

Antimicrobial Stewardship and HAI Prevention: Insights from COVID-19

February 25, 2021



Rules of Engagement

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Participants



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Agenda

(15 min) Summary Review: Antimicrobial Use and Hospital Acquired Infections (HAIs) in COVID

(30 min) Roundtable Discussion

(15 min) Questions

COVID Pandemic: Current State of Play

- The COVID-19 pandemic has accounted for over **90 million cases worldwide** and **more than 400,000 deaths in the US**.
- Hospitalized COVID patients deal with more than just COVID
 - co-infection
 - MDRO (multidrug resistance)
 - ? mortality, readmission

Candida auris: Killer fungus spreading rapidly in coronavirus wards in US

WION Web Team

Washington, United States • Published: Jan 09, 2021, 11:04 AM (IST)



<https://pandemic.internationalsofos.com/2019-ncov/ncov-education-and-communication>
<https://coronavirus.jhu.edu/map.html>

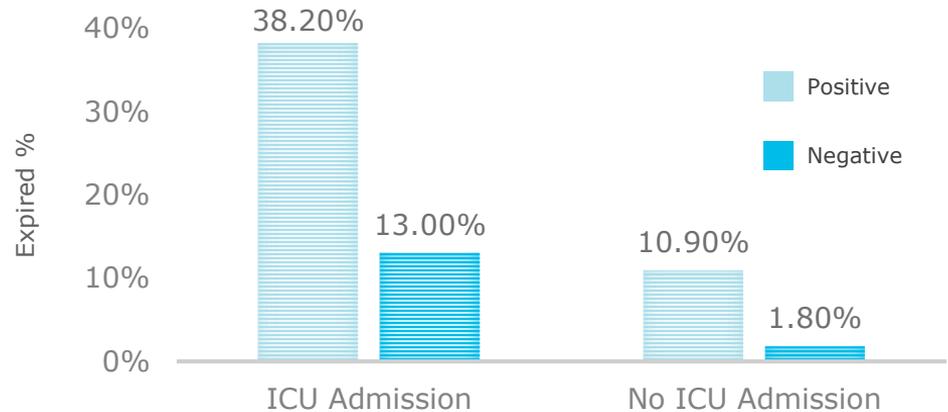
REF-20421, Prestel C, Anderson E, et al. Candida auris Outbreak in a COVID-19 Specialty Care Unit - Florida, July -August 2020, CDC Morbidity and Mortality Weekly Report, 2020.

Why Should we Still Care About COVID?

COVID testing status and hospital care:

- COVID+ patients (vs COVID -) have*:
 - Higher mortality (both ICU and non-ICU areas)
 - Longer length of stay
 - Higher rate % needing ICU care

	Admit	Col. %	ER Admit	AVG. LOS	ICU Admits	Avg. ICU LOS
Negative	131,123	87.0%	47.6%	5.4	17.5%	3.9
Positive	19,675	13.0%	57.0%	9.3	24.3%	8.1
Grand Total	150,798	100.0%	48.8%	5.9	18.4%	4.7



*Source: BD insights Research & Analytics, <https://www.bd.com/en-us/clinical-excellence/covid-19-insights-analytics>

* REF-20422, Musmar, J, Meeting Summary, PACCARB, Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria, 2020.

* REF-20423, Price-Haywood E, Burton J, Fort D, Seoane L, Hospitalization and Mortality among Black Patients and White Patients with COVID-19, NEJM, 2020.

Hospitals are Using Resources in COVID

Characteristic	Not tested for SARS-CoV-2 (n=457,655)	Tested for SARS-CoV-2	
		SARS-CoV-2 positive (n=17,075)	SARS-CoV-2 negative (n=124,979)
Demographics			
Male sex, n (%)	201,145 (44%)	9,053 (53%)	58,114 (46%)
Age, mean (SD) [median] years	48.5 (27.5) [54]	61.7 (18.0) [63]	58.5 (20.9) [62]
ICU Admissions: n (%)	47,405 (10.4%)	4,034 (24%)	20,969 (17%)
Specimens collected for other pathogens, n (%)	189,564 (41.4%)	16,706 (97.2%)	114,899 (91.9%)
Specimens positive for other pathogens, n (% of admissions with specimens collected)	53,114 (28.0%)	3,487 (20.9%)	24,539 (21.4%)

