NORTHERN HEALTH

ANTIMICROBIAL STEWARDSHIP

ANNUAL REPORT 2021 -2022

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CONTENTS

INTRODUCTION

Northern Health's Antimicrobial Stewardship (AMS) Program is continually striving to meet the needs of our various facilities and patient populations being managed at these facilities. We are working towards improvements in antimicrobial prescribing and ultimately patient care.

Sharing this report with interested stakeholders is as important as creation of the report itself. With the vast geographical size of our health authority comes the constant challenge of finding effective ways to distribute information and other program related communications. We will be utilizing several avenues to distribute this report and apologize for any duplications. If you are interested in providing feedback on distribution methods for this information or on the information contain therein, please feel free to contact the Program Coordinator (Alicia Rahier).

We are constantly seeking engagement at the site level and encourage anyone interested in antimicrobial stewardship and how it can be improved at their facility to also contact the program coordinator. Only when we work together can we truly improve the use of antimicrobials within the Northern Health Authority.

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EXECUTIVE SUMMARY

BEST PRACTICES

There is ongoing work to develop and revise clinical tools, protocols, and order sets. Items completed and actively being developed/revised include:

Clinical tools, standards, and policies

- Firstline Northern Health (NH) guideline library launched (Spectrum mobile health platform)
- Antimicrobial stewardship audit and feedback review of antimicrobial orders (new - April 2021)
- Outpatient parenteral therapy clinical practice standard (revised – May 2022)
- Allergy documentation policy and procedure (updated – May 2021)
- Allergy history and sensitivity record form updated (November 2021) and implemented (February 2022)

Education initiatives

- Principles of OPAT – Continuing Medical Education (CME) presentation; March 2022

Order set development

- Community acquired pneumonia in adults update: The Antimicrobial Stewardship Committee reviewed both the recently updated Infectious Diseases Society of America (IDSA) guidelines (2019) and existing order set within NH. Revisions were approved and published in June 2021.
- Febrile neutropenia in adults update: The Antimicrobial Stewardship Committee reviewed and revised the febrile neutropenia in adults order set (previously created by another working group) with consideration of the newly revised (but not yet finalized) BC Cancer guidelines (2021). Revisions were approved and published in March 2022.
- IV Antimicrobial therapy for outpatients – under revision: The Antimicrobial Stewardship Committee is actively reviewing/revising the current IV antimicrobial therapy order set for outpatients.

ANTIMICROBIAL USAGE METRICS

Antimicrobial utilization, measured in defined daily dose (DDD) per 100 patient-days, is calculated to track the utilization trend over time. The DDD is the assumed average adult maintenance dose per day for a drug used for its main indication. The conversion of drug utilization to this standardized measurement allows for comparisons to be made across different antibiotic classes and facilities. Our current year compared to 2020/21 showed reductions in antimicrobial usage in majority of our Health Service Delivery Areas (HSDAs) including University Hospital of Northern BC (UHNBC) except for the Northeast. This reduction was anticipated as the effects of the COVID-19 pandemic on hospitalizations tapered down. The Northeast HSDA, however, is showing a further increase in use compared to the last fiscal year, which will need to be explored at the specific drug level. The increase in usage of ceftriaxone and azithromycin seen in all HSDAs last fiscal year has been sustained in the Northeast and Northern Interior (excluding UHNBC). Anecdotally, it appears that most NH physicians turn to ceftriaxone and azithromycin for any patient that presents with any variation of respiratory symptoms (regardless of COVID status/ risk). Encouraging use of the revised community acquired pneumonia order set may help shift use of antimicrobials for respiratory infections.

CLINICAL SERVICE/AUDIT AND FEEDBACK

The A&F clinical service and evaluation efforts are focused on:

- Optimizing empiric therapies
- Targeting therapy based on additional diagnostic information
- Optimizing antimicrobial dosing and treatment durations
- Converting intravenous (IV) antimicrobials to oral formulations when appropriate to prevent the complications associated with IV agents
- Providing education to prescribers on the clinical practice guidelines for the treatment of infections
- Promoting consultation of infectious disease specialist when necessary

BEST PRACTICES

CLINICAL TOOLS, STANDARDS AND POLICIES

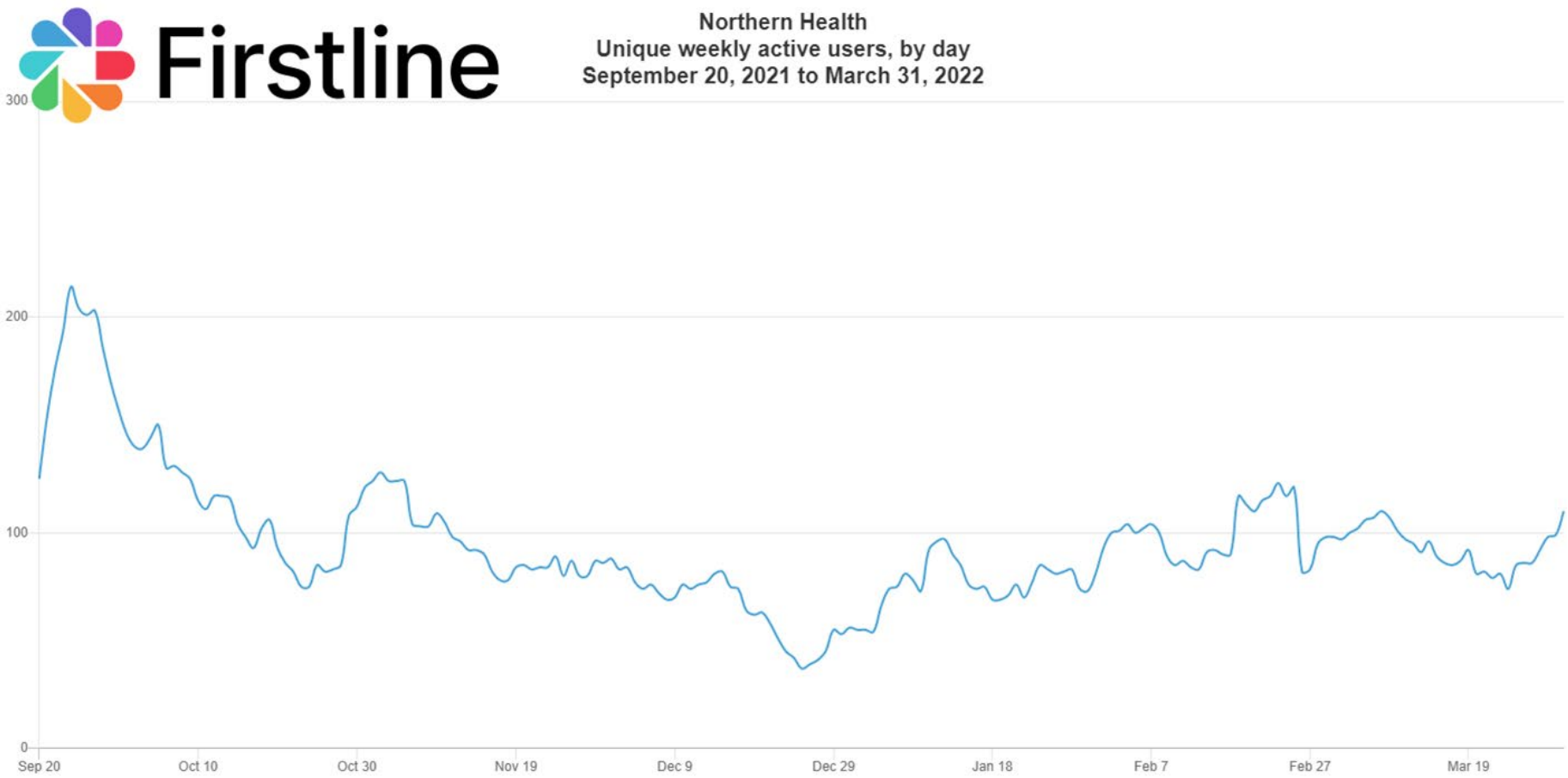
All-staff antimicrobial stewardship webpage on OurNH and NH physicians website (ongoing); technology advancements

Northern Health (NH) staff can quickly and easily gain access to information about the NH Antimicrobial Stewardship (AMS) program as well as any relevant clinical practice standards, clinical memos or bulletins, annual reports and other online resources from the OurNH Antimicrobial Stewardship page found under Clinical and patient care > Medications. NH prescribers can also access this information on the NH Physicians webpage. Under Physicians resources > Clinical resources, the AMS link is at the top of the list.

At the end of last fiscal year funding was granted to obtain a license for a Northern Health specific module within the Spectrum mobile health platform. One month prior to our launch in September 2021 the company went through a public facing name change to Firstline; same application and service. Firstline is an electronic library that can be customized to deliver local antimicrobial stewardship and infectious diseases resources within any health system. It is available both as a mobile application or via web browser. There is a how-to guide available on the NH physicians webpage. This means that NH prescribers, pharmacists and nurses are now able to access NH supported guidelines and antimicrobial/pathogen information easily and quickly from their mobile devices and computers. Firstline can be downloaded for free and Northern Health can be found in the locations list. Since the NH library went live in September our active user counts have remained stable with an average weekly active user count of 94 (see Figure 1). Figures 2 and 3 show the most frequently viewed guidelines and antimicrobial monographs respectively.

