

Antimicrobial Stewardship

Annual Report 2018 -2019



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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

- [Antimicrobial Stewardship \(AMS\) webpage](#) on OurNH and the [NH physicians' website](#)
- Clinical tool pocket cards for empiric treatment and antimicrobial dosing (updated August 2018)

Education initiatives

- Education sessions for prescribers – Friday Grand Rounds at UHNBC
- Education sessions for pharmacists and nurses
- Learning hub modules for urinary tract infections (updated March 2019)
- Learning hub modules for pneumonia (completed February 2019)

Order set development

- Creation of regional vancomycin and aminoglycoside initiation order sets (completed Spring 2019)
- Creation of a regional *Clostridium Difficile* order set (projected completion Fall 2019)

Research

- Pharmacy resident project – Assessing the use of a standardized allergy history questionnaire in patients with a reported penicillin allergy (completed May 2019; final manuscript pending)

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.

Data collection and analysis with regard to antimicrobial use and costs in NH has proven to be challenging; an aspect that is shared with other AMS programs across Canada. The NH AMS data analysis team continues to work on determining the most appropriate methods for pulling the required data for analysis of these metrics. Despite rigorous methods used previously there have been issues identified with previously reported data that points to inaccuracy and renders any further analysis inappropriate until these issues have been confidently resolved. For this reason, there is no separate Mid-Year report circulated for the 2018-19 FY and there will not be any utilization

metrics included in this annual report. We hope to be able to report on this area for the 2019-20 Mid-Year report.

Clinical Service/Audit & Feedback

Throughout this fiscal year variations of Prospective Audit and Feedback (A&F) of targeted antimicrobials have been continued (with mentorship from the AMS program coordinator at UHNBC) at NH sites with onsite pharmacist support.

In July 2018, an electronic drug therapy problem tracker was implemented in NH for pharmacists to input their data for the number and types of drug therapy problems being identified, as well as whether or not they were able to resolve the problem. 2392 drug therapy problems were identified during AMS reviews by pharmacists with a 90% resolution rate (Table 1). The top 3 drug therapy problems were: 1. Antimicrobial dosage too low (suboptimal with regard to efficacy), 2. Unnecessary antimicrobial discontinued and 3. Antimicrobial dosage too high (suboptimal with regard to safety).

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 just as important as having the report at all. 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 what you read in this report, please feel free to contact the interim program coordinator (see page 4 for contact information).

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 interim program coordinator. Only when we work together can we truly improve the use of antimicrobials within the Northern Health Authority.

Antimicrobial Stewardship Program Team Members

AMS Program Coordinator (Pharmacist Lead)
<ul style="list-style-type: none"> • Ryan Doerksen (Interim Coordinator) • Alicia Rahier (<i>maternity leave until September 2019</i>)
AMS Program/ Infection Prevention and Control Medical Lead
<ul style="list-style-type: none"> • Dr. Abu Hamour (NH Infectious Disease Specialist)
AMS Subcommittee Members
<ul style="list-style-type: none"> • Amy Nunley (Clinical Pharmacy Specialist - NI) <i>maternity leave until May 2019</i> • Andrew Lowe (Clinical Pharmacist - NE) • Barb Falkner (Professional Practice Lead Pharmacist) • Barret Barr (Clinical Pharmacy Specialist - NI) <i>covering Amy Nunley until May 2019</i> • Carey-Anne Lawson (IT - CIS Pharmacist) • Carly Rosger (Clinical Pharmacist - NW) • Carol Pruner (Clinical Pharmacist - NI) • Dr. Cornelia Popa (Physician, DCDH - NE) • Deanna Danskin (Quality Resource Technologist Microbiology) • Debora Giese (CIC - Certified Infection Control - NW) • Dr. Inban Reddy (Family Practice Physician - NI) • Jessica Brecknock (Medication Use Management Pharmacist) • Juanita Kerbrat (Coordinator, Infection Control RN - NE) • Judy Klein (IPC - Infection Prevention Professional - NE) • Kyla Bertschi (Clinical Pharmacy Specialist - NI) • Kyla Redlon (Clinical Nurse Educator - NI) • Dr. Sandra Vestvik (Chief of Staff MD, BVDH - NW) • Dr. Sukh Sarkaria (Physician, DCDH - NE)
Clinical Pharmacists (who provide data for Audit and Feedback)
<ul style="list-style-type: none"> • Rebecca Arsenault – MMH • Manuela Krisinger – MMH • Samantha Holland – Omineca Lakes District • Tracy Moraes - PRRH • Gordon Ling - PRRH • Eyad Abu Sabiha – KGH • Oseyi Oseghale - FSJ • Michael Matula - GRB • Jordan Lewis - GRB • Leah Smith – Remote Relief Pharmacist • Michael Gentleman - Relief Pharmacist

