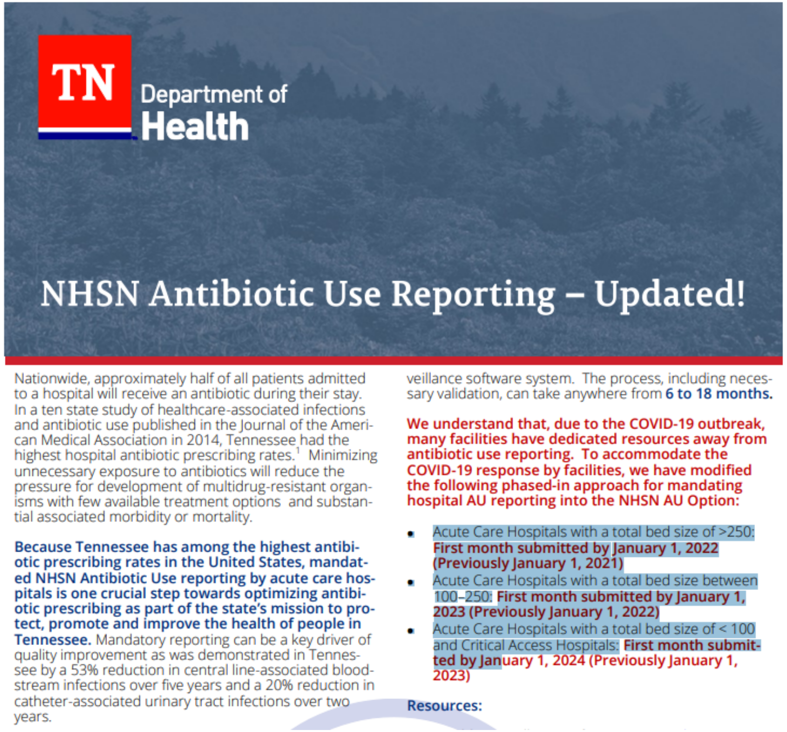
Antimicrobial Steward Call
December 12, 2023

Tennessee Department of Health
Healthcare Associated Infections and Antimicrobial Resistance Program

Welcome

Announcements

Other Reminders



TN Department of Health

NHSN Antibiotic Use Reporting – Updated!

Nationwide, approximately half of all patients admitted to a hospital will receive an antibiotic during their stay. In a ten state study of healthcare-associated infections and antibiotic use published in the Journal of the American Medical Association in 2014, Tennessee had the highest hospital antibiotic prescribing rates.[1] Minimizing unnecessary exposure to antibiotics will reduce the pressure for development of multidrug-resistant organisms with few available treatment options and substantial associated morbidity or mortality.

Because Tennessee has among the highest antibiotic prescribing rates in the United States, mandated NHSN Antibiotic Use reporting by acute care hospitals is one crucial step towards optimizing antibiotic prescribing as part of the state's mission to protect, promote and improve the health of people in Tennessee. Mandatory reporting can be a key driver of quality improvement as was demonstrated in Tennessee by a 53% reduction in central line-associated bloodstream infections over five years and a 20% reduction in catheter-associated urinary tract infections over two years.

veillance software system. The process, including necessary validation, can take anywhere from **6 to 18 months.**

We understand that, due to the COVID-19 outbreak, many facilities have dedicated resources away from antibiotic use reporting. To accommodate the COVID-19 response by facilities, we have modified the following phased-in approach for mandating hospital AU reporting into the NHSN AU Option:

- Acute Care Hospitals with a total bed size of >250: **First month submitted by January 1, 2022 (Previously January 1, 2021)**
- Acute Care Hospitals with a total bed size between 100–250: **First month submitted by January 1, 2023 (Previously January 1, 2022)**
- Acute Care Hospitals with a total bed size of < 100 and Critical Access Hospitals: **First month submitted by January 1, 2024 (Previously January 1, 2023)**

Resources:

- Acute Care Hospitals with a total bed size > 100: Already Required
- Acute Care Hospitals with a total bed size of < 100 and Critical Access Hospitals: First month submitted by Jan 2024
- CMS Promoting Interoperability: AU AND AR for CY 2024

AU Reports

- Quarterly Reports Disseminated for:
  - AU Quality Report
  - SAAR Report
    - Initial Report lacked ICU SAARs for Medium-sized facilities
    - Working to correct
  - AU PP Survey
    - Final Survey will be for Q4 2023

Stewardship Risk Score

- **Survey has been sent out to all stewards in Tennessee, Colorado, and Virginia**
  - Results to help guide the workgroup
  - Currently analyzing results from survey
  - Thank you for completing!