- Culturing practices differed based on SARS-CoV-2 status and tested or not.
 - SARS-CoV2 + were also cultured for other pathogens at **97%**
 - SARS-CoV2 – were also cultured at **92%** (COVID -) rate
 - No SARS-CoV2 test: **41%** culture rate

Culture Results: Possible Co-Infections

*Respiratory + cultures:

- COVID+ patients - 24%
- COVID - 15%
- No SARSCoV2 test - 14%

*ALL groups: Gram neg rods 45%

*Pseudomonas and Candida higher in COVID

*Co-infection in COVID patients with another respiratory virus 2.2%

*COVID patients had more cultures done later in the hospitalization

Source and pathogen distribution by SARS-CoV-2 testing status

Specimen Onset, Source, and Pathogens	Not tested for SARS-CoV-2 (n=457,655)	Tested for SARS-CoV-2	
		SARS-CoV-2 positive (n=17,075)	SARS-CoV-2 negative (n=124,979)
Any positive specimen	77,625	5,571	40,742
Specimen onset			
Admission period	61,990 (79.9%)	3,119 (56.0%)	31,534 (77.4%)
Hospital-onset period	15,635 (20.1%)	2,452 (44.0%)	9,208 (22.6%)
Specimen source, n (% positive specimens)			
Urine	22,026 (28.4%)	1,754 (31.5%)	10,409 (25.5%)
Respiratory	10,775 (13.9%)	1,324 (23.8%)	5,949 (14.6%)
Blood	12,306 (15.9%)	1,181 (21.2%)	10,287 (25.2%)
Other	16,804 (21.6%)	1,015 (18.2%)	7,721 (19.0%)
Skin/Wound	14,416 (18.6%)	275 (4.9%)	5,819 (14.3%)
Intra-abdominal	1,318 (1.7%)	22 (0.2%)	557 (1.4%)
Specimen pathogens, n (% total pathogens)			
Total pathogens	91,219	6,057	48,051
Any bacteria	71,496 (78.4%)	4871 (80.4%)	38,932 (81.0%)
Gram-negative	40,670 (44.6%)	2,791 (46.1%)	21,719 (45.2%)
Enterobacterales	26,462 (29.0%)	1,860 (30.7%)	14,128 (29.4%)
Pseudomonas aeruginosa	3,950 (4.3%)	410 (6.8%)	2,481 (5.2%)
Acinetobacter baumannii	279 (0.3%)	27 (0.4%)	162 (0.3%)
Gram-positive	30,826 (33.8%)	2,080 (34.3%)	17,213 (35.8%)
Staphylococcus aureus	11,247 (12.3%)	746 (12.3%)	6,710 (14.0%)
Enterococcus spp.	6,950 (7.6%)	575 (9.5%)	4,024 (8.3%)
Streptococcus pneumoniae	725 (0.8%)	99 (1.6%)	546 (1.1%)
Non-SARS-CoV-2 virus	14,327 (15.7%)	599 (9.9%)	5,908 (12.3%)
Respiratory viruses*	5,333 (5.8%)	136 (2.2%)	1,395 (2.9%)
Fungi	4210 (4.6%)	483 (8.0%)	2,445 (5.1%)
Candida spp.	1963 (2.2%)	365 (6.0%)	1,657 (3.4%)
Aspergillus spp.	122 (0.1%)	6 (0.1%)	121 (0.3%)

A Clinician View

*Hopkins

- Used clinical teams to determine whether cultures were clinically relevant
- 1016 hospitalized patients 3/1/2020 – 5/31/2020 (5 hospitals) for the first 7 days (Also used chart review of progress notes and xrays/radiology reports)
- Findings:
 - Bacterial respiratory co-pathogen with SARS-CoV-2 was 1.2%
 - Most patients (69%) still received antibiotics for pneumonia
 - Most common non-respiratory clinical infection was UTI (3%)
- Conclusions: “Using multidisciplinary consensus definitions, proven or probable...
 - *bCAP was uncommon in adults hospitalized due to COVID-19, as were other nonrespiratory bacterial infections.*
 - *Empiric antibiotic use was high,*
 - *highlighting the need to enhance antibiotic stewardship in the treatment of viral pneumonias.”*

Open Forum Infectious Diseases

MAJOR ARTICLE



Prevalence of Co-infection at the Time of Hospital Admission in COVID-19 Patients, A Multicenter Study

Sara M. Karaba,^{1,2} George Jones,¹ Taylor Helsel,² L. Leigh Smith,¹ Robin Avery,¹ Kathryn Dzintars,^{3,4} Alejandra B. Salinas,¹ Sara C. Keller,^{1,2} Jennifer L. Townsend,^{3,5} Eili Klein,⁶ Joe Amoah,⁷ Brian T. Garibaldi,^{3,8} Sara E. Cosgrove,^{1,2} and Valeria Fabre^{1,3}

The Need for ASP: Antimicrobial Stewardship Programs

- Antimicrobial use:
 - COVID + patients 68% } **21% Culture+**
 - COVID - patients 46% }
 - Vaughn et.al: 27-84% early antibiotic use*
- Antibiotics of note :
 - Extended spectrum 3rd/4th generation cephalosporins
 - Macrolides
 - Beta-lactams/inhibitors
 - Vancomycin
 - Fluroquinolones; Carbapenems

	Non-SARS-CoV-2 tested admissions (n=457,655)	SARS-CoV-2 positive (n=17,075)	SARS-CoV-2 negative (n=124,979)
Admissions Prescribed Antimicrobials (duration ≥ 24 hours; n (%))	118,453 (25.9%)	11,681 (68%)	56,809 (46%)
Admission to Abx Start (mean (SD); median hours)	25.7 ± 157.6 (1)	9.2 ± 51.9 (0)	9.9 ± 50.8 (0)
Duration of Abx (mean (SD); median days)	4.1 ± 3.9 (3)	6.0 ± 5.2 (4.7)	5.0 ± 4.7 (3.5)
Most Common Antimicrobial Classes Prescribed as a % of Discharges Prescribed an Abx			
3rd/4th Gen Cephalosporins	57,136 (48.2%)	8,643 (74%)	33,750 (59%)
Glycopeptides	34,971 (29.5%)	3,630 (31%)	21,719 (38%)
Macrolides	21,638 (18.3%)	8,036 (69%)	16,264 (29%)
β-lactam/β-lactamase inhibitors	35,861 (30.3%)	3,175 (27%)	19,073 (34%)
Fluoroquinolones	18,335 (15.5%)	1,277 (11%)	9,689 (17%)
1st/2nd Gen Cephalosporins	20,128 (17.0%)	560 (5%)	8,705 (15%)
Tetracyclines	7,968 (6.7%)	2,386 (20%)	6,386 (11%)
Carbapenems	8,230 (6.9%)	1,083 (9%)	5,025 (9%)
Antifungals	7,577 (6.4%)	658 (6%)	4,229 (7%)
Anti-influenza agents	3,459 (2.9%)	933 (8%)	998 (2%)

REF-20477, Pusniak L, Finelli I, Bauer K, Moise P, Yu K, De Anda C, et al. Incidence of Infections and Antimicrobial Usage among US Hospitalized Patients with and without COVID-19, ECCVID, MSD Poster, 2020.

REF-20425, Vaughn V, Gahdhi T, Petty L, Patel P, Malani A, et al. Empiric antibacterial Therapy and Community-onset Bacterial Coinfection in Patients Hospitalized with COVID-19, IDSA, 2020.