Contact Information

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Best Practices

1. Clinical Tools, Standards and Policies

1.1 All-Staff Antimicrobial Stewardship webpage on OurNH and NH Physicians website (ongoing)

NH staff can quickly and easily gain access to information about the NH AMS program as well as any relevant clinical tools, clinical practice standards, clinical memos or bulletins and other online resources from the [All-staff Antimicrobial Stewardship Webpage](#). NH prescribers can also access this information on the [NH Physicians' Webpage](#). Under Physicians Resources, Clinical Resources prescribers will find the Antimicrobial Stewardship webpage at the top of the list.

1.2 Clinical tools pocket cards for antibiotic dosing and empiric treatment (updated August 2018)

The [Adult Dosing Guidelines pocket card](#) was updated to include antibiotic dosing for peritoneal dialysis in addition to hemodialysis. Several antibiotics were also updated to include the most recent dosing recommendations. The [Empiric Treatment Guidelines for Common Infections in Adults pocket card](#) included updates to the *Clostridium difficile* section, as well as the pneumonias section (community-acquired, hospital-acquired, and aspiration) and urinary tract infections. The updated documents are available on the Antimicrobial Stewardship webpage as well as the NH Physicians' webpage.

2. Education Initiatives

2.1 Education sessions for prescribers – Friday Grand Rounds

Prescriber education has been shown to benefit AMS outcomes when done in conjunction with other initiatives. The AMS program conducted three education sessions for internal medicine grand rounds at UHNBC for the 2018/19 fiscal year: infective endocarditis January 25th by Dr. Abu Hamour, blood stream infections May 17th by Dr. Will Connors (Infectious Disease specialist, Vancouver), and *Clostridium difficile* May 24th by Dr. Abu Hamour. The May 17th session was facilitated in conjunction with an evening education event on dental infections by Dr. Will Connors for dentists and physicians (collaborative event with the Prince George Dental Society). Prescribers (at all sites) are encouraged to provide requests for topics and future education sessions to the interim AMS Program Coordinator who will work with sites to set up opportunities.

2.2 Education sessions for nurses and pharmacists

In quarter 1 the AMS program coordinator conducted an education session and webinar for nurses in NH focussed on providing information on the AMS program, as well as IV to oral antibiotic step-down principles and AMS practices with regard to urinary tract infections and wound care. Ongoing topics of interest for this group include continued education on obtaining detailed antibiotic allergy information in order to prevent inaccurate allergy labelling, as well as providing further information on IV to oral stepdown for equipotent antibiotics in an effort to increase awareness of this topic for nurse-prescriber patient discussions.

Pharmacists are instrumental in AMS outcomes and continuing education is vital to furthering efforts in this area. In quarter 1 the AMS program coordinator provided an education session on antimicrobial stewardship tips for practice including allergy assessment (principles around penicillin allergy de-labelling), urinary tract infections, and wound infections. The session was available to all pharmacists in NH via teleconference and videoconference. Pharmacists (at all sites) are encouraged to provide requests for topics and future education opportunities to the interim AMS Program Coordinator.