- Recruiting for workgroup of subject matter experts to help determine
  - Quantify value of each stewardship intervention listed in the NHSN Annual Hospital Survey

Analysis of National Healthcare Safety Network Antimicrobial Use of Tennessee 2019–2022

Analysis of National Healthcare Safety Network Antimicrobial Use of Tennessee 2019–2022.

TN Department of Health

Dipen M Patel, MBBS, MPH, Cullen Adre, PharmD, Callyn Wren, PharmD, Cari Simmons, MSN, RN, CIC, Christopher Evans, PharmD

Tennessee Department of Health, Nashville, TN

Background

- The National Healthcare Safety Network (NHSN) Antimicrobial Use (AU) Option allows antimicrobial stewardship programs to track, analyze, and report AU trends.
- The AU rate allows inter- and/or intra-facility comparisons among specific wards, combined wards, and facility-wide aggregated data.
- The Tennessee Healthcare-Associated Infections and Antimicrobial Resistance (HAI/AR) Program uses the NHSN AU Option to calculate facilities' AU rates and aggregates them at state and regional levels.
- In 2022, Tennessee began requiring all acute care hospitals to report into the NHSN's AU Option in a phased approach.

Methods

- Data was collected from the NHSN Antibiotic Use (AU) Option from January 2019 through December 2022.
- Facility-wide inpatient data from acute care hospitals that reported into AU Option during that time period were included in the study.
- AU rates were calculated as Antimicrobial Days of Therapy (DOT) per 1000 Days Present (DP) for facilities and aggregated by facility bed-size and geographic region.
- Data also identified the most used antimicrobial drugs across the state facilities by AU rates.

Results/Figures

- A total of 73 facilities have reported at least one month into NHSN AU Option.
- Statewide AU Rate increased from 595 to 606 DOT/1000 DP, ($p<0.0001$) (figure 1).
- Most reporting facilities (n=28) fell in the 101–250 bed-size category with a reported AU rate of 622 DOT/1000 DP. The highest AU rate was observed with the <100 bed-size category at 721 DOT/1000 DP.
- The Tennessee regions showed variation in AU rate over the years 2019-2022 with AU rate highest in West TN at 743 DOT/1000 DP and lowest in Southeast TN at 513 DOT/1000 DP (Figure 2).
- Most commonly used antimicrobials were vancomycin, ceftriaxone and piperacillin/tazobactam (311, 302, 240 DOT/1000 DP, respectively) (figure 3).

Figure 1: AU rate over 2019-2022

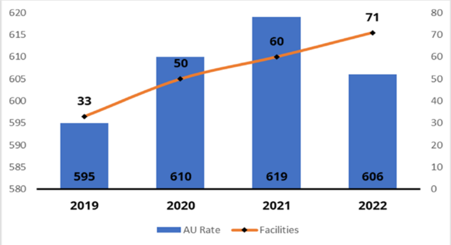


Figure 2: AU rate by TN regions over 2019-2022

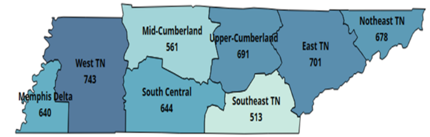
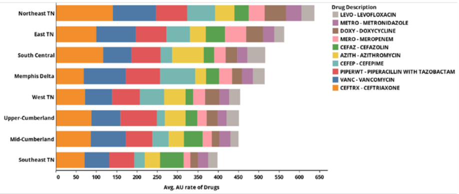


Figure 3: Most Common used Antimicrobials

Figure 4: Avg. AU rate of Antimicrobials by regions



Discussion and Conclusions

- The number of TN facilities submitting AU data into NHSN has increased since 2019.
- The AU rate is high among medium bed-size facilities.
- We did observe significant variation in AU rates among the different regions in TN.
- The HAI/AR program identifies facilities with high AU and areas for potential interventions to improve AU in TN.
- This analysis shows how state HAI/AR programs can access and leverage NHSN AU Option data to replicate in their respective jurisdictions.

