



Antimicrobial Stewardship Program

2024 Annual Report



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Executive Summary

The 2024 Annual Report of the Saskatchewan Health Authority (SHA) Antimicrobial Stewardship Program (ASP) outlines key initiatives, achievements, and challenges in optimizing antimicrobial use, reducing antimicrobial resistance (AMR), and improving patient outcomes. Through strategic interventions, enhanced surveillance, and provider education, the ASP has continued working toward reducing inappropriate antimicrobial use and improving stewardship practices across the province.

KEY ACHIEVEMENTS IN 2024

Educational and Awareness Activities

- Maintained updated guidelines in the Firstline app to promote improved treatment outcomes, reaching more than 1747 users each month.
- Delivered 69 educational presentations to healthcare providers, trainees, and administrative staff.

Interventional Activities

- Conducted 365 in-patient antimicrobial reviews resulting in interventions, ensuring appropriate use and reducing unnecessary prescriptions.
- Created a new tool, the dental prescription pad, that was adopted by national partners.
- Collaborated on provincial surveillance for urinary tract infections in long-term care facilities, supporting data-driven interventions.

Policy and Advisory Committee Work

- Contributed to the Pan-Canadian Action Plan on AMR (PCAP) Year 1 Progress Report with other national partners.
- Contributed to the development of the SHA provincial restricted antimicrobials list.
- Initiated the creation of a One Health focused committee of inter-organizational interest holders to review antimicrobial stewardship activities and ensure the Saskatchewan health system is working toward the goals outlined in the PCAP.

Public Awareness and Advocacy

- Led World AMR Awareness Week efforts in Saskatchewan, lighting landmarks in blue and engaging with healthcare leaders at new sites this year.
- Worked with long-term care interest holders to promote AMS awareness through social media posts and via a podcast.

CHALLENGES AND FUTURE DIRECTIONS

- Need for an official mandate requiring antimicrobial indications with prescriptions.
- Improving timely and ongoing access to data sources.
- Improving outreach to primary healthcare clinics to enhance AMS efforts.
- Expanding antibiogram development to better tailor antibiotic prescribing.

By continuing to refine strategies and foster a culture of responsible antimicrobial use, the ASP remains committed to combating resistance and optimizing patient outcomes in 2025 and beyond.

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Introduction

The growing threat of antimicrobial resistance (AMR) poses dire consequences for human, animal, and environmental health. The Council of Canadian Academies has predicted that increasing AMR rates in Canada could lead to 140,000 preventable deaths and more than \$120 billion in lost gross domestic product by the year 2050¹. Active and effective antimicrobial stewardship programs (ASPs) are a critical component of the efforts required to combat AMR. In fact, the Public Health Agency of Canada (PHAC) has included “stewardship” as one of the five pillars in the Pan-Canadian Action Plan on AMR (PCAP)². In Saskatchewan, the Saskatchewan Health Authority (SHA) ASP strives to meet the goals outlined in the PCAP to ensure we are doing our part to tackle this global problem.

Program activities are broadly separated into three categories: educational and awareness activities, interventional activities, and advisory committees and policy development. While they are thematically separated, there is often overlap between these categories for individual activities, depending on the intended outcomes. That is to say, an educational activity may be part of an interventional activity aimed at producing a behavior change among prescribers, and in fact, this is often the case.

If you have questions, comments, or concerns about any of the content of this report, please email antimicrobial.stewardship@saskhealthauthority.ca for more information.

Time Frame

This report covers antimicrobial stewardship (AMS) activities and interventions occurring between January 1, 2024 and December 31, 2024 for the SHA ASP.

SHA ASP Staff Complement

In 2024, the SHA ASP staff consisted of two 1.0 full-time equivalent (FTE) AMS pharmacists and one 0.6 FTE research scientist. The ASP was directly supported by a team of clinicians, analysts, and administrative staff within the Stewardship and Clinical Appropriateness Department. Further project-specific support was provided by individuals and groups both internal and external to the SHA.

The SHA ASP would like to thank all contributors, collaborators, partners, colleagues, students, residents, and other interest holders, both locally and nationally, who participated in and supported the work described herein. The achievements of this program to date would not have been possible without the assistance of this large group of individuals and allied organizations.

Educational and Awareness Activities

The general goals of these activities were to promote awareness of the threat of AMR and provide education on how AMS addresses this threat. Additionally, education for healthcare providers often focused on improving antimicrobial use (AMU) for specific indications in line with best practice. Education and awareness activities were provided to healthcare providers, trainees/students, administrators, health system collaborators, and the general public. These activities contribute to creating the culture change required to address AMR as a global population.

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PRESENTATIONS

Educational Presentations: 69

In general, presentations were approximately one hour long and focused on a specific topic, tailored to the audience. More specific information on the presentations is expanded upon in the following seven sub-categories described below.

In addition to the updates outlined below, the ASP has a standing (pre-recorded) presentation that is provided for each cohort of the general clinical orientation for nursing staff and a standing virtual meeting to introduce newly hired, Regina-area physicians to the ASP as part of their orientation.

In December 2024, the virtual meeting with newly hired physicians transitioned to an online survey format using the Research Electronic Database Capture (REDCap) tool. The “orientation survey” includes information and links to the Firstline app and the ASP website, as well as contact information for the Program. For 2025, we will be able to report on the number of new physicians introduced to the ASP through this survey.

Approximately 1 education session was presented or hosted every 4 working days.

Elementary and High School Presentations: 19

These included in-person presentations at four different schools in Regina: Martin Collegiate, Campbell Collegiate, Campus Regina Public, and Miller High School. The presentations were incorporated into Health Science 20 and Biology 30 courses and included a general introduction to the concepts of AMR and AMS along with a review of case studies highlighting decision making around antibiotic prescribing. One presentation was for a Science 10 class and focused on careers in AMS. The number of attendees varied by class, but most often were in the range of 20-30 students. There was some hesitation for teachers to engage in 2024 due to a recently implemented Saskatchewan government [policy](#) limiting the presentation of sexual health content from external parties (*i.e.*, external to the school). Some teachers preferred or were instructed to hold off on external presentations until a school or school board policy was in place.

Pharmacy Student Presentations: 3

These included in-person, three-hour education sessions for fourth year pharmacy students while on their hospital rotations. For these sessions, students prepared and presented on common bacterial pathogens that cause infections in humans and important considerations in microbiology. The facilitators would outline steps in assessing antimicrobial therapy and review a patient case applying the learned content.

Long-Term Care Presentations: 13

These included virtual and in-person presentations to long-term care (LTC) leadership, staff, residents, and resident families at sites across the province. Topics focused on general AMS principles, appropriate testing and management of urinary tract infections (UTIs) and asymptomatic bacteriuria, and penicillin allergies. In-person presentations occurred at five sites in Regina (Brightwater, Regina Pioneer Village, William Booth Special Care Home, Wascana Rehabilitation Centre, and Regina Lutheran Home) and two virtual presentations were provided for facilities in Estevan (Hillview Manor) and Weyburn (Hilltop Manor). Group size varied based on the audience from a handful of attendees to several dozen.

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One of the presentations in 2024 was recorded as a podcast as part of an ongoing collaboration with the [Better LTC Consortium](#). The content included a conversation with the ASP research scientist and one of the ASP pharmacists about general AMS concepts and specific topics related to managing urinary tract infections and asymptomatic bacteriuria in LTC populations. The two-part podcast was published in early 2025 and can be accessed on the Better LTC Consortium [website](#).

In collaboration with the [AMR Aware Canada](#) group, the AMS research scientist moderated a national webinar as part of the [CANAMS!](#) webinar series. The webinar featured presentations by staff from the two LTC facilities in Saskatchewan that had recently developed local AMS committees. They spoke about their experiences in developing their respective committees and discussed the barriers and facilitators to the process.

General Clinical Education Presentations: 25

These included local, provincial, and national presentations, either virtual or in-person, on a variety of topics to a variety of audiences. Topics included general AMS principles, appropriate testing and management of UTIs and asymptomatic bacteriuria, penicillin allergy de-labelling, procalcitonin (PCT) use in intensive care units (ICUs), using the Firstline app, community-acquired pneumonia management, dental tools for AMS, surgical prophylaxis, and basic microbiology. Audiences included the general public, primary care clinics (physicians, pharmacists, nurse practitioners), internationally trained family physicians, medical residents, family physicians, ICU clinicians, orthopedic surgeons, pharmacists, emergency physicians, infection prevention and control (IPAC) staff, the Saskatchewan Ministry of Health, dentists and other oral health professionals, pharmacy students, and graduate students within the University of Saskatchewan Community Health and Epidemiology Program. Audience sizes ranged widely, depending on the presentation and forum, from a handful of attendees to hundreds. Twelve presentations (12/25, 48%) were provincial in scope, five (5/25, 20%) were delivered in Regina, another five (5/25, 20%) were delivered to other sites in Saskatchewan (Swift Current, Saskatoon, Fort Qu'Appelle, and Moose Jaw), and the remaining three (3/25, 12%) were national in scope. Of note, 2024 marked the reestablishment of presentations to oral health professionals following the COVID-19 pandemic.

Education Rounds Webinars: 5

In general, these 45 minute, virtual webinars alternated each month between ASP-related and other topics, with some months exempted due to cancellations. All webinars were recorded and posted to a [playlist](#) on the Stewardship and Clinical Appropriateness YouTube [channel](#). More than 219 attendees viewed the presentations live, an average of 44 attendees per webinar. In total, there were 68 asynchronous views of these videos on the YouTube channel by the end of 2024.

Speakers/topics included:

- SHA / Learning Health Systems and Antimicrobial Stewardship **(16 views; published February 2024)**
- University of Saskatchewan / U of S STARS – Choosing Wisely from the Start **(29 views; published April 2024)**
- SHA / Antibioqram Updates 2023 – Saskatoon Area and Introducing AMRNet **(30 views; published June 2024)**

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- University of Saskatchewan / “Stepping Up” STBBI Medical Education in Saskatchewan (**13 views; published July 2024**)
- Nova Scotia Health / Using a Point Prevalence Survey to Inform AMS Interventions (**7 views; published August 2024**)

Infectious Diseases Journal Club: 3

In 2024, Regina AMS pharmacists continued the bi-monthly infectious diseases (ID) journal club they initiated in 2023. As before, ID pharmacists, physicians, and microbiologists from both Regina and Saskatoon, as well as clinical pharmacists across the province, were invited to participate. Newly published papers that were potentially practice changing were presented to the group followed by open discussions.

