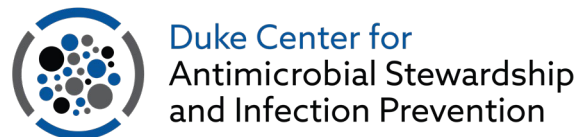


Hospital COVID-19 Burden Impact on Inpatient Antibiotic Use Rates

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Representing: Duke-UNC CDC Epicenter



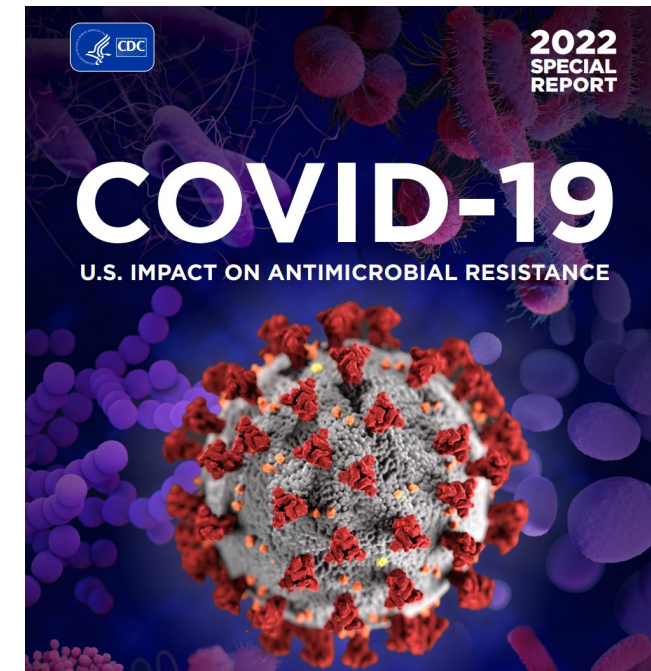
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Disclosures:

- None relevant
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Background

- The COVID-19 pandemic reversed years of progress combatting antibiotic resistance.
 - Increased incidence of infection due to resistant infections
 - Halted tracking for 9 of 18 antimicrobial resistant threats
 - High rates of antibiotic use in COVID patients
 - Rapid, drastic changes in healthcare delivery



<https://www.cdc.gov/drugresistance/covid19.html>

Pandemic Pinch- DASON Survey



13/29 (45%) of facilities reported diverting ASP personnel to other activities

62% of routine stewardship work was shifted to other areas due to COVID-19



Dodds Ashley et al. IDWeek 2021

Objectives

- We aimed to determine the impact of COVID on antibiotic use after adjusting for other practice-related factors including:
 - dynamic COVID case shifts
 - pauses in surgical procedures
 - changes in COVID treatment paradigms

Methods

- Antibiotic Use Data Were Obtained from 30 Southeast US Hospitals
Average beds: 289 (range: 25-979)