Disclosure

Nothing to Disclose

Contact Information

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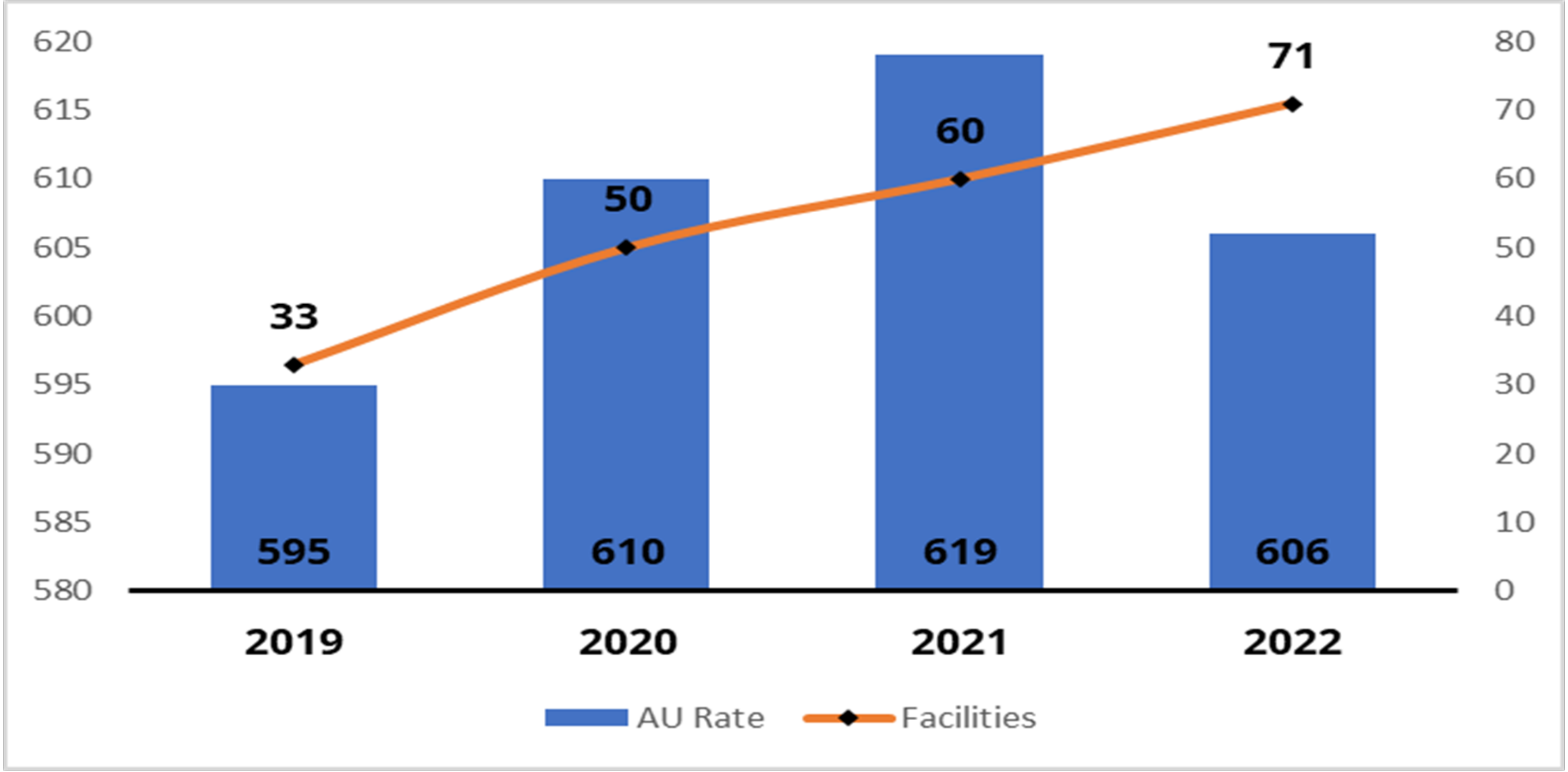