2.3 Education Modules – Learning Hub

Learning modules have been designed for use by pharmacists, nurses, physicians and other health care professionals. The AMS program has two topics on the learning hub, which were identified by the AMS subcommittee as areas of education interest: 1) urinary tract infections (searchable as NHA - AMS - Urinary Tract Infections) and 2) pneumonia (completed in February 2019, searchable under NHA - AMS - Pneumonia). Each course contains 3 modules, with each module taking approximately 20 minutes to complete (including the quizzes). Participants will receive a certificate of completion once all modules, corresponding quizzes and feedback evaluations are completed.

The urinary tract infection (UTI) modules were updated in March 2019 to reflect the current NH antibiogram. The first module covers asymptomatic bacteriuria and uncomplicated UTI, the second module covers complicated UTI and pyelonephritis, and the third module discusses catheter-associated UTIs. The pneumonia modules completed testing in February 2019. The first module covers community-acquired pneumonia, the second module covers hospital-acquired and ventilator-associated pneumonia, and the third module covers aspiration pneumonia. Efforts are ongoing to market these learning modules as education opportunities for NH staff.

3. Order Set Development

3.1 Initiation of Vancomycin and Aminoglycosides for Adult Inpatients regional order sets (completed Spring 2019)

These order sets were adapted (with permission) from other B.C. health authorities. They were developed with the intent to help simplify initial dosing of these antibiotics for prescribers which can be difficult as there are variations in dose and dosing frequency depending on patients' weight and height in addition to serum creatinine/renal function. NH pharmacists will continue to do all follow up monitoring and dosing of vancomycin and aminoglycosides. These order sets were approved by NHMAC in May 2019 and have been implemented and are available for use at all NH inpatient facilities.

3.2 Creation of *Clostridium Difficile* regional order set (projected completion Fall 2019)

Management of *Clostridium difficile* infection (CDI) has been identified as an area of concern in NH as evidenced by the retrospective evaluation of CDI risk factors and management at UHNBC (see [NH AMS Annual Report for 2017/2018](#) on the AMS webpage for further information on this project and results). Currently there is no order set or policy for CDI available in NH. A draft order set is in progress which will include guidance on appropriate treatment options for first CDI episode, recurrent CDI, and severe (fulminant) CDI as well as treatment duration and other CDI-related considerations (i.e. discontinuing antidiarrheals, antibiotics, laxatives, promotility agents, and proton pump inhibitors). The first draft has been circulated for stakeholder feedback around NH, with plans to have edits completed and NHMAC approval in the Fall 2019.

4. Research

4.1 Pharmacy Resident Research project – Assessing the use of a standardized allergy history questionnaire in patients with a reported penicillin allergy (completed May 20 19 – final manuscript pending)

Abstract:

Inappropriate allergy labeling is associated with significant clinical and pharmacoeconomic implications. Detailed allergy assessments are a key component of antimicrobial stewardship and aid in identifying true immediate Type-1 hypersensitivity reactions. The allergy form currently used at the University Hospital of Northern British Columbia (UHNBC) relies on the assessor's ability to ask appropriate prompting questions to obtain a thorough history. The primary objective of this study was to compare the quality and quantity of documentation gathered from a standardized allergy history questionnaire to that of the current allergy history form. This was a prospective observational study of patients admitted to medical and surgical services at

UHNBC with a penicillin allergy reported on their Electronic Medical Record (EMR).

Results: A total of 40% of patients had an inappropriate allergy label on their EMR. Out of the 48 patients assessed, only 36 had a listed reaction on their EMR. Furthermore, only 36 of the 48 patients had the same allergy reported on the allergy history form in their paper chart, of which 22 had a documented reaction. The mean time to conduct the questionnaire was 2 minutes, ranging from 1 to 4 minutes to complete.

Conclusion: Documentation of allergy histories at UHNBC is often incomplete. Detailed allergy assessments are the first step in identifying true Immunoglobulin E (IgE)-mediated hypersensitivity reactions. Therefore, implementation of a standardized allergy history questionnaire may serve to improve documentation and overall antimicrobial stewardship.

Clinical Service (Prospective Audit & 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, taking into account 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

Throughout the 2018/19 fiscal year variations of Prospective Audit and Feedback of targeted antimicrobials were carried out across NH through our clinical pharmacy service with support and mentorship from the AMS program coordinator at UHNBC.