- All hospitals had robust stewardship programs in place prior to 2019

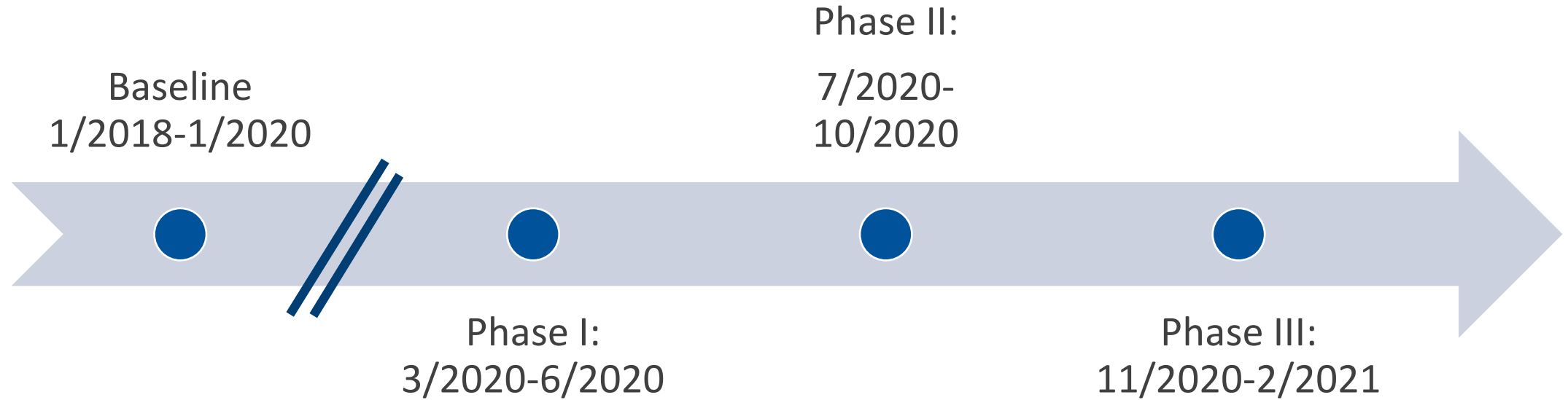
Data Extracts

- Pre-existing data extracts were used to capture:
 - Antimicrobial administrations
 - All antimicrobial agents
 - Broad-spectrum hospital onset agents: amikacin, aztreonam, cefepime, ceftazidime, doripenem, gentamicin, imipenem/cilastatin, meropenem, piperacillin/tazobactam, tobramycin
 - Community-acquired pneumonia (CAP) agents: ceftriaxone, azithromycin, levofloxacin, moxifloxacin, doxycycline
 - Systemic antifungal agents
 - Diagnosis codes and patient demographics
 - Charlson comorbidity index
- National Healthcare Safety Network surgical data:
 - Knee and hip prostheses (KPRO and HPRO)
 - Colon (COLO) and hysterectomy (HYST) procedures

Defining COVID Burden

COVID19 patient days	Patient days (calculated per calendar day at single, hospital-specific census time point similar to NHSN MDRO/CDI module) occurring during a COVID19 admission. Each day was attributed to the calendar month in which it occurred and summed monthly.
COVID19 admissions	Count of admissions with an ICD10 diagnosis code of U07.1 (post April 2020) or B97.29 (March-April 2020 only). COVID19 admissions are assigned to the month of the admission date.