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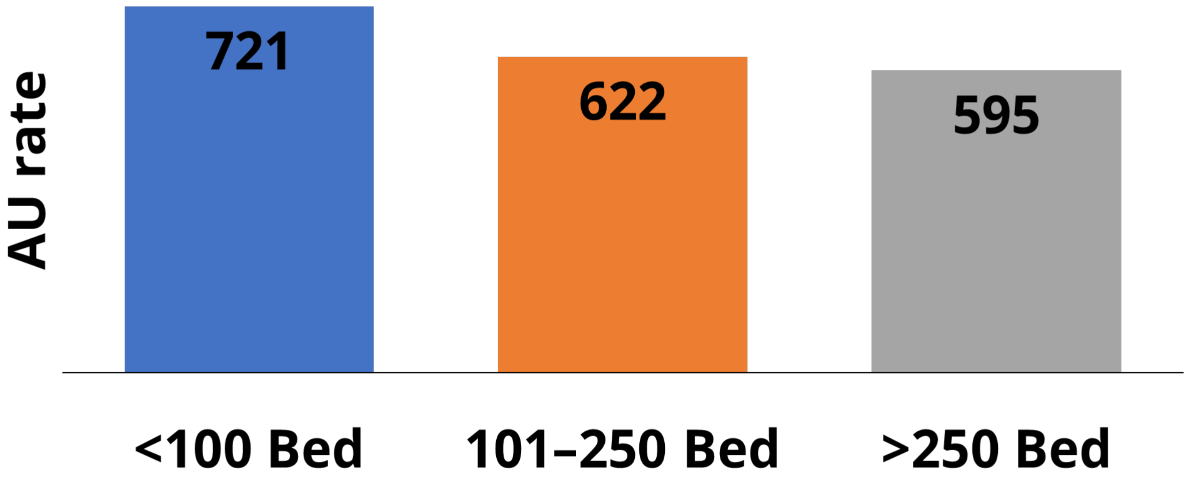

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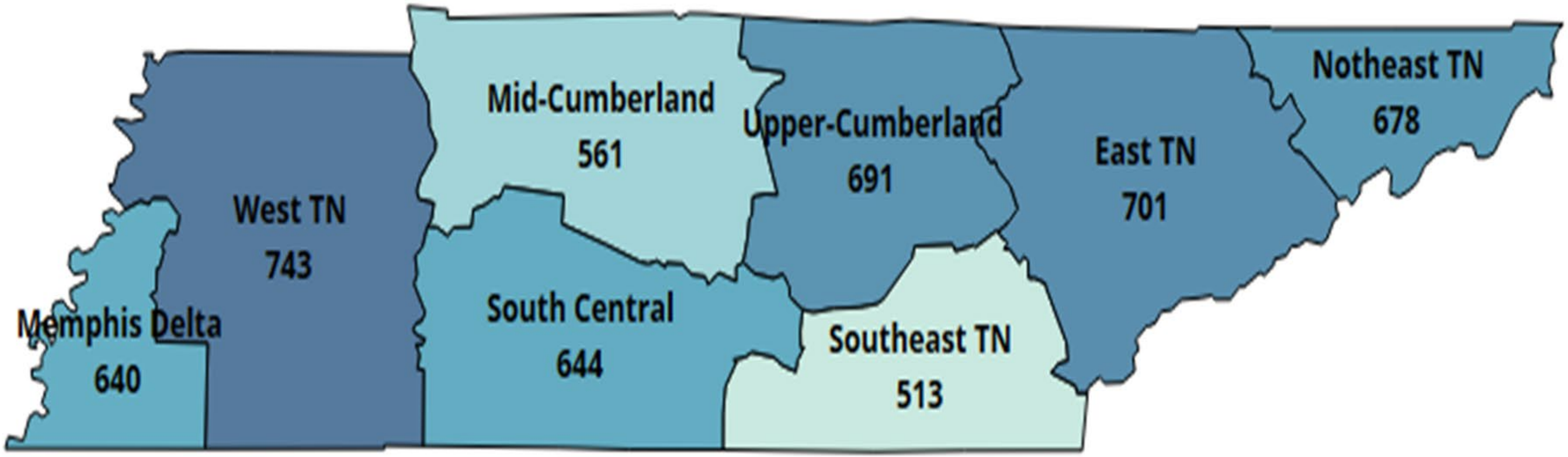