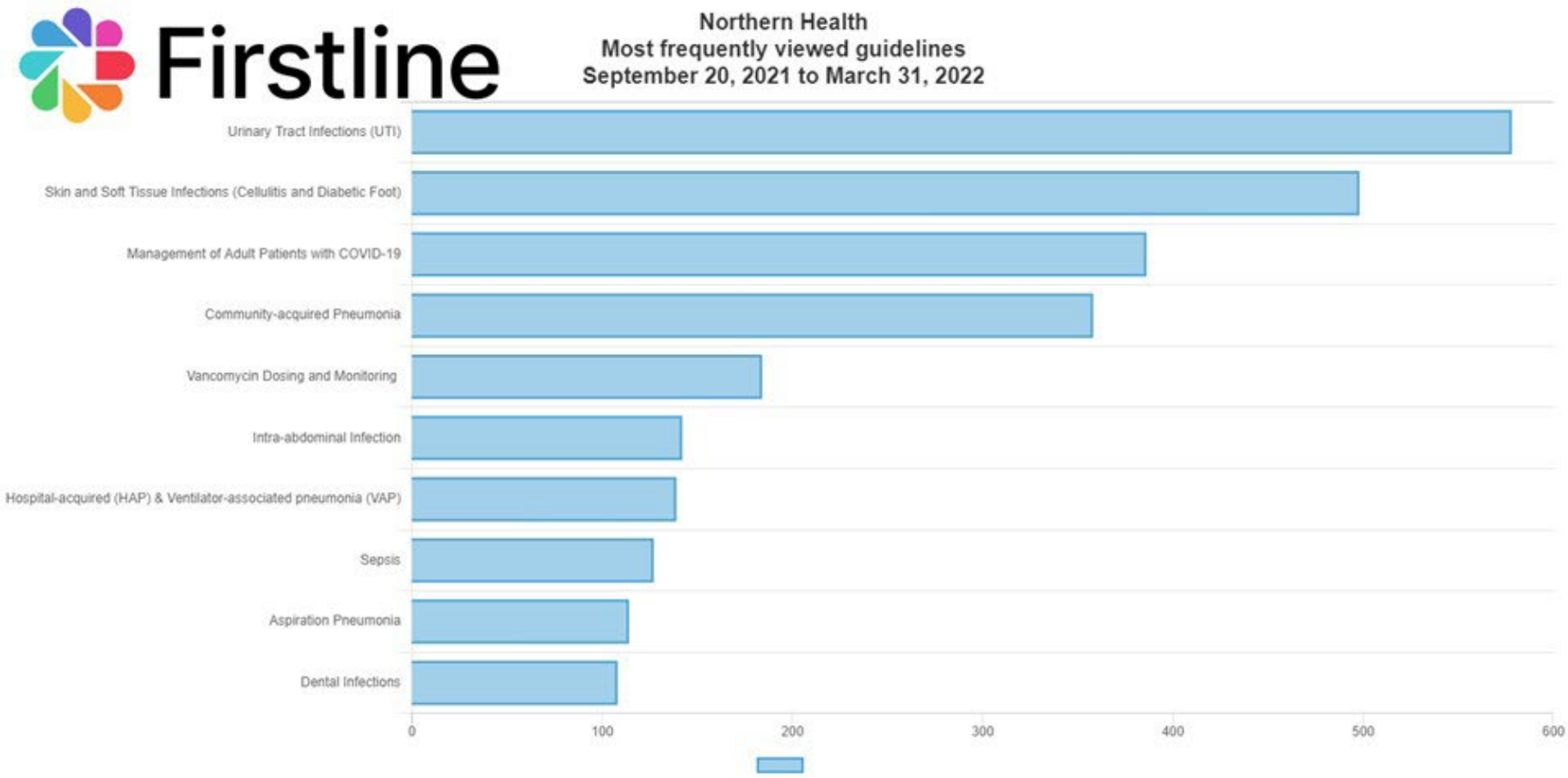
Previously created clinical tool pocket cards (empiric treatment guidelines for common infections in adults and dosing of antimicrobials in renal dysfunction) will no longer be updated via print/pdf files. Information and guidance with regards to these topics will be now found in the Firstline NH library.

Firstline Figure 1: Active weekly users



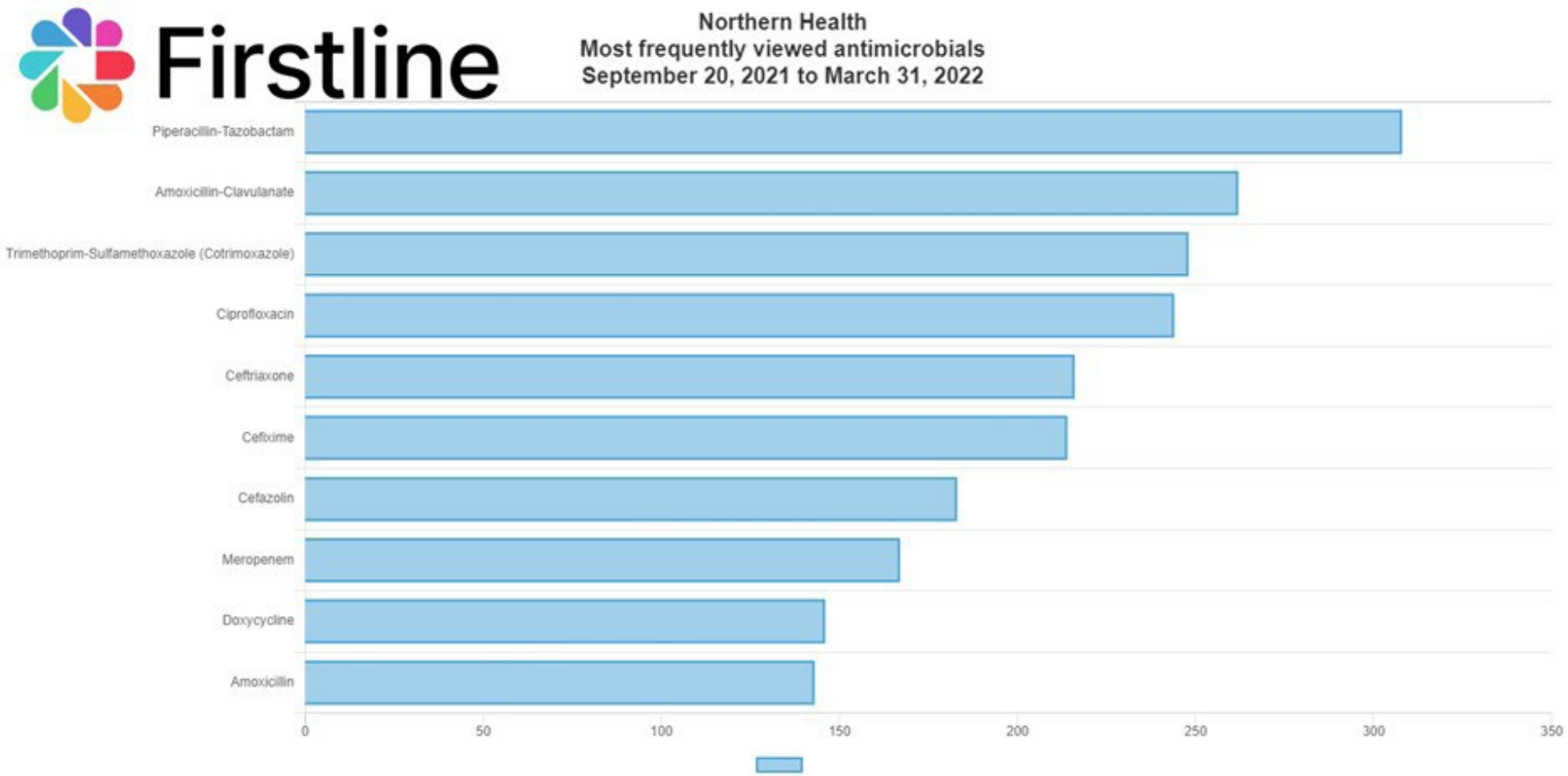
Data source and graph prepared by: Firstline analytics dashboard.

Firstline Figure 2: Most frequently viewed guidelines



Data source and graph prepared by: Firstline analytics dashboard.

Firstline Figure 3: Most frequently viewed antimicrobials



Data source and graph prepared by: Firstline analytics dashboard.

CLINICAL PRACTICE STANDARDS, POLICIES AND CLINICAL FORMS

Antimicrobial stewardship audit and feedback review of antimicrobial orders (new April 2021)

Clinical pharmacists with support from the AMS program coordinator will review and assess all orders for antimicrobials prescribed to patients admitted to NH facilities or seen through the community IV programs and provide recommendations to the most responsible prescriber (MRP) for optimization when necessary. Clinical pharmacists may require advice from the medical lead for AMS who will be contacted ad hoc to review patient cases as part of the medical lead responsibilities and provide recommendations directly to the MRP.

Allergy documentation policy and procedure (updated May 2021)

A Regulated Health Professional (RHP) must complete allergy documentation:

- At hospital admission, transfer from other inpatient facility, and during pre-surgical screening
- Before providing care that would be affected by the patient's allergy status (e.g., medication prescribing and/or administration)
- In response to a new allergic response during hospital stay

Due to the potential for a patient's allergy status to change over their lifetime, RHPs must also collect and reconcile allergy information with the patient or caregiver at each hospital admission before the patient/client receives medications (except in an emergency). Documentation of allergy must be entered in the electronic and paper chart by a regulated health professional, pharmacy assistant, or radiology staff, as appropriate. This documentation will include a description of the reaction and timeframe in relation to when the reaction occurred (year/age) and in relation to doses (e.g., within minutes to hours of first dose). Allergies will be listed and clearly visible in the clinical record.

Updates included: updating terminology in definitions list, clarifying where in workflow this information is to be gathered and by whom; reinforcement of food allergies including how to capture and communicate; new links provided for more information to end users and reinforcement of avoiding use of free text.

Allergy history and sensitivity record form updated (November 2021) and implemented (February 2022)

In response to results from a previous Pharmacy Resident research project: Assessing the use of a standardized allergy history questionnaire in patients with a reported penicillin allergy (completed May 2019), a re-design project was initiated for the NH Allergy/Sensitivity Record, including stake-holding opportunities, patient partner involvement, and testing of the form prior to implementation. The revised form is now available in admission packages and through Document Source.

Outpatient parenteral therapy clinical practice standard (revised May 2022)

Any facility or community supported by the Northern Health Authority shall abide by the recommendations within this clinical practice standard both for selection of appropriate clients for this service as well as for standardized operation and provision of IV medications and infusions in the outpatient setting. A Northern Health hospital pharmacy may dispense formulary parenteral medications if a patient requires the drug parenterally and meets the eligibility criteria outlined below. Oral ancillary medications will not be dispensed (with exception of probenecid). All medications will be entered onto pharmanet by pharmacy staff. The medications may be administered at home or in the emergency department or an outpatient department. All infusions administered via continuous ambulatory drug delivery (CADD) pump or elastomeric infuser bottle, must be through a central line (i.e., peripherally inserted central catheter (PICC) line). Do not administer through peripheral lines.

EDUCATION INITIATIVES

Education sessions for prescribers – CME Rounds
Prescriber education has been shown to benefit AMS outcomes when done in conjunction with other initiatives. The AMS Medical Lead (Dr. Abu Hamour) recently provided an update on Principles of Outpatient Patient Antimicrobial Therapy (OPAT) in March 2022. This recorded session as well as other previous sessions are available for viewing. Prescribers (at all sites) are encouraged to provide requests for topics and future education sessions to the AMS Program Coordinator who will work with sites to set up opportunities either regionally or site specific.

