

SHS + UHN

ASP

ANTIMICROBIAL
STEWARDSHIP
PROGRAM



Q1 REPORT

FISCAL YEAR 2017 | 2018



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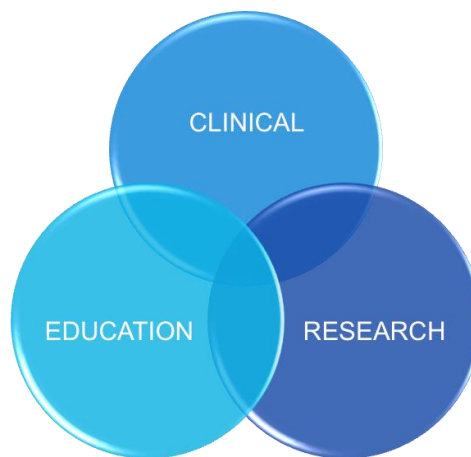
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“Getting patients the right antibiotics, when they need them”

EXECUTIVE SUMMARY

The Sinai Health System-University Health Network Antimicrobial Stewardship Program (SHS-UHN ASP) was established in 2009. The SHS-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 SHS-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 System (Bridgepoint Health and Mount Sinai Hospital (MSH)) and University Health Network (Princess Margaret Cancer Centre (PM), Toronto General Hospital (TGH), Toronto Rehabilitation Institute (TRI), and Toronto Western Hospital (TWH)).

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.)

For the first time in our quarterly report, we are reporting on the antimicrobial use and cost at TRI. There is a general trend of decreased antimicrobial consumption and cost in the MSH NICU, TGH ICU, TGH CVICU, and TRI-Bickle. However, consumption and costs have increased in the PMCC Leukemia service, Allogeneic Bone Marrow Transplant Program (allo-BMT), Multi-Organ Transplant Program (MOTP), and TRI-University Centre, as well as all GIM units across UHN (exception – no increase cost at TWH). While there is a decrease in cost in the MSH ICU, TWH ICU, and at TRI-Lyndhurst, there is an increase in antimicrobial consumption in these units. With an increase in incidence of vancomycin-resistant enterococcus (VRE), we have seen a corresponding increase in daptomycin use (i.e. cost and consumption) at TGH and PM; we are investigating this. We are also currently investigating the rise in antimicrobial consumption and cost in General Internal Medicine at TGH.

Table 1: Summary of Antimicrobial Usage 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: 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 17/18 Q1 HIGHLIGHTS

Research – Published In This Quarter

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

- Vallipuram J, Dhalla S, Bell CM, Dresser L, Han H, Husain S, Minden M, Paul NS, So M, Steinberg M, Vallipuram M, Wong G, Morris AM. Chest CT Scans are Frequently Abnormal in Asymptomatic Patients with Newly Diagnosed Acute Myeloid Leukemia. *Leukemia and Lymphoma*: 2017 Apr;58(4):834-41.
- Bai AD, Agarwal A, Steinberg M, Showler A, Burry L, Tomlinson GA, Bell CM, Morris AM. Clinical predictors and clinical prediction rules to estimate initial patient risk for infective endocarditis in *Staphylococcus aureus* bacteremia: a systematic review and meta-analysis. *Clin Microbiol Infect*. 2017 May 6: [Epub ahead of print].
- Sasson G, Bai AD, Showler A, Burry L, Steinberg M, Ricciuto DR, Fernandes T, Chiu A, Raybardhan S, Science M, Fernando E, Morris AM, Bell CM. Staphylococcus aureus bacteremia in immunosuppressed patients: a multicenter, retrospective cohort study. *Clin Microbiol Infect*. 2017 Jul;36(7): 1231-41.
- Bai AD, Steinberg M, Showler A, Burry L, Bhatia RS, Tomlinson GA, Bell CM, Morris AM. Diagnostic Accuracy of Transthoracic Echocardiography For Infective Endocarditis Findings Using Transesophageal Echocardiography as the Reference Standard: A Meta-Analysis. *J Am Soc Echocardiogr*. 2017 Jul;30(7): 639-46.e8.
- McIntyre M, Naik L, Bell CM, Morris AM. The development and assessment of a physician-specific antibiotic usage and spectrum feedback tool. *Open Forum Infect Dis*. Volume 4, Issue 3, 1 July 2017, ofx124, <https://doi.org/10.1093/ofid/ofx124>.

There are currently an additional five manuscripts that have been submitted to medical journals and are undergoing peer review, as well as four manuscripts that are close to ready for submission.

Abstracts

- Quinn KL, Bell CM, Daneman N, Morris AM, Jeffs L, Maxwell CJ, Bronskill SE. Going beyond antimicrobial stewardship to identify outliers in drug prescribing: a protocol for a cohort study of frail older adults. Oral Presentation: CFN Annual Conference, Toronto, Ontario, April 23-24, 2017
- Kruger S, Jeffs L, Bell CM, Morris AM, Bronskill SE, Maxwell CJ, Steinberg M, Zahradnik M. Potentially Inappropriate Medication Use in Long-Term Care: Preliminary Findings from a Qualitative Analysis. Oral Presentation: CFN Annual Conference, Toronto, Ontario, April 23-24, 2017

- So M, Morris AM, Bell CM, Humar A, Husain S. Effect of Academic Detailing with Prescribers for Antimicrobial Stewardship in Solid Organ Transplant Patients. Oral presentation; 2017 American Transplant Congress Chicago, Illinois, Apr 29 to May 3, 2017
- Natori Y, So M, Husain S, Bell CM, Morris AM. Impact of an Antimicrobial Stewardship Program to Reduce Drug-Resistant Bacteremia in Patients with Hematological Malignancies. Student poster presentation; AMMI Canada, Toronto, Ontario, May 3-6, 2017
- McIsaac W, Morris AM, Senthinathan A, Nakamachi Y, Steinberg M, Moineddin R, Dresser L, McIntyre M, Bell CM, Bloom J, Tannenbaum D. Designing an Effective Outpatient Antimicrobial Stewardship Program to Reduce Unnecessary Antibiotic Use in Primary Care using a Mixed-Methods Collaborative Model. 'Incubator stream' poster presentation; AMMI Canada, Toronto, Ontario, May 3-6, 2017
- Zahradnik M, Jeffs L, Morris AM, Nakamachi Y, Steinberg M, Kruger S, Bell CM, Law M. Using Quality Improvement Methods to Sustain Optimal Antimicrobial Use in the ICU Setting. Poster Presentation; AMMI Canada; Toronto, Ontario, May 3-6, 2017
- Zahradnik M, Jeffs L, Morris AM, Nakamachi Y, Steinberg M, Kruger S, Bell CM, Law M. Building Capacity to Improve & Sustain Antimicrobial Stewardship Programs in ICUs. Poster Presentation; Canadian Association for Health Services and Policy Research (CAHSPR); Toronto, Ontario, May 24-26, 2017

Best Practices

Several algorithms and best practice guidelines have been developed and implemented into practice across UHN and SHS. The algorithms and best practices can be found [here](#) on our ASP website.

Miranda So (ASP Pharmacist) and Dr. Shahid Husain (ASP Physician) continue to work closely with the **Multi-Organ Transplant Program** to develop best practice "Guidelines for Common Infections in Solid Organ Transplant Patients". The guidelines have undergone consultative reviews with stakeholders, content experts, and key opinion leaders and have been implemented into practice.

An **ASP nurse-focused initiative** aimed at reducing overtreatment of **Asymptomatic Bacteriuria** is currently in progress. This intervention is led by our **ASP Nurse Leader, Linda Jorgoni**, and includes providing audit and feedback to selected units and educational sessions and urine culture surveys to assess nurse behaviour and sentiments towards urine cultures. The results of this initiative will help to further inform us of the best strategies to support knowledge translation and reduce unnecessary urine C&S utilization and reduce asymptomatic bacteriuria and/or antibiotic usage.

Provincial, National, and International Role

On June 15, 2017, ASP team members Dr. Andrew Morris and Yoshiko Nakamachi were asked to appear as expert witnesses before the **House Standing Committee on Health (HESA)** in Ottawa. They were called upon to provide expert testimony on antimicrobial resistance during the 42nd Parliament, 1st session meeting. Dr. Morris spoke as Chair of the Antimicrobial Stewardship and Resistance Committee,

Association of Medical Microbiology and Infectious Disease Canada. Ms. Nakamachi spoke on behalf of the **Canadian Nurses Association**.

Our team had previously partnered with **Public Health Ontario** in hosting an Ontario Antimicrobial Stewardship Roundtable. After that roundtable, the **Ministry of Health and Long-Term Care (MoHLTC)** asked to meet with the SHS-UHN ASP to discuss an Ontario Strategy for antimicrobial resistance (AMR). Specifically, during their June 28 visit with our team, the proposed strategy included:

- Surveillance of antimicrobial use and feedback to users for peer comparison
 - Setting of standards for hospital-based reporting of usage and inclusion in HQO Quality-Improvement Plans
 - Having mandatory provincial point prevalence audits/surveys of antimicrobial use
- Setting standards for Antimicrobial Prescribing
- Moving to standardize and centralize antimicrobial purchasing province-wide
- Developing Human Resources in Antimicrobial Stewardship
- Developing and implementing a public awareness campaign regarding antimicrobial resistance and antimicrobial use.

As previously reported, the SHS-UHN ASP has been working 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). Members of our ASP team led the Pan-Canadian Action Round Table with 50 experts and champions of change on antimicrobial resistance (AMR). An expert group (the AMS Canada Steering Committee), which includes members Dr. Andrew Morris and Yoshiko Nakamachi, identified and committed to three “table setting” activities in AMS that support a National Action Plan on AMR. Specifically, these three activities are as follows:

1. Developing an evaluation protocol to assess progress in national AMS efforts.
2. Modeling strategies for educating the public on AMR and AMS.
3. Developing and promoting national guidelines on antimicrobial use for primary care practitioners treating common infections.

In addition, a proposed solution was put forth for the Federal Government to commit substantial federal investment to support the provinces and territories in implementing national antimicrobial stewardship (AMS) initiatives in Canada as they relate to three key areas:

1. Leadership, Governance, and Resources;
2. Data, and;
3. Standardization and Best Practices.

The SHS-UHN ASP continues to be a leader in antimicrobial stewardship and is currently working with, and providing expert guidance to, over 30 hospitals, as well as to **PSASS** (Pharmacy Students for Antimicrobial Stewardship Society), **DSASS** (Dental Students for Antimicrobial Stewardship Society), and **SASS** (Students for Antimicrobial Stewardship Society).



The Leslie Dan Faculty of Pharmacy at the University of Toronto continues to be the only Pharmacy School in Canada to offer an antimicrobial stewardship elective course, which is led by Miranda So, Assistant Professor (SHS-UHN ASP Pharmacist).

FISCAL YEAR 17/18 Q1 RESULTS

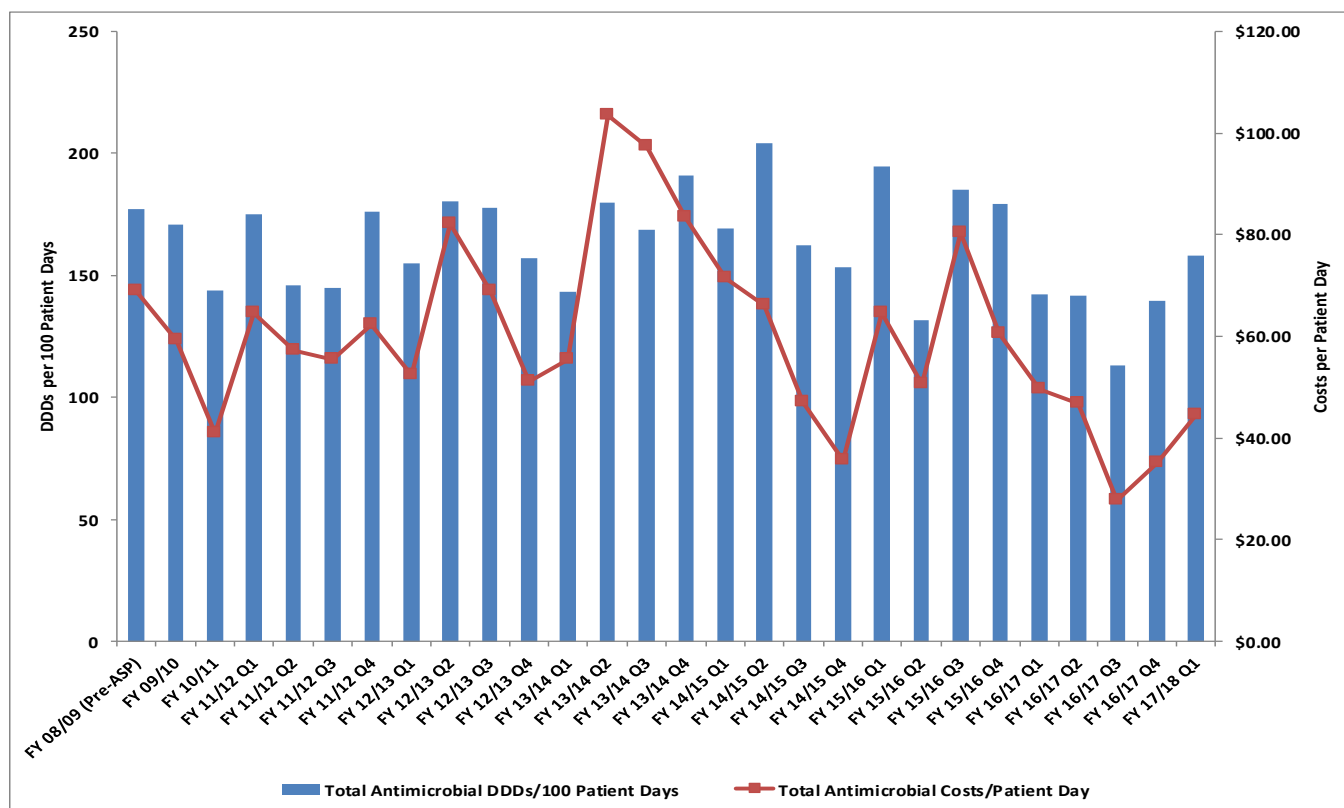
CRITICAL CARE

Mount Sinai Hospital: Medical Surgical ICU

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 11.3% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 10.3% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 40.1% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 27.2% compared to YTD last year.
- NB: Patients transferred from Princess Margaret accounted for 11% of patient visits and 64% of the antimicrobial costs.

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



To view **Appendix 1: FY 17/18 Q1 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 increased (↑) by 3.6% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 0.6% compared to YTD last year.

