

Antimicrobial Stewardship (AMS) Program: FY 16/17 Quarter 4 Update

Executive Summary

Best Practices

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

- Antimicrobial Dosing Guidelines for Adults clinical tool 2016/17 update (projected completion April 2017)
- Empiric Treatment of Common Infections in Adults clinical tool 2016/17 update (projected completion April 2017)
- Revision/regionalization of Sexual Assault Order set (AMS contribution for antimicrobial section completed March 2017)
- Creation/Regionalization of Chronic Obstructive Pulmonary Disorder (COPD) order sets (projected completion June 2017)
- Pharmacist Managed Pharmacokinetic Monitoring and Dosing of Vancomycin and Aminoglycosides clinical practice standard (projected completion June 2017)
- Intravenous to oral antimicrobial conversion order set (pilot project Dawson Creek – implemented March 2017)
- Revision of Outpatient IV Antimicrobial Therapy options; re-instatement of Cefazolin + Probenecid (Probenecid available for use May 1st; order set completion projected June 2017)
- Regional Sepsis protocol revisions/updates (projected completion June 2017)
- Pharmacy Resident Research project – Gap analysis of outpatient IV antimicrobial therapy (OPAT) across NH (project completion May 2017)

Future projects in active initial or planning stages include:

- Education Module and treatment algorithm development for Urinary Tract Infections (including catheter associated and asymptomatic bacteriuria)

- Education Module development for Community Acquired Pneumonia, Aspiration Pneumonia and Hospital Acquired pneumonia in Adults

Antimicrobial Usage Metrics

We have developed a new reporting system for gathering our usage metrics and plan on publishing results in the annual report, planned for distribution in June 2017.

Clinical Service/Audit & Feedback

Variations of Prospective Audit and Feedback (A&F) of targeted antimicrobials continue to occur at UHNBC, GR Baker, Mills Memorial hospital, Prince Rupert Regional Hospital, Bulkley Valley & District Hospital and Wrinch Memorial Hospital. During this quarter, A&F reviews commenced at Fort St. John Hospital and the Omineca Lakes district facilities. GR Baker has graduated to a more independent model for identifying and resolving drug therapy problems related to antimicrobials. Over the quarter approx. 1650 patient cases were reviewed and 534 drug therapy problems were identified with a 61% resolution rate. The top 3 drug therapy problems encountered continue to be: A. Unnecessary Antimicrobial Discontinued, B. Suboptimal or ineffective therapy and C. Converting IV antimicrobial to an oral agent.

Patient case reviews at Kitimat General Hospital are planned to commence September 5th 2017.

Fiscal Year 16/17 Q4 Results

Please note: the Antimicrobial Stewardship working group has become a permanent committee under the NH Medication Safety and Quality Committee and will now be referred to as the Antimicrobial Stewardship (AMS) Subcommittee

The position of Medical co-Lead for the AMS program and Infection Prevention and Control has been officially filled by our infectious disease expert Dr. Abu Hamour. Plans for collaborative work with the co-leads will be commencing in quarter 1 of the 2017/18 FY.

Ongoing Program Initiatives

- I. Clinical tools, standards, policies and education initiatives
- II. Regional Order Set development
- III. Prospective Audit and Feedback service including Outcome and Process Measures

1. Clinical tools, standards, policies and education initiatives

1.1 Antimicrobial Dosing Guidelines for Adults clinical tool 2016/17 update

Annual revision/update to clinical tool has been completed and published. Distribution to clinicians in each HSDA set for April 2017.

1.2 Empiric Treatment of Common Infections in Adults clinical tool 2016/17 update

Ongoing annual revision and update to clinical tool is planned for publication and distribution to clinicians in each HSDA in April 2017.

1.3 Pharmacist Managed Pharmacokinetic Monitoring and Dosing of Vancomycin and Aminoglycosides Clinical Practice Standard (projected completion June 2017)

Creation of a new regional clinical practice standard is underway. This CPS will authorize pharmacists to provide monitoring and dosing of vancomycin and aminoglycosides (gentamicin, tobramycin and amikacin). In addition to this policy, there will be updates to pharmacists training of new staff as well as opportunity for current staff to be oriented to the standardized procedure for managing these medications. The draft policy has been reviewed by the pharmacy group and is now awaiting circulation for stakeholder feedback from nursing and physician leadership.

1.4 Pharmacy Resident Research project – Gap analysis of outpatient IV antimicrobial therapy (OPAT) across NH

A research project is underway, led by the NH pharmacy resident for 2016/17. He is currently in the data analysis phase which involves compiling responses from site interviews to identify successes and areas for

improvement. The goals are to provide a gap analysis of current practices for outpatient IV antimicrobial therapy based on standardized criteria found in the literature and to provide possible solutions to the more common barriers identified.

The pharmacy resident will be developing in collaboration with the AMS subcommittee, a regional order set and clinical practice standard for OPAT in NH. He will have the data from his research ready for review and sharing in May 2017.

2. Regional Order Set development

2.1 Revision/Regionalization of Sexual Assault Order set

Revision to UHNBC's currently existing order set is underway. The AMS subcommittee was asked for feedback on updated antimicrobial options. This has been provided and presented at the March NHMAC meeting. The order set lead RN was given feedback requesting a protocol to be developed and added to the current order set. Work is complete from an AMS perspective and has been removed from the active projects list.

2.2 Creation/Regionalization of Chronic Obstructive Pulmonary Disorder Acute Exacerbation (COPDAE) order sets

Creation of a new order set for COPDAE is being led by the Respiratory Therapy group. Draft has been distributed to stakeholder groups. This order set contains admission orders, orders for 48 hours after admission as well as discharge orders which can be sent to a patient's community pharmacy. Currently the working group is planning to meet for review and incorporation of stakeholder feedback; goal for completion and implementation in June 2017.

2.3 Revision of Outpatient IV Antimicrobial Therapy order set: re-instatement of Cefazolin + Probenecid

Currently there is no regional order set for outpatient IV therapy. In conjunction with the research project discussed above (refer to item 1.4), there is work being done to create a regional order set (using UHNBC's site specific order set) which will include a re-instatement of a previously used management strategy of cefazolin plus probenecid, for outpatient IV management of uncomplicated skin and soft tissue infections. In 2011, probenecid was removed from the Canadian Market. At that time, ceftriaxone replaced cefazolin plus probenecid in the outpatient setting for skin and soft tissue infections. This is not ideal because ceftriaxone has suboptimal activity against *S. aureus*, has a higher risk for developing *C. difficile* infection and provides unnecessary Gram negative coverage promoting antimicrobial resistance. Gentes and Bolduc (division of Galenova) are now compounding probenecid capsules. Several other Health Authorities (HA) in Canada (including BC) are currently ordering from this manufacturer. The AMS subcommittee has conducted a review and cost analysis to support bringing

this product back to NH. Probenecid will be available for prescribing as of May 1st/17 and this combination therapy will be added to the regional order set being developed.

2.4 Regional Sepsis protocol revisions/updates

The AMS program coordinator is representing the AMS Subcommittee on a regional working group led by the Critical Care Program. Extensive revisions are underway for this regional document with hopes of shortening the form and updating the content to align with the 2016 Surviving Sepsis guidelines. The working group has monthly meetings and the order set is currently still in the revision stage of development.

Future project developments in initial planning stages:

The AMS program coordinator hopes to once again have increased resources via pharmacy student summer employment to aid with development of learning modules for pharmacists and other health care providers. Priority topics include:

- Urinary Tract Infections (including catheter associated and asymptomatic bacteriuria)
- Community Acquired Pneumonia and Aspiration Pneumonia in Adults
- Hospital Acquired Pneumonia

3. 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, 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

Efforts for bi-weekly to weekly review of patients on antimicrobials continue at UHNBC, GR Baker and Mills Memorial hospital, Prince Rupert Regional Hospital, Bulkley Valley & District Hospital and Wrinch Memorial Hospital. In January and March of this year these reviews have commenced at Fort St. John Hospital and the Omineca Lakes District facilities (Lakes District Hospital, St. John Hospital and Stuart Lake Hospital). As of March 2017 GR Baker has been actively providing A&F reviews independent from regular meetings with the AMS program coordinator and has been successful as maintaining regular DTP identification and resolution.

An intravenous to oral antimicrobial conversion order set has been developed and approved for use in the Dawson Creek District Hospital. Due to pharmacist work load constraints the AMS focus at this site will be using this order set and encouraging IV to PO step down. A pilot project was started in March 2017 and results of this (number of interventions carried out or prompted by the pharmacist using this order set) will be reviewed in September with plans for extending this order set regionally.

3.1 Outcome Measure Evaluation: Antibiotic Utilization 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 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). New reports for pulling data have been created and are currently being analyzed for production of these metrics. Reports containing the DDD per 100 patient days will be circulated as an annual AMS program report in May 2017.

3.2 Process Measure Evaluation: Audit and Feedback Recommendations and Acceptance rates

Variations of prospective audit and feedback (A&F) of targeted antimicrobials are currently occurring at UHNBC, GR Baker, Mills Memorial, Bulkley Valley & District, Wrinch Memorial, Prince Rupert Regional, Omenica Lakes District facilities and Fort St. John Hospital. This process involves assessment of patients on antimicrobial therapy evaluated against recommended therapies according to infectious disease resources and guidelines to ensure the optimal use of drug therapy. This strategy is employed after the drug has been initiated; currently reviews are being done on a weekly to biweekly basis for rural sites and 3 times a week for specific wards at UHNBC. Initiation of A&F at sites outside UHNBC is occurring in a stepwise approach (see Table 2).

Table 2

Site	Date initiated
GR Baker Memorial Hospital	May 13, 2016 (independent reviews commenced March 2017)
Mills Memorial Hospital	June 7, 2016
Kitimat General Hospital	June 9, 2016 (on hold Oct 2016)**

Bulkley Valley & District Hospital	July 6, 2016
Wrinch Memorial Hospital	July 6, 2016
Prince Rupert Regional Hospital	July 7, 2016
Dawson Creek & District Hospital	Sept 6, 2016 – adapted in March 2017 due to work load constraints IV to PO order set initiated March 2017
St. John Hospital	Jan 30 th , 2017
Lakes District Hospital	Jan 30 th , 2017
Stuart Lake Hospital	Jan 30 th , 2017
Fort St. John Hospital	March 7 th , 2017 (On hold as of April 2017)**

**Recent new hire of on-site pharmacist for Kitimat General Hospital has occurred, therefore bi-weekly reviews are planned to re-commence in September 2017. Due to need for pharmacist clinical training, A&F reviews at Fort St. John hospital will be postponed until September 2017.

Analysis of the cases reviewed, drug therapy problems identified and resolved was done collectively for all sites active at any point during quarter 4 (see Table 3).

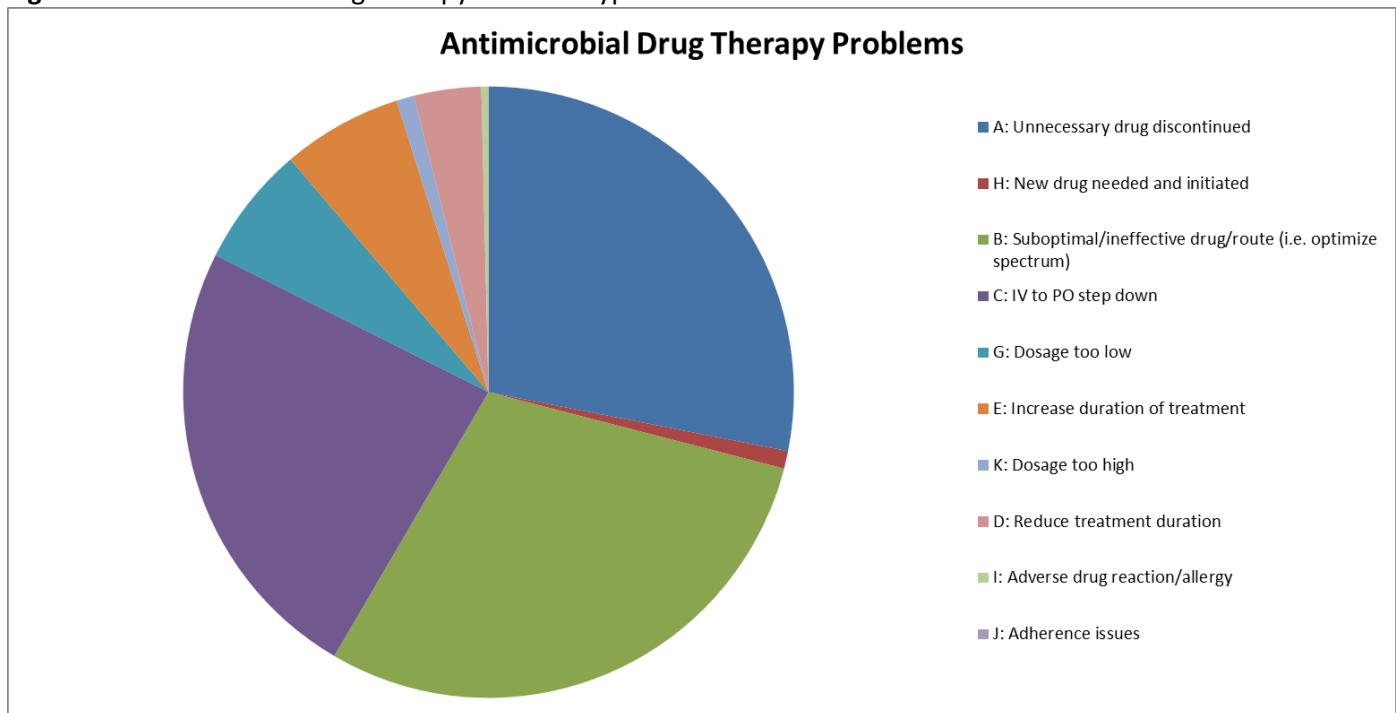
Table 3 - Audit and Feedback antimicrobial drug therapy problem resolutions; (Dec 2nd – Mar 31st, 2017)

Measure	Number of Patients
Patient Chart Reviewed	1656
Antimicrobial therapy problems identified	534
Antimicrobial therapy recommendations resolved	328 (61%)
Unresolved antimicrobial drug therapy problems	206
Unresolved drug therapy problems due to pharmacist workload demands	116 (56%)
Unresolved drug therapy problems due to patient discharge	51 (25%)

Antimicrobial therapy recommendations resolved, captures problems that the pharmacist resolved on their own (e.g. dose optimization) or recommendations made to and accepted by the appropriate physician (e.g. discontinuing an unnecessary antimicrobial or changing agents based on culture results). The resolution rate (61%) has continued to increase from previous quarters; our goal is to maintain this level above 50% moving forward with a target of 80%. Issues which go unresolved because the pharmacist is unable to follow through due to workload constraints represents 56% of the unresolved drug therapy problems and 22% of all identified drug therapy problems this quarter. Unresolved issues due to patient's discharge occurring before interventions could be made equate to 25% of the unresolved drug therapy problems and only 9.5% of all identified drug therapy problems. We will continue to monitor the percentage of identified issues unresolved due to pharmacist workload constraints (stable at 22%) to ensure it doesn't increase as this identifies an issue with our

current system and will warrant further review of resources. There are a variety of types of antimicrobial therapy problems; Figure 10 displays various types of drug therapy problems **identified**.

Figure 10 - Antimicrobial Drug Therapy Problem Types



The top 3 drug therapy problems encountered continue to be:

- A. Unnecessary Antimicrobial Discontinued
- B. Change in therapy to optimize microbial spectrum
- C. Converting IV therapy to an oral agent.

Note: these proportions reflect **identified** drug therapy problems

The AMS program will continue to provide quarterly updates to ensure transparency on timelines and progress of all active and pending clinical project development and initiatives, antimicrobial consumption (once new report data is analyzed) and resolution rates of drug therapy problems identified. For any questions regarding this report or the AMS program please contact the program coordinator (Alicia Ridgewell) at 250-565-5956 or via email alicia.ridgewell@northernhealth.ca.

Acknowledgements for work done in the AMS Program

The Antimicrobial Stewardship Subcommittee (AMSSC) is an inter-disciplinary subcommittee, mandated as a sub-committee of the NH Medication Safety & Quality Committee (NHMSQC).

Members (As of Dec 1st, 2016)

Alicia Ridgewell (AMS program coordinator – Clinical pharmacist)
Dr. Abu Hamour (Infectious disease MD)
Dr. Fareen Din (Intensivist, Nephrologist/Internist - UHNBC)
Dr. Inban Reddy (Family Practice MD- Northern Interior)
Dr. Barb Falkner (Professional Practice Lead pharmacist)
Carol Pruner (Clinical pharmacist - UHNBC)
Amy Nunley (Clinical Pharmacy Specialist –UHNBC)
Dr. Kyla Bertschi (Clinical Pharmacy Specialist - UHNBC)
Andrew Lowe (Pharmacist –North East)
Carly Rosger (Pharmacist – North West)
Nancy Dyck (Medication Use Management pharmacist)
Carey-Anne Lawson (IT-CIS pharmacist)
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Deanna Danskin (Quality Resource Technologist Microbiology)
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