SHS + UHN
ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

Q1 AND 2 REPORT

FISCAL YEAR 2021 | 2022

@shsuhnasp

Sinai Health System

UHN Toronto General Toronto Western Princess Margaret Toronto Rehab Michener Institute

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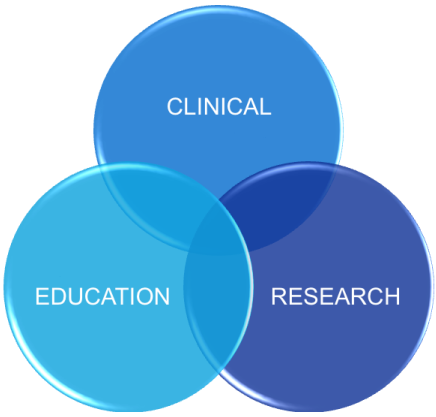
"Getting patients the right antibiotics, when they need them"

EXECUTIVE SUMMARY

The Sinai Health-University Health Network Antimicrobial Stewardship Program (SH-UHN ASP) was established in 2009. The SH-UHN ASP uses a collaborative and evidence-based approach to improve the quality of antimicrobial use by getting patients the right antibiotics when they need them. The ASP follows data-driven quality improvement methodology to pursue the best possible clinical outcomes for its patients.



The SH-UHN ASP blends research, education, and clinical care to take a leadership role in antimicrobial stewardship and improving the quality of health care.

ANTIMICROBIAL CONSUMPTION AND COSTS

The ASP works with clinical teams across both Sinai Health (Bridgepoint Health and Mount Sinai Hospital (MSH)) and University Health Network (Princess Margaret Cancer Centre (PM), Toronto General Hospital (TG), Toronto Rehabilitation Institute (TRI), and Toronto Western Hospital (TW)).

Where possible, we show Defined Daily Doses (DDD) together with Days of Therapy (DOT). The metrics are extracted from the hospital pharmacy databases and the Provincial Critical Care Information System (CCIS). Although these two metrics are closely related, using lower or higher doses of antimicrobials will result in a corresponding change in DDD without any change in DOT (i.e. inpatients with renal dysfunction, extremes of body mass, or central nervous system infections). Table 1 summarizes antimicrobial usage and cost in the various units and services at SH and UHN.

The COVID-19 pandemic arrived in Toronto in January 2020 and began influencing hospital service delivery in February 2020 with reductions in clinical services, including elective and non-urgent surgeries. Accordingly, acute care hospitals (including SH and UHN) saw an expected reduction in clinical demand for antimicrobial therapy, which is reflected in the data presented. The SH-UHN ASP had to alter its operations to support clinical teams while optimizing physical distancing.

Additionally, members of the SH-UHN ASP played a variety of important roles in the pandemic effort, including supporting the development of mission-critical IT applications and surveillance systems, assessing for COVID-19 at UHN's assessment centres, helping develop mathematical models for personal protective equipment and drug supply and demand, and developing clinical COVID-19 therapeutic practice guidelines and other resources to support healthcare provision.

Table 1: Summary of Antimicrobial Usage (DDDs) and Cost by Hospital/Unit

Hospital/Unit	Antimicrobial Usage	Antimicrobial Cost
Mount Sinai Hospital: Medical Surgical ICU	↓	↓
Mount Sinai Hospital: Neonatal ICU	↓	↑
Toronto General Hospital: Cardiac ICU	↓	↓
Toronto General Hospital: Cardiovascular ICU	↑	↓
Toronto General Hospital: Medical Surgical ICU	↑	↓
Toronto Western Hospital: Medical Surgical Neurosurgical ICU	↑	↑
Mount Sinai Hospital: General Internal Medicine	↓	↓
Toronto General Hospital: General Internal Medicine	↑	↑
Toronto Western Hospital: General Internal Medicine	↑	↓
Princess Margaret Cancer Centre: Leukemia Service	↑	↓
Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant	↑	↑
Toronto General Hospital: Multi-Organ Transplant Program	↑	↓
Toronto Rehabilitation Institute: Bickle	↓	↓
Toronto Rehabilitation Institute: Lyndhurst	↑	↓
Toronto Rehabilitation Institute: University Centre	↑	↓

↓ Decrease compared to previous YTD ↑ Increase of < 10% compared to previous YTD ↑ Increase of > 10% compared to previous YTD

FISCAL YEAR 21/22 Q1 AND Q2 HIGHLIGHTS

Research – Published In These Quarters

Multiple research projects continue, with many important projects nearing completion and being prepared for submission to key medical journals.

Publications

The following articles were published or accepted for publication in peer-reviewed medical journals:

- Langford B, **So M**, Raybardhan S, Leung V, Soucy JPR, Westwood D, Daneman N, MacFadden DR. Antibiotic prescribing in patients with COVID-19: a rapid review and meta-analysis. *Clin Microbiol Infect*, 2021;27(4): P520-531.doi: https://doi.org/10.1016/j.cmi.2020.12.018

- Wu JH, Khalid F, Langford BJ, Beahm NP, **McIntyre M**, Schwartz KL, Garber G, Leung V. Community pharmacist prescribing of antimicrobials: A systematic review from an antimicrobial stewardship perspective. Can Pharm J (Ott). 2021;154(3):179-192. doi: https://doi.org/10.1177/1715163521999417

- **Jorgensen SCJ**, Stewart JS, Dalton B. The case for 'conservative pharmacotherapy'. *J Antimicrob Chemother*, 2021; 76(7): 1658-1600. https://doi.org/10.1093/jac/dkab011

- **Jorgensen SCJ**, Spellberg B, Shorr AF, Wright WF, Should Therapeutic Drug Monitoring Based on the Vancomycin Area Under the Concentration-Time Curve Be Standard for Serious Methicillin-Resistant *Staphylococcus aureus* Infections?—No, *Clinical Infectious Diseases*, 2021; 72(9): 1502-1506.doi: https://doi.org/10.1093/cid/ciaa1743

- **So M**, Hand J, Forrest G, Pouch SM, Te H, Ardura MI, Bartash RM, Dadhania DM, Edelman J, Ince D, Jorgenson MR, Kabbani S, Lease ED, Levine D, Ohler L, Patel G, Pisano J, Spinner ML, Abbo L, Verna EC, **Husain S**. White paper on antimicrobial stewardship in solid organ transplant recipients. *Am J Transplant*, 2021 Jul 1 [Epub]. doi: https://doi.org/10.1111/ajt.16743

- Dalton BR, Krishnan A, Stewart JJ, **Jorgensen SCJ**. Limitations of classification and regression tree analysis in vancomycin exposure-response relationship studies: insights from data simulation. *Clin Microbiol Infect*, 2021 Jul 28 [Epub]. doi: https://doi.org/10.1016/j.cmi.2021.07.028

- Tew M, Dalziel K, Thursky K, Krahn M, Abrahamyan L, **Morris AM**, Clarke P. Excess cost of care associated with sepsis in cancer patients: Results from a population-based case-control matched cohort. *PLoS One*, 2021 Aug 11;16(8):e0255107. doi: https://doi.org/10.1371/journal.pone.0255107

- **Jorgensen SCJ**, Lapinsky SE. Tocilizumab for coronavirus disease 2019 in pregnancy and lactation: a narrative review. *Clin Microbiol Infect*, 2021 Aug 23: S1198-743X(21)00476-6. doi: https://doi.org/10.1016/j.cmi.2021.08.016

- **Jorgensen SCJ**, Davis MR, Lapinsky SE. A review of remdesivir for COVID-19 in pregnancy and lactation. *J Antimicrob Chemother*, 2021 Aug 24; [Epub]. doi: https://doi.org/10.1093/jac/dkab311

- Saatchi A, **Morris AM**, Patrick DM, Mccormack J, Reyes RC, Morehouse P, Reid J, Shariff S, Povitz M, Silverman M, Marra F. Outpatient antibiotic use in British Columbia, Canada: reviewing major trends since 2000. *JAC- Antimicrobial Resistance*, 2021; 3(3): dlab116, doi: https://doi.org/10.1093/jacamr/dlab116

- Daneman N, Lee SM, Bai H, **Bell CM**, Bronskill SE, Campitelli MA, Dobell G, Fu L, Garber G, Ivers N, Lam JMC, Langford BJ, Laur C, **Morris A**, Mulhall C, Pinto R, Saxena FE, Schwartz KL, Brown KA. Population-Wide Peer Comparison Audit and Feedback to Reduce Antibiotic Initiation and Duration in Long-Term Care Facilities with Embedded Randomized Controlled Trial. *Clin Infect Dis*, 2021 Sep 15;73(6): e1296-1304. doi: https://doi.org/10.1093/cid/ciab256

Grants Awarded

- AHSC AFP Innovation Fund: Developing national antimicrobial prescribing guidelines. Principal Investigator: Andrew Morris. Co-investigators: Chaim Bell, Edith Blondel-Hill, Susan Fryters, Warren McIsaac, Patricia Sullivan-Taylor, Per Vandvik.

- HIV and Hepatitis C Community Action Fund (Public Health Agency of Canada): Developing Model(s) for a Pan-Canadian Antimicrobial Resistance (AMR) Network. Principal Investigator: Andrew Morris. Co-investigators: Gerry Wright, Herman Barkema, Scott Weese.

Research Studies

The following grant-funded studies are progressing according to timelines:

- Designing an Effective Outpatient Antimicrobial Stewardship Program to Reduce Unnecessary Antibiotic Use in Primary Care using a Mixed-Methods Collaborative Model. AHSC AFP Innovation Fund. Principal Investigators: Warren McIsaac, Andrew Morris.

- The Development and Testing of a Scaling Strategy for a Community-Based Primary Care Antimicrobial Stewardship Program Utilizing an Innovative University of Toronto Primary Care Testing Platform: the UTOPIAN Practice Based Research Network. Principal Investigator: Warren McIsaac. Co-investigators: Andrew Morris, Noah Ivers, Yoshiko Nakamachi. Funded by AHSC AFP Innovation Fund.

In addition to these funded projects, multiple unfunded research projects continue, led by various members of the SH-UHN ASP team. The following investigator-initiated study is progressing:

- Antimicrobial Stewardship Content in Canadian Undergraduate Pharmacy Programs: A National Survey. Pharmacy Resident: Jenna Sauve. Principal Investigator: Miranda So. Co-investigators: Marisa Battistella, Linda Dresser, Marie Rocchi.

Best Practices

Several algorithms and best practice guidelines have been developed and implemented into practice across UHN and SH. The algorithms and best practices can be found here on our ASP website. The SH-UHN ASP continually updates these practice tools to reflect the latest evidence.

Dr. Miranda So (ASP Pharmacist) and **Dr. Shahid Husain (Immunocompromised Infectious Disease and ASP Physician)** have completed and implemented the "Empiric Guidelines for Common Infections in Solid Organ Transplant Patients". The guidelines have undergone consultative reviews with stakeholders, content experts, and key opinion leaders. Guidelines continue to be introduced to staff and trainees in the **Multi-Organ Transplant Program** through a series of sessions with each of the transplant organ teams. Under the auspices of antimicrobial stewardship, the guidelines provide best practice recommendations to prescribers, pharmacists, and nurses on diagnostic workup, empiric therapy, and appropriate referral to specialist consultation, including Transplant Infectious Diseases.

JEDI and SABR

JEDI (Judicious Evaluation of antimicrobial Decision-making in the ICU) rounds. This is being led by our ASP Pharmacists, Drs. Mark McIntyre and Jennifer Curran**,** whereby the ASP team **audits appropriateness** of antimicrobial prescribing in the ICUs once a week. The audit results are then shared and discussed with the ICU team during a weekly meeting. The **appropriateness of antimicrobial prescribing** adjudication uses locally-developed, peer-reviewed, and published criteria for appropriateness.

SABR (Stewardship at Bedside Rounds). This is an **innovative** way of **actively engaging nurses** in antimicrobial stewardship activities. The aim is to embed into daily bedside rounds "Infection" as a separate entity during the head-to-toe assessment. The components of "infection" include temperature, white blood cell count, antimicrobials, indication for antimicrobial use, and other relevant information that pertains to infection. This intervention is designed to change nursing practice using different behaviour change strategies (e.g. audit and feedback).

Antimicrobial Stewardship in Leukemia Program

During the early months of Wave 1 of the COVID-19 pandemic, twice-monthly directed antimicrobial surveys were put on pause. Regular meetings resumed in August 2020 and have continued since.

Drs. Husain and So have been conducting twice-monthly directed antimicrobial prescribing surveys using an online tool and *a priori* definitions developed by Australia's National Centre for Antimicrobial Stewardship (NCAS) to assess adherence to the High-Risk Febrile Neutropenia Guideline and appropriateness of antimicrobial prescriptions. The online tool is called the National Antimicrobial Prescribing Survey (NAPS). Starting in May 2019, the format of the antimicrobial stewardship intervention was updated from the conventional, twice weekly audit-and-feedback meetings reviewing all admitted patients (which had been in place since 2010) to a new format with two parts: (1) presentation of the aggregate "dashboard" metrics from the NAPS survey and (2) focused, in-depth discussions on specific patients with unique antimicrobial needs and themes identified from the dashboard. With the new format, antimicrobial stewardship meetings now take place twice per month.

Provincial, National, and International Role

In April 2019, the Ontario government announced it would expand the scope of practice for certain health professionals, including pharmacists. **The SH-UHN ASP is actively working with the OCP (Ontario College of Pharmacists)** in developing regulations that would authorize pharmacists to prescribe for minor ailments. Prescribing antimicrobials for certain types of infections is included in the expanded scope of practice.

The SH-UHN ASP continues to work closely with **HealthCareCAN**, the **National Collaborating Centre for Infectious Diseases (NCCID)**, and the **Public Health Agency of Canada (PHAC)** to inform our national health leaders on Antimicrobial Stewardship (AMS) and Antimicrobial Resistance (AMR).

The SH-UHN ASP continues to play a leading role in implementing an antimicrobial survey tool across Canada. This tool, **Canadian NAPS**, has been collecting information about antibiotic prescriptions, accompanying diagnoses, and the appropriateness of the prescriptions. **The SH-UHN ASP continues to lead this initiative for Year 3**, making it available to an even larger number of hospitals across Canada in each of the provinces, with a **target of 100 acute care hospitals**. This initiative is being supported by PHAC (Public Health Agency of Canada), NCAS (National Centre for Antimicrobial Stewardship), and The Guidance Group in Australia.

Dr. Andrew Morris co-chaired with Dr. Gerry Wright (McMaster University) a Public Health Agency of Canada-funded initiative to develop a National Antimicrobial Resistance Network. This work, completed in autumn 2021, is a national network to facilitate implementing the Pan-Canadian Action Plan on Antimicrobial Resistance. More information and the final report can be found at www.amrnetwork.ca.

The Leslie Dan Faculty of Pharmacy at the University of Toronto continues to be the only Pharmacy School in Canada to offer an elective course in Year 3 dedicated to Antimicrobial Stewardship, which is led by **Drs. Linda Dresser (now retired) and Mark McIntyre**, SH-UHN ASP Pharmacists.

Drs. Shahid Husain and **Miranda So** are Chair and Co-Chair, respectively, of the Antimicrobial Resistance-Antimicrobial Stewardship White Paper Working Group of the American Society of Transplantation (AST). They are working with Dr. Jonathan Hand (also Co-Chair) of the Ochsner Health Centre in New Orleans, LA, USA. The Working Group consists of AST members from transplant infectious diseases and various organ transplant sub-specialties. The objective of the Working Group is to develop best practice recommendations for implementing antimicrobial stewardship program interventions in the solid organ transplant population. Final revisions were being prepared for journal submission.

Collaboration with the Michener Institute

The Antimicrobial Stewardship Nursing Curriculum has been incorporated in the Critical Care Nursing Certificate. **Linda Jorgoni, RN, ASP Nurse Leader**, and **Dr. Linda Dresser**, in partnership with the Michener Institute, developed the first **Canadian nursing curriculum addressing antimicrobial stewardship** concepts combined with infectious diseases management for critical care nurses. The content includes online modules, clinical placement, and in-class teaching. It provides nurses with foundational knowledge related to AMS and management of patients with infectious diseases. The first cohort of newly-hired critical care nurses received this new course content in October 2018. Since then, multiple cohorts of students have taken this course. Throughout Waves 1 and 2 of the pandemic, the course was delivered virtually so as not to interrupt the certification process of our critical care nurses.

FISCAL YEAR 21/22 Q1 AND Q2 RESULTS

CRITICAL CARE

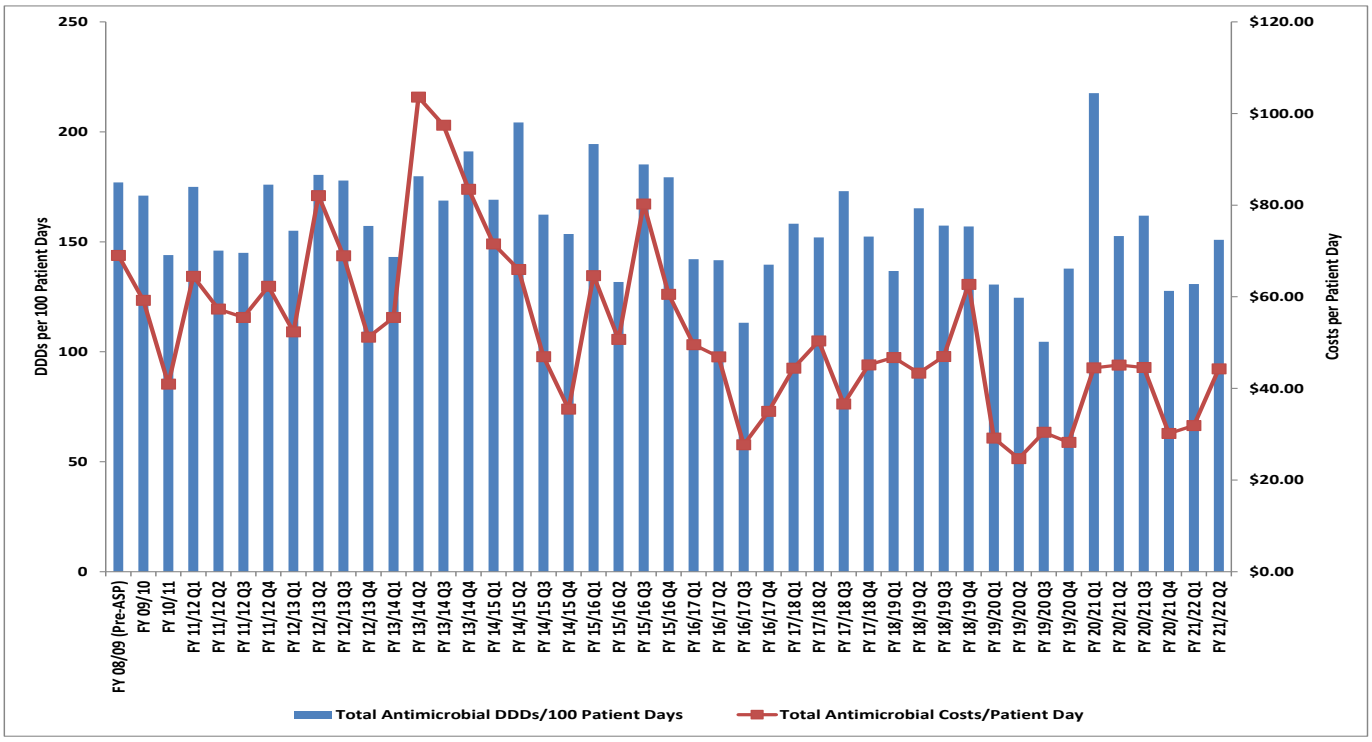
Mount Sinai Hospital: Medical Surgical ICU

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 24.4% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 16.0% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 34.0% compared to YTD last year.
  - Antifungal costs per patient day decreased (↓) by 1.9% compared to YTD last year.

NB: Patients transferred from Princess Margaret accounted for 14% of patient visits and 60% of the antimicrobial costs.

Mount Sinai Hospital: Medical Surgical ICU
Antimicrobial Consumption and Costs Per Patient Day

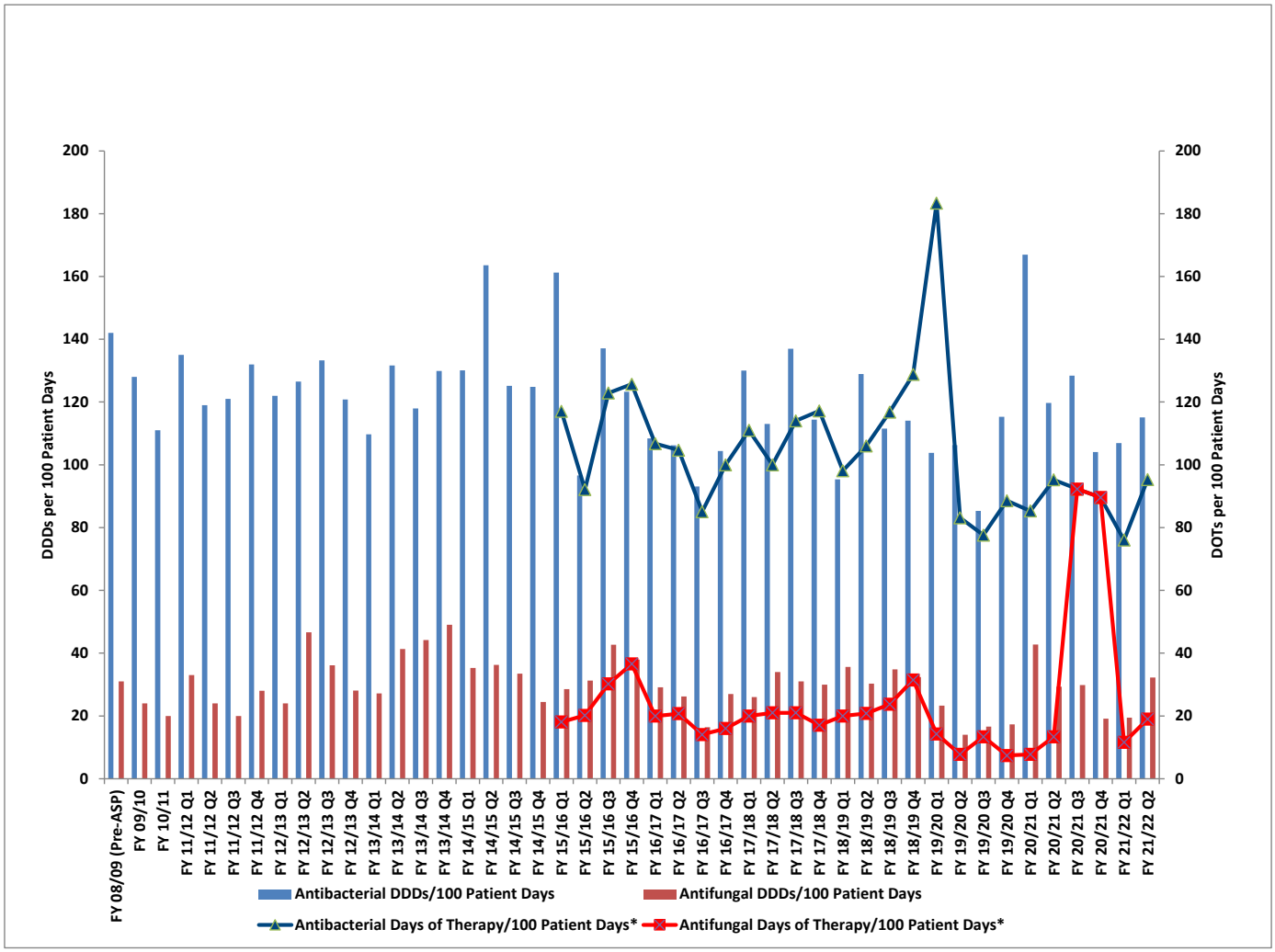


To view **Appendix 1: FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click **here**.

To view **Appendix 2: FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click **here**.

Mount Sinai Hospital: Medical Surgical ICU
Antimicrobial Consumption as Defined Daily Dose versus Antimicrobial Consumption as Days of Therapy

- Antibacterial Days of Therapy (DOT) per 100 patient days decreased (↓) by 7.1% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 0.3% compared to YTD last year.



SHS + UHN ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

Table 2: Mount Sinai Hospital: Medical Surgical ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance					YTD of Previous Year
														Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs																			
Total Antimicrobial DDDs/100 Patient Days	**177**	**171**	**144**	**167**	**170**	**172**	**164**	**156**	**135**	**159**	**154**	**124**	**164**	**131**	**151**			**140**	**185**
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	127	123	136	116	103	123	113	102	129	107	115			111	144
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	35	41	25	32	25	30	33	18	30	19	32			25	36
Total Antimicrobial Costs	$332,724	$285,975	$193,129	$279,859	$291,470	$424,044	$232,814	$274,258	$187,684	$206,738	$258,822	$134,940	$188,496	$39,579	$46,936			$86,515	$98,109
Total Antimicrobial Costs/Patient Day	**$69.01**	**$59.23**	**$40.95**	**$59.22**	**$62.37**	**$85.36**	**$62.54**	**$61.45**	**$39.96**	**$44.35**	**$50.10**	**$28.12**	**$40.90**	**$31.92**	**$44.28**			**$37.62**	**$44.80**
Systemic Antibacterial Costs	$174,339	$142,134	$95,773	$125,339	$134,811	$108,886	$92,928	$68,246	$57,257	$80,561	$85,783	$63,733	$71,126	$15,504	$14,365			$29,869	$43,068
Systemic Antibacterial Costs/Patient Day	$36.16	$29.44	$20.31	$26.94	$28.85	$21.92	$20.71	$15.29	$12.19	$17.28	$16.61	$13.28	$15.43	$12.50	$13.55			$12.99	$19.67
Systemic Antifungal Costs	$143,100	$132,519	$88,998	$141,877	$144,811	$296,573	$134,504	$189,661	$119,234	$112,610	$163,194	$67,973	$113,345	$22,435	$31,824			$54,259	$52,647
Systemic Antifungal Costs/Patient Day	$29.68	$27.45	$18.87	$30.50	$30.99	$59.70	$40.53	$42.50	$25.39	$24.16	$31.59	$14.16	$24.59	$18.09	$30.02			$23.59	$24.04
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	111	109	115	99	110	113	84	91	76	95			84	90
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	17	21	27	18	20	24	10	14	12	19			15	15
Patient Care Outcomes																			
Hospital-Acquired C. difficile Cases (rate per 1,000 pt days)	NA	NA	NA	5 (1.07)	8 (1.71)	4 (0.91)	7 (1.59)	5 (1.12)	2 (0.43)	4 (0.86)	1 (0.19)	1 (0.21)	4 (0.87)	1 (0.81)	1 (0.94)			2 (0.87)	
ICU Average Length of Stay (Days)	5.84	5.57	5.67	5.51	5.24	6.10	5.26	4.45	4.20	4.54	5.12	5.62	7.12	7.40	4.7			6.05	8.02
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.5	17.0	15.3	13.9	14.2	12.5	14.7	14.8	16.50	14.10	14.7	12.8			13.70	12.4
ICU Readmission Rate Within 48 Hrs (as a %)	3.2	2.9	2.7	2.7	1.9	3.2	2.6	2.1	2.5	2.6	2.4	1.80	3.80	1.2	1.3			1.20	2.6
ICU Ventilator Days	NA	3286	2934	2677	2749	3069	2597	2504	2231	2845	2884	2971	2807	1140	585			1725	1026
ICU Multiple Organ Dysfunction Score (MODS)	4.00	4.04	4.12	4.25	4.62	4.87	4.73	4.43	3.92	3.86	4.08	4.33	4.38	4.49	4.22			4.36	4.23

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs + systemic antivirals; non-systemic antimicrobials are excluded.
Data Sources: Antimicrobial DDD and Costs (PharmNet), C difficile (Infection Control Dashboards), Other ICU Patient Care Indicators (Critical Care Information System).

Historical antimicrobial usage and cost data updated due to the discovery that selected added drug dosages (Fluconazole 400mg/200ml bag, Pip-Tazo 13.5gm vial, Daptomycin 500mg vial) were not included in the report. Data have been revised to include Fluconazole starting August 2013, Pip-Tazo January 2015, and Daptomycin, November 2015.

There was a calculation error for the ICU Readmission Rate for FY 16/17 Q4. That figure has now been corrected.

Table 3: Mount Sinai Hospital: Medical Surgical ICU Total Antimicrobial Costs (Princess Margaret Cancer Centre (PM) and Non-PM Patients)

MSH ICU Total Antimicrobial Costs																	
Antimicrobial Cost per Patient Day																	
	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Q1	FY 21/22 Q2	FY 21/22 Q3	FY 21/22 Q4	FY 21/22 YTD	Previous YTD
Non-PM Patients	$78,737.00	$87,931.12	$109,282.63	$150,869.65	$118,306.39	$78,180.71	$59,166.51	$93,341.59	$91,857.61	$53,343.80	$75,831.49	$13,800.67	$15,435.97			$29,236.64	$30,872.10
	$21.14	$25.42	$31.77	$37.79	$31.80	$23.12	$9.78	$18.48	$17.50	$9.51	$13.04	$5.88	$12.64			$5.88	$22.52
PM Patients	$114,392.00	$191,928.21	$182,187.68	$273,174.21	$122,698.89	$209,984.51	$128,517.32	$113,396.53	$166,964.00	$81,595.88	$112,664.30	$25,778.56	$31,500.11			$57,278.67	$28,700.72
	$179.02	$181.58	$249.91	$317.64	$170.89	$231.26	$191.53	$155.98	$142.46	$118.60	$76.54	$85.36	$121.15			$85.36	$153.48
Total ICUs	$193,129.00	$279,859.33	$291,470.31	$424,043.86	$241,005.28	$288,165.22	$187,683.83	$206,738.12	$258,821.61	$134,939.68	$188,495.79	$39,579.23	$46,936.08			$86,515.31	$59,572.82
	$44.26	$61.97	$69.91	$87.40	$54.30	$67.17	$27.93	$35.78	$40.31	$21.43	$25.86	$14.94	$31.69			$14.94	$38.24

Note: 15/16 is open year data; totals and cost per day may change based on coding changes. Antimicrobial costs from PharmNet; ICU visits and patient days from CIHI DAD Database.

