Saskatchewan Health Authority

Antimicrobial Stewardship Program

Saskatoon Area - Annual Report

Fiscal Year 2024

Dr. Amina (Sarah) Henni, MD, FRCPC
Physician Lead, Antimicrobial Stewardship Program
Division of Infectious Diseases
Saskatchewan Health Authority, Saskatoon

Danielle Shmyr, BSP, ACPR
Pharmacist Lead, Antimicrobial Stewardship Program
Department of Pharmacy
Saskatchewan Health Authority, Saskatoon

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Executive Summary

The former Saskatoon Health Region (fSHR) established an antimicrobial stewardship program in November 2014. Since that time, the fSHR Antimicrobial Stewardship Program has focused on using an evidence based perspective to inform and improve the usage of antimicrobials across our care facilities. Program goals include ensuring the selection and delivery of the right antimicrobial and dose for the right duration for the infections being treated.

The report includes highlights of activities and initiatives for the 2024 fiscal year. Commentary presented herein continues to relate and reflect upon most frequently used antimicrobials and any other agents of interest based upon standardized international measurement.

2024 Year Highlights

CLINICAL ROLE

- Ward presence and formalized audit and feedback mechanisms for antimicrobial stewardship activities at Royal University Hospital (RUH)
- Focused audit and feedback on ceftriaxone on adult Medicine wards
- Implementation of joint ICU Antimicrobial Stewardship Rounds at RUH
- Implementation of positive blood culture audit at RUH

BEST PRACTICES

- Ongoing development and updating of content on Firstline® in collaboration with Regina Antimicrobial Stewardship pharmacists. Firstline® is a mobile application designed to help healthcare workers optimize antimicrobial prescribing and minimize antimicrobial resistance
- Continued development and implementation of regional antibiograms. As per previous years the antibiograms were also presented concurrently in the mobile application format on Firstline®
- Ongoing review of provincial proposed pre-printed order sets involving antimicrobials
- Collaboration with microbiology in updating reporting cascades and comments ("nudges") on microbiology reports

REGIONAL PRESENCE

- Co-Chair of the interdisciplinary provincial Antimicrobial Advisory Subcommittee (AmAS) which reports to the Drugs and Therapeutics Committee (DTC) and provides recommendations regarding antimicrobials and their use
- Antimicrobial drug shortage and backorder management in conjunction with the Saskatoon Drug Shortages team
- Representation on Regional Infection Prevention and Control Committee

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EDUCATIONAL ACTIVITIES

- General Surgery Academic Half Day – Antimicrobial Stewardship In the Surgical Patient – A. Henni
- Emergency Medicine Academic Half Day - Approach to Fever in a Returning Traveller - A. Henni
- Antimicrobial Stewardship Network – Saskatoon Area Antibiogram Updates 2023 – D. Shmyr
- Provincial Pharmacy Rounds – Ask Us Anything! Any and all things infectious diseases and antimicrobial stewardship as requested by you – D. Shmyr, M. Kucey, K. Schmidt
- Department of Medicine Grand Rounds – The (Not So) Good, The Bad and The Ugly: Local Perspectives in Antimicrobial Stewardship and Infection Prevention and Control – D. Shmyr and A. Wong (Accredited)
- General Internal Medicine PGY1 Intro Academic Half Days – Intro to Microbiology, Bugs and Drugs Part 1, Bugs and Drugs Part 2 - A. Henni and D. Shmyr
- Clinical Teaching Unit Morning Education Sessions – Antibiotics Part 1, Antibiotics Part 2, Antibiotics Part 3, Antibiotics Part 4, Antifungals, Skin and Soft Tissue Infections, Urinary Tract Infections, Community Acquired Pneumonia – **ONGOING** – D. Shmyr and A. Henni
- Introduction to Antimicrobial Stewardship, Firstline, and Antibiograms – **ONGOING** – D. Shmyr
- Vancomycin Pharmacokinetics and Dosing – Case Examples – **ONGOING** – D. Shmyr
- Aminoglycoside Pharmacokinetics and Dosing – Case Examples – **ONGOING** – D. Shmyr
- Bugs and Drugs Modules 1-4 – **ONGOING** – D. Shmyr

RESEARCH

- Participation as primary co-preceptor for pharmacy resident projects:
    - Ecobichon N., Shmyr D., Evans B., Alawazi D. “Development of an Antimicrobial Lock Order Set for the Saskatchewan Health Authority ” – 2024-2025
- Robichaud N., Henni A., Spence C. “The impact of sequence of antibiotic administration in hospitalized patients with sepsis - 2024-ongoing

Process and Outcome Measures

Antimicrobial utilization metrics background

Standardized measures of antimicrobial consumption are preferred for comparisons across centers, and should be standardized into rates, using hospital denominator data. The denominator data should be derived in the same way between sites of care optimally using the same data used to track nosocomial infections and Antimicrobial Resistant Organisms by Infection Prevention and Control (e.g. DDD/100 or 1000 patient days).

