



# **NORTH DAKOTA**

## **ANTIBIOTIC USE AND STEWARDSHIP REPORT**

2023

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## Introduction

Antimicrobial stewardship, or coordinated efforts to improve antimicrobial use through tracking and data, preventing infections, and antibiotic use, is a part of the Centers for Disease Control and Prevention's (CDC) five core actions to prevent antimicrobial resistance<sup>1</sup>. In the CDC's 2022 special report, *COVID-19 U.S. Impact on Antimicrobial Resistance*, it highlighted that antimicrobial stewardship was working by lowering deaths from antimicrobial resistant pathogens by 18% from 2012 to 2017, but the pandemic resulted in more resistant infections, increased antibiotic use, and less prevention efforts<sup>1</sup>. Thus, this antimicrobial use and stewardship report for North Dakota is intended to help identify and analyze antimicrobial usage in the state and serve as a guide to create stewardship interventions to improve antimicrobial use and prevent the emergence of resistance.

## Antibiotic Use in Health Care

### OUTPATIENT ANTIBIOTIC PRESCRIBING

The North Dakota Department of Health and Human Services (NDDHHS) has access to outpatient data from IQVIA™ via the CDC, Centers for Medicaid and Medicare (CMS)

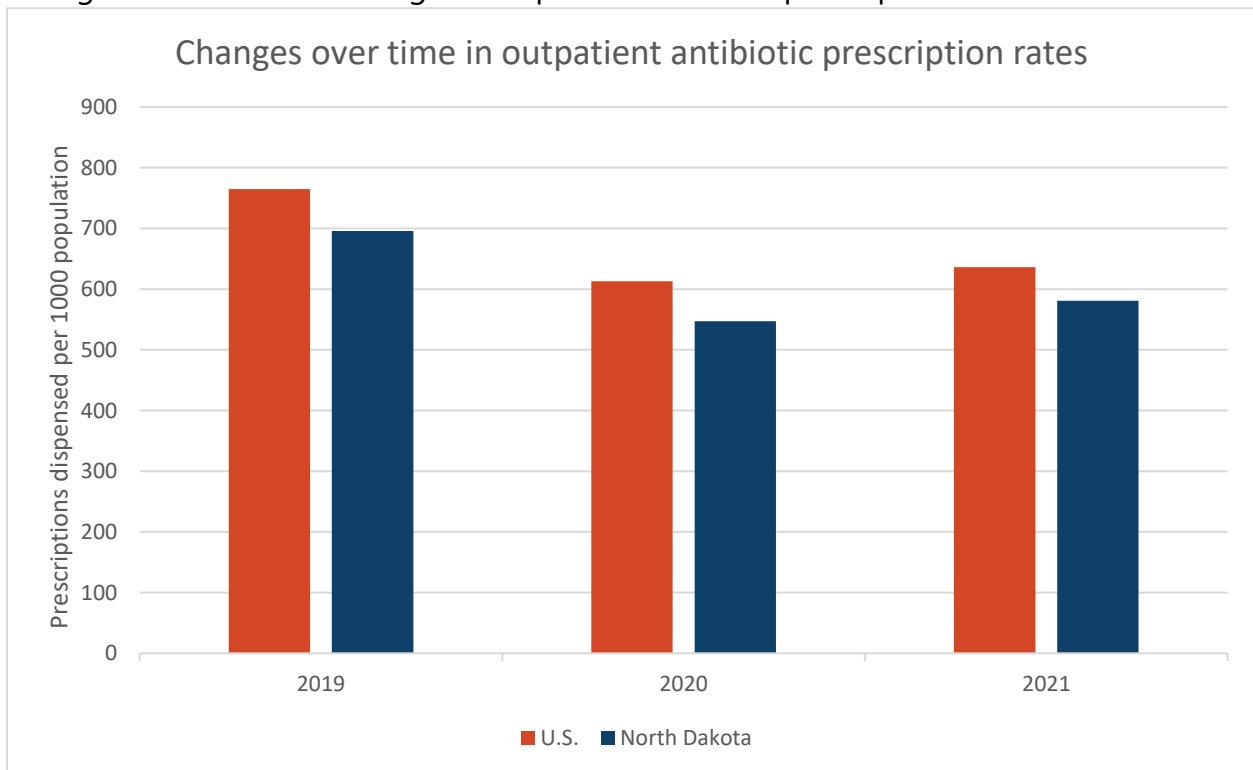
Part D Public Use Files, and North Dakota Medicaid. Data available through National Healthcare Safety Network (NHSN) is also analyzed.