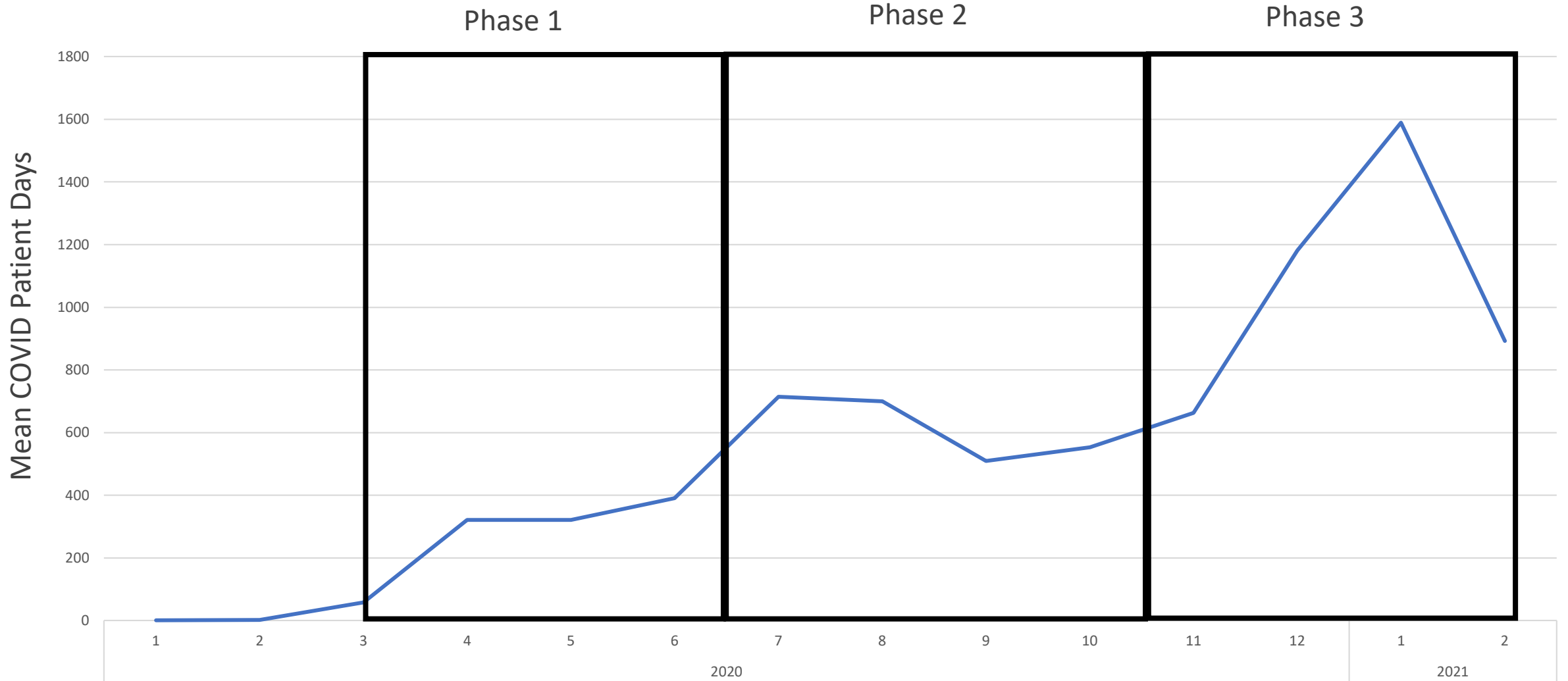
Time Periods



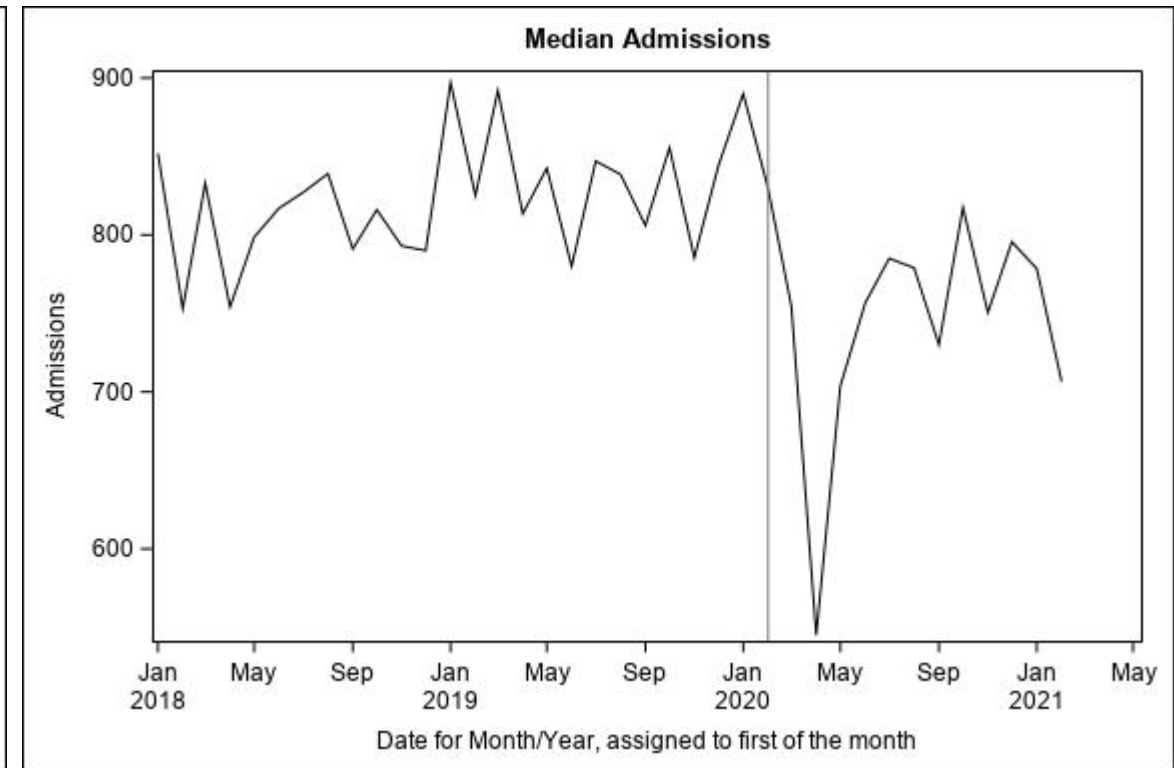