Pharmacists identified 2392 drug therapy problems (DTPs) during AMS reviews throughout 2018/19 with a resolution rate of 90%. This is our highest recorded resolution rate thus far, up from 71% last fiscal year – and well exceeding our goal of 80%. Reasons for being unable to resolve an identified DTP are summarized in Table 1; 51% of unresolved DTPs were due to prescriber or patient disagreeing with the recommended solution, 17% were due to pharmacist workload, 15% were due to patient being discharged before the DTP could be resolved and 17% were do to pharmacists being unable to contact prescribers. This distribution of unresolved DTP reasons is similar to previous years.

Analysis of the cases reviewed, as well as DTPs identified and resolved was done collectively for all sites active at any point during the fiscal year (see Table 1).

Table 1 - Audit and Feedback antimicrobial drug therapy problem resolutions

Measure		Number of Patients
Antimicrobial therapy problems identified		2392
Resolved antimicrobial therapy problems		2160
Unresolved antimicrobial therapy problems		232
Unresolved reason	Prescriber or patient disagreed	119 (51%)
	Pharmacist workload	39 (17%)
	Patient discharged	35 (15%)
	Unable to contact prescriber	39 (17%)
Antimicrobial therapy problem resolution rate		90%

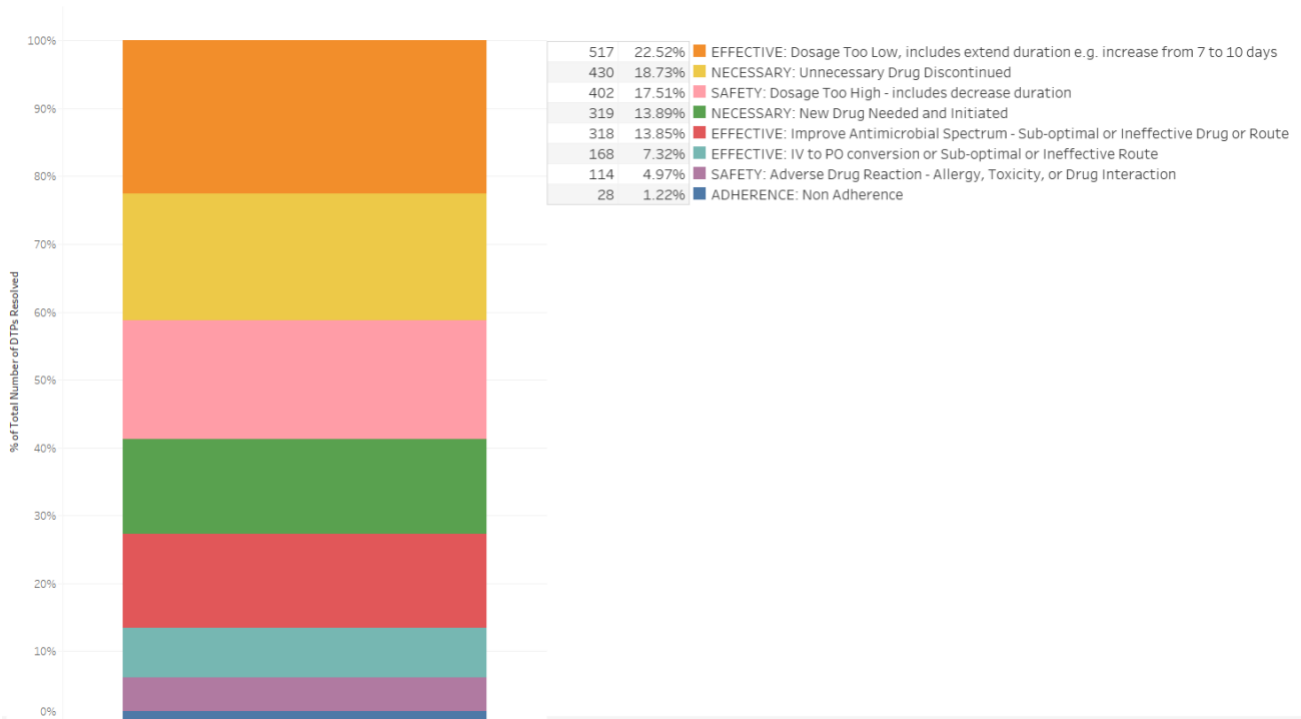
Prior to July 2018, this data was collected by way of manual methods requiring individual pharmacists to notify the AMS program coordinator of these items. The AMS coordinator had tried to encourage this tracking consistently; however, it is not unreasonable to assume that workload restricted this data collection, especially at UHNBC. In July 2018, an online DTP tracker system was implemented for NH. This system still requires individual pharmacist data entry but the intent of this system is to make this tracking process more comprehensive and convenient. It was anticipated that this system would show an increase in antimicrobial DTP identification and subsequent increase in resolution rate as well, and based on the data from this fiscal year it appears that this may be the case. The AMS program coordinator anticipates that this trend will continue to improve as pharmacists become more familiar with the data entry and incorporating the process into their daily workload.