Western Canada AMS Rounds: 1

AMS pharmacists in Alberta lead monthly, virtual meetings to provide other AMS pharmacists across Western Canada an opportunity to discuss clinical conundrums, interesting cases, newly published research papers, changes to guidelines, *etc.* Pharmacists volunteer to present a topic to the group and presentations are followed by open discussions. Meetings generally include approximately ten attendees from British Columbia, Alberta, Saskatchewan, and Manitoba.

In 2024, an SHA ASP pharmacist presented and discussed the results of the ERADICATE trial, which investigated the use of ceftobiprole for treatment of complicated methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia³.

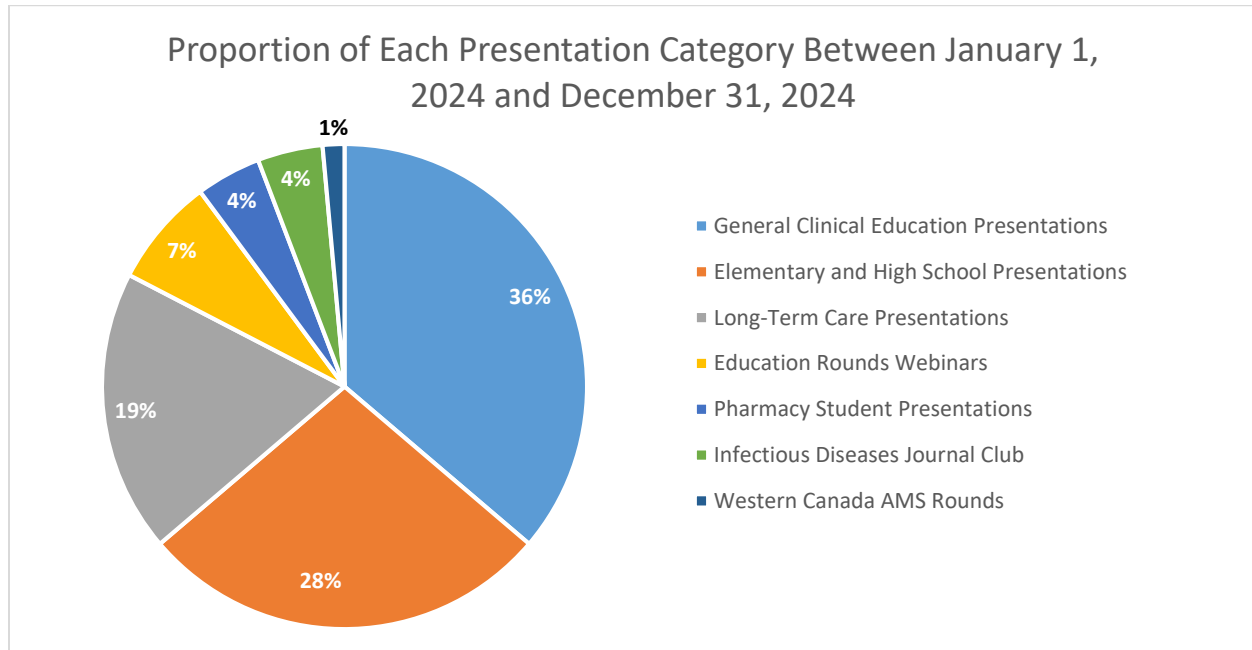


Figure 1 – Proportion of Each Presentation Category Between January 1, 2024 and December 31, 2024. The majority of presentations (57/69, 83%) were for general clinical education, elementary and high schools, and LTC.

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ADDITIONAL EDUCATIONAL ACTIVITIES AND CONTENT

Student and Resident Mentorship: 4 pharmacy students, 4 pharmacy residents

Throughout the year, the ASP hosted pharmacy students and residents as part of their training. Students and residents were engaged in clinical AMS work, data collection to inform AMS efforts, research projects, and creating educational content for the ASP, such as the Case of the Month for Firstline and various other educational posters and handouts. Students were with the ASP for four weeks and residents were on rotation for three to four weeks. Pharmacy resident research projects take place over one year. Student and resident contributions to the ASP are vital to achieving our goals.

Informational Posters: 4

Four informational posters were created: one described the utility of MRSA swabs (to be shared with clinicians to help reduce unnecessary anti-MRSA therapy), the second provided information on prescribing cefazolin for patients with anaphylactic β -lactam allergies (developed as part of a pharmacy resident research project described below), and the last two were designed as part of the work with pharmacy students developing AMS tools for dentistry – a patient-facing poster about penicillin allergies and a tri-fold pamphlet discussing AMS in dentistry. All documents were made available on the ASP [website](#).

ASP Website: 3798 total views

The ASP [website](#) was continuously monitored and updated to ensure that content was current and accurate. The website consists of four linked webpages:

- a patient/public-facing page with general AMS information (**1302 views**)
- an education and research page that outlines and links to our educational and awareness efforts as well as a list of our journal publications (**329 views**)
- an about us page with contact information for Regina and Saskatoon-based AMS experts (**613 views**)
- a provider-facing page with information on AMS-related tools and resources available to clinicians (**1554 views**)

Publications: 3

Members of our ASP team contributed to three new publications in 2024 that discussed efforts to improve COVID-19 vaccine uptake in Saskatchewan through a developmental evaluation, clinician experience of dalbavancin use in Canada, and development and dissemination of an electronic penicillin allergy de-labelling tool.

There are a total of 12 AMS-related, peer-reviewed journal publications that included ASP members as co-authors with 87 total citations as of February 21, 2025 (a 6% increase over the 82 citations from the 2023 Annual Report):

- Saravanabavan S, McKernan P, Cameron S, Kwan N, Kang KT, Roberts A, Carr R, Mak R, Elwood C, Paquette V, Stimpson R, Abrahams B, Chan ES, Slayter K, Rahier A, Sainchuk I, Olsen S, Kucey

12 AMS-related, peer-reviewed journal publications have been cited a total of 87 times as of February 2025.

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- M, Shamseddine J, Babiker ZOE, Wong T. Developing and disseminating an electronic penicillin allergy de-labelling tool using the model for improvement framework. *Allergy Asthma and Clinical Immunology*. (2024) 20(1):73. Published 2024 Dec 23. doi: 10.1186/s13223-024-00942-3. **(citations as of February 21, 2025: 0)**
- Zhanel G, Silverman M, Malhotra J, Baxter M, Rahimi R, Irfan N, Girouard G, Dhimi R, Kucey M, Stankus V, Schmidt K, Poulin S, Connors W, Tascini C, Walkty A, Karlowisky J. Real-life experience with IV dalbavancin in Canada; results from the CLEAR (Canadian LEadership on Antimicrobial Real-life usage) registry. *Journal of Global Antimicrobial Resistance*. (2024) 38:154-157. Published 2024 Jun 20. doi: 10.1016/j.jgar.2024.06.002. **(citations as of February 21, 2025: 1)**
 - Yasinian M, Carr T, Vanstone J, Azizian A, Falastein P, and Groot G. Improving COVID-19 Vaccine Uptake in Saskatchewan, Canada: A Developmental Evaluation Approach. *The Open Public Health Journal* (2024) 17: E18749445288367. Published 2024 Mar 21. doi: 10.2174/0118749445288367240311101720 **(citations as of February 21, 2025: 0)**
 - Vanstone JR, Azizian AR, Berry W, Carr T, Falastein P, Mise T-R, Patel S, Sarker KK, Yasinian M, and Groot G. Identifying Barriers and Enablers to Vaccine uptake from Immunizers and Individuals Receiving a COVID-19 Vaccine in Saskatchewan. *The Open Public Health Journal* (2022) 15: e187494452208012. Published 2022 Oct 31. doi: 10.2174/18749445-v15-e2208012 **(citations as of February 21, 2025: 2)**
 - Khaketla M, Carr T, Ndubuka N, Quinn BG, Reeder B, Sarker KK, Addae A, Ali A, Groot G, Sari N, Vanstone J, Hartness CJ, and Zayed R. Community and Public Health Responses to a COVID-19 Outbreak in North-west Saskatchewan: Challenges, Successes and Lessons Learned. *International Journal of Indigenous Health* (2022) 17(1): 73-86. Published 2022 Jul 5. <https://doi.org/10.32799/ijih.v17i1.36703> **(citations as of February 21, 2025: 3)**
 - Vanstone JR, Patel S, Berry W, Degelman ML, Hanson C, Phillips C, and Parker R. Using audit and feedback to encourage primary healthcare prescribers to record indications for antimicrobial prescriptions: a quality improvement initiative. *BMJ Open Quality* (2022) (11):e001760. Published 2022 Mar 10. <http://dx.doi.org/10.1136/bmjoq-2021-001760> **(citations as of February 21, 2025: 4)**
 - Azizian AR, Carr T, Muhajarine N, Verall T, Hartness C, Vanstone JR, Yasinian M, Skrapek C, Andreas B, Farthing G, and Groot G. Developing a patient-oriented realist evaluation for COVID-19 vaccine implementation in Saskatchewan: a methodologic framework. *Canadian Medical Association Journal* (2021) 9(4): E1034-E1039. Published 2021 Nov 23. <https://doi.org/10.9778/cmajo.2021004> **(citations as of February 21, 2025: 3)**
 - Groot G, Baer S, Badea A, Dalidowicz M, Yasinian M, Ali A, Carr T, Reeder B, COVID-19 Evidence Support Team (CEST). Developing a rapid evidence response to COVID-19: The collaborative approach of Saskatchewan, Canada. *Learning Health Systems* (2021): e10280. Published 2021 Jun 22. <https://doi.org/10.1002/lrh2.10280> **(citations as of February 21, 2025: 9)**
 - Wade-Cummings M, Mailman JF, Degelman, ML, Phillips C, Vanstone JR. Identification of Staphylococci by Polymerase Chain Reaction Directly from a Positive Blood Culture and Effect on Patient Care. *Canadian Journal of Hospital Pharmacy* (2021) 74(1):43-9. Published 2021 Jan 15. doi:10.4212/cjhp.v74i1.3039 **(citations as of February 21, 2025: 3)**
 - Lee C, Jafari M, Brownbridge R, Phillips C, Vanstone JR. The viral prescription pad - a mixed methods study to determine the need for and utility of an educational tool for antimicrobial

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- stewardship in primary health care. *BMC Family Practice* (2020) 21(1):42. Published 2020 Feb 22. doi:10.1186/s12875-020-01114-z (**citations as of February 21, 2025: 25**)
- Pflanzner S, Phillips C, Mailman J, Vanstone JR. AMS in the ICU: empiric therapy and adherence to guidelines for pneumonia. *BMJ Open Quality* (2019) 8(2):e000554. Published 2019 Apr 24. doi:10.1136/bmjoq-2018-000554 (**citations as of February 21, 2025: 4**)
 - Lee C, Phillips C, Vanstone JR. Educational intervention to reduce treatment of asymptomatic bacteriuria in long-term care. *BMJ Open Quality* (2018) 7(4):e000483. Published 2018 Dec 1. doi:10.1136/bmjoq-2018-000483 (**citations as of February 21, 2025: 33**)

AMS Committee Development Toolkit

Building from work that was initiated in 2023 to support the development of local AMS committees at two LTC facilities in Saskatchewan, the SHA ASP began development of a toolkit intended to assist other facilities and sites across Saskatchewan to be ready to meet the Accreditation Canada Required Organizational Practices for AMS. The toolkit included:

- a document which guides interest holders to relevant literature and resources providing evidence-based information and approaches to developing a local AMS committee
- a template to develop a committee terms of reference document
- a template to compile and submit an annual report on local AMS committee activities
- a program charter for the SHA ASP, intended to inform other sites of the support they may receive from the provincial Program

The toolkit is awaiting approval and will be published on the ASP website and disseminated to interest holders across the province in 2025.