## **IQVIA™ OUTPATIENT ANTIBIOTIC PRESCRIBING DATA 2019-2021**

The CDC works with IQVIA™, a contract research organization, that tracks outpatient antibiotic prescriptions filled at community pharmacies to provide this information to states. This data does not include prescriptions filled at federal facilities. The information in this section details results from IQVIA™ data.

Since 2019, North Dakotans have continued to receive less outpatient antibiotic prescriptions per 1,000 population than the U.S. overall (Figure 1). From 2019 to 2020, there was a 21.5% decrease in the number of outpatient prescriptions in North Dakota. This is in line with the national trend, which saw a 20% decrease in the first year of the COVID-19 pandemic. Antibiotic prescriptions dispensed per 1,000 population in North Dakota did increase in 2021 but did not surpass the pre-pandemic prescribing level (Figure 1)<sup>2</sup>.

Figure 1. Details the change in outpatient antibiotic prescriptions from 2019-2021.



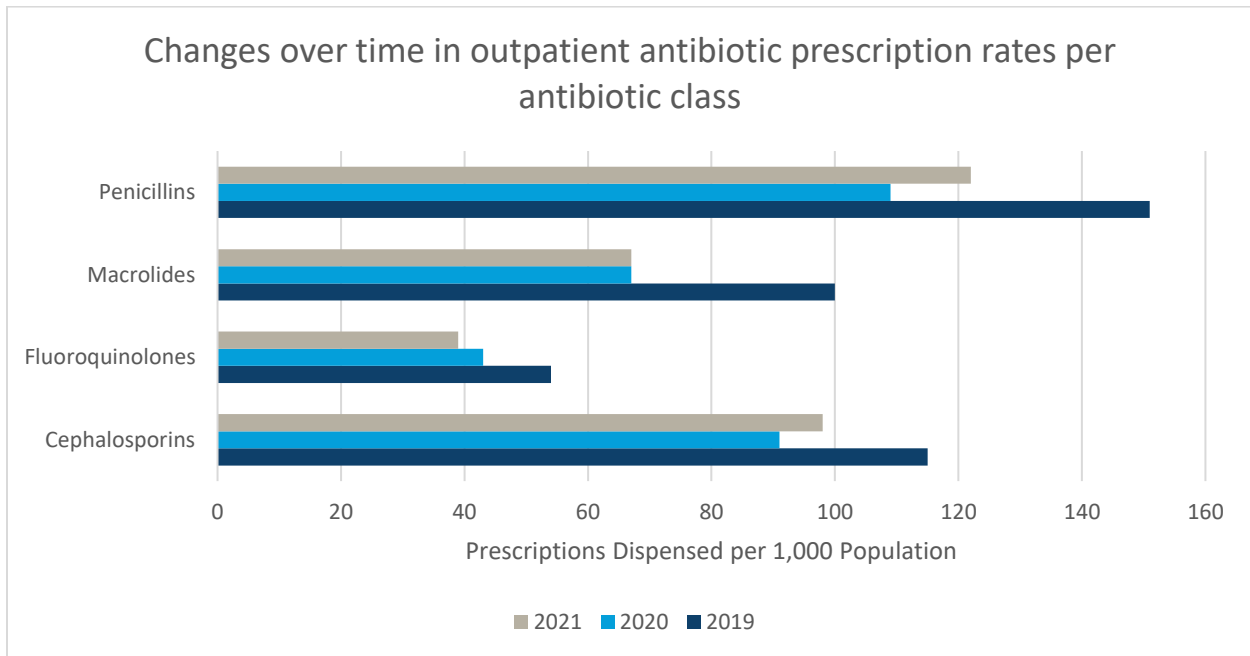
In 2020, there were double digit percentage reductions in four of the commonly used classes of antibiotics. In 2021, we saw increased prescriptions for cephalosporins (+7.7%) and penicillin (+12%), while fluoroquinolone prescriptions continued to decrease by 10%, and macrolides saw no difference in the number of outpatient prescriptions (Table 1 and Figure 2)<sup>2</sup>. Limitations on this data include not providing indications for outpatient prescriptions; thus, we are not able to assess appropriateness of these prescriptions and cannot speculate on the reasons for the changes in antibiotic prescribing rates. Furthermore, the period of time for comparison, 2019-2021, included the transition into the COVID-19 pandemic. Any changes in prescribing patterns over that time may have been due to the influences of the pandemic more than antimicrobial stewardship efforts.