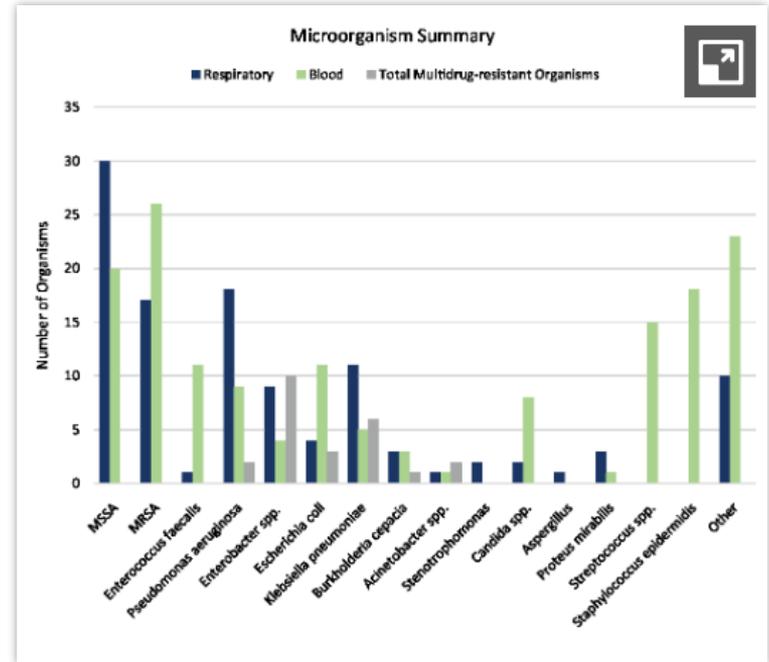
Adult and Pediatric Patients

- SARS-CoV-2 PCR+
- AND positive blood or respiratory culture
- N= 152
 - 91 patients (respiratory culture+)
 - 82 patients (blood culture +)
- 5 most common respiratory co-pathogens:
 - *S. aureus* (44%)
 - *P. aeruginosa* (16%)
 - *Klebsiella* spp (10%)
 - *Enterobacter* spp (8%),
 - *E. coli* (4%)

Concise Communication

Bacterial and fungal coinfections in COVID-19 patients hospitalized during the New York City pandemic surge

Priya Nori MD¹, Kelsie Cowman MPH¹, Victor Chen PharmD², Rachel Bartash MD¹, Wendy Szymczak PhD³,



COVID Adverse Post-hospital Outcomes

- 60-day outcomes after:
 - 1250 COVID patients discharged
 - 975 (78%) home; 158 (13%) SNF
 - At day 60: **84 had died**
 - 10.4% were in ICU
 - 6.7% were in medical ward
- By 60 days post discharge
 - 189 **(15%) readmitted**



The image shows a screenshot of a web page from the journal 'Annals of Internal Medicine'. The page title is 'Sixty-Day Outcomes Among Patients Hospitalized With COVID-19' and it is marked as 'FREE'. The authors listed are Vineet Chopra, MD, MSc, Scott A. Flanders, MD, and Megan O'Malley, PhD. The article is dated 11 November 2020 and is categorized as a 'Letter'. A DOI link is provided at the bottom: <https://doi.org/10.7326/M20-5661>.

Clinical Summary

Gaps

- Culture positive with COVID-19 infection is about 20%
- Relevant clinical co-infection, may be less (as low as 1-3%)
- Antimicrobial use on COVID patients is at 68% (27 -84%)
- In hospital mortality and post-hospital mortality is significant
- Readmission (15%)

Who will address these gaps?

- ASPs: deal with appropriate and timely antimicrobial use
- Infection Prevention: prevent infection spread and report HAIs

ASP and IP programs Pre COVID-19

- The Joint Commission licensing surveys
 - Infection Prevention support (mandated NHSN HAIs)
 - 2016: started auditing ASPs
- CMS codified as of March 2020:
 - ASPs are required to have certain components
 - Tethered ASPs and Infection Prevention Programs to CoP
- What happens to Antimicrobial Stewardship and Infection Prevention Programs **Post COVID?**



**Eddie Stenejem,
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**Rebekah Moehring,
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Roundtable **Topic #1**

How has your
ASP been
engaged in
the pandemic
response?



Eddie Stenejem,
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Rebekah Moehring,
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What HAI and antimicrobial use patterns have you seen in your institution?

How have “Metrics of success” for ASP changed?

Changes in diagnostic test policy?

Roundtable **Topic #2**

How have
**Infection
Prevention
programs**
interfaced with
ASPs during the
pandemic?



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Do HAI prevention bundles falter during surge capacity situations?

Insights to mitigation of bundle prevention failure?

Collaborations to facilitate safety and HCP welfare

Roundtable **Topic #3**

How can **stewardship programs** help during a pandemic/surge capacity seasons?



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Has the function of ASP teams changed due to the pandemic?

Is there a resource optimization role for ASPs during a pandemic (e.g. antimicrobial stocking, use of diagnostic tests/supplies)?

How can ASP teams proactively protect/identify at risk populations?

Roundtable **Topic #4**

What has the pandemic taught us about **Administrative pain points** during a pandemic and/or flu season preparation?



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“Pull through” learnings for long term enhancement of IPC and ASP teams?



Thank you

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Questions? Email bd.mms@bd.com