Defined daily doses (DDDs), as used by the World Health Organization (WHO), is calculated as the total number of grams of an antimicrobial agent used divided by the number of grams in an average adult daily dose. DDD is less accurate in pediatrics, across body mass indices, and in populations with renal impairment requiring dose adjustments as the defined amounts contained within published DDD databases may not reflect the actual doses received by special populations. Sites with hemodialysis and pediatrics will not find the conversion as accurate although comparison in trends between sites will likely remain robust. The capability of reporting use in DDDs exists for those sites within the Saskatoon Area in the Saskatchewan Health Authority using the BDM pharmacy system – more specifically Royal University Hospital, St. Paul's Hospital and Saskatoon City Hospital.

Days of Therapy (DOT), as recommended by the Centers for Disease Control and Prevention, US National Healthcare Safety Network, and Canadian Delphi Panel, is now the preferred measure of antimicrobial use because it is more applicable to different populations and less likely to be affected by different dosing schemes. This would be the eventual goal for the program however, with existing informatics this is not possible. We also acknowledge that due to being unable to obtain DOT metrics with existing infrastructure, pediatric antimicrobial consumption metrics at Jim Pattison Children's Hospital are lacking. Attempts will be made to incorporate this measurement strategy where able.

Deliverables for Antimicrobial Utilization Data Reporting

General Operation Goals	Status	Commentary
All sites in the Saskatoon service area report antimicrobial usage using DDDs	Completed / ongoing	Exceptions include rural sites (e.g. Humboldt) due to a lack of total electronic pharmacy record integration and JPCH due to inability to use DDD as a reliable metric in pediatrics
All sites in the Saskatoon service area (including JPCH) able to report antimicrobial consumption metrics using days of therapy (DOT) for analysis and interpretation	Incomplete – no operational plan generated thus far	Information systems support is required given complexity, time required, and large amount of epidemiologic enquiry required.
Collect and report data on interventions performed during antimicrobial stewardship rounds (prospective audit and feedback, joint ICU rounds, blood culture audits, etc)	Data collection occurs in RedCap for all stewardship interventions, analysis incomplete due to inadequate support	Additional data analyst support required

Antimicrobial Adverse Effects	Status	Commentary
Encourage ongoing surveillance and reporting of antimicrobial adverse effects in alignment with current practice	Ongoing	n/a

Antimicrobial Resistance Rates	Status	Commentary
Antimicrobial resistance pertaining to organisms of interest will be examined annually looking for nosocomial resistance pressure, which are subject to changes in antibiotic prescribing.	Ongoing	• Monitored via joint efforts between the antimicrobial stewardship pharmacist and medical microbiology. • Annual publication of Saskatoon and rural antibiograms

Summary of Antimicrobial Stewardship Activities

Prospective Audit and Feedback

- **Routine Audits**
  - ASP performs routine audits for patients on broad spectrum antibiotics at RUH
  - Starting September 2024, medicine patients on ceftriaxone were prioritized due to data showing ceftriaxone use on medicine wards at RUH were double the national average
  - Other targeted antimicrobials include piperacillin/tazobactam, carbapenems, and fluoroquinolones
  - Verbal and/or written communication is provided with all interventions

- **Positive Blood Culture Audits**
  - ASP performs routine audits on all patients admitted to RUH with positive blood cultures

Antimicrobial Stewardship Rounds

- **ICU Antimicrobial Stewardship Rounds**
  - Starting Sept 2024, ASP participates in handshake ICU antimicrobial stewardship rounds once weekly on Wednesdays at RUH. This intervention was initiated due to data showing the RUH ICU has double the national average antimicrobial use compared to other participating ICUs
  - Participation is voluntary, with 19/20 intensivists at RUH participating
  - Patients are reviewed if they are on antimicrobials at the time of rounds. Patients are excluded if they are on antimicrobials for prophylaxis or are being actively followed by Infectious Diseases.
  - Any suggested changes and rationale are documented in the electronic record
  - Suggested interventions are tracked using RedCap; antimicrobial, type of intervention, suggested monitoring, and acceptance of suggestion are captured

Formulary Restriction and Preauthorization

- Through the Antimicrobial Advisory Subcommittee, provincial formulary alignment work was ongoing
- Work to establish provincial formulary restriction criteria for antimicrobials is also ongoing, with expected completion and operationalization in 2025
- In the interim, certain antimicrobials restricted for use by Infectious Diseases physicians in the former Saskatoon Health Region continues

Education

- As outlined above in year highlights along with informal ongoing activities (e.g. bedside/ward teaching and discussions)

- Notably, starting March 2024 ASP focused on developing an ongoing infectious diseases curriculum for general internal medicine residents. We initiated once monthly morning teaching (September to June annually) and Academic Half Days

Clinical Pathways/Pre-Printed Order Sets

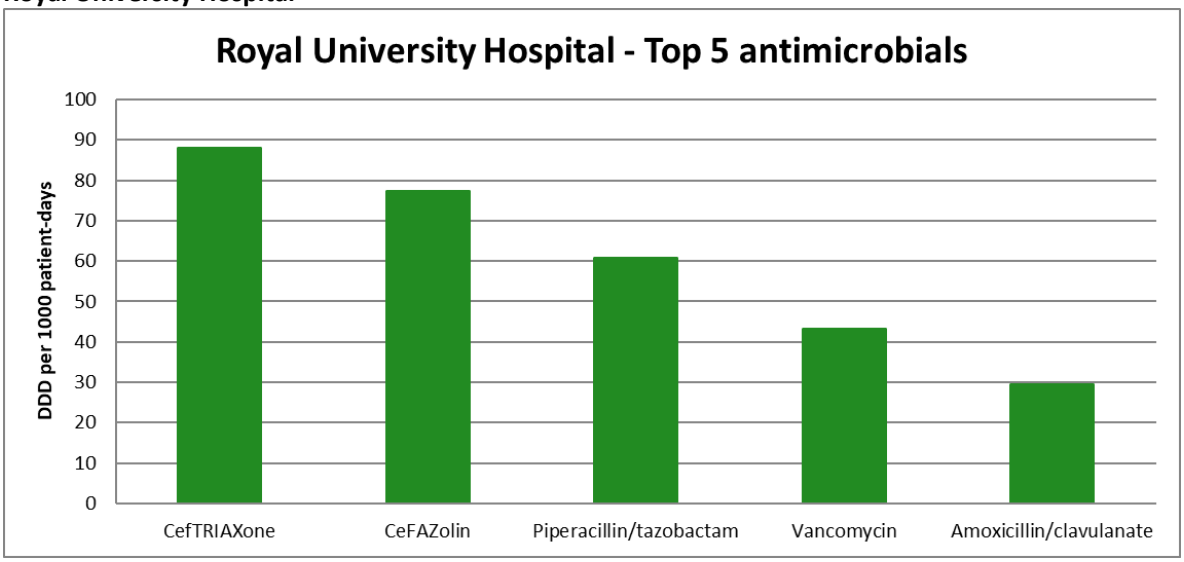
- Work continues with relevant PPO development, with a goal for the provincial Antimicrobial Advisory Subcommittee to review all new PPOs that include antimicrobials
- In collaboration with Regina Antimicrobial Stewardship Pharmacists, content updating and development continues on Firstline. Priorities include updating existing clinical pathways that target high yield antimicrobial stewardship opportunities and assist in front line clinician decision support

Antimicrobial Usage – Defined Daily Dose (DDD)

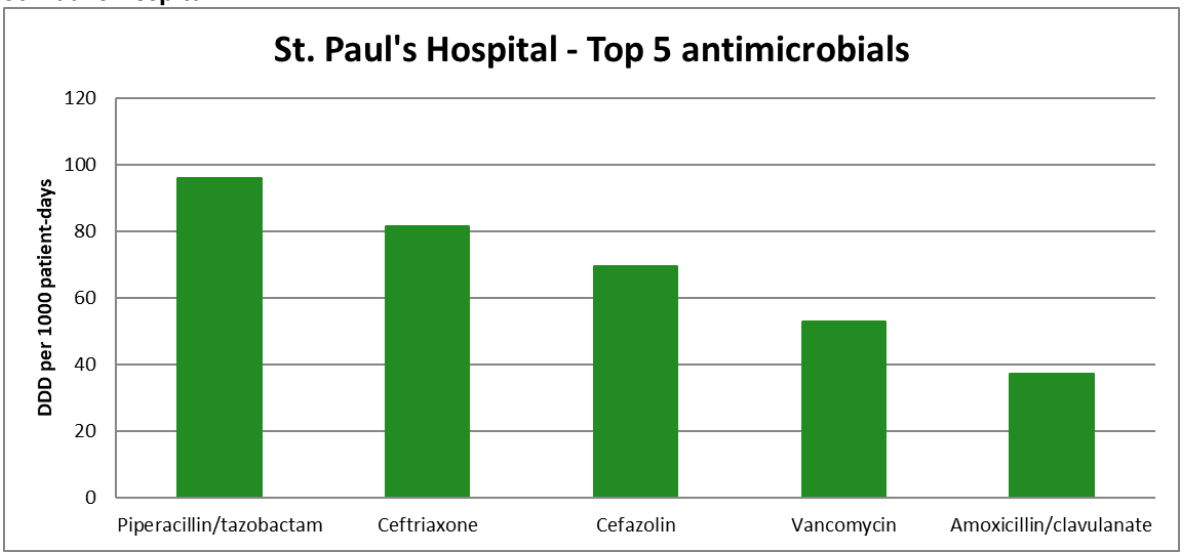
Antimicrobial usage is measured as DDD per 1000 patient days and allows for site comparisons and monitoring of trends in use. Emergency and pediatric populations have been removed from the analysis as they are not accurately represented with DDD analysis.

Top 5 Antimicrobials by Site

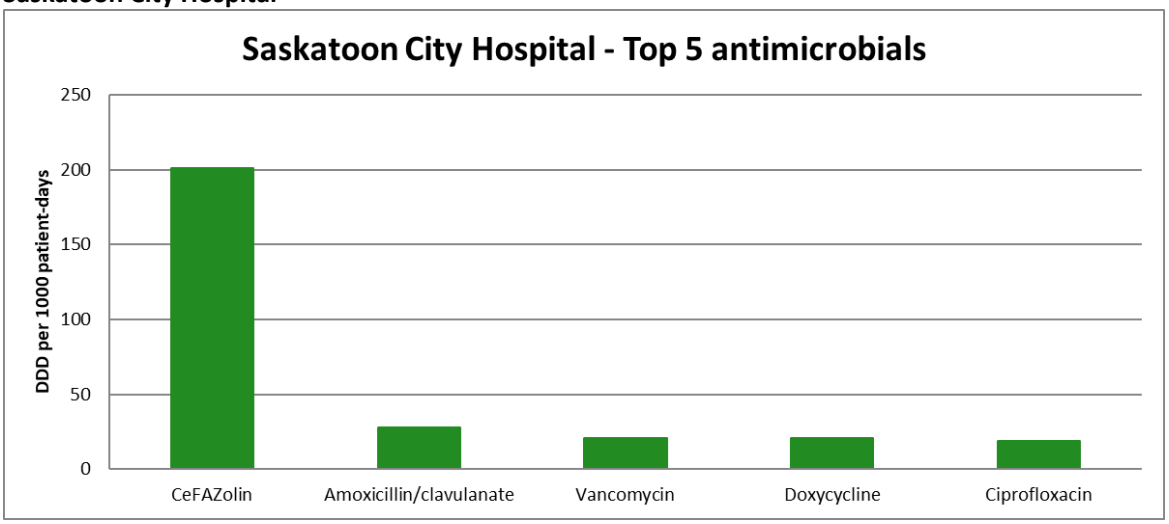
Royal University Hospital



St. Paul's Hospital

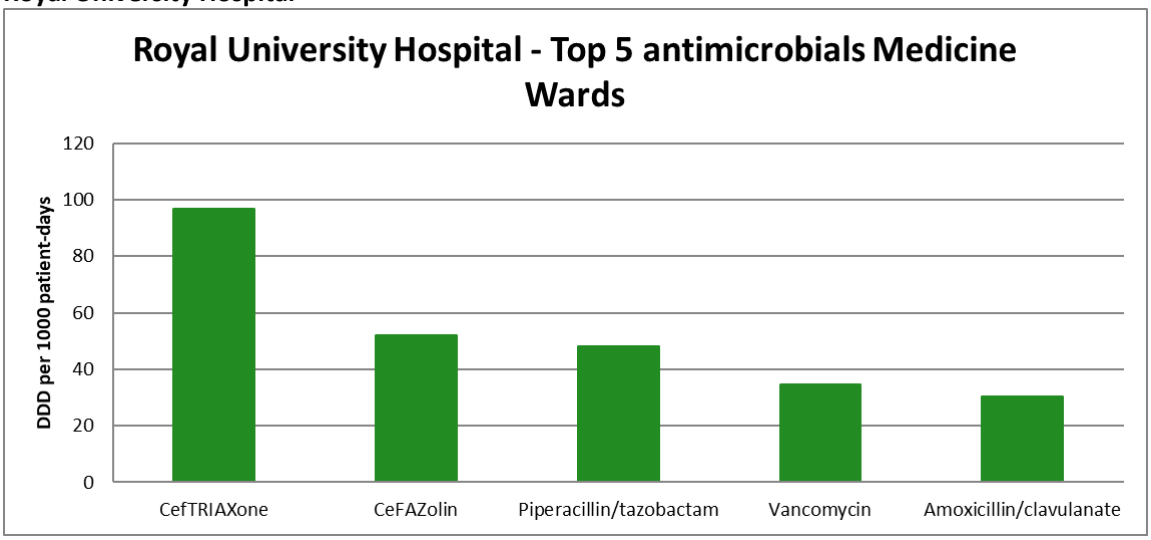


Saskatoon City Hospital

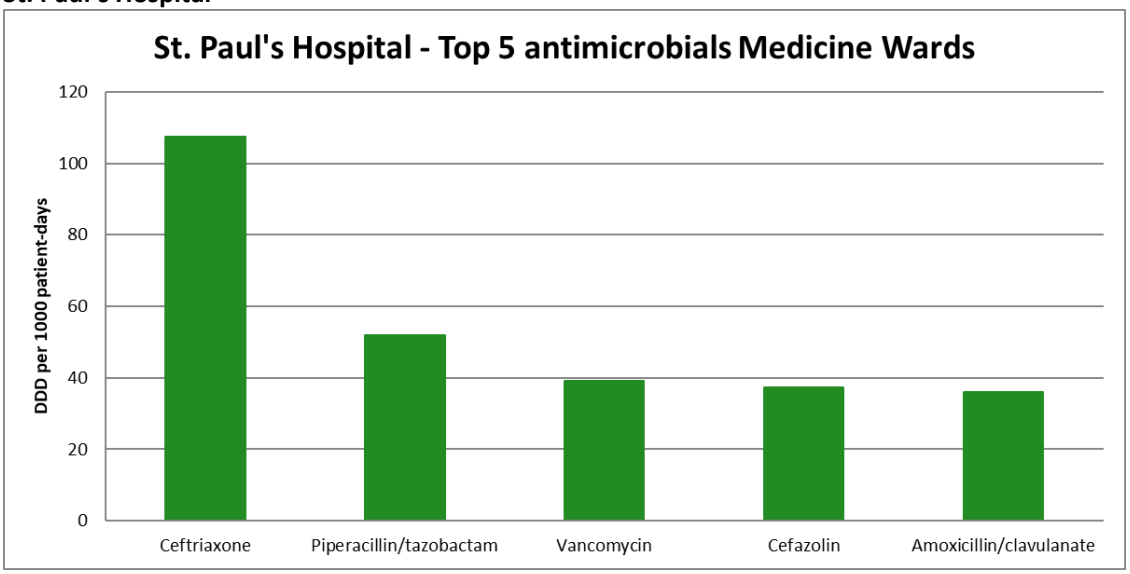


Antimicrobial Use on Medicine Wards

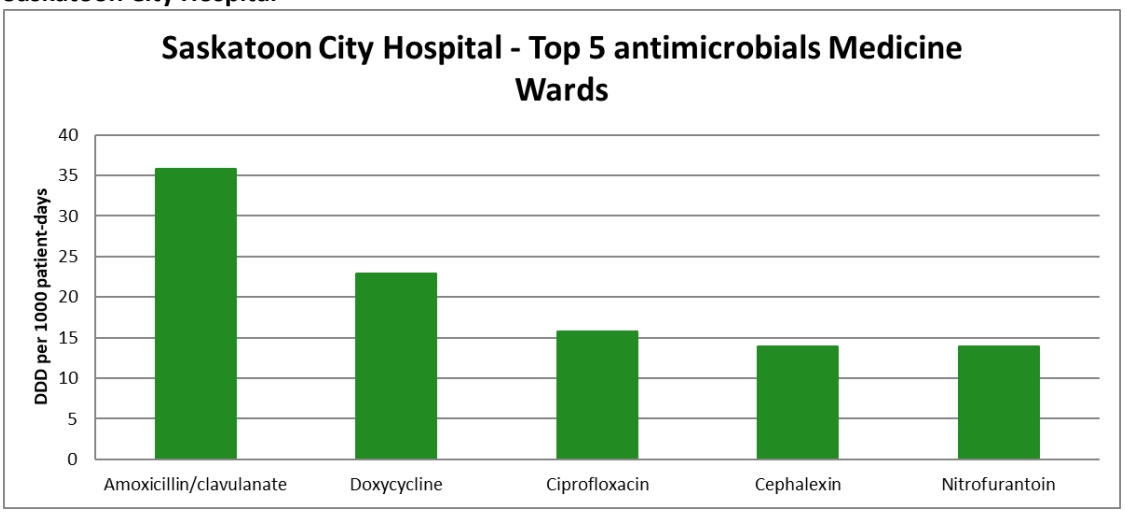
Royal University Hospital



St. Paul's Hospital

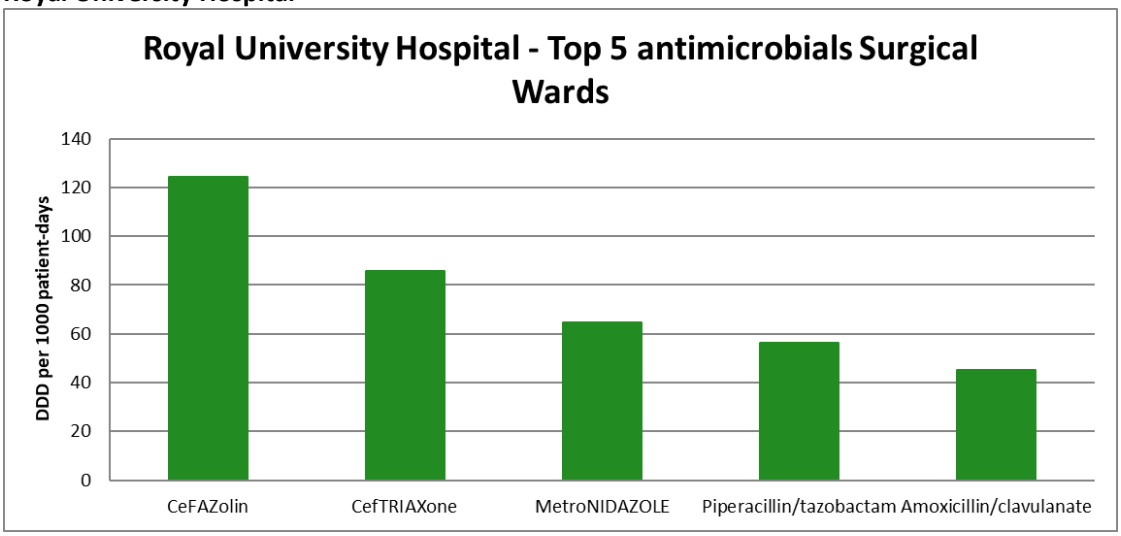


Saskatoon City Hospital

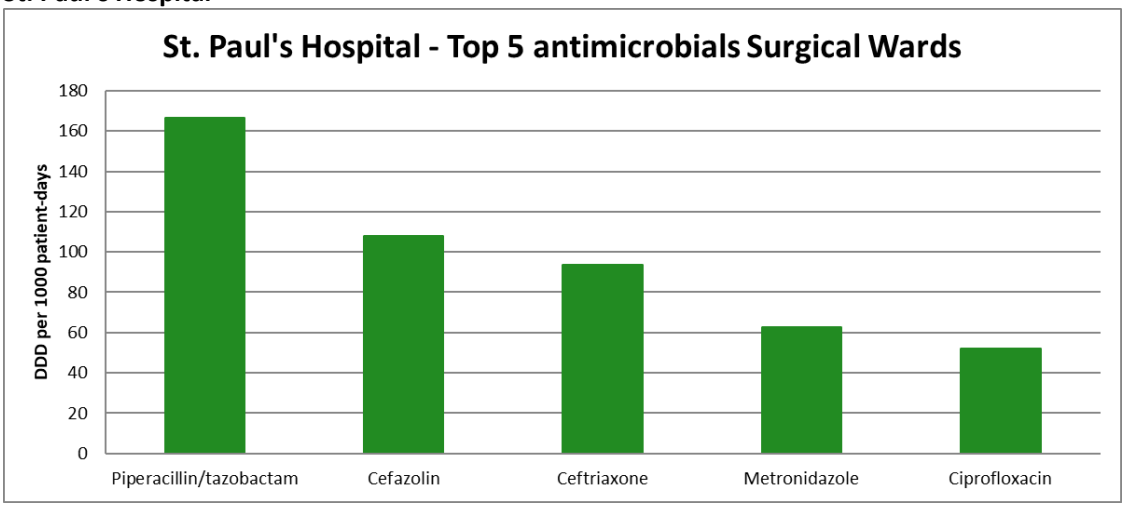


Antimicrobial Use on Surgery

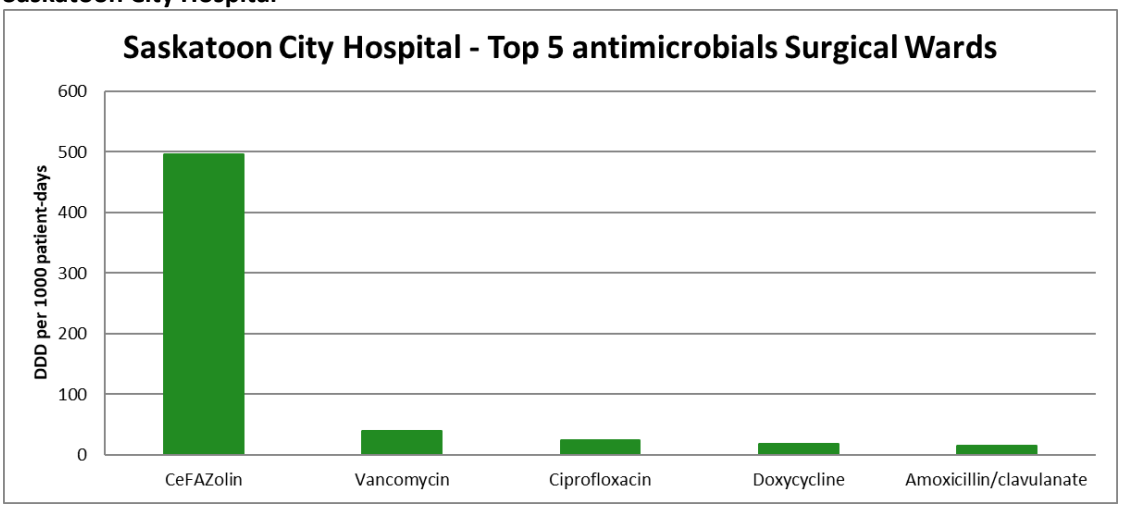
Royal University Hospital



St. Paul's Hospital

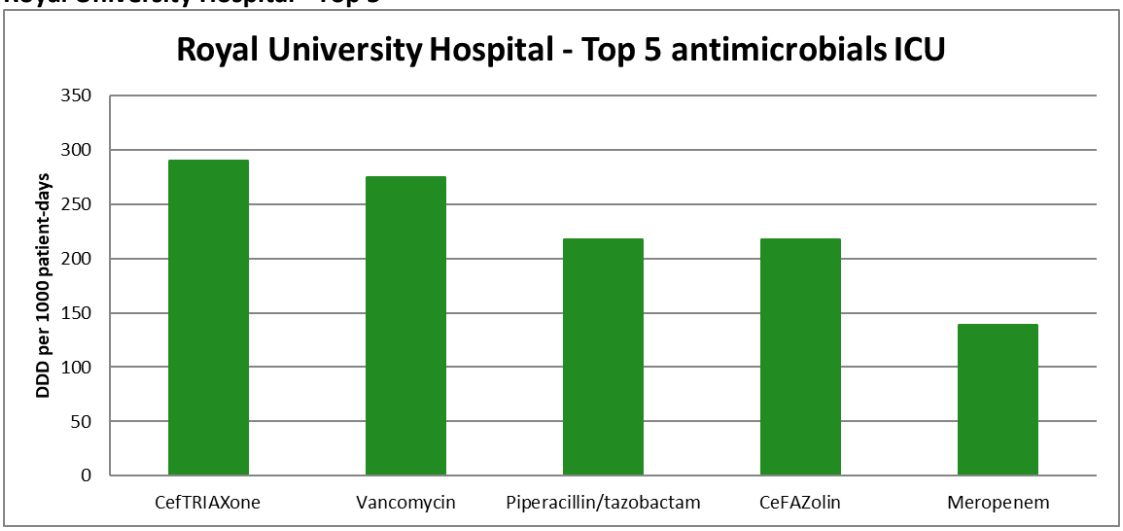


Saskatoon City Hospital

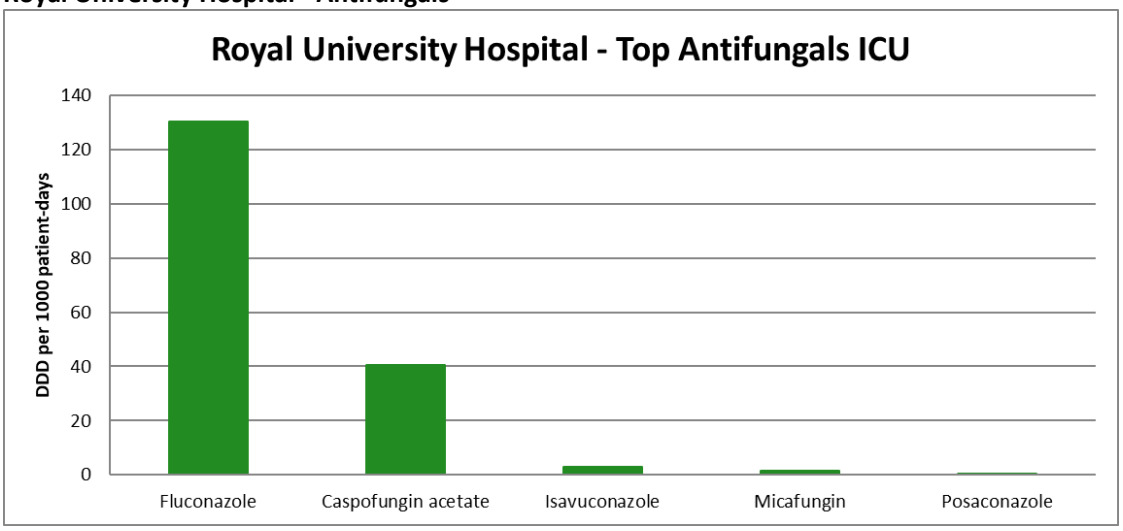


Antimicrobial Use in ICU

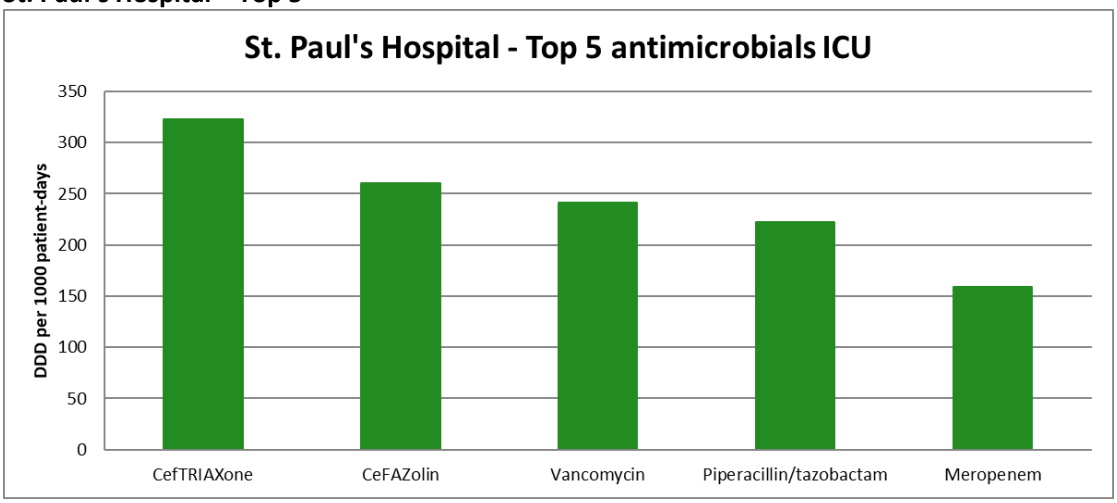
Royal University Hospital - Top 5



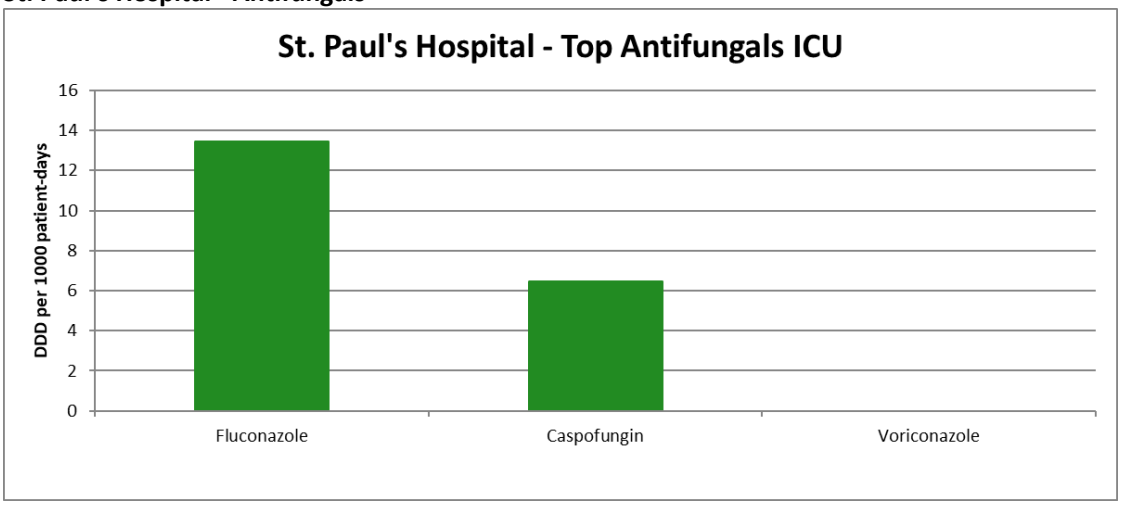
Royal University Hospital - Antifungals



St. Paul's Hospital – Top 5



St. Paul's Hospital - Antifungals



Compliance with Accreditation Canada Required Organizational Practices

	TESTS FOR COMPLIANCE	Royal University Hospital (RUH)	St Paul's Hospital (SPH)	Saskatoon City Hospital (SCH)
		Fall 2024 Assessment		
Major	An antimicrobial stewardship program has been implemented	**Met**	**Unmet**	**Met**
Major	The program specifies who is accountable for implementing the program	**Met**	**Unmet**	**Met**
Major	The program is interdisciplinary involving pharmacists, infectious diseases physicians, infection control specialists, physicians, microbiology staff, nursing staff, hospital administrators, and information system specialists, as available and appropriate.	**Met**	**Unmet**	**Unmet**
Major	The program includes interventions to optimize antimicrobial use that may include audit and feedback, a formulary of targeted antimicrobials and approved indications, education, antimicrobial order forms, guidelines and clinical pathways for antimicrobial utilization, strategies for streamlining or de-escalation of therapy, dose optimization, and parenteral to oral conversion of antimicrobials.	**Met**	**Unmet**	**Unmet**
Minor	The program is evaluated on an ongoing basis and results are shared with stakeholders in the organization.	**Unmet**	**Unmet**	**Unmet**

Future Recommendations

With expansion of focused stewardship clinical services at RUH, as well as ongoing education and research, the stewardship program within Saskatoon is at capacity with current funding. In order to provide further support to St. Paul's Hospital and Saskatoon City Hospital, further support is required.

As noted in the Fall 2024 Accreditation Canada Program Assessment, we have yet to effectively reach St. Paul's Hospital or Saskatoon City Hospital in any capacity other than the Firstline app. As well, with the expansion of SCH and addition of internal medicine wards, we expect patient acuity and antimicrobial use to increase at this site.

Programming and statistical measurement remains a difficult and time consuming activity. There is a lack of any data analysis support staff.

Recommendations from the Association of Medical Microbiology and Infectious Diseases (AMMI) Canada suggest that to meet the Required Organizational Practice Accreditation Standards the following is needed:

- Physician: 1.0 FTE per 1000 acute care beds
- Pharmacist: 3.0 FTE per 1000 acute care beds
- Project/Program Administrative and Coordination Support: 0.5 FTE per 1000 acute care beds
- Data Analyst: 0.4 FTE per 1000 acute care beds

- Current funding in the Saskatoon area is 1.3 FTE (1.0 FTE pharmacist and 0.3 FTE physician) for approximately 1000 acute care beds

With these considerations, the following recommendations are made:

Recommendation
1. Expansion of the number of infectious diseases/antimicrobial stewardship pharmacist positions: **a. Additional 2.0 FTE pharmacists**
2. **Expansion of the number of antimicrobial stewardship physician positions.** a. **Additional 0.3-0.5 FTE**
3. Establishment of funded position for data analysis and project/program coordination **a. 0.4 FTE**