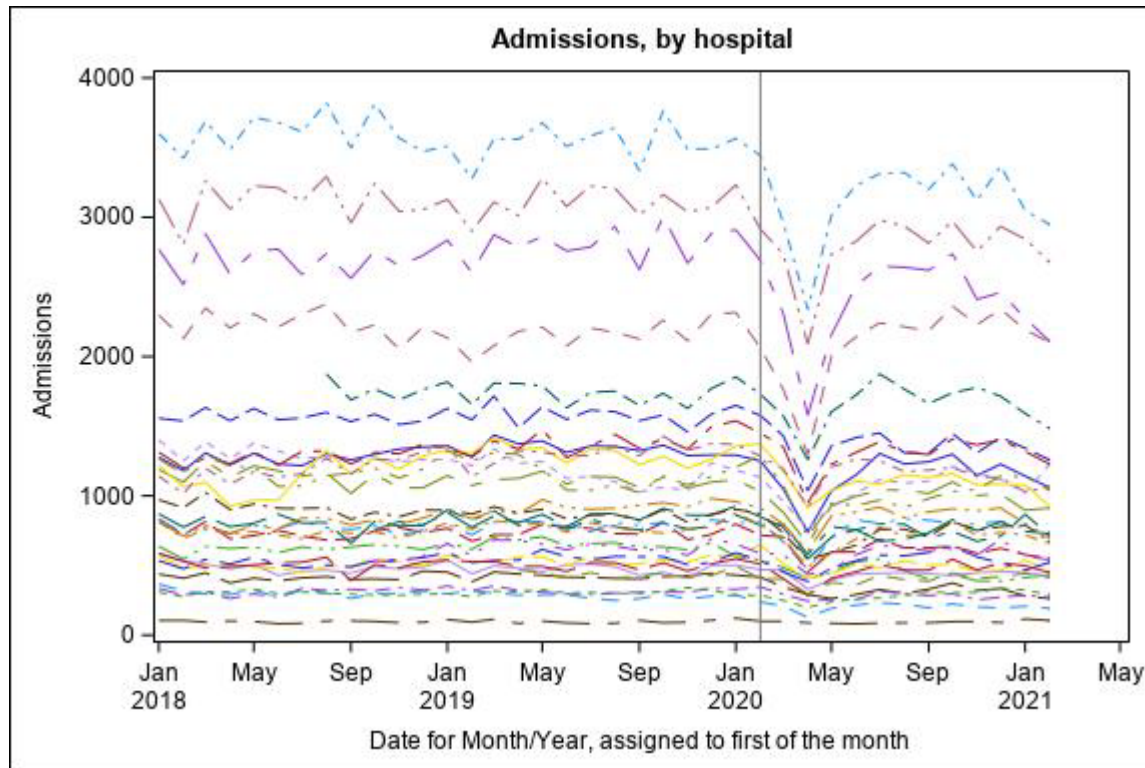
Model Parameters