ORDER SET DEVELOPMENT

Community acquired pneumonia in adults update (June 2021)

The Antimicrobial Stewardship Committee reviewed both the recently updated IDSA guidelines (2019) and existing order set within NH. This review led to revisions including:

- Re-identifying severities as moderate versus severe
- Removed monotherapy moxifloxacin as third regimen for penicillin allergy – instead added cefuroxime IV to moderate severity as an alternative
- Doxycycline is now second line to azithromycin for moderate severity
- Added Prevnar 13 (conjugate vaccine) and influenza vaccine
- Second page: removed discharge criteria and added considerations for additional coverage for MRSA and pseudomonas.

Febrile neutropenia in adults update (March 2022)

The Antimicrobial Stewardship Committee reviewed and revised the febrile neutropenia in adults order set (previously

created by another working group) with consideration of the newly revised (but not yet finalized) BC Cancer guidelines (2021). This review led to the following revisions:

- Re-structuring and simplifying the patient inclusion criteria
- Including high and low risk factors for determining patients requiring admission and those that could be managed as an outpatient
- Simplifying initial broad spectrum antibiotic choices with clear criteria for additional agents
- Reference to online resource Firstline (via app or desktop) for guidance on outpatient therapies, duration of treatment and persistent infections

Inpatient COVID-19 vaccine orders: ages five and up (new March 2022)

The Ministry of Health has ordered that eligible patients for the COVID-19 vaccine should be vaccinated in the acute care inpatient setting. To guide vaccine prescribing, administration, and documentation in Northern Health facilities, a new regional order set was created. Due to the ongoing ebb and flow of vaccine supplies and prescriber/patient preferences, the orders were written in a generic format so that any brand of vaccine can be provided based on what is available at the time of administration. The actual product given will be recorded within the ImmsBC database for provincial tracking by the immunizer.

LTC COVID-19 vaccine primary series and booster orders (new January 2021, April 2022)

Residents of facilities are typically elderly and usually have chronic health conditions or compromised immune systems which makes them particularly vulnerable to severe illness and death from COVID-19. Although vaccination rate of residents and staff is generally high in many facilities, there are facilities where this is not the case and there are residents who are not vaccinated. The intention of creating an order set for the primary series vaccinations in long term care residents is to facilitate physicians having this conversation with their patients and for ease of ordering and supplying of the vaccines.
We know that vaccination is not completely protective, and protection may wane with time which means subsequent booster immunizations will remain important for public health moving forward. The intention of a booster vaccine order set in this setting is also to facilitate ordering and administering of these vaccinations.

Pediatric sepsis and septic shock (revised August/September 2021)

In efforts to support best practice in pediatric care at all sites (Tiers 1-4) across the province, a provincial toolkit was developed to support emergency department staff in the early recognition and management of pediatric patients with sepsis. This provincial work was led by Child Heath BC (CHBC) in partnership with clinical and content experts, representing each of the regional health authorities. The provincial toolkit consists of a package of clinical practice support tools that, when used together, assist the clinician to rapidly assess

and begin implementation of time sequenced interventions in emergent and urgent care settings. The goal is that all children and youth who present in emergent/urgent care settings will be initially screened at triage or primary assessment using the screening tool. Ongoing re-assessment and screening will continue throughout the emergent/urgent care visit.
UHNBC was invited to be an early adopter of the provincial toolkit and a Northern Health (NH) Pediatric Sepsis Working Group was convened to support adoption. Given the regional gap in supports for pediatric sepsis, it was determined that the tools would be developed as order sets for all settings where pediatric patients are treated. While the provincial order sets were developed specific to initial management of septic shock the NH pediatric sepsis working group identified the need for the pre-printed orders to also support initial management of suspected sepsis in the pediatric population when signs of a systemic infection are present and sepsis is suspected, but without clinical evidence of shock.

The working group has utilized the Child Health BC septic shock orders and BC Children's Hospital pre-printed order sets for suspected sepsis as a guide for development. These orders were reviewed by stakeholders and feedback gathered to ensure suitability for use in NH context given the difference in resources between BC Children's Hospital and NH sites, particularly the absence of an on-site Pediatric Intensive Care Unit (PICU).

The NH Pediatric Sepsis Working Group developed two new pre-printed order sets:

- 10-111-5389 – Pediatric sepsis: 0 days of age to 28 days of age
- 10-111-5390 – Pediatric sepsis: 29 days of age to 17 Years less 1 Day

Under revision: IV antimicrobial therapy for outpatients, adult sepsis

Program due diligence for maintaining up-to-date, best practice, evidence-based order sets, enables the Antimicrobial Stewardship committee to actively review and revise the regional order set for IV antimicrobial therapy for outpatient management. The revision is anticipated to be approved and available for use by fall 2022.

CLINICAL SERVICE
(PROSPECTIVE AUDIT AND FEEDBACK)

Audit and feedback (A&F) is an evidence-based practice of reviewing a patient's medical chart and diagnostic test results and engaging with prescribers to collaboratively optimize antimicrobial therapies. This practice involves the selection of the most appropriate, narrowest spectrum agent based on clinical status, indication, allergies, culture results, potential drug interactions and adverse effects, considering current clinical practice guidelines.

The A&F clinical service and evaluation efforts are focused on:

- Optimizing empiric therapies
- Targeting therapy based on additional diagnostic information
- Optimizing antimicrobial dosing and treatment durations
- Converting intravenous (IV) antimicrobials to oral formulations when appropriate to prevent the complications associated with IV agents
- Providing education to prescribers on the clinical practice guidelines for the treatment of infections
- Promoting consultation of infectious disease specialist when necessary

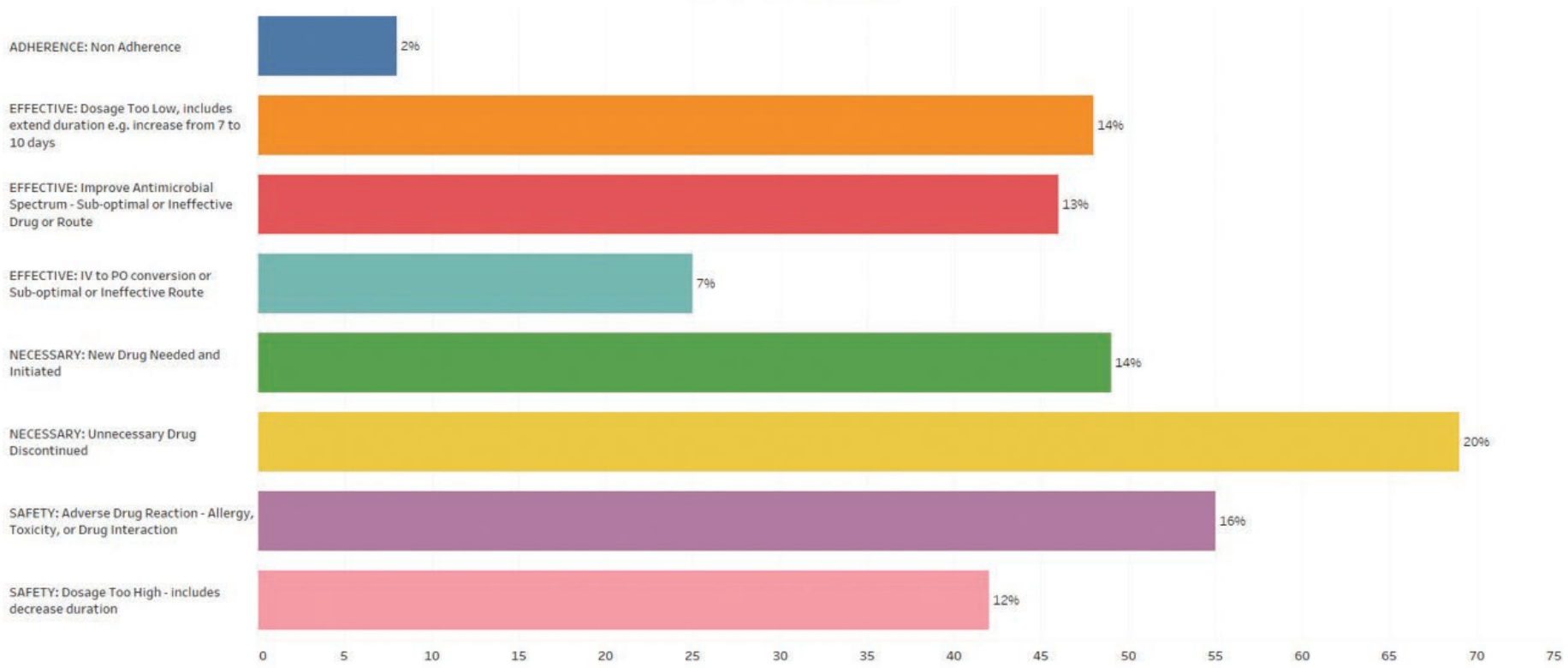
AUDIT AND FEEDBACK RECOMMENDATIONS AND RESOLUTION RATES

In September 2021 the Professional Practice Clinical Pharmacy Leads decided to adopt an alternative model for tracking of drug therapy problems (DTPs). This change involved tracking activities carried out by the clinical pharmacists' group during pre-determined two-week intervals. The interval that prospective audit and feedback of antimicrobials was tracked during the 2021/22 fiscal year was January 16 to 29, during which pharmacists resolved 1207 drug therapy problems (DTPs) with 28.3 per cent of these specific to antimicrobial therapies. There are a variety of types of antimicrobial therapy problems; Figure 4 displays types of DTPs identified and resolved.

The top DTP groups identified and resolved include:

1. Unnecessary antimicrobial discontinued
2. Adverse drug reactions
3. New drug needed and initiated
4. Dosage too low (includes need for extending duration)

Figure 4: Antimicrobial drug therapy problem (DTP) types resolved in FY 2021/22



Data source: Northern Health online Drug Therapy Problem tracker.

Graph prepared by: Clinical outcomes analyst for medication management.