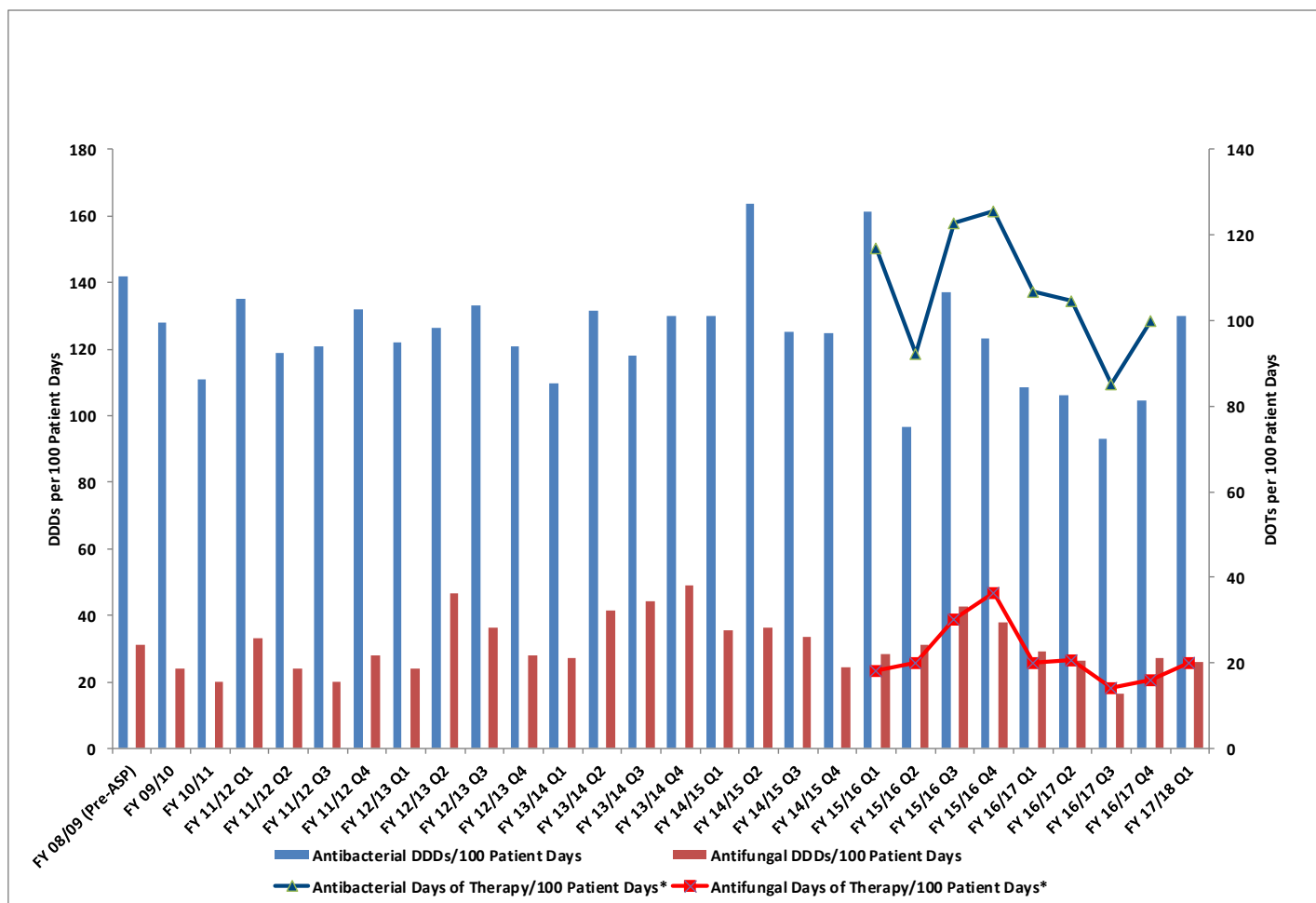


Table 2: Mount Sinai Hospital: Medical Surgical ICU

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 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	158				158	142
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	127	123	136	116	103	130				130	108
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	35	41	25	32	25	26				26	29
Total Antimicrobial Costs	\$332,724	\$285,975	\$193,129	\$279,859	\$291,470	\$424,044	\$232,814	\$274,258	\$187,684	\$50,392				\$50,392	\$59,907
Total Antimicrobial Costs/Patient Day	\$69.01	\$59.23	\$40.95	\$59.22	\$62.37	\$85.36	\$62.54	\$61.45	\$39.96	\$44.44				\$44.44	\$49.55
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$125,339	\$134,811	\$108,886	\$92,928	\$68,246	\$57,257	\$20,134				\$20,134	\$15,318
Systemic Antibacterial Costs/Patient Day	\$36.16	\$29.44	\$20.31	\$26.94	\$28.85	\$21.92	\$20.71	\$15.29	\$12.19	\$17.75				\$17.75	\$12.67
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$141,877	\$144,811	\$296,573	\$134,504	\$189,661	\$119,234	\$29,026				\$29,026	\$42,494
Systemic Antifungal Costs/Patient Day	\$29.68	\$27.45	\$18.87	\$30.50	\$30.99	\$59.70	\$40.53	\$42.50	\$25.39	\$25.60				\$25.60	\$35.15
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	111	109	115	99	111				111	107
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	17	21	27	18	20				20	20
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)	1 (0.88)				1 (0.88)	0 (0.00)
ICU Average Length of Stay (Days)	5.84	5.57	5.67	5.51	5.24	6.10	5.26	4.45	4.195	4.015				4.015	4.18
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.5	17.04	15.3	13.9	14.2	12.5	10.7				10.7	9.5
ICU Readmission Rate Within 48 Hrs (as a %)	3.2	2.9	2.7	2.7	1.86	3.2	2.6	2.1	2.5	4.3				4.3	3.2
ICU Ventilator Days	NA	3286	2934	2677	2749	3069	2597	2504	2231	702				702	552
ICU Multiple Organ Dysfunction Score (MODS)	4.00	4.04	4.12	4.25	4.62	4.87	4.73	4.43	3.92	3.69				3.69	3.6

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 Q3. That figure has now been corrected.

Table 3: Mount Sinai Hospital: Medical Surgical ICU Total Antimicrobial Costs

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 Q1	FY 17/18 Q2	FY 17/18 Q3	FY 17/18 Q4	FY 17/18 YTD	Previous YTD
Non-PM Patients	\$78,737	\$87,931	\$109,283	\$150,870	\$135,395	\$71,509	\$59,167	\$18,333				\$18,333	\$17,979
	(\$21.14)	(\$25.42)	(\$31.77)	(\$37.54)	(\$37.70)	(\$23.5)	(\$9.78)	(\$16.73)				(\$16.73)	(\$8.28)
PM Patients	\$114,392	\$191,928	\$182,188	\$273,174	\$97,419	\$202,749	\$755,530	\$32,058				\$32,058	\$41,928
	(\$179.02)	(\$181.58)	(\$249.91)	(\$317.64)	(\$135.68)	(\$218.05)	(\$191.53)	(\$191.96)				(\$191.96)	(251.06)
Total	\$193,129	\$279,859	\$291,470	\$424,044	\$232,814	\$274,258	\$1,222,586	\$50,392				\$50,392	\$59,907
	(\$44.26)	(\$61.97)	(\$69.91)	(\$87.40)	(\$52.46)	(\$67.17)	(27.93)	(\$39.90)				(\$39.90)	(25.62)

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 PM and Non-PM Patients (with costs/patient day indicated)

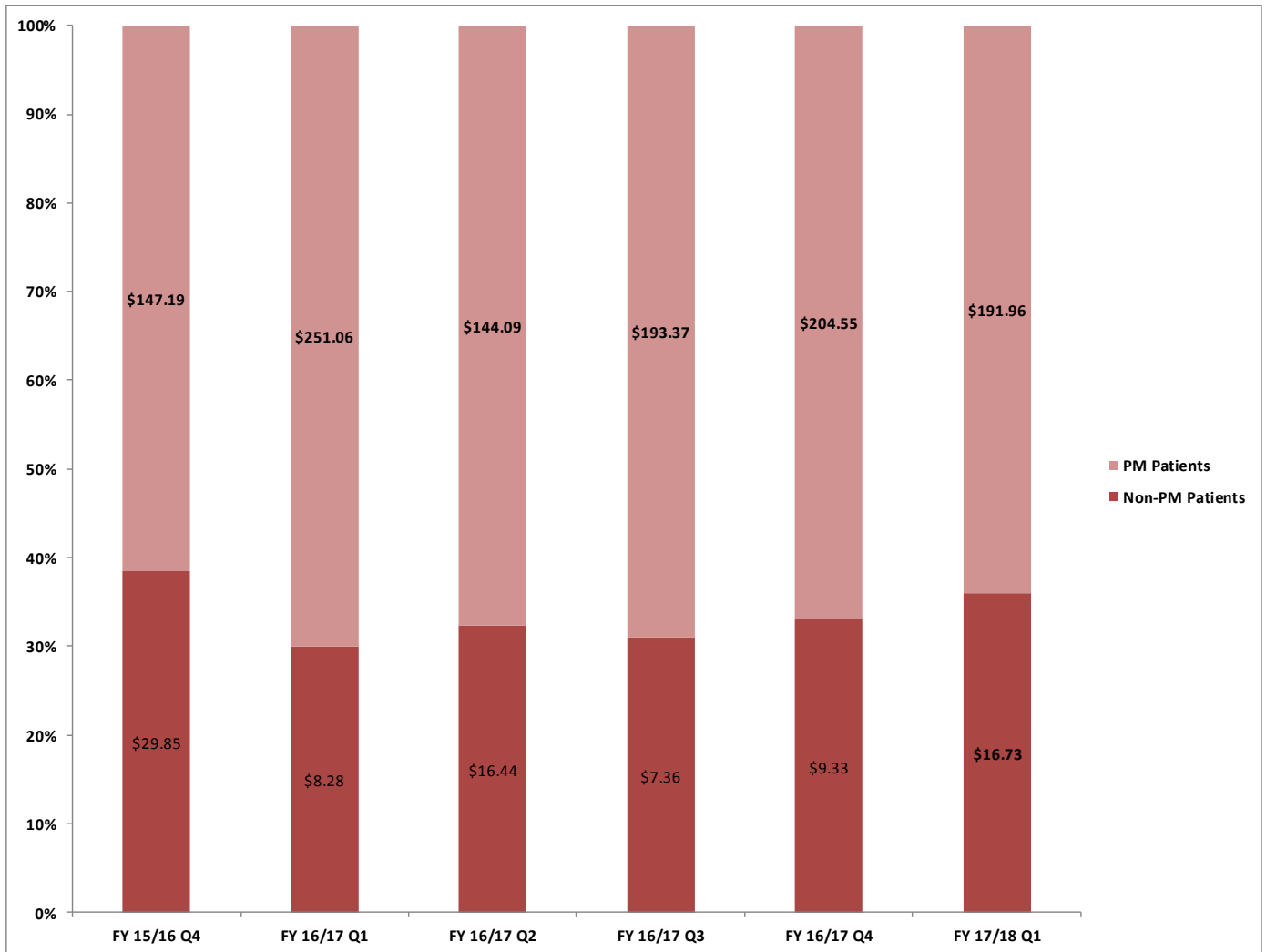
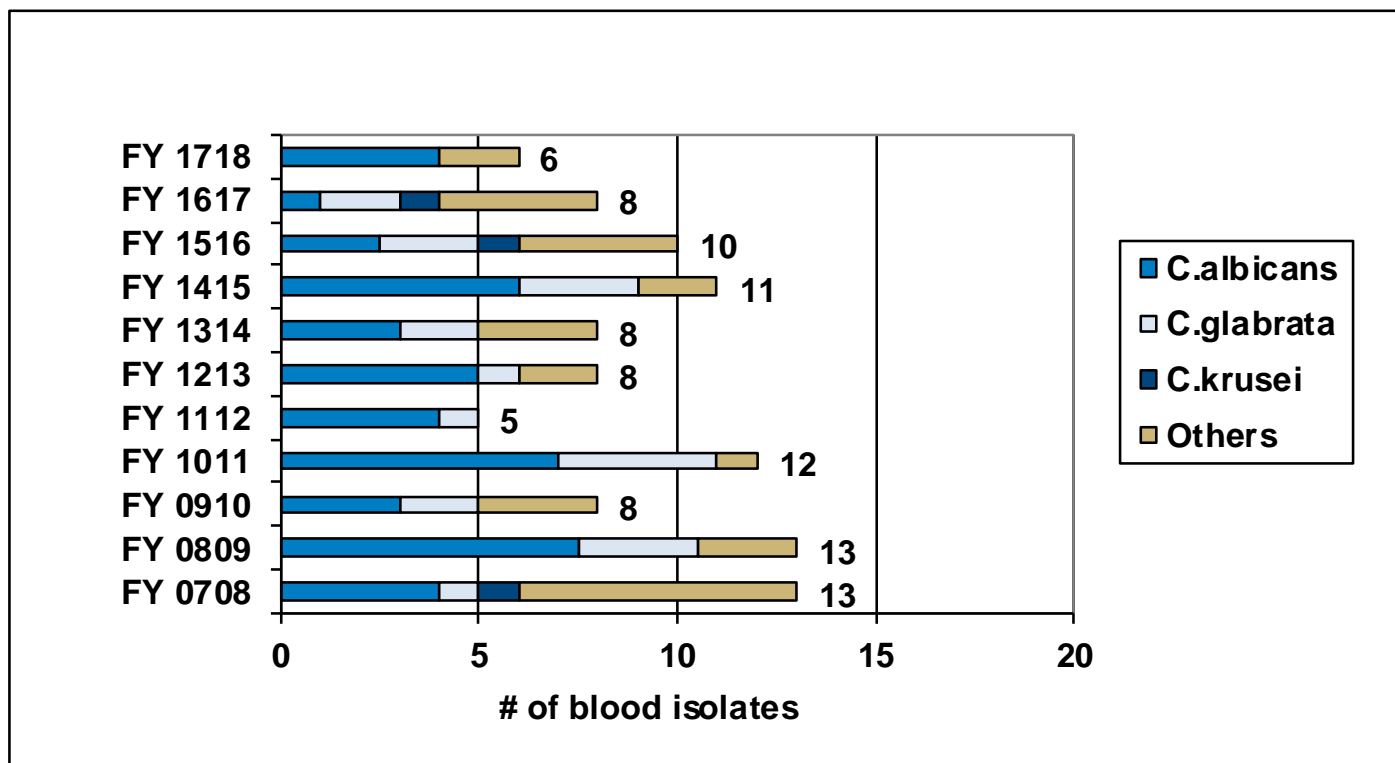


Table 4: Yeast Species Isolated in Blood – Mount Sinai Hospital: Medical Surgical ICU



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 considered to be the standard metric for antimicrobial consumption for neonates. The FY 17/18 Q1 summary includes:

- Antimicrobial days of therapy (DOT) per 100 patient days decreased (↓) by 13.2% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 57.7% compared to YTD last year.

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

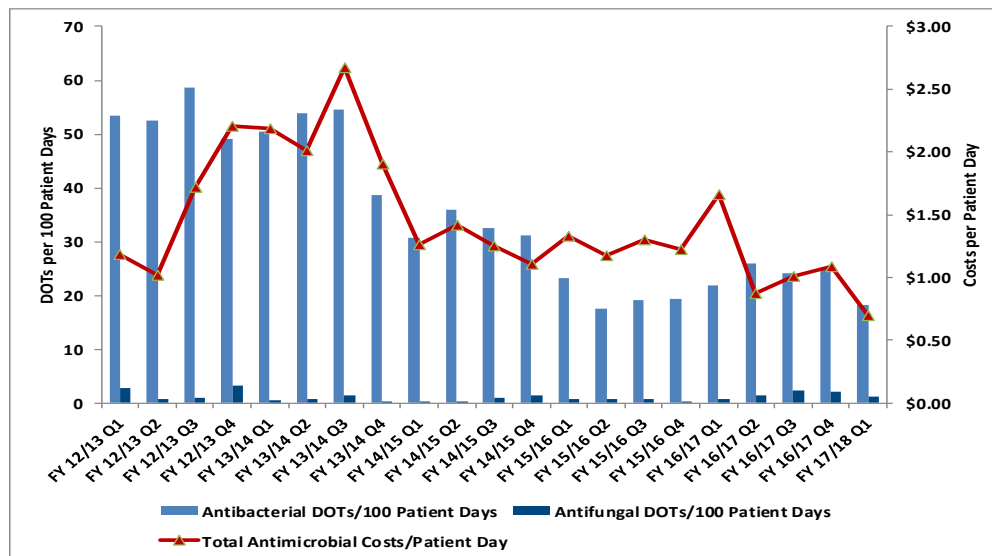


Table 5: Mount Sinai Hospital: Neonatal ICU

Indicators	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY17/18 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	19.5				19.5	22.5
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.5	48.7	32.7	19.9	24.2	18.3				18.3	21.9
Systemic Antifungal DOTs/100 Patient Days	2.2	1.8	0.7	0.8	0.7	1.6	1.2				1.2	0.6
Total Antimicrobial Costs	\$16,415	\$17,682	\$26,162	\$21,371	\$21,232	\$19,618	\$2,988				\$2,988	\$7,022
Total Antimicrobial Costs/Patient Day	\$1.31	\$1.51	\$2.17	\$1.26	\$1.26	\$1.15	\$0.70				\$0.70	\$1.66
Systemic Antibacterial Costs	\$14,783	\$16,505	\$25,290	\$20,516	\$20,804	\$18,247	\$2,965				\$2,965	\$6,810
Systemic Antibacterial Costs/Patient Day	\$1.18	\$1.41	\$2.10	\$1.21	\$1.23	\$1.07	\$0.70				\$0.70	\$1.61
Systemic Antifungal Costs	\$1,632	\$1,177	\$872	\$855	\$428	\$1,372	\$22				\$22	\$212
Systemic Antifungal Costs/Patient Day	\$0.13	\$0.10	\$0.07	\$0.05	\$0.03	\$0.08	\$0.005				\$0.01	\$0.05