- Level changes for each pandemic phase were compared to baseline
- Negative binomial GEE models were fit to AU and included
 - Phase
 - Interaction terms between COVID burden and phase
- Models were adjusted for:
 - Charlson comorbidity index
 - Hospital surgical volume
 - Time since 2017
 - Seasonality

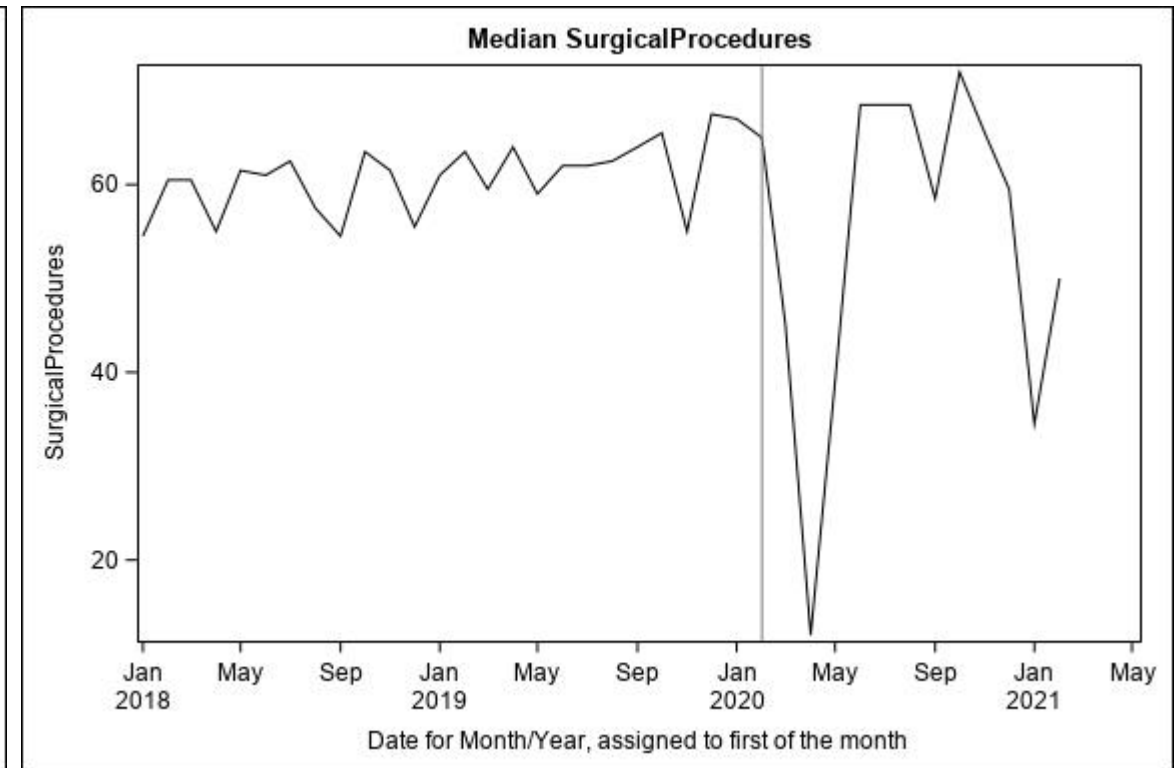
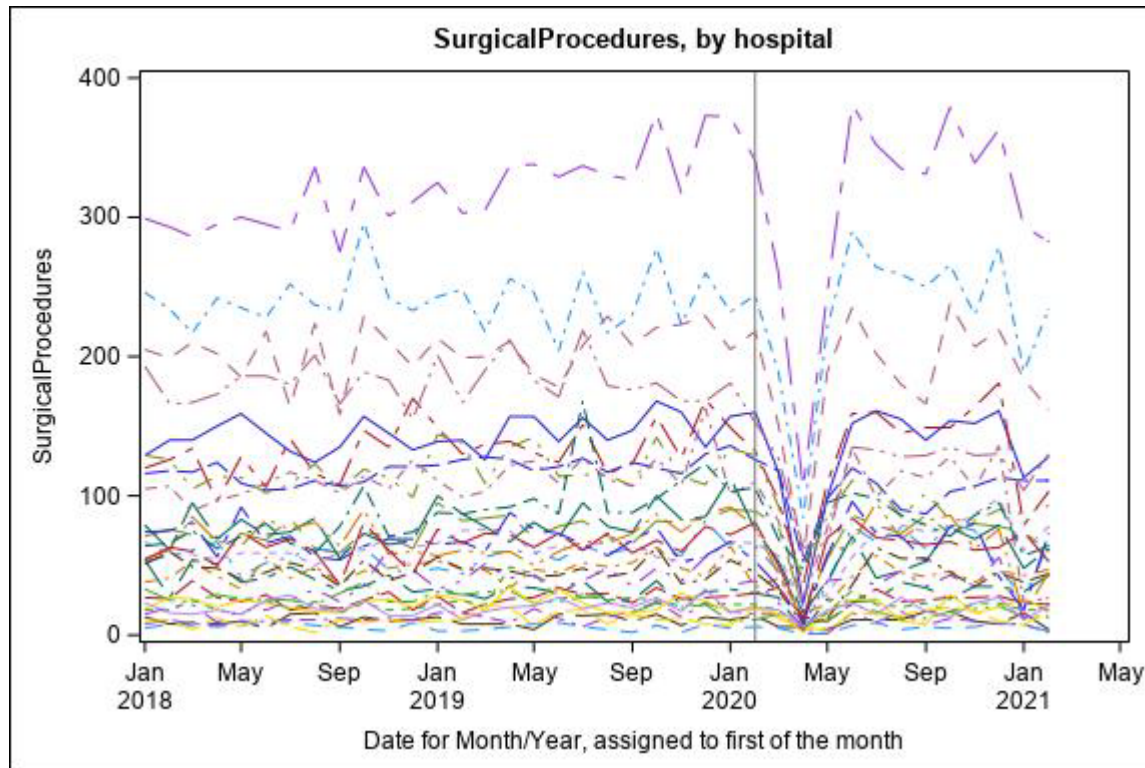
COVID Burden