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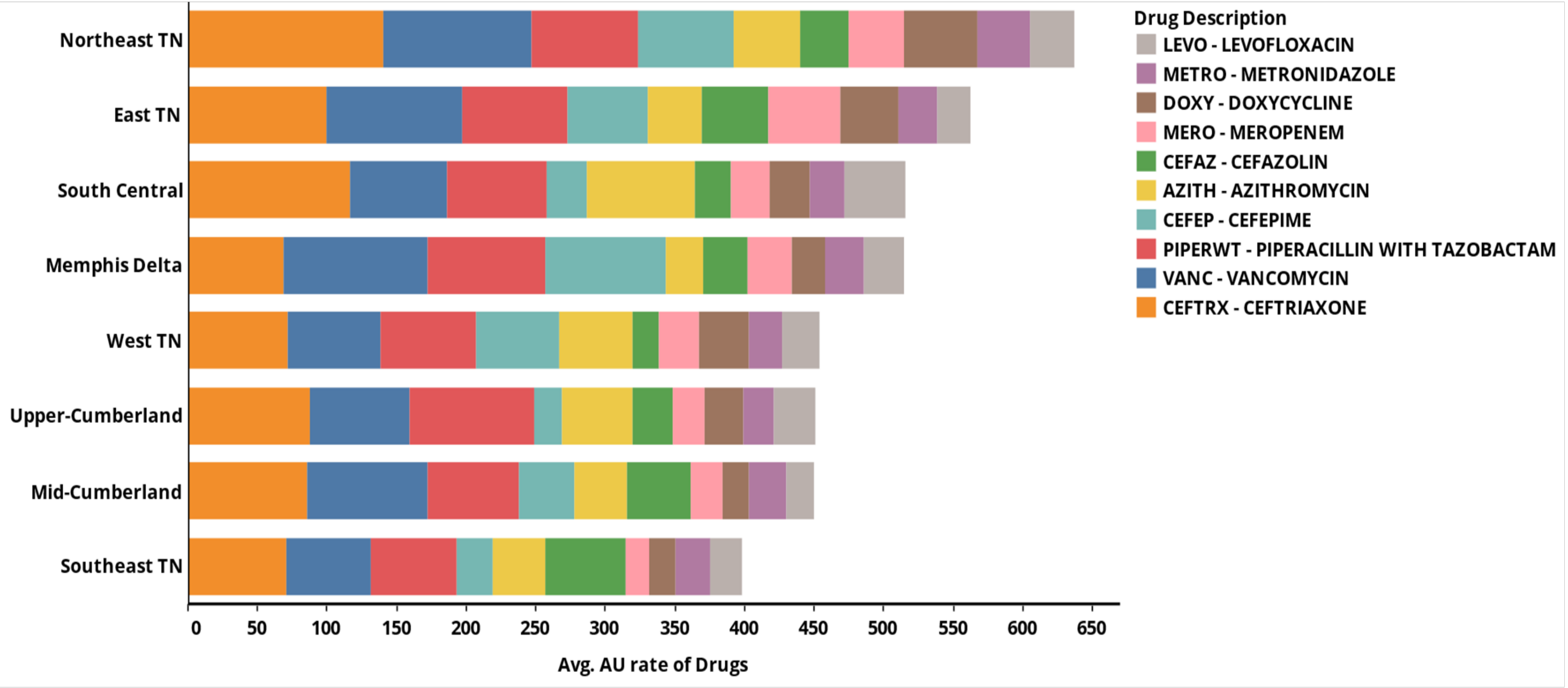

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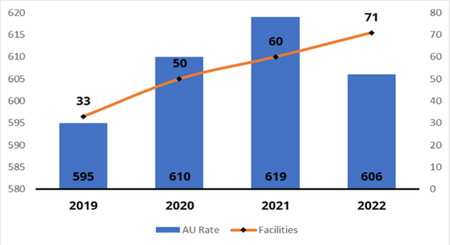

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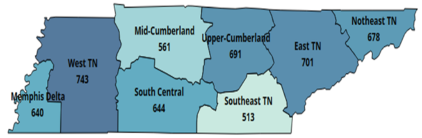

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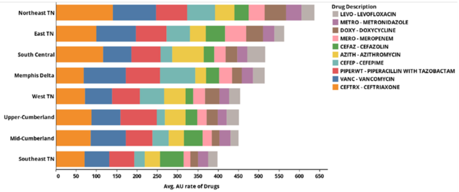

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ADS 26

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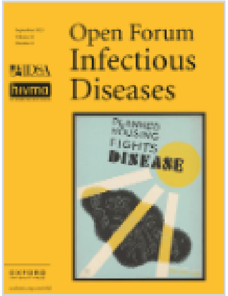
https://doi.org/10.1016/j.ajic.2023.04.014

CDC Health Equity and Antibiotic Prescribing Scoping Review

Health Equity and Antibiotic Prescribing



Volume 10, Issue 9
September 2023

JOURNAL ARTICLE

Health Equity and Antibiotic Prescribing in the United States: A Systematic Scoping Review

Christine Kim, Sarah Kabbani, William C Dube, Melinda Neuhauser, Sharon Tsay, Adam Hersh, Jasmine R Marcelin, Lauri A Hicks   Author Notes

Open Forum Infectious Diseases, Volume 10, Issue 9, September 2023, ofad440, https://doi.org/10.1093/ofid/ofad440