Firstline App

The Firstline app provides antibiograms, clinical guidelines, antimicrobial information, and educational opportunities for healthcare providers across Saskatchewan. Our ASP team, in collaboration with the ASP physician and ID pharmacist in Saskatoon, maintain the content within the SHA instance to ensure the information is accurate and up to date. In 2024, nine guidelines were revised and one new guideline was created, all of which are outlined in the newly added 'Change Log' in the app, under Resources and Tools.

In 2024, there was an average of 1747 users each month, a 35% increase over the average monthly users in 2023 (*i.e.*, 1295; monthly users are defined as unique individuals who have accessed the app in a given month). Figure 2 shows the 2024 data broken down by month and by the platform used to access the app. Aggregate monthly users are also broken down by clinical role and location in Figures 3 and 4.

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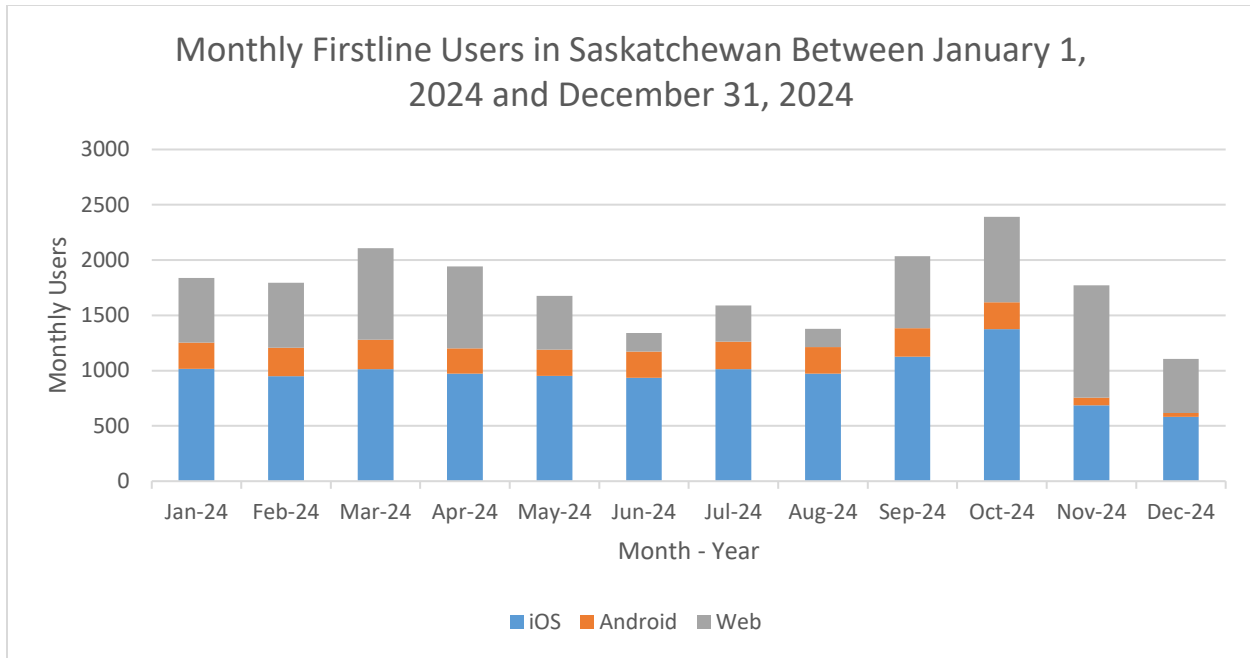


Figure 2 – Monthly Firstline Users in Saskatchewan Between January 1, 2024 and December 31, 2024. There was an average of 1747 Firstline users each month in 2024. The majority of users accessed Firstline through iOS devices.

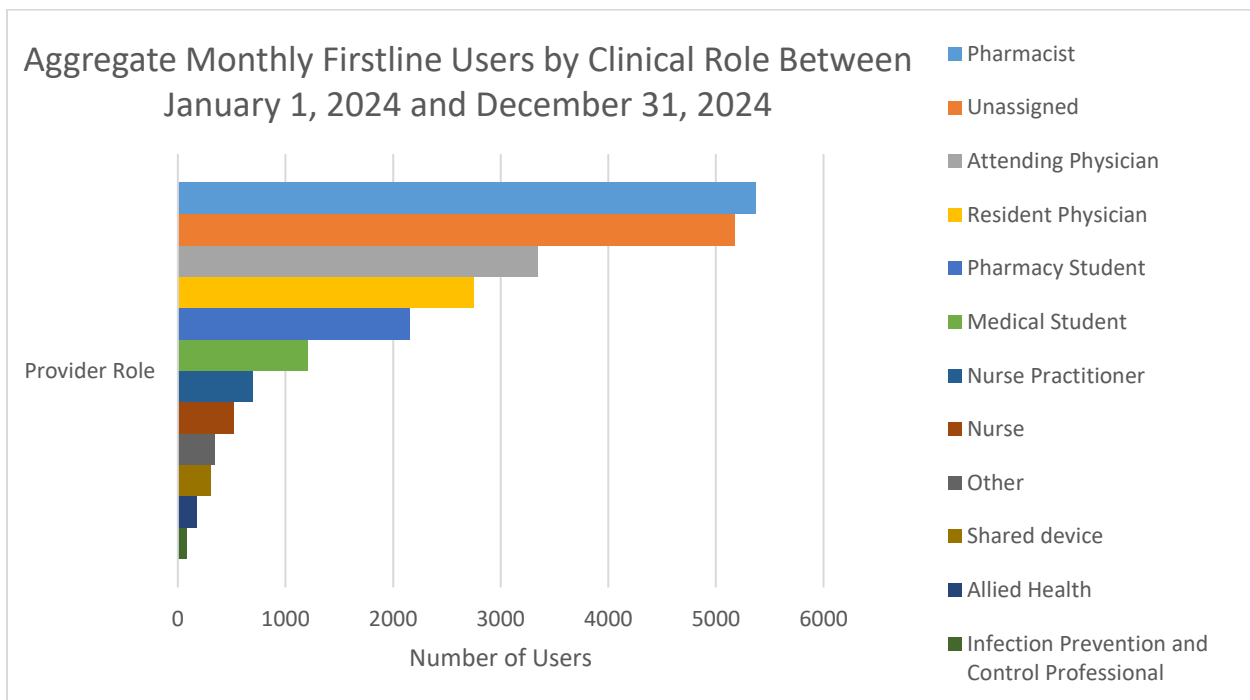


Figure 3 – Aggregate Monthly Firstline Users by Clinical Role between January 1, 2024 and December 31, 2024. Pharmacists, attending physicians, and resident physicians accounted for approximately 52% (11,463/22,177) of the aggregate monthly users.

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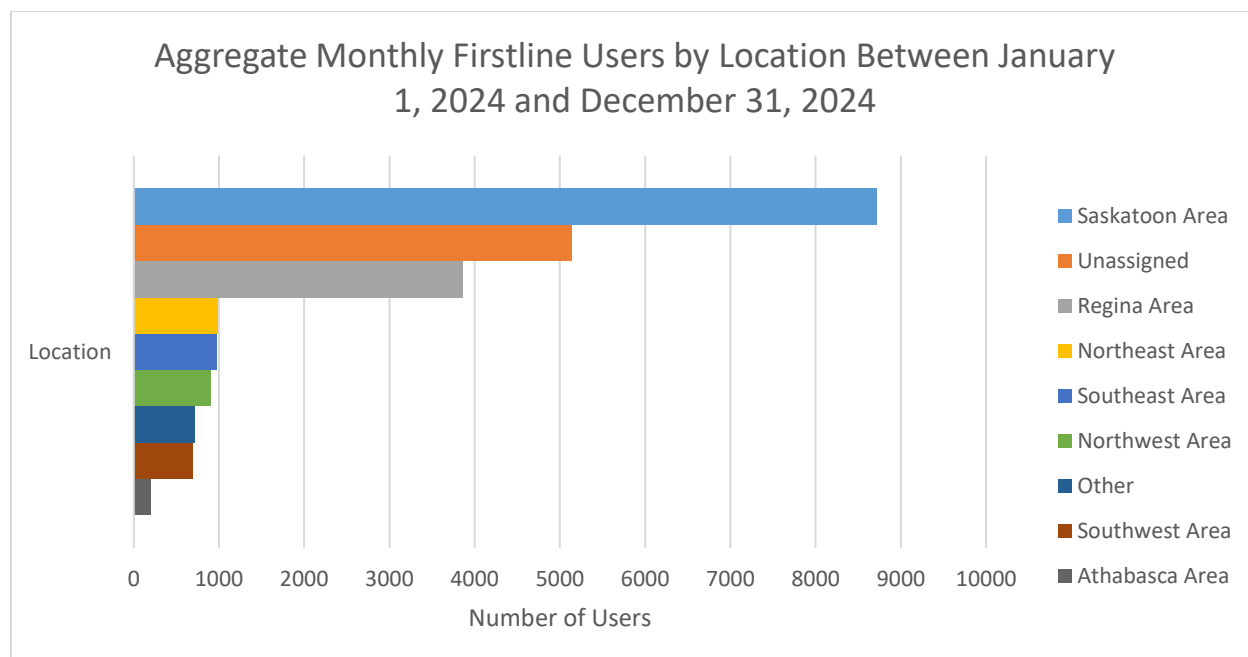


Figure 4 – Aggregate Monthly Firstline Users by Location Between January 1, 2024 and December 31, 2024. Saskatoon and Regina areas accounted for approximately 57% (12,581/22,182) of the aggregate monthly users.