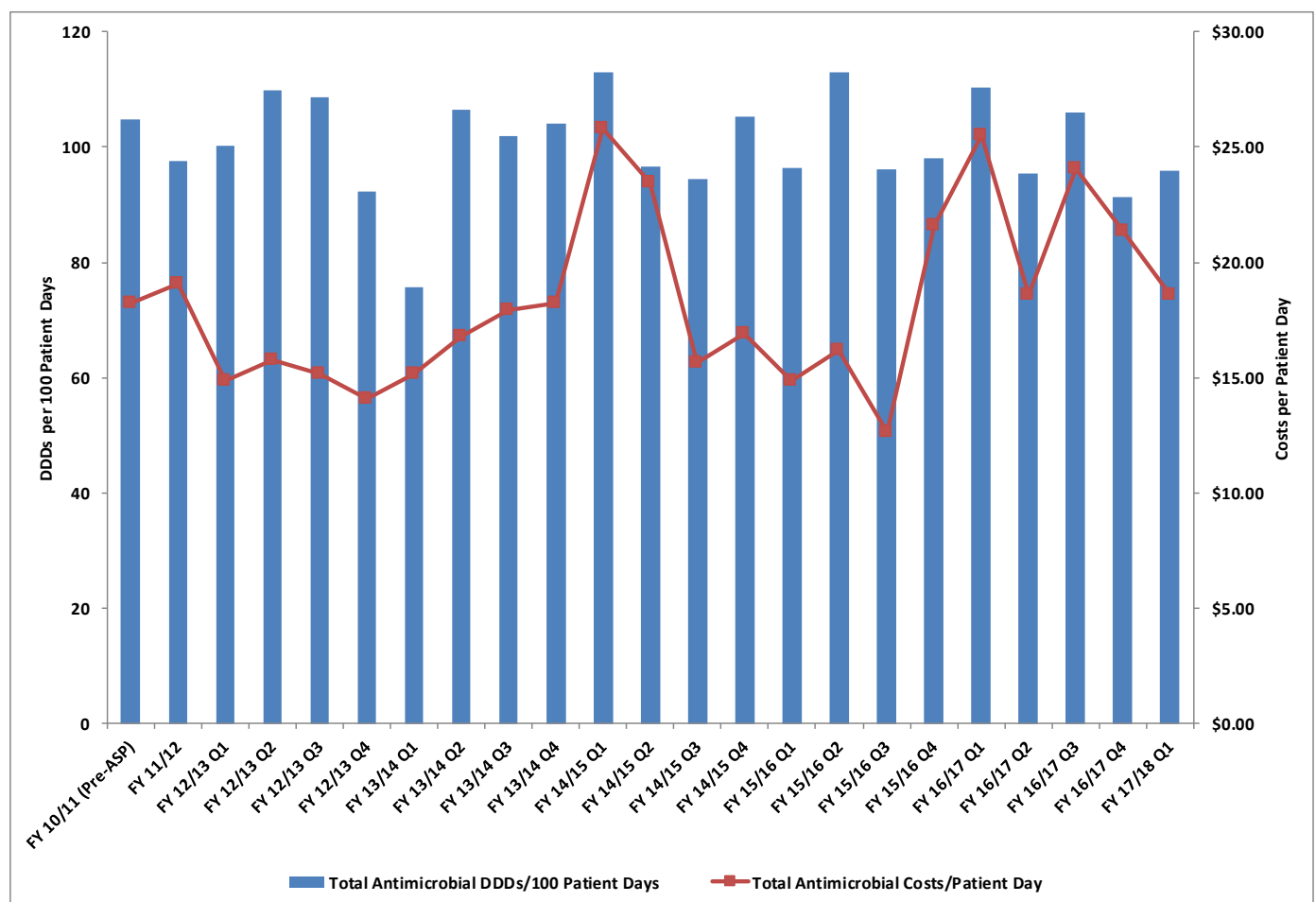
Notes: Effective January 15, 2014, the NICU changed to a mixed-acuity model of care. Prior to this, ASP reported level 3 pharmacy data only. As of January 15, pharmacy data includes both level 2 and level 3 usage and cost. Patient days include both level 2 and 3 days; January level 2 days were determined 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: Cardiovascular ICU

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 12.9% compared to YTD last year.
 - Antimicrobial costs per patient day decreased (↓) by 27.2% compared to YTD last year.
 - Antibacterial costs per patient day decreased (↓) by 19.1% compared to YTD last year.
 - Antifungal costs per patient day decreased (↓) by 41.0% 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 0.3% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 2.0% compared to YTD last year.

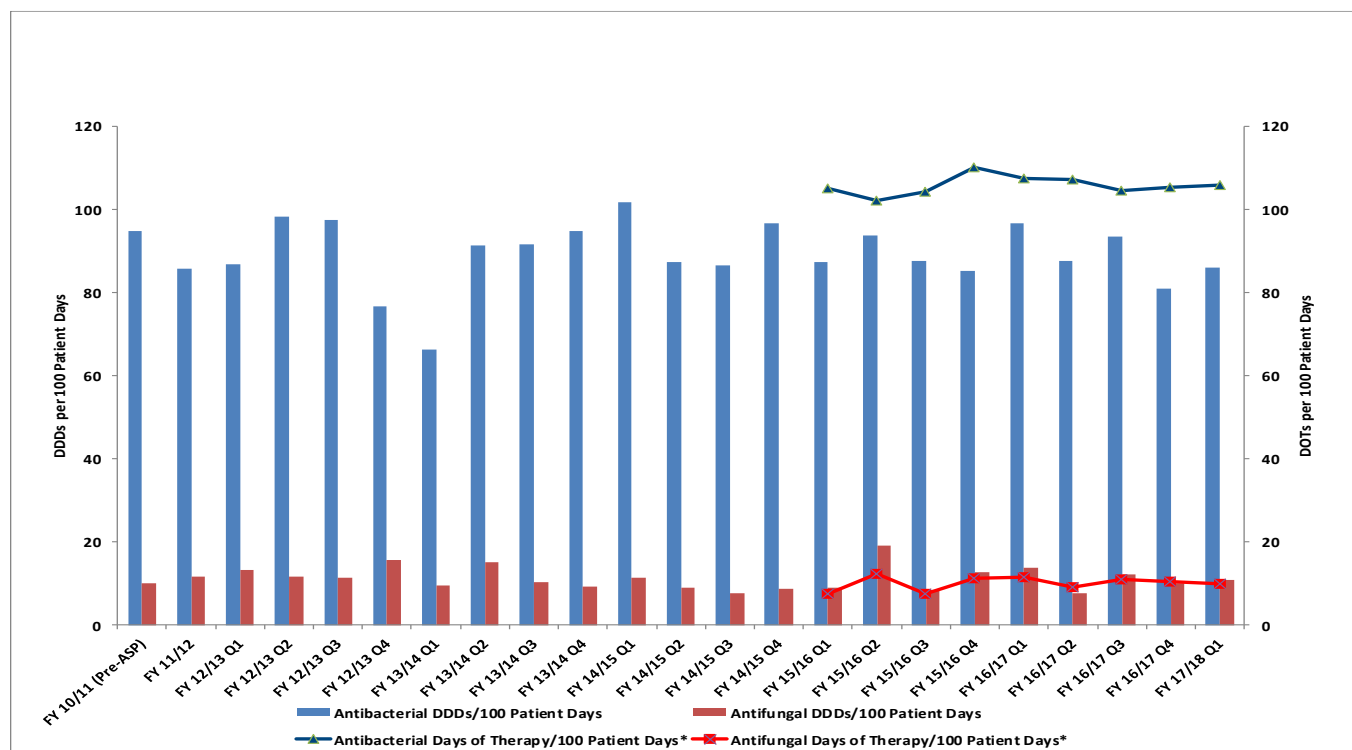


Table 6: Toronto General Hospital: Cardiovascular ICU

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 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	96				96	110
Systemic Antibacterial DDDs/100 Patient Days	95	86	89	86	93	89	90	86				86	97
Systemic Antifungal DDDs/100 Patient Days	10	12	13	11	9	13	11	11				11	14
Total Antimicrobial Costs	\$108,172	\$108,464	\$85,916	\$100,736	\$129,314	\$110,716	\$153,093	\$31,705				\$31,705	\$44,457
Total Antimicrobial Costs/Patient Day	\$18.20	\$19.06	\$14.99	\$17.00	\$20.46	\$16.34	\$22.44	\$18.60				\$18.60	\$25.54
Systemic Antibacterial Costs	\$100,375	\$99,261	\$74,232	\$80,204	\$91,366	\$85,343	\$96,782	\$22,253				\$22,253	\$28,103
Systemic Antibacterial Costs/Patient Day	\$16.89	\$17.44	\$12.95	\$13.54	\$14.45	\$12.60	\$14.19	\$13.05				\$13.05	\$16.14
Systemic Antifungal Costs	\$7,797	\$9,204	\$11,684	\$20,532	\$37,948	\$25,373	\$56,311	\$9,452				\$9,452	\$16,354
Systemic Antifungal Costs/Patient Day	\$1.31	\$1.62	\$2.04	\$3.47	\$6.00	\$3.75	\$8.26	\$5.54				\$5.54	\$9.39
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	129	105	106	106				106	107
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	28	10	11	10				10	12
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)	2 (1.17)				2 (1.17)	1 (0.57)
ICU Average Length of Stay (days)	3.12	2.95	2.97	3.20	3.46	3.45	3.48	3.08				3.08	3.13
ICU Mortality Rate (as a %)	3.5	3.0	3.0	4.6	4.6	4.0	3.7	5.0				5.01	4.6
ICU Readmission Rate Within 48 Hrs (as a %)	1.6	2.2	1.8	2.2	2.4	1.6	2.0	2.5				2.52	1.9
Central Line Infection Rate (per 1000 pt days)	0.73	0.17	0.34	0.16	0.15	0.53	0.84	0.0				0.00	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	0.93				0.93	1.89
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.51	5.77	5.60	5.83	6.04	6.02				6.02	6.15
ICU Ventilator Days	3015	3571	3676	4049	3925	4239	4917	1073				1073	1056

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 7: TGH CVICU FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures

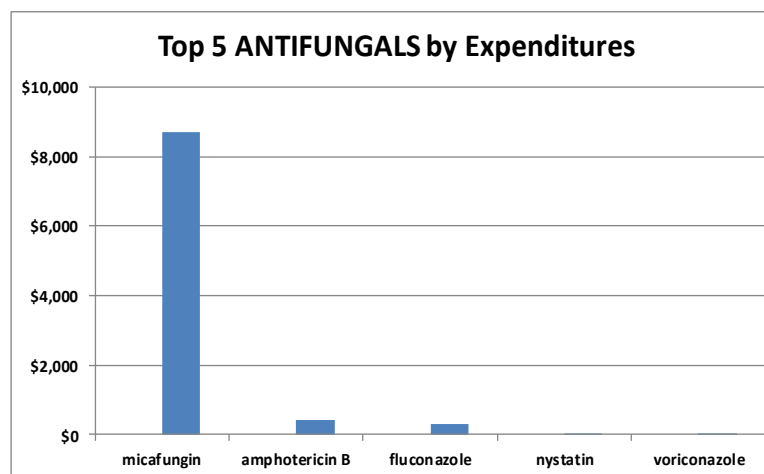
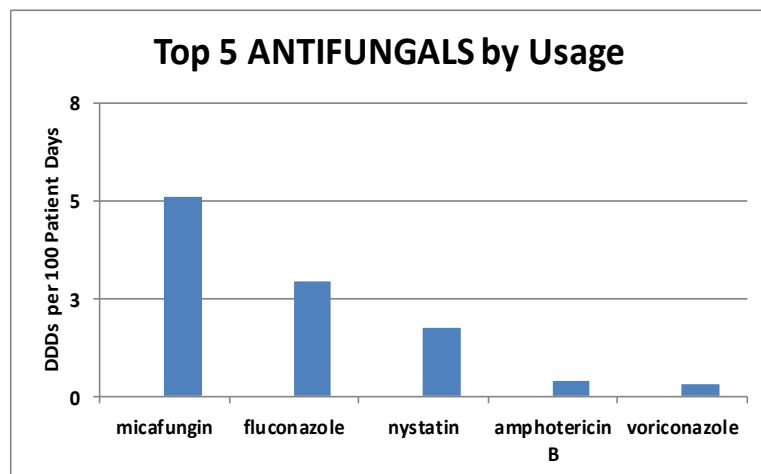
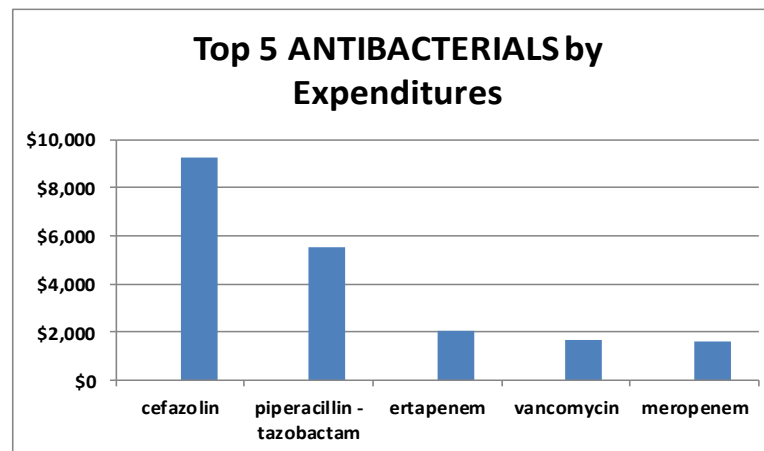
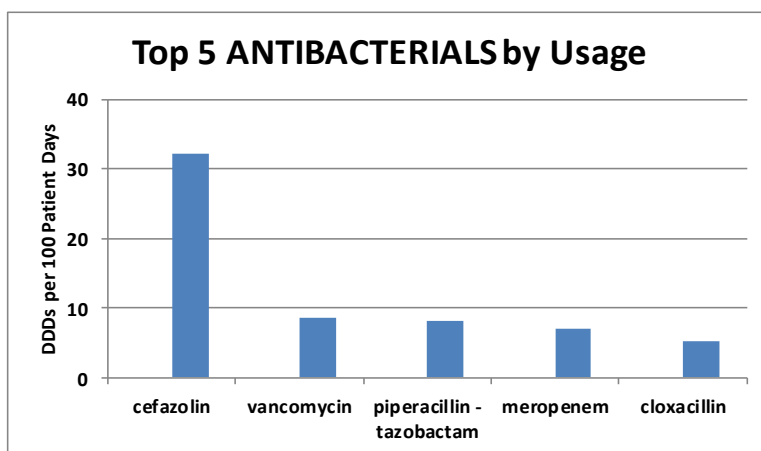


Table 8: Yeast Species Isolated in Blood – Toronto General Hospital Cardiovascular ICU