Published: 19 August 2023   **Article history** ▾

Acknowledgment

- Slides presented by Capt. Lauri Hicks at the SHEA Advancing Health Equity in Antimicrobial Stewardship Workshop, September 2023, Atlanta, GA

Definitions

- **Disparity**: difference in health, services, or outcomes by some variable (e.g., age, race, insurance). May or may not be clinically justifiable.
- **Health equity**: the state in which everyone has a fair and just opportunity to attain their highest level of health.
- **Marker**: characteristics of a sub-population experiencing a health inequity.
  - e.g., race, ethnicity, geography
- **Driver**: the factors that create, perpetuate, or exacerbate a health inequity.
  - e.g., racism, income inequality

Search Strategy

- **Literature search** conducted using Medline, Embase, and Scopus
- Timeline: **January 1, 2000-January 4, 2022**
- Titles, abstracts, keywords of full articles published in **English**
- Terms related to **antibiotic use**, **antibiotic stewardship**, and **health equity**
- Health equity search terms based on the **"MEDLINE®/PubMed® Health Disparities and Minority Health Search Strategy"** available on the National Library of Medicine's website

Settings and Themes

- Setting
  - 55 Outpatient
  - 3 Dentistry
  - 2 Long-term care
  - 1 Acute care
- Most common health equity themes
  - Age
  - Sex
  - Race/ethnicity
  - Insurance status/type
  - Geography/rurality
  - Comorbidities
  - Prescriber type/setting/specialty

Biological Sex

- Results are inconsistent
- **Females more likely to receive antibiotics and broad-spectrum antibiotics** compared to males
- Unclear whether this difference represents a health inequity since females have more interactions with healthcare during their childbearing years

Wattles BA, et al. J Rural Health 2022;38:427-32.
Copp HL, et al. Pediatrics. 2011 Jun;127(6):1027-33.

Age

- **<5 years of age**
  - Kentucky Medicaid study found that **children between 0-2 years of age 39% more likely to receive inappropriate antibiotics** than children 10-19 years of age
- **Older adults**
  - **More likely to receive antibiotics** for respiratory conditions **and more likely to receive non-guideline concordant care** for urinary tract infections than younger adults

Wattles BA, et al. Infect Control Hosp Epidemiol. May 12 2021:1-7.
Schroeder AM, et al. Am J Emerg Med. 09 2021;47:66-69.
Langner JL, et al. Research Support, N.I.H., Extramural. Am J Obstet Gynecol. 09 2021;225(3):272.e1-272.e11.

Race and Ethnicity

- People in racial or ethnic minority groups were less likely to be diagnosed with a condition warranting an antibiotic, less likely to receive antibiotics overall, and less likely to receive broad-spectrum antibiotics.
  - **Black children 25% less likely to receive an antibiotic** from the **same clinician**, and **12% less likely to receive a broad-spectrum antibiotic** than non-Black children
  - **Non-Hispanic Black and Hispanic children less likely to receive antibiotics for viral respiratory infection** (NH black (adjusted odds ratio [aOR] 0.44; CI 0.36–0.53), Hispanic (aOR 0.65; CI 0.53–0.81))
- While in this specific instance, this seems to reflect more guideline-concordant, higher quality care BEWARE of misinterpreting this finding as an intention to deliver higher quality care.
  - **Black children 28% less likely to receive antibiotics when they were indicated for a respiratory infection.**

Gerber JS, et al. Pediatrics. Apr 2013; 131(4): 677-84.
Goyal, et al. Pediatrics. Dec 2011;128(6):1053-61.
Kornblith, et al. Am J Emerg Med. Feb 2018;36(2):218-225.

Insurance Status

- Similar to race, lower socioeconomic status may lead to less intensive care, which in the case of antibiotic prescribing for certain conditions may be inadvertently better
- **Women covered by Medicaid** being treated for urinary tract infections **36% more likely to receive a guideline-concordant antibiotics** compared with those covered by third-party insurance
- **Children with public or no insurance less likely** (OR: 0.79 [95% CI: 0.66–0.94] than those with private insurance **to receive a broad-spectrum antibiotic**

Langner JL, et al. Am J Obstet Gynecol. 09 2021;225(3):272.e1-272.e11.
Hersh AL, et al. Pediatrics. Dec 2011;128(6):1053-61.

