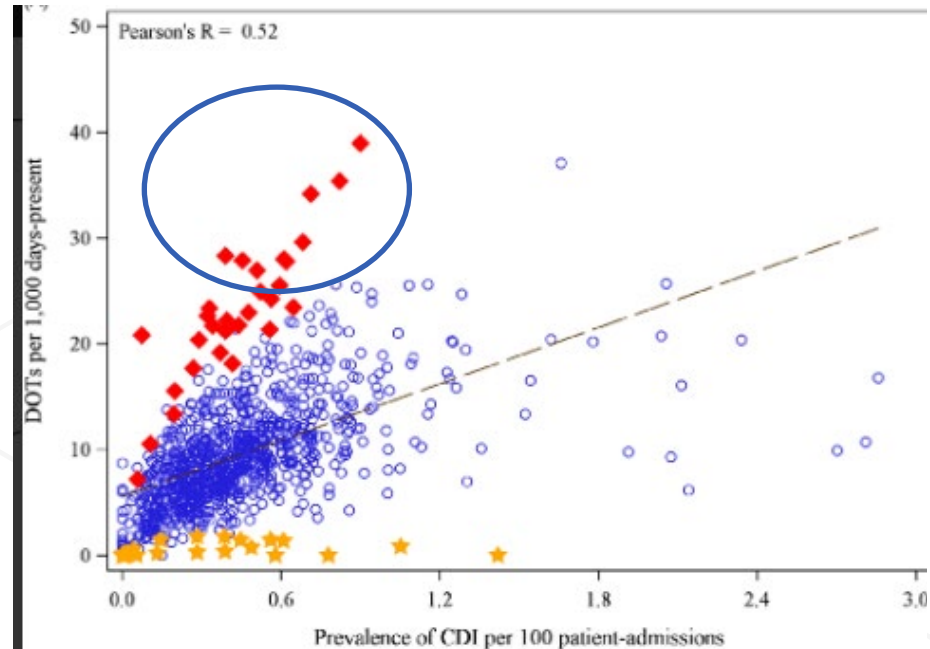
# Rates of Remdesivir Use, Hospital-Wide

Facilities Reporting Data for All Months, 2020-2022 (Previous 24 Months)



### Association between prevalence of laboratory-identified *Clostridioides difficile* infection (CDI) and antibiotic treatment for CDI in US acute-care hospitals, 2019

Red diamonds are hospitals with more CDI treatment than predicted



## Assessing Correlation of Antibiotic Use and Resistance

- Correlations between antibiotic use and resistance can be informative for potential opportunities to improve use.
- Are there hospitals where use of some agents is much higher than what we would expect given resistance patterns?
  - E.g., a hospital using a lot of ceftazidime-avibactam, but with very little CRE
- Are there hospitals where use of some agents is much lower than what we would expect given resistance patterns?

# What's Needed

- Sustainability of critical AU surveillance programs that turn data into prevention:
  - Reporting antibiotic use and resistance will now be required by CMS as part of the Promoting Interoperability standards.
  - NHSN will need increased and on-going funding to support the new reporters and data analyses to support action.
- Funding sustainability for health departments and healthcare facilities.
  - Short-term supplement funding will expire in the next couple years
  - We will need a more robust workforce, especially for new NHSN antibiotic use and AR reporting requirements.
- Increasing AU data collection from nursing homes and outpatient facilities
- Supporting implementation of CDC's Core Elements and enhancing existing programs
  - Including data tracking during emergencies and outbreaks