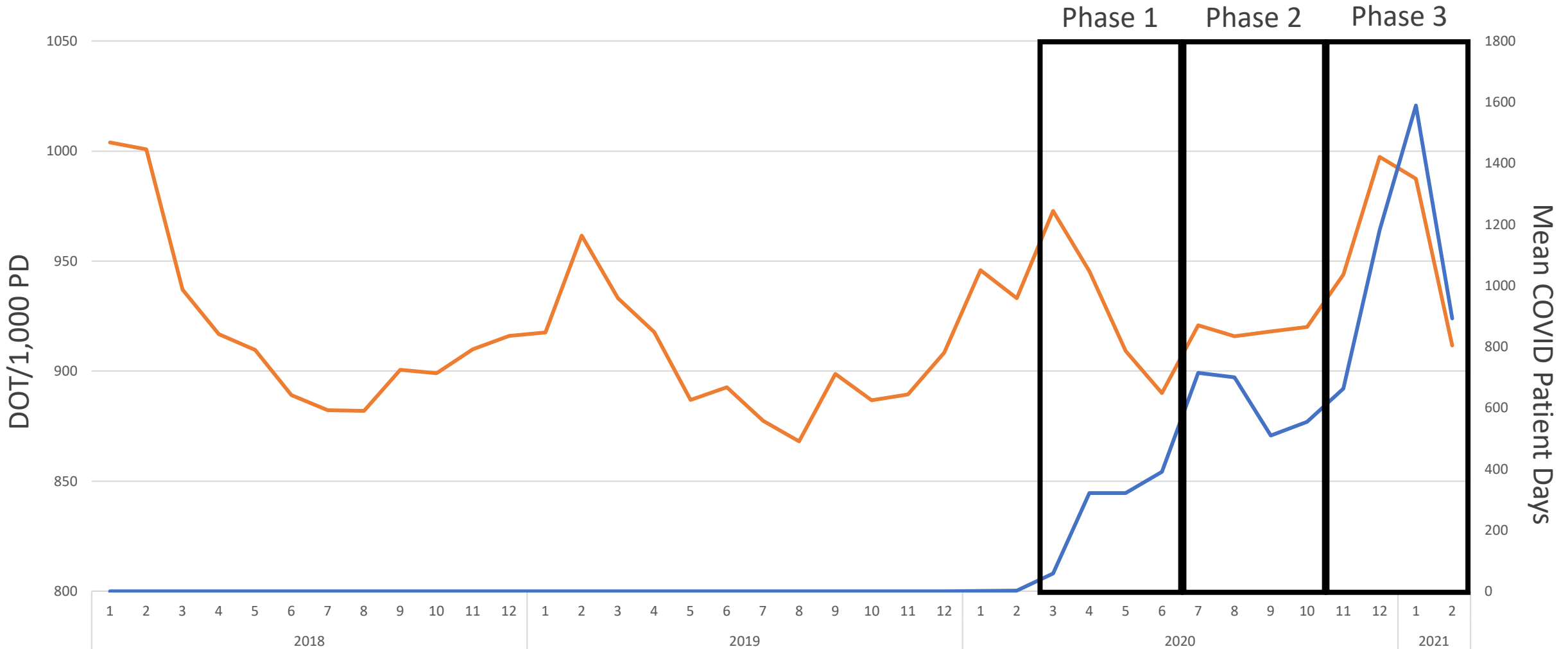
Patient Volume



Surgical Procedures

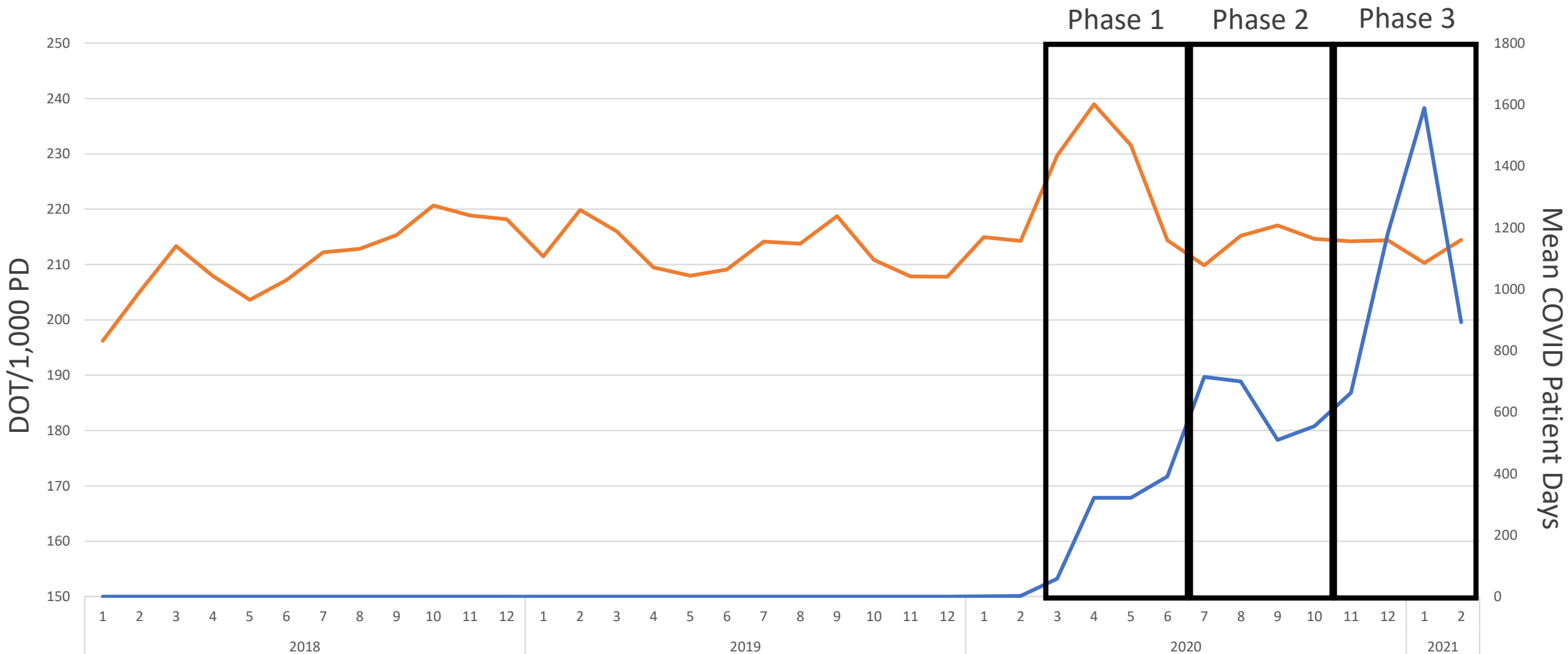


Raw Rates: All Antimicrobial Agents



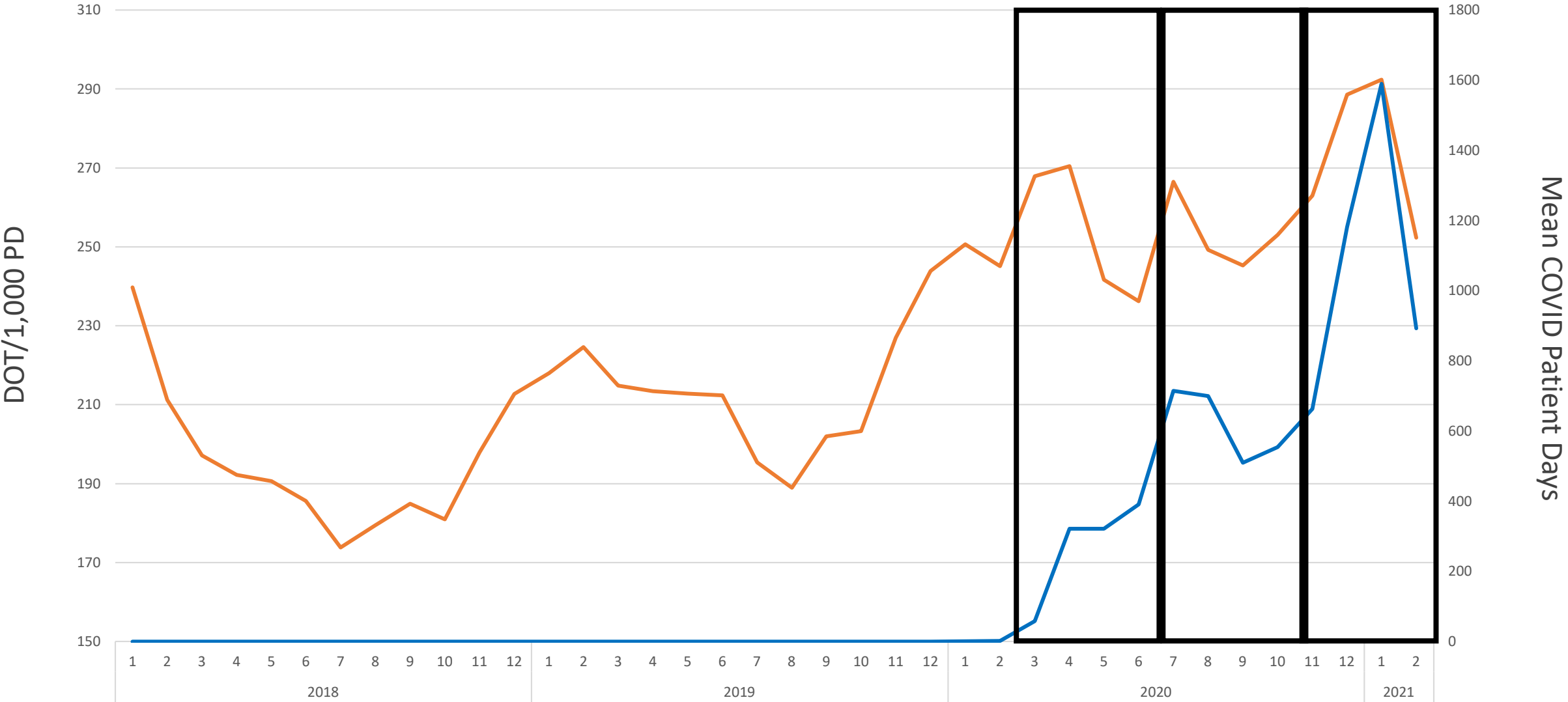
RR, 95% CI	Level Change Phase 1 (3/20-6/20)	Level Change Phase 2 (7/20-10/20)	Level Change Phase 3 (11/20-2/21)
All antimicrobials	1.036 (1.002-1.072); 0.039	1.067 (1.002-1.138); 0.045	1.054 (0.996-1.115); 0.069