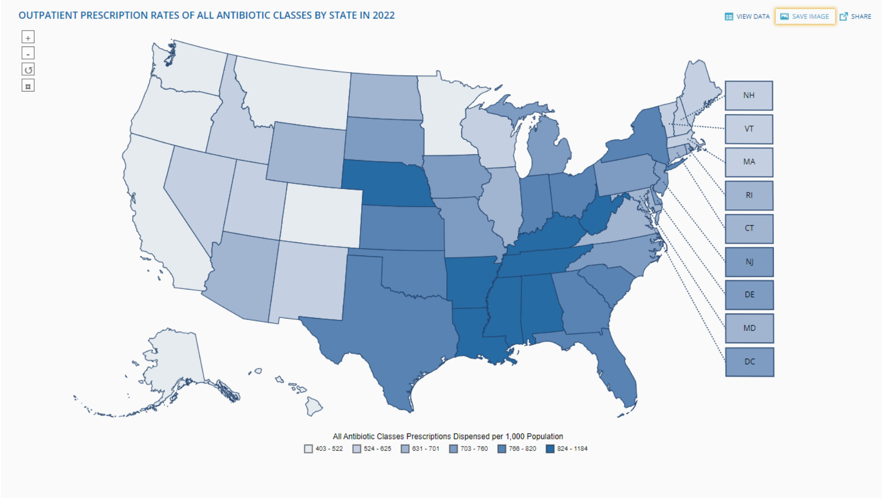
Prescriber Type/specialty

- Older physicians, male clinicians, advanced practice providers, non-internal medicine, and non-pediatric clinicians had higher rates of antibiotic prescribing.
- Pediatrician prescribing for children is more likely to be guideline-concordant compared with non-pediatricians for respiratory infections.
  - **Pediatricians more likely to not prescribe** for upper respiratory infections (86.6%) **compared with advanced practice practitioners** (76.8%) and **non-pediatricians** (80.8%).
  - Other examples in literature suggest differences in quality of prescribing according to clinician type

Frost HM, et al. J Pediatr. 12 2018;203:76-85.e8.

Geography and Rurality

- South has the highest rates of antibiotic use, and studies assessing prescribing for respiratory infections also show more inappropriate prescribing in the South compared to other regions.
  - **Children living in the South were 82% more likely to receive a broad-spectrum antibiotic than those living in the West census region** (aOR = 1.82, 95% CI = 1.30, 2.55; other regions not significantly different from the West).



- Rural location associated with higher inappropriate antibiotic use.
  - Among **children insured by Kentucky Medicaid, those living in a rural area were 9% more likely to receive an inappropriate antibiotic prescription** compared to children in urban area.

Hersh AL, et al. Pediatrics. Dec 2011;128(6):1053-61.
Wattles BA, et al. Infect Control Hosp Epidemiol. May 12 2021:1-7.
https://arpsp.cdc.gov/profile/antibiotic-use/all-classes

Health Equity Markers and Drivers

Characteristics associated with antibiotic prescribing	Markers	Drivers[1]
White non-Hispanic persons	Race/ethnicity	Implicit bias, differential access, expectations
Age <5 and ≥65 years	Age	Implicit bias, comorbid conditions
Female	Biologic sex	Interactions with healthcare, gender bias
Private insurance	Insurance status, socioeconomic status	Structural inequities, differential access, health literacy
Seen by advanced practice or family practice provider	Clinician specialty, setting	Engagement with stewardship, variable antibiotic use training
Live in South census or rural setting	Geography, rurality	Cultural norms, access to expertise

[1] Examples from literature and expert review

Limitations

- Most studies **did not have health equity as an objective**.
  - Not the exposure of interest
  - Many studies excluded because they did not include multivariable modeling
  - Among studies included that used multivariable modeling, often sociodemographic variables were excluded from models because they were insignificant in univariate analyses
- Data
  - Many areas understudied or completely missing, if collected often aggregated
  - Missingness in demographic variables within certain datasets.
- Findings **primarily represent outpatient setting**.
- When included in an article, there tends to be an association observed. Potential publication bias.
- **No articles assessing gender identity, sexual orientation, disability, homelessness, or immigrant or refugee status**

Next Steps:

- Clinicians, antibiotic stewards, and health system leadership should be aware that prescribing behavior varies according to both clinician- and patient-level markers.
- Assessing potentially modifiable drivers is an important next step.
- Researchers should include health equity-related objectives to improve characterization of health equity issues.
- Antibiotic stewardship interventions should be designed to address drivers of health inequities and examine the effects of interventions on equity.