In total, 55 different guidelines were accessed a total of 41,115 times in 2024. This represents a 34% increase in the number of unique guidelines accessed and a 38% increase in the total number of times guidelines were accessed compared to 2023 (*i.e.*, 41 guidelines and 29,695 times accessed). The top ten most frequently viewed guidelines are shown in Figure 5.

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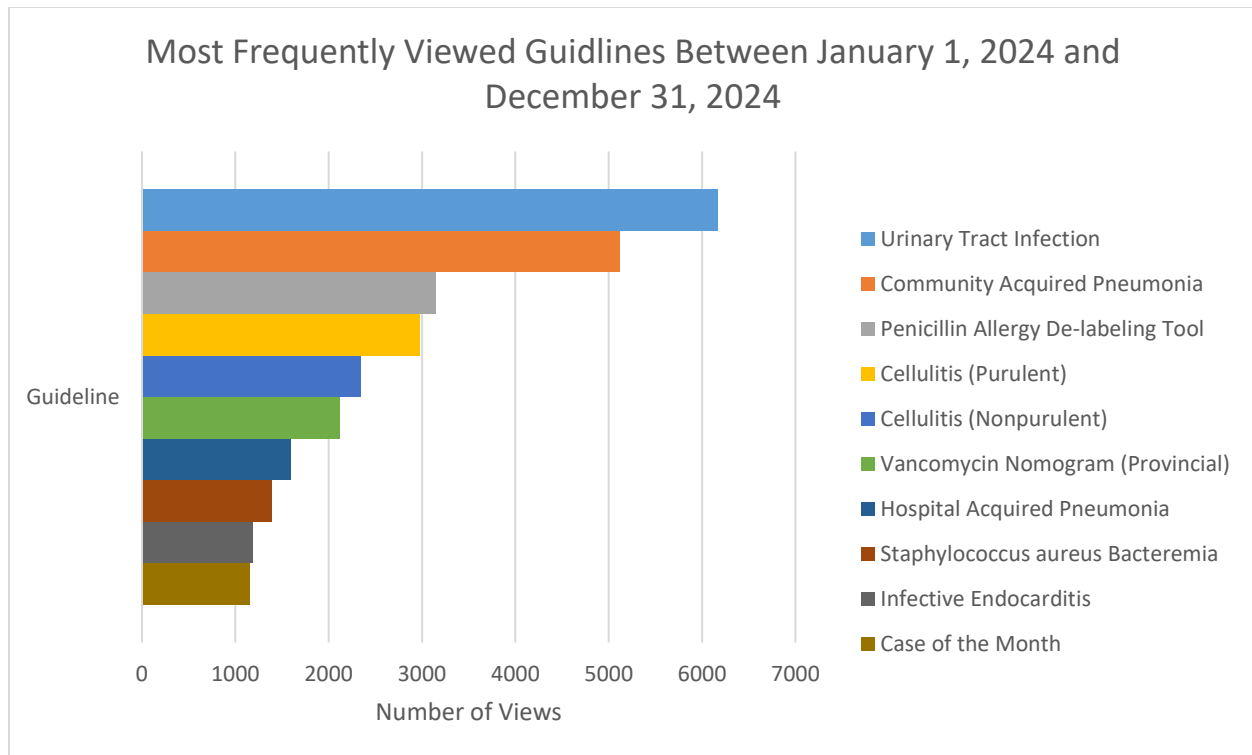


Figure 5 – Most Frequently Viewed Guidelines Between January 1, 2024 and December 31, 2024. The top ten most frequently viewed guidelines are shown in descending order of the number of views. These ten guidelines accounted for approximately 52% (27,181/41,115) of the total number of guideline views.

We published five “case of the month” case studies in collaboration with the ID pharmacist in Saskatoon. The purpose of these activities is to provide clinical practice pearls to providers on specific, antimicrobial-related topics. There were a combined 1152 views of the five cases of the month, a 103% increase from the 568 views in 2023 with one additional case published.

Provincial AMS Network Meetings: 5

These one hour, bi-monthly meetings provide an opportunity for interest holders and collaborators across organizations and the province to connect, share and discuss AMS-related activities going on in their local areas or organizations, and receive updates on activities from the SHA ASP. The invitee list includes the members of our ASP and people involved in AMS-related work from across the province, representatives of the Saskatchewan Ministries of Health and Agriculture, patient partners, universities, and SHA IPAC, pharmacy, ID, laboratory, and administration.

Conferences Attended: 6

Members of the SHA ASP attended and/or presented at six conferences in 2024. In September, presentations were provided at both the Saskatchewan Family Medicine Conference and the Saskatchewan Dental Conference, detailing information about pediatric respiratory tract infections (RTIs) and tools for AMS in dentistry, respectively. A hospital pharmacy leadership conference was also attended, which focused on equity, diversity and inclusion. In October, a poster detailing the work with primary health care (PHC) clinics to increase the number of prescriptions with recorded indications was

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presented at the Western Canadian One Health AMS Conference in Vancouver. This conference was the third installment of a conference series initiated in Regina in 2019 by the SHA ASP team and our partners. We also attended the Canadian Society of Hospital Pharmacy Saskatchewan Branch conference. In November, the ASP was part of an exhibitor booth at the Saskatchewan Nurse Practitioner's Conference, attending with the goal of promoting AMS awareness and providing AMS-related tools to conference attendees.

RxFiles Academic Detailing Collaboration

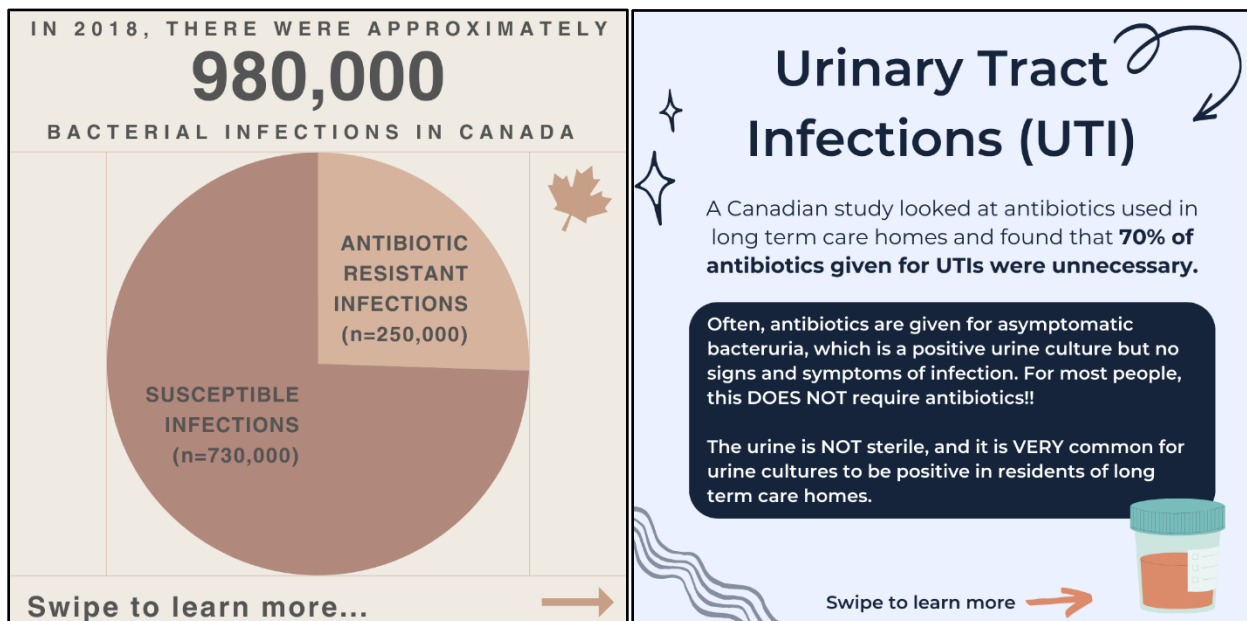
Building on the work that was initiated in 2023 to provide education regarding appropriate management of pediatric RTIs to prescribers, the ASP pharmacists collaborated with RxFiles to support content creation for their 2024 academic detailing topics on RTIs and penicillin allergies, including RxFiles chart reviews, education sessions for academic detailers, and poster creation. In addition to the academic detailing campaign, one of the ASP pharmacists co-presented with a representative from RxFiles and Dr. Rupesh Chawla (pediatric ID) on the topic of pediatric RTIs at the Saskatchewan Family Medicine Conference in September.

MedSask Guideline Review

As the role of community pharmacists continues to expand to allow for increased prescribing privileges, it is imperative that antimicrobial stewardship principles are incorporated into prescribing guidelines and treatment algorithms for ID. The ASP pharmacists reviewed Level 1 and 2 Community Pharmacist Prescribing Guidelines created by medSask for the following indications: acute rhinosinusitis, acute otitis media, and pharyngitis to help ensure judicious and appropriate use of antimicrobials.

Social Media Awareness

The SHA ASP collaborated with the [Better LTC Consortium](#) to create two social media posts that were shared via that organization's Instagram account. One post focused on general AMR and AMS information, while the other focused on management of UTIs and asymptomatic bacteriuria in LTC.



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World AMR Awareness Week: November 18-24

The World Health Organization (WHO) promotes an annual, global awareness week focused on AMR. Members of the ASP are engaged with a national network ([AMR Aware Canada](#)) that meets in the months leading up to WAAW to share information about awareness initiatives being planned at sites across the country and to focus efforts on national WAAW activities. One of the major WAAW activities is the #GoBlue campaign that encourages local landmarks across Canada to light up in blue during WAAW. There are also social media campaigns, virtual backgrounds for video conferences, and people are encouraged to wear light blue during the week.



In Saskatchewan, Regina City Hall and the Moose Jaw Clock Tower both lit up in blue from November 22-24, 2023. While fewer sites were represented for the #GoBlue campaign in Saskatchewan compared to 2023, we had an increase in the number of sites providing informational booths and other activities at local hospitals, with Regina, Saskatoon, Moose Jaw, Lloydminster, and Meadow Lake all participating. See Appendix 1 for more information on the WAAW activities that occurred in 2024.

Stewardship and Clinical Appropriateness 5 Min Update: 10

The Stewardship and Clinical Appropriateness Department distributes a monthly newsletter via email and in the SHA Rounds to update readers on ASP (and Opioid Stewardship Program) activities, as well as to advertise the upcoming Education Rounds webinars. The email distribution list includes members of our ASP and people involved in AMS-related work from across the province, representatives of the Saskatchewan Ministries of Health and Agriculture, patient partners, universities, and SHA IPAC, pharmacy, ID, laboratory, and administration.