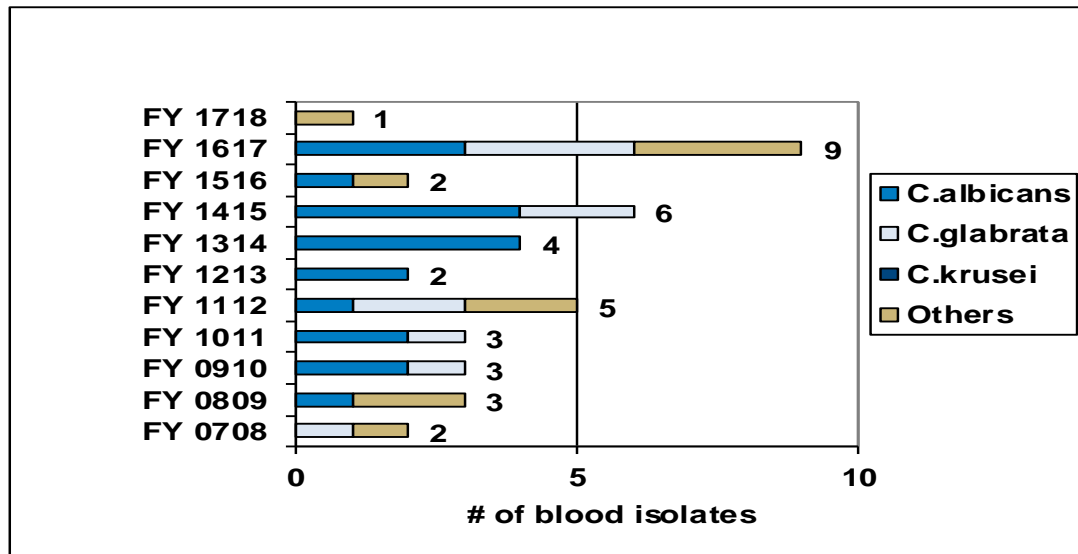
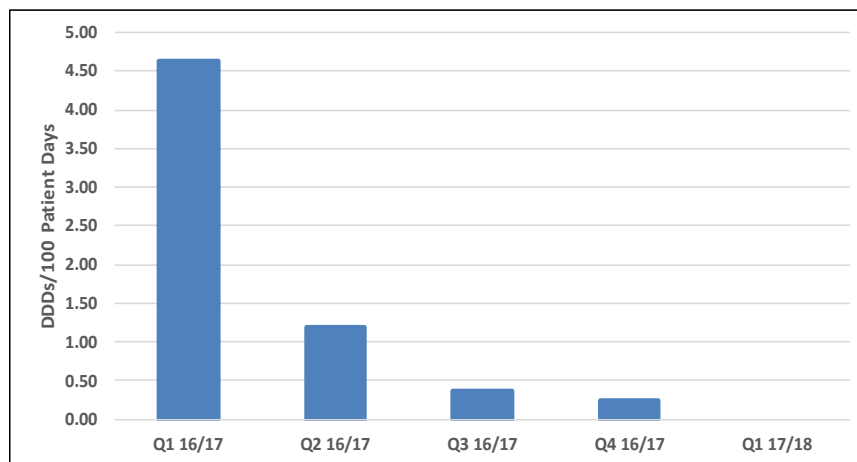


Table 9: Daptomycin Use – Toronto General Hospital Cardiovascular ICU

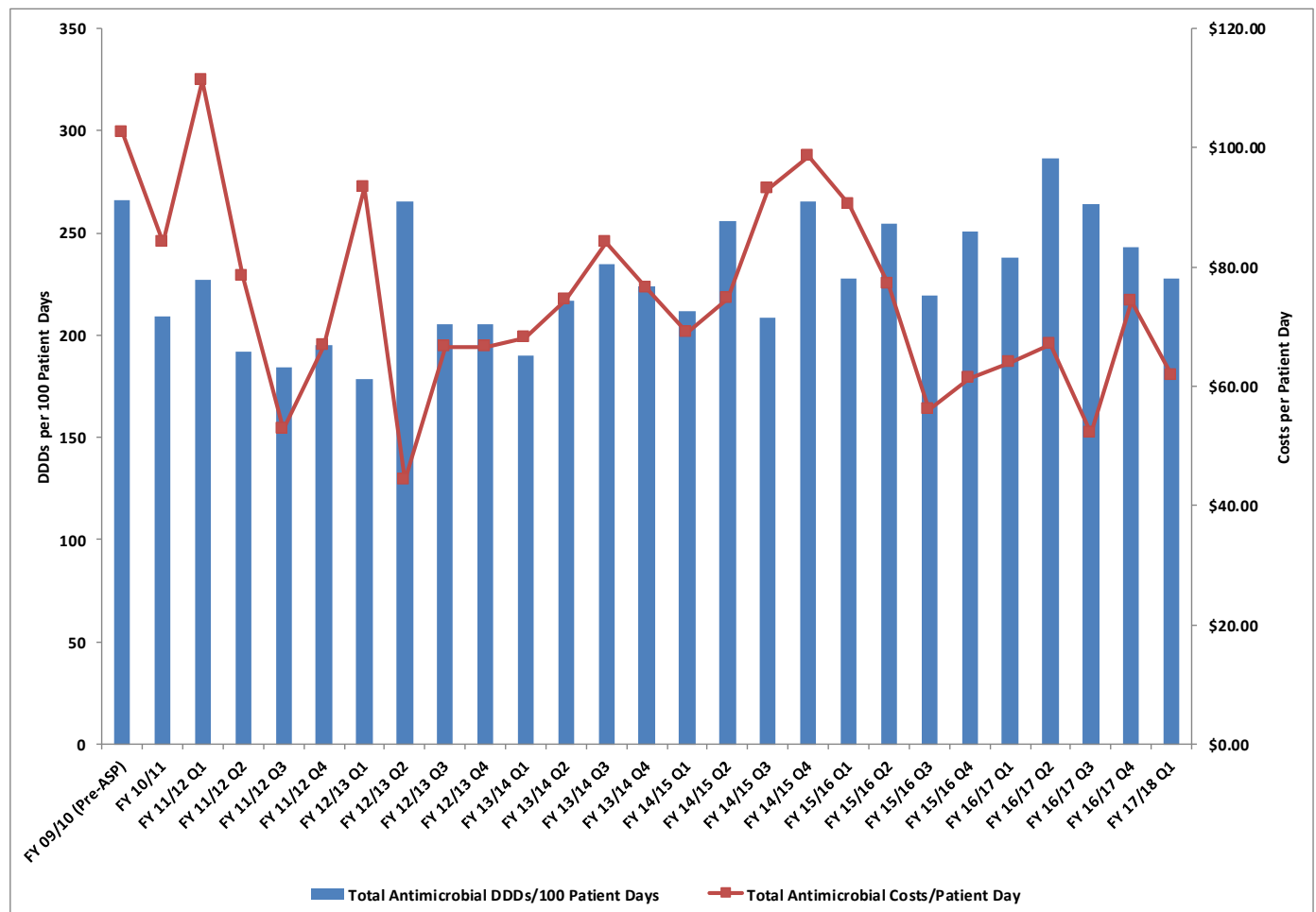


Toronto General Hospital: Medical Surgical ICU

FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 4.2% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 3.5% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 3.9% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 3.0% compared to YTD last year.

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



To view **Appendix 1: FY 17/18 Q1 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 decreased (↓) by 10.0% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days decreased (↓) by 21.7% compared to YTD last year.

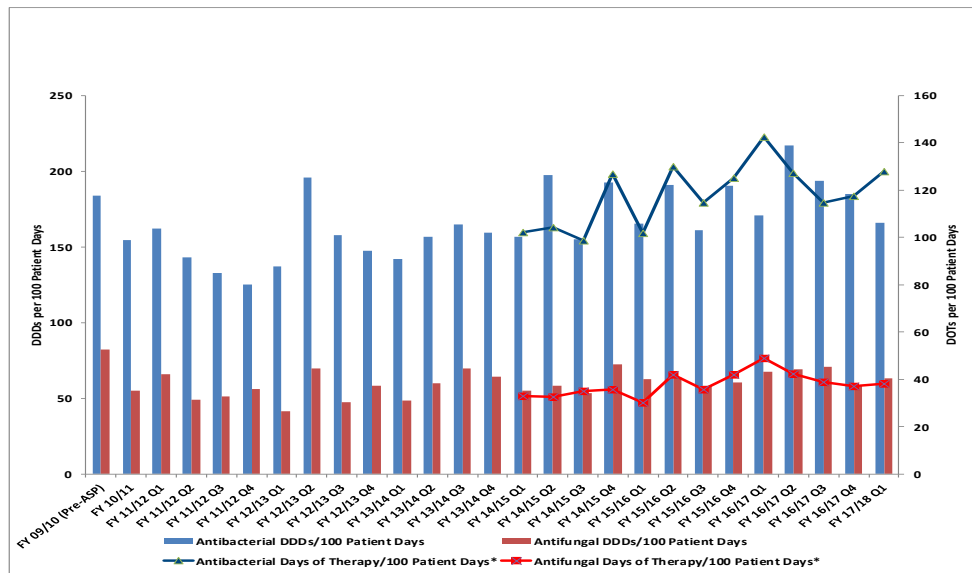


Table 10: Toronto General Hospital: Medical Surgical ICU

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 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	228				228	238
Systemic Antibacterial DDDs/100 Patient Days	184	155	143	159	156	175	178	191	166				166	171
Systemic Antifungal DDDs/100 Patient Days	82	55	55	54	61	60	84	66	63				63	67
Total Antimicrobial Costs	\$701,451	\$629,472	\$567,532	\$473,613	\$584,018	\$686,577	\$587,950	\$557,091	\$125,469				\$125,469	\$155,901
Total Antimicrobial Costs/Patient Day	\$102.52	\$84.06	\$76.93	\$63.75	\$75.71	\$83.65	\$71.06	\$64.53	\$61.78				\$61.78	\$64.00
Systemic Antibacterial Costs	\$390,209	\$375,436	\$292,355	\$231,171	\$225,557	\$293,126	\$254,392	\$267,107	\$63,059				\$63,059	\$78,696
Systemic Antibacterial Costs/Patient Day	\$57.03	\$50.14	\$39.63	\$31.12	\$29.24	\$35.71	\$30.75	\$30.94	\$31.05				\$31.05	\$32.31
Systemic Antifungal Costs	\$311,242	\$254,036	\$275,176	\$242,443	\$358,461	\$393,451	\$333,559	\$289,984	\$62,410				\$62,410	\$77,205
Systemic Antifungal Costs/Patient Day	\$45.49	\$33.93	\$37.30	\$32.63	\$46.47	\$47.94	\$40.31	\$33.59	\$30.73				\$30.73	\$31.69
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	107.9	118.3	126	128				128	143
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	34.1	37.7	42	38				38	49
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)	4 (1.97)				4 (1.97)	3 (1.23)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.79	8.22	8.08	7.62	7.94	6.65				6.65	8.77
ICU Mortality Rate (as a %)	16.2	15.7	16.3	16.0	17.8	17.2	17.2	16.8	16.6				16.6	16.4
ICU Readmission Rate Within 48 Hrs (as a %)	3.8	4.4	4.4	2.8	3.5	3.0	3.4	3.2	2.8				2.8	2.7
ICU Ventilator Days	5399	6256	6507	6458	24620	7330	7048	7657	1683				1683	2161
Apache II Score	n/a	n/a	16.1	15.775	15.9	15.1	15.4	16.7	16.4				16.4	16.5

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

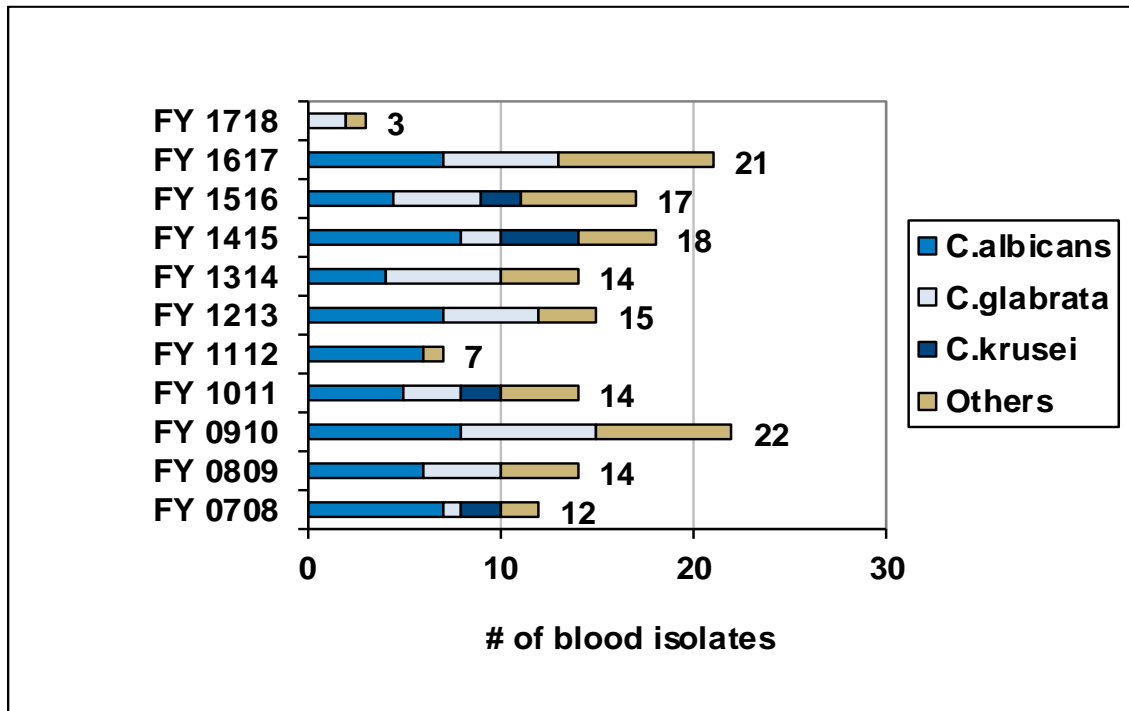
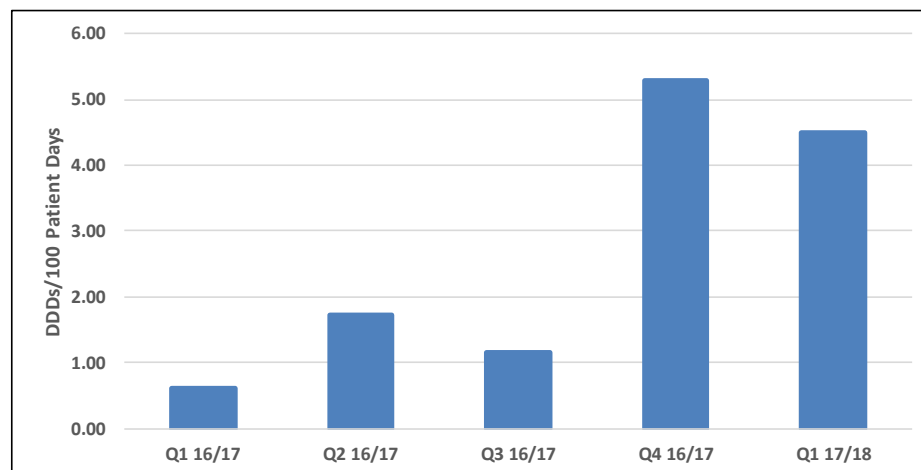