Gender Discrepancies in Stewardship Recommendations

Health Equity: Pharmacist Gender and Physician Acceptance of Antibiotic Stewardship Recommendations

Infection Control & Hospital Epidemiology (2023), **44**, 570–577
doi:10.1017/ice.2022.136

SHEA

Original Article

Pharmacist gender and physician acceptance of antibiotic stewardship recommendations: An analysis of the reducing overuse of antibiotics at discharge home intervention

Valerie M. Vaughn MD, MSc[1,2,3], Daniel L. Giesler MD, PharmD[3], Daraoun Mashrah PharmD[4], Adamo Brancaccio PharmD[4], Katie Sandison PharmD[4], Emily S. Spivak MD, MHS[5], Julia E. Szymczak PhD[6], Chaorong Wu PhD[7], Jennifer K. Horowitz MA[3], Linda Bashaw BA[8] and Adam L. Hersh MD, PhD[9]

[1]Division of General Internal Medicine, Department of Internal Medicine, University of Utah School of Medicine, Salt Lake City, Utah, [2]Division of Health System Innovation & Research, Department of Population Health Science, University of Utah School of Medicine, Salt Lake City, Utah, [3]Division of Hospital Medicine, Department of Internal Medicine, Michigan Medicine, Ann Arbor, Michigan, [4]Department of Pharmaceutical Services, Michigan Medicine, Ann Arbor, Michigan, [5]Division of Infectious Diseases, Department of Internal Medicine, University of Utah School of Medicine, Salt Lake City, Utah, [6]Department of Biostatistics, Epidemiology and Informatics, University of Pennsylvania Perelman School of Medicine, Philadelphia, Pennsylvania, [7]Division of Epidemiology University of Utah, Salt Lake City, Utah, [8]Clinical Experience and Quality Program, Department of Internal Medicine, Michigan Medicine, Ann Arbor, Michigan and [9]Division of Infectious Diseases, Department of Pediatrics, University of Utah School of Medicine, Salt Lake City, Utah

TN

Study Design

- May to October 2019, single academic medical center
- 20 clinical pharmacists (12 women, 8 men)
  - No specialist postgraduate infectious diseases residency training
- Antibiotic timeouts held prior to discharge to improve discharge antibiotic prescribing
- Patients eligible if receiving antibiotic therapy on a hospital medicine service
- Antibiotic stewardship team designed pocket cards with discharge recommendations for most common inpatient diseases

Antibiotic Timeouts

- ~15 minutes
- Patients with anticipated discharge within 48 hours

4 Common Recommendations

- Stopping unnecessary therapy
- Reducing excessive duration
- Improving appropriate selection
- Documenting the antibiotic plan in the discharge summary

Outcomes

- Percentage of antibiotic recommendations made by pharmacists that were accepted by hospitalists
- 295 antibiotic timeouts/6-month study period
  - 158 (53.6%) conducted by 12 female pharmacists
  - 137 (46.4%) conducted by 8 male pharmacists
- Most common diagnoses: PNA (28.5%) & UTI (28.1%)

Results

- Antibiotic prescribed at discharge:
  - 110/137 (80.3%) male pharmacists vs. 146/158 (92.4%) of female pharmacists (P<0.001)
- Changes recommended in 82 timeouts - 51 (62.2%) were accepted
- Duration was the most common recommendation & most likely to be accepted by clinicians
- Female pharmacists were less likely to recommend an antibiotic change:
  - 30 (19%) of 158 timeouts vs. 52 (38%) of 137 timeouts by male pharmacists (P<0.001)

TN

Results

- Female pharmacists' recommendations were less likely to be accepted by hospitalists than male pharmacist recommendations
  - **10/30 (33.3%)** recommendations vs. **41/52 (78.8%)** recommendations ($P<0.001$)
- Female pharmacists were less likely to have an antibiotic timeout result in an antibiotic change
  - 10/158 timeouts (6.3%) vs. 41/137 (29.9%) timeouts ($p<0.001$)

TN

Conclusions

- Antibiotic timeouts conducted by female pharmacists were substantially less likely (aOR, 0.15) to result in an antibiotic change when compared to timeouts conducted by male pharmacists
- Physicians have decision-making authority
- Antibiotic stewardship “consults” typically unsolicited & depend on pre-existing relationships
- Pharmacists are strategic on when to make recommendations

Next Steps

- **Next Call**
  - February 13 2pm Eastern/1pm Central Time
  - Topic: Targeted Assessment for Antimicrobial Stewardship
  - Topic: Stewardship Risk Score Survey Results
  - Topic: Fever in ICU Guidelines

- **Feedback always appreciated**
  - Christopher.evans@tn.gov