Table 1. North Dakota’s outpatient antibiotic prescriptions per 1,000 population by drug class and percent changed compared to previous year.

<b>Drug Class</b>	<b>2019</b>	<b>2020 Rate (% change)</b>	<b>2021 Rate (% change)</b>
<b>Cephalosporins</b>	115	91 (-20.8%)	98 (+7.7%)
<b>Fluoroquinolones</b>	54	43 (-20.8%)	39 (-10%)
<b>Macrolides</b>	100	67 (-33%)	67 (0%)
<b>Penicillin</b>	151	109 (-27.8%)	122 (+12%)

\*Rate is outpatient antibiotic prescriptions per 1,000 population\*

Figure 2: Displays the rate antibiotics were prescribed in North Dakota by antibiotic class.



## OUTPATIENT ANTIBIOTIC PRESCRIBING FOR MEDICARE BENEFICIARIES

This section summarizes the data from the CMS Medicare Part D Prescriber Public Use Files. These files contain information on prescription drugs provided to Medicare beneficiaries enrolled in Part D by physicians and other health care providers. The CMS Medicare Part D files have a two-year lag period; thus, the most recent data is from 2021. These files show the number of prescribers that have written prescriptions for Medicare beneficiaries, total number of prescriptions, geographic information, and prescriber specialty, among other data. In Table 2, data is summarized for high and low volume prescribers in North Dakota for calendar year 2021<sup>3</sup>. Both the CDC and medical literature consider high volume prescribers as those that are in the top 10% of total antibiotics prescribed per prescriber<sup>4,5</sup>. Among the 118,261 antibiotic prescriptions during 2021, 34% were written by the top 10% of prescribers.

Table 2. Summary of North Dakota Medicare Beneficiaries antibiotic prescribing in 2021, including all, high, and low-volume prescribers.

<b>Antibiotic Prescribing for North Dakota Beneficiaries</b>	<b>All prescribers who prescribed at least one antibiotic</b>	<b>High Volume Prescribers</b>	<b>Low-Volume Prescribers</b>
<b>Number of prescribers</b>	1845	184	1661
<b>Number of prescription claims (% of total volume)</b>	118,261	40,517 (34%)	77,744 (66%)

When prescription claims are broken down to the specialty of the prescriber, nurse practitioners, who make up 25% of Medicare antibiotic prescribers in North Dakota, have the highest number of prescription claims (24.5% of antibiotic prescriptions). Seven percent of NP’s write for 23.7% of all antibiotic claims written by NP’s. Family Practice providers, who make up 16% of Medicare prescribers writing for antibiotics in North Dakota, wrote for 21.4% of all Medicare Part D antibiotic claims, but 19% (59 providers) wrote for over half of all those claims. This data highlights which specialties are writing for antibiotics, but similar to the IQVIA data, is limited in that it cannot speak to the appropriateness of the antibiotics prescribed. The data is also limited by the inability to adjust for volume of Medicaid beneficiaries per practice setting. Although, the data does help determine who is writing for antibiotics and provides specialties antimicrobial stewardship efforts can focus on.