Raw Rates: Broad-Spectrum Agents



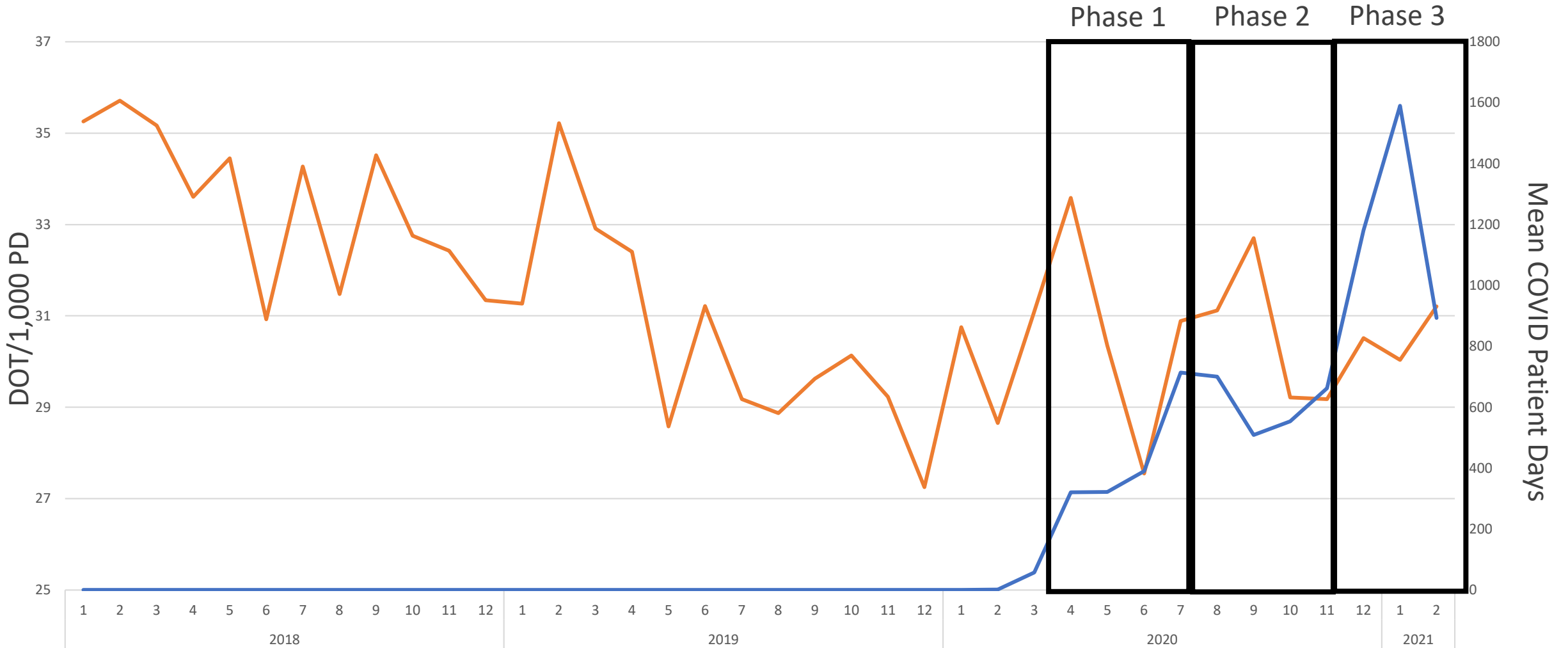
RR, 95% CI	Level Change Phase 1 (3/20-6/20)	Level Change Phase 2 (7/20-10/20)	Level Change Phase 3 (11/20-2/21)
Broad spectrum	1.075 (1.025-1.126); 0.003	0.996 (0.929-1.067); 0.90	1.004 (0.918-1.098); 0.94

Raw Rates: Agents for CAP



RR, 95% CI	Level Change Phase 1 (3/20-6/20)	Level Change Phase 2 (7/20-10/20)	Level Change Phase 3 (11/20-2/21)
CAP	1.078 (1.001-1.161); 0.047	1.226 (1.059-1.419); 0.006	1.137 (0.961-1.345); 0.13

Raw Rates: Antifungal Agents



RR, 95% CI	Level Change Phase 1 (3/20-6/20)	Level Change Phase 2 (7/20-10/20)	Level Change Phase 3 (11/20-2/21)
Antifungal	1.029 (0.876- 1.209); 0.73	1.086 (0.831-1.418); 0.55	0.890 (0.698-1.134); 0.35

COVID-19 Impact on Antibiotic Use

Model Results: Relative Rate (95% Confidence Interval); p-value

	Impact of COVID-19 Burden (per 100-day increase)		
	Phase 1 (3/20-6/20)	Phase 2 (7/20-10/20)	Phase 3 (11/20-2/21)
All antimicrobials	0.995 (0.985-1.005); 0.33	0.996 (0.987-1.005); 0.40	0.998 (0.994-1.002); 0.40
Broad spectrum	0.996 (0.982-1.009); 0.51	1.000 (0.987-1.012); 0.94	0.999 (0.991-1.007); 0.84
CAP	0.978 (0.961-0.995); 0.013	0.988 (0.967-1.011); 0.30	0.992 (0.980-1.003); 0.17
Antifungal	1.031 (1.004-1.059); 0.026	0.998 (0.972-1.025); 0.87	1.011 (0.999-1.023); 0.071

Discussion

- Overall data trends are similar to that observed by others.
- Frequent, concise communication was deployed network-wide and key to success.



FAQ: Should Antibiotic Therapy be Continued in Patients Diagnosed with COVID-19?

The ability to streamline and de-escalate empiric antibiotic therapy remains a challenge for antimicrobial stewardship programs. This challenge is further complicated by the ongoing pandemic and increased concern for COVID-19 infection, especially in light of reported mortality rates associated with severe disease presentation. Providers may decide to continue antibiotic therapy in the setting of viral illness due to a concern for bacterial co-infection.

- Limitations:
 - analysis by hospital size not conducted
 - effects of ongoing pandemic phases no included

Rose AN et al. *OFID* 2021;8:ofab236
Vaughn VM et al. *Clin Infect Dis* 2021;18:e533-41.

Conclusions

- Changes in hospital AU observed during early phases of the COVID pandemic appeared unrelated to COVID burden and may have been due to indirect pandemic effects (e.g., case mix, healthcare resource shifts).
- By one year into the pandemic, these disruptive effects were not as apparent
- This represents rapid adoption of new treatment approaches by clinicians
- Lessons learned during COVID on changing antibiotic prescribing for viral pneumonia should be carried forward for stewardship intervention

Questions:
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