Table 12: Daptomycin Use – Toronto General Hospital: Medical Surgical ICU

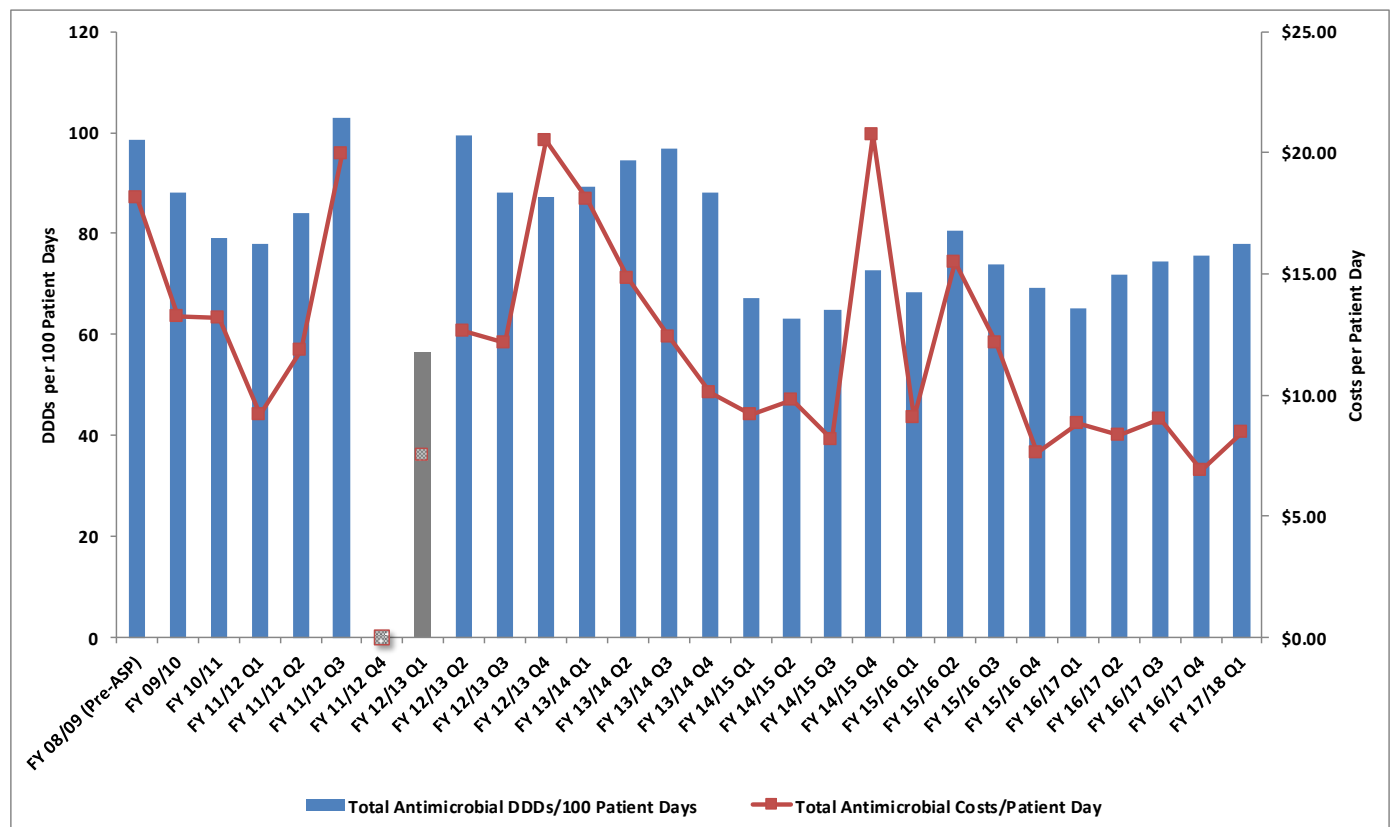


Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 19.7% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 4.4% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 45.2% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 70.3% compared to YTD last year.

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

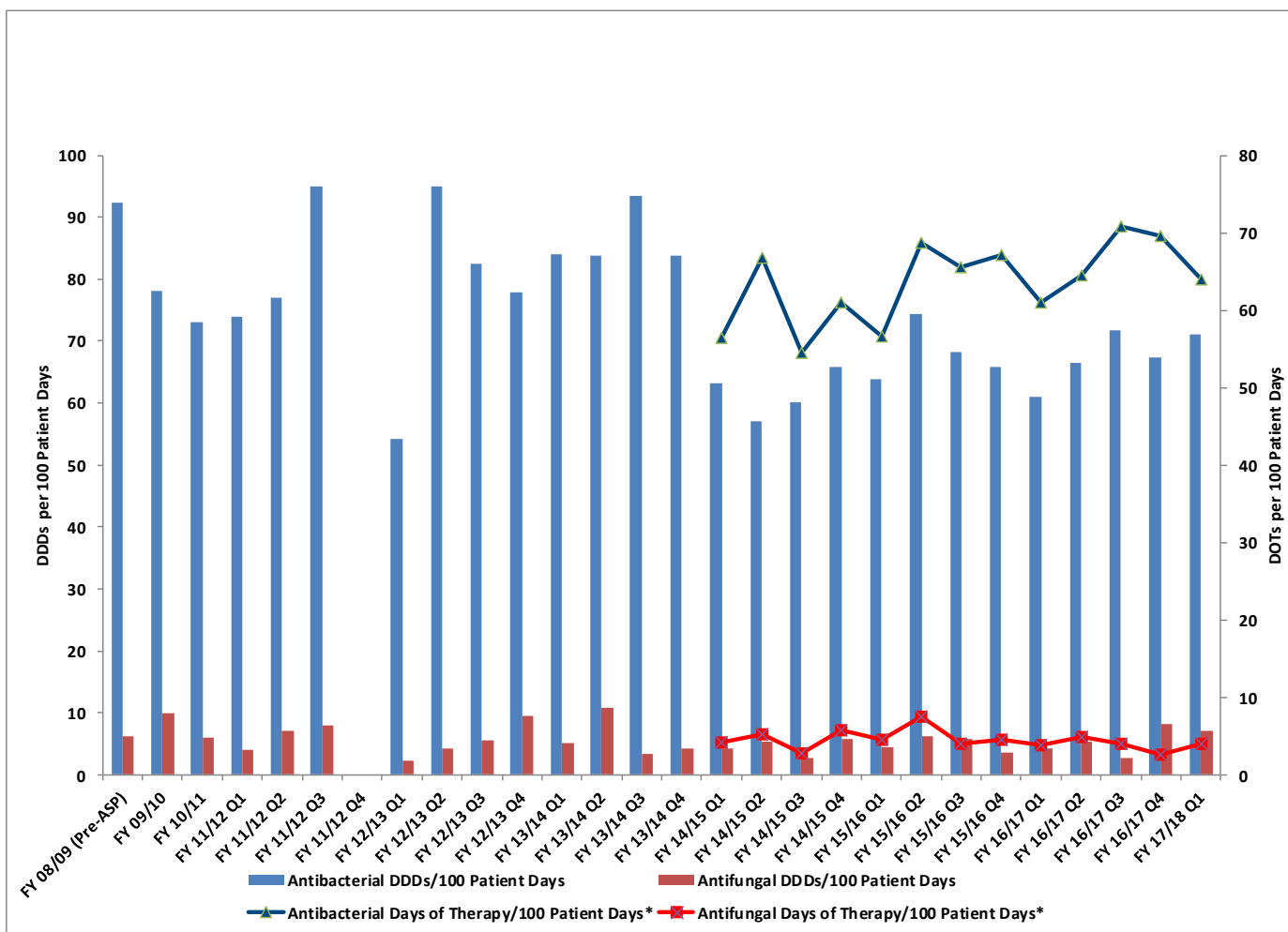


Due to an error in the Centricity Pharmacy database, we are not able to provide accurate DDD data and utilization cost for the Toronto Western Hospital ICU for FY 11/12 Q4. This also affected the recovery in FY 12/13 Q1 so neither quarter is reflected in the above graph.

To view **Appendix 1: FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click [here](#).

Toronto Western Hospital: Medical, Surgical, 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 5.0% compared to YTD last year. Compared to DDD/100 patient days, this suggests a more profound increase in daily drug dose than initiation events.
- Antifungal Days of Therapy (DOT) per 100 patient days decreased (↓) by 6.4% 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.

Table 13: 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	FY17/18 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	78				78	65
Systemic Antibacterial DDDs/100 Patient Days	92	78	73	77	78	86	62	68	67	71				71	61
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	5	6	5	9	5	7				7	4
Total Antimicrobial Costs	\$136,758	\$100,408	\$101,191	\$105,899	\$102,978	\$120,538	\$138,014	\$127,293	\$98,672	\$24,077				\$24,077	\$25,988
Total Antimicrobial Costs/Patient Day	\$18.16	\$13.24	\$13.17	\$13.60	\$13.37	\$13.49	\$11.97	\$11.10	\$8.28	\$8.47				\$8.47	\$8.85
Systemic Antibacterial Costs	\$123,314	\$87,445	\$79,280	\$89,784	\$70,099	\$85,916	\$89,382	\$74,877	\$69,868	\$20,866				\$20,866	\$14,840
Systemic Antibacterial Costs/Patient Day	\$16.37	\$11.53	\$10.32	\$11.53	\$9.10	\$9.61	\$7.75	\$6.53	\$5.86	\$7.34				\$7.34	\$5.05
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$16,115	\$32,879	\$34,623	\$48,631	\$52,416	\$28,805	\$3,210				\$3,210	\$11,148
Systemic Antifungal Costs/Patient Day	\$1.79	\$1.71	\$2.85	\$2.07	\$4.27	\$3.87	\$4.22	\$4.57	\$2.42	\$1.13				\$1.13	\$3.80
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	n/a	60	65	67	64				64	61
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	n/a	4	5	4	4				4	4
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)	2 (0.7)				2 (0.7)	1 (0.34)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.71	7.98	7.68	8.7	8.01	9.5	8.38				8.4	10.88
ICU Mortality Rate (as a %)	19.6	19.9	18.1	17.0	16.4	17.1	19.0	17.9	18.5	14.1				14.1	19.2
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	2.92				2.92	1.23
ICU Ventilator Days	4617	6305	5960	5578	4947	5523	5180	5414	4937	1097				1097	1371
ICU Apache II Score	15.0	14.7	13.7	13.8	12.9	12.8	13.2	13.0	14.0	13.0				13.0	13.6

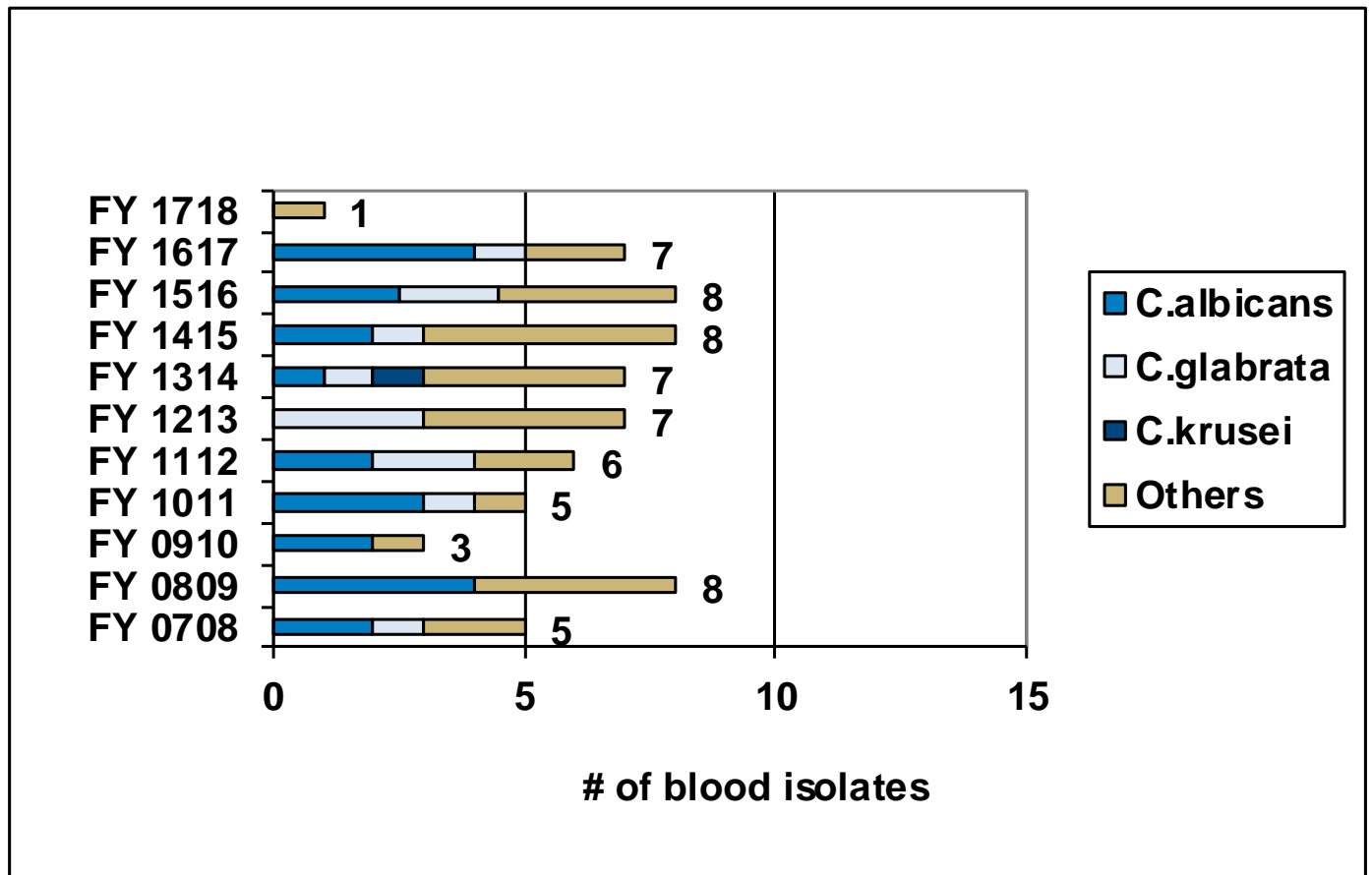
Notes: Q4 13/14 data consists of MSNICU patients (including eight ICU II patients).

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



EMERGENCY DEPARTMENT

Mount Sinai Hospital: Emergency Department

Data is currently not available for FY 17/18 Q1.

Summary of SNAP (Sepsis Now A Priority) Project: The SNAP algorithm continues to be utilized in the Mount Sinai Hospital Emergency Department. Algorithm-related interventional times continue to be monitored and reported back to frontline staff via monthly SNAP scorecards. Reporting of the SNAP scorecard is being managed by the Emergency Department. There have been recent discussions with the MSH ED staff to determine how best to continue improving care and increasing awareness and use of the SNAP algorithm.

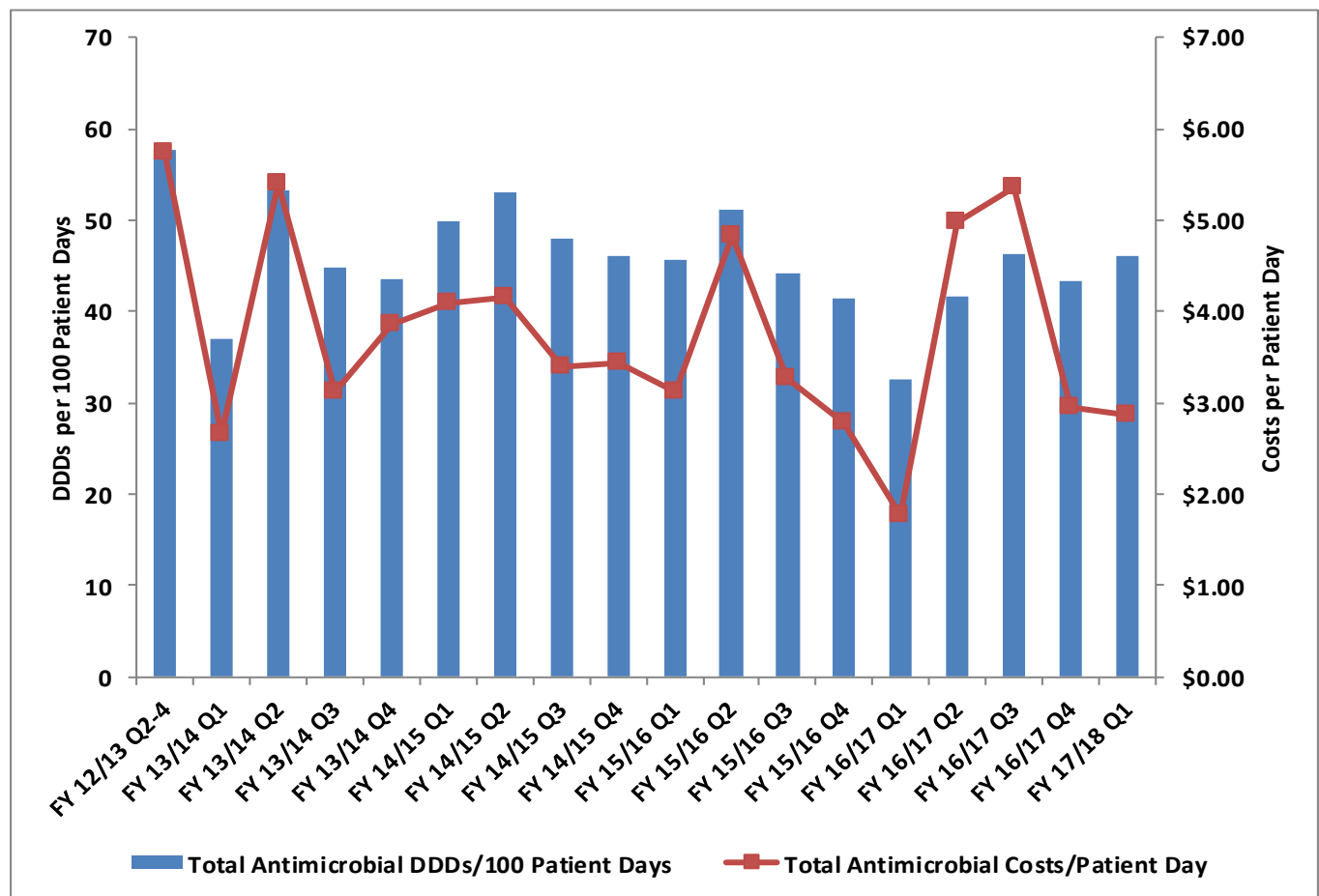
GENERAL INTERNAL MEDICINE

Mount Sinai Hospital: General Internal Medicine

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 42.5% compared to YTD last year.
 - Antimicrobial costs per patient day increased (↑) by 62.0% compared to YTD last year.
 - Antibacterial costs per patient day increased (↑) by 72.0% compared to YTD last year.
 - Antifungal costs per patient day decreased (↓) by 12.1% compared to YTD last year.
- NB: Usage data calculated for patients admitted by admission to GIM medical service at MSH.

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



To view **Appendix 2: General Internal Medicine FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

Table 15: 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 Performance					YTD of Previous Year
						Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs											
Total Antimicrobial DDDs/100 Patient Days	58	45	48	43	41	46				46	33
Systemic Antibacterial DDDs/100 Patient Days	53	41	43	39	37	43				43	29
Systemic Antifungal DDDs/100 Patient Days	3	3	3	3	3	2				2	3
Total Antimicrobial Costs	\$125,012	\$123,737	\$128,661	\$106,518	\$126,283	\$22,926				\$22,926	\$15,988
Total Antimicrobial Costs/Patient Day	\$5.74	\$3.76	\$3.63	\$2.92	\$3.69	\$2.87				\$2.87	\$1.77
Systemic Antibacterial Costs	\$105,621	\$99,731	\$104,822	\$84,173	\$78,418	\$20,228				\$20,228	\$13,286
Systemic Antibacterial Costs/Patient Day	\$4.85	\$3.03	\$2.96	\$2.31	\$2.29	\$2.53				\$2.53	\$1.47
Systemic Antifungal Costs	\$15,422	\$20,153	\$16,352	\$15,983	\$42,012	\$1,831				\$1,831	\$2,353
Systemic Antifungal Costs/Patient Day	\$0.71	\$0.61	\$0.46	\$0.44	\$1.23	\$0.23				\$0.23	\$0.26
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)	0(0.00)	2 (0.35)				2 (0.35)	0(0.00)

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).

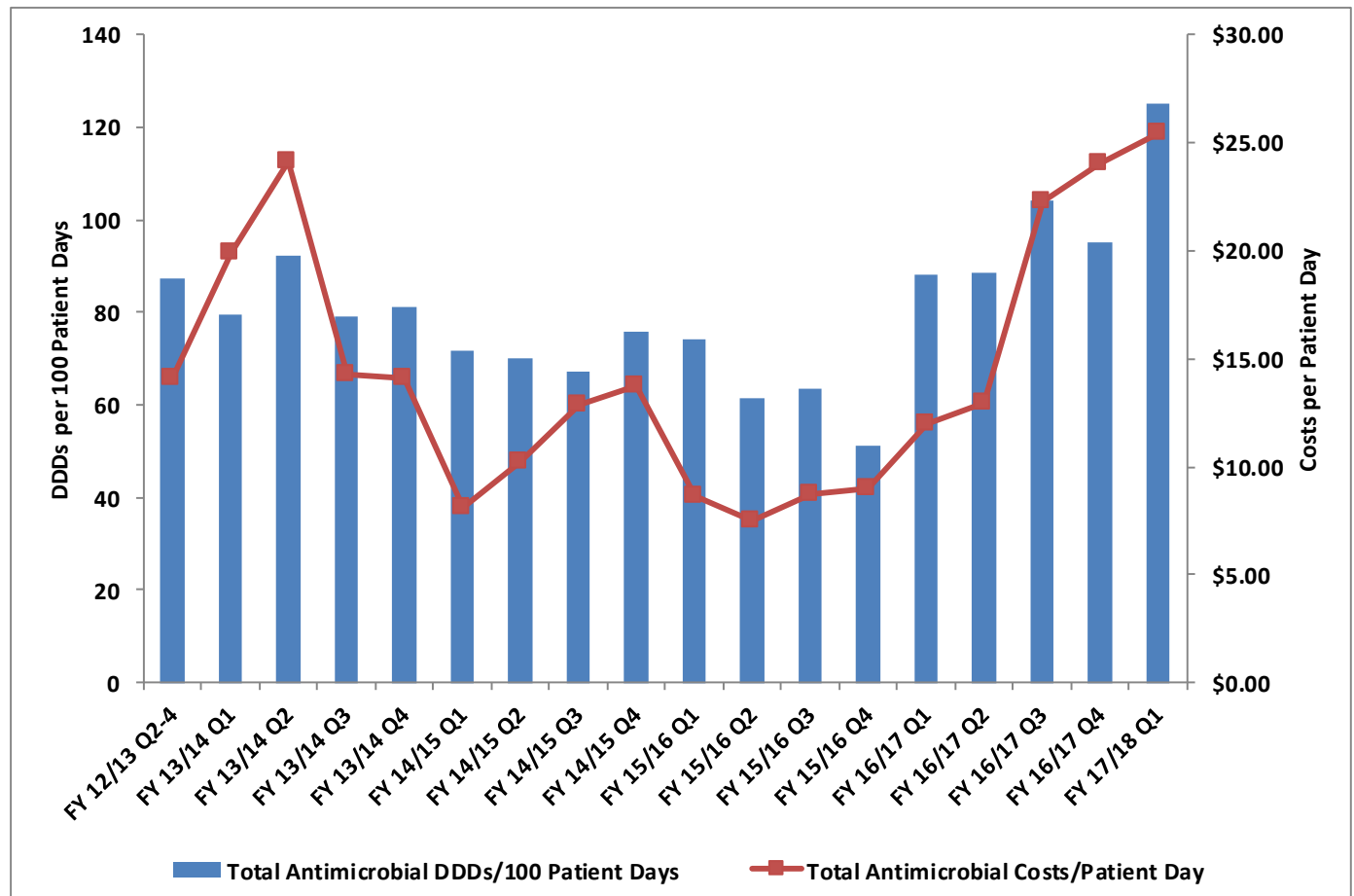
Historical antimicrobial usage and cost data updated due to the discovery that selected added drug dosages (Fluconazole 400mg/200ml bag, Pip-Tazo 13.5gm vial, Daptomycin 500mg vial) were not included in the report. Data have been revised to include Fluconazole starting August 2013, Pip-Tazo January 2015,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

Toronto General Hospital: General Internal Medicine

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 42.0% compared to YTD last year.
 - Antimicrobial costs per patient day increased (↑) by 112.6% compared to YTD last year for TGH.
 - Antibacterial costs per patient day increased (↑) by 88.4% compared to YTD last year.
 - Antifungal costs per patient day increased (↑) by 146.7% compared to YTD last year.
- NB: Usage data calculated for patients admitted to primary GIM units at TGH.

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



To view **Appendix 2: General Internal Medicine FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

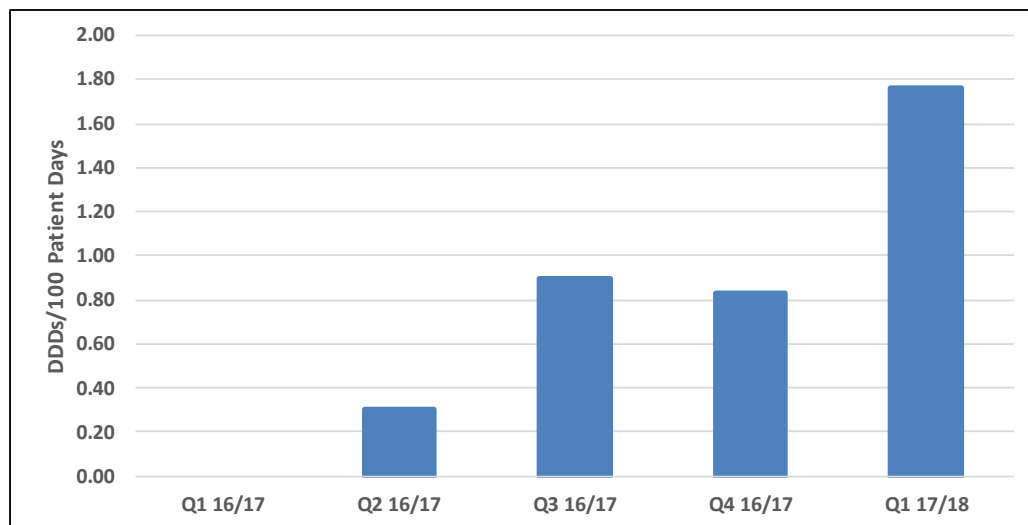
Table 16: Toronto General Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18 Performance					YTD of Previous Year
						Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs											
Total Antimicrobial DDDs/100 Patient Days	87	83	83	63	94	125				125	88
Systemic Antibacterial DDDs/100 Patient Days	77	70	73	55	78	107				107	71
Systemic Antifungal DDDs/100 Patient Days	11	13	10	8	16	18				18	17
Total Antimicrobial Costs	\$279,644	\$471,342	\$352,036	\$313,464	\$494,787	\$178,785				\$178,785	\$83,645
Total Antimicrobial Costs/Patient Day	\$14.10	\$18.05	\$13.30	\$8.48	\$17.77	\$25.49				\$25.49	\$11.99
Systemic Antibacterial Costs	\$171,817	\$225,491	\$221,389	\$202,012	\$250,100	\$92,785				\$92,785	\$48,975
Systemic Antibacterial Costs/Patient Day	\$8.67	\$8.64	\$8.36	\$5.47	\$8.98	\$13.23				\$13.23	\$7.02
Systemic Antifungal Costs	\$107,827	\$245,851	\$130,647	\$111,452	\$244,687	\$86,000				\$86,000	\$34,671
Systemic Antifungal Costs/Patient Day	\$5.44	\$9.42	\$4.93	\$3.02	\$8.79	\$12.26				\$12.26	\$4.97
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)	3 (0.43)				3 (0.43)	1 (0.14)

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 17: Daptomycin Use – Toronto General Hospital: General Internal Medicine



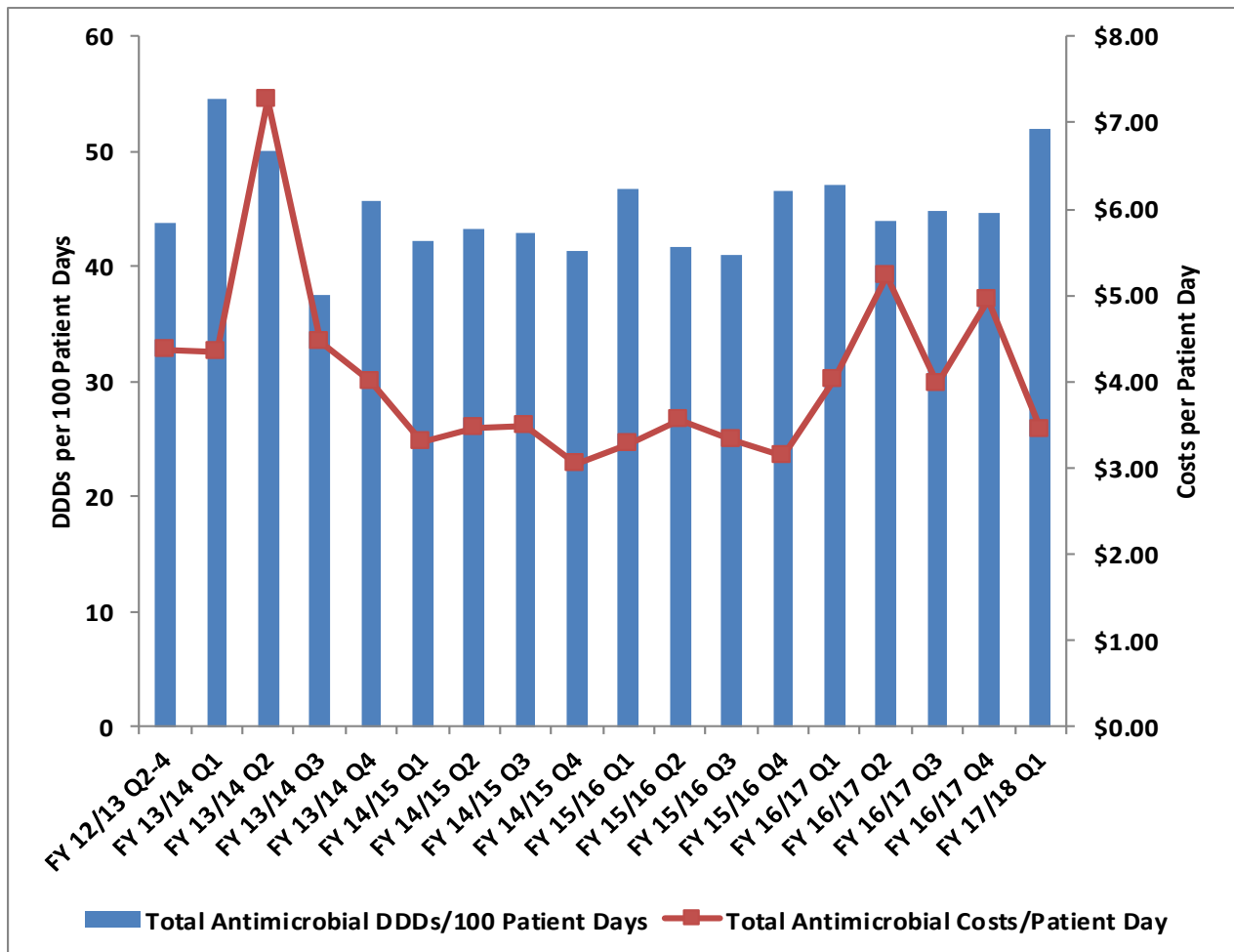
Toronto Western Hospital: General Internal Medicine

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 24.1% 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 83.6% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 93.8% compared to YTD last year*.

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

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



To view **Appendix 2: General Internal Medicine FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

Table 18: 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 Performance					YTD of Previous Year
						Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs											
Total Antimicrobial DDDs/100 Patient Days	44	47	42	47	45	52				52	47
Systemic Antibacterial DDDs/100 Patient Days	41	44	40	42	42	47				47	44
Systemic Antifungal DDDs/100 Patient Days	3	3	3	6	3	5				5	3
Total Antimicrobial Costs	\$74,737	\$115,919	\$110,889	\$108,612	\$146,214	\$25,111				\$25,111	\$32,853
Total Antimicrobial Costs/Patient Day	\$4.36	\$5.01	\$3.32	\$3.32	\$4.52	\$3.43				\$3.43	\$4.01
Systemic Antibacterial Costs	\$60,999	\$93,779	\$103,080	\$105,744	\$118,506	\$3,953				\$3,953	\$26,872
Systemic Antibacterial Costs/Patient Day	\$3.56	\$4.05	\$3.09	\$3.23	\$3.67	\$0.54				\$0.54	\$3.28
Systemic Antifungal Costs	\$13,738	\$22,140	\$7,810	\$2,868	\$27,708	\$331				\$331	\$5,981
Systemic Antifungal Costs/Patient Day	\$0.80	\$0.96	\$0.23	\$0.09	\$0.86	\$0.05				\$0.05	\$0.73
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)	1 (0.14)				1 (0.14)	1 (0.12)

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 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 6.4% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 41.9% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 27.1% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 47.5% compared to YTD last year.
- Due to an increase in allo-BMT patients being placed on the leukemia units, starting on September 12, 2016, a representative from the allo-BMT team routinely attends ASP rounds on Monday.

Princess Margaret Cancer Centre: Leukemia Service Antimicrobial Consumption and Costs Per Patient Day

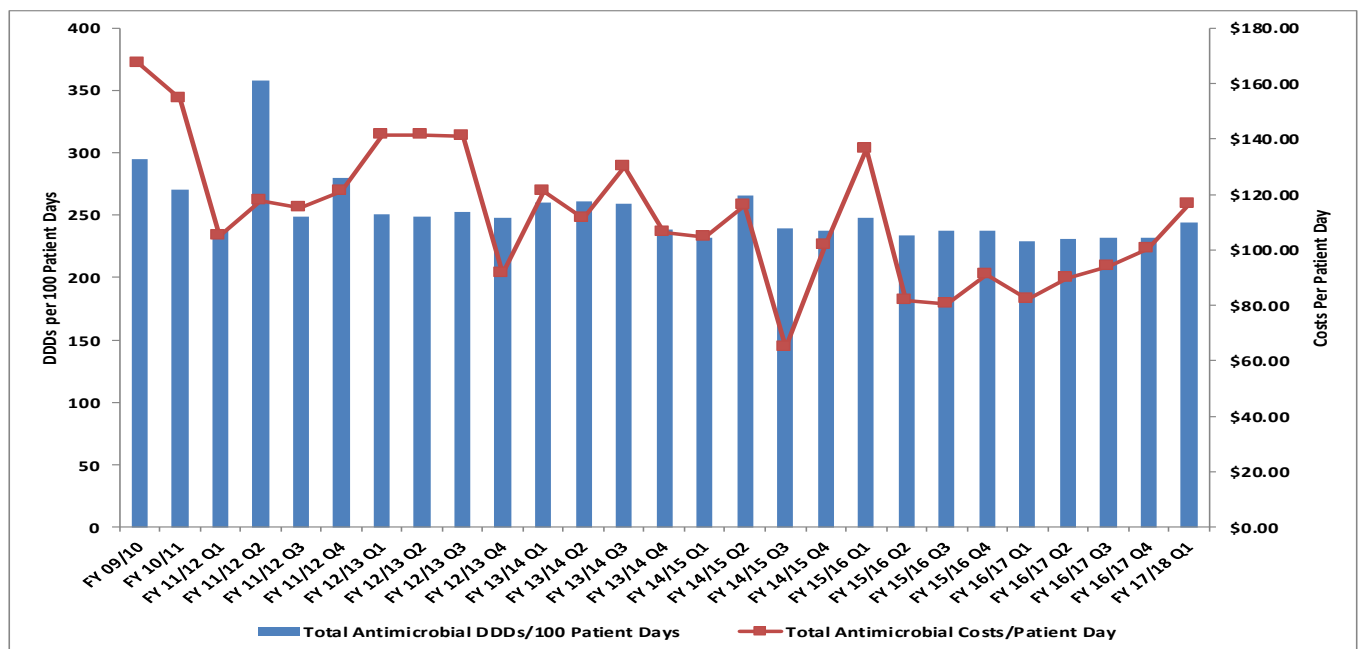


Table 19: Princess Margaret Cancer Centre: Leukemia Service

Indicators									FY 17/18 Performance				YTD of Previous Year	
	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	Q1	Q2	Q3	Q4		YTD
Antimicrobial Usage and Costs														
Total Antimicrobial DDDs/100 Patient Days	295	270	239	250	255	244	239	239	244				244	229
Systemic Antibacterial DDDs/100 Patient Days	191	163	134	146	138	136	138	138	143				143	134
Systemic Antifungal DDDs/100 Patient Days	104	107	105	104	117	108	101	101	100				100	95
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$1,310,857	\$1,695,539	\$1,534,499	\$1,412,805	\$1,479,103	\$1,479,103	\$460,019				\$460,019	\$322,206
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$115.13	\$128.91	\$117.10	\$96.46	\$96.98	\$96.98	\$116.31				\$116.31	\$81.99
Systemic Antibacterial Costs	\$659,034	\$609,747	\$663,175	\$422,438	\$485,263	\$471,597	\$403,399	\$403,399	\$112,841				\$112,841	\$88,244
Systemic Antibacterial Costs/Patient Day	\$62.28	\$57.33	\$58.24	\$45.85	\$37.03	\$32.20	\$26.45	\$26.45	\$28.53				\$28.53	\$22.45
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$647,637	\$1,092,448	\$1,049,236	\$941,208	\$1,075,705	\$1,075,705	\$347,178				\$347,178	\$233,962
Systemic Antifungal Costs/Patient Day	\$104.84	\$96.99	\$56.88	\$83.06	\$80.07	\$64.26	\$70.53	\$70.53	\$87.78				\$87.78	\$59.53
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)	14 (0.92)	5 (1.26)				5 (1.26)	3 (0.76)

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

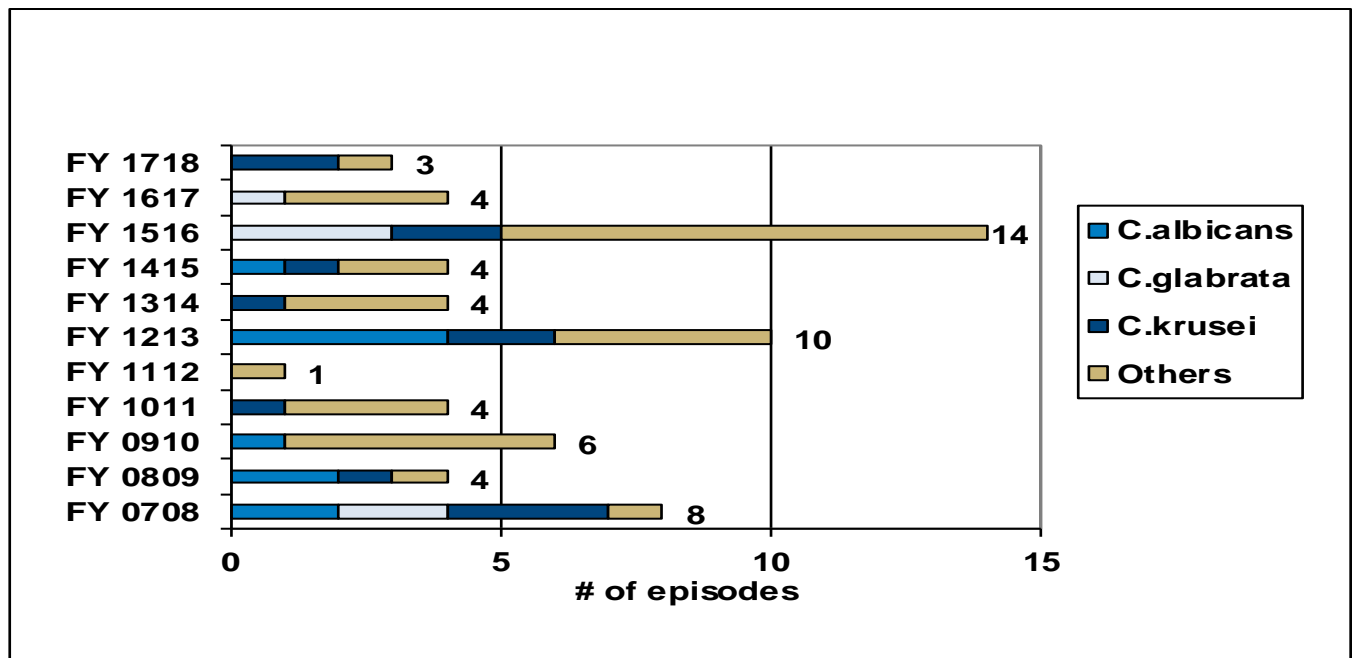


Table 21: Daptomycin Use – Princess Margaret Cancer Centre: Leukemia Service

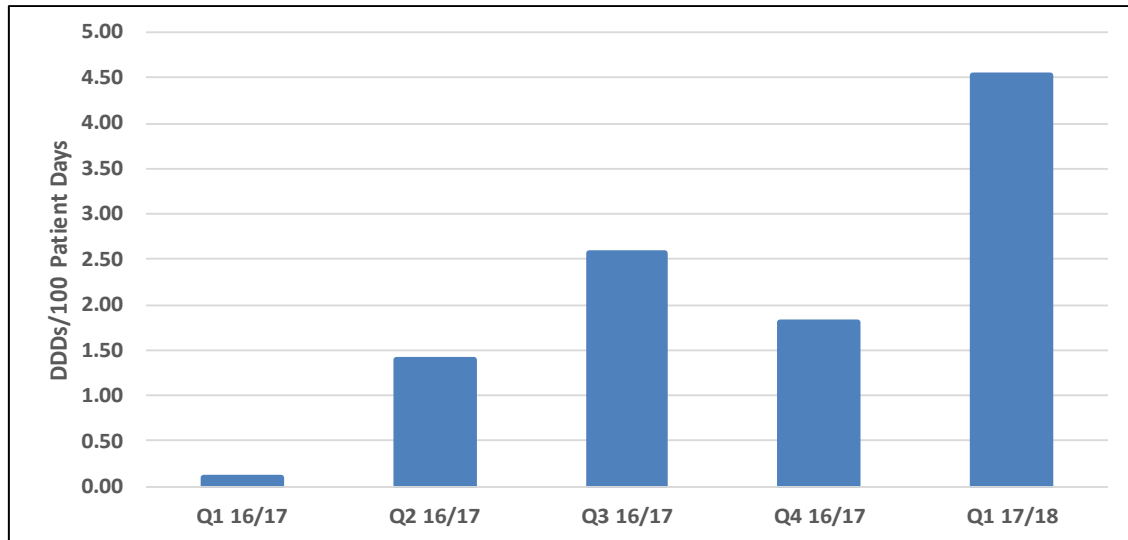
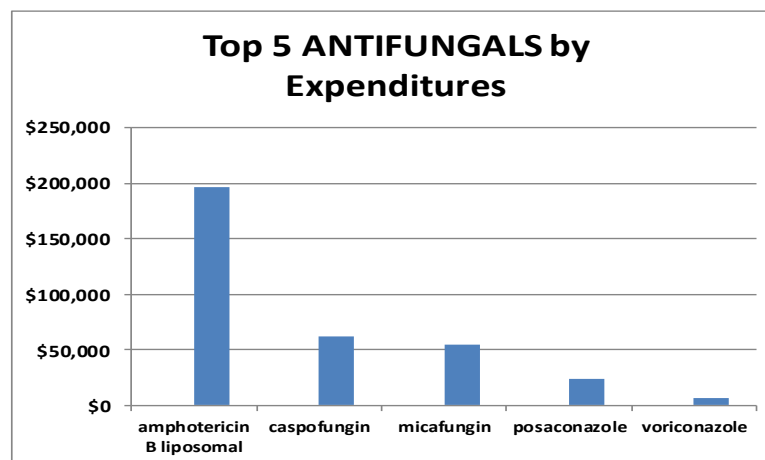
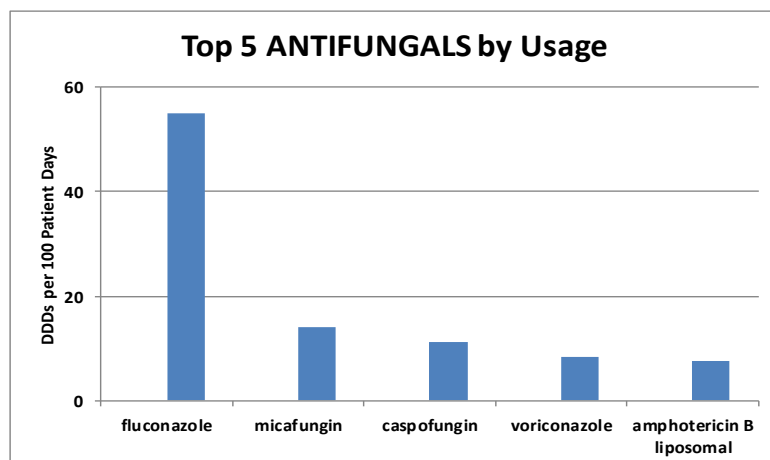
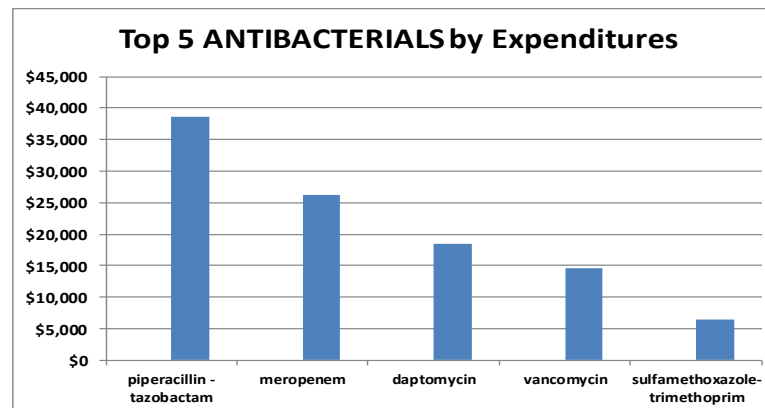
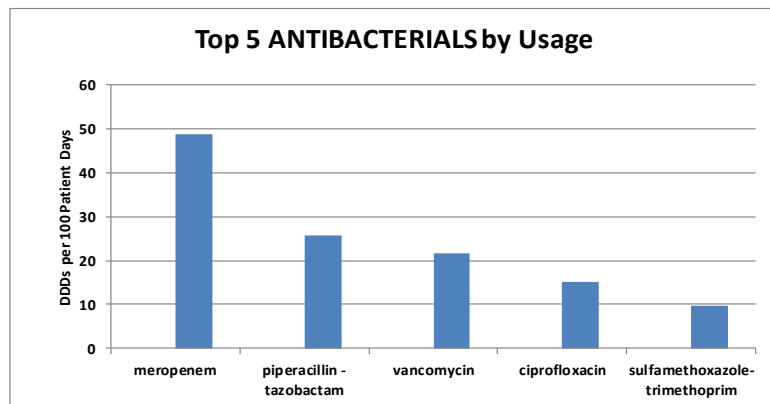


Table 22: Princess Margaret Cancer Centre: Leukemia FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures



Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 15.9% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 50.6% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 55.8% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 49.4% compared to YTD last year.

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

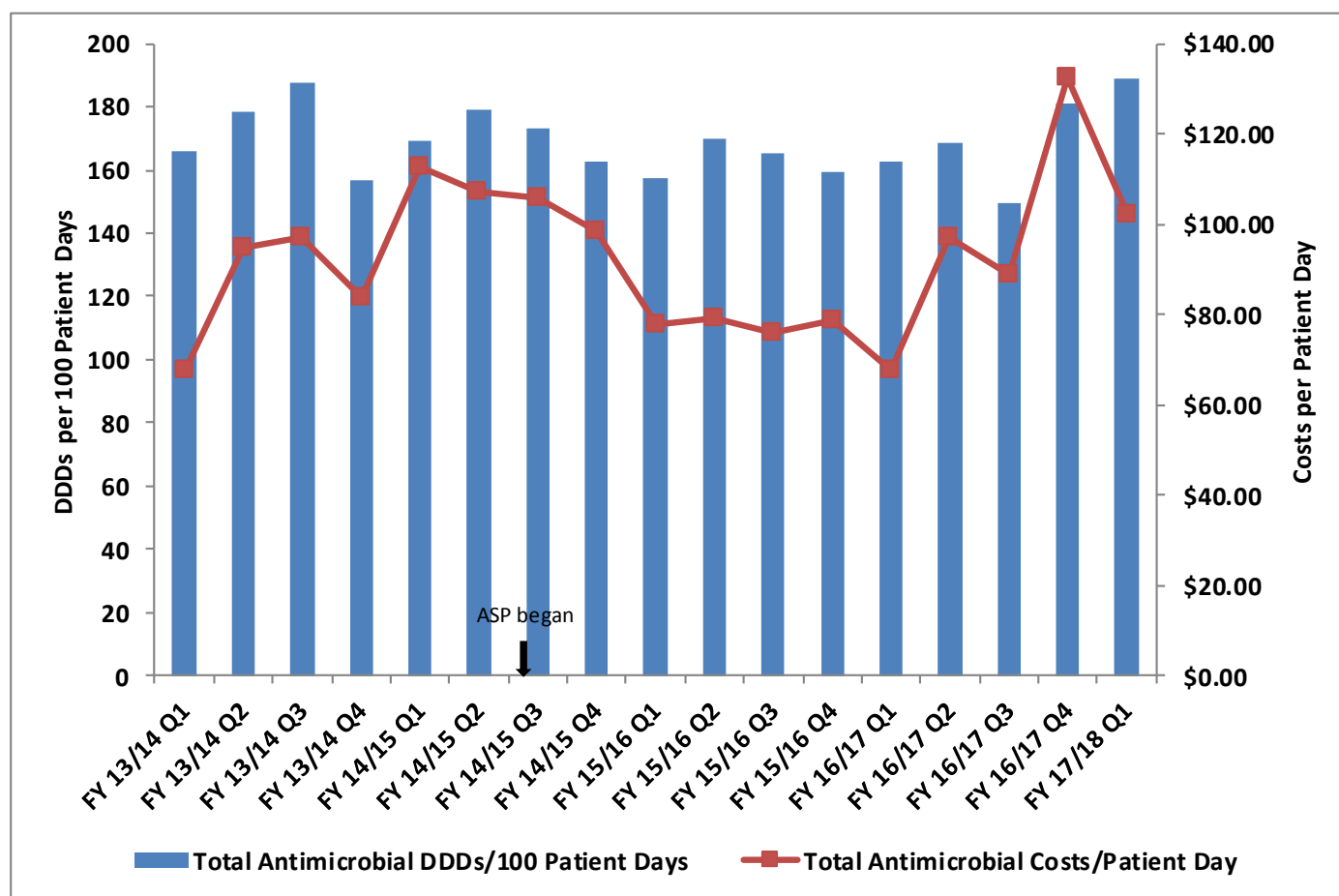


Table 23: Yeast Species Isolated in Blood – Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

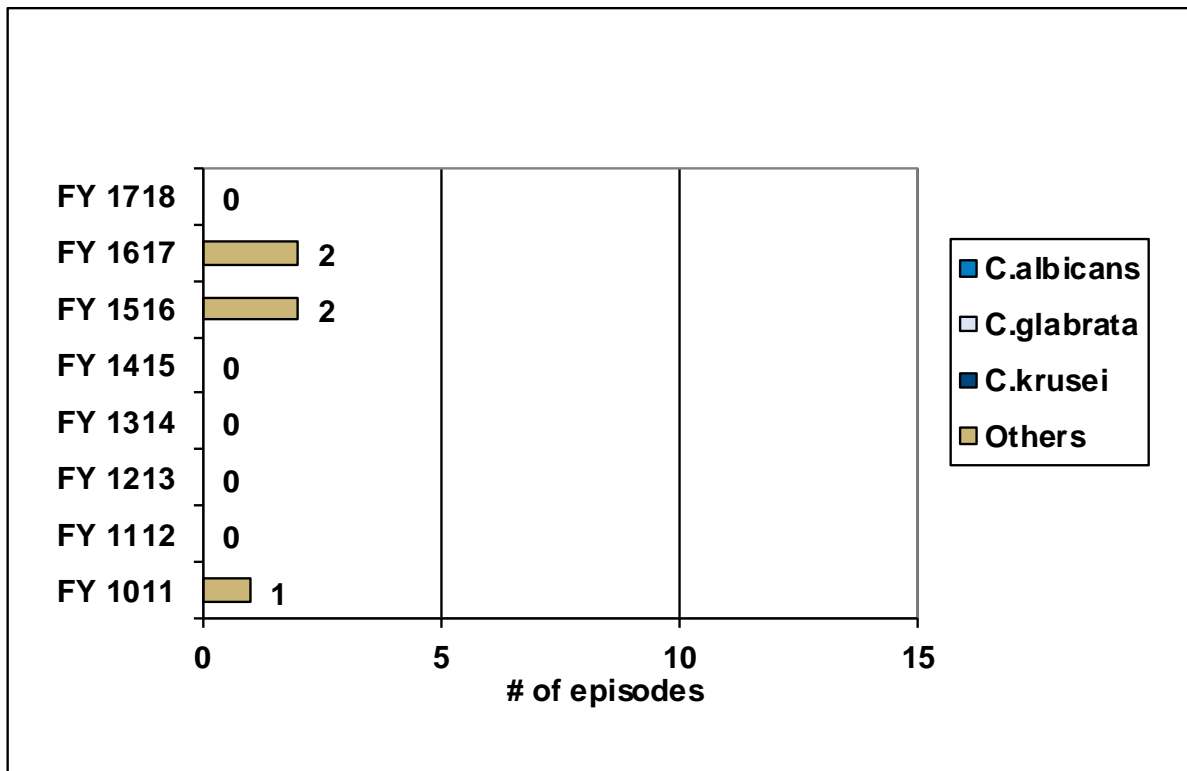


Table 24: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

Indicators					FY 17/18 Performance					YTD of Previous Year
	FY 13/14	FY 14/15	FY 15/16	FY 16/17	Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs										
Total Antimicrobial DDDs/100 Patient Days	172	171	163	163	189				189	163
Systemic Antibacterial DDDs/100 Patient Days	114	104	107	107	140				140	121
Systemic Antifungal DDDs/100 Patient Days	59	67	56	56	48				48	42
Total Antimicrobial Costs	\$416,614	\$512,300	\$381,633	\$381,633	\$122,875				\$122,875	\$82,396
Total Antimicrobial Costs/Patient Day	\$85.65	\$106.13	\$77.62	\$77.62	\$101.97				\$101.97	\$67.70
Systemic Antibacterial Costs	\$75,219	\$78,038	\$60,088	\$60,088	\$23,247				\$23,247	\$15,066
Systemic Antibacterial Costs/Patient Day	\$15.46	\$16.17	\$12.22	\$12.22	\$19.29				\$19.29	\$12.38
Systemic Antifungal Costs	\$341,395	\$434,261	\$321,545	\$321,545	\$99,629				\$99,629	\$67,330
Systemic Antifungal Costs/Patient Day	\$70.19	\$89.97	\$65.39	\$65.39	\$82.68				\$82.68	\$55.32
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)	0 (0)				0 (0)	2 (1.64)

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: Allogeneic Bone Marrow Transplant

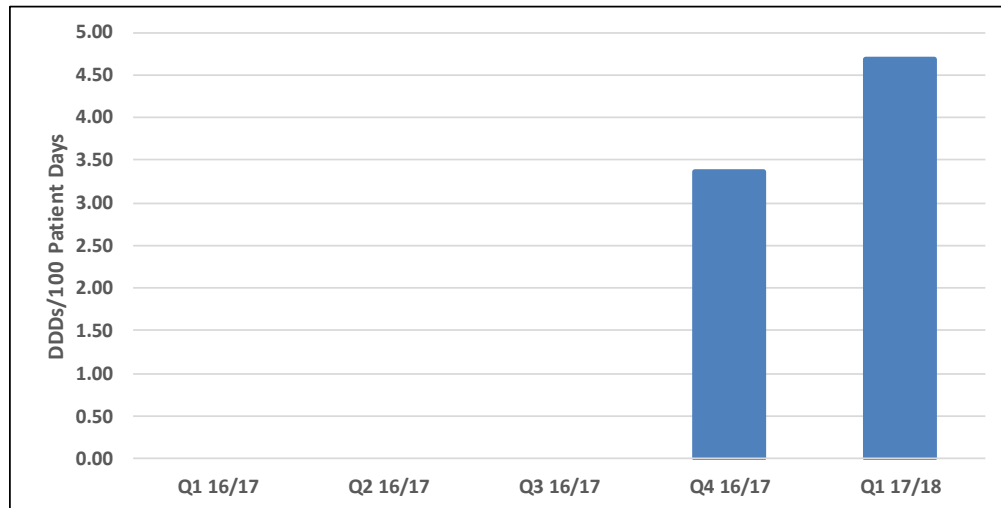
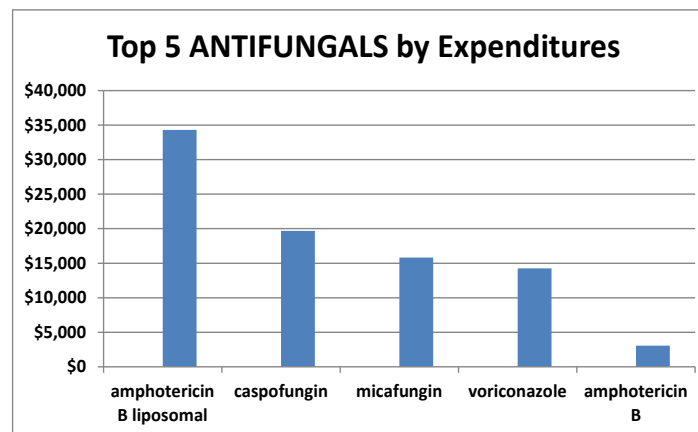
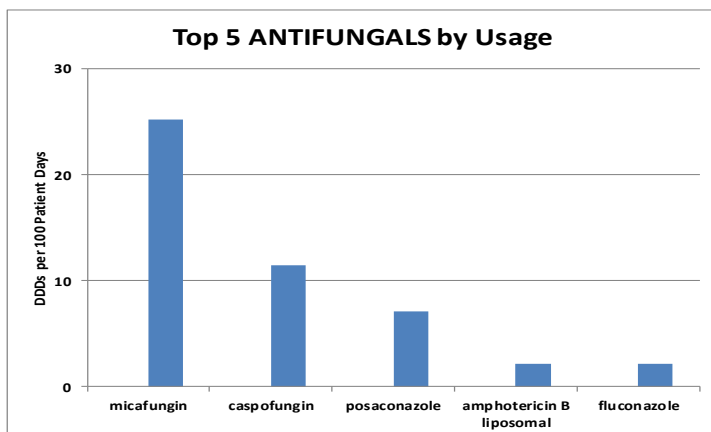
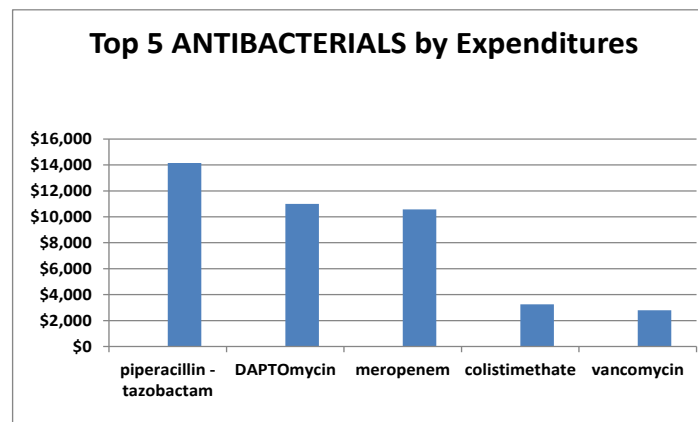
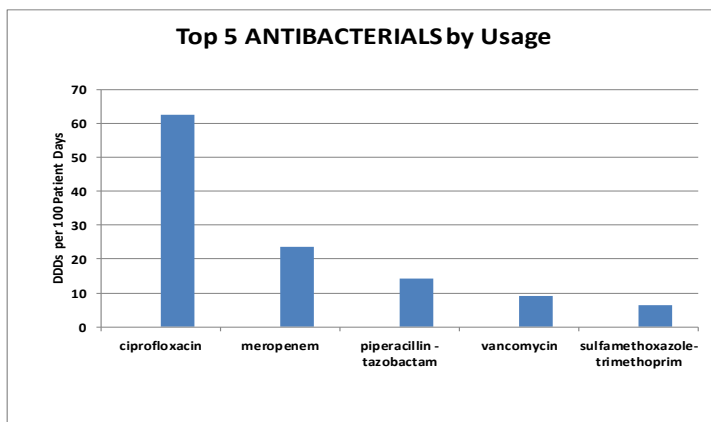


Table 26: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures



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

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 41.5% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 33.4% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 50.3% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 16.4% compared to YTD last year.

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

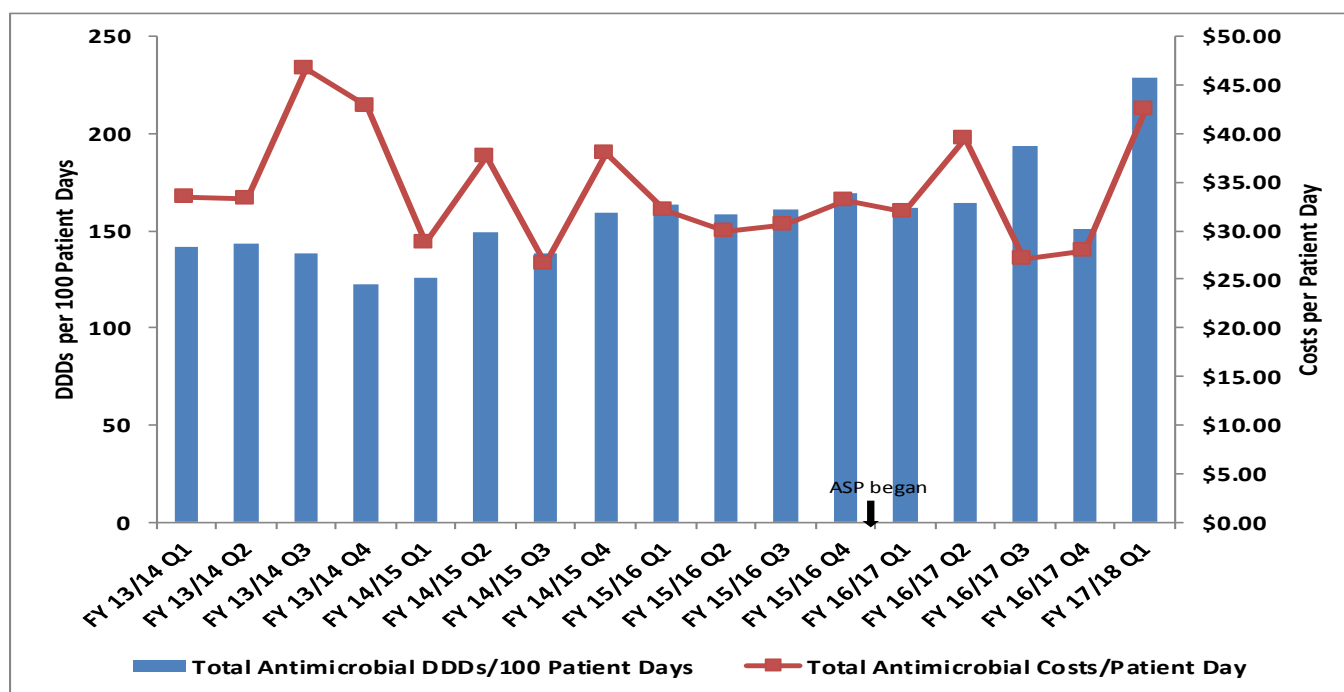