The ASP updates included the following topics:

- promotion of the general AMS education module published in 2023 and available to SHA staff
- promotion of the penicillin allergy assessment tool available on Firstline
- an antibiogram update
- promotion of the STBBI Treatment Education Program for Saskatchewan (STEPS)
- promotion of the CANAMS! national webinar series and the upcoming presentations featuring staff from local LTC facilities
- promotion of the newly developed tools to promote AMS in dentistry

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- a review of a *Proceedings of the National Academy of Sciences* [article](#) discussing the connection between antidepressant use and increased emergence of AMR⁴
- a review of a WHO warning of increasing reports of a hyper-virulent, multidrug-resistant *Klebsiella pneumoniae* bacterium
- a review of recent conference presentations the SHA ASP participated in, including the Saskatchewan Family Medicine Conference, the Saskatchewan Dental Conference, and the Western Canadian One Health AMS Conference
- a review of WAAW activities

MyLearning Modules: 1

In order to provide more opportunities for education about AMR and AMS within the SHA, the ASP created an education module using the SHA's MyLearning platform in 2023. The first module we created was a general introduction to the concepts of AMR and AMS. The module was made broadly available on January 9, 2024. The content can be accessed by searching for "antimicrobial stewardship" in the MyConnection/MyLearning platform.

In 2024, there were 473 unique enrolments in the learning module. There was a peak of new enrolments in September (see Figure 6) which corresponded with an SHA Rounds article that was submitted to promote the uptake of the learning module.

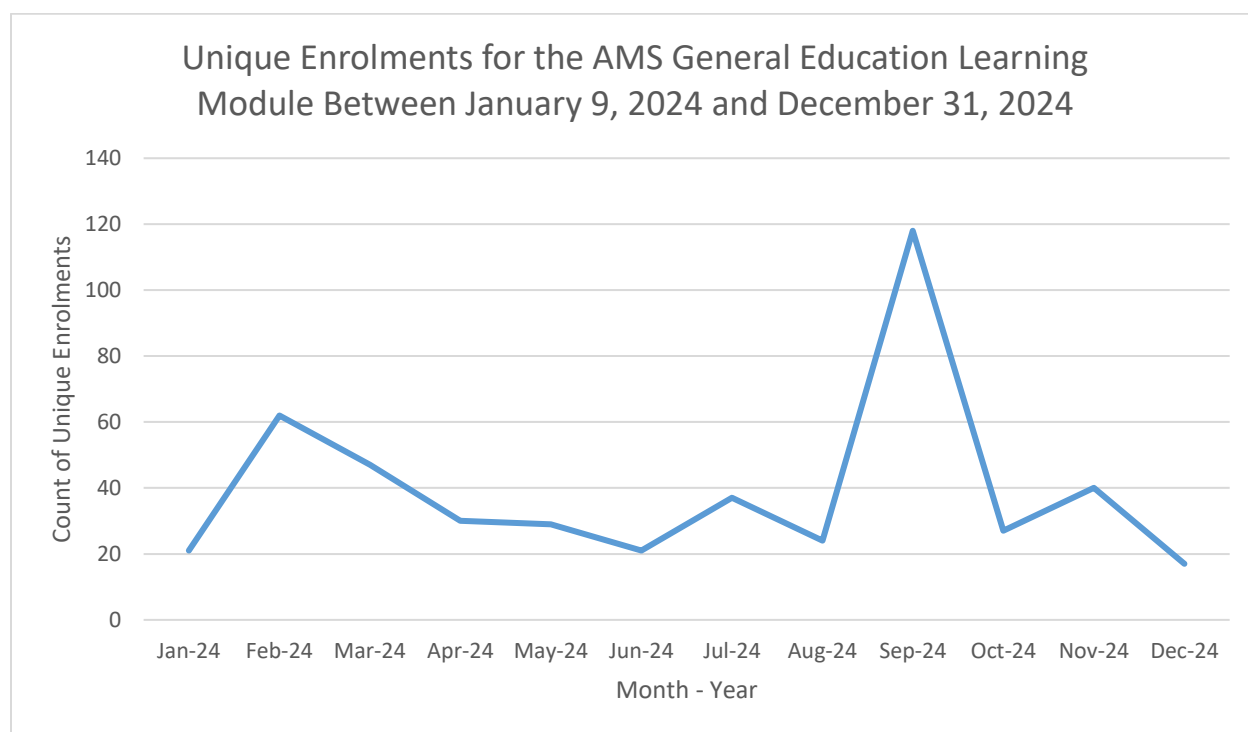


Figure 6 – Unique Enrolments for the AMS General Education Learning Module Between January 9, 2024 and December 31, 2024. The learning module was launched on January 9th. Two peaks are seen in enrolment: February corresponds to the 5 Min Update promoting the new module and September correlates to an SHA Rounds article that was submitted for the same purpose.

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Almost 67% (316/473) of those enrolled in the learning module have completed 100% of the module and the average progress among all those enrolled is 73%. Table 1 provides a breakdown of progress for those enrolled in the module.

Table 1. Distribution of Those Enrolled in the AMS Learning Module Based on the Percentage of the Module Completed (January 9, 2024 to December 31, 2024).

% of Module Completed	Count (N = 473)	%
0%	64	14%
1% - 19%	34	7%
20% - 39%	33	7%
40% - 59%	11	2%
60% - 79%	10	2%
80% - 99%	5	1%
100%	316	67%

Interventional Activities

The general goals of these activities were to create the policy and/or behavioural changes required to address AMR as well as provide direct patient care. These activities may engage healthcare workers, administrators, AMS interest holders, and/or the general public to drive actions and/or policies which create more rational and appropriate AMU.

ASP Pharmacist Consults

The ASP pharmacists provide an adjunct ID and AMS consult service for Regina-area hospitals and acute care facilities across the province. The two pharmacists alternate clinical service weeks to maintain ongoing coverage. Consults and patient audits include reviewing antimicrobial treatment for patients on wards at Regina General and Pasqua Hospitals which do not have dedicated pharmacy services, infectious diseases consult support, reviewing patients with positive blood cultures, and consult services for clinicians throughout Saskatchewan. In addition, in July 2024, the ASP pharmacists began weekly AMS rounds with the ICU clinicians in Regina, reviewing current ICU patients and providing a specific stewardship focus for a service area with high AMU.

Antimicrobial review data described below were self-recorded by the ASP pharmacists in a REDCap tool and are likely an underestimation of the total number of interventions as they are not always reliably recorded due to competing priorities in daily work. Additionally, antimicrobial reviews that do not require intervention are not always recorded.

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The ASP pharmacists performed 365 documented antimicrobial reviews over the 261 working days in 2024. This accounts for 1.4 reviews per working day and includes more than 299 unique patients (plus 66 blank patient identifiers in the data set). The majority of patients that were reviewed were located at the Regina General and Pasqua Hospitals (80.8% combined). Patients outside of Regina represented 13.2% of the reviews, over one-third of which were in Yorkton. Table 2 shows the distribution of patient reviews by location. Additionally, the ASP pharmacists answer 10-20 questions received by WebEx messaging, phone calls, or text messages each week which are not captured in the REDCap tool.

**Approximately 2
AMU interventions
were performed each
working day.**

Table 2. Distribution of Patient Location for Antimicrobial Reviews by ASP Pharmacists (January 1, 2024 to December 31, 2024).

Patient Location	Count (N=365)	%
Regina General Hospital	231	63.3%
Pasqua Hospital	64	17.5%
Patient Outside of Regina	48	13.2%
Outpatient	14	3.8%
Wascana Rehabilitation Centre	7	1.9%
Blank	1	0.3%
Patient Location Outside Regina	Count (N=48)	%
Yorkton	18	37.5%
Swift Current	7	14.6%
Fort Qu'Appelle	5	10.4%
Estevan	4	8.3%
Moosomin	4	8.3%
Melville	2	4.2%
Moose Jaw	2	4.2%
Canora	1	2.1%
Esterhazy	1	2.1%
Indian Head	1	2.1%
Kamsack	1	2.1%
Kindersley	1	2.1%
Lloydminster	1	2.1%

Antimicrobial reviews are broken down into seven categories, with almost half being accounted for between stewardship consults and new ID consults. AMS rounds in Regina ICUs were added beginning in July 2024. The distribution of the types of antimicrobial reviews is shown in Table 3.

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Table 3. Distribution of ASP Pharmacist Antimicrobial Review Types (January 1, 2024 to December 31, 2024).

Type of Review	Count (N=365)	%
Stewardship Consult	93	25.5%
New Infectious Diseases Consult	79	21.6%
ICU Rounds	64	17.5%
Follow-up Review (for Infectious Diseases Consult)	45	12.3%
<i>Staphylococcus aureus</i> Bacteremia Audit	34	9.3%
Positive Blood Culture Audit (Non- <i>Staphylococcus aureus</i> Bacteremia)	29	7.9%
Stewardship Audit	17	4.7%
Blank	4	1.1%
Total	365	

The most common antibiotic reviewed was piperacillin/tazobactam, taking over from vancomycin in 2023. The most common indication for an antibiotic that was reviewed was for bacteremia, accounting for over 40% of all indications. The top ten antibiotics and indications reviewed are shown in Table 4.

Table 4. Distribution of the Top Ten Antimicrobials and Indications Reviewed by ASP Pharmacists (January 1, 2024 to December 31, 2024).

Antibiotics Reviewed	Count (N=365)	%
Piperacillin/Tazobactam	55	15.1%
Vancomycin	54	14.8%
Ceftriaxone	44	12.1%
Cefazolin	35	9.6%
Meropenem	27	7.4%
No Antimicrobial	24	6.6%
Ciprofloxacin	15	4.1%
Daptomycin	13	3.6%
Metronidazole	10	2.7%
Linezolid	9	2.5%
Indication Reviewed	Count (N=365)	%
Bacteremia	147	40.3%
Pneumonia - Community Acquired (CAP)	17	4.7%
Other Indication	16	4.4%
Intra-abdominal Infection	15	4.1%
Unknown/Not Specified	13	3.6%
Infective Endocarditis	12	3.3%
Osteomyelitis	11	3.0%
Pneumonia - Ventilator Associated (VAP)	11	3.0%
Pneumonia - Hospital Acquired (HAP)	10	2.7%
Diabetic Foot Infection	9	2.5%

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In total, 86.2% of all interventions suggested by the ASP pharmacists were accepted by consulting or attending clinicians, an increase of 2.9% from the 83.3% of accepted interventions in 2023. As expected, interventions that increased AMU (e.g., increasing dose and/or duration, broadening spectrum of coverage, or adding antimicrobials) had a higher acceptance rate than interventions intended to reduce AMU (e.g., decreasing dose and/or duration, IV/PO stepdown, narrowing spectrum of coverage, or stopping antimicrobials); 98.7% versus 87.6% respectively. There was an increase of 5.1% in the acceptance rate of interventions intended to reduce AMU in 2024 compared to 2023 (82.5%). Table 5 provides the distribution of acceptance rates for ASP pharmacist-suggested interventions for antimicrobial reviews.