Table 3. High-volume prescribers by specialties

Specialty	All prescribers claims (n=118,261)	High Volume Prescribers Claims (n=40,517)	% of Claims by High Volume Prescribers	Number of high-volume prescribers/Number of prescribers
<b>Family Practice</b>	25,332	13,301	52.5%	59/309 (19%)
<b>Nurse Practitioners</b>	28,990	6868	23.7%	33/468 (7%)
<b>Physician Assistants</b>	13,746	3972	28.9%	20/208 (9.6%)
<b>Internal Medicine</b>	9692	3885	40%	19/121 (15.7%)
<b>Urology</b>	3995	3450	86.4%	11/19 (57.9%)
<b>Others</b>	63,998	9041	14.1%	42/721 (5.8%)

## ANTIBIOTIC ADMINISTRATION IN HOSPITALS

One way to determine if a hospital is using more antibiotics than comparable hospitals is to look at the standardized antibiotic administration ratio (SAAR) that is an NHSN-derived measure. This number is derived using the NHSN Antimicrobial Use Option data that hospitals input into NHSN. The SAAR is a metric for comparing observed to predicted days of antimicrobial therapy, which is derived by comparing the facility administration rate to a baseline or “expected” administration rate generated from a national dataset. It is adjusted for factors that may affect antibiotic prescribing such as care unit type, teaching hospital status, and pediatric vs adult care. The interpretation of a SAAR value depends on if it is greater or less than one. If the SAAR value is less than one, it indicates fewer antimicrobials were administered than expected, while if the SAAR value is greater than one, there was more antimicrobials administered than expected. The SAAR values allow facilities to compare themselves to similar facilities and to pinpoint units that may be targets for stewardship activities.

In calendar year 2021, only four hospitals in North Dakota submitted at least one month of Antimicrobial Use (AU) data to NHSN. In 2022, the amount increased to 12 hospitals reporting at least one month of data. According to NHSN, there were 37 eligible



hospitals in 2022 that could have reported AU data. Thus, only 27% of eligible hospitals reported AU data to NHSN in 2022. Unfortunately, due to the low number of facilities reporting, NHSN does not have enough data to calculate a Median SAAR value for North Dakota; thus, North Dakota’s median SAAR value is unable to be compared to other states and limits the ability to use this metric to guide statewide stewardship efforts. Although, facilities that are reporting to NHSN may compare their SAAR number nationally to other facilities of similar size. SAAR data for the hospitals reporting to NHSN in 2022 is listed in Table 4. The limitation to the SAAR data in this table is it cannot be compared hospital to hospital as bed size ranges from 20 beds to over 350 beds. Facility type is also different (critical access hospitals vs acute care hospitals). The number of facilities reporting to NHSN is expected to increase in coming years due to changes in CMS regulations requiring hospitals to report AU data to NHSN.

Table 4: 2022 SAAR numbers for hospitals

	<i>2022 SAAR Number</i>
<i>Hospital 1</i>	<i>0.886</i>
<i>Hospital 2</i>	<i>0.923</i>
<i>Hospital 3</i>	<i>1.122</i>
<i>Hospital 4</i>	<i>1.032</i>
<i>Hospital 5</i>	<i>0.852</i>
<i>Hospital 6</i>	<i>0.866</i>
<i>Hospital 7</i>	<i>1.408</i>
<i>Hospital 8</i>	<i>1.361</i>
<i>Hospital 9</i>	<i>0.756</i>
<i>Hospital 10</i>	<i>0.99</i>
<i>Hospital 11</i>	<i>0.965</i>
<i>Hospital12</i>	<i>1.137</i>

