Concise Communication

Antibiotic prescribing in mental health units across the Veterans’ Health Administration: How much and how appropriate?

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Abstract

We evaluated antibiotic-prescribing across 111 mental health units in the Veterans’ Health Administration. We found that accurate diagnosis of urinary tract infections is a major area for improvement. Because non–mental-health clinicians were involved in most antibiotic-prescribing decisions, stewardship interventions for mental health patients should have a broad target audience to be effective.

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Methods

The Institutional Review Board of the University of Iowa and the Research & Development Committee of the Iowa City Veterans Affairs Health Care System approved this study and waived informed consent.

Using the Veterans’ Affairs Informatics and Computing Infrastructure (VINCI), we collected administrative data on all patients admitted to an inpatient mental health ward in VHA between January 1, 2016 and December 31, 2018. This cohort included data from inpatient mental health units across 111 unique medical centers, including 105 medical centers with an acute-care hospital. We excluded substance abuse rehabilitation units and domiciliaries.

Inpatient and postdischarge antibiotics were collected from the bar-coded medication administration records (BCMA) and outpatient medication files, respectively. Antibiotics included all agents and routes of administration listed in the National Healthcare Safety Network’s (NHSN) Antimicrobial Use protocol.

Results

Antibiotic use

There were 252,588 patient admissions across the 111 mental health units. Mental health units averaged 759 admissions per year (SD, 436). During the study period, 27,401 (10.9%) patient admissions had antibiotics administered while hospitalized on the mental health unit (Table 1). The diagnoses that were most commonly associated with an antibiotic prescription were UTI (n = 5,026, 18.3%), SSTI (n = 2,992, 10.9%), and ARIs (n = 1,935, 7.1%), which included acute bronchitis, pharyngitis, sinusitis and upper respiratory tract infections. The median total duration of therapy in patients who received antibiotics, including inpatient and after discharge, was 7 days (IQR 4-10).

Across all 111 sites, the median inpatient antibiotic DOT per 1,000 days present was 73.5 (IQR, 60.4–86.1) The most commonly

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prescribed agents, as quantified by DOT per 1,000 days-present, were trimethoprim-sulfamethoxazole (10.7), cephalosporins (9.5), tetracyclines (8.8), anti-influenza medications (8.3) and fluoroquinolones (8.0).

Manual chart reviews to assess guideline-concordance

Table 2 shows the findings from the manual chart reviews, including the percentage of cases in which the reviewers disagreed. Among 111 UTI cases, 27 cases (24.3%) had documentation of altered mental status. For 56 cases (50.5%), documentation indicated the absence of local genitourinary symptoms, and an additional 7 cases (6.3%) had negative urine cultures collected before antibiotics were initiated. Therefore, the diagnosis of UTI was not supported by history or laboratory findings in 63 cases (56.8%). In 21 cases (18.9%) documentation could not be found that indicated that anyone had asked the patient about local genitourinary symptoms.

For 101 SSTI cases, a documented history of active intravenous drug use was present in 25 cases (24.8%). In 6 (5.9%) cases with chronic bilateral lower leg skin changes, we found no documented evidence of cellulitis but antibiotics had still been prescribed for these patients. In the remaining 95 cases with infection (39 purulent and 56 nonpurulent), antibiotic selection and duration was guideline concordant in 75 (78.9%) and 86 (90.5%) cases, respectively.

The 108 ARI cases included 55 cases (50.9%) of upper respiratory tract infections, 20 cases (18.5%) with pharyngitis, 13 cases (12.0%) of sinusitis, and 20 cases (18.5%) of acute bronchitis, which included 1 case recategorized as an acute exacerbation of chronic obstructive pulmonary disease. In 76 cases (70.4%) an antibiotic was not indicated and not prescribed. In 29 cases (26.9%) an antibiotic was not indicated but had still been prescribed, and in 3 cases (2.8%) an antibiotic was both indicated and prescribed.

Antibiotic recommendations were made by emergency department clinicians in 81 (25.3%) of the manually reviewed cases; recommendations were made by internal medicine clinicians in 89 cases (27.8%); and recommendations were made by infectious diseases clinicians in 2 cases (0.6%). At least 1 of these services was involved in 161 (50.3%) of all reviewed cases, including 54 cases

| Characteristic                          | Antibiotic Received (n = 27,401) | No antibiotic Received (n = 225,187) | Total (n = 252,588) |
|----------------------------------------|----------------------------------|-------------------------------------|---------------------|
| Age, mean y (SD)                       | 54.7 (14.2)                      | 50.8 (14.3)                         | 51.2 (14.4)         |
| Sex, no. (%)                           |                                  |                                     |                     |
| Male                                   | 23,168 (84.5)                    | 204,307 (90.7)                     | 227,475 (90.1)      |
| Female                                 | 4,233 (15.5)                     | 20,880 (9.3)                       | 25,113 (9.9)        |
| Race, no. (%)                          |                                  |                                     |                     |
| White                                  | 17,863 (65.2)                    | 145,126 (64.4)                     | 162,989 (64.5)      |
| Black or African American              | 7,646 (27.9)                     | 63,225 (28.1)                      | 70,871 (28.0)       |
| American Indian or Alaska Native       | 272 (1.0)                        | 2,002 (0.9)                        | 2,274 (0.9)         |
| Native Hawaiian or Pacific Islander    | 173 (0.6)                        | 1,469 (0.7)                        | 1,642 (0.7)         |
| Asian                                  | 115 (0.4)                        | 1,404 (0.6)                        | 1,519 (0.6)         |
| Missing                                | 1,332 (4.9)                      | 11,961 (5.3)                       | 13,293 (5.3)        |
| Ethnicity, no. (%)                     |                                  |                                     |                     |
| Hispanic or Latino                     | 1,295 (4.7)                      | 13,623 (6.0)                       | 14,918 (5.9)        |
| Psychiatric diagnosis, no. (%)         |                                  |                                     |                     |
| Substance use disorder                 | 19,920 (72.7)                    | 173,123 (67.8)                     | 193,043 (76.4)      |
| Schizoaffective disorder               | 17,284 (63.1)                    | 143,330 (63.6)                     | 160,614 (63.6)      |
| Anxiety disorder                       | 14,545 (53.1)                    | 128,240 (56.9)                     | 142,785 (56.5)      |
| Psychosis                              | 6,903 (25.2)                     | 47,313 (21.0)                      | 54,216 (21.5)       |
| Personality disorder                   | 4,224 (15.4)                     | 33,103 (14.7)                      | 37,327 (14.8)       |
| Comorbid conditions, no. (%)           |                                  |                                     |                     |
| Drug abuse                             | 14,682 (53.6)                    | 121,648 (54.0)                     | 136,330 (54.0)      |
| Alcohol use disorder                   | 13,434 (49.0)                    | 120,291 (53.4)                     | 133,725 (52.9)      |
| Asthma/COPD                            | 6,478 (23.6)                     | 38,507 (17.1)                      | 44,985 (17.8)       |
| Diabetes                               | 6,299 (23.0)                     | 38,279 (17.0)                      | 44,578 (17.6)       |
| Neurologic disorder                    | 3,544 (12.9)                     | 19,294 (8.6)                       | 22,838 (9.0)        |
| Dementia                               | 2,773 (10.1)                     | 11,551 (5.1)                       | 14,324 (5.7)        |
| Renal failure                          | 2,044 (7.5)                      | 10,339 (4.6)                       | 12,383 (4.9)        |
| Length of stay, median d (IQR)         | 7 (3–13)                         | 5 (3–9)                            | 5 (3–9)             |
Skin and Soft-Tissue Infections, and Acute Respiratory Tract Infections Across 111 VHA Medical Centers, 2016

antibiotic therapy.4

ies in acute-care hospitals have reported that half of all patients are exposed to an antibiotic. In contrast, stud-

In this study across 111 inpatient mental health units in the VHA, 1

Discussion

In this study across 111 inpatient mental health units in the VHA, 1 of every 10 patients was exposed to an antibiotic. In contrast, studies in acute-care hospitals have reported that half of all patients are exposed to an antibiotic.4

The most common reason for antibiotic therapy in these inpatient mental health wards was a suspected UTI, but most UTI cases had the documented absence of local genitourinary symptoms or had no documentation suggesting that a clinician inquired about these symptoms. In many cases, the presence of altered mental status appeared to be a driver of antibiotic therapy even though antibiotics are not recommended for bacteriuria in the context of cognitive impairment alone.5 Overall, these findings suggest that UTI is commonly misdiagnosed and therefore represent an optimal target for stewardship efforts. We also identified some opportunities to improve antibiotic-prescribing for SSTIs and ARIs.

Our results revealed that emergency department and internal medicine clinicians commonly provided treatment recommendations in mental health patients with suspected infections. Because antibiotic-prescribing was not consistently better when these services were involved, antibiotic stewardship interventions to

(48.7%) with UTI, 70 cases (69.3%) with SSTI, and 37 cases (34.3%) with ARI. When these nonpsychiatric services were involved, we detected no differences in the quality of antibiotic-prescribing for UTIs or SSTIs and less guideline-concordant management for ARI (Supplementary Table 3 online).

Table 2. Assessment of Guideline-Concordant Diagnoses and Antibiotic Management for Inpatient Mental Health Patients Diagnosed With Urinary Tract Infections, Skin and Soft-Tissue Infections, and Acute Respiratory Tract Infections Across 111 VHA Medical Centers, 2016–2018

| Variable | Urinary Tract Infections | Skin and Soft-Tissue Infections | Acute Respiratory Tract Infections |
|----------|--------------------------|---------------------------------|-----------------------------------|
|          | (n = 111)                | (n = 101)                       | (n = 108)                         |
| Documentation and laboratory findings, if applicable, supported diagnosis of infection | 27 (24.3) | 95 (94.1) | 108 (100) |
| No | 63 (56.8) | 6 (5.9) | 0 (0) |
| Unable to assess | 21 (18.9) | . | . |
| Guideline-concordant antibiotic selection, no (%) | 38 (79.2) | 75 (78.9) | 79 (73.1) |
| No | 10 (20.8) | 20 (21.1) | 29 (26.9) |
| Guideline-concordant-antibiotic duration, no. (%) | 29 (60.4) | 86 (90.5) | 79 (73.1) |
| Too long | 18 (37.5) | 9 (9.5) | 29 (26.9) |
| Too short | 1 (2.1) | 0 | 0 |
| Antibiotic duration, median d (IQR) | 7 (6.5–10) | 8 (6–10) | 0 (0–5) |
| Secondary reviewer changed original assessment, no (%) | 12 (10.8) | 36 (35.6) | 2 (1.9) |

Note. IQR, interquartile range.

We also identified some opportunities to improve antibiotic-prescribing in VHA mental health units must target both mental health clinicians as well as these other physician disciplines.6

Our findings are in line with prior work that has described the frequent misdiagnosis of UTIs.7,8 We speculate that a major contributor to the overdiagnosis of UTIs is the seemingly routine performance of urinalyses in admitted patients.9 More thoughtful ordering and interpretation of urine studies may help mitigate incorrect UTI diagnoses and subsequent unnecessary antibiotic use.10

Our study had a few limitations. First, our manual chart reviews were dependent on the quality of the clinicians’ documentation and our ability to ascertain key data elements in the medical record. To minimize the possibility of omission, we had 2 team members review each included case. Second, to assess guideline concordance, we sampled an equal number of cases from each facility regardless of bed size. As a result, antibiotic-prescribing practices at smaller facilities, which contributed less to total national antibiotic use, may have disproportionately influenced our overall assessments of guideline discordance. Third, because we specifically looked for cases coded as a UTI, we may have overlooked asymptomatic cases in which abnormal urine studies were correctly not attributed to a UTI. Finally, our findings may not be generalizable to non-VHA settings.

In conclusion, our study measured and evaluated antibiotic-prescribing across inpatient mental health units, which have been overlooked by both antibiotic stewardship metrics and by prior research. Future antibiotic stewardship interventions in mental health units should focus on the accurate diagnosis of UTIs while
targeting the different physician disciplines involved in antibiotic decision making for mental health patients.

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Conflict of interest. All authors report no conflicts of interest.

Supplementary material. To view supplementary material for this article, please visit https://doi.org/10.1017/ice.2021.432

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