Table 5. Distribution of Acceptance Rates for ASP Pharmacist-Suggested Interventions for Antimicrobial Reviews (January 1, 2024 to December 31, 2024).

Intervention	Count	Accepted	% Accepted
Adding Antimicrobial	25	25	100.0%
Dose Optimization (Increase)	23	23	100.0%
IV/PO Stepdown	20	20	100.0%
Change in Antimicrobial Due to Adverse Effect	8	8	100.0%
Dose Optimization (Decrease)	7	7	100.0%
Broadening Antibiotic Spectrum	2	2	100.0%
Duration Optimization (Increase)	28	27	96.4%
Narrowing Antibiotic Spectrum	53	51	96.2%
ID Consult Recommended	11	10	90.9%
Duration Optimization (Decrease)	24	20	83.3%
Antibiotic Unnecessary/Stopped	89	71	79.8%
Change in Antimicrobial - Other Optimization	9	5	55.6%
Drug-Bug Mismatch	13	0*	0.0%
Total	312	269	86.2%

*It is unlikely that none of the drug-bug mismatch interventions were accepted; the data collection tool was not capturing follow-up for those patients in 2023 and 2024 (this has been addressed as of March 2025). If all 13 drug-bug mismatch interventions were accepted, the total acceptance rate for all interventions would have been 90.4% (282/312).

Random Antimicrobial Audits by Pharmacy Students

One of the learning activities for pharmacy students who complete their rotations with the ASP is to conduct random audits of inpatients with active antimicrobial orders. Antimicrobial orders are retrieved from the inpatient pharmacy database at the beginning of the day and students review a random selection of active inpatient charts to assess a number of aspects of AMU. This activity serves as both a learning opportunity for students (who learn more about appropriate antimicrobial treatment) as well as a surveillance activity for the ASP (providing information about opportunities for AMU improvement within inpatient facilities).

For the four students who worked with the ASP between January 1, 2024 and December 31, 2024, 183 audits were conducted on antimicrobial orders at Regina General Hospital. Due to the ongoing research

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project led by PHAC, audits were suspended at Wascana Rehabilitation Centre for 2024 so as not to add another confounding factor in the research data.

The most common antimicrobial reviewed by students was ceftriaxone and diabetic foot infections were the most common indication. Table 6 shows the distribution of the top ten antimicrobials and indications for pharmacy student random antimicrobial audits.

Table 6. Distribution of the Top Ten Antimicrobials and Indications Randomly Reviewed by Pharmacy Students (January 1, 2024 to December 31, 2024).

Antimicrobial Reviewed	Count (N=183)	%
Ceftriaxone	48	26.2%
Metronidazole	22	12.0%
Piperacillin/Tazobactam	18	9.8%
Vancomycin	16	8.7%
Cefazolin	15	8.2%
Ciprofloxacin	11	6.0%
Amoxicillin/Clavulanate	7	3.8%
Azithromycin	5	2.7%
Sulfamethoxazole/Trimethoprim (Septra)	5	2.7%
Cephalexin	4	2.2%
Indication Reviewed	Count (N=183)	%
Other	50	27.3%
Blank	20	10.9%
Diabetic Foot Infection	12	6.6%
Bacteremia	11	6.0%
Cellulitis	9	4.9%
Pneumonia - Not Specified	9	4.9%
Urinary Tract Infection (UTI) - Other	9	4.9%
Osteomyelitis	7	3.8%
Abscess - Other	6	3.3%
Urinary Tract Infection (UTI) - Cystitis (Lower)	6	3.3%

One intervention the ASP has been promoting is the benefits of including an indication with antimicrobial orders to ensure all clinicians have a clear understanding of why the antimicrobial was ordered. Random student audits in 2024 determined that nearly 77% (140/183) of the antimicrobial orders they reviewed did not have an indication documented with the original order, similar to the data collected in 2023 (75%, 234/314). They did find that approximately 66% (120/183) of antimicrobial orders had an indication documented somewhere in the patient's chart (albeit not with the original order), or they were able to deduce the indication from information elsewhere in the patient's chart. However, at least 11% (20/183) of antimicrobial orders (a further 43 of the 183 reviews had blanks in the data set for this metric) had no indication documented, nor was the student able to deduce the reason for the antimicrobial order. This

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indicates that improving documentation of indications with antimicrobial orders is still a work in progress within inpatient facilities in Regina.

In addition to reviewing the indications for antimicrobial orders, the pharmacy student random antimicrobial audits also assessed the appropriateness of AMU based on the indication, dose, duration, and whether the patient was eligible for IV to PO stepdown. From the 2024 data, 17% of antibiotic orders were not indicated for the patient, 12% of orders had an incorrect dose, 16% of orders had an incorrect duration of treatment, and 19% of orders were eligible for IV to PO stepdown. Each of these represents an opportunity for continued improvement in AMU within acute care facilities. Table 7 provides more details for each of these categories of appropriateness of AMU.

Table 7. Measures of Appropriateness of Antimicrobial Use of Antimicrobials Randomly Reviewed by Pharmacy Students (January 1, 2024 to December 31, 2024).

Was the Antibiotic Indicated?	Count (N=183)	%
Yes	93	50.8%
Unknown	59	32.2%
No	31	16.9%
Was the Dose Correct?	Count (N=183)	%
Yes	141	77.0%
No	22	12.0%
Blank	20	10.9%
Was the Duration Correct?	Count (N=183)	%
Yes	87	47.5%
Not Indicated	47	25.7%
No	29	15.8%
Blank	20	10.9%
Eligible for IV/PO Stepdown?	Count (N=183)	%
No	81	44.3%
Blank	68	37.2%
Yes	34	18.6%

Including Indications with Antimicrobial Prescriptions in PHC

In 2020, the SHA ASP began a monthly audit and feedback activity with a group of PHC clinics in the Regina area. Feedback was provided to prescribers regarding the proportion of their antimicrobial prescriptions with a documented indication with the goal of increasing the number of indications. This provides both more complete information for patients and other healthcare providers involved in the patient's care, as well as more granular information and better data for future AMS interventions. More details on this work are available in our publication from 2022⁵.

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Throughout 2023, monthly data updates (audit and feedback) continued to be distributed to prescribers via email. Prescribers were encouraged to reach out to the ASP with any questions and to receive their identification number to review their personal prescribing data. We also encouraged clinics to provide us opportunities to meet with prescribers in person to discuss their data and possible behaviour change initiatives. As expected, for a multitude of reasons, there was very little uptake on these offers.

In July 2024, we transitioned from monthly email updates to a dynamic, virtual dashboard using PowerBI hosted on a SharePoint site. Prescribers were informed of the change via email and we requested they contact the ASP to receive access to the dashboard. To the end of 2024, no prescribers have accessed the dashboard.

CANBuild-AMR

In February 2024, the SHA ASP was invited to participate in a Canadian Institutes of Health Research-funded study entitled, CANBuild-AMR. This project is led by a team based in Ontario and expands on a previous research project that used audit and feedback to reduce unnecessary antibiotic prescriptions among high-prescribers of antibiotics in PHC in that province⁶. The goal of the current research project is to expand this work nationally.

In Saskatchewan, a partnership was established between the SHA ASP and collaborators in the Saskatchewan Ministry of Health to provide audit and feedback on antibiotic prescribing practice for all family physicians in Saskatchewan. This will be done through a letter mailed to physicians indicating their antibiotic prescribing rates and how they compare to colleagues across the province. A final letter will be mailed 12 months later and changes in prescribing habits due to the audit and feedback will be analyzed.

Procalcitonin Testing in Regina ICUs

In October 2023, the ASP team launched a PCT protocol within the Regina ICUs to guide antibiotic discontinuation and help reduce AMU. Data from the first six months of PCT use (October 2023 to March 2024) were collected and analyzed beginning in April 2024 using electronic data sources supplemented with a patient chart review performed by a medical resident, Dr. Lisa Hubbs.

The preliminary data analysis indicated that, in the first six months of PCT use in Regina ICUs, there was a statistically significant increase in the total days of antimicrobial therapy when comparing pre- and post-intervention data on all three ICUs combined. This information was shared and discussed with ICU clinicians in the fall of 2024 to further understand the various factors that may have contributed to this unexpected increase in AMU. These factors included: comparing winter AMU (post-intervention) versus a full year of AMU (pre-intervention) for which seasonality is a known factor, the potential of a more intense respiratory infection season during the winter of 2023/24 which may have driven higher overall AMU, and overall poor adherence to the PCT protocol. A plan was discussed with clinicians to focus on the most relevant patients for PCT use and to ensure that multiple PCT tests were ordered in order to properly identify trends in the results. Further data will be collected in 2025 to continue exploring the first year of PCT use and provide additional feedback to clinicians.

ICU Collaborative Work

Continued collaboration and meetings with the Critical Care Pharmacy Specialist contributed to the successful initiation of another pharmacy resident research project (discussed below) which began in July

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2024. Further discussions throughout the year led to the formalization of AMS-related ICU pharmacy student projects that are slated to begin in 2025.

Penicillin Allergy De-labelling

In 2022, the ASP launched a penicillin allergy de-labelling tool on the Firstline app. This tool was adopted from a group in British Columbia who created it as a way to help alleviate pressure on allergists to perform penicillin allergy testing on low-risk patients. The tool is safe to use in all healthcare settings and has even been used by our pharmacy students to de-label patients while in hospital.

Data are collected in REDCap for penicillin allergy assessments performed on inpatients by the ASP pharmacists, pharmacy students, or ID physicians in Regina. There were 19 assessments completed in 2024, with all but one at the Regina General Hospital. The REDCap tool does not account for penicillin allergy assessments that may have occurred outside of Regina and Saskatoon, or in other healthcare settings (e.g., PHC, LTC). Pharmacy students completed the majority of the assessments (84.2%, 16/19), with the same number of the patients being deemed to be at very low risk for a true penicillin allergy. Fourteen patients had their penicillin allergy de-labelled based on their history alone and two were de-labelled following an amoxicillin test dose challenge. The data are outlined in Table 8 below.

Table 8. Penicillin Allergy Assessments and De-labelling Outcomes (January 1, 2024 to December 31, 2024).

Assessor	Count (N=19)	%
Pharmacy Student	16	84.2%
ASP Pharmacist	3	15.8%
Assessment	Count (N=19)	%
Very low risk for penicillin allergy	16	84.2%
Possible allergy*	3	15.8%
Outcomes for Patients with “Very Low Risk for Penicillin Allergy”	Count (N=16)	%
Patient De-labelled Based on History Alone	14	87.5%
Patient Tolerated Amoxicillin Test Dose Challenge and was De-labelled	2	12.5%

*All patients identified as having a possible allergy were not de-labelled in hospital, as per the algorithm.

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Patient name: _____
Date: _____

The symptoms you are presenting with today suggest a viral infection:

- ☐ Common cold (upper respiratory tract infection): Cough can last 3-4 weeks
- ☐ Acute bronchitis: Cough can last 3-4 weeks
- ☐ Sore throat (viral pharyngitis)
- ☐ Sinus infection (acute sinusitis)
- ☐ Other viral respiratory infection: _____



You do not need antibiotics because they do not work on viral infections. Using antibiotics when not needed makes them less effective for potential future bacterial infections. They can cause side effects (like diarrhea, rash) and, in rare cases, allergic reactions, or kidney injury, or liver injury.

How to help you feel better and manage symptoms:

When you have a viral infection, it is very important to get plenty of rest and give your body time to fight off the virus.

- Rest as much as possible
- Drink plenty of fluids
- Wash your hands frequently and try to stay home to avoid spreading the infection
- Take over-the-counter medication, as advised:
 - ☐ Acetaminophen (e.g., Tylenol) for fever and aches
 - ☐ Ibuprofen (e.g., Advil, Motrin) for fever and aches
 - ☐ Naproxen (e.g., Aleve) for fever and aches
 - ☐ Lozenge (cough candy) for sore throat
 - ☐ Nasal saline (e.g., Salinex) for nasal congestion
 - ☐ Other: _____(E.g., Nasal decongestant if Salinex does not work, for short-term use only!)

Please return to your provider or seek more immediate medical care if:

- Symptoms do not improve in ____ day(s), or worsen at any time
- You develop persistent fever (above 38°C or ____ as directed)
- Other: _____

Prescriber: _____



This information is for you to use when talking with your health care provider. It is not to be used as independent guidance.
This prescription pad was adapted from the Saskatchewan Health Authority Antimicrobial Stewardship Program.

Viral Prescriptions

In 2016, the SHA ASP (at that time, the Regina Qu'Appelle Health Region ASP) developed a viral prescription – a document intended for use at the point of care, particularly in outpatient settings (e.g., PHC and emergency departments), to help reduce unnecessary use of antibiotics when managing upper respiratory tract infections. An article on the development and utility of this tool was published in 2020⁷. The viral prescription was adopted and adapted by both [RxFiles](#) and [Choosing Wisely Canada](#), who have translated it into other languages and made a pediatric version available. In addition to being available online with instructions on how to embed these tools into common electronic medical records, the SHA ASP has provided multiple print runs of physical prescription pads for PHC clinics around the province since their creation.

In 2024, 15 adult and six pediatric viral prescription pads were printed and provided for PHC clinics in the Touchwood-Qu'Appelle Network. In

addition to those specifically requested, viral prescription pads were also distributed to attendees at the provincial family medicine and nurse practitioner conferences in 2024.

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AMS Tools for Dentistry

In August 2023, the SHA ASP began a project with a group of four University of Saskatchewan pharmacy students for a third-year professional practice course. The course required students to engage in a professional practice project over two semesters. The students were tasked with the development of a suite of tools that could be used by dentists to promote better antimicrobial stewardship in their practice. Through a collaborative process that included members of the ASP, practicing dentists in Saskatchewan, and patient partners from across Canada, the students created four documents: a “dental prescription” (similar to the viral prescription described above), a penicillin allergy algorithm aimed toward dentists and intended to assist with assessing penicillin allergies, and two patient-facing documents – a general AMS information brochure specific to dentistry and a penicillin allergy informational poster.

In addition to being posted on the ASP [website](#), the students presented the documents in-person at the Saskatoon and District Dental Society meeting in March 2024 to wrap up their portion of this work. The SHA ASP team continued to promote the documents to oral health professionals in Saskatchewan with presentations to the Saskatchewan Oral Health Coalition in May 2024 and a presentation at the Saskatchewan Dental Conference in September 2024. As with the viral prescription, the dental prescription was adopted by Choosing Wisely Canada and released nationally as part of their “Taking the Bite Out of Tooth Pain” [toolkit](#) in the fall of 2024.



Patient name: _____
Date: _____



Antibiotics are not needed to treat your dental symptoms today. Using antibiotics when they are not needed can cause harmful side effects and make them less effective in the future when we really need them to treat infections.

The symptoms you present with today suggest:

- ☐ Tooth pain (cause not yet known)
- ☐ Localized abscess (a pocket of pus near the tooth)
- ☐ Dry socket (pain after the tooth has been removed)
- ☐ Dental decay (a cavity)
- ☐ Post-operative pain (pain after dental surgery)
- ☐ Other: _____

How to help you feel better and treat symptoms:

- ☐ Ibuprofen* (e.g., Advil, Motrin) 400-600 mg every 6-8 hours as needed for up to _____ days
- ☐ Acetaminophen (e.g., Tylenol) 500-1000 mg every 4-6 hours as needed for up to _____ days

*Only to be used if no other conditions that could cause issues like renal or liver failure, history of gastrointestinal bleeding. Ibuprofen is first line medication recommended for mild to moderate tooth pain. For severe pain, you can take a combination of Ibuprofen and Acetaminophen, using the doses above. Do not exceed maximum daily dose of Acetaminophen (4000 mg) or Ibuprofen (1200 mg-2400 mg), if no history of congestive heart disease, risk of cardiac attack or strokes.

- ☐ Saltwater rinse/gargle
- ☐ Ice pack - apply to the sore areas
- ☐ Heat pad - apply to the sore area
- ☐ Other treatment (Please specify): _____

Next Steps:

- ☐ Please contact your dentist for further assessment and definitive dental treatment

Please return to your primary care provider, dentist, or seek more immediate medical care if any of the following occur:

Fever: Temperature above 38°C/100.4°F
Severe pain: Increased pain after visit
Facial swelling: Cheeks, floor of the mouth and/or under the jaw
Difficulty swallowing/breathing
Other (Please specify): _____

Prescriber: _____



This prescription pad was adapted from the Saskatchewan Health Authority Antimicrobial Stewardship Program.

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Canadian Nosocomial Infection Surveillance Program Data Submission

The SHA ASP submits annual AMU data (since 2018) for both Regina General and Pasqua Hospitals to the Canadian Nosocomial Infection Surveillance Program (CNISP) as part of their national surveillance system. The data are analyzed by CNISP year-over-year and are available to submitting sites for comparison against other hospitals. These data are helpful for informing, developing, and driving stewardship interventions on relevant units in Regina hospitals. Preliminary surveillance data are unable to be shared outside of the submitting institutions, as per PHAC's request.

Pharmacy Resident Research Project – Improving Antibiotic Prophylaxis Prescribing Among Orthopedic Surgeons for Patients with a β -Lactam Allergy (Ashley Hermanus, PharmD)

In May 2023, the SHA ASP submitted a research project proposal for the Regina-area pharmacy residents for their 2023-24 residency year. The research project was based on the finding that approximately 20% of patients labelled with a penicillin allergy, who were receiving an elective hip or knee arthroplasty in Regina, were receiving sub-optimal prophylactic antibiotic therapy. The goal of the research project was to raise awareness among orthopedic surgeons regarding the preferred antibiotic therapy for these patients (*i.e.*, cefazolin) and, using audit and feedback, to provide ongoing information and motivation to promote a change in prescribing practice.

An education session was held in November 2023 to provide the background information for the project and outline the expected change in prescribing practices, as well as to gather further information on other perceived barriers to the practice change. From this information, an informational poster was created and distributed to nursing and pharmacy staff and anesthesiologists to ensure the same practice change information was shared with all members of surgical teams. The first audit and feedback session was held in February 2024 and a statistically significant decrease in the number of inappropriate antibiotic orders for patients with a labelled β -lactam allergy was identified. Audit and feedback was repeated in the fall of 2024, with a similar decrease in inappropriate orders continuing in the updated data set. A final audit and feedback session is planned for the spring of 2025, after which the project will be completed.

Pharmacy Resident Research Project – Implementing MRSA Nasal Swabs to Reduce Anti-MRSA Therapy in Regina ICUs (Keren-Happauch Emekeme, PharmD)

In May 2024, the SHA ASP, in collaboration with the Critical Care Pharmacy Specialist, submitted a research project proposal for the Regina-area pharmacy residents for their 2024-25 residency year. The research project was based on the high negative predictive value of MRSA nasal swabs for ruling out MRSA pneumonia. As an example of anti-MRSA therapy, Regina ICUs had nearly double the amount of vancomycin use compared to other sites across the country, an issue that was identified in the previously submitted CNISP data. Implementing the use of MRSA swabs for patients with pneumonia in ICUs will allow clinicians to reduce the length of anti-MRSA therapy.

The fall of 2024 was mostly reserved for project development and Research Ethics Board approval. The resident presented an educational session at the ICU Rounds in December 2024 to introduce the background and reasoning for the proposed practice change. Due to issues with finalization of SHA operational approval, adjustments had to be made to the project for the audit and feedback portion of the project. Further information on project outcomes will be provided in the 2025 Annual Report.

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Firstline App Content Review

Following changes in staffing among provincial AMS colleagues, it was pertinent to regroup in 2023 and revisit the content in the Firstline app that had been created several years earlier. The SHA ASP, along with our colleagues in Saskatoon (Danielle Shmyr and Dr. Sarah Henni), initiated a scheduled review of all content in the SHA Firstline instance. The most commonly reviewed guidelines took priority for review of content. In 2024, nine guidelines were revised and one new guideline was created, all of which are outlined in the newly added 'Change Log' in the app, under Resources and Tools.

Provincial UTI Surveillance

In July 2023, the provincial IPAC team launched a UTI surveillance form that included information requested by the SHA ASP to help identify how frequently LTC residents were being treated for asymptomatic bacteriuria. The ASP team, with support from other department members, created a dashboard (using Power BI), to make the provincial data set available to interest holders across the SHA (e.g., IPAC staff, LTC staff, etc.). Data presented in the dashboard included UTI rates, rates of treatment of asymptomatic bacteriuria, and rates of contaminated samples with the goal that interest holders in LTC facilities could use it for audit and feedback purposes to help drive clinical behaviour change.

Data collection continued throughout 2024 until December, when the provincial IPAC team opted to remove the additional information from the form that was included at the request of the ASP (reverting the form to UTI surveillance only). This decision was made in response to frontline staff concerns about the additional data collection without active interventions. As of January 2025, the additional information providing data for asymptomatic bacteriuria treatment will be removed from the provincial surveillance form, once again limiting our ability to collect province-wide data and provide the baseline information for improvement efforts on this important issue in LTC.

As a caveat to the above changes, the Regina IPAC team requested a continuation of the full data collection form (i.e., including the asymptomatic bacteriuria information) exclusively for the Wascana Rehabilitation Centre in Regina. The local IPAC team was interested in partnering with the SHA ASP, the local AMS Committee, and other interest holders in the facility to create a focused improvement effort around appropriate urine culture ordering practice and downstream treatment of asymptomatic bacteriuria. This project will begin in 2025, following an initial meeting in December 2024.

Reducing Unnecessary Urine Cultures in LTC

In February 2023, through our collaboration with IPAC staff, the ASP was made aware of a call for LTC facilities to participate in a PHAC-led research study. The goal of the study was to provide audit and feedback to clinical staff regarding urine culture use, as well as educational engagement with resident caregivers, to reduce unnecessary urine cultures among LTC residents. The study team aimed to include ten LTC facilities across Canada.

Data collection for this study began in spring 2024 for the Wascana Rehabilitation Centre in Regina and continued throughout the fall. Final study data will be collected in spring 2025, at which point the research project will be concluded. We are hoping to capitalize on any momentum this study has initiated at the facility to enhance interest in the new implementation project outlined above, in collaboration with local IPAC staff and the facility's AMS Committee.

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Antibiograms

The Regina-area antibiogram is updated annually and added to Firstline as well as being posted on the SHA Library [website](#). The ASP collaborates with the Regina General Hospital Microbiology Department to produce and finalize the antibiogram each year. Laboratory data are collected for the previous calendar year and collated to produce the updated antibiogram. When available and if staff time permits, the antibiogram may be disaggregated into specific patient populations to provide further clinical relevance.

Except for the Saskatoon and Prince Albert areas, antibiogram production for other areas in the province is supported by the SHA ASP pharmacists and Regina General Hospital Microbiology staff when possible. The ASP team also provides communication to let clinicians know when antibiograms are updated.

Advisory Committees and Policy Development

These activities include engagement with various committees, representing local, provincial, and national interests, to help promote AMS efforts, advocate for appropriate AMS resources, and advise on policy development and implementation.

Regina ASP Advisory Council

The council meets quarterly to discuss activities and issues related to the ASP, including research and quality improvement projects, antibiograms and resistance trends, antimicrobial susceptibility testing, and educational opportunities.

Regina IPAC Network Operations Committee

The SHA ASP received an invitation to participate in the ongoing Regina IPAC Network Operations Committee meetings. There were three meetings held in 2024 with discussions that included UTI data for LTC and acute care facilities.

Pan-Canadian Action Plan on AMR

Members of the SHA ASP were actively involved in meetings and document review as part of a larger federal/provincial/territorial (F/P/T) committee for the finalization of the PCAP² (published June 22, 2023). Following a report from the Auditor General of Canada released on October 9, 2023⁸, the F/P/T committee was reinstated to compile annual updates for the PCAP. Members of the SHA ASP participated in this work and the Year 1 Progress Report was released in September 2024⁹.

In order to ensure that the health system in Saskatchewan is actively working toward addressing the goals outlined in the PCAP, the SHA ASP began the preliminary planning for creation of an executive committee that can drive this work in the province. In collaboration with partners in the Saskatchewan Ministry of Health, we will work toward updating a previous environmental scan and gap analysis of AMS efforts in the province. This document will be used to inform where gaps exist in meeting the goals outlined in the PCAP, which in turn, will provide direction for the executive committee to help ensure that work is prioritized to achieve the desired outcomes. We will take a One Health approach to this work to ensure all aspects of AMS in Saskatchewan are able to move forward together. Further information will be provided in the 2025 Annual Report.

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Antimicrobial Advisory Subcommittee

In September 2023, the first of the bi-monthly meetings of the SHA Drugs and Therapeutics Committee, Antimicrobial Advisory Subcommittee (AmAS) was held.

At the beginning of 2024, the ASP pharmacists helped create a Beta-Lactam Allergy Assessment Tool for Surgical Prophylaxis that would be incorporated into any new and updated surgical order sets when cefazolin is indicated. Following that, a large effort undertaken by the AmAS was to develop a provincial restricted antimicrobial policy. Many meetings were held with ID experts and clinicians throughout the province to determine which antimicrobials required restrictions and criteria to consider with the use of several antimicrobial gents. There were several iterations and revisions of the policy, which was finalized at the end of 2024. Future efforts include the development of a provincial surgical prophylaxis guideline and a provincial penicillin allergy desensitization protocol.

Opportunities for Growth

Gaps and barriers to effective AMS that arose in 2024 are described below.

An ongoing opportunity for enhancing AMS work across the SHA would be to address the lack of an official SHA mandate on including indications with antimicrobial prescriptions. This would provide a directive for all prescribers to ensure that they are including this vital information with their antimicrobial orders, which promotes patient safety and better information for data users. Similar mandates have already been adopted by health systems around the world.

The lack of resources for laboratory staff limiting their ability to create a fully developed antibiogram has limited our access to an antibiogram that only represents data for all patients as an aggregate (for Regina and several other areas within the province). This means that clinicians lack detailed information that may be relevant for empiric prescribing for specific patient populations. Work on a national level (AMRNet, led by the Canadian Network for Public Health Intelligence) was intended to ease the burden of antibiogram creation on local laboratories, however, this has yet to come to fruition.

In addition to resourcing for antibiogram data access, limited resourcing for our colleagues in the Digital Health portfolio has created ongoing challenges to timely access to other laboratory data that are used to drive policy, research, and quality improvement projects in AMS. This has meant that policy decisions have been made, for example with respect to antimicrobial restrictions, without basing these decisions on a full and complete data set. Data access barriers have also created stress for researchers and students involved in AMS-related research and quality improvement projects and has led to workarounds being created within the system to access data or modify projects to work within the limitations of accessible data.

A final ongoing challenge has been the lack of engagement among PHC clinics. This began with the onset of the COVID-19 pandemic, which limited our ability to visit clinicians in person. However, as the pandemic has waned, we have not been able to re-establish regular in-person visits with PHC clinics in Regina and the surrounding area. This has limited the effectiveness of our PHC interventions.

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Abbreviations

ASP – antimicrobial stewardship program
AmAS – Antimicrobial Advisory Subcommittee
AMS – antimicrobial stewardship
AMR – antimicrobial resistance
AMU – antimicrobial use
CNISP – Canadian Nosocomial Infection Surveillance Program
FTE – full-time equivalent
F/P/T – federal/provincial/territorial
ICU – intensive care unit
ID – infectious diseases
IPAC – infection prevention and control
IV – intravenous
LTC – long-term care
MRSA – Methicillin-resistant *Staphylococcus aureus*
PCAP – Pan-Canadian Action Plan on AMR
PCT – procalcitonin
PHAC – Public Health Agency of Canada
PHC – primary healthcare
PO – *per os* (by mouth)
REDCap – Research Electronic Database Capture
RTI – respiratory tract infection
SHA – Saskatchewan Health Authority
STARS – Students and Trainees Advocating for Resource Stewardship
STBBI – sexually transmitted and blood borne illness
STEPS – STBBI Treatment Education Program for Saskatchewan
UTI – urinary tract infection
WAAW – World AMR Awareness Week
WHO – World Health Organization

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Appendices

Appendix 1 – WAAW Review from the Stewardship and Clinical Appropriateness 5 Min Update – Issue 60 (November 2024)

November 2024

ISSUE #60

Stewardship and Clinical Appropriateness
5 Minute Update

**Saskatchewan
Health Authority**

Antimicrobial Stewardship Program

Phone: 306-766-3520 | E-mail: antimicrobial.stewardship@saskhealthauthority.ca [WEBSITE](#)

WAAW 2024

Sunday, November 24th wrapped up another World Antimicrobial Resistance Awareness Week (WAAW). This year was another fantastic year for growing engagement across Saskatchewan.

We had two sites participating in the #GoBlue campaign: Regina City Hall and the Moose Jaw Clock Tower both lit up in blue for the last three days of the campaign.

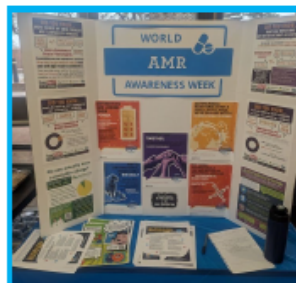


Even better, six sites across Saskatchewan were engaged in awareness activities this year! We set up a booth in the Regina General Hospital for the second year in row with cookies and information on hand for passers-by. Thank you to Kirsten Robison, a fourth-year pharmacy student, for helping to run the booth this year.



The Dr. F.H. Wigmore Regional Hospital in Moose Jaw set up a booth in the main lobby throughout the week (photo above). They also promoted awareness via social media posts throughout the week.

In Saskatoon, a booth at the Royal University Hospital was hosted by pharmacy students and another booth in the Health Sciences E-Wing Atrium at the University of Saskatchewan had members of the Canadian Association of Pharmacy Students and Interns on hand.



Lloydminster (photo above) and Meadow Lake Hospitals also set up booths and the cafeteria in

Lloydminster even served blue desserts!

Thank you to all of the stewardship champions across the province who made the extra effort to promote awareness and engage in activities. I hope everyone had an informative and productive week raising awareness about this globally important issue. If you have ideas for next year or stories you'd like to share, please send them to us!

-Jason Vanstone, PhD



79th UNGA



On September 26th, the United Nations General Assembly met for a High-Level Meeting on AMR for the second time (the first was in 2016). This time around, global leaders agreed to a 106-item [political declaration](#) which, among other things, affirms commitment to reducing human deaths associated with AMR by 10% by 2030.

Check out [this summary](#) from the United Nations Environment Programme to get more details and learn more about what our own political leaders have agreed to on our behalf. This summary also underscores the One Health approach needed for effective action against AMR by outlining the connections to animal health and the environment.

-Jason Vanstone, PhD