*\* Data was retrieved from NHSN database in October 2023. Access to this data is made possible thru a data use agreement that allows us to look at overall trends and provide deidentified data to hospitals if requested. \**

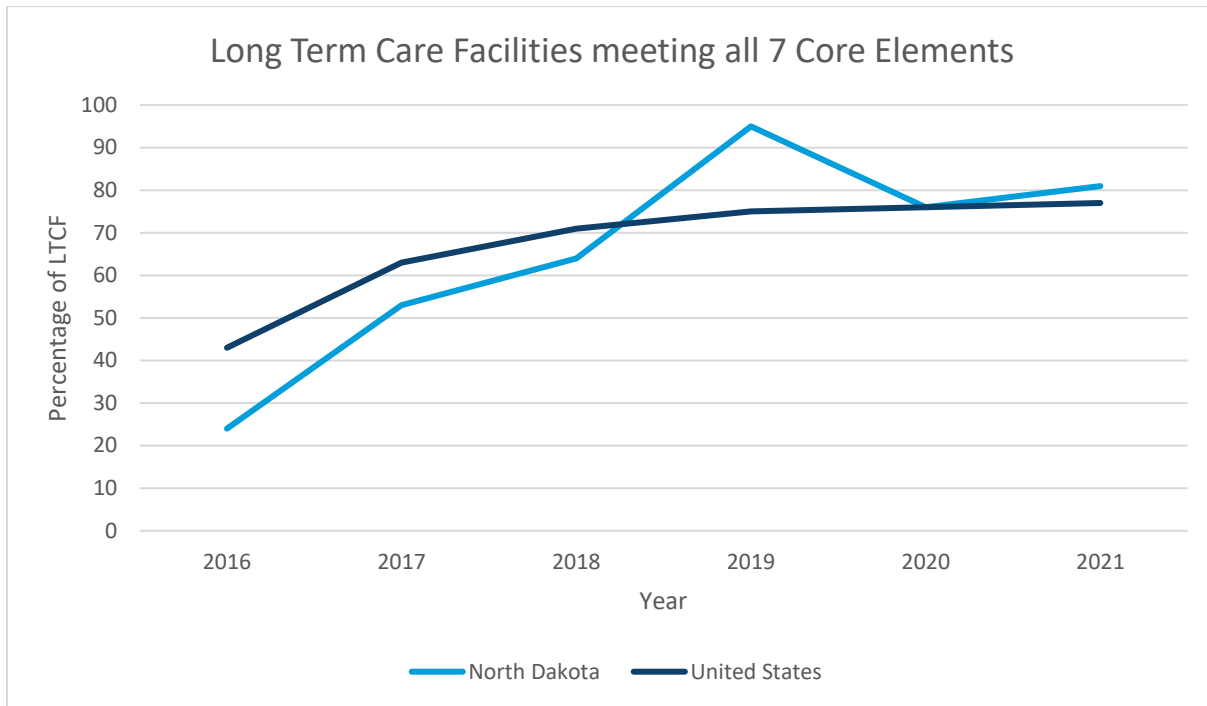
# Antibiotic Stewardship

## NURSING HOME CORE ELEMENTS OF ANTIBIOTIC STEWARDSHIP

The CDC recommends nursing homes take steps to improve antibiotic prescribing and decrease inappropriate antibiotic use. Studies have shown that 40-75% of antibiotics prescribed in nursing homes may not be needed or inappropriately prescribed<sup>6</sup>. With an estimated 70% of residents in a nursing home receiving one or more antibiotics when followed over a year<sup>6</sup>, increasing stewardship in this setting will help reduce adverse events, prevent emergence of resistance, and most importantly potentially have better outcomes for the residents.

Long Term Care Facilities (LTCF) are able to report core element uptake in their facilities thru NHSN. Participation varies by state and the year, so data in Figure 3 may not represent all LTCFs in United States, but it does provide an estimate of the uptake of Core Elements in LTCFs. In 2016, when the core elements were developed, only 24% of LTCFs in North Dakota reported that they met all seven of the elements, well below the national average. In the years since, we have seen great improvement rising above the national average in 2018 and peaking at 95% in 2019. In 2020, stewardship efforts were diminished due to the strain that the Covid-19 pandemic put on LTCFs. We are working on refocusing on antibiotic stewardship in LTCFs in North Dakota and hope to see continued increases like those made in 2021.

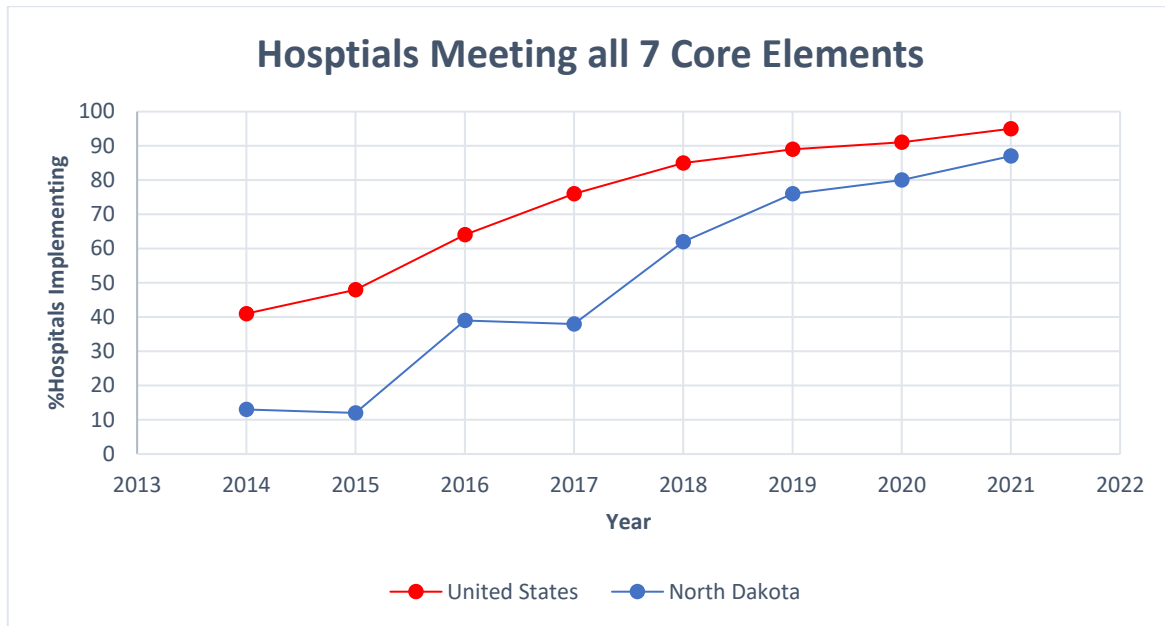
Figure 3 Percentage of Long-Term Care Facilities self-reporting core element participation



## HOSPITAL CORE ELEMENTS OF ANTIBIOTIC STEWARDSHIP

In 2014, the CDC developed the seven Core Elements of Antibiotic Stewardship for Hospitals. After its creation, the Joint Commission and CMS, two hospital regulatory agencies, required implementation of the Core Elements into hospital practices. Since 2014, North Dakota has greatly increased the number of hospitals meeting all seven core elements. In 2021, 87% of the 47 hospitals in North Dakota reported on NHSN's annual survey that they were meeting all of the Core Elements (Figure 3)<sup>2</sup>. North Dakota is still trailing the national average of 95% of hospitals meeting all core elements, but North Dakota is exceeding the nation in the elements of Tracking and Education.

Figure 4. Summarizes the number of hospitals meeting the seven Core Elements of Antibiotic Stewardship



## HEALTH DEPARTMENT CORE ELEMENTS OF ANTIBIOTIC STEWARDSHIP

In September of 2023, the CDC released the Core Elements of Antibiotic Stewardship for Health Departments. The elements include leadership commitment, accountability, stewardship expertise, action, tracking, reporting, and education<sup>7</sup>. NDDHHS is committed to meeting the core elements. This report is an example of how North Dakota is tracking and reporting antibiotic usage and the implementation of stewardship within the state. North Dakota has added an antimicrobial stewardship expert, Emily Perry PharmD, to the staff. She is available to assist all facilities in implementation of the core elements of antimicrobial stewardship. NDDHHS is committed to educating patients, residents, families, and healthcare workers. Educational pamphlets have been created and sent out to LTCFs across the state and webinars have been given at a variety of conferences this past year. One way to track stewardship activity through the state is through the antimicrobial stewardship honor roll, which was created this year as a way to highlight both LTCFs and hospitals that are meeting the Core Elements of Antimicrobial Stewardship and are working on preventing antimicrobial resistance in their facilities.

## OPPORTUNITIES FOR STEWARDSHIP GROWTH

Based on the information provided in this report, we have identified areas both at the state and facility levels to support improvement in antimicrobial stewardship which include the following:

- Engage with healthcare facilities to support antimicrobial use data entry into NHSN.
- Provide continuing education opportunities on antimicrobial stewardship to facilities
- Address high volume prescribing through education and encourage prescriber feedback at a facility level.
- Obtain quantitative and qualitative data on all outpatient antimicrobial prescriptions to explore prescribing in relation to diagnosis and health equity.
- Provide a platform to collaborate with antimicrobial stewardship partners throughout the state to facilitate sharing of best practices and ensure stewardship efforts are coordinated and effective across the state.

Intervention's healthcare facilities may implement to achieve stewardship growth would be:

- Identifying a target to reduce antimicrobial use (i.e., reducing prescriptions for asymptomatic bacteriuria, reducing fluoroquinolone use, appropriate duration of antibiotics for community acquired pneumonia)
- Review medical records to establish baselines for prescribing for an indication and track improvement initiatives
- Provide feedback to providers on antimicrobial prescribing highlighting priority conditions

## Summary

The core elements of tracking and reporting are essential for antibiotic stewardship programs and are critical for health departments to lead targeted stewardship efforts. Improving antibiotic prescribing is a national priority to help prevent the emergence of resistance. NDDHHS tracks prescribing data via CMS's Medicare Part D prescribing files and IQVIA™ to aid in formulating stewardship interventions within the state. Although

these databases do not confer the indications for antibiotics, NDDHHS is working on procuring this information from other sources, thus hoping to have more detailed antibiotic use data in the years to come.

North Dakota has seen great improvement in the uptake of the core elements of antimicrobial stewardship in both hospitals and LTCFs in the state over the years. We have gone from 13% of hospital meeting all core elements in 2014 to 87% self-reporting all elements are being met in 2021. NDDHHS will continue to work with facilities to achieve 100% of North Dakota's hospitals meeting all core elements of antimicrobial stewardship.

One must remember there are limitations to the data in this report. First, there may be errors and/or biases due to self-reporting. While respondents to NHSN Annual Hospital Survey are encouraged to consult facility experts, the accuracy of response may have been influenced by the level of local antimicrobial stewardship expertise in the facilities. The accuracy of antimicrobial stewardship self-report has not been assessed in North Dakota. Secondly, the data does not indicate the quality or scope of reported antimicrobial stewardship practices. NDDHHS will continue to work with facilities to assure high quality and effective antimicrobial stewardship in North Dakota.

The department will use the information from this report to support increases in the prevalence of hospitals adopting the core elements of antimicrobial stewardship. The goal in North Dakota is to have all hospitals implement all elements of antimicrobial stewardship in the coming year. Antibiotic use data is essential to successful stewardship programs. NDDHHS will continue to evaluate mechanisms for supporting collection, interpretation, and application of antibiotic use data through NHSN's Antibiotic Use and Resistance Module and collaboration with partners within the state.

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