There are a variety of types of antimicrobial therapy problems; Figure 1 displays types of DTPs identified and resolved. The top 3 DTPs identified and resolved include:

- #1** antimicrobial dosage too low (suboptimal with regard to efficacy)
- #2** unnecessary antimicrobial discontinued
- #3** antimicrobial dosage too high (suboptimal with regard to safety)

The current top 3 list is largely driven by dose adjustments and discontinuations for vancomycin, which may not have been reported as consistently prior to the implementation of the online DTP tracker. In previous quarters/fiscal years, IV to PO conversion has consistently been in the top 3 DTPs identified and resolved; however, in 2018/19 it dropped to #6. IV to PO conversion remains a focus area of AMS as timely conversion is effective for many infections and, when appropriate, can help to prevent adverse effects associated with IV administration as well as provide the benefit of cost savings to the health care system. Efforts will be made to encourage pharmacists to continue their great work on identifying and resolving AMS DTPs, and education/information will continue to be provided to prescribers with regard to assessing patients for IV to PO conversion of antimicrobials.

Figure 1 – Antimicrobial Drug Therapy Problem (DTP) Types Resolved in FY 2018/19



Data source: Manual tracking spreadsheet maintained by AMS program coordinator with input from clinical pharmacists (up until July 2018); July 2018 onwards from NH online DTP tracker

Graph prepared by: Planning & Performance Analyst for NH Pharmacy Group

Outcome and Process Measures

Antimicrobial Utilization & Costs across NH

Antibiotic 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.

Data collection and analysis with regard to antimicrobial use and associated costs in NH has proven to be challenging; an aspect that is shared with other AMS programs across Canada. The NH AMS data analysis team continues to work on determining the most appropriate metrics and means of analysis for the data; however, despite rigorous methods there have been issues identified with previously reported data rendering this data as inaccurate and inappropriate for drawing comparisons. Due to this current situation, there has been a delay in circulation of reports. Since at this time utilization metrics and cost analysis are not available there will not be a separate mid-year report for 2018/19 FY. There are plans to have a mid-year report for 2019/20 as long as the data collection/ analysis issues have been resolved and data validation allows for accurate conclusions. At that point the next report to be shared with our stakeholders will include data from the last 3 FY so that trends can be seen and comparisons can be made.

Accreditation & Resources

The most recent site surveys for Accreditation took place in June 2018 and the overall rating for the required organizational practice of Antimicrobial Stewardship was considered 'met' for all tests of compliance and no further evidence submission was required for the survey. The full report and final results of this survey can be found on OurNH [Accreditation info for NH](#). The NH AMS program remains dedicated towards meeting and maintain accreditation standards and requirements ongoing.

NH staff (including physicians) have ongoing access to online resources for AMS via the NH [physicians' website](#) as well as [OurNH](#). Both platforms have a dedicated page for Antimicrobial Stewardship information, guidelines and tools as well as access to current and previous reports. The aim is for staff to be able to educate and update themselves on the work being done by the AMS program.