OUTCOME AND PROCESS MEASURES

ANTIMICROBIAL UTILIZATION AND COSTS ACROSS NH

Antibiotic utilization, measured in defined daily dose (DDD) per 1000 patient-days, is calculated to track the utilization trend over time. The DDD is the assumed average adult maintenance dose per day for a drug used for its main indication. The conversion of drug utilization amount to DDD units is performed to standardize utilization of different classes of antibiotics, allowing comparisons to be made across different facilities or patient groups (excluding pediatric populations). Table 1 is a summary of the change in usage of all antimicrobials (antibiotics, antifungals, and antivirals) compared across fiscal years. Our current year compared to 2020/21 shows reductions in antimicrobial usage in most of our Health Service Delivery Areas (HSDAs) including University Hospital of Northern BC (UHNBC) except for the Northeast. This reduction was anticipated as the effects of the COVID-19 pandemic on hospitalizations tapers down. The Northeast HSDA however is showing a further increase in use compared to last fiscal which will need to be explored at the specific drug level.

To investigate which drugs are contributing to the increases in the Northeast we have divided the information from Table 1 further to show individual drug usage. We can then compare to usage in each HSDA, see Figures 5 to 8. For ease of assessment, we have pulled out target IV agents that have historically and anecdotally been agents of high use (e.g., ceftriaxone, piperacillin-tazobactam) and or require case by case assessment (e.g., daptomycin). The increase in usage of ceftriaxone and azithromycin seen in all HSDAs last fiscal year has been sustained in the northeast and northern interior (excluding UHNBC). However, usage of these agents in the northwest and at UHNBC are reduced or only slightly increased compared to 2020/21. The northeast is showing increases in most other target agents with exception of carbapenems and daptomycin. Although the northern interior saw increases in piperacillin-tazobactam usage there was a reduction in use of vancomycin, carbapenems, daptomycin and micafungin. The northwest and UHNBC saw reductions in use of all targeted antimicrobials with exception of daptomycin. Most facilities have been experiencing ongoing hospitalizations (at or over capacity) which may explain some of the increases in use seen. Culturally it appears that most NH physicians turn to ceftriaxone and azithromycin for any patient that presents with any variation of respiratory symptoms (regardless of COVID status/risk). It is important to note that clinical pharmacist support was absent in the northeast during this timeframe therefore the increased use of most antimicrobials could be due to a lack of stewardship review and feedback to prescribers. Increased clinical pharmacist support and encouraging use of the revised community acquired pneumonia order set may help shift use of antimicrobials for respiratory infections.

Table 1: Total antimicrobial utilization year to year comparison (DDD/1000 patient days)

HSDA Grouping	FY2020/21 compared to FY2019/20	FY2021/22 compared to FY2020/21
Northeast	↑	↑
Northern Interior (Excluding UHNBC)	↑	↓
Northwest	↑	↓
UHNBC	↑	↓
Northern Health	↑	↓

↓ Decrease from Previous Year
↑ Greater than 10% increase from Previous Year

Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

HIGH BIOEQUIVALENT ANTIMICROBIALS

Timely conversion from intravenous (IV) to oral (PO) antimicrobial therapy is effective for a variety of infections, especially for agents with high bioavailability (the fraction of unchanged drug that is absorbed and reaches the systemic circulation). Conversion from IV to PO antimicrobials in select patients results in cost savings for the facility as well as positive clinical outcomes such as shortened hospital stay, reduced risk of line-related infections and adverse events and no IV related mobility restrictions for patients. There is a group of antimicrobials where the oral formulation is equally potent compared to the IV formulation; this group is referred to as high bioequivalent antimicrobials.

A selection of these high bioequivalent targeted antimicrobials is compared per HSDA using the DDD per 1000 patient-days, see Figures 9 to 13. From a stewardship perspective the goal is to see a preference for use of oral agents from this group of therapies. Although this is true for most agents in all HSDAs there appears to be a preference for IV metronidazole in all HSDAs. Metronidazole is 100% bioavailable therefore if the gastrointestinal (GI) tract is functioning there is very little need for the IV formulation in most cases. The one setting that might contribute to preference of IV versus oral route for metronidazole is peri-operative situations where patients are NPO either due to impending surgery, obstruction, or bowel rest post-operatively. There is still the potential that IV route is used longer than necessary either due to being prescribed in addition to other IV antimicrobials (e.g., cefazolin or ceftriaxone) or missed opportunities for oral conversion post-operatively. Alternatively, there are likely cases where post-operatively the IV metronidazole is just stopped rather than stepped down to oral or the oral step down is a different agent altogether (e.g., cefazolin IV and metronidazole IV changed to amoxicillin-clavulanate orally) which would still be achieving stewardship goals. On a positive note, use of oral azithromycin and clindamycin has improved since last fiscal year and was used preferentially over the IV formulation.

ANTIMICROBIAL COSTS

In the 2020/21 fiscal year, Northern Health experienced an increase in drug costs in all sectors except for complex care (Hospital Act beds). The largest increase was attributable to acute inpatient care. Historically antimicrobial costs have remained stable proportionally compared to the total antimicrobial costs at less than 20 per cent. In the 2021/22 fiscal we saw an 18 per cent decrease in antimicrobial costs, as well as a four per cent reduction in total drug cost (see Figure 14). The overall proportion of antimicrobial cost was only 13 per cent of the total drug costs. Now that the pandemic landscape has changed and we are seeing less hospitalizations due to COVID-19, it is expected that this cost reduction should be sustained for the next few years with perhaps a smaller reduction next year.

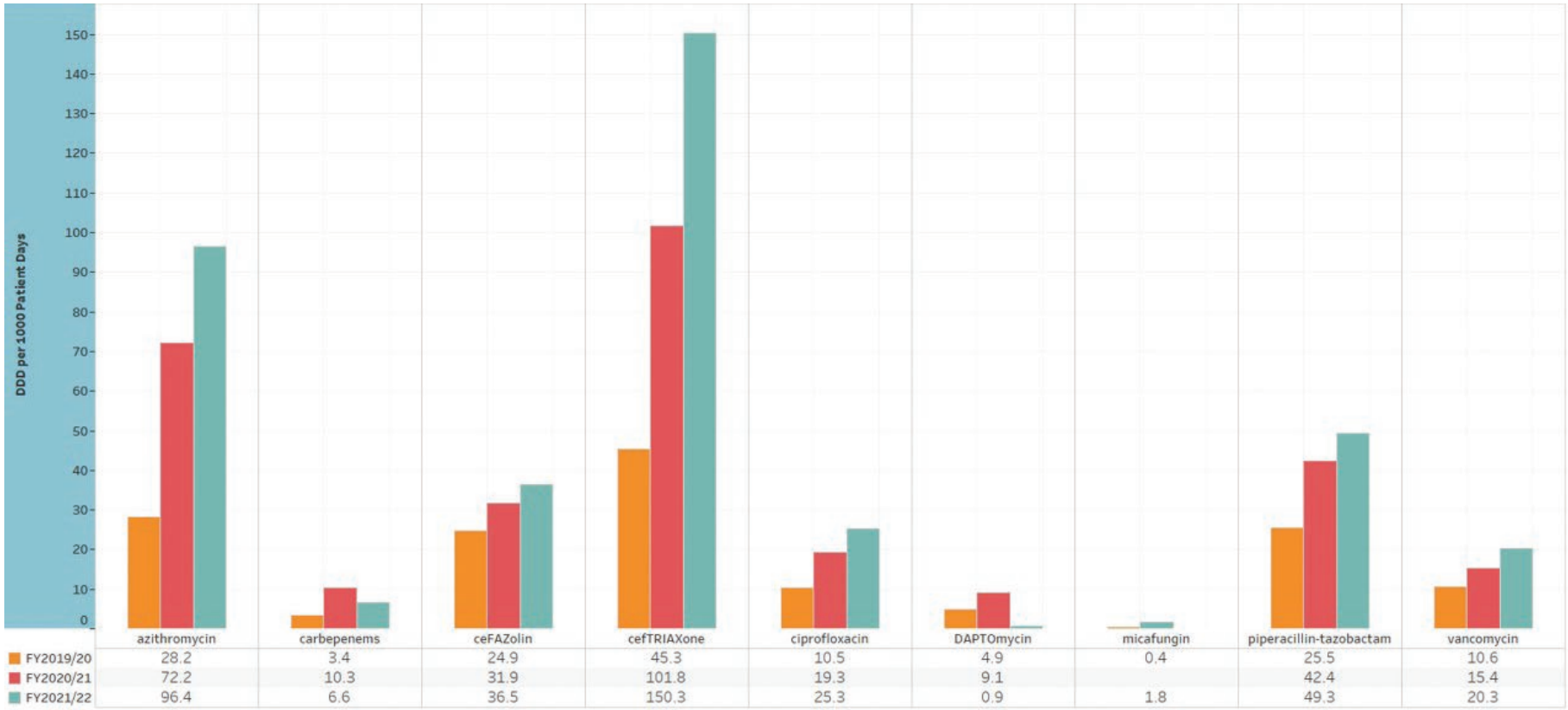
COVID-19 AND VACCINES

The AMS program leads continue to participate in review and distribution of information regarding the management of COVID-19 infected patients within our health authority.

Vaccines have been one of the biggest success stories in modern medicine. Thanks to vaccines, we have been able to control and eradicate numerous infectious diseases around the world. We can all help add COVID-19 to the list by getting vaccinated including booster shots. Vaccines themselves don't save lives but being vaccinated does and as healthcare providers the public rely on our information, guidance, and encouragement to take this step.

The AMS program would like to acknowledge all the ongoing hard work and dedication of the essential staff working at the bedside for our patients. We hope that the toughest times are behind us and we can continue to move forward in our new "normal". We will continue to provide support and guidance to the clinicians within NH who continue to meet the needs of our various facilities and patient populations being managed at our facilities.

Figure 5: Targeted antimicrobial utilization for Northeast (DDD/1000 inpatient days)



	azithromycin	carbepenems	ceFAZolin	cefTRIAXone	ciprofloxacin	DAPTOmycin	micafungin	piperacillin-tazobactam	vancomycin
FY2019/20	28.2	3.4	24.9	45.3	10.5	4.9	0.4	25.5	10.6
FY2020/21	72.2	10.3	31.9	101.8	19.3	9.1		42.4	15.4
FY2021/22	96.4	6.6	36.5	150.3	25.3	0.9	1.8	49.3	20.3

Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

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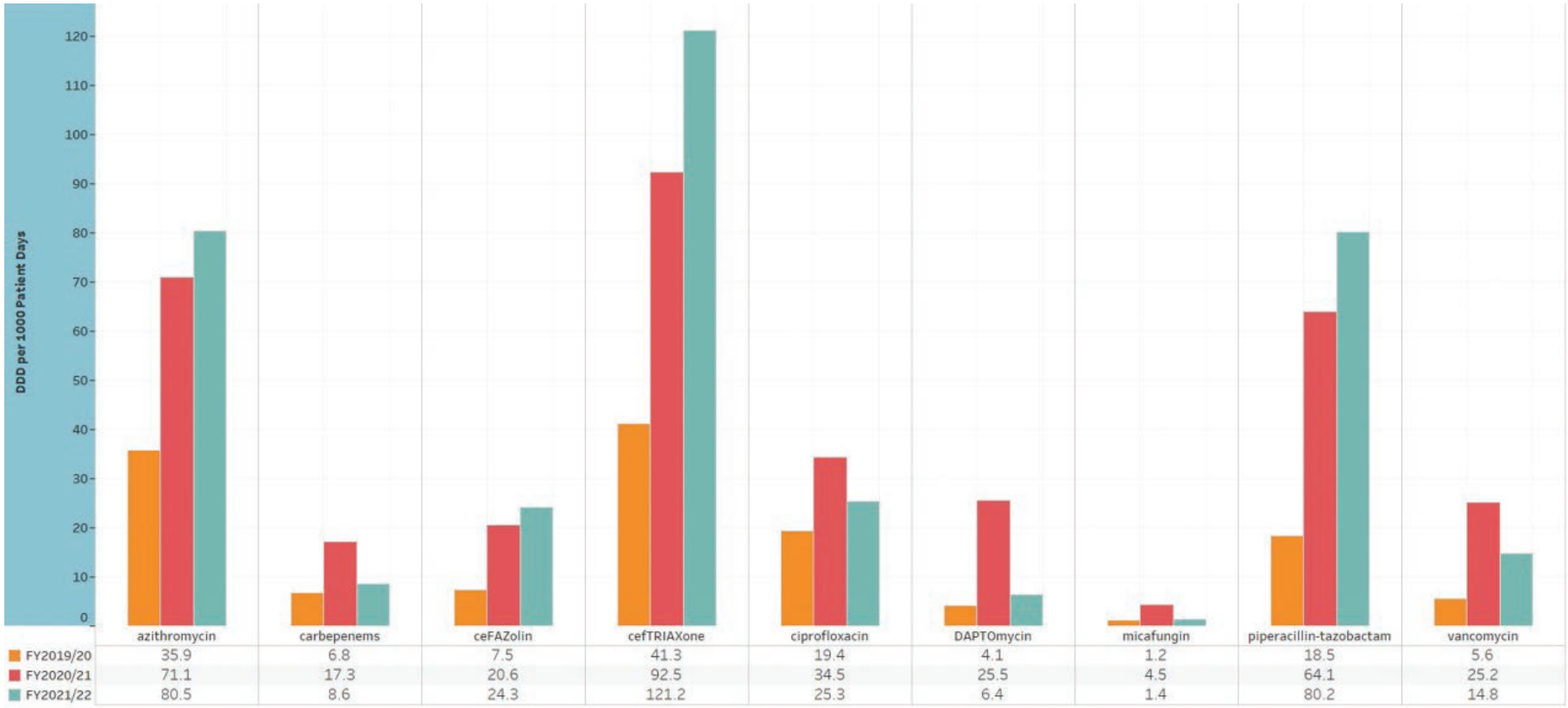
Figure 6: Targeted antimicrobial utilization for Northern Interior [excluding UHNBC] (DDD/1000 inpatient days)

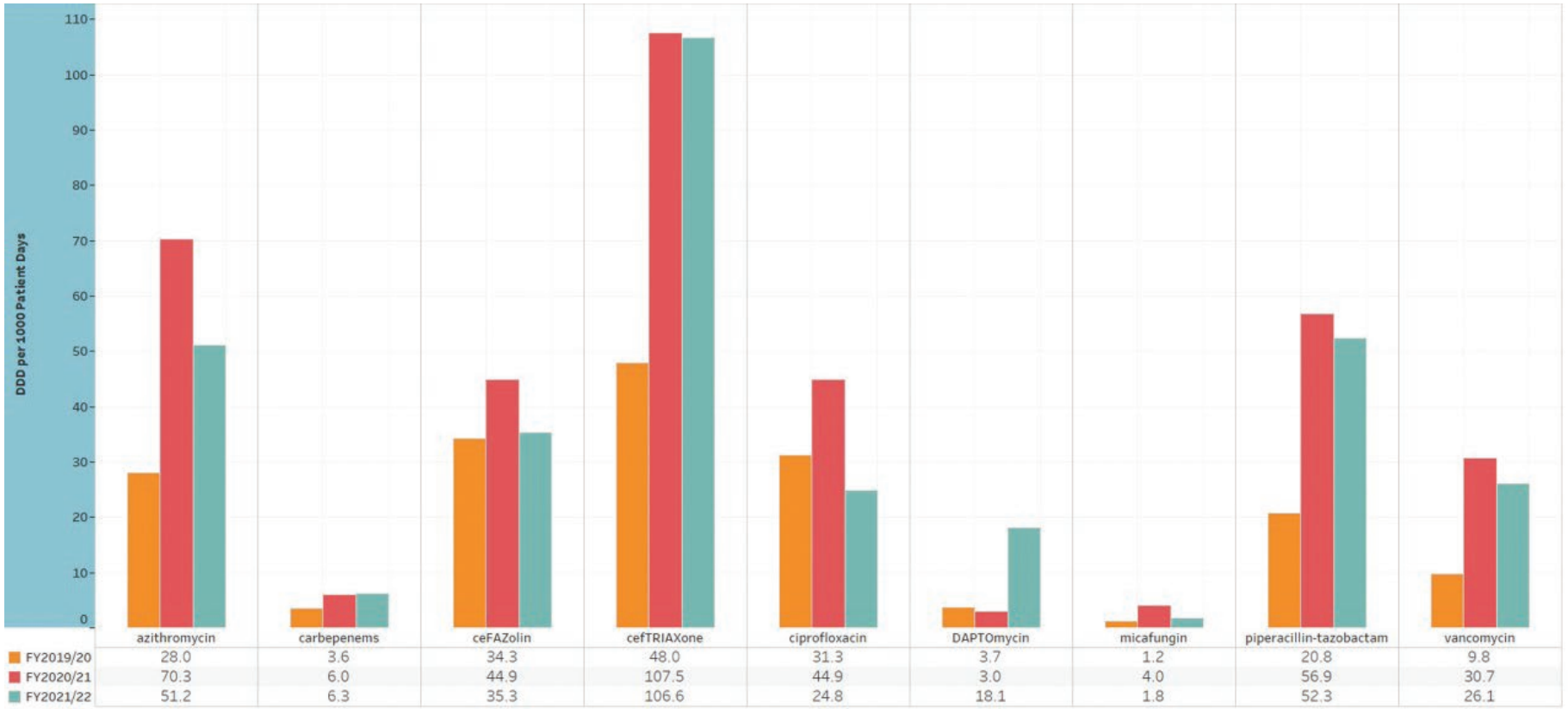


	azithromycin	carbepenems	ceFAZolin	cefTRIAXone	ciprofloxacin	DAPTOmycin	micafungin	piperacillin-tazobactam	vancomycin
FY2019/20	35.9	6.8	7.5	41.3	19.4	4.1	1.2	18.5	5.6
FY2020/21	71.1	17.3	20.6	92.5	34.5	25.5	4.5	64.1	25.2
FY2021/22	80.5	8.6	24.3	121.2	25.3	6.4	1.4	80.2	14.8

Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

Figure 7: Targeted antimicrobial utilization for Northwest (DDD/1000 inpatient days)

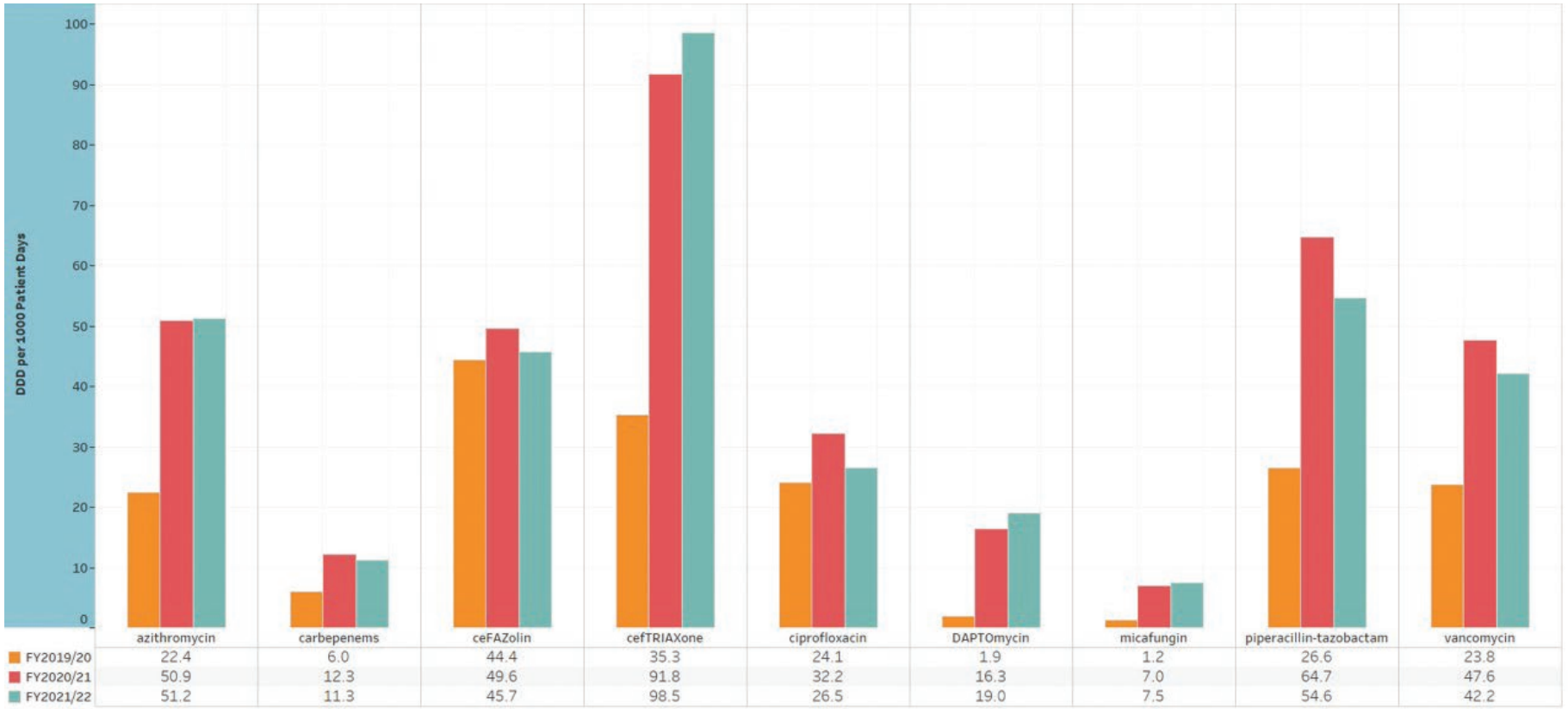


	azithromycin	carbepenems	ceFAZolin	cefTRIAXone	ciprofloxacin	DAPTOmycin	micafungin	piperacillin-tazobactam	vancomycin
FY2019/20	28.0	3.6	34.3	48.0	31.3	3.7	1.2	20.8	9.8
FY2020/21	70.3	6.0	44.9	107.5	44.9	3.0	4.0	56.9	30.7
FY2021/22	51.2	6.3	35.3	106.6	24.8	18.1	1.8	52.3	26.1

Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

Figure 8: Targeted antimicrobial utilization for UHNBC (DDD/1000 inpatient days)

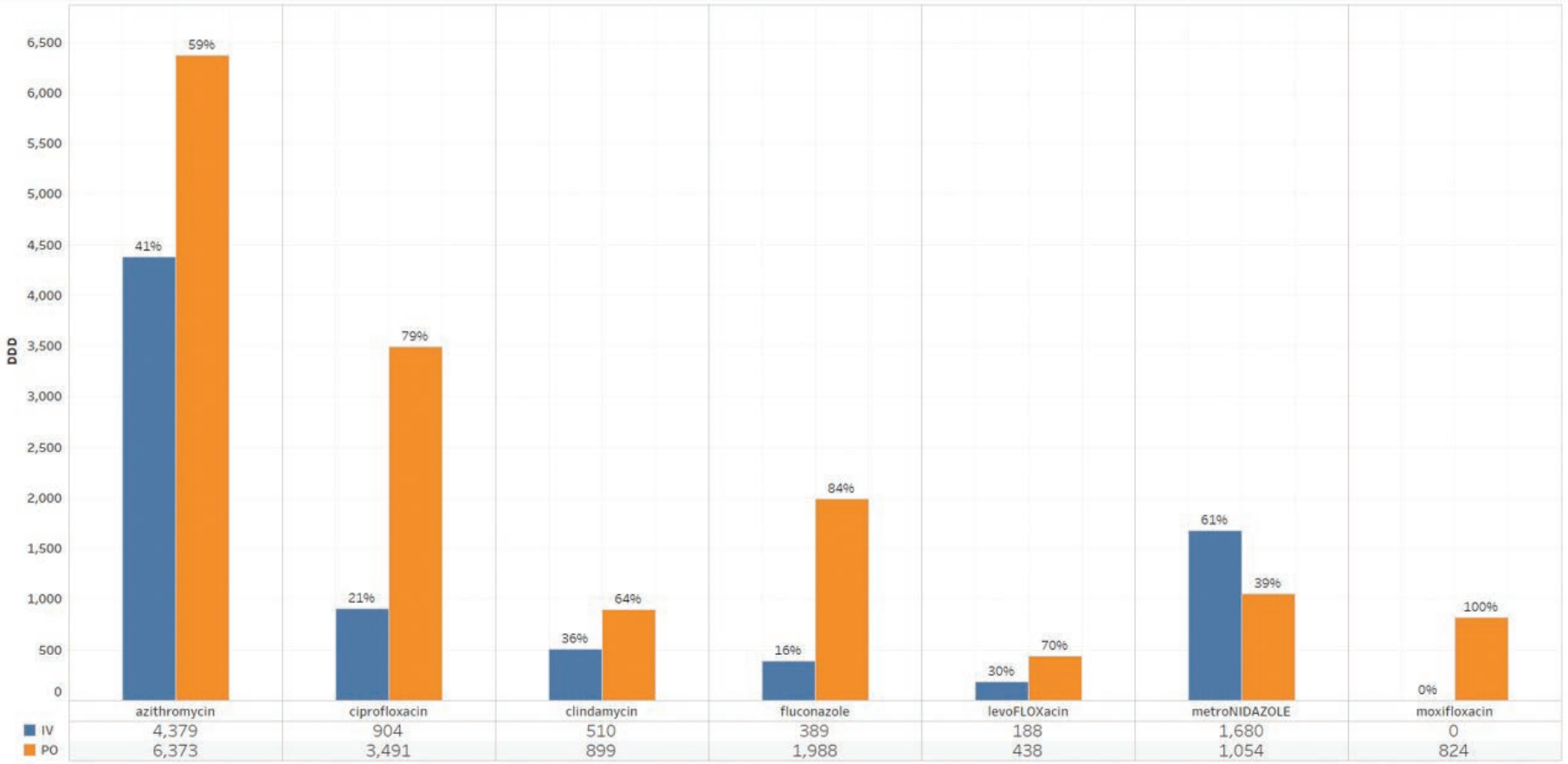


	azithromycin	carbepenems	ceFAZolin	cefTRIAXone	ciprofloxacin	DAPTOmycin	micafungin	piperacillin-tazobactam	vancomycin
FY2019/20	22.4	6.0	44.4	35.3	24.1	1.9	1.2	26.6	23.8
FY2020/21	50.9	12.3	49.6	91.8	32.2	16.3	7.0	64.7	47.6
FY2021/22	51.2	11.3	45.7	98.5	26.5	19.0	7.5	54.6	42.2

Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

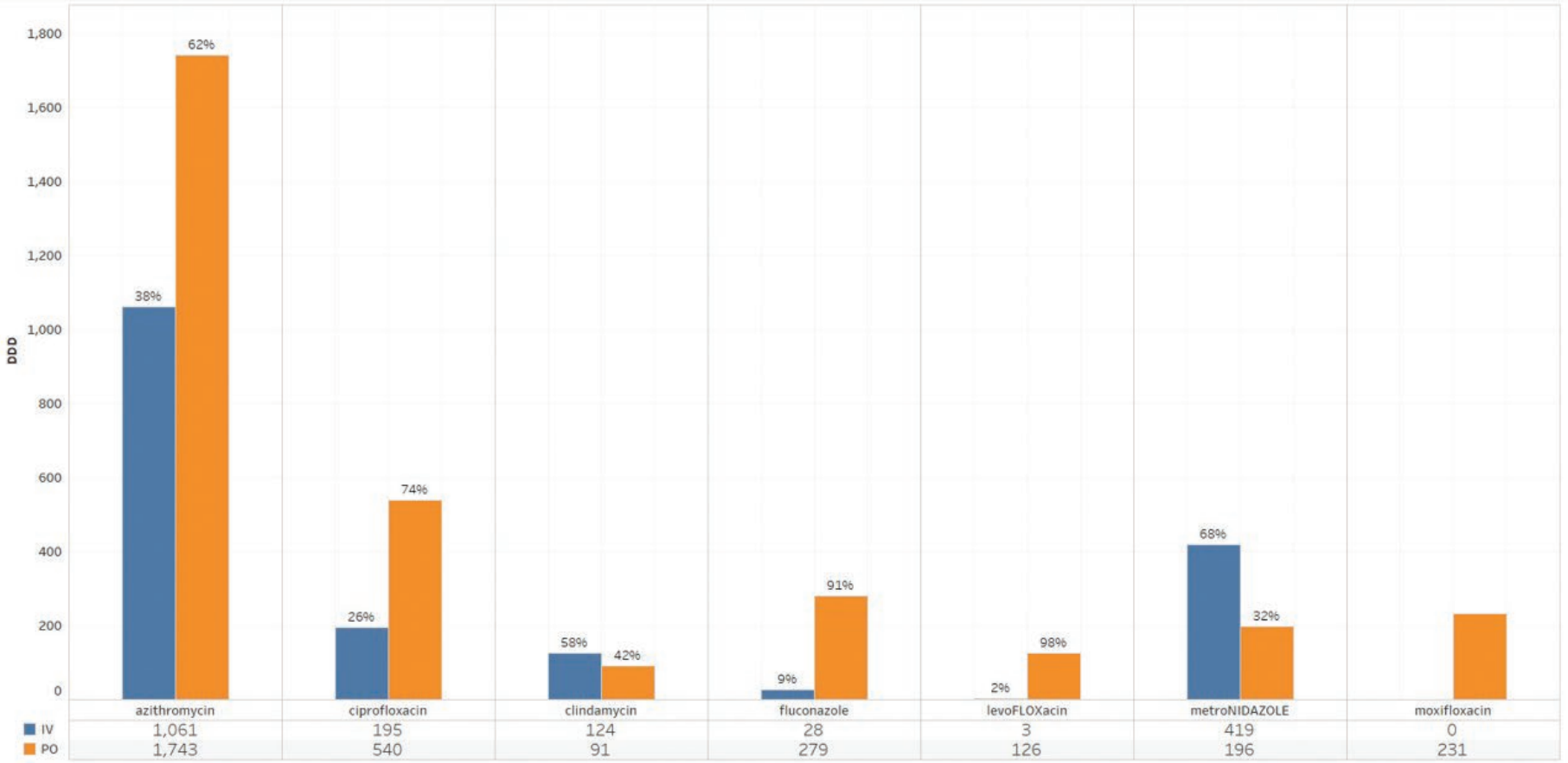
Figure 9: High bioequivalent antimicrobials IV versus oral for all NH (DDD/1000 inpatient days), FY 2021/22



Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

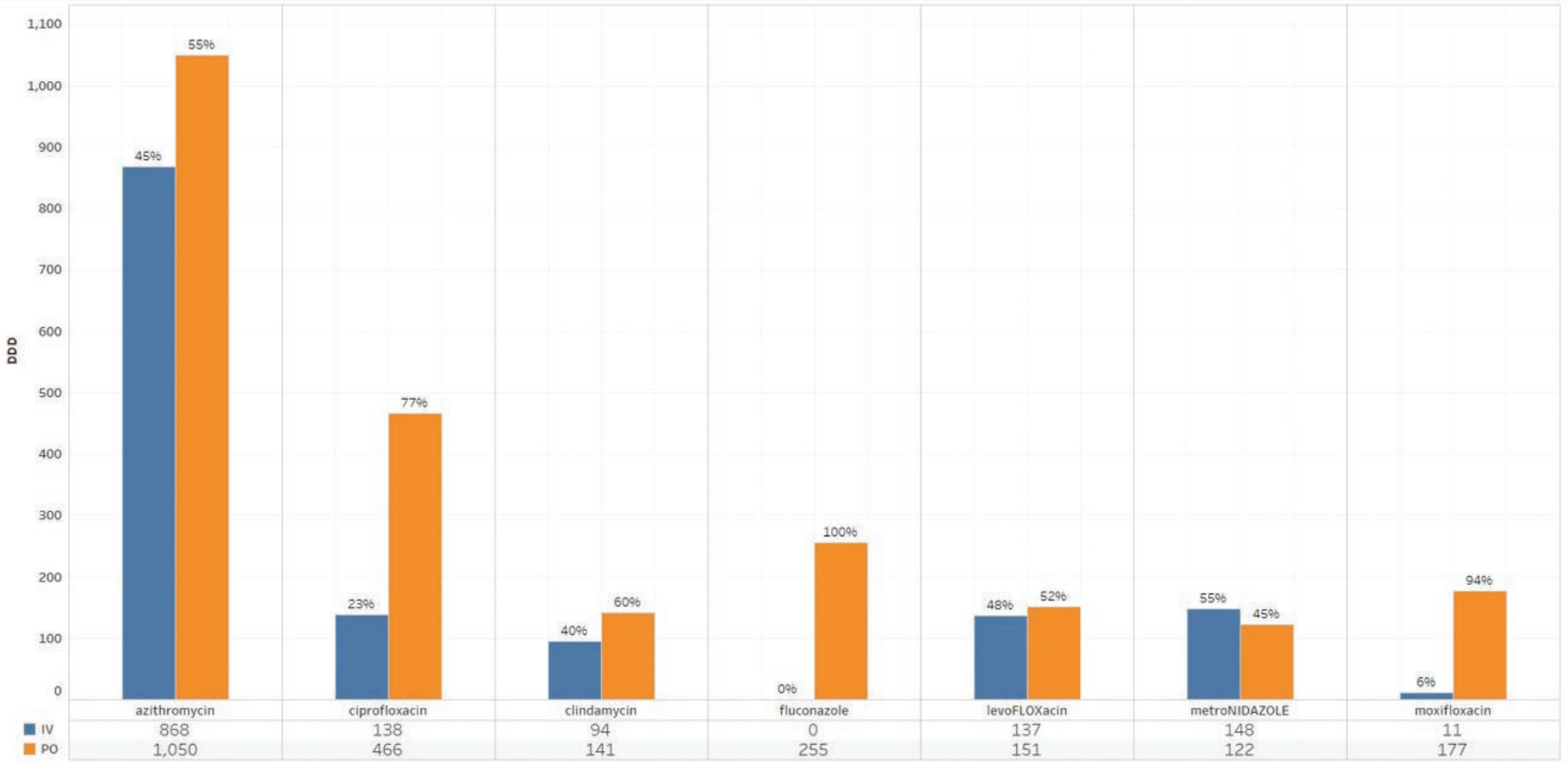
Figure 10: High bioequivalent antimicrobials IV versus oral for Northeast (DDD/1000 inpatient days), FY 2021/22



Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

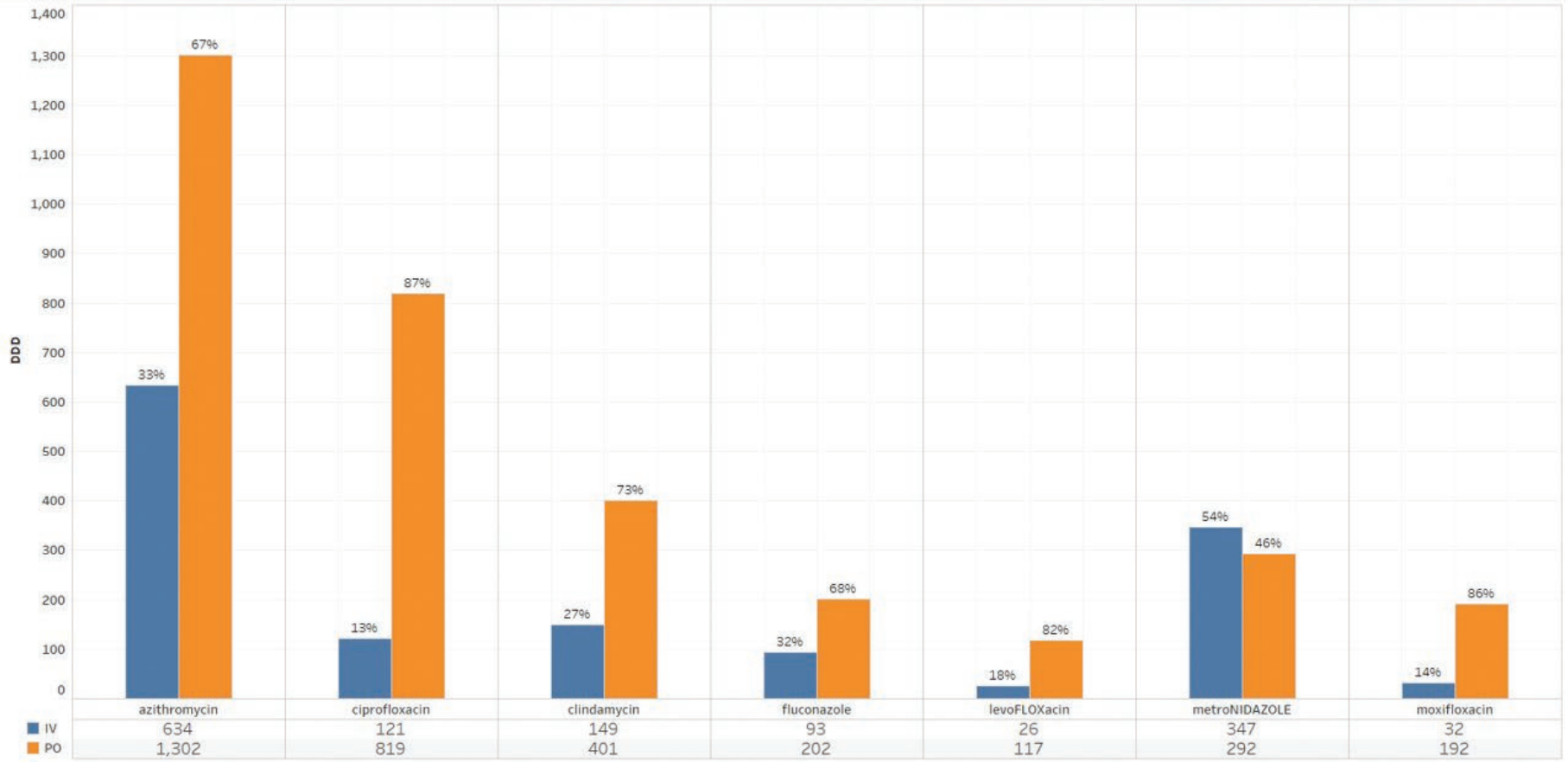
Figure 11: High bioequivalent antimicrobials IV versus oral for Northern Interior [excluding UHNBC] (DDD/1000 inpatient days), FY 2021/22



Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

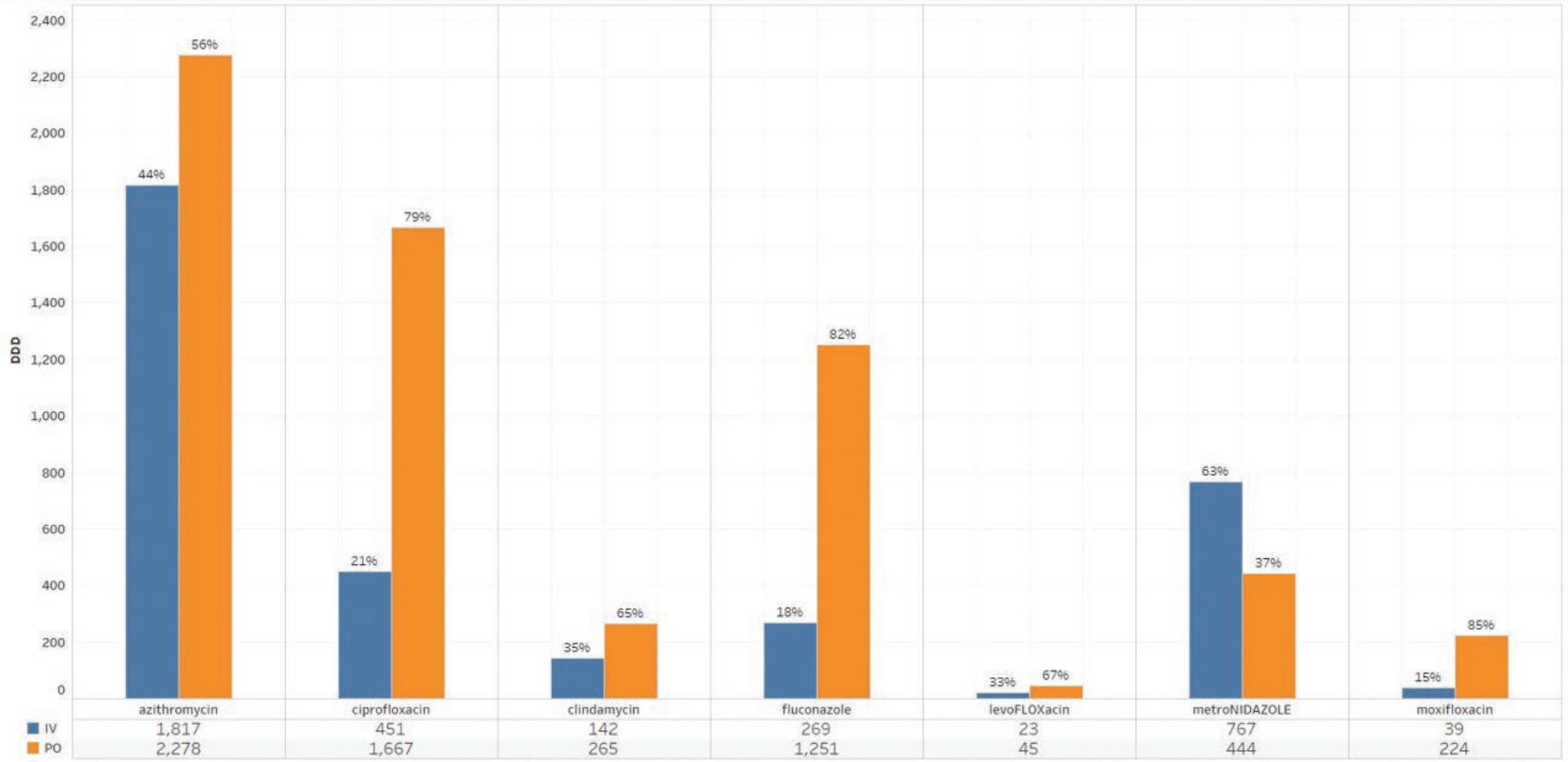
Figure 12: High bioequivalent antimicrobials IV versus oral for Northwest (DDD/1000 inpatient days), FY 2021/22



Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

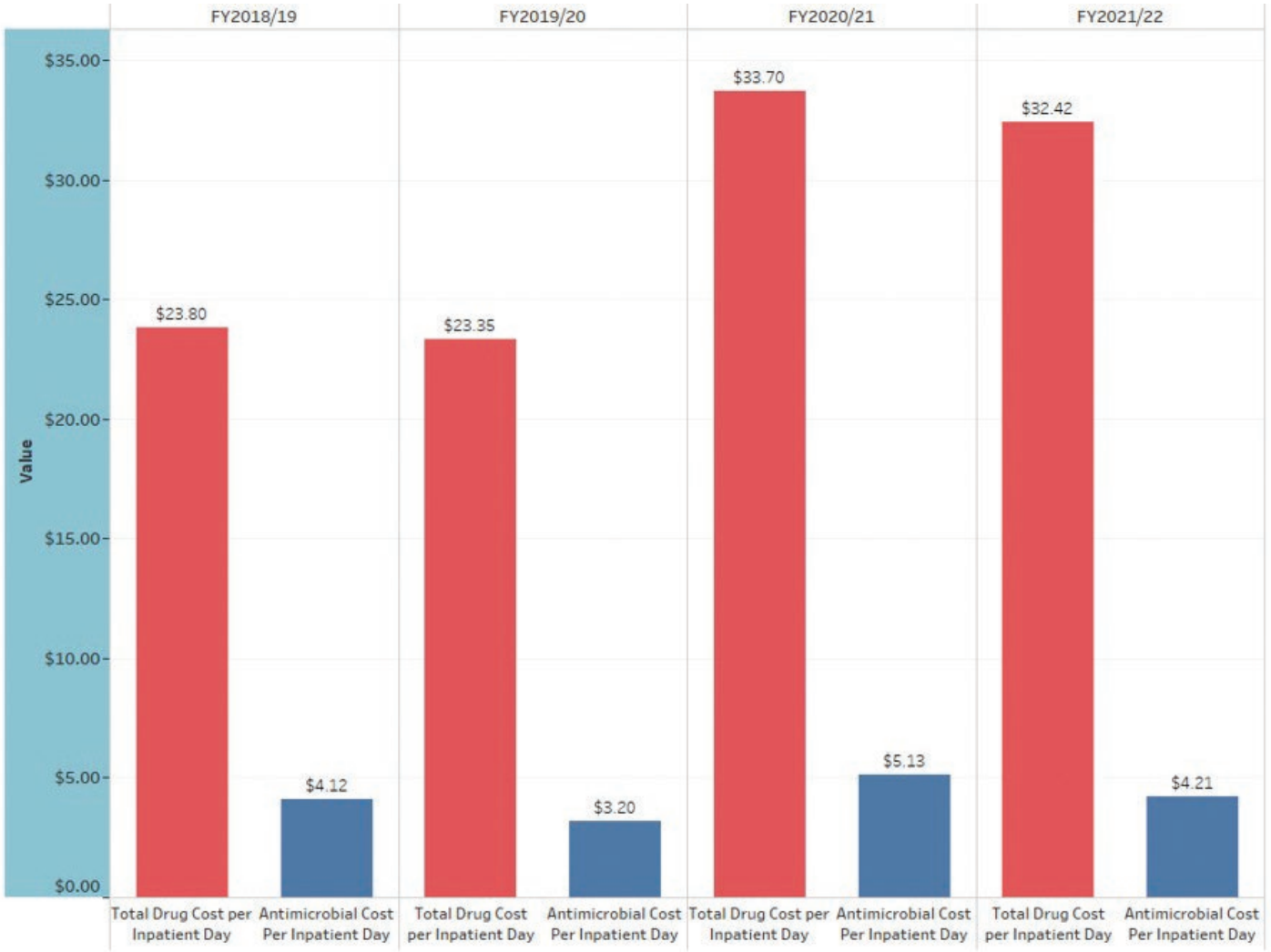
Figure 13: High bioequivalent antimicrobials IV versus oral for UHNBC (DDD/1000 inpatient days), FY 2021/22



Data source: Cerner - Product dispense and supply chain.

Graph prepared by: Clinical outcomes analyst for medication management.

Figure 14: Drug costs per inpatient day total versus antimicrobials



Data source: Cerner database.

Graph prepared by: Clinical outcomes analyst for medication management.

ANTIMICROBIAL STEWARDSHIP PROGRAM TEAM MEMBERS

PROGRAM COORDINATOR (PHARMACIST LEAD)

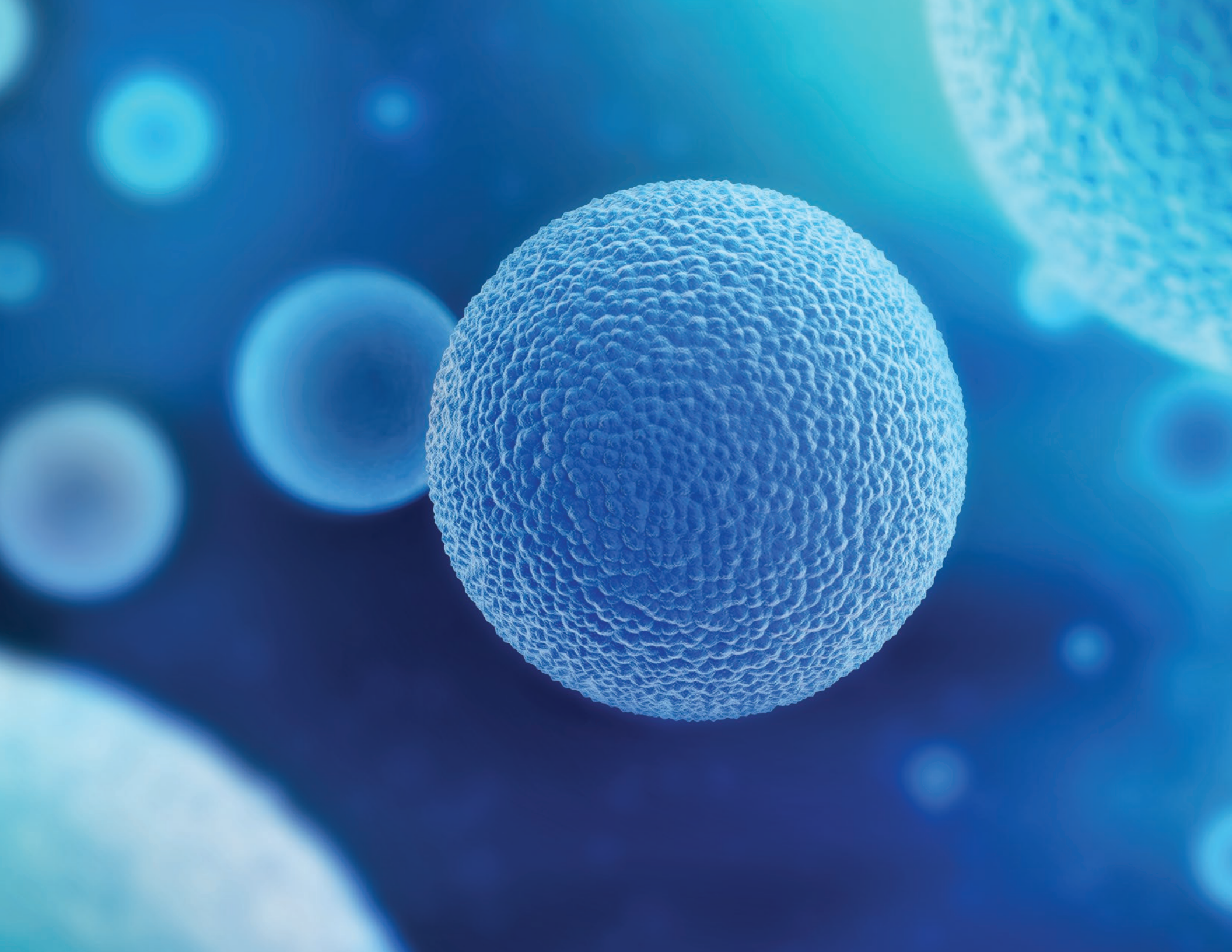
- Alicia Rahier

AMS PROGRAM/ INFECTION PREVENTION AND CONTROL MEDICAL LEAD

- Abu Hamour (NH Infectious Diseases Specialist)

AMS SUBCOMMITTEE MEMBERS

- Barb Falkner (Professional Practice Lead Pharmacist)
- Barret Barr (Clinical Pharmacy Specialist - NI)
- Carey-Anne Lawson (IT - CIS Pharmacist)
- Allissa King (Quality Resource Technologist Microbiology) on leave until April 2022
- Thomas Chen (Quality Resource Technologist Microbiology) covering for Allissa King until October 2021
- Debora Giese (CIC - Certified Infection Control - NW)
- Gordon Ling (Clinical Pharmacist - NW)
- Ryan Doerksen (Medication Use Management Pharmacist)
- Juanita Kerbrat (Coordinator, Infection Control RN - NE)
- Kyla Bertschi (Clinical Pharmacy Specialist - NI)
- Rachel Henri (Clinical Nurse Educator, Medicine - NI)
- Marilyn Ringdal (Clinical Nurse Educator - Wound, Ostomy and Continence - NI)
- Sandra Vestvik (Chief of Staff MD, BVDH - NW)



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