Mount Sinai Hospital: Medical Surgical ICU Proportional Antimicrobial Costs for Princess Margaret Cancer Centre and Non-Princess Margaret Cancer Centre Patients

(with costs/patient day indicated)

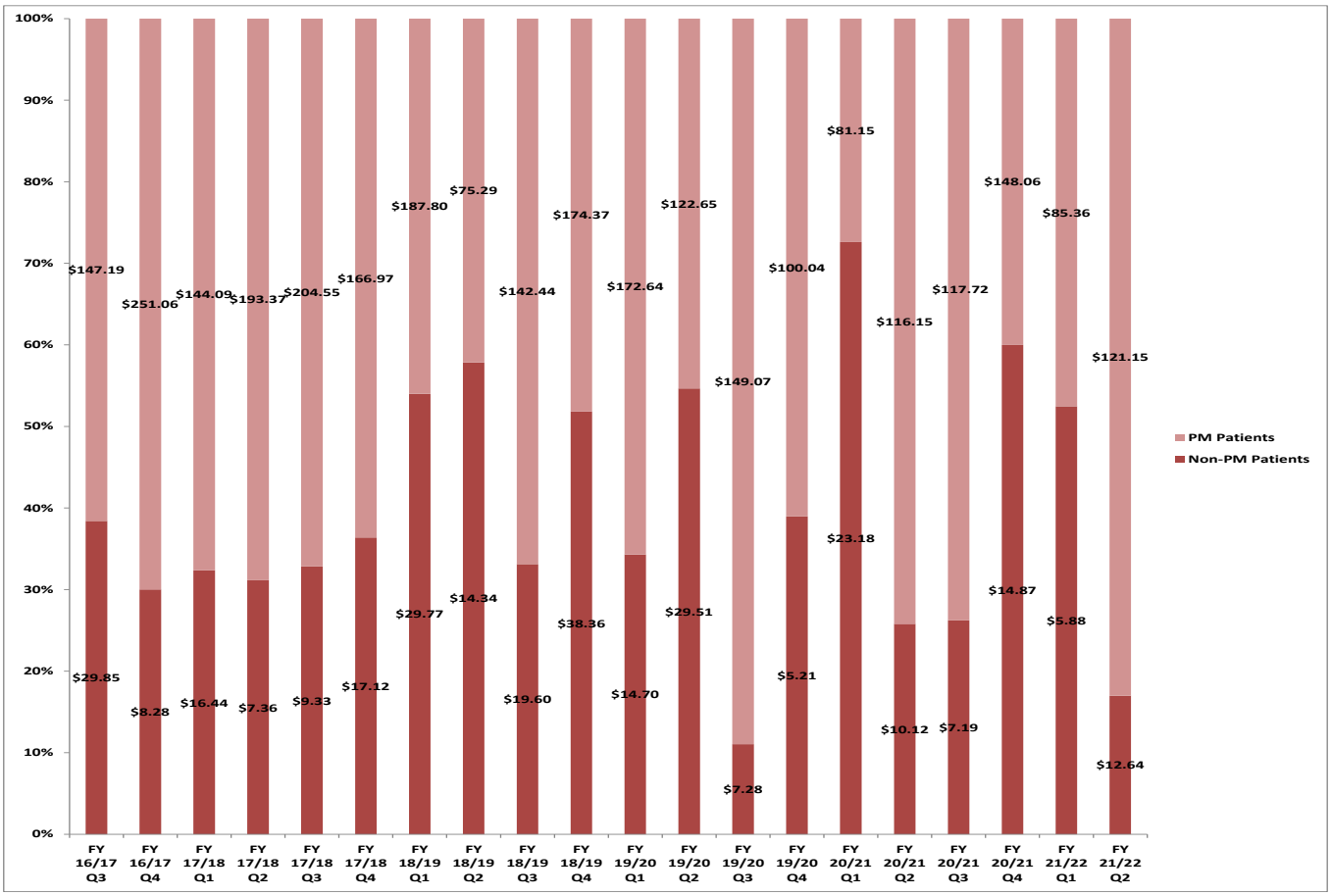
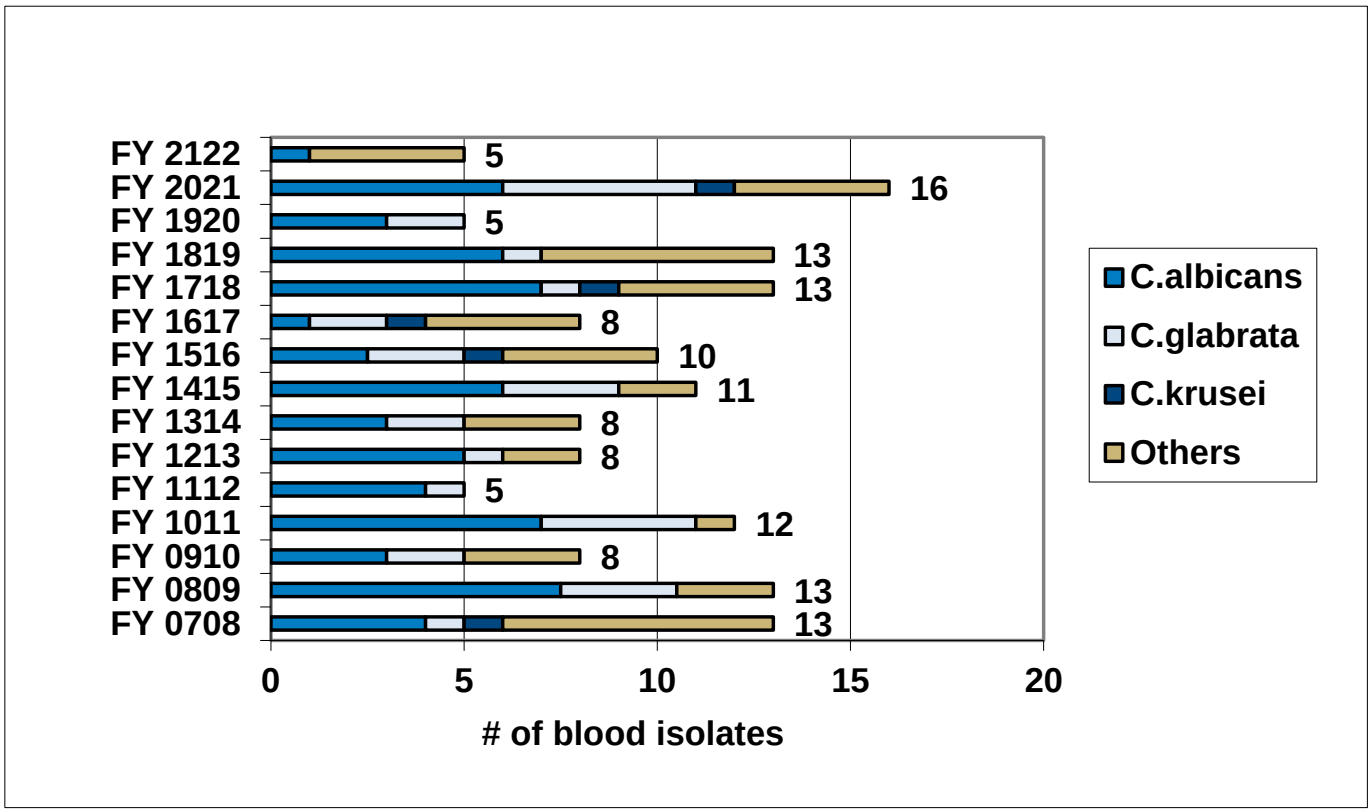
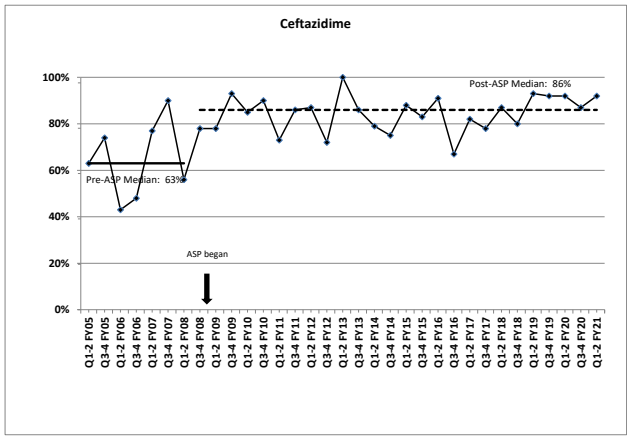


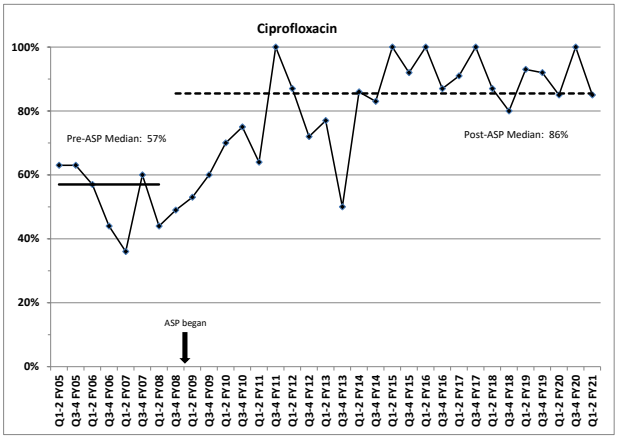
Table 4: Yeast Species Isolated in Blood – Mount Sinai Hospital: Medical Surgical ICU

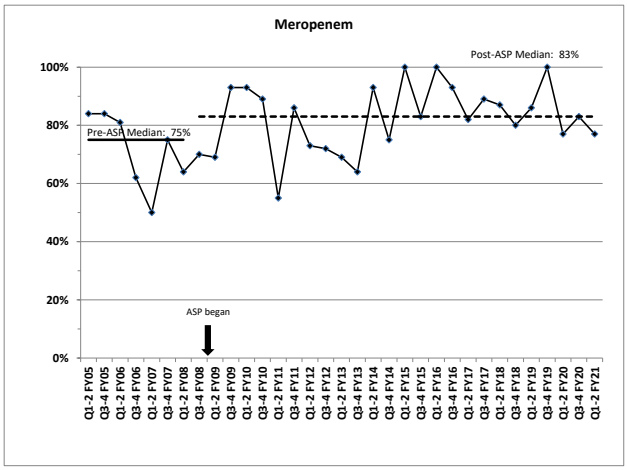


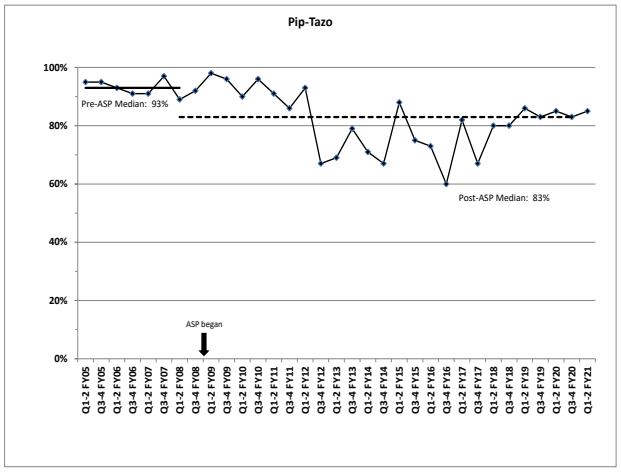
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q4 2017/18 Quarterly Report and moving forward, it will be counted as 1.

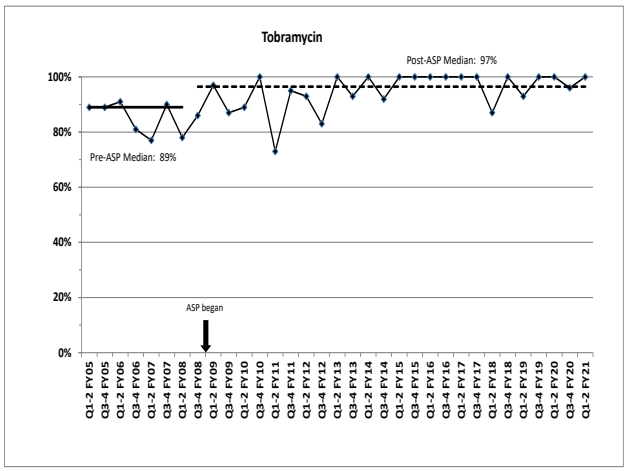
MSH ICU Pseudomonas Susceptibility











Mount Sinai Hospital: Neonatal ICU

Currently, there are no active ASP rounds in the NICU, however, we have continued to collect days of therapy (DOT), which is the standard metric for antimicrobial consumption for neonates. The FY 21/22 Q1and Q2 summary includes:

- Antimicrobial days of therapy (DOT) per 100 patient days decreased (↓) by 2.9% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 27.5% compared to YTD last year.

Mount Sinai Hospital: Neonatal ICU
Antimicrobial Consumption and Costs Per Patient Day

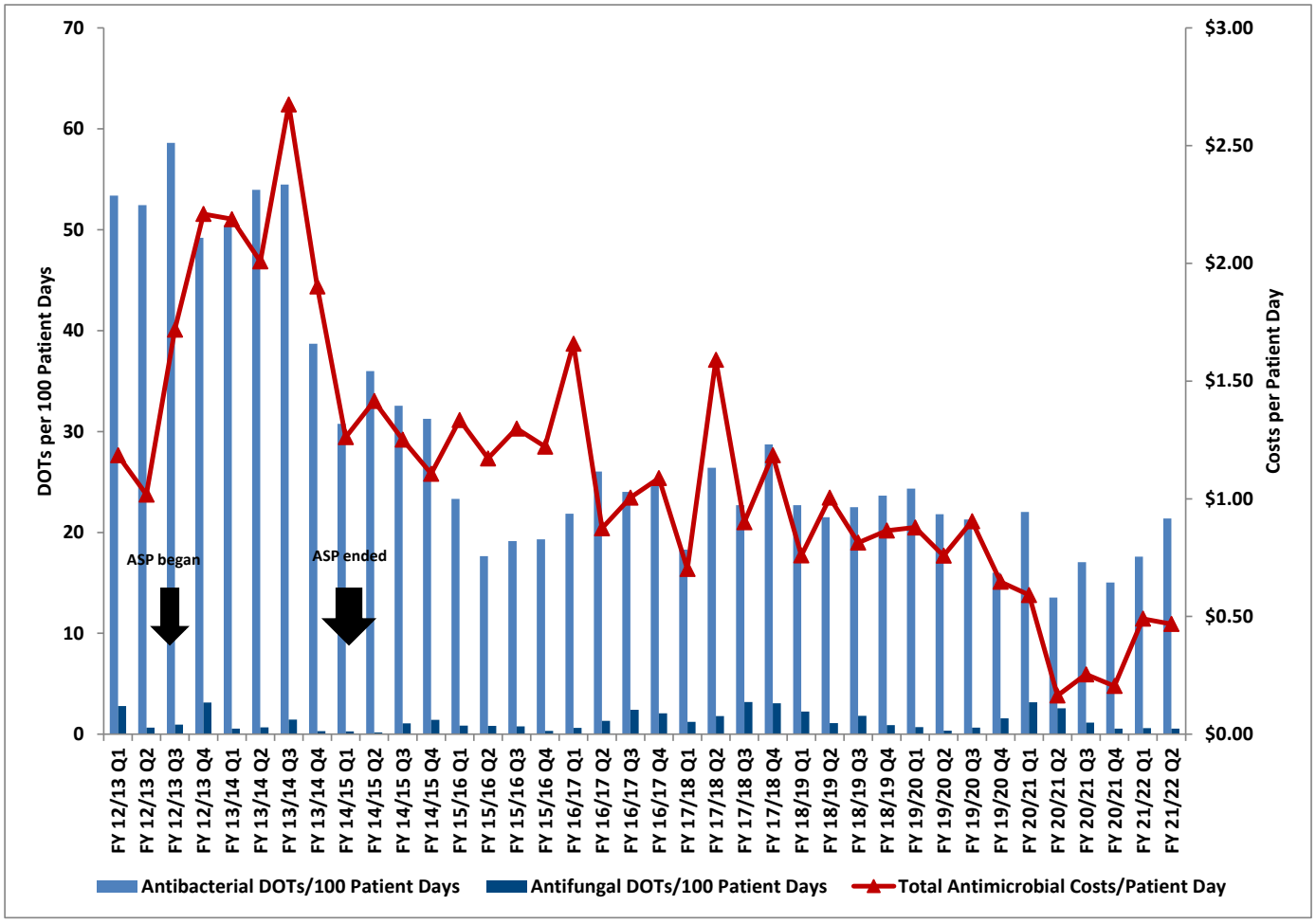


Table 5: Mount Sinai Hospital: Neonatal ICU

Indicators	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY21/22 Performance					YTD of Previous Year
											Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs																
Total Antimicrobial DOTs/100 Patient Days	**67.3**	**55.4**	**49.4**	**33.5**	**20.6**	**25.8**	**26.4**	**24.1**	**21.6**	**18.8**	**18.2**	**21.9**			**20.0**	**20.6**
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.5	48.7	32.7	19.9	24.2	24.1	22.6	20.8	16.9	17.6	21.4			19.5	17.8
Systemic Antifungal DOTs/100 Patient Days	2.2	1.8	0.7	0.8	0.7	1.6	2.3	1.5	0.8	1.8	0.6	0.6			0.6	2.9
Total Antimicrobial Costs	$16,415	$17,682	$26,162	$21,371	$21,232	$19,618	$19,272	$15,325	$13,996	$5,402	$2,221	$2,028			$4,249	$3,330
Total Antimicrobial Costs/Patient Day	**$1.31**	**$1.51**	**$2.17**	**$1.26**	**$1.26**	**$1.15**	**$1.09**	**$0.86**	**$0.80**	**$0.30**	**$0.49**	**$0.47**			**$0.48**	**$0.38**
Systemic Antibacterial Costs	$14,783	$16,505	$25,290	$20,516	$20,804	$18,247	$18,042	$14,788	$13,642	$4,913	$2,172	$2,023			$4,196	$2,882
Systemic Antibacterial Costs/Patient Day	$1.18	$1.41	$2.10	$1.21	$1.23	$1.07	$1.02	$0.83	$0.78	$0.28	$0.48	$0.47			$0.47	$0.33
Systemic Antifungal Costs	$1,632	$1,177	$872	$855	$428	$1,372	$1,230	$451	$354	$488	$49	$5			$54	$448
Systemic Antifungal Costs/Patient Day	$0.13	$0.10	$0.07	$0.05	$0.03	$0.08	$0.07	$0.03	$0.02	$0.03	$0.01	$0.00			$0.01	$0.05

Notes: Effective January 15, 2014, the NICU changed to a mixed-acuity model of care. Prior to this, ASP reported level 3 pharmacy data only. As of January 15, pharmacy data includes both level 2 and level 3 usage and cost. Patient days include both level 2 and 3 days; January level 2 days were determined by dividing the total days for the month by 2, since the change occurred midway through the month.
Days of Therapy (DOT) was used as the metric for antimicrobial consumption, which is considered to be the standard for neonates.

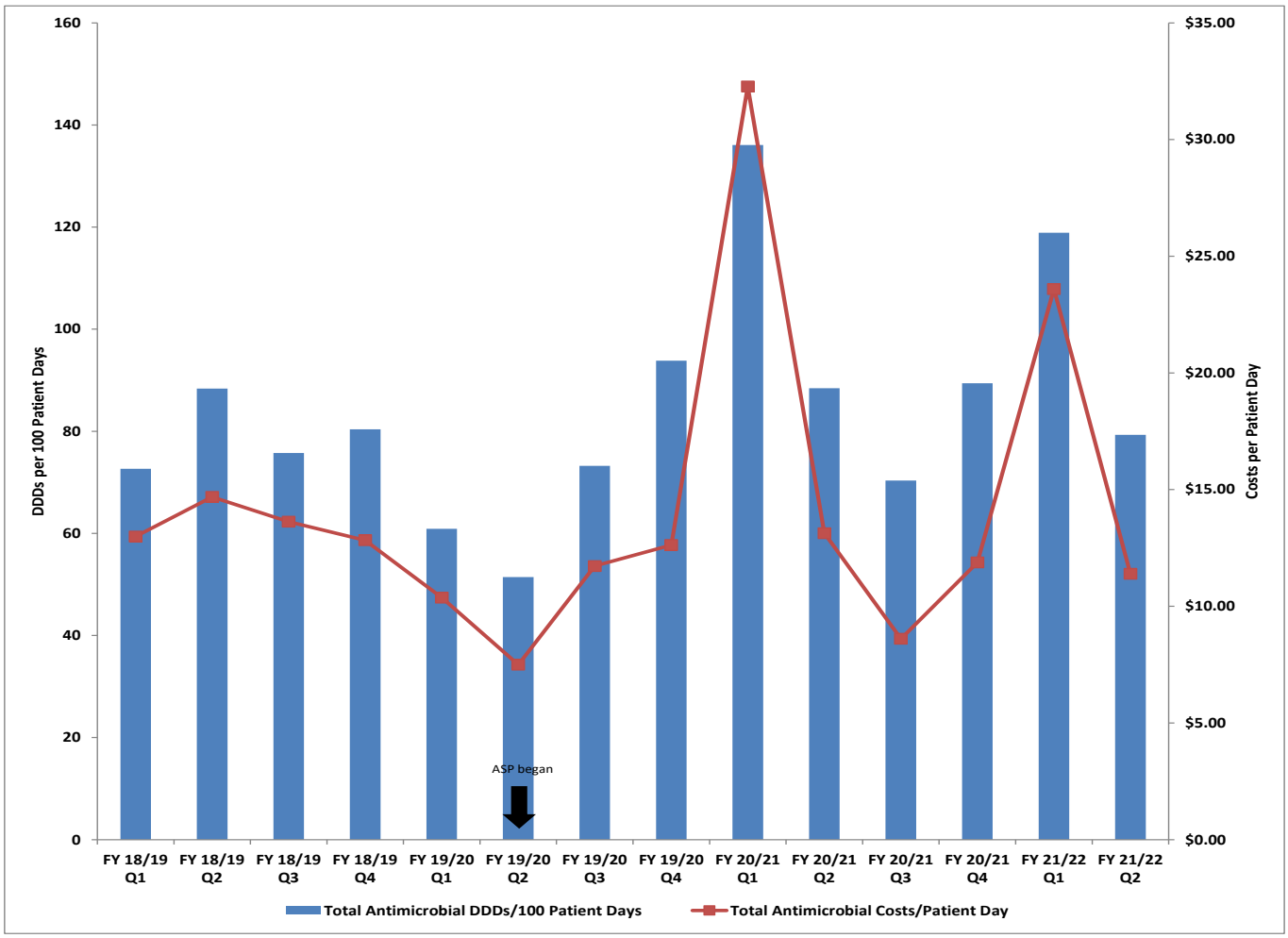
Toronto General Hospital: Cardiac ICU

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 12.3% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 23.9% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 30.4% compared to YTD last year.
  - Antifungal costs per patient day increased (↑) by 1.1% compared to YTD last year.

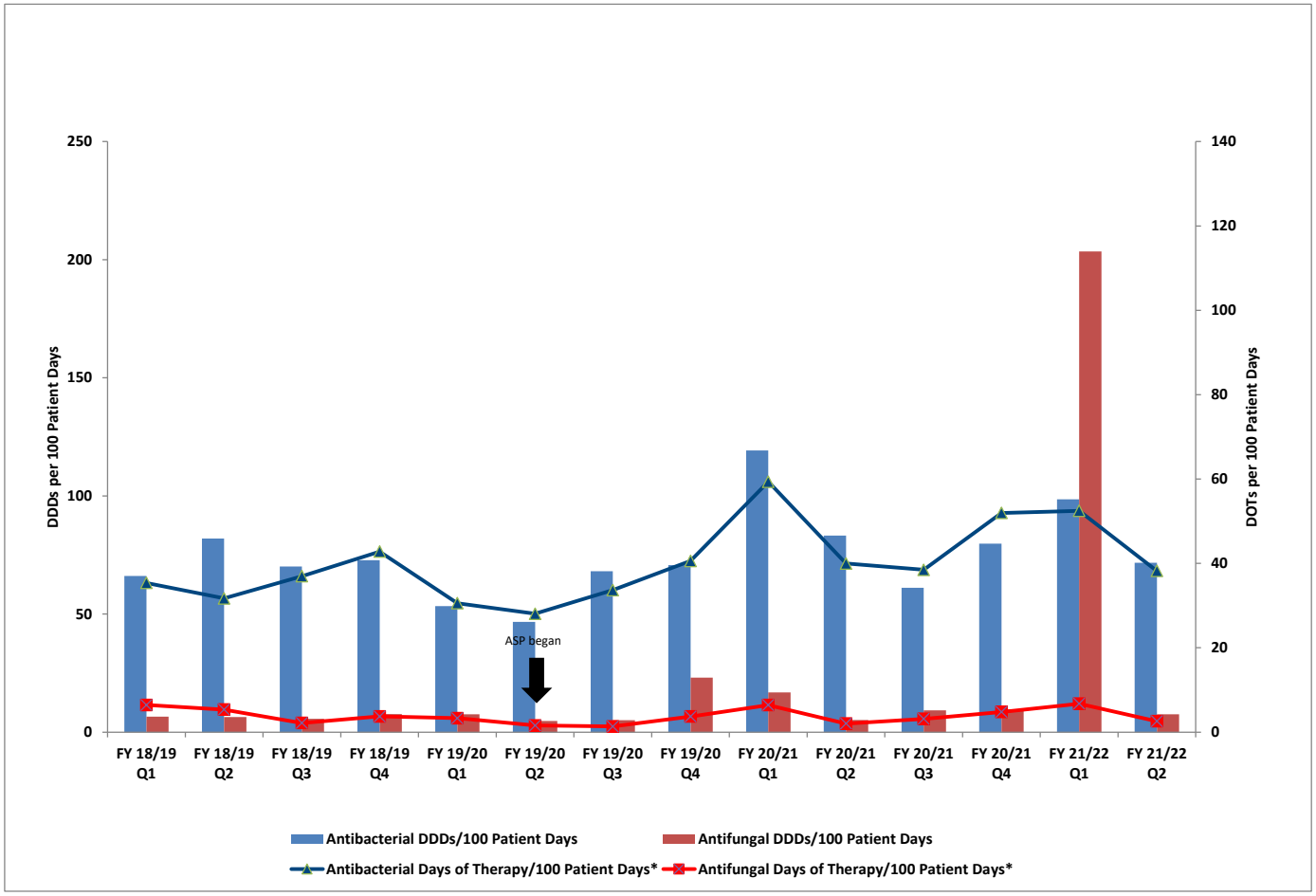
  NB: micafungin prophylaxis in heart transplant patients had stopped in October 2015 and was then reinstated in March of 2016.

Toronto General Hospital: Cardiac ICU
Antimicrobial Consumption and Costs Per Patient Day



Toronto General Hospital: Cardiac ICU
Antimicrobial Consumption as Defined Daily Dose Versus Antimicrobial Consumption as Days of Therapy

- Antibacterial Days of Therapy (DOT) per 100 patient days decreased (↓) by 9.0% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 9.4% compared to YTD last year.



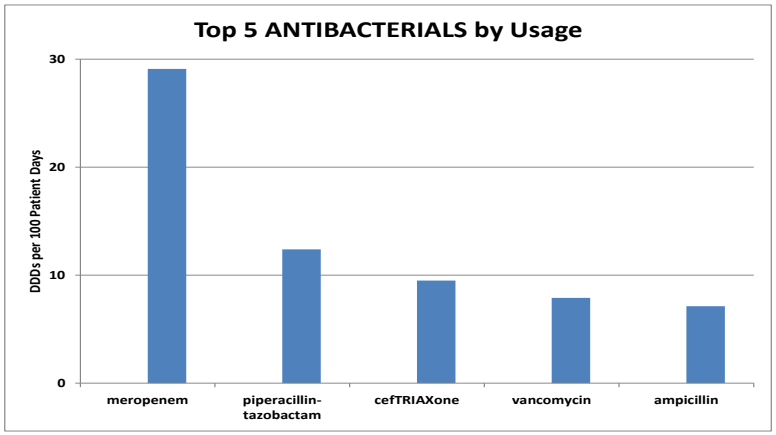
SHS + UHN ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

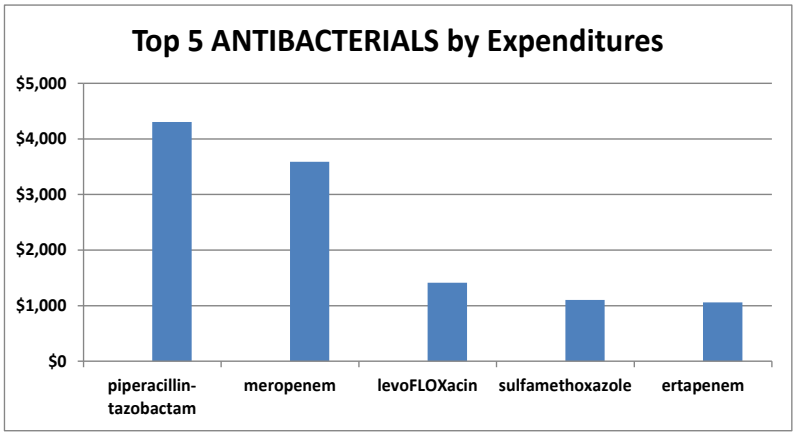
Table 6: Toronto General Hospital: Cardiac ICU

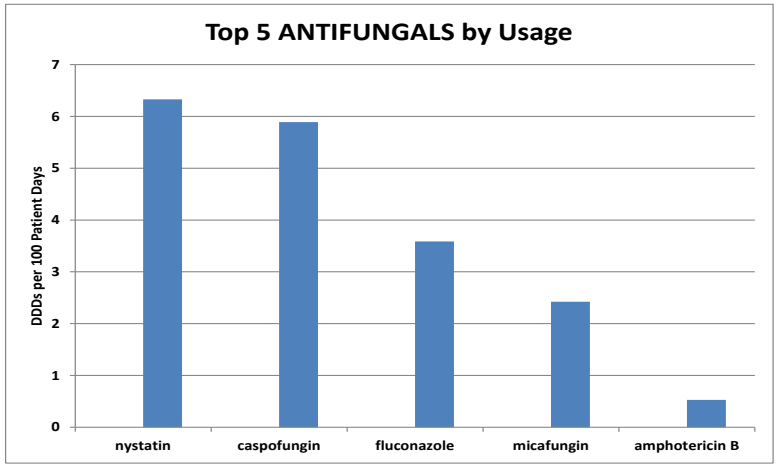
Indicators	FY 18/19 (Pre-ASP)	FY 19/20	FY 20/21	FY 21/22 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs									
Total Antimicrobial DDDs/100 Patient Days	**79**	**70**	**96**	**119**	**79**			**99**	**113**
Systemic Antibacterial DDDs/100 Patient Days	73	60	85	99	72			85	102
Systemic Antifungal DDDs/100 Patient Days	7	10	10	203	8			107	11
Total Antimicrobial Costs	$54,453	$41,378	$61,193	$24,347	$11,431			$35,778	$40,427
Total Antimicrobial Costs/Patient Day	**$13.53**	**$10.54**	**$16.26**	**$23.59**	**$11.40**			**$17.58**	**$23.11**
Systemic Antibacterial Costs	$48,188	$33,665	$51,061	$15,269	$10,789			$26,058	$32,164
Systemic Antibacterial Costs/Patient Day	$11.97	$8.57	$13.57	$14.80	$10.76			$12.81	$18.39
Systemic Antifungal Costs	$6,265	$7,713	$10,132	$9,078	$641			$9,719	$8,263
Systemic Antifungal Costs/Patient Day	$1.56	$1.96	$2.69	$8.80	$0.64			$4.78	$4.72
Antibacterial Days of Therapy/100 Patient Days*	37	33	47	52	38			45	50
Antifungal Days of Therapy/100 Patient Days*	4	2	4	7	3			5	4
Patient Care Outcomes									
Hospital-Acquired C. difficile Cases (rate per 1,000 pt days)	3 (0.75)	1 (0.25)	5 (1.33)	0 (0)	2 (1.99)			2 (0.98)	4 (2.29)
ICU Average Length of Stay (days)	2.95	2.97	3.32	3.88	3.43			3.65	3.575
ICU Mortality Rate (as a %)	6.63	6.68	6.30	8.3	6.9			7.60	6.2
ICU Readmission Rate Within 48 Hrs (as a %)	1.92	1.7	1.9	4.7	3.1			3.9	2.8
Central Line Infection Rate (per 1000 pt days)	0.7	0.80	0.50	0.0	0.00			0.00	0.0
Ventilator-Associated Pneumonia Rate (per 1,000 pt days)	0.00	0.00	0.00	0.00	0.00			0.00	0.00
ICU Multiple Organ Dysfunction Score (MODS)	2.12	2.11	2.32	2.91	2.47			2.69	2.20
ICU Ventilator Days	819	743	1052	408	223			631	481

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity).

Table 7: TG CICU FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures







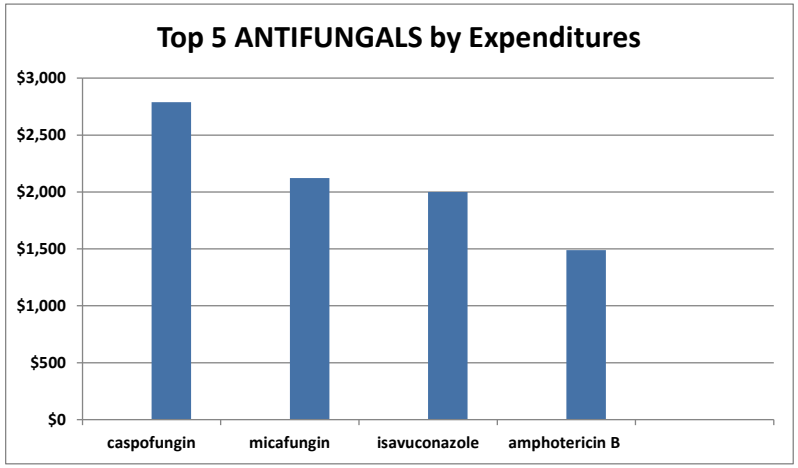
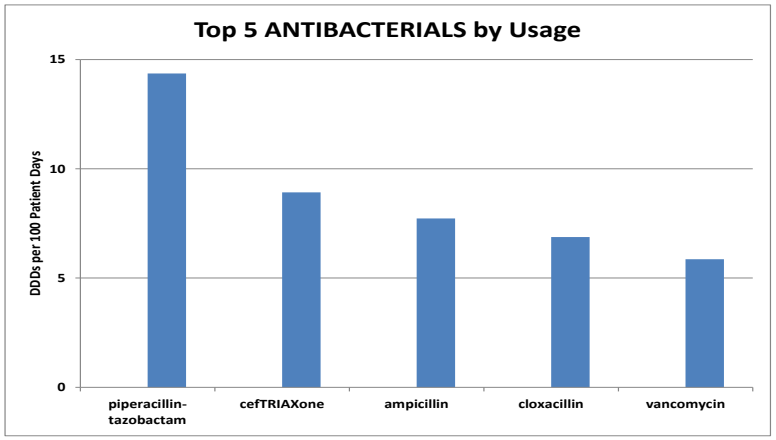
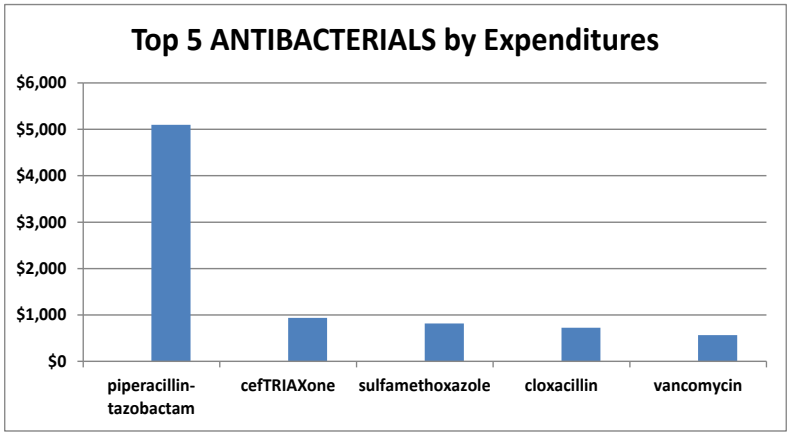
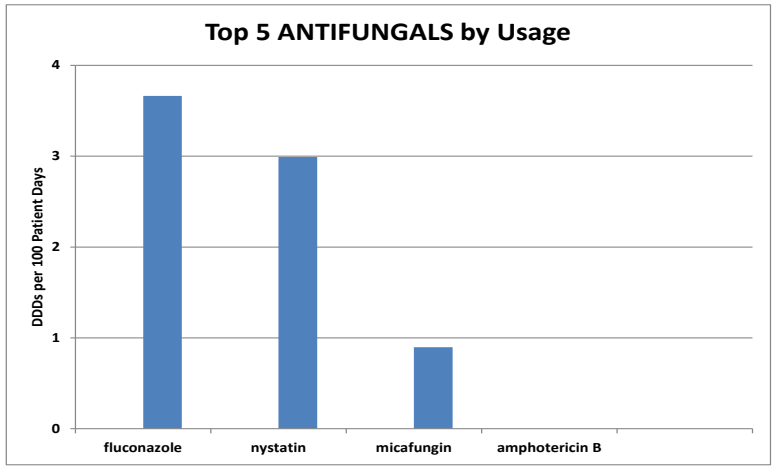


Table 8: TG CICU FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures







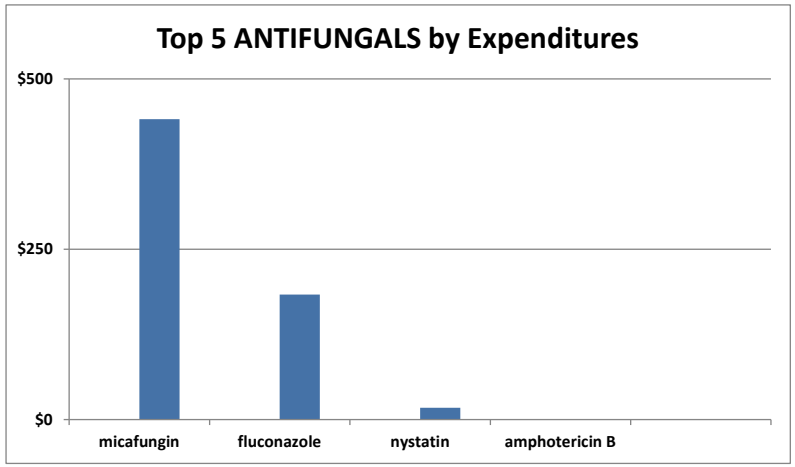
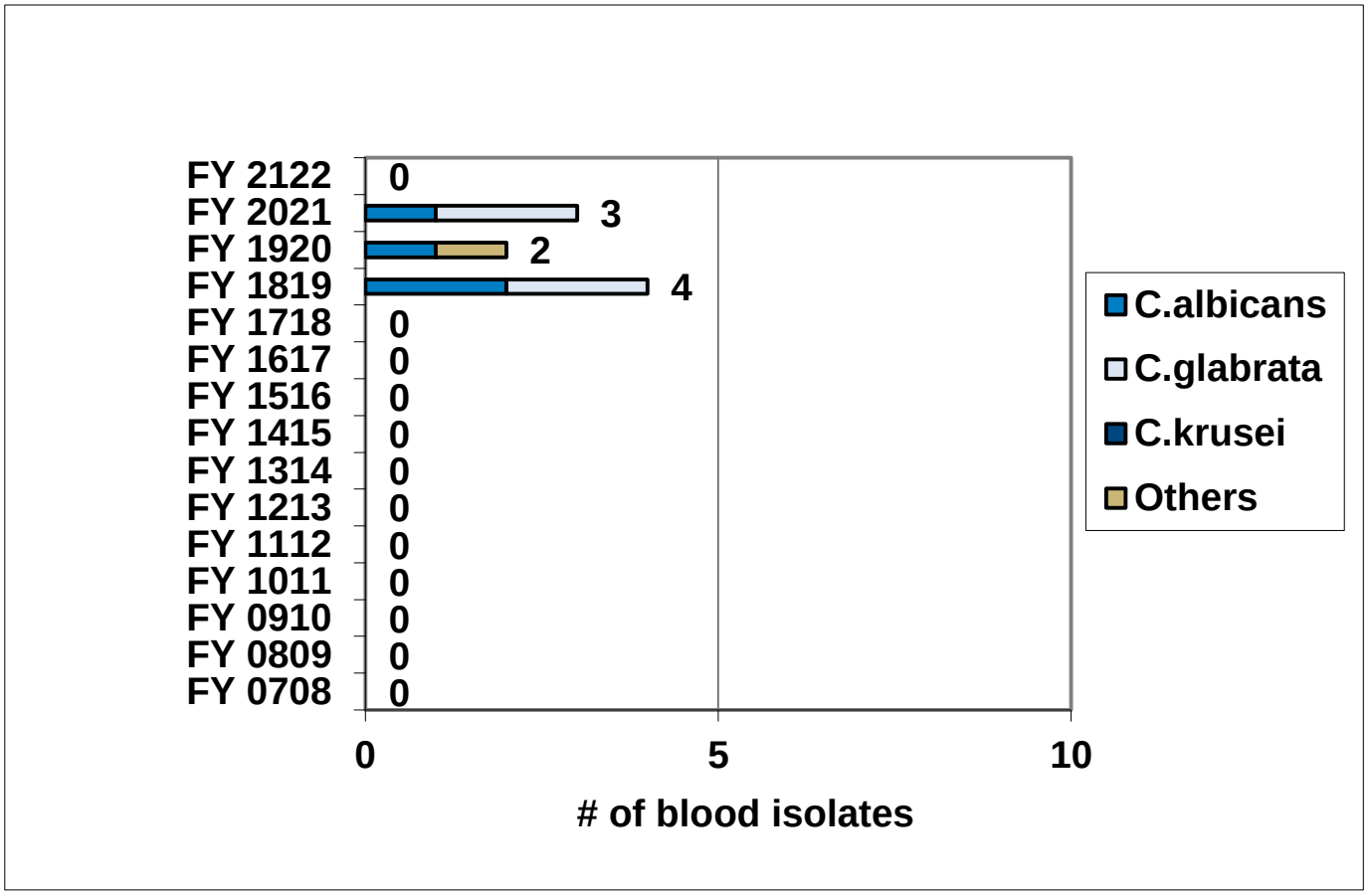
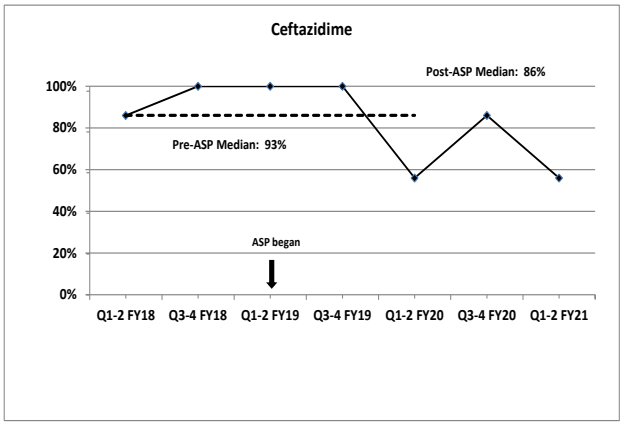


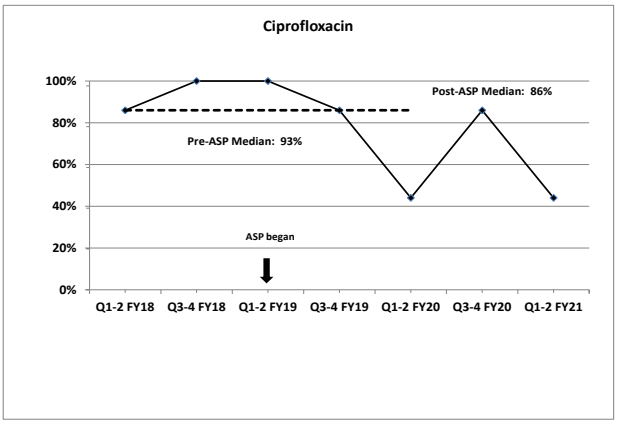
Table 9: Yeast Species Isolated in Blood – Toronto General Hospital Cardiac ICU

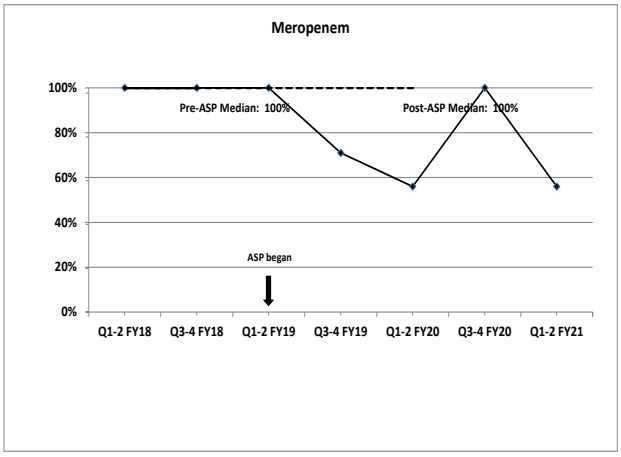


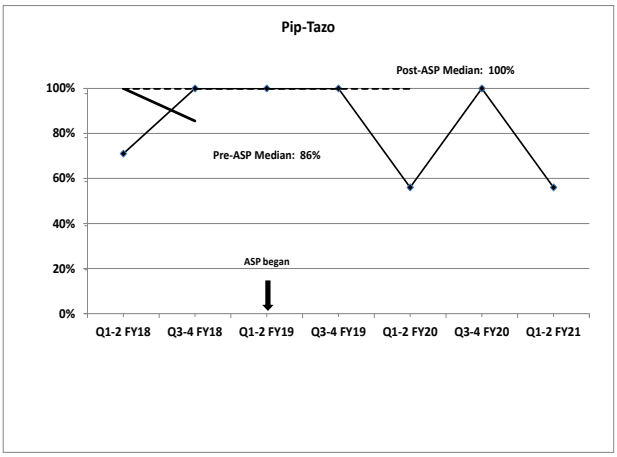
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

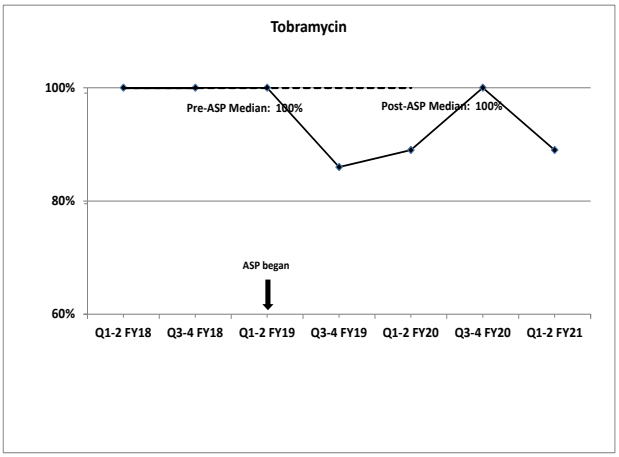
TG CICU Pseudomonas Susceptibility











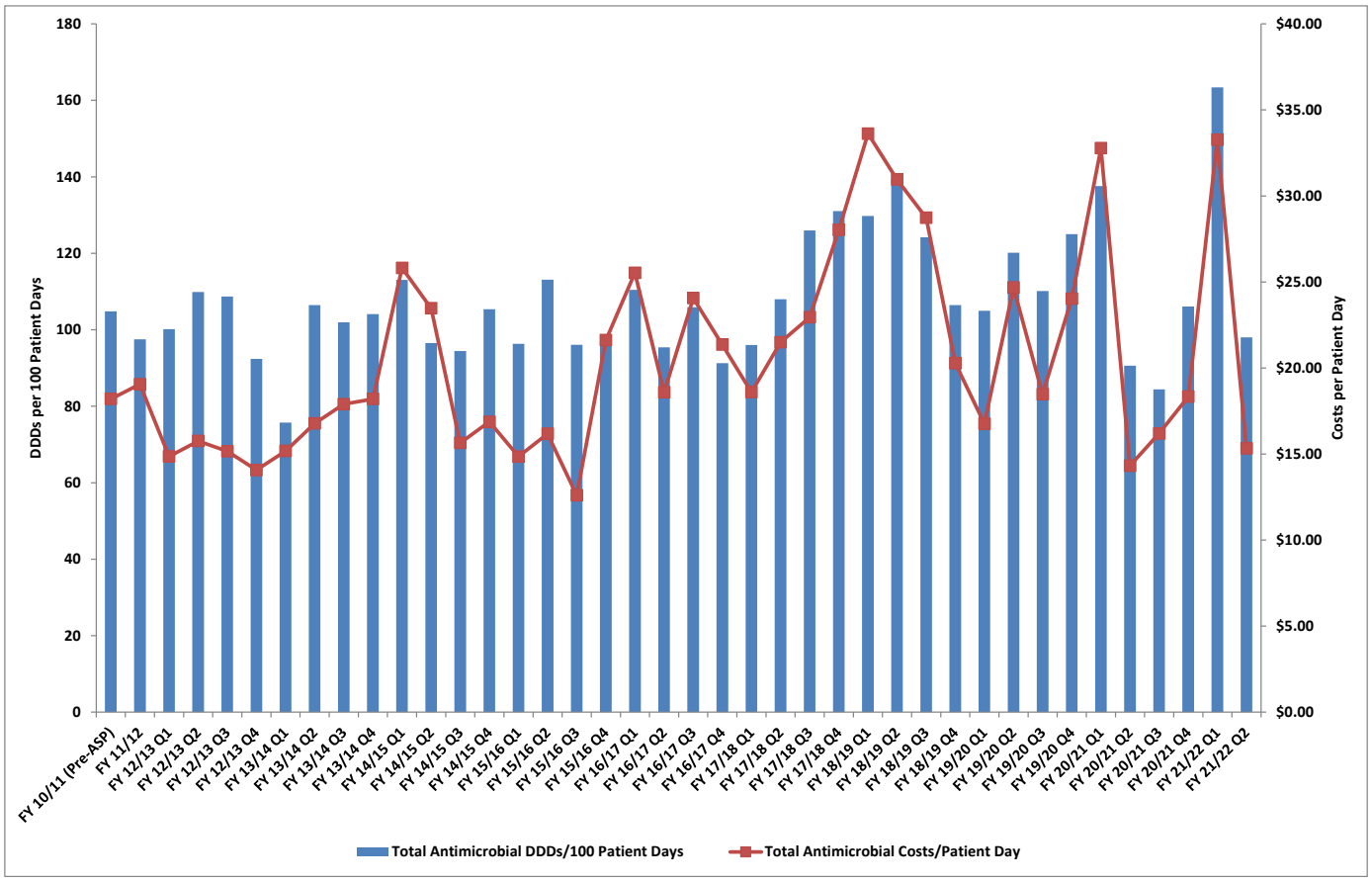
Toronto General Hospital: Cardiovascular ICU

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 11.1% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 1.4% compared to YTD last year:
  - Antibacterial costs per patient day increased (↑) by 10.8% compared to YTD last year.
  - Antifungal costs per patient day decreased (↓) by 18.6% compared to YTD last year.

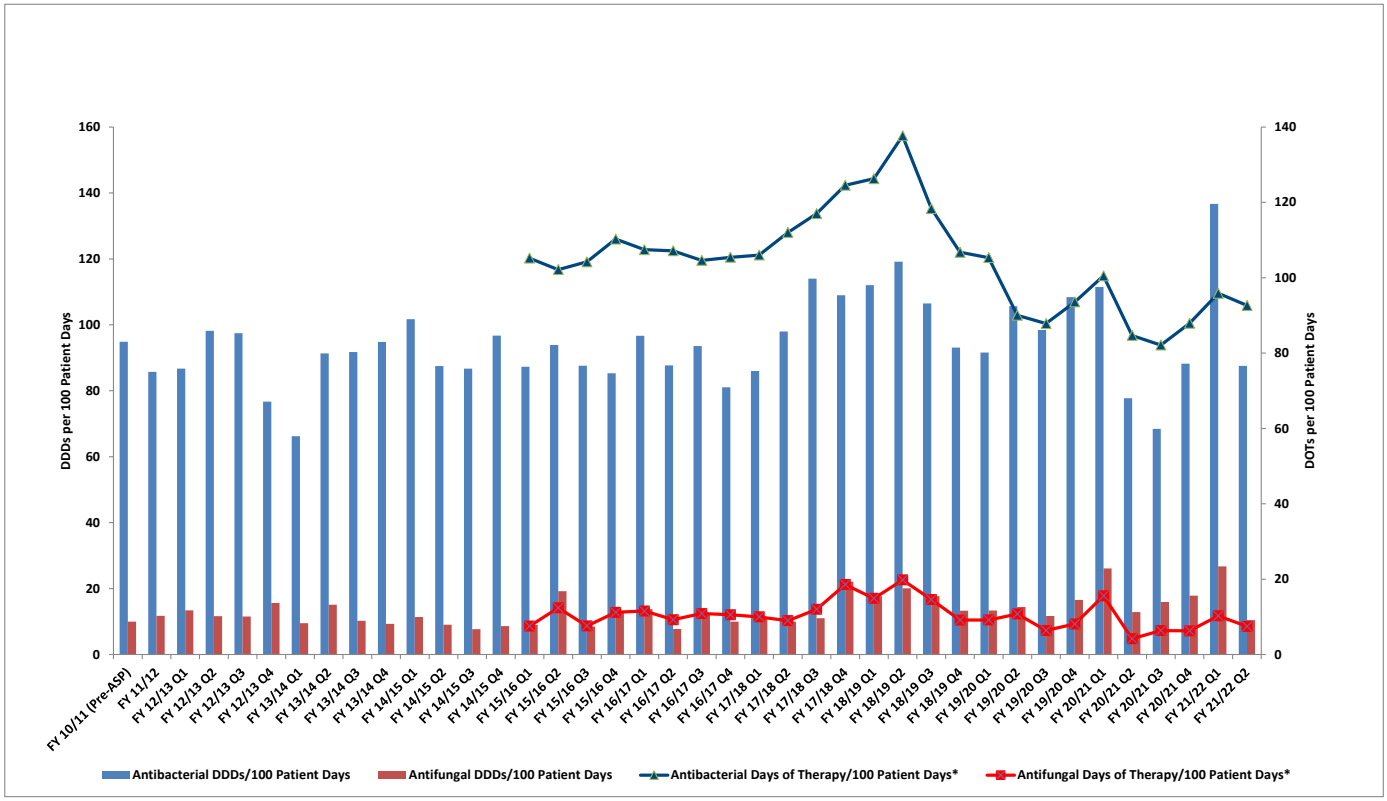
  NB: micafungin prophylaxis in heart transplant patients had stopped in October 2015 and was then reinstated in March of 2016

Toronto General Hospital: Cardiovascular ICU
Antimicrobial Consumption and Costs Per Patient Day



Toronto General Hospital: Cardiovascular ICU
Antimicrobial Consumption as Defined Daily Dose Versus Antimicrobial Consumption as Days of Therapy

- Antibacterial Days of Therapy (DOT) per 100 patient days increased (↑) by 2.1% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days decreased (↓) by 7.8% compared to YTD last year.



SHS + UHN ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

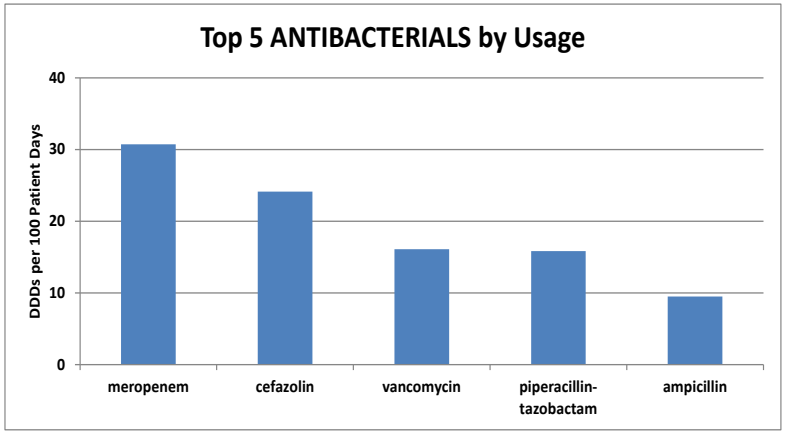
Table 10: Toronto General Hospital: Cardiovascular ICU

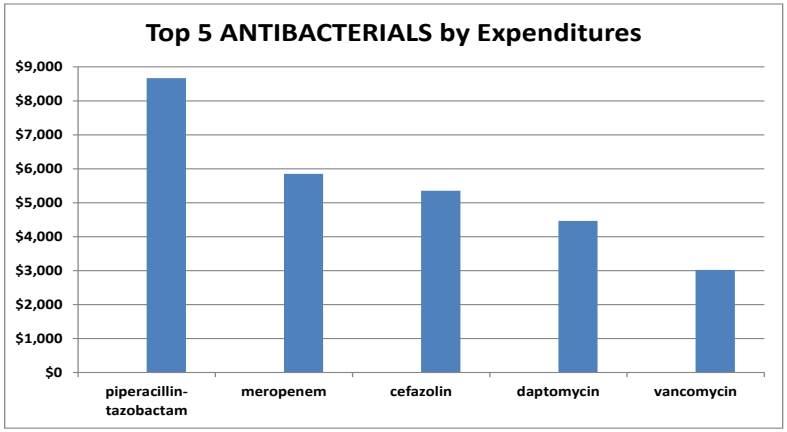
Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance					YTD of Previous Year
												Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs																	
Total Antimicrobial DDDs/100 Patient Days	**105**	**98**	**102**	**97**	**102**	**101**	**101**	**115**	**125**	**114**	**103**	**163**	**98**			**127**	**114**
Systemic Antibacterial DDDs/100 Patient Days	95	86	89	86	93	89	90	102	108	101	85	137	88			109	94
Systemic Antifungal DDDs/100 Patient Days	10	12	13	11	9	13	11	14	17	14	18	27	10			18	19
Total Antimicrobial Costs	$108,172	$108,464	$85,916	$100,736	$129,314	$110,716	$153,093	$160,790	$191,845	$123,093	$137,761	$52,923	$31,433			$84,356	$70,944
Total Antimicrobial Costs/Patient Day	**$18.20**	**$19.06**	**$14.99**	**$17.00**	**$20.46**	**$16.34**	**$22.44**	**$22.80**	**$28.30**	**$20.70**	**$19.99**	**$33.26**	**$15.33**			**$23.17**	**$23.49**
Systemic Antibacterial Costs	$100,375	$99,261	$74,232	$80,204	$91,366	$85,343	$96,782	$112,228	$131,651	$88,887	$91,191	$33,036	$22,561			$55,598	$41,627
Systemic Antibacterial Costs/Patient Day	$16.89	$17.44	$12.95	$13.54	$14.45	$12.60	$14.19	$15.92	$19.42	$14.95	$13.23	$20.76	$11.01			$15.27	$13.78
Systemic Antifungal Costs	$7,797	$9,204	$11,684	$20,532	$37,948	$25,373	$56,311	$48,562	$60,194	$34,207	$46,570	$19,886	$8,872			$28,758	$29,316
Systemic Antifungal Costs/Patient Day	$1.31	$1.62	$2.04	$3.47	$6.00	$3.75	$8.26	$6.89	$8.88	$5.75	$6.76	$12.50	$4.33			$7.90	$9.71
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	129	105	106	115	122	87	88	96	93			94	92
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	28	10	11	13	15	8	8	10	7			9	10
Patient Care Outcomes																	
Hospital-Acquired C. difficile Cases (rate per 1,000 pt days)	2 (0.34)	5 (0.88)	6 (1.05)	7 (1.18)	7 (1.11)	7 (1.03)	6 (0.88)	19 (2.69)	4 (0.59)	1 (0.17)	8 (1.16)	4 (2.51)	3 (1.46)			7 (1.92)	2 (0.66)
ICU Average Length of Stay (days)	3.12	2.95	2.97	3.20	3.46	3.45	3.48	3.22	3.55	3.13	3.56	4.06	3.5			3.78	3.5
ICU Mortality Rate (as a %)	3.5	3.0	3.0	4.6	4.6	4.0	3.7	4.3	2.80	3.50	4.60	9.8	4.0			6.90	5.5
ICU Readmission Rate Within 48 Hrs (as a %)	1.6	2.2	1.8	2.2	2.4	1.6	2.0	2.0	1.6	2.0	2.2	1.4	1.7			1.5	2.3
Central Line Infection Rate (per 1000 pt days)	0.73	0.17	0.34	0.16	0.15	0.53	0.84	2.41	0.70	0.60	0.84	1.5	0.59			1.10	0.0
Ventilator-Associated Pneumonia Rate (per 1,000 pt days)	2.99	2.80	1.91	1.73	2.81	0.94	4.06	4.11	3.10	2.16	4.06	0	0.00			0.00	0
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.51	5.77	5.60	5.83	6.04	5.44	3.99	3.91	3.99	4.19	3.78			3.99	3.74
ICU Ventilator Days	3015	3571	3676	4049	3925	4239	4917	4555	3906	3405	3724	1361	1068			2429	1514

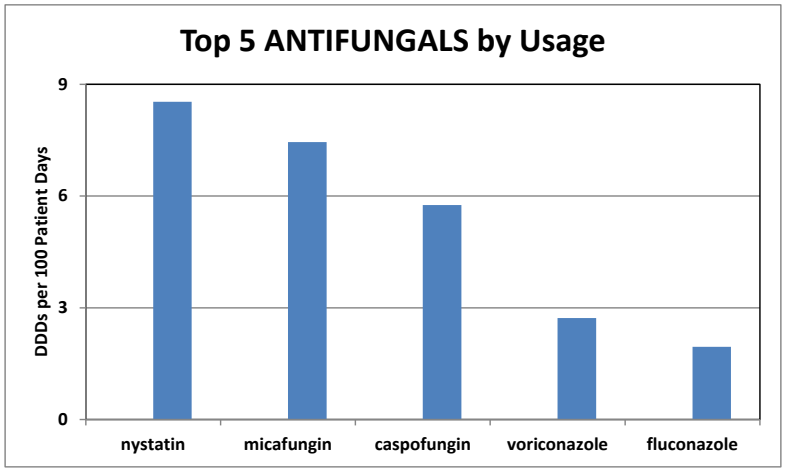
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

There was a calculation error for the ICU Readmission Rate for FY 16/17 Q3. That figure has now been corrected.

Table 11: TG CVICU FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures







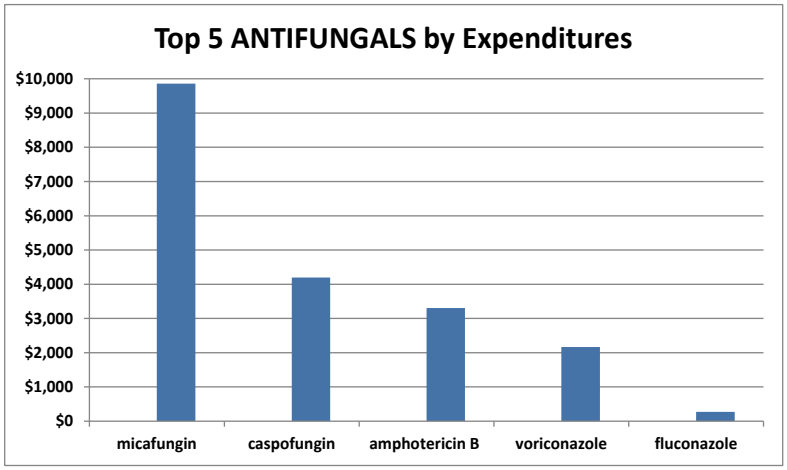
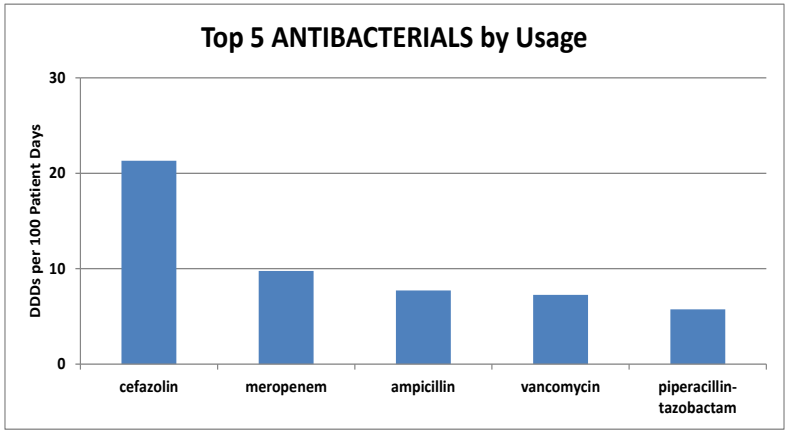
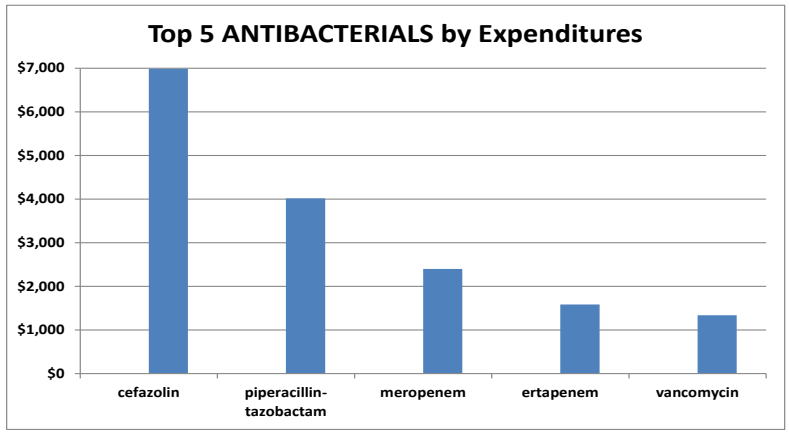
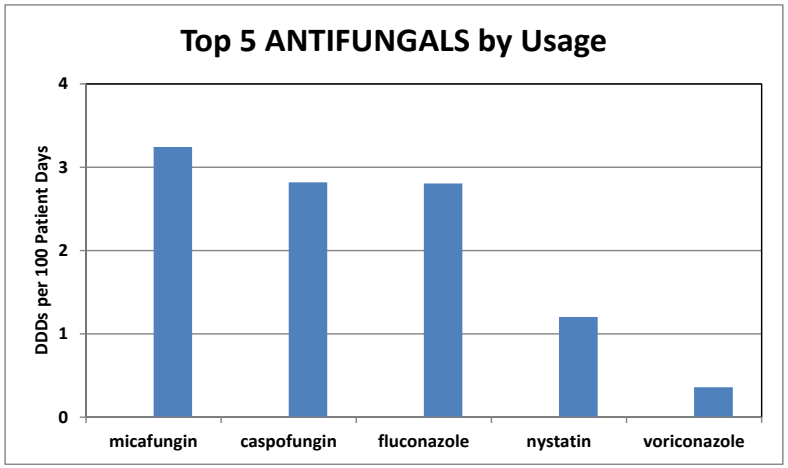


Table 12: TG CVICU FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures







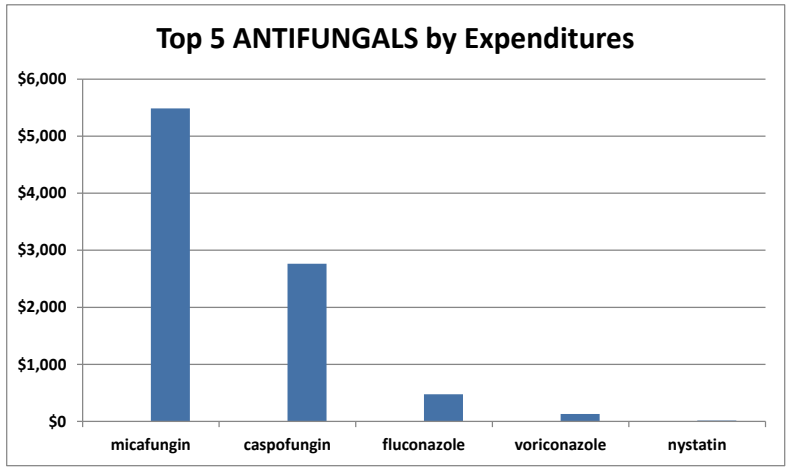


Table 13: Daptomycin Use – Toronto General Hospital Cardiovascular ICU

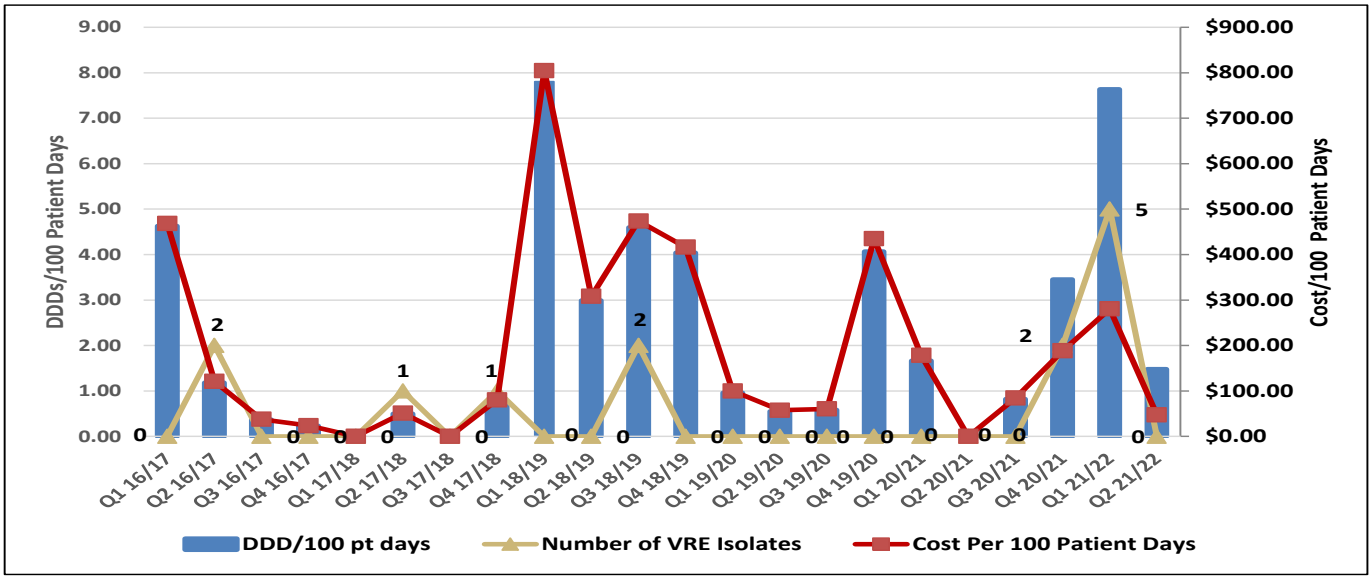
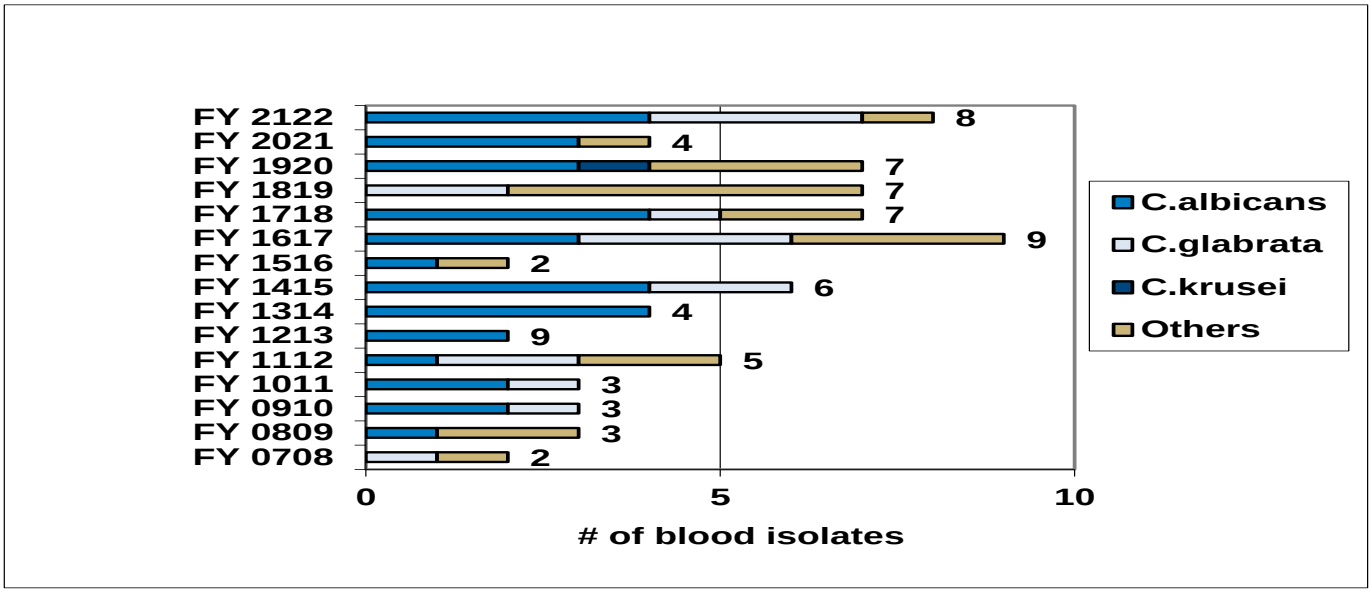


Table 14: Yeast Species Isolated in Blood – Toronto General Hospital Cardiovascular ICU



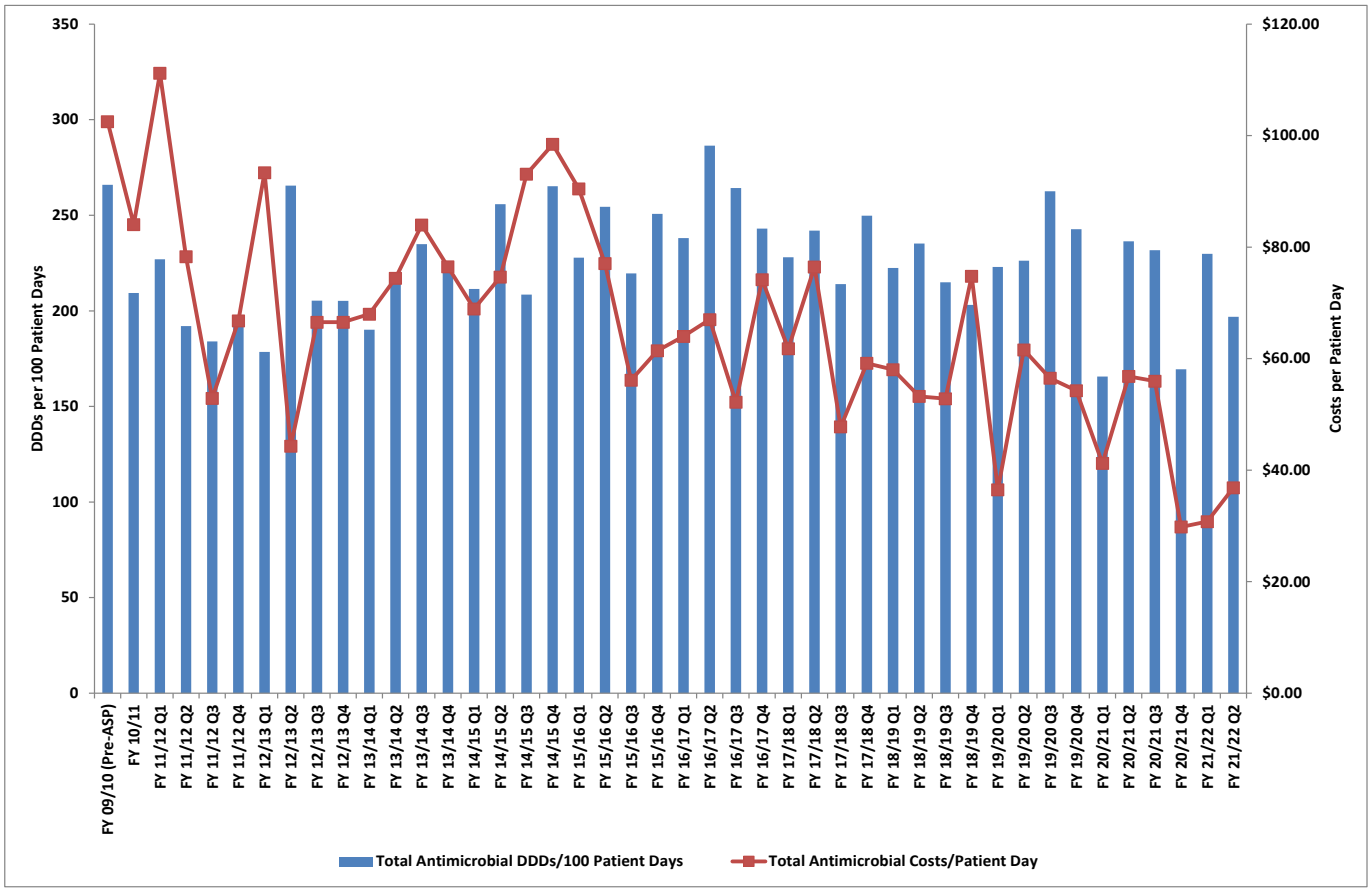
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

Toronto General Hospital: Medical Surgical ICU

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 6.5% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 31.5% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 37.6% compared to YTD last year.
  - Antifungal costs per patient day decreased (↓) by 19.5% compared to YTD last year.

Toronto General Hospital: Medical Surgical ICU
Antimicrobial Consumption and Costs Per Patient Day

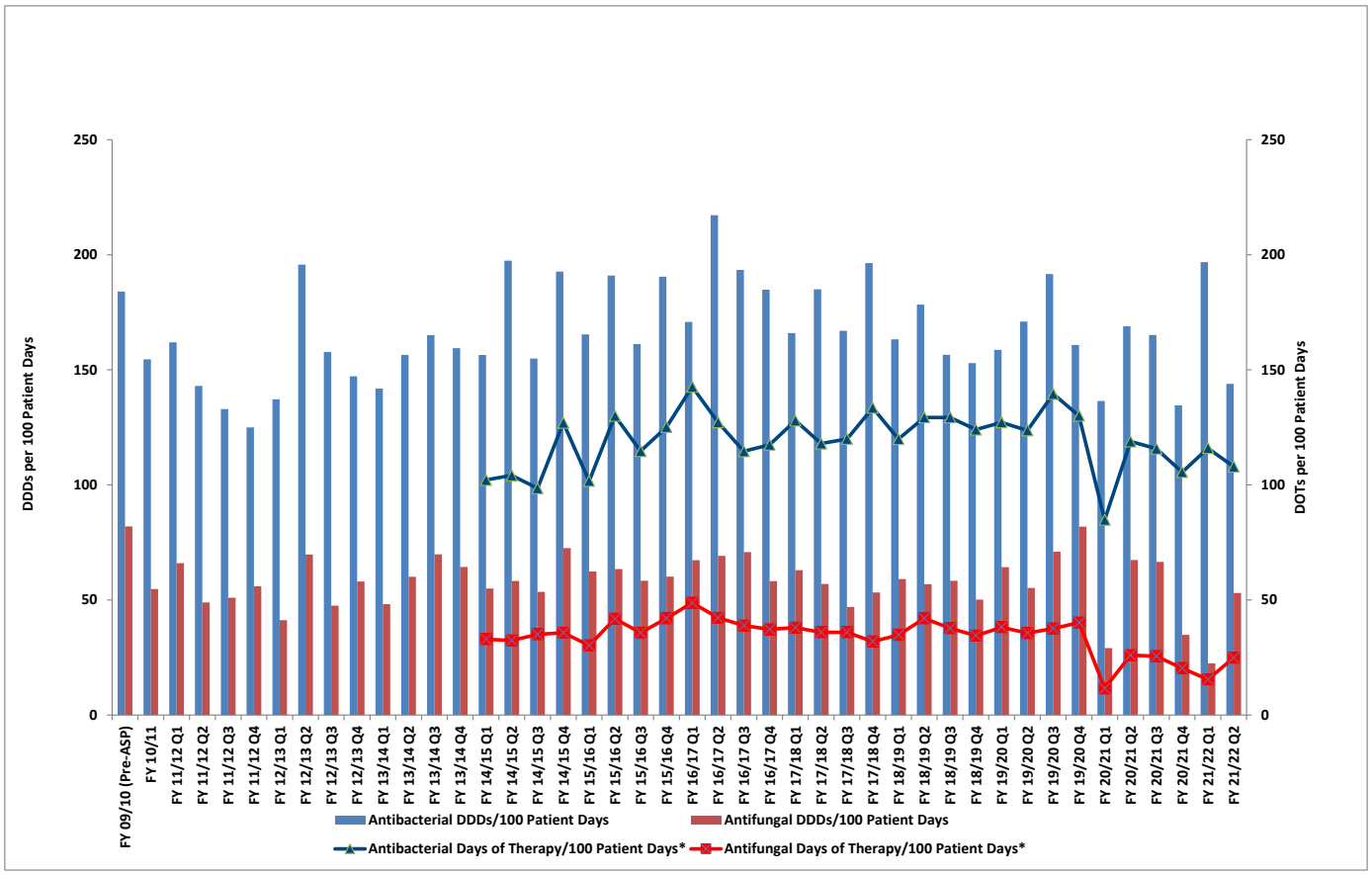


To view **Appendix 1: FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click **here**.

To view **Appendix 2: FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click **here**.

Toronto General Hospital: Medical Surgical ICU Antimicrobial Consumption as Defined Daily Dose Versus Antimicrobial Consumption as Days of Therapy

- Antibacterial Days of Therapy (DOT) per 100 patient days increased (↑) by 9.7% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 5.5% compared to YTD last year.



SHS + UHN ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

Table 15: Toronto General Hospital: Medical Surgical ICU

Indicators	FY 09/10 (Pre-ASP)	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance					YTD of Previous Year
													Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs																		
Total Antimicrobial DDDs/100 Patient Days	**266**	**209**	**199**	**213**	**217**	**235**	**239**	**258**	**234**	**219**	**239**	**199**	**230**	**197**			**214**	**201**
Systemic Antibacterial DDDs/100 Patient Days	184	155	143	159	156	175	178	191	179	163	171	150	197	144			172	153
Systemic Antifungal DDDs/100 Patient Days	82	55	55	54	61	60	84	66	55	56	68	49	23	53			37	48
Total Antimicrobial Costs	$701,451	$629,472	$567,532	$473,613	$584,018	$686,577	$587,950	$557,091	$521,004	$586,604	$523,646	$457,230	$106,549	$112,719			$219,269	$233,590
Total Antimicrobial Costs/Patient Day	**$102.52**	**$84.06**	**$76.93**	**$63.75**	**$75.71**	**$83.65**	**$71.06**	**$64.53**	**$61.18**	**$59.83**	**$52.21**	**$45.05**	**$30.77**	**$36.85**			**$33.62**	**$49.09**
Systemic Antibacterial Costs	$390,209	$375,436	$292,355	$231,171	$225,557	$293,126	$254,392	$267,107	$259,216	$278,131	$270,654	$278,146	$79,760	$52,851			$132,611	$155,085
Systemic Antibacterial Costs/Patient Day	$57.03	$50.14	$39.63	$31.12	$29.24	$35.71	$30.75	$30.94	$30.44	$28.37	$26.98	$27.40	$23.03	$17.28			$20.33	$32.59
Systemic Antifungal Costs	$311,242	$254,036	$275,176	$242,443	$358,461	$393,451	$333,559	$289,984	$261,788	$308,473	$252,992	$179,084	$26,789	$59,868			$86,657	$78,505
Systemic Antifungal Costs/Patient Day	$45.49	$33.93	$37.30	$32.63	$46.47	$47.94	$40.31	$33.59	$30.74	$31.46	$25.22	$17.64	$7.74	$19.57			$13.29	$16.50
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	107.9	118.3	126	125	126	127	107	116	108			112	102
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	34.1	37.7	42	35	37	37	21	16	25			20	19
Patient Care Outcomes																		
Hospital-Acquired C. difficile Cases (rate per 1,000 pt days)	10 (1.46)	10 (1.33)	11 (1.49)	11 (1.48)	12 (1.56)	10 (1.22)	10 (1.21)	15 (1.74)	9 (1.06)	14 (1.43)	8 (0.8)	13 (1.28)	1 (0.29)	3 (0.98)			4 (0.61)	9 (1.89)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.79	8.22	8.08	7.62	7.94	7.10	8.01	8.41	8.26	16.88	11.91			14.40	8.18
ICU Mortality Rate (as a %)	16.2	15.7	16.3	16.0	17.8	17.2	17.2	16.8	15.7	16.30	15.34	19.80	23.5	16.3			19.90	18.3
ICU Readmission Rate Within 48 Hrs (as a %)	3.8	4.4	4.4	2.8	3.5	3.0	3.4	3.2	2.3	3.40	3.02	3.40	1.5	3.4			2.40	5.0
ICU Ventilator Days	5399	6256	6507	6458	24620	7330	7048	7657	7670	8305	8203	8036	3376	2763			6139	3511
Apache II Score	n/a	n/a	16.1	15.8	15.9	15.1	15.4	16.7	16.9	16.60	15.43	16.70						
ICU Multiple Organ Dysfunction Score (MODS)										5.83	5.83	5.96	6.34	5.67			6.01	6.10

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

There was a calculation error for the ICU Readmission Rate for FY 16/17 Q3. That figure has now been corrected.

Table 16: Daptomycin Use – Toronto General Hospital: Medical Surgical ICU

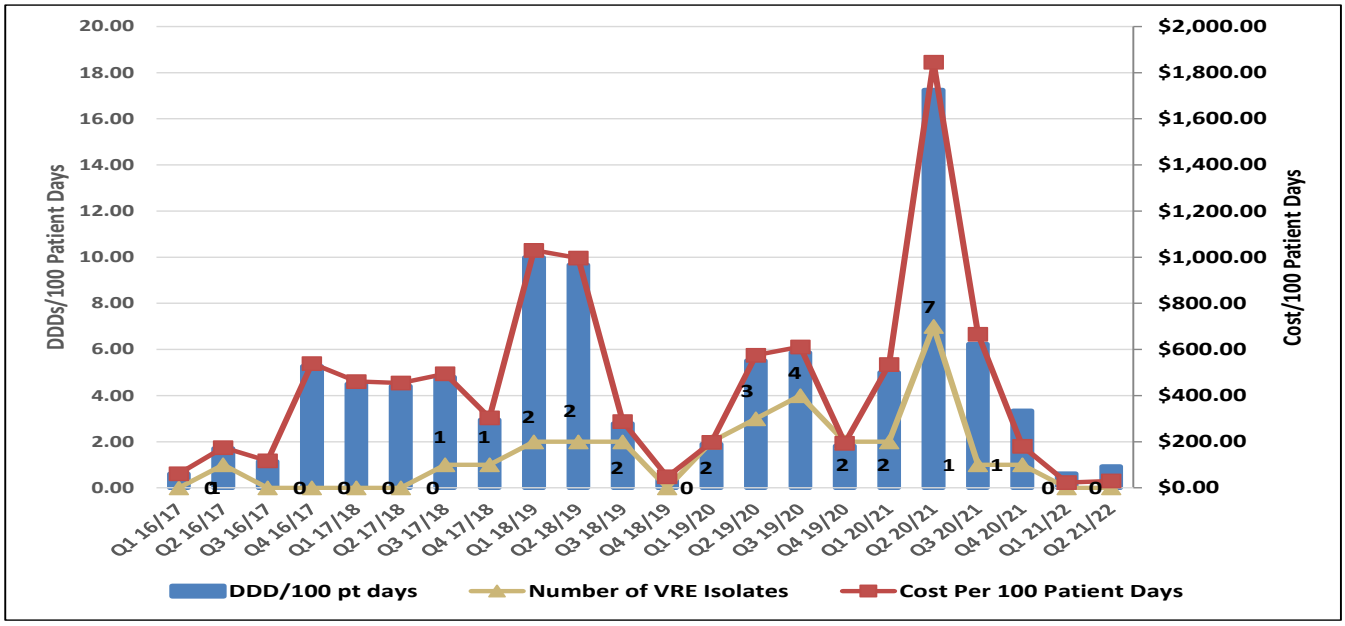
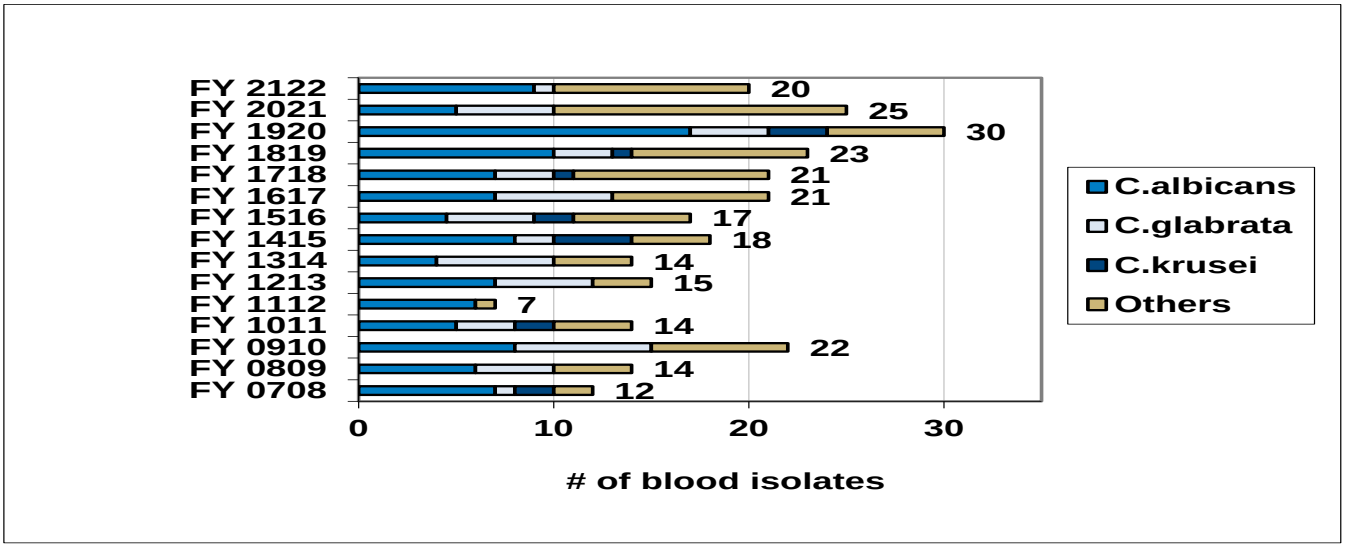
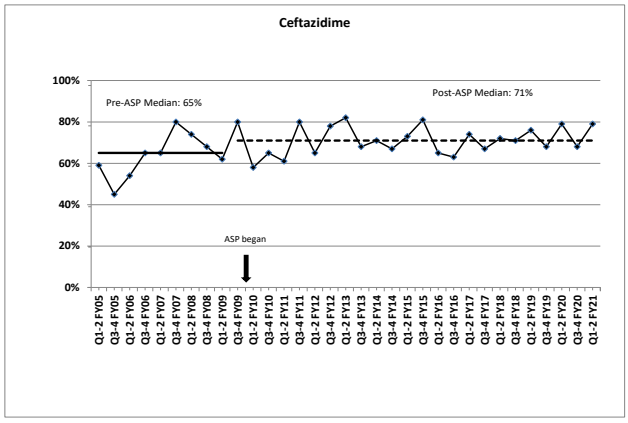


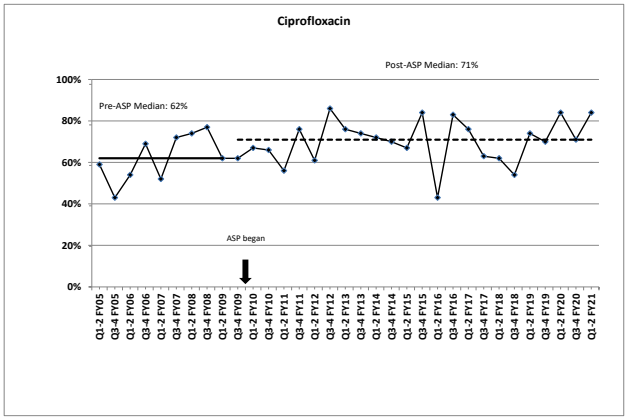
Table 17: Yeast Species Isolated in Blood – Toronto General Hospital: Medical Surgical ICU

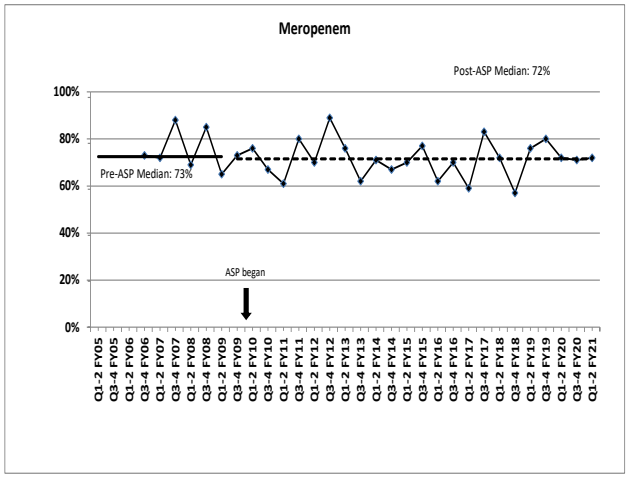


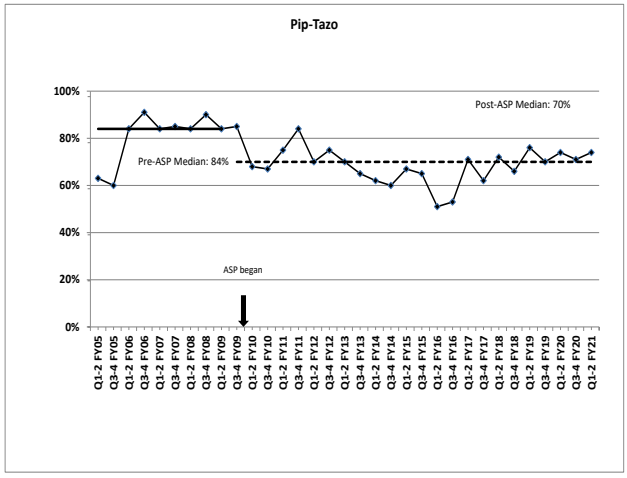
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q4 2017/18 Quarterly Report and moving forward, it will be counted as 1.

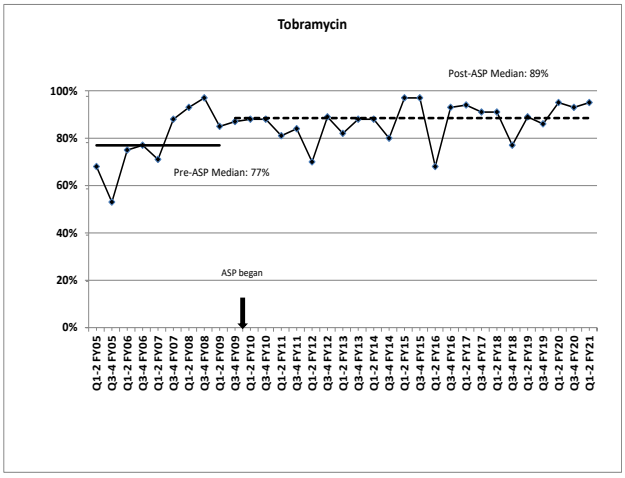
TG MSICU Pseudomonas Susceptibility











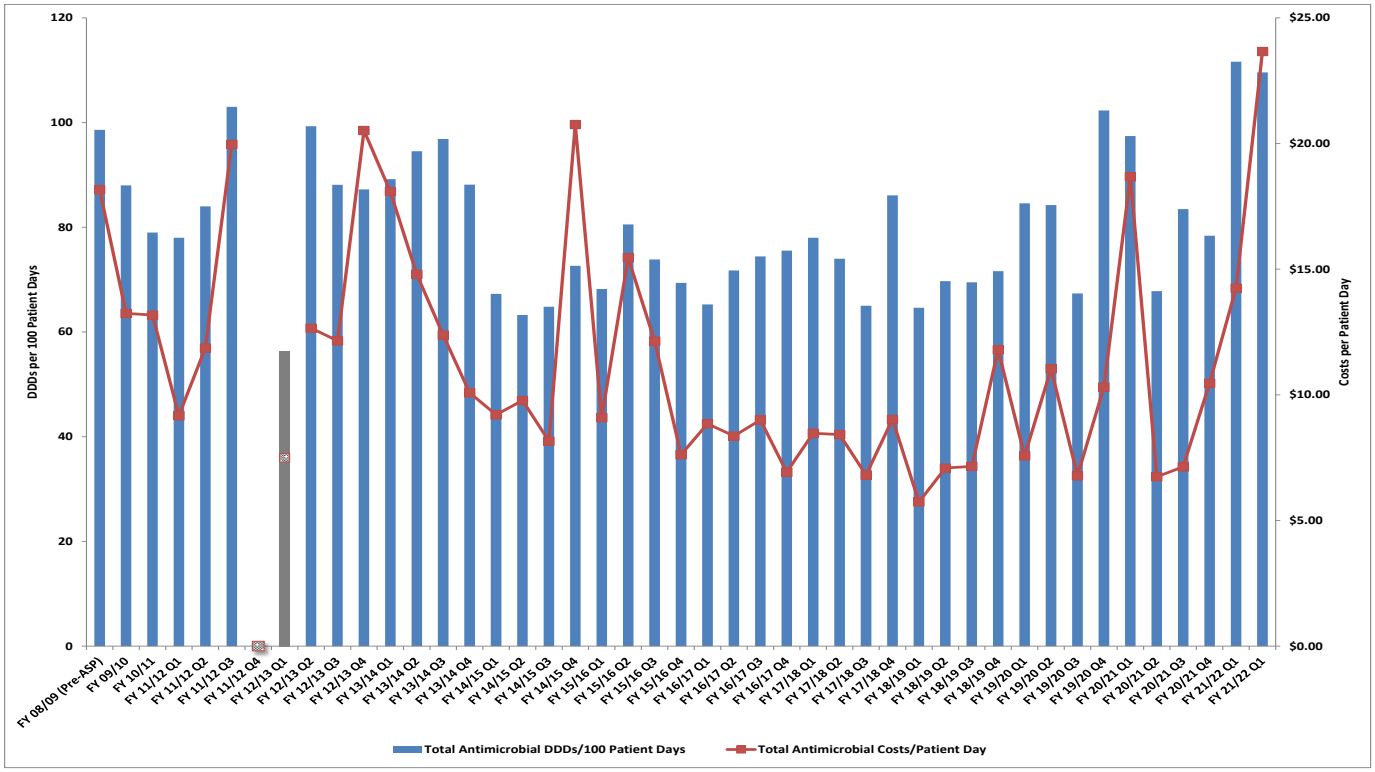
Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 34.2% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 49.3% compared to YTD last year:
  - Antibacterial costs per patient day increased (↑) by 9.7% compared to YTD last year.
  - Antifungal costs per patient day increased (↑) by 126.5% compared to YTD last year.

  NB: TW cost data is nearly entirely driven by increases in ICU fungemia cases in Q1 of FY 20/21.

Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU Antimicrobial Consumption and Costs Per Patient Day



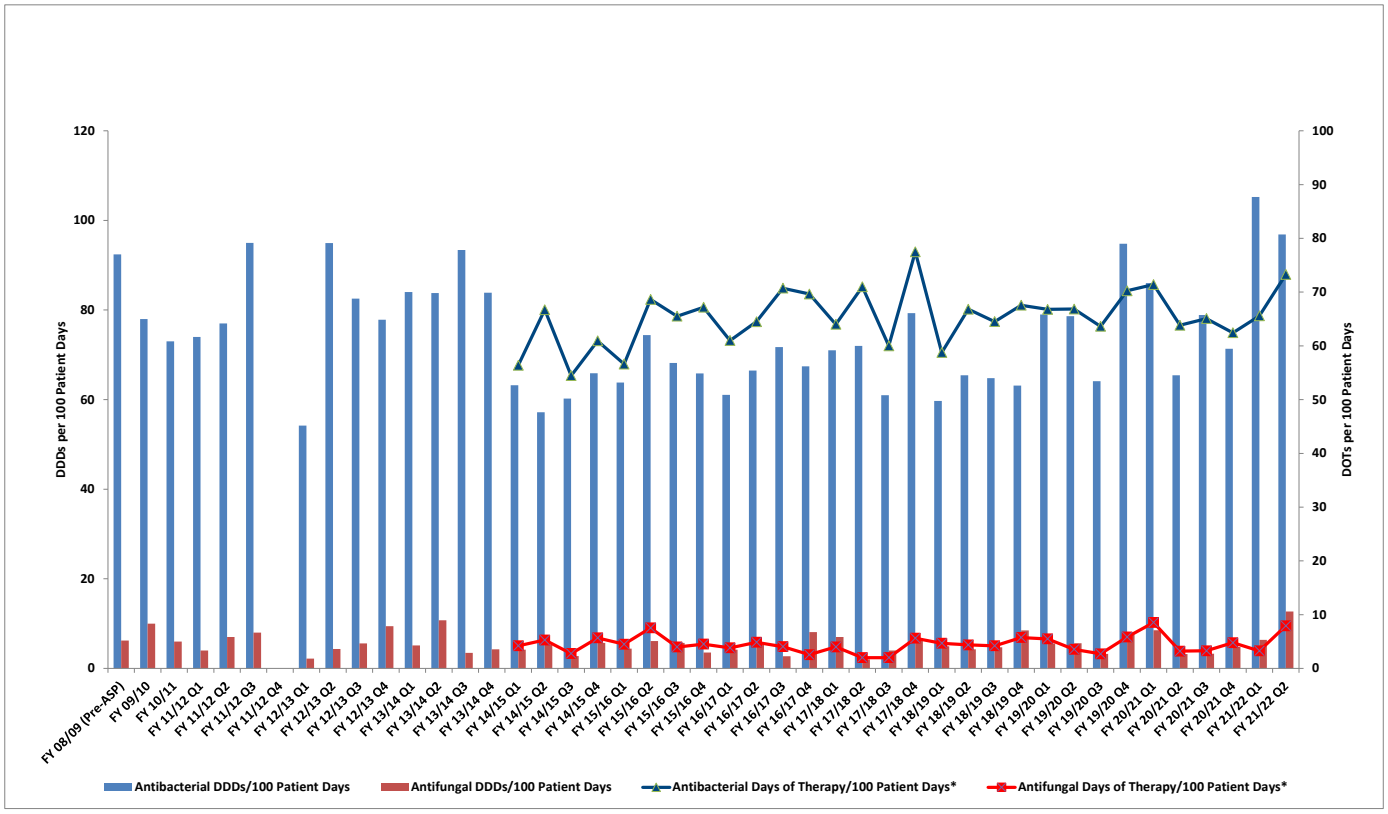
Due to an error in the Centricity Pharmacy database, we are not able to provide accurate DDD data and utilization cost for the Toronto Western Hospital ICU for FY 11/12 Q4. This also affected the recovery in FY 12/13 Q1 so neither quarter is reflected in the above graph.

To view **Appendix 1: FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click **here**.

To view **Appendix 2: FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click **here**.

Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU Antimicrobial Consumption as Defined Daily Dose Versus Antimicrobial Consumption as Days of Therapy

- Antibacterial Days of Therapy (DOT) per 100 patient days increased (↑) by 2.4% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days decreased (↓) by 6.8% compared to YTD last year.



Due to an error in the Centricity Pharmacy database, we are not able to provide accurate DDD data and utilization cost for the Toronto Western Hospital ICU for FY 11/12 Q4.

SHS + UHN ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

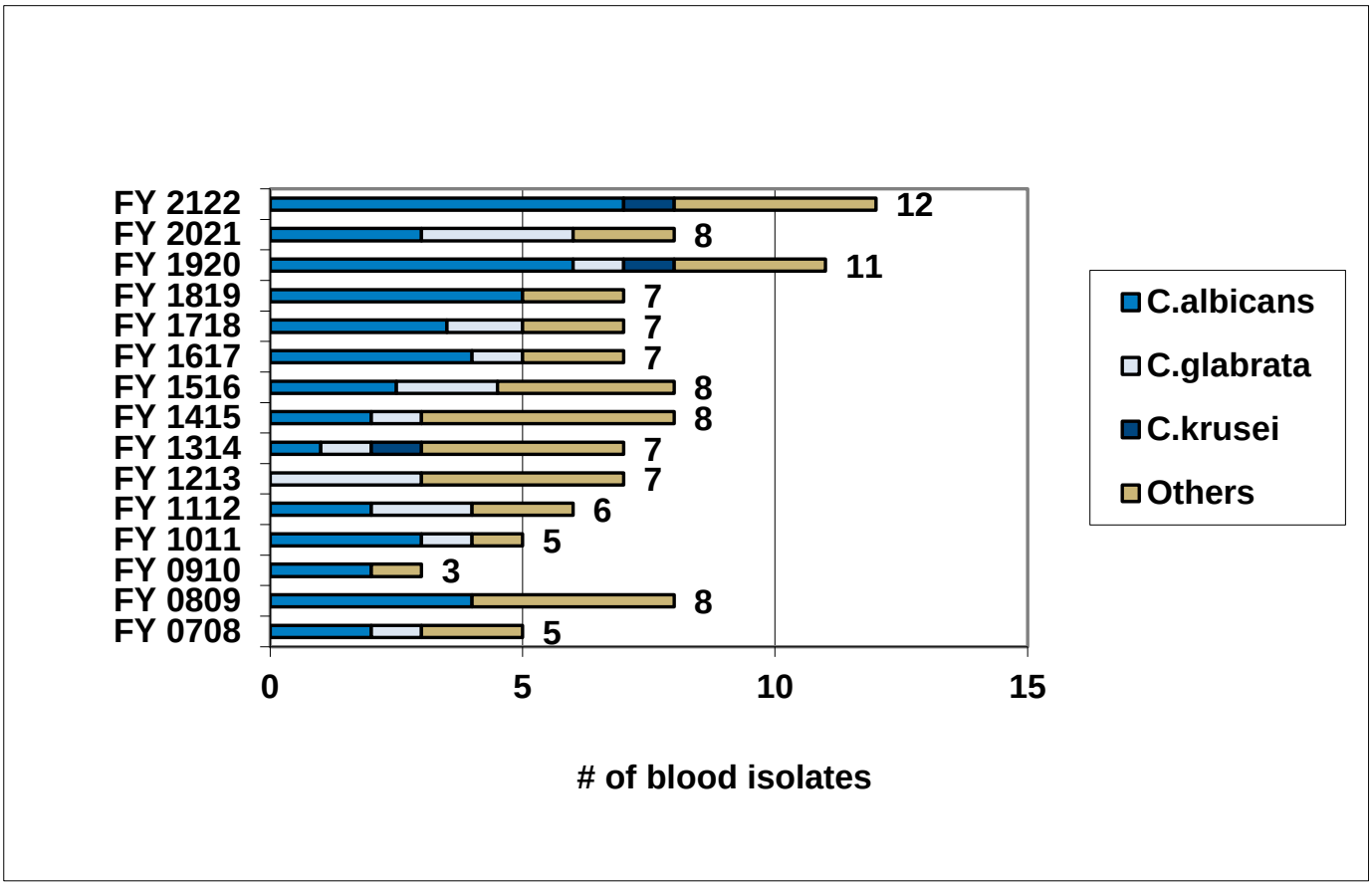
Table 18: Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY21/22 Performance					YTD of Previous Year
														Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs																			
Total Antimicrobial DDDs/100 Patient Days	**99**	**88**	**79**	**83**	**83**	**92**	**67**	**77**	**72**	**76**	**69**	**85**	**82**	**112**	**110**			**111**	**82**
Systemic Antibacterial DDDs/100 Patient Days	92	78	73	77	78	86	62	68	67	71	63	79	75	105	97			101	76
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	5	6	5	9	5	5	6	5	6	6	13			9	7
Total Antimicrobial Costs	$136,758	$100,408	$101,191	$105,899	$102,978	$120,538	$138,014	$127,293	$98,672	$93,958	$93,848	$102,868	$125,917	$41,892	$66,926			$108,818	$73,639
Total Antimicrobial Costs/Patient Day	**$18.16**	**$13.24**	**$13.17**	**$13.60**	**$13.37**	**$13.49**	**$11.97**	**$11.10**	**$8.28**	**$8.18**	**$7.94**	**$8.88**	**$10.71**	**$14.25**	**$23.67**			**$18.87**	**$12.64**
Systemic Antibacterial Costs	$123,314	$87,445	$79,280	$89,784	$70,099	$85,916	$89,382	$74,877	$69,868	$73,007	$64,386	$89,646	$87,976	$27,223	$25,651			$52,873	$48,697
Systemic Antibacterial Costs/Patient Day	$16.37	$11.53	$10.32	$11.53	$9.10	$9.61	$7.75	$6.53	$5.86	$6.35	$5.45	$7.74	$7.48	$9.26	$9.07			$9.17	$8.36
Systemic Antifungal Costs	$13,444	$12,963	$21,911	$16,115	$32,879	$34,623	$48,631	$52,416	$28,805	$20,951	$29,462	$13,223	$37,941	$14,669	$41,276			$55,945	$24,943
Systemic Antifungal Costs/Patient Day	$1.79	$1.71	$2.85	$2.07	$4.27	$3.87	$4.22	$4.57	$2.42	$1.82	$2.49	$1.14	$3.23	$4.99	$14.60			$9.70	$4.28
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	n/a	60	65	67	68	64	65	66	66	73			69	68
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	n/a	4	5	4	3	5	4	5	3	8			5	6
Patient Care Outcomes																			
Hospital-Acquired C. difficile Cases (rate per 1,000 pt days)	6 (0.79)	9 (1.18)	4 (0.52)	13 (1.66)	5 (0.65)	12 (1.34)	10 (1.16)	9 (0.78)	8 (0.67)	10 (0.87)	20 (1.69)	11 (0.95)	18 (1.53)	3 (1.02)	2 (0.71)			5 (0.87)	12 (2.06)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.71	7.98	7.68	8.7	8.01	9.5	8.2	8.405	8.4	10.3	11.21	7.8			9.5	11.4
ICU Mortality Rate (as a %)	19.6	19.9	18.1	17.0	16.4	17.1	19.0	17.9	18.5	16.3	13.6	15.6	17.2	20.6	13.5			17.1	15.8
ICU Readmission Rate Within 48 Hrs (as a %)	3.9	4.7	4.9	3.21	3.00	3.85	3.40	2.54	1.34	2.61	2.37	1.6	2.7	3.92	5.07			4.5	2.10
ICU Ventilator Days	4617	6305	5960	5578	4947	5523	5180	5414	4937	4755	4484	4457.0	6032.0	2071	1662			3733.0	2916
ICU Apache II Score	15.0	14.7	13.7	13.8	12.9	12.8	13.2	13.0	14.0	13.4	13.5								
ICU Multiple Organ Dysfunction Score (MODS)											3.26	3.91	4.07	4.32	3.98			4.15	4.13

Notes: Data beginning in Q4 13/14 data consists of MSNICU patients (including eight ICU II patients).
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity) *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

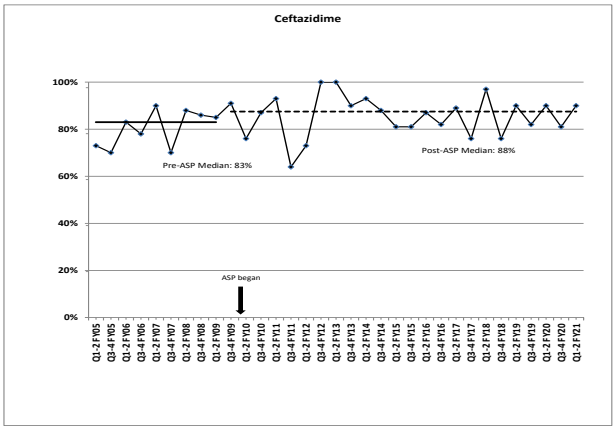
There was a calculation error for the ICU Readmission Rate for FY 16/17 Q3. That figure has now been corrected.

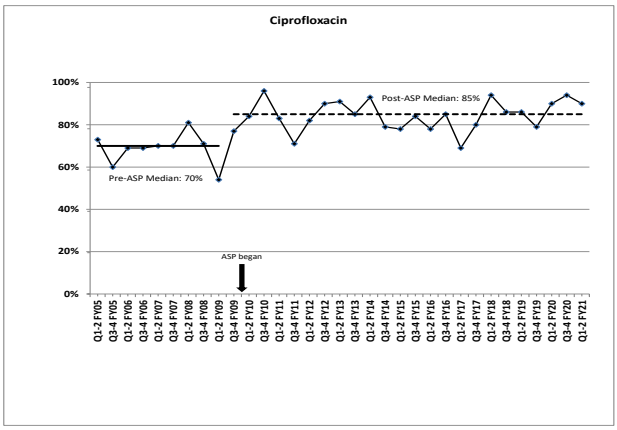
Table 19: Yeast Species Isolated in Blood – Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

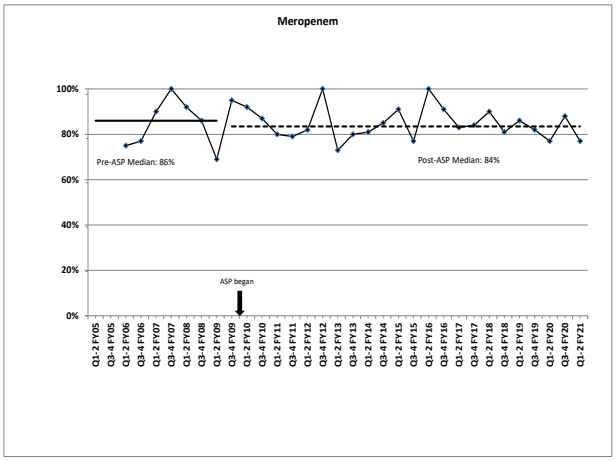


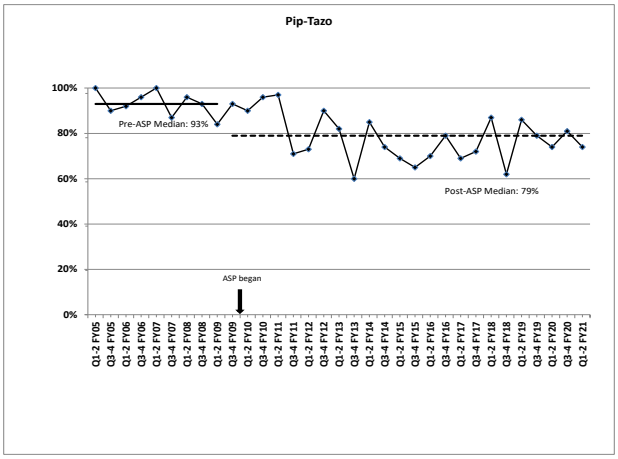
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

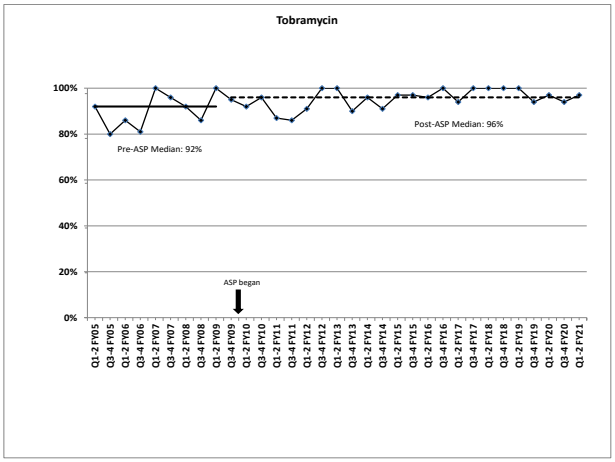
TW MSNICU Pseudomonas Susceptibility











GENERAL INTERNAL MEDICINE

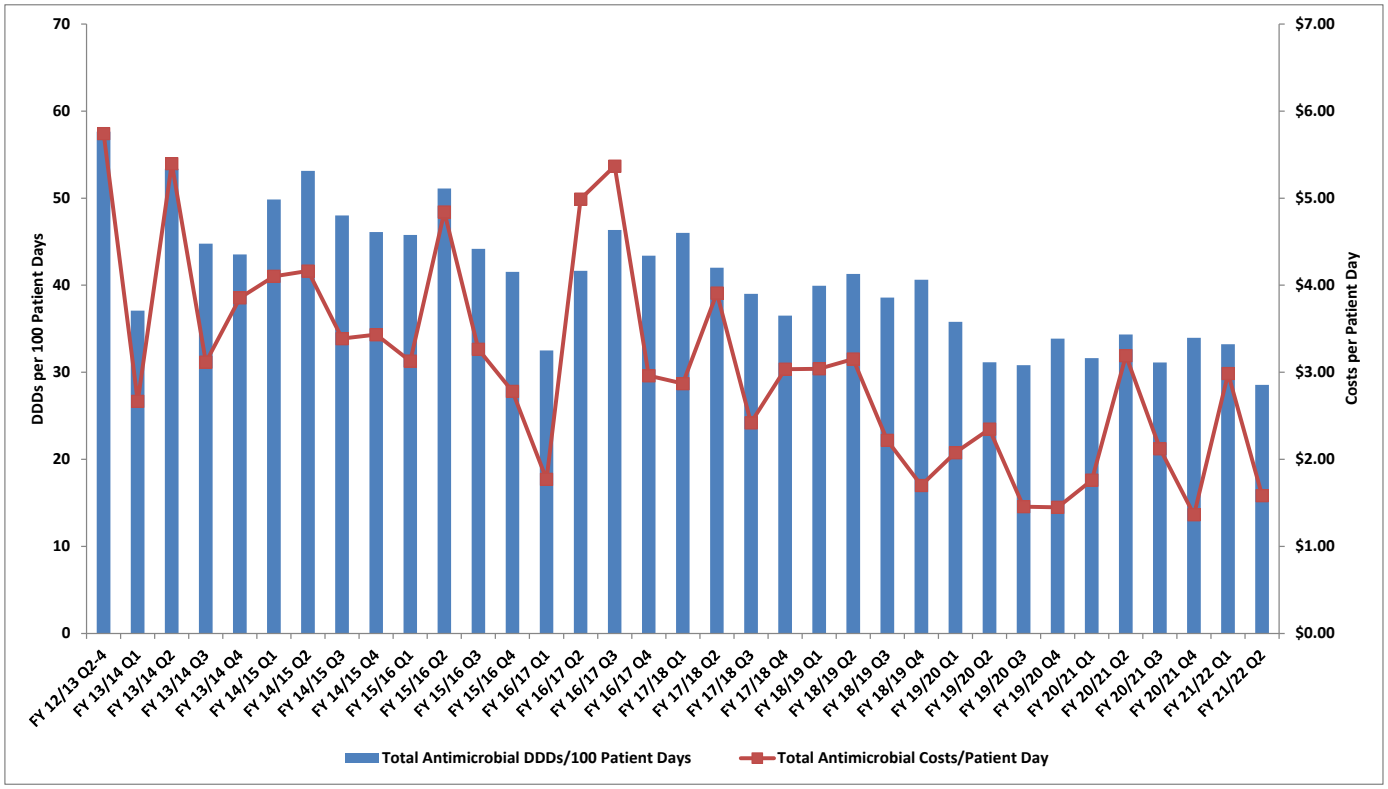
Mount Sinai Hospital: General Internal Medicine

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 6.7% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 10.0% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 10.3% compared to YTD last year.
  - Antifungal costs per patient day decreased (↓) by 13.2% compared to YTD last year.

  NB: Usage data calculated for patients admitted by admission to GIM medical service at MSH. MSH usage data is nearly entirely driven by increases in a single patient for meropenem in Q2 of FY 20/21.

Mount Sinai Hospital: General Internal Medicine Antimicrobial Consumption and Costs Per Patient Day



To view **Appendix 3: General Internal Medicine FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click **here**.

To view **Appendix 4: General Internal Medicine FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click **here**.

Table 20: Mount Sinai Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs															
Total Antimicrobial DDDs/100 Patient Days	**58**	**45**	**48**	**43**	**41**	**41**	**40**	**33**	**33**	**33**	**29**			**31**	**33**
Systemic Antibacterial DDDs/100 Patient Days	53	41	43	39	37	37	36	30	31	30	26			28	31
Systemic Antifungal DDDs/100 Patient Days	3	3	3	3	3	3	3	2	2	2	2			2	2
Total Antimicrobial Costs	$125,012	$123,737	$128,661	$106,518	$126,283	$105,254	$88,219	$78,788	$79,663	$27,336	$15,040			$42,375	$46,382
Total Antimicrobial Costs/Patient Day	**$5.74**	**$3.76**	**$3.63**	**$2.92**	**$3.69**	**$3.04**	**$2.35**	**$1.83**	**$2.12**	**$2.99**	**$1.58**			**$2.27**	**$2.52**
Systemic Antibacterial Costs	$105,621	$99,731	$104,822	$84,173	$78,418	$81,436	$76,628	$66,233	$59,293	$20,301	$11,979			$32,280	$35,452
Systemic Antibacterial Costs/Patient Day	$4.85	$3.03	$2.96	$2.31	$2.29	$2.35	$2.04	$1.54	$1.58	$2.22	$1.26			$1.73	$1.93
Systemic Antifungal Costs	$15,422	$20,153	$16,352	$15,983	$42,012	$17,644	$6,476	$8,187	$18,356	$5,815	$2,808			$8,624	$9,788
Systemic Antifungal Costs/Patient Day	$0.71	$0.61	$0.46	$0.44	$1.23	$0.51	$0.17	$0.19	$0.49	$0.64	$0.30			$0.46	$0.53
Patient Care Outcomes															
Hospital-Acquired C. difficile Cases (rate per 1,000 patient days)	16 (0.64)	8 (0.32)	7 (0.27)	7 (0.28)	9 (0.35)	13 (0.55)	11 (0.44)	2 (0.08)	7 (0.29)	1 (0.17)	0 (0)			1 (0.08)	5 (0.42)

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs + systemic antivirals; non-systemic antimicrobials are excluded.

Data Sources: Antimicrobial DDD and Costs (PharmNet), C difficile (Infection Control Dashboards).

Historical antimicrobial usage and cost data updated due to the discovery that selected added drug dosages (Fluconazole 400mg/200ml bag, Pip-Tazo 13.5gm vial, Daptomycin 500mg vial) were not included in the report. Data have been revised to include Fluconazole starting August 2013, Pip-Tazo January 2015, and Daptomycin, November 2015.

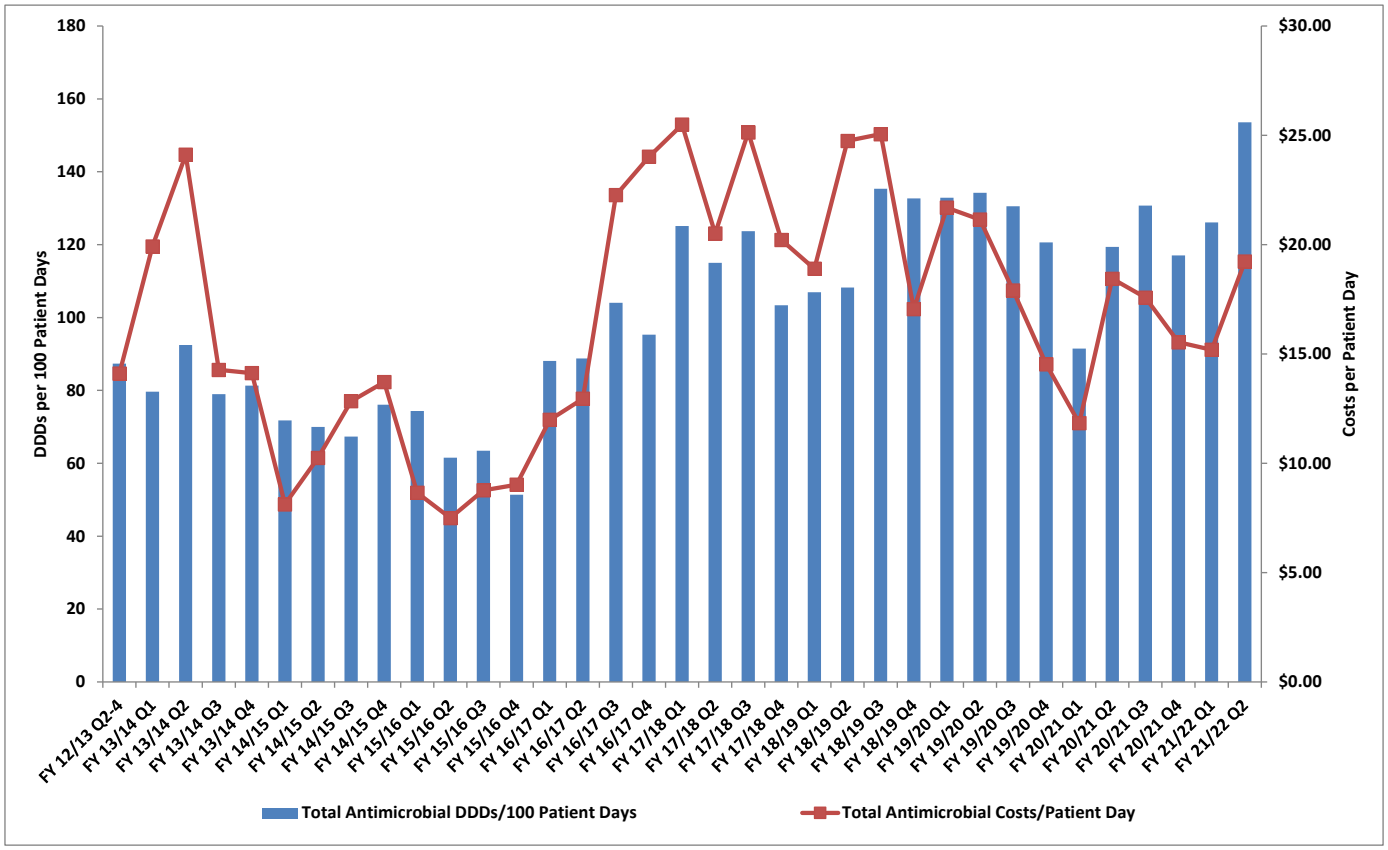
Toronto General Hospital: General Internal Medicine

The 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 33.0% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 13.7% compared to YTD last year:
  - Antibacterial costs per patient day increased (↑) by 6.6% compared to YTD last year.
  - Antifungal costs per patient day increased (↑) by 33.8% compared to YTD last year.

  NB: Usage data calculated for patients admitted to primary GIM units at TG.

Toronto General Hospital: General Internal Medicine Antimicrobial Consumption and Costs Per Patient Day



To view **Appendix 3: General Internal Medicine FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click **here**.

To view **Appendix 4: General Internal Medicine FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click **here**.

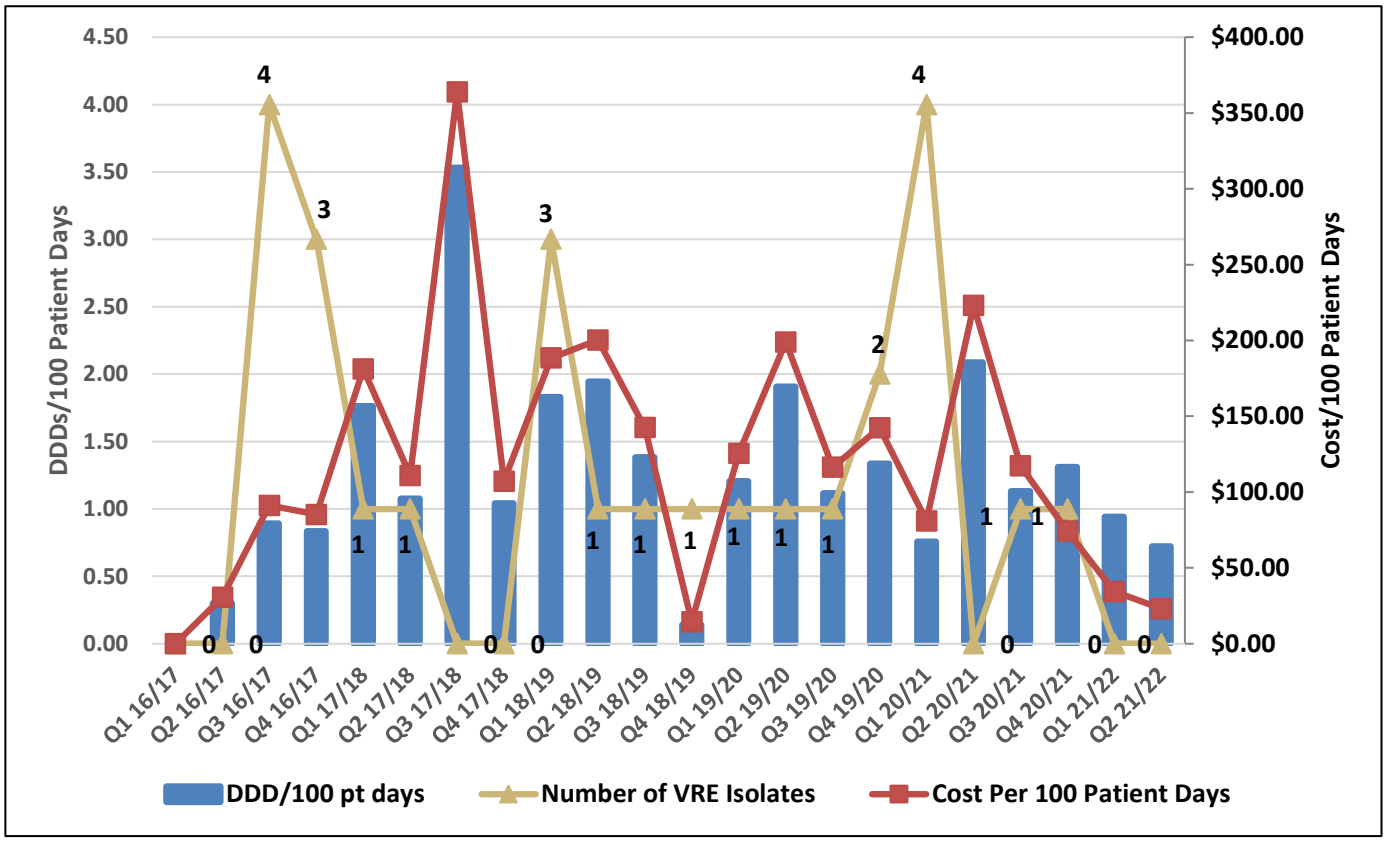
Table 21: Toronto General Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs															
Total Antimicrobial DDDs/100 Patient Days	**87**	**83**	**83**	**63**	**94**	**117**	**120**	**130**	**115**	**126**	**154**			**141**	**106**
Systemic Antibacterial DDDs/100 Patient Days	77	70	73	55	78	99	104	112	96	106	128			118	91
Systemic Antifungal DDDs/100 Patient Days	11	13	10	8	16	17	16	17	20	20	26			23	15
Total Antimicrobial Costs	$279,644	$471,342	$352,036	$313,464	$494,787	$640,238	$576,907	$508,715	$350,361	$80,776	$123,631			$204,407	$167,255
Total Antimicrobial Costs/Patient Day	**$14.10**	**$18.05**	**$13.30**	**$8.48**	**$17.77**	**$22.84**	**$21.44**	**$18.84**	**$15.96**	**$15.19**	**$19.22**			**$17.40**	**$15.30**
Systemic Antibacterial Costs	$171,817	$225,491	$221,389	$202,012	$250,100	$370,814	$348,326	$375,780	$254,387	$59,389	$81,971			$141,360	$123,409
Systemic Antibacterial Costs/Patient Day	$8.67	$8.64	$8.36	$5.47	$8.98	$13.23	$12.94	$13.92	$11.59	$11.17	$12.75			$12.03	$11.29
Systemic Antifungal Costs	$107,827	$245,851	$130,647	$111,452	$244,687	$269,424	$228,581	$132,936	$95,974	$21,387	$41,661			$63,048	$43,846
Systemic Antifungal Costs/Patient Day	$5.44	$9.42	$4.93	$3.02	$8.79	$9.61	$8.49	$4.92	$4.37	$4.02	$6.48			$5.37	$4.01
Patient Care Outcomes															
Hospital-Acquired C. difficile Cases (rate per 1,000 patient days)	15 (0.76)	16 (0.61)	15 (0.68)	14 (0.6)	5 (0.19)	15 (0.54)	7 (0.26)	10 (0.37)	11 (0.5)	3 (0.56)	1 (0.16)			4 (0.34)	3 (0.27)

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.

Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

Table 22: Daptomycin Use – Toronto General Hospital: General Internal Medicine



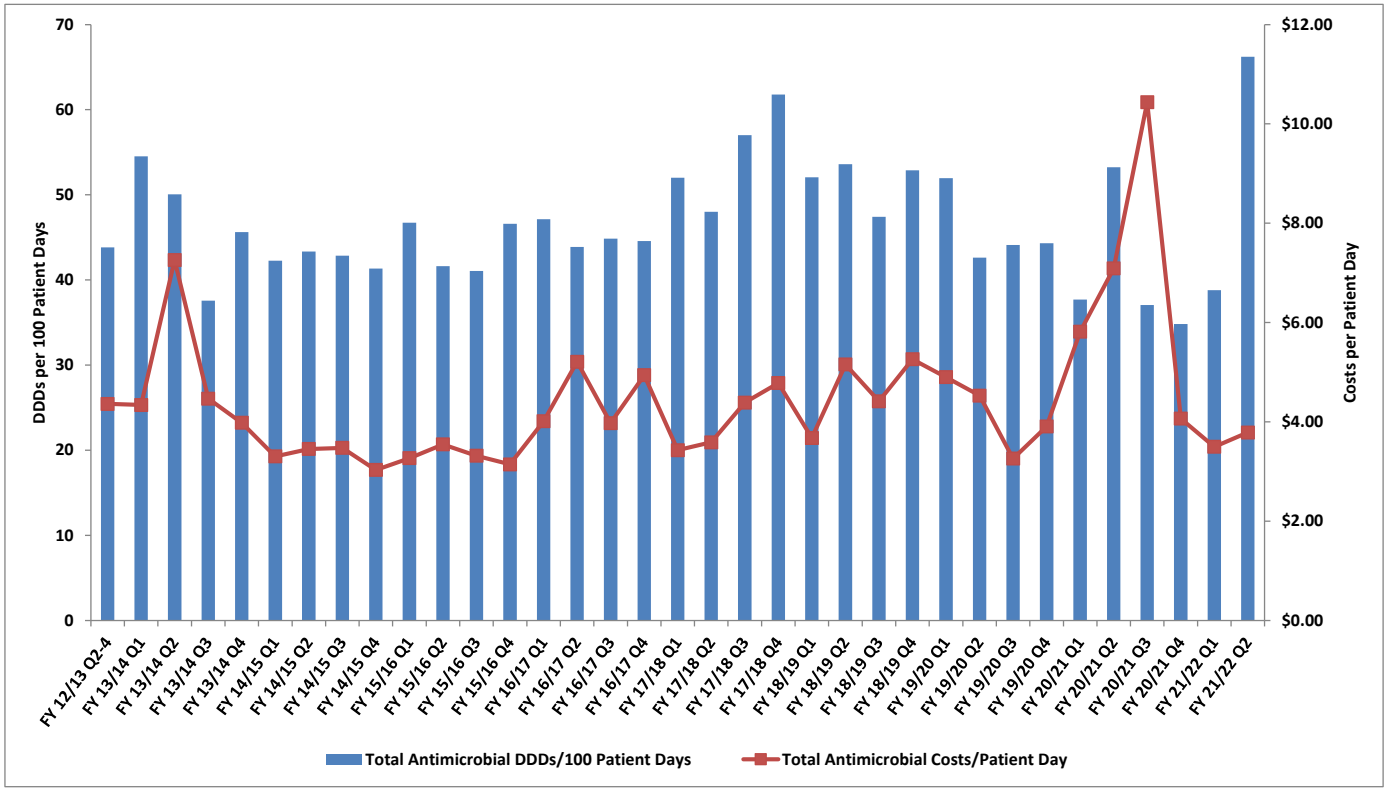
Toronto Western Hospital: General Internal Medicine

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 13.4% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 44.3% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 17.3% compared to YTD last year.
  - Antifungal costs per patient day decreased (↓) by 96.2% compared to YTD last year.

NB: Usage data calculated for patients admitted to primary GIM units at TW. TW cost data is nearly entirely driven by increases in a single patient for amphotericin in Q2 of FY 20/21.

Toronto Western Hospital: General Internal Medicine Antimicrobial Consumption and Costs Per Patient Day



To view **Appendix 3: General Internal Medicine FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click **here**.

To view **Appendix 4: General Internal Medicine FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click **here**.

Table 23: Toronto Western Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs															
Total Antimicrobial DDDs/100 Patient Days	**44**	**47**	**42**	**47**	**45**	**54**	**51**	**46**	**40**	**39**	**66**			**53**	**47**
Systemic Antibacterial DDDs/100 Patient Days	41	44	40	42	42	51	49	43	36	37	63			51	43
Systemic Antifungal DDDs/100 Patient Days	3	3	3	6	3	3	3	2	4	1	3			2	4
Total Antimicrobial Costs	$74,737	$115,919	$110,889	$108,612	$146,214	$121,275	$135,824	$128,301	$155,226	$23,554	$26,381			$49,935	$57,077
Total Antimicrobial Costs/Patient Day	**$4.36**	**$5.01**	**$3.32**	**$3.32**	**$4.52**	**$4.04**	**$4.63**	**$4.14**	**$6.82**	**$3.50**	**$3.79**			**$3.65**	**$6.54**
Systemic Antibacterial Costs	$60,999	$93,779	$103,080	$105,744	$118,506	$93,880	$124,868	$115,758	$90,992	$23,040	$25,723			$48,763	$37,575
Systemic Antibacterial Costs/Patient Day	$3.56	$4.05	$3.09	$3.23	$3.67	$3.13	$4.26	$3.74	$4.00	$3.42	$3.69			$3.56	$4.31
Systemic Antifungal Costs	$13,738	$22,140	$7,810	$2,868	$27,708	$6,569	$10,956	$12,543	$64,234	$514	$658			$1,172	$19,502
Systemic Antifungal Costs/Patient Day	$0.80	$0.96	$0.23	$0.09	$0.86	$0.22	$0.37	$0.40	$2.82	$0.08	$0.09			$0.09	$2.23
Patient Care Outcomes															
Hospital-Acquired C. difficile Cases (rate per 1,000 patient days)	7 (0.41)	14 (0.6)	11 (0.33)	7 (0.21)	10 (0.31)	14 (0.47)	11 (0.38)	9 (0.29)	10 (0.44)	4 (0.59)	7 (1)			11 (0.8)	4 (0.46)

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.

Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

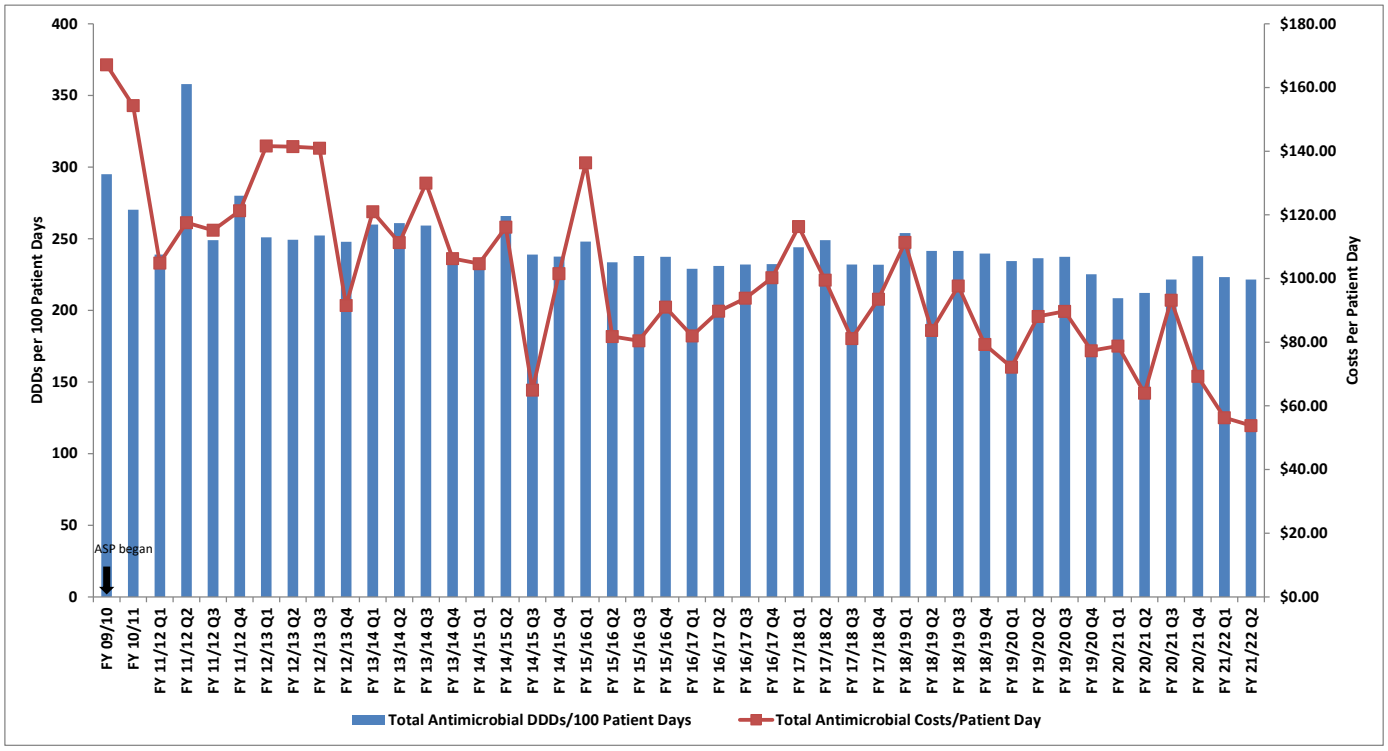
IMMUNOCOMPROMISED HOST

Princess Margaret Cancer Centre: Leukemia Service

The FY 21/22 Q1 and Q2 summary includes:

- Current year-to-date (YTD) antimicrobial consumption in defined daily doses (DDDs) per 100 patient days increased (↑) by 5.6% compared to last year.
- YTD antimicrobial costs per patient day decreased (↓) by 22.1% compared to last year:
  - YTD antibacterial costs per patient day decreased (↓) by 24.7% compared to last year.
  - YTD antifungal costs per patient day decreased (↓) by 20.7% compared to last year.
- Drs. So, Husain, and Morris and Yoshiko Nakamachi continue to work with PM's Senior Leadership Team to optimize the impact of antimicrobial stewardship interventions in malignant haematology.

Princess Margaret Cancer Centre: Leukemia Service
Antimicrobial Consumption and Costs



SHS + UHN ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

Table 24: Princess Margaret Cancer Centre: Leukemia Service

Indicators	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs																		
Total Antimicrobial DDDs/100 Patient Days	**295**	**270**	**239**	**250**	**255**	**244**	**239**	**231**	**239**	**244**	**233**	**221**	**223**	**221**			**222**	**211**
Systemic Antibacterial DDDs/100 Patient Days	191	163	134	146	138	136	138	132	140	142	144	132	121	127			124	130
Systemic Antifungal DDDs/100 Patient Days	104	107	105	104	117	108	101	99	99	102	89	89	102	95			98	80
Total Antimicrobial Costs	$1,768,317	$1,641,331	$1,310,857	$1,695,539	$1,534,499	$1,412,805	$1,479,103	$1,469,522	$1,568,972	$1,487,404	$1,291,277	$1,117,520	$220,617	$218,298			$438,915	$487,785
Total Antimicrobial Costs/Patient Day	**$167.12**	**$154.32**	**$115.13**	**$128.91**	**$117.10**	**$96.46**	**$96.98**	**$91.50**	**$97.45**	**$93.10**	**$81.91**	**$76.15**	**$56.29**	**$53.81**			**$55.03**	**$70.60**
Systemic Antibacterial Costs	$659,034	$609,747	$663,175	$422,438	$485,263	$471,597	$403,399	$376,733	$433,025	$405,965	$419,026	$340,914	$73,983	$68,651			$142,634	$164,102
Systemic Antibacterial Costs/Patient Day	$62.28	$57.33	$58.24	$45.85	$37.03	$32.20	$26.45	$23.46	$26.89	$25.41	$26.58	$23.23	$18.88	$16.92			$17.88	$23.75
Systemic Antifungal Costs	$1,109,283	$1,031,584	$647,637	$1,092,448	$1,049,236	$941,208	$1,075,705	$1,092,789	$1,135,947	$1,081,438	$872,251	$776,606	$146,634	$149,647			$296,281	$323,683
Systemic Antifungal Costs/Patient Day	$104.84	$96.99	$56.88	$83.06	$80.07	$64.26	$70.53	$68.04	$70.55	$67.69	$55.33	$52.92	$37.42	$36.89			$37.15	$46.85
Patient Care Outcomes																		
Hospital-Acquired C. difficile Cases (rate per 1,000 patient days)	6 (0.56)	7 (0.65)	14 (1.17)	5 (0.51)	11 (0.84)	13 (0.89)	14 (0.92)	13 (0.81)	14 (0.87)	4 (0.25)	7 (0.44)	8 (0.55)	3 (0.77)	3 (0.74)			6 (0.75)	5 (0.72)

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

Table 25: Daptomycin Use – Princess Margaret Cancer Centre: Leukemia Service

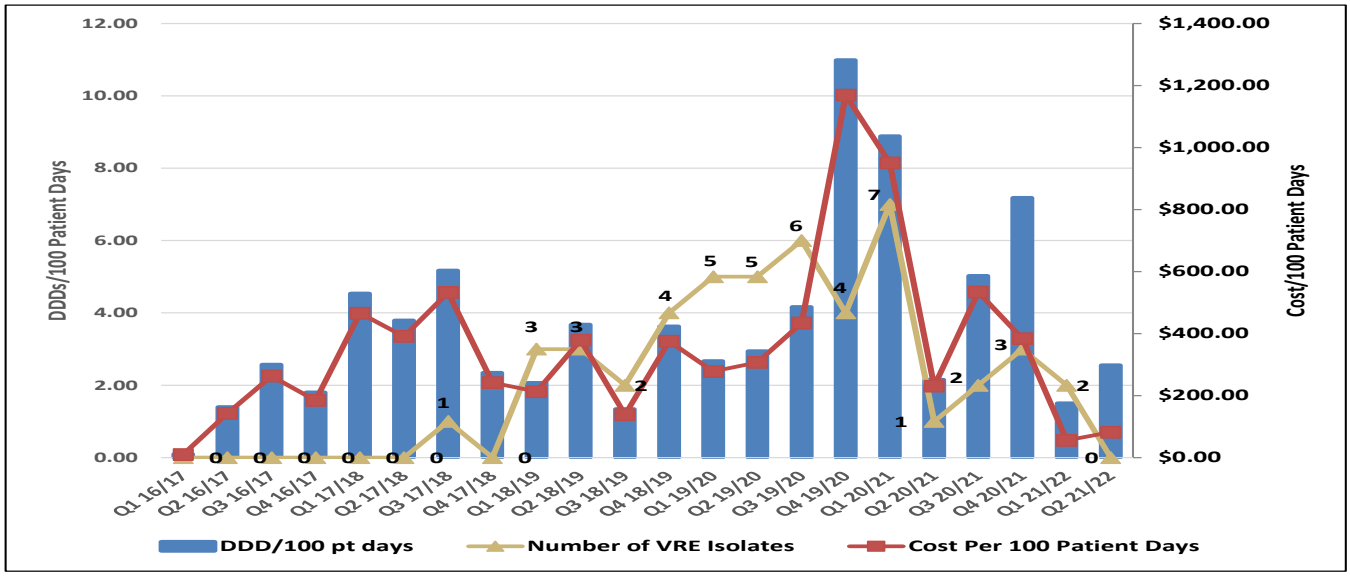
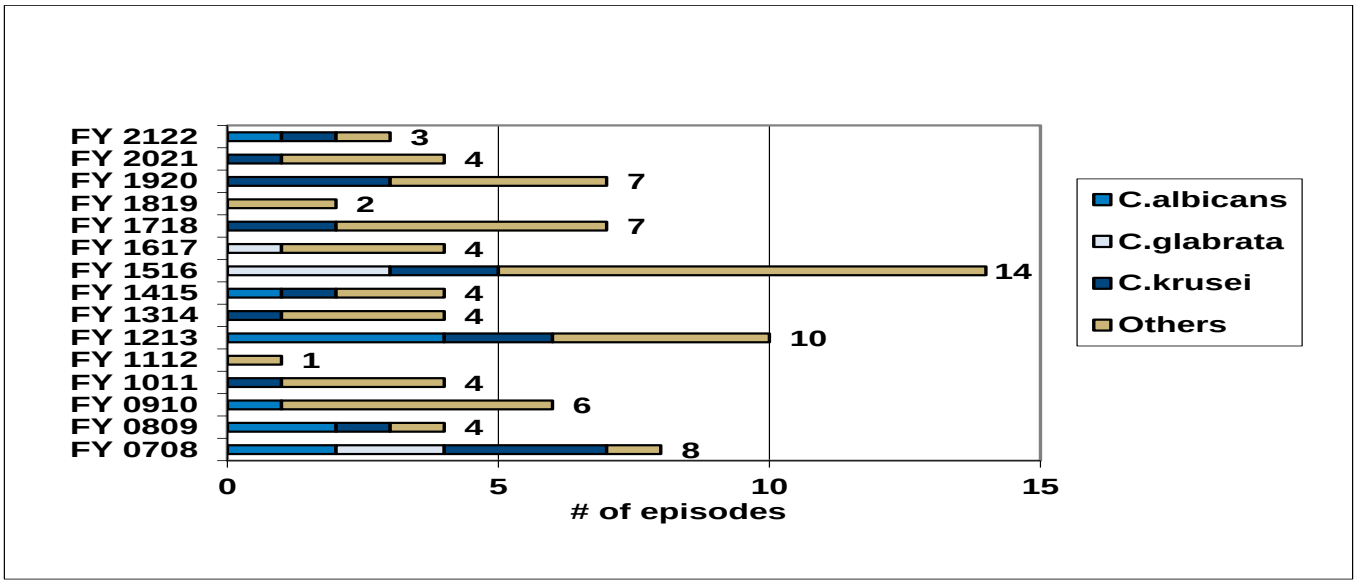
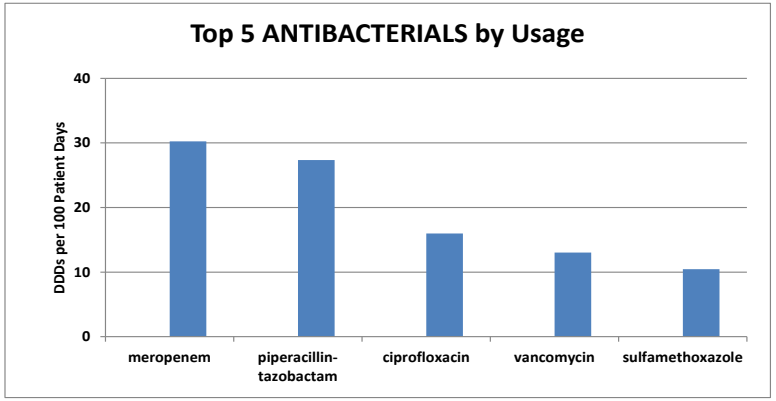


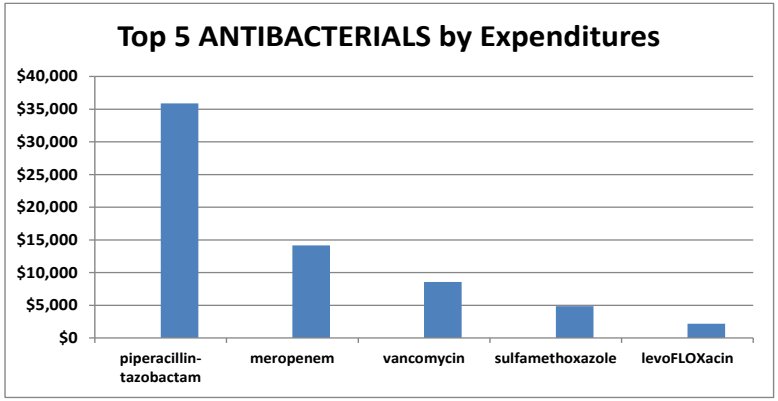
Table 26: Yeast Species Isolated in Blood – Princess Margaret Cancer Centre: Leukemia Service

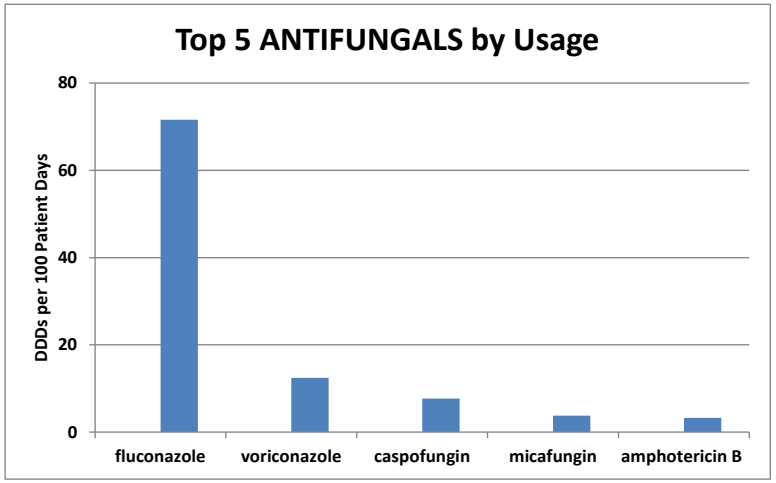


NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

Table 27: Princess Margaret Cancer Centre: Leukemia FY 21/22 Q1 Top 5 Antimicrobials by Usage and Expenditures







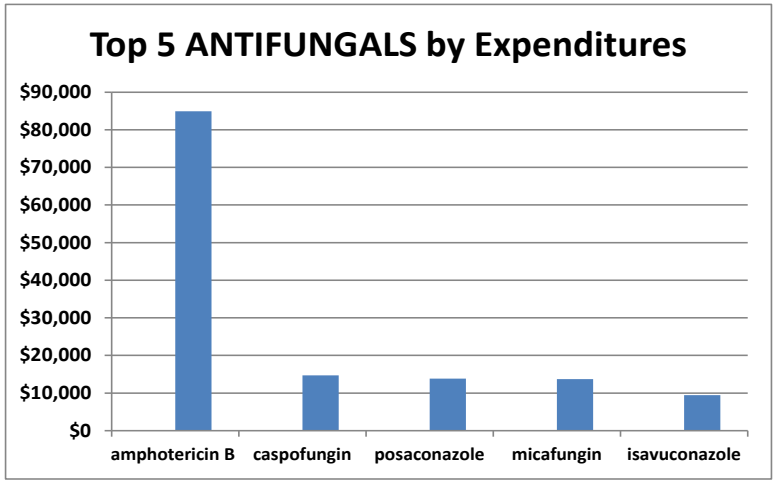
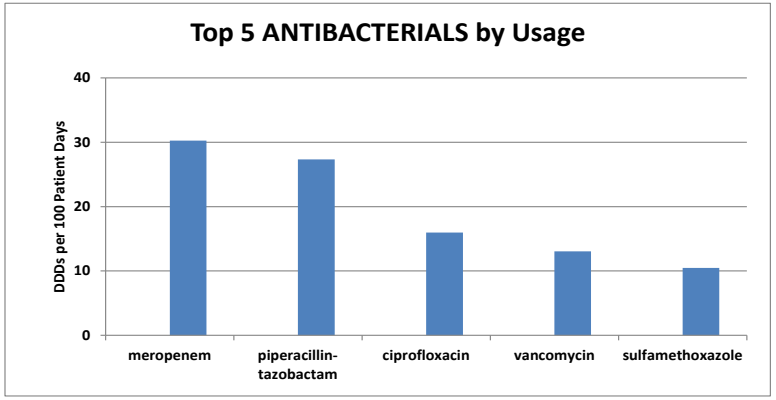
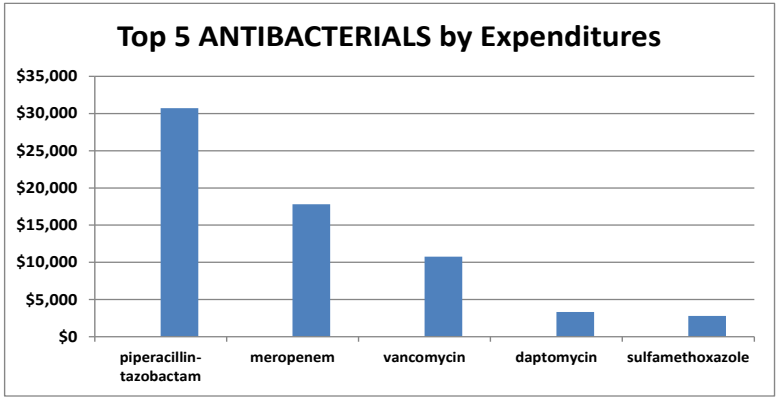
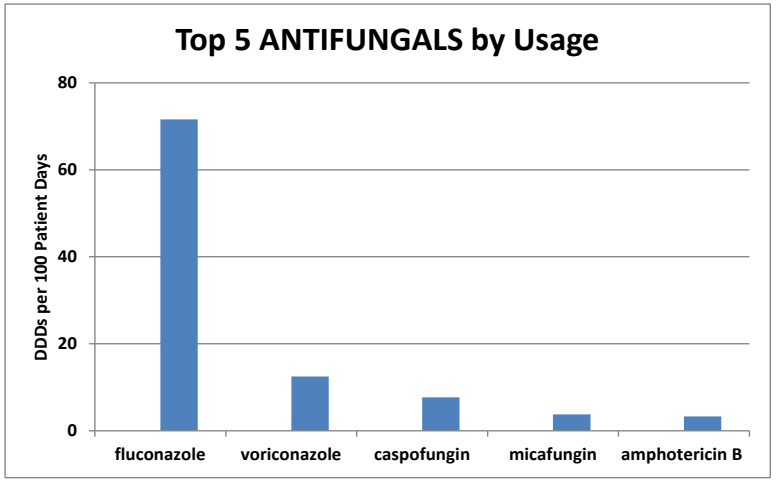
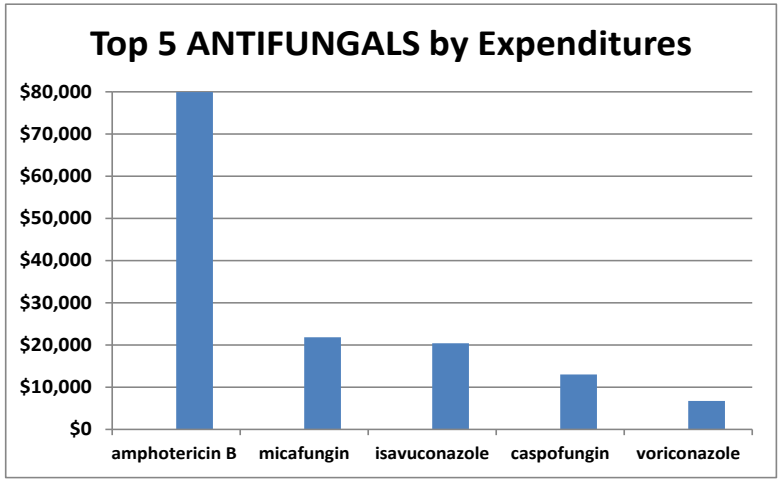


Table 28: Princess Margaret Cancer Centre: Leukemia FY 21/22 Q2 Top 5 Antimicrobials by Usage and Expenditures





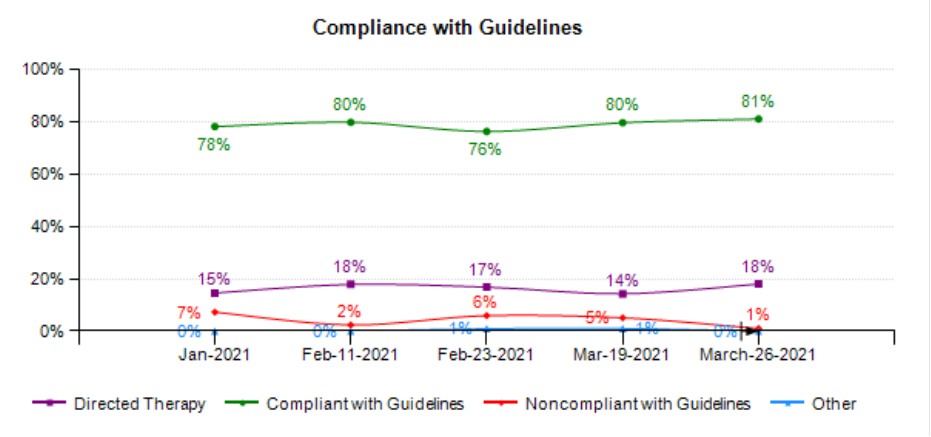




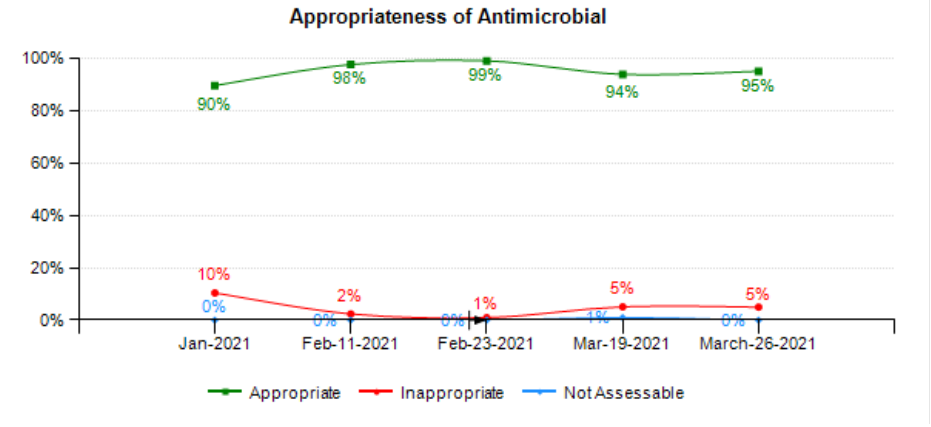
Antimicrobial Prescribing Survey in Leukemia Service

April-July 2021 NAPS Dashboard Report

Compliance with High Risk Febrile Neutropenia Guideline and Directed Therapy



Appropriate use = Compliance with guidelines + Directed Therapy



HOSPITAL NAPS National Antimicrobial Prescribing Survey

Hospital NAPS appropriateness definitions

GUIDANCE | NCAS

			If endorsed guidelines are present	If endorsed guidelines are absent
Appropriate	1	Optimal[1]	Antimicrobial prescription follows endorsed local/ regional/ provincial guidelines *optimally*, including antimicrobial choice, dosage, route and duration[2]	The antimicrobial prescription has been reviewed and endorsed by an infectious diseases clinician or a clinical microbiologist **OR** The prescribed antimicrobial will cover the likely causative or cultured pathogens ***and*** there is not a narrower spectrum or more appropriate antimicrobial choice, dosage, route or duration[2] available
	2	Adequate	Antimicrobial prescription does not optimally follow the endorsed local/ regional/ provincial guidelines (including antimicrobial choice, dosage, route or duration[2]) however, is a ***reasonable*** alternative choice for the likely causative or cultured pathogens **OR** For surgical prophylaxis, as above ***and*** duration[2] is less than 24 hours	Antimicrobial prescription (including antimicrobial choice, dosage, route and duration[2]) is not the most optimal, however, is a ***reasonable*** alternative choice for the likely causative or cultured pathogens **OR** For surgical prophylaxis, as above ***and*** duration[2] is less than 24 hours
Inappropriate	3	Suboptimal	There may be a mild or non-life-threatening allergy mismatch **OR** Antimicrobial prescription (including antimicrobial choice, dosage, route and duration[2]) is an ***unreasonable*** choice for the likely causative or cultured pathogens, including: • spectrum excessively broad, unnecessary overlap in spectrum of activity, dosage excessively high or duration excessively long • failure to appropriately de-escalate with microbiological results	
	4	Inadequate	Antimicrobial prescription (including antimicrobial choice, dosage, route or duration[2]) is ***unlikely*** to treat the likely causative or cultured pathogens **OR** The documented or presumed indication does not require ***any*** antimicrobial treatment **OR** There may be a severe or possibly life-threatening allergy mismatch, or the potential risk of toxicity due to drug interaction **OR** For surgical prophylaxis, the duration[2] is greater than 24 hours (except where local guidelines endorse this)	
	5	Not assessable	The indication is not documented and unable to be determined from the notes **OR** The notes are not comprehensive enough to assess appropriateness **OR** The patient is too complex due to multiple co-morbidities, allergies or microbiology results, *etc.*	

[1] Taking into account acceptable changes due to the patient's weight or renal function, if this information is available

[2] Duration should only be assessed if the guidelines state a recommended duration and the antimicrobial has already been dispensed for longer than this, or if there is a clear planned 'end date' documented

Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

The FY 21/22 Q1 and Q2 summary includes:

- Year-to-date (YTD) antimicrobial consumption in defined daily doses (DDDs) per 100 patient days increased (↑) by 534.9% compared to last year.
- YTD antimicrobial costs per patient day increased (↑) by 17.4% compared to last year:
  - YTD antibacterial costs per patient day increased (↑) by 295.7% compared to last year.
  - YTD antifungal costs per patient day increased (↑) by 29.2% compared to last year.

Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant Antimicrobial Consumption and Costs

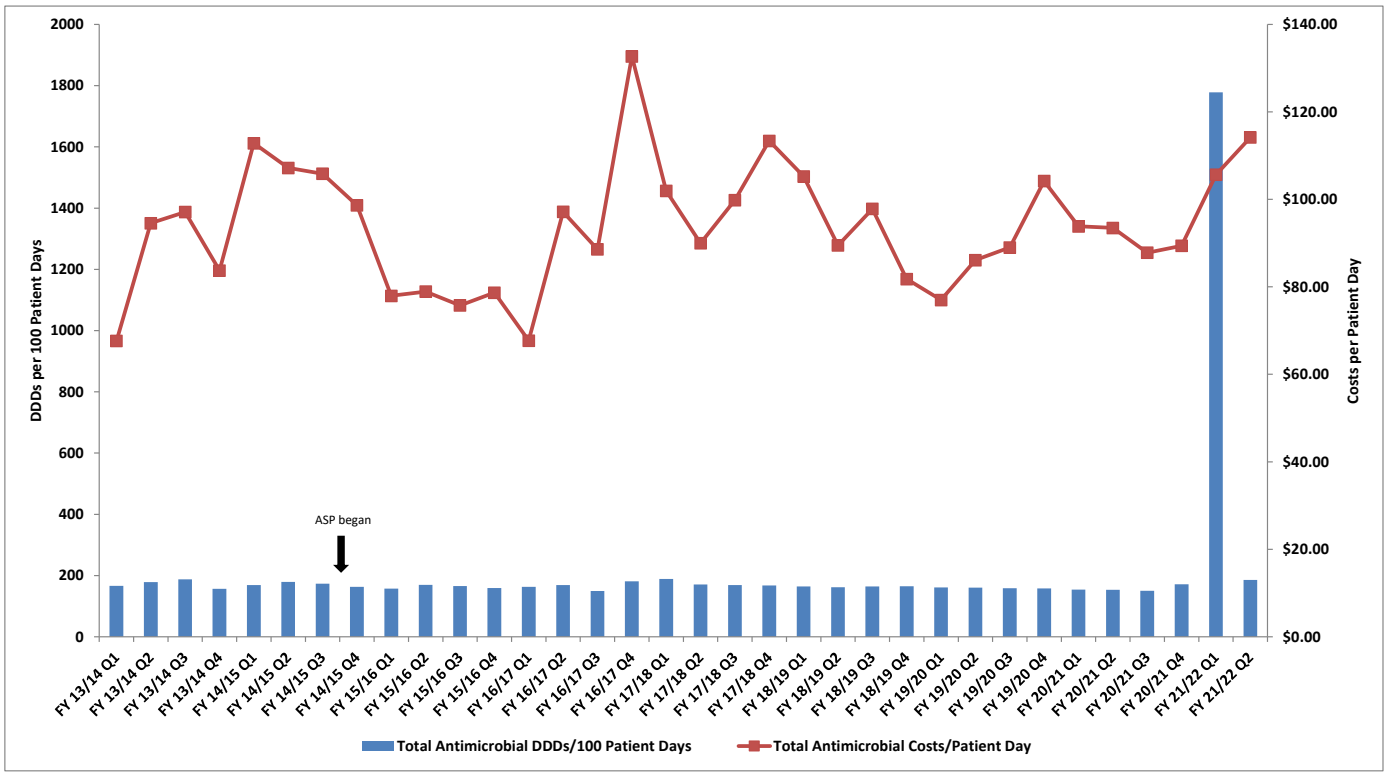


Table 29: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

Indicators	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs														
Total Antimicrobial DDDs/100 Patient Days	**172**	**171**	**163**	**163**	**173**	**164**	**159**	**157**	**1778**	**186**			**977**	**154**
Systemic Antibacterial DDDs/100 Patient Days	114	104	107	107	123	110	111	104	120	130			125	99
Systemic Antifungal DDDs/100 Patient Days	59	67	56	56	50	54	48	53	57	56			57	55
Total Antimicrobial Costs	$416,614	$512,300	$381,633	$381,633	$689,940	$791,632	$766,239	$819,348	$233,651	$255,953			$489,604	$420,178
Total Antimicrobial Costs/Patient Day	**$85.65**	**$106.13**	**$77.62**	**$77.62**	**$102.50**	**$93.68**	**$89.18**	**91**	**$105.63**	**$114.16**			**110**	**$93.64**
Systemic Antibacterial Costs	$75,219	$78,038	$60,088	$60,088	$111,250	$138,437	$162,471	$161,403	$33,682	$338,733			$372,415	$94,823
Systemic Antibacterial Costs/Patient Day	$15.46	$16.17	$12.22	$12.22	$16.53	$16.38	$18.91	$17.95	$15.23	$151.09			$83.61	$21.13
Systemic Antifungal Costs	$341,395	$434,261	$321,545	$321,545	$578,690	$653,195	$603,768	$657,945	$199,969	$217,220			$417,189	$325,355
Systemic Antifungal Costs/Patient Day	$70.19	$89.97	$65.39	$65.39	$85.97	$77.30	$70.27	$73.16	$90.40	$96.89			$93.67	$72.51
Patient Care Outcomes														
Hospital-Acquired C. difficile Cases (rate per 1,000 patient days)	4 (0.82)	12 (2.49)	7 (1.42)	7 (1.42)	13 (1.93)	11 (1.3)	20 (2.33)	17 (1.89)	4 (1.81)	2 (0.89)			6 (1.35)	13 (2.9)

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.

Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

Table 30: Daptomycin Use – Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

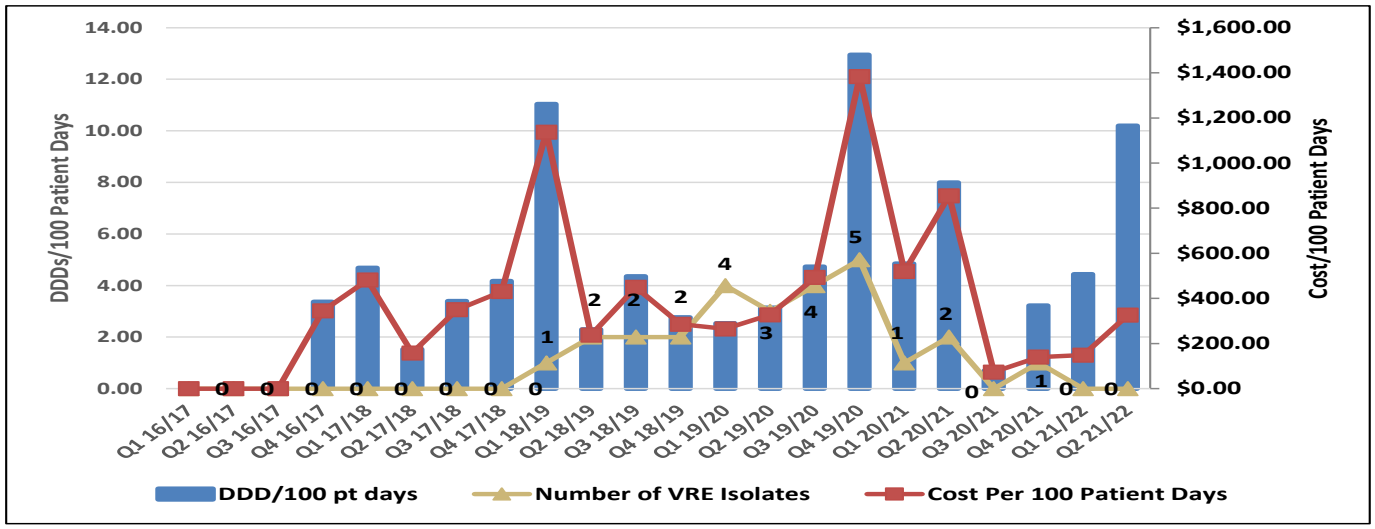
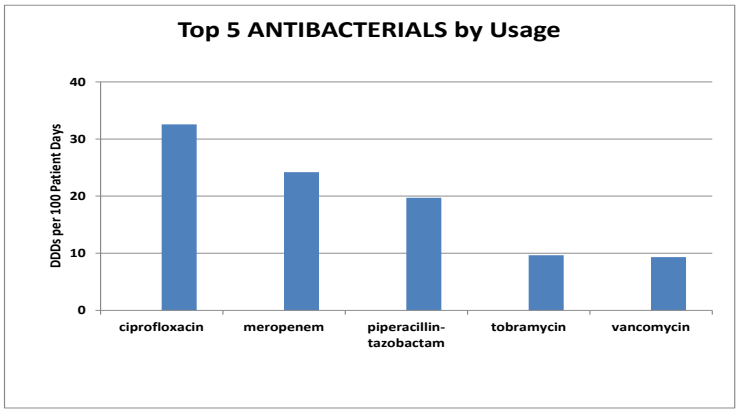
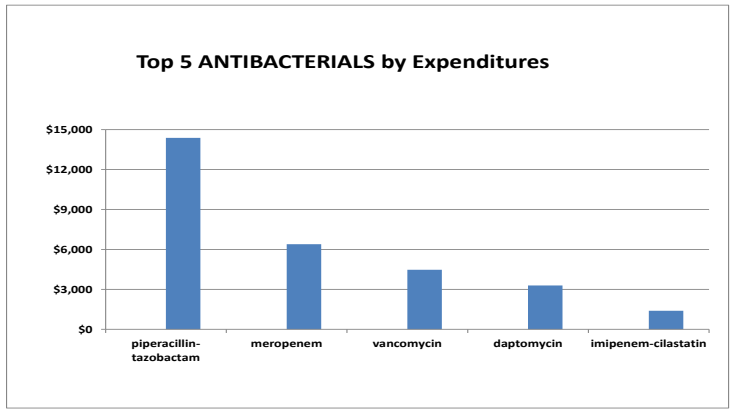


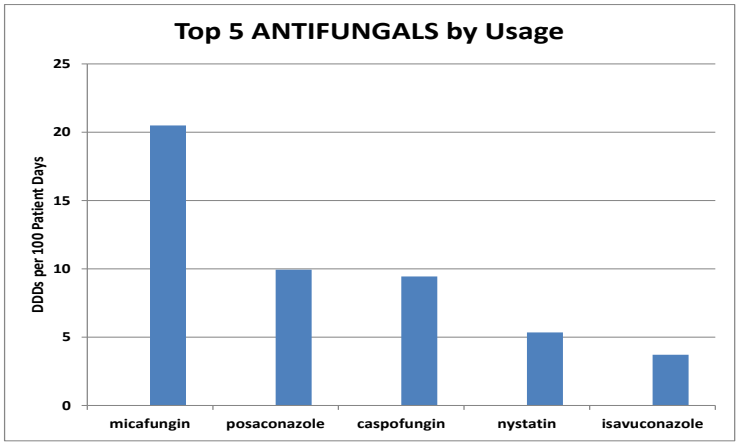
Table 31: Yeast Species Isolated in Blood – Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

Table 32: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures







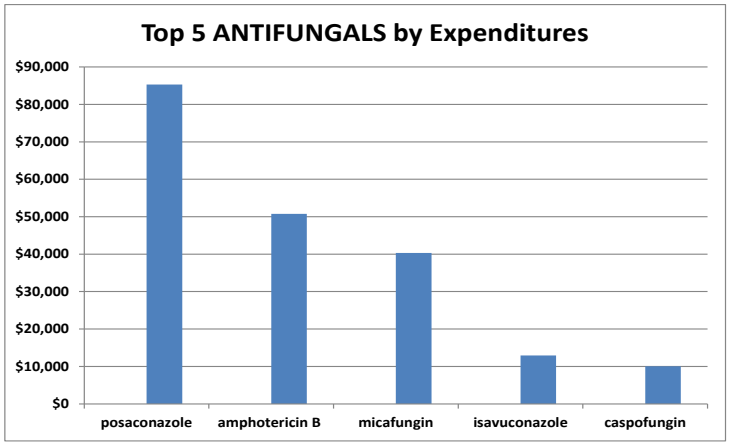
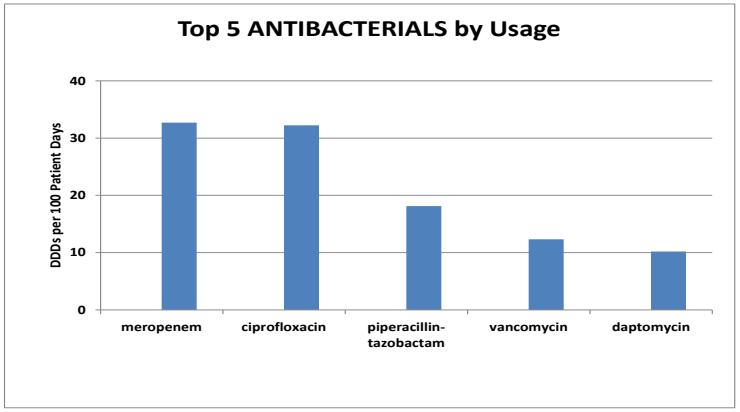
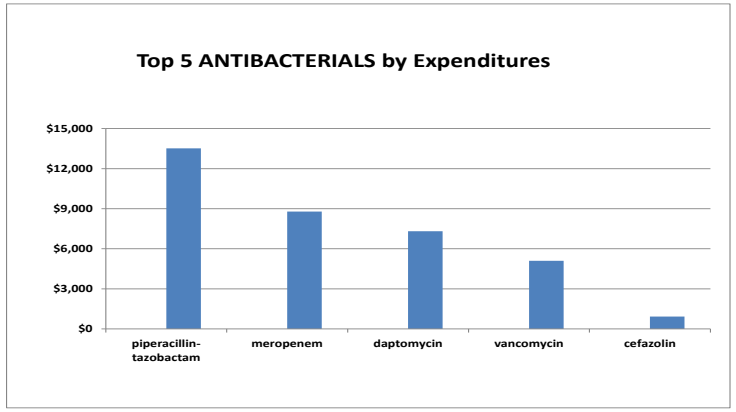
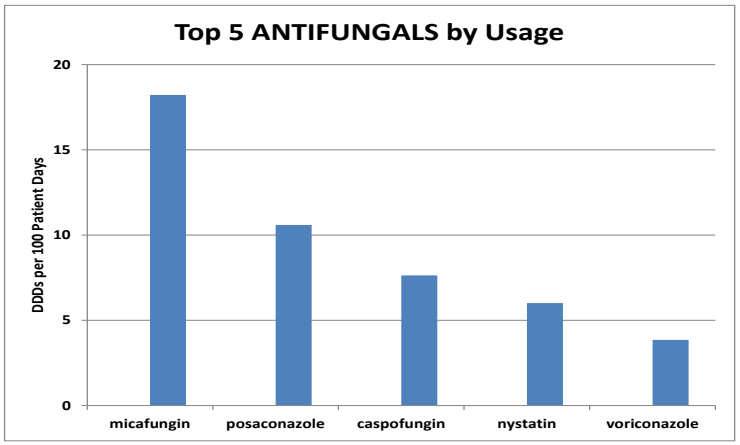
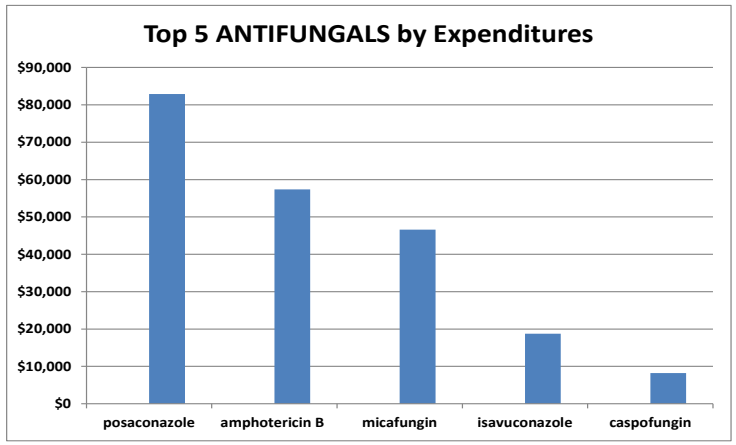


Table 33: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures









Toronto General Hospital: Multi-Organ Transplant Program (MOTP)

The FY 21/22 Q1 and Q2 summary includes:

- Year-to-date (YTD) antimicrobial consumption in defined daily doses (DDDs) per 100 patient days increased (↑) by 10.1% compared to last year.
- YTD antimicrobial costs per patient day decreased (↓) by 10.9% compared to last year:
  - YTD antibacterial costs per patient day decreased (↓) by 43.8% compared to last year.
  - YTD antifungal costs per patient day increased (↑) by 66.2% compared to last year.

Toronto General Hospital: Multi-Organ Transplant Program (MOTP) Antimicrobial Consumption and Costs

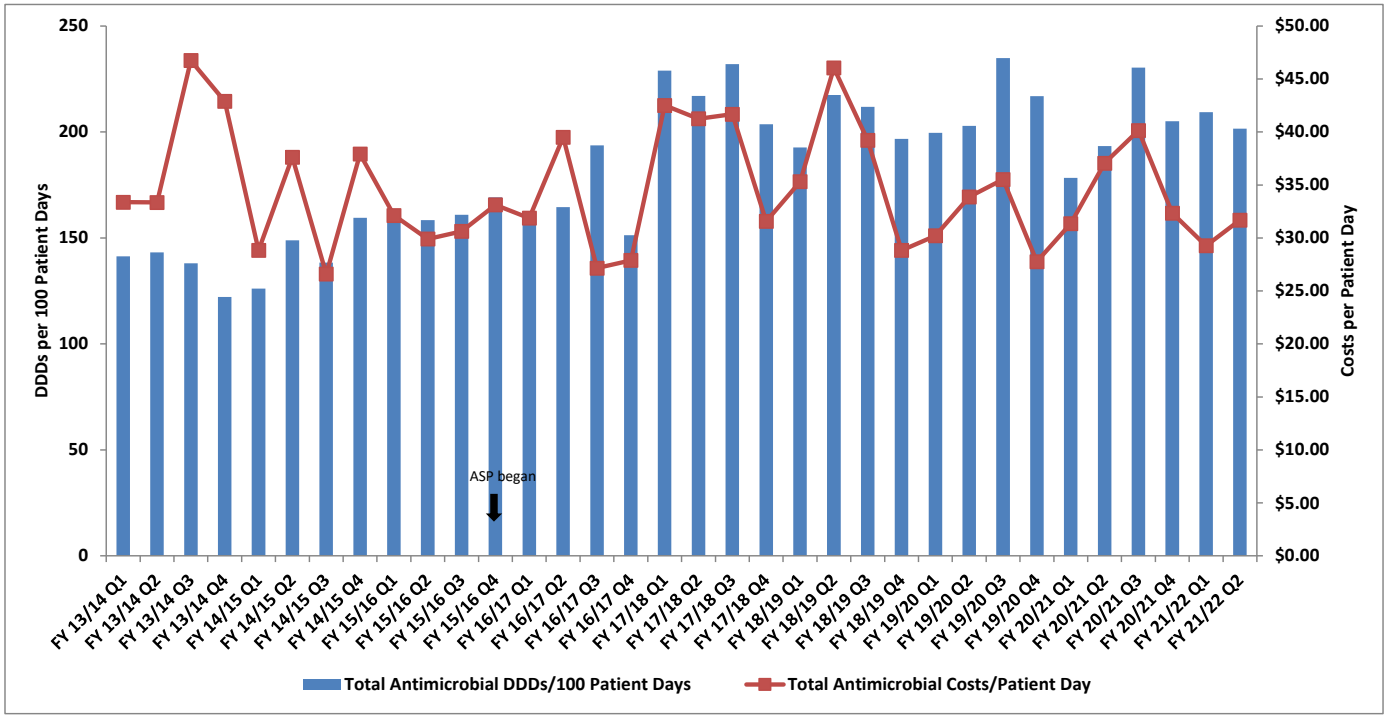


Table 34: Toronto General Hospital: Multi-Organ Transplant Program (MOTP)

Indicators	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs														
Total Antimicrobial DDDs/100 Patient Days	**136**	**143**	**211**	**156**	**220**	**205**	**213**	**203**	**209**	**202**			**205**	**186**
Systemic Antibacterial DDDs/100 Patient Days	93	98	112	108	155	143	142	128	118	114			116	122
Systemic Antifungal DDDs/100 Patient Days	43	45	99	48	65	62	71	75	1410	88			89	65
Total Antimicrobial Costs	$837,263	$725,411	$709,892	$904,028	$859,544	$765,566	$651,061	$608,528	$105,501	$140,007			$245,509	$282,965
Total Antimicrobial Costs/Patient Day	**$39.16**	**$32.69**	**$31.47**	**$31.57**	**$40.78**	**$37.52**	**$31.89**	**$35.39**	**$29.27**	**$31.69**			**$30.60**	**$34.36**
Systemic Antibacterial Costs	$327,831	$379,748	$342,941	$452,266	$519,656	$470,402	$445,722	$404,532	$50,818	$57,966			$108,784	$198,508
Systemic Antibacterial Costs/Patient Day	$15.33	$17.11	$15.20	$15.79	$24.66	$23.05	$21.83	$23.53	$14.10	$13.12			$13.56	$24.11
Systemic Antifungal Costs	$509,433	$345,664	$366,951	$451,762	$339,887	$295,164	$205,339	$203,996	$54,684	$82,041			$136,724	$84,457
Systemic Antifungal Costs/Patient Day	$23.82	$15.58	$16.26	$15.78	$16.13	$14.47	$10.06	$11.86	$15.17	$18.57			$17.04	$10.26
Patient Care Outcomes														
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	14 (0.65)	18 (0.81)	11 (0.49)	17 (0.59)	11 (0.52)	16 (0.78)	18 (0.88)	18 (1.05)	4 (1.11)	3 (0.68)			7 (0.87)	9 (1.09)

Table 35: Daptomycin Use – Toronto General Hospital: Multi-Organ Transplant Program (MOTP)

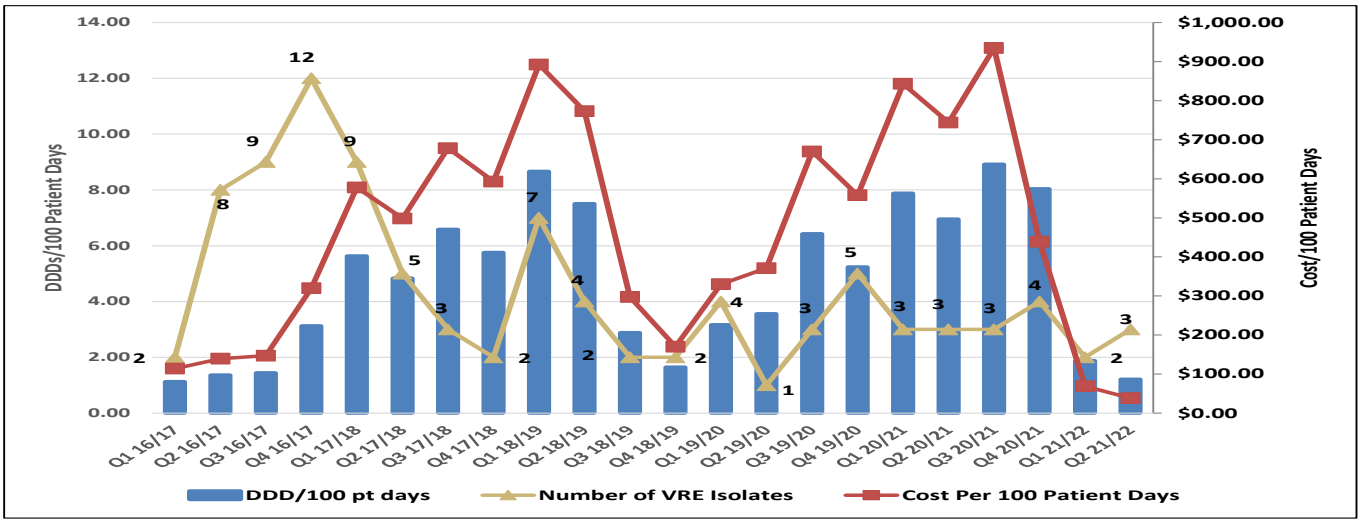
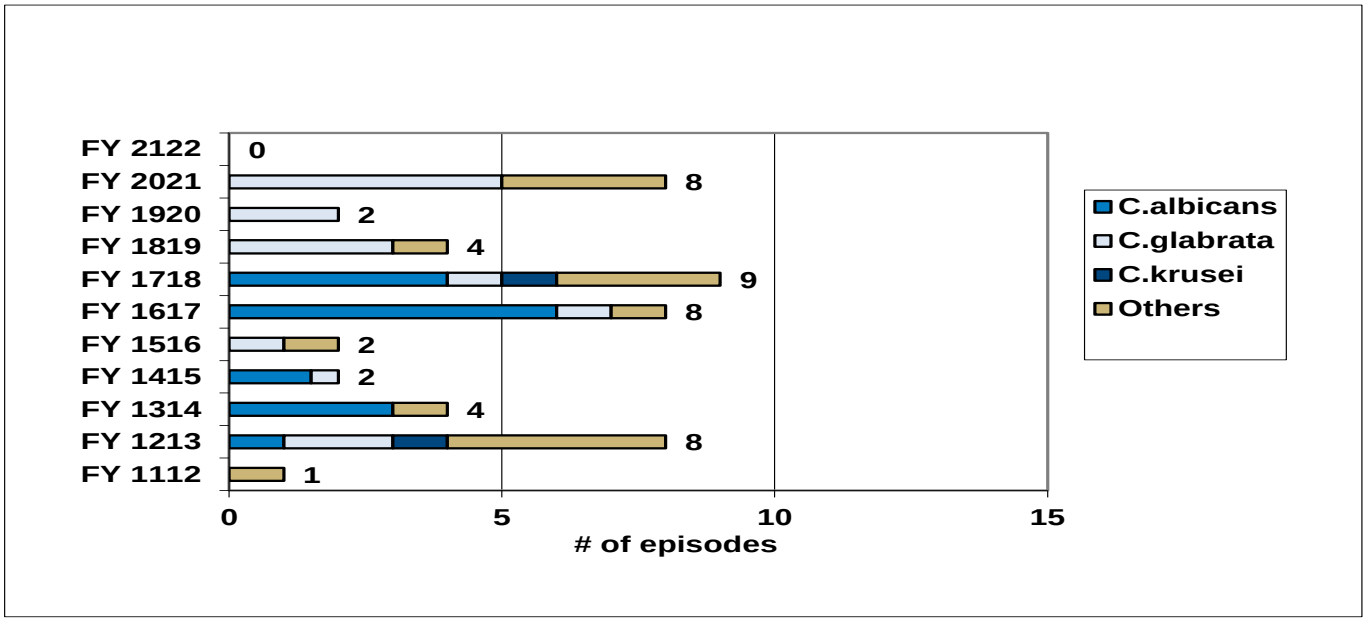


Table 36: Yeast Species Isolated in Blood – Toronto General Hospital: Multi-Organ Transplant Program (MOTP)



NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

TORONTO REHABILITATION INSTITUTE

Toronto Rehabilitation Institute: Bickle

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 10.5% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 49.8% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 23.7% compared to YTD last year.
  - Antifungal costs per patient day decreased (↓) by 71.9% compared to YTD last year.

Toronto Rehabilitation Institute: Bickle
Antimicrobial Consumption and Costs Per Patient Day

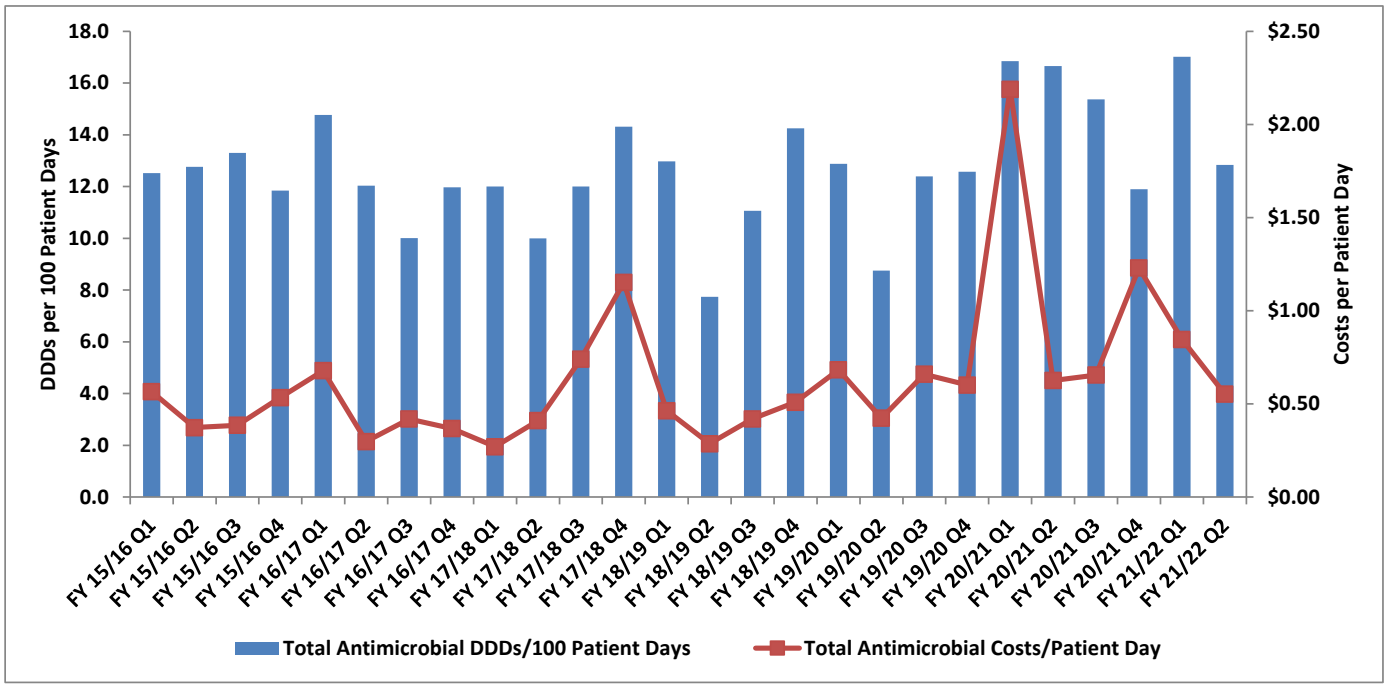


Table 37: Toronto Rehabilitation Institute: Bickle

Indicators	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY21/22 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs												
Total Antimicrobial DDDs/100 Patient Days	**13**	**12**	**12**	**11**	**12**	**15**	**17**	**13**			**15**	**17**
Systemic Antibacterial DDDs/100 Patient Days	11	11	11	11	11	14	15	12			14	15
Systemic Antifungal DDDs/100 Patient Days	2	2	1	1	1	1	2	1			1	2
Total Antimicrobial Costs	$31,326	$28,952	$38,119	$26,945	$37,344	$79,977	$16,708	$10,138			$26,846	$47,161
Total Antimicrobial Costs/Patient Day	**$0.46**	**$0.44**	**$0.63**	**$0.43**	**$0.59**	**$1.17**	**$0.85**	**$0.55**			**$0.70**	**$1.40**
Systemic Antibacterial Costs	$29,933	$23,571	$26,056	$26,265	$36,289	$43,790	$11,324	$7,413			$18,737	$21,674
Systemic Antibacterial Costs/Patient Day	$0.44	$0.36	$0.43	$0.42	$0.58	$0.64	$0.57	$0.40			$0.49	$0.64
Systemic Antifungal Costs	$1,393	$5,381	$12,063	$679	$1,055	$36,187	$5,390	$2,724			$8,114	$25,487
Systemic Antifungal Costs/Patient Day	$0.02	$0.08	$0.20	$0.01	$0.02	$0.53	$0.27	$0.15			$0.21	$0.76
Patient Care Outcomes												
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	7 (0.10)	7 (0.11)	4 (0.07)	1 (0.02)	1 (0.02)	4 (0.06)	0 (0)	4 (0.22)			4 (0.11)	4 (0.12)

Toronto Rehabilitation Institute: Lyndhurst

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 73.0% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 21.5% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 44.0% compared to YTD last year.
  - Antifungal costs per patient day increased (↑) by 598.0% compared to YTD last year.

Toronto Rehabilitation Institute: Lyndhurst
Antimicrobial Consumption and Costs Per Patient Day

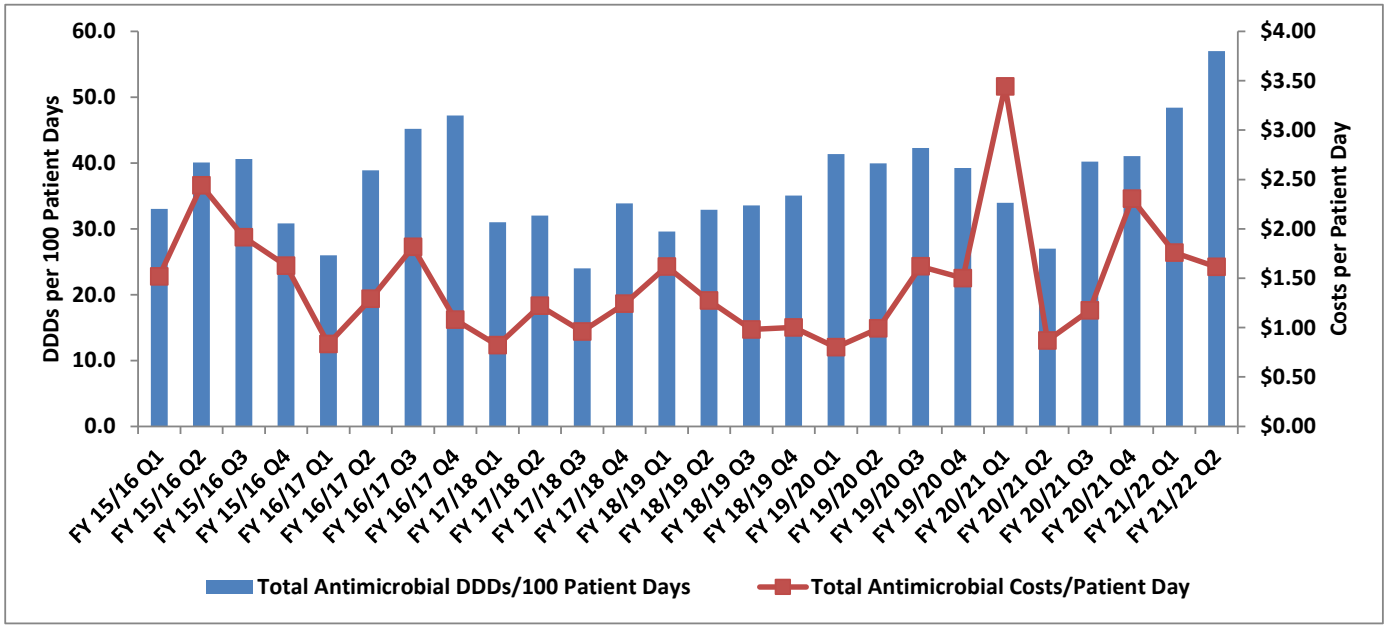


Table 38: Toronto Rehabilitation Institute: Lyndhurst

Indicators	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY21/22 Performance					YTD of Previous Year
							Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs												
Total Antimicrobial DDDs/100 Patient Days	**36**	**39**	**30**	**33**	**41**	**36**	**48**	**57**			**53**	**30**
Systemic Antibacterial DDDs/100 Patient Days	34	38	30	32	40	35	44	53			49	30
Systemic Antifungal DDDs/100 Patient Days	2	1	1	0	1	1	4	4			4	1
Total Antimicrobial Costs	$35,817	$23,520	$19,991	$23,262	$23,828	$37,955	$8,723	$7,895			$16,618	$20,646
Total Antimicrobial Costs/Patient Day	**$1.88**	**$1.26**	**$1.06**	**$1.22**	**$1.23**	**$1.95**	**$1.76**	**$1.61**			**$1.69**	**$2.15**
Systemic Antibacterial Costs	$35,473	$23,404	$18,691	$21,813	$22,712	$32,337	$4,231	$7,587			$11,819	$20,590
Systemic Antibacterial Costs/Patient Day	$1.86	$1.26	$0.99	$1.14	$1.17	$1.66	$0.85	$1.55			$1.20	$2.14
Systemic Antifungal Costs	$344	$116	$1,300	$1,450	$1,116	$5,618	$206	$196			$402	$56
Systemic Antifungal Costs/Patient Day	$0.02	$0.01	$0.07	$0.08	$0.06	$0.29	$0.04	$0.04			$0.04	$0.01
Patient Care Outcomes												
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	3 (0.16)	1 (0.05)	1 (0.05)	1 (0.05)	2 (0.1)	1 (0.05)	0 (0)	0 (0)			0 (0)	1 (0.1)

Toronto Rehabilitation Institute: University Centre

The FY 21/22 Q1 and Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 14.0% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 14.6% compared to YTD last year:
  - Antibacterial costs per patient day decreased (↓) by 32.1% compared to YTD last year.
  - Antifungal costs per patient day decreased (↓) by 2.1% compared to YTD last year.

Toronto Rehabilitation Institute: University Centre Antimicrobial Consumption and Costs Per Patient Day

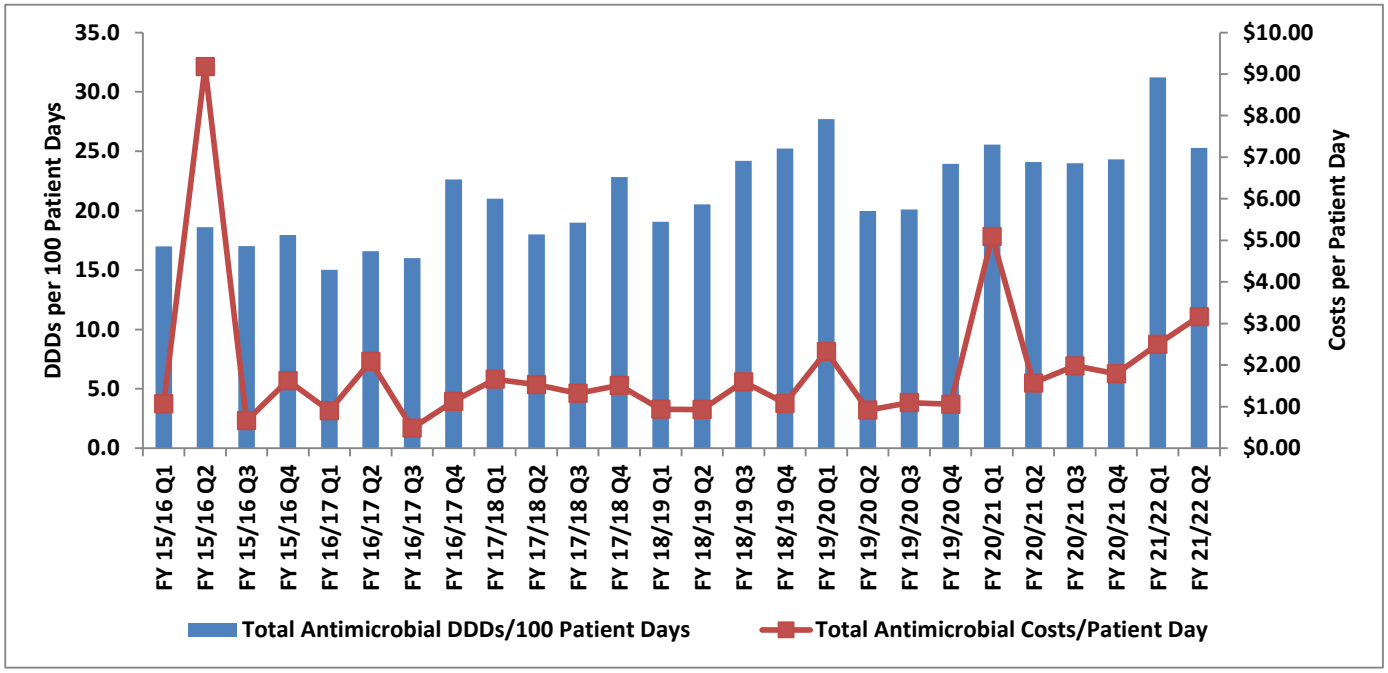


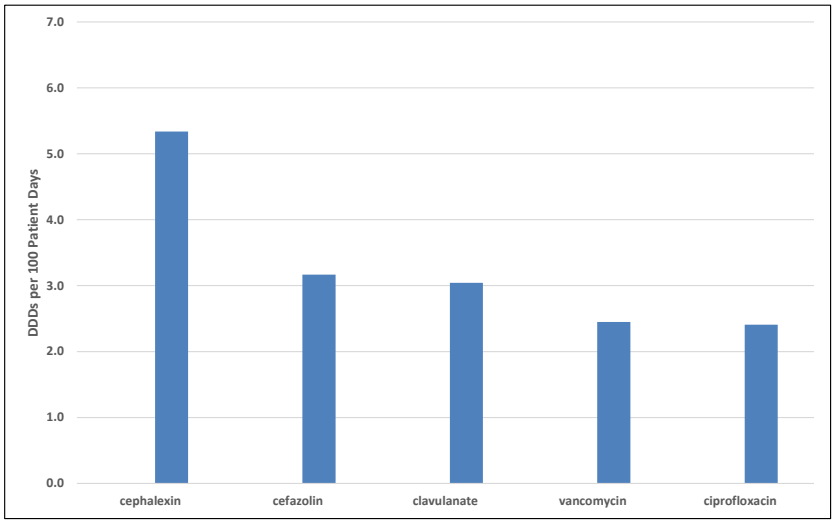
Table 39: Toronto Rehabilitation Institute: University Centre

Indicators	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY21/22 Performance					YTD of Previous Year
							Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs												
Total Antimicrobial DDDs/100 Patient Days	**18**	**18**	**18**	**22**	**23**	**24**	**31**	**25**			**28**	**25**
Systemic Antibacterial DDDs/100 Patient Days	16	15	15	19	19	20	25	21			23	21
Systemic Antifungal DDDs/100 Patient Days	1	3	3	4	4	4	6	4			5	4
Total Antimicrobial Costs	$154,345	$58,364	$58,364	$59,142	$70,519	$118,011	$30,816	$38,216			$69,032	$74,544
Total Antimicrobial Costs/Patient Day	**$3.09**	**$1.14**	**$1.14**	**$1.14**	**$1.36**	**$2.59**	**$2.50**	**$3.17**			**$2.83**	**$3.31**
Systemic Antibacterial Costs	$52,505	$30,908	$30,908	$43,669	$36,357	$51,287	$11,654	$11,138			$22,792	$30,989
Systemic Antibacterial Costs/Patient Day	$1.05	$0.60	$0.60	$0.84	$0.70	$1.12	$0.95	$0.92			$0.93	$1.38
Systemic Antifungal Costs	$1,840	$27,456	$27,456	$15,473	$34,162	$66,724	$19,161	$27,079			$46,240	$43,555
Systemic Antifungal Costs/Patient Day	$0.04	$0.54	$0.54	$0.30	$0.66	$1.46	$1.56	$2.24			$1.90	$1.94
Patient Care Outcomes												
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	2 (0.04)	2 (0.04)	2 (0.04)	4 (0.08)	2 (0.04)	8 (0.18)	0 (0)	0 (0)			0 (0)	6 (0.27)

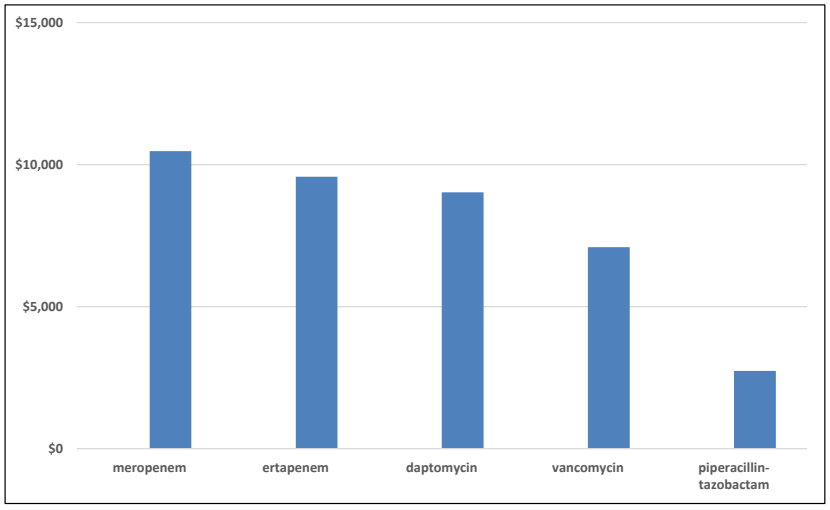
BRIDGEPOINT HEALTH

Bridgepoint Health: Hospital-Wide

Bridgepoint Health: Hospital-Wide
Top 5 ANTIBACTERIALS by Usage
2021/22 YTD



Bridgepoint Health: Hospital-Wide
Top 5 ANTIBACTERIALS by Expenditures
2021/22 YTD



BEST PRACTICE GUIDELINES AND ALGORITHMS

- The Surgical Antimicrobial Working Group has been struck by the Surgical and Critical Care Program Safety and Quality Committee. Co-chaired by Drs. Andrew Morris and Preeti Dhar, and with representation from the ASP by Dr. Mark McIntyre, this working group is responsible for addressing antimicrobial use within the surgical program by focusing on use perioperatively and post-operatively. Current projects underway are focusing on the development and implementation of the modACCEPT tool led by Dr. Tariq Esmail (Anesthesia) and the development and implementation of procedure-based antimicrobial prophylaxis recommendations led by Drs. Mark McIntyre and Alon Vaisman (Infectious Diseases/Infection Prevention and Control). Future projects aim to assess and optimize management of postoperative prophylaxis and infection management.
- The Team Cefazolin group, of which Dr. Mark McIntyre is a member, won the Ontario Health Surgical Quality and Innovation Award for development and implementation of a cefazolin allergy screening tool into the Toronto Western surgical pre-admission unit. This tool aims to improve the rate of cefazolin usage in patients with self-reported beta-lactam allergies.
- Drs. Husain and So have implemented the ASP MOT Common Infections Management Guidelines for Solid Organ Transplant Patients. The guidelines have undergone consultative reviews by content experts in MOT and Transplant Infectious Diseases and have been introduced to all the transplant teams.
- The ASP-Allogeneic Bone Marrow Transplant Working Group was formed to update the antimicrobial prophylaxis guideline for allogeneic bone marrow transplant recipients. It is currently being formatted for incorporation into the existing High-Risk Febrile Neutropenia Protocol. Drs. Husain and So would like to thank the members of the Working Group for their contributions.
- Clinical summaries continue to be available on the ASP website and on mobile device web browsers for a series of common and important conditions. We continuously review and update all our clinical summaries – ensuring that they reflect best practices based on the current clinical literature.
- Whiteboard animation videos continue to be available on our program's YouTube channel.

EDUCATION

- As part of our General Internal Medicine (GIM) initiative, the ASP team has been providing ongoing education and support to GIM Pharmacists at both MSH and UHN. The ASP team provides education and tools to physicians and medical trainees through several means, including ASP/ID GIM case-based noon rounds and via a mobile ASP web application (http://www.antimicrobialstewardship.com/treatment) to provide efficient access to resources.
- Once a month the ASP team meets with all Nurse Practitioners from the Malignant Hematology program for case rounds.
- The Leslie Dan Faculty of Pharmacy at the University of Toronto is the first institution to offer an elective in Antimicrobial Stewardship in the Entry-to-Practice Doctor of Pharmacy Curriculum. Drs. Linda Dresser (now retired) and Mark McIntyre are the course coordinators, with contributions from other ASP team members.
- The SH-UHN ASP continues to provide ASP rotations for residents and fellows from across the country and internationally.
- The Michener Critical Care RN Infection Module has been offered four times now, once a quarter.

MEMBERSHIPS

Public Health Agency of Canada

Dr. Andrew Morris is an invited member of EAGAR (Expert Advisory Group on Antimicrobial Resistance), chaired by the Federal Chief Medical Officer of Health, Dr. Theresa Tam. Dr. Morris co-chairs an initiative through the Public Health Agency of Canada to develop a National AMR Network.

Association of Medical Microbiology and Infectious Diseases Canada

Dr. Andrew Morris is a physician member of AMMI Canada's Antimicrobial Stewardship and Resistance Committee. Dr. Linda Dresser (now retired) is a pharmacist member of this committee.

Federal/Provincial/Territorial Pan-Canadian Antimicrobial Stewardship Task Group

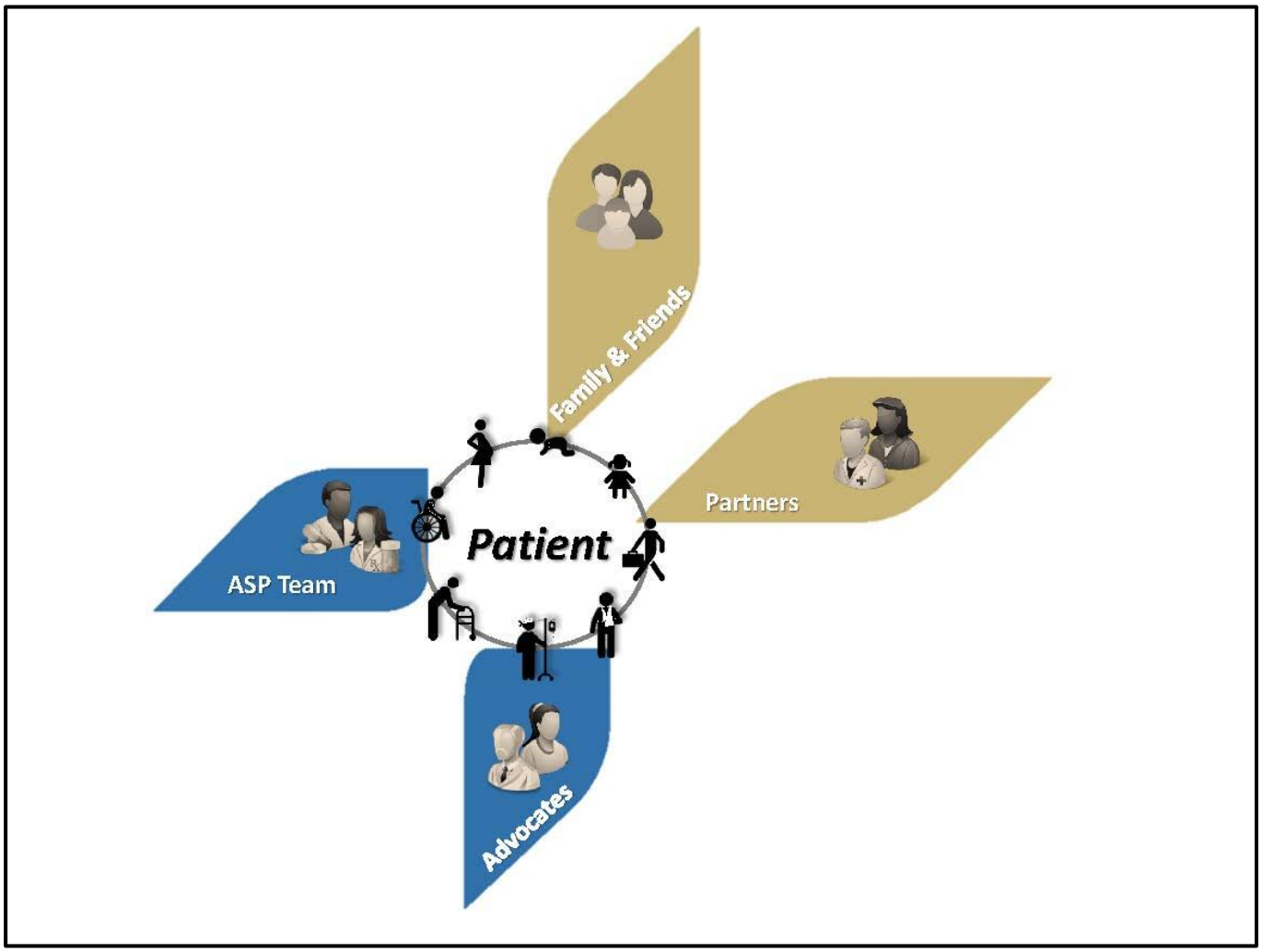
Yoshiko Nakamachi is a member of the Federal/Provincial/Territorial Pan-Canadian Antimicrobial Stewardship Task Group for the development of the Pan-Canadian AMR Framework and AMR Action Plan.

Ontario College of Pharmacists

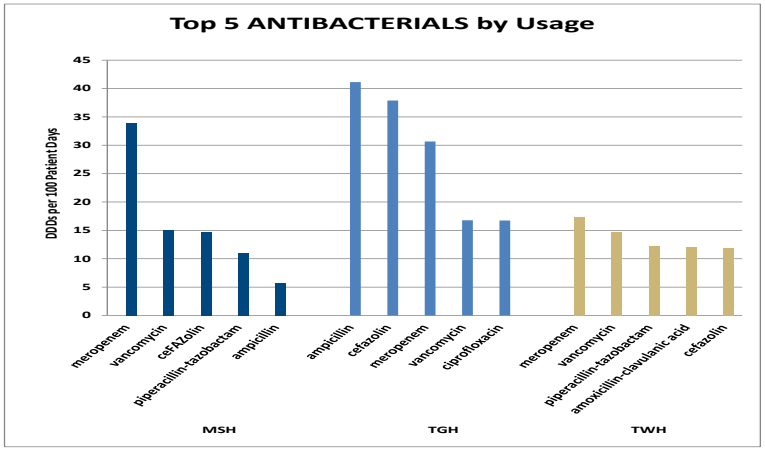
Yoshiko Nakamachi and Drs. Andrew Morris and Mark McIntyre are members of the Minor Ailments Advisory Group, which will provide recommendations that will inform the regulatory submission on expanded scope of practice for Ontario pharmacists.

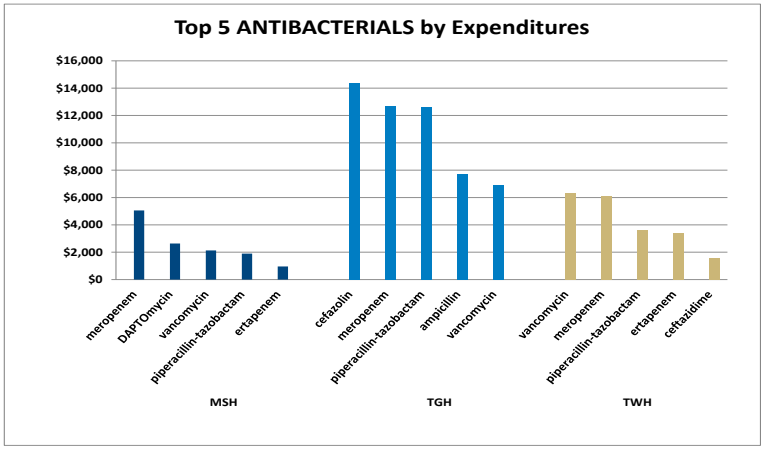
STRATEGIC PLANNING

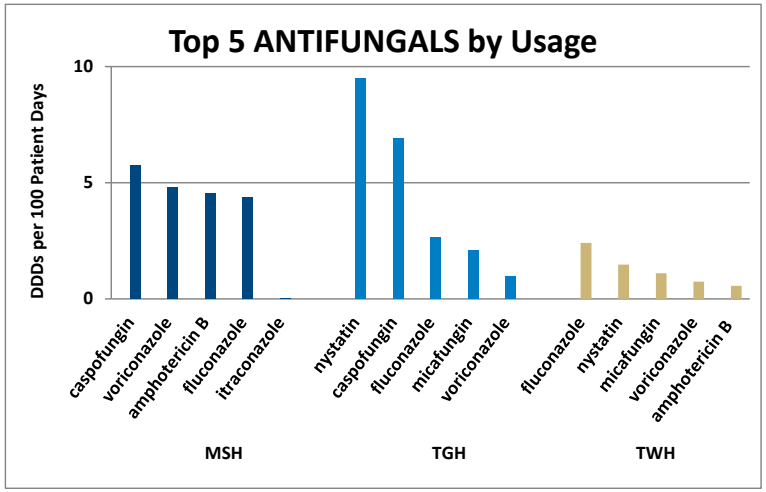
The ASP team developed the SH-UHN ASP Strategic Plan 2016-2019. Please contact Yoshiko Nakamachi (Yoshiko.Nakamachi@uhn.ca) if you would like a copy.

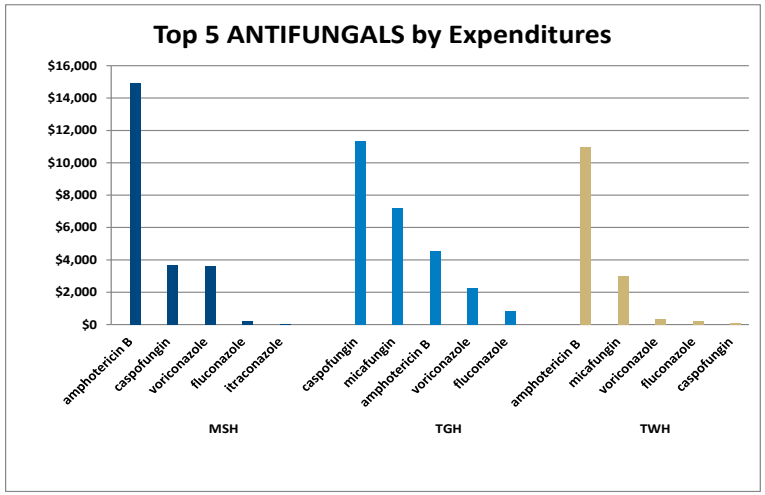


Appendix 1: FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site

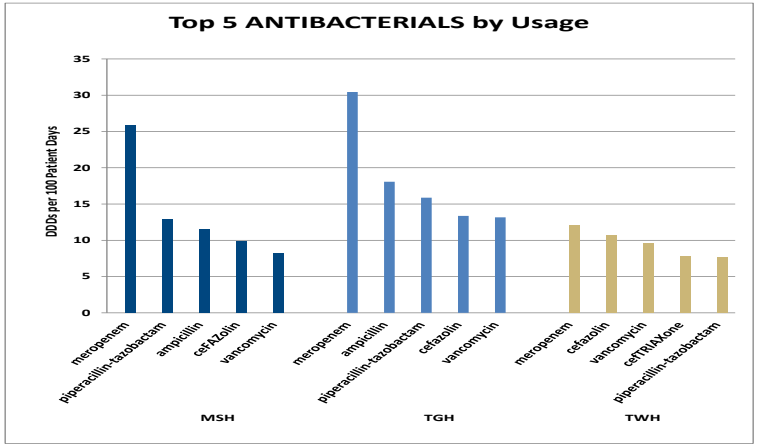


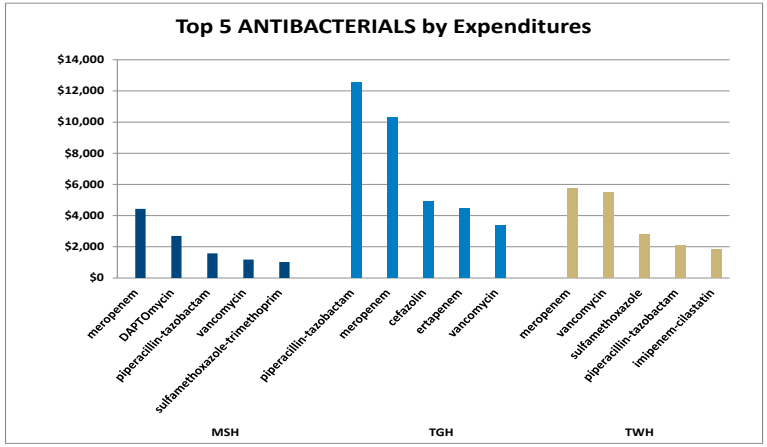


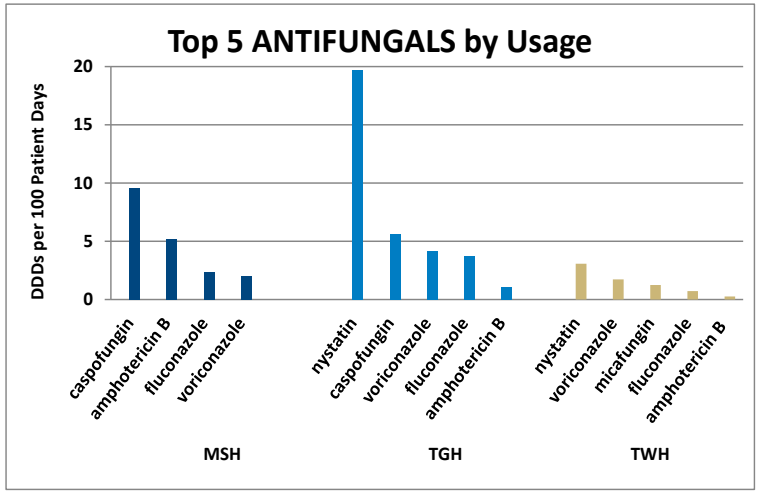


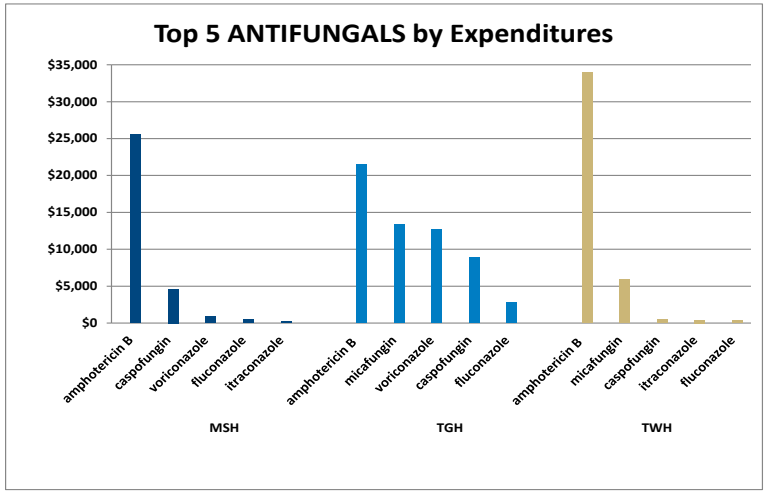


Appendix 2: FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site

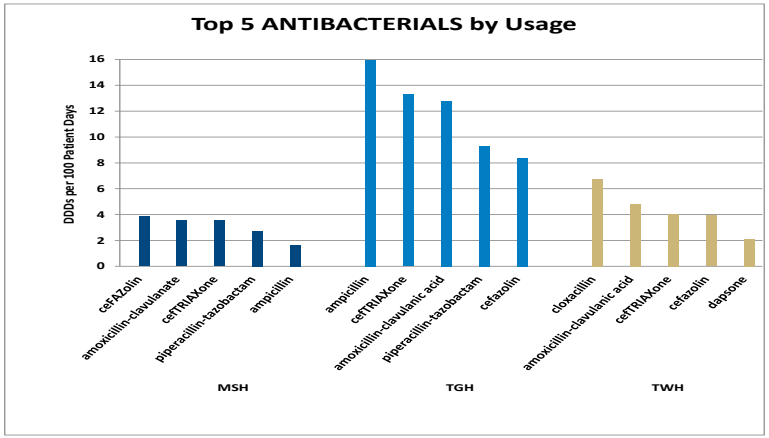


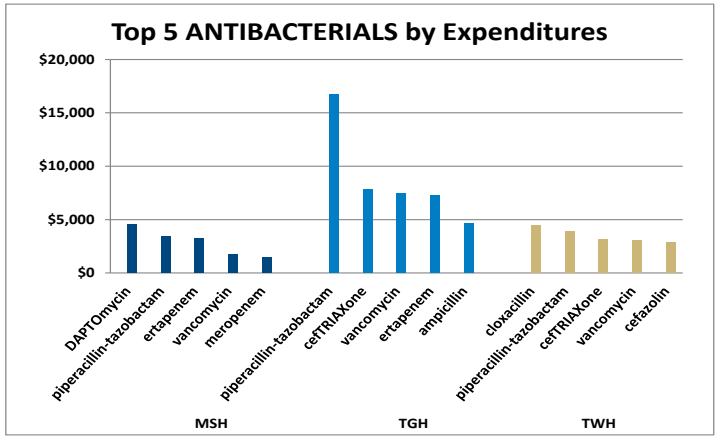


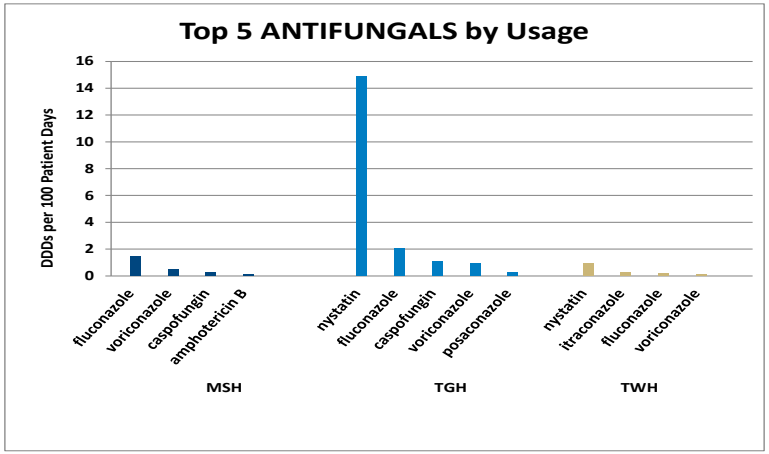


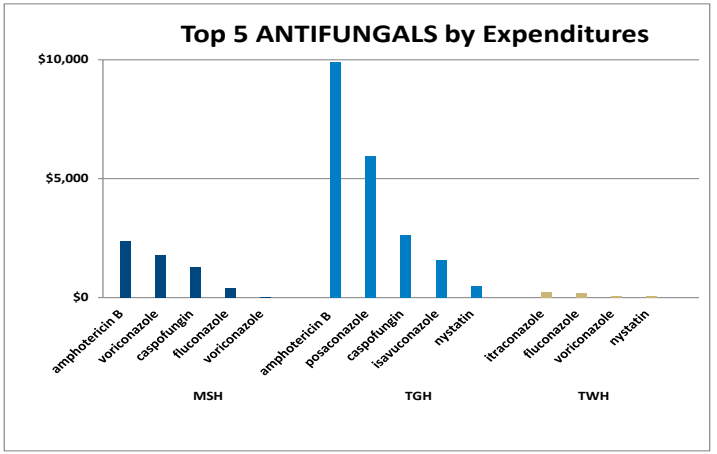
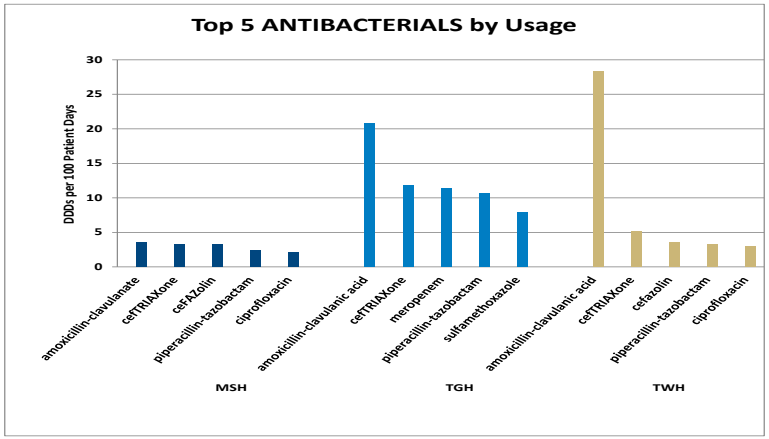
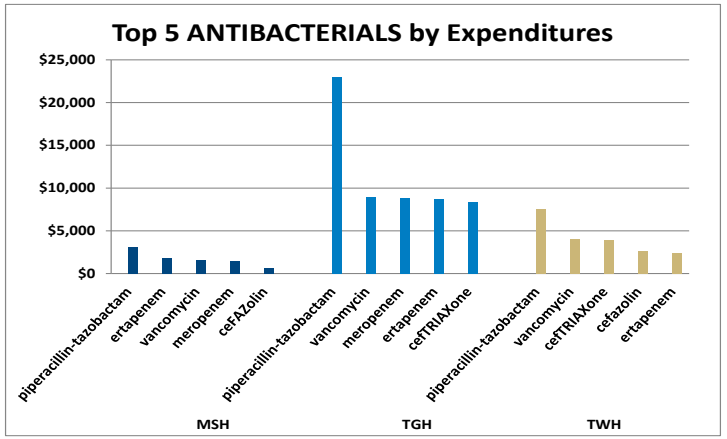
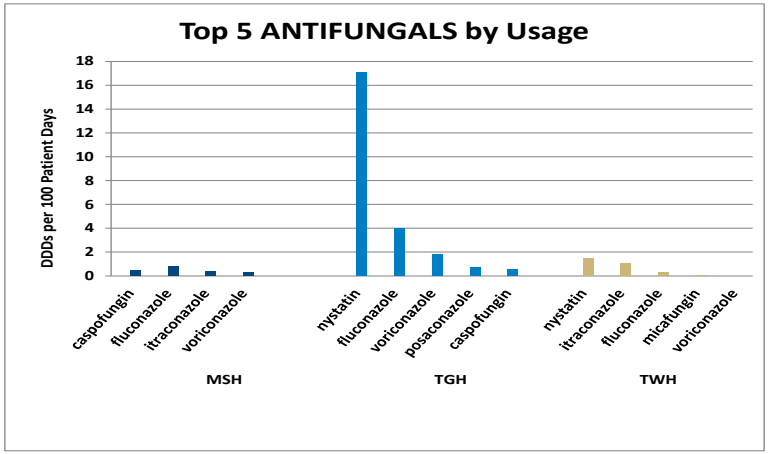
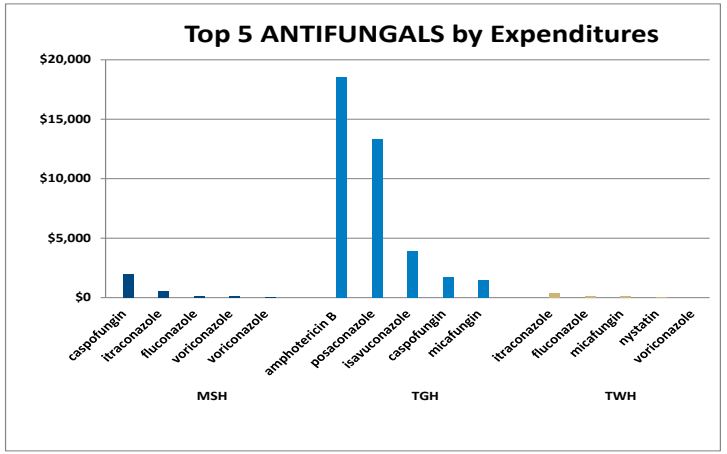


Appendix 3: General Internal Medicine FY 21/22 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures









Appendix 4: General Internal Medicine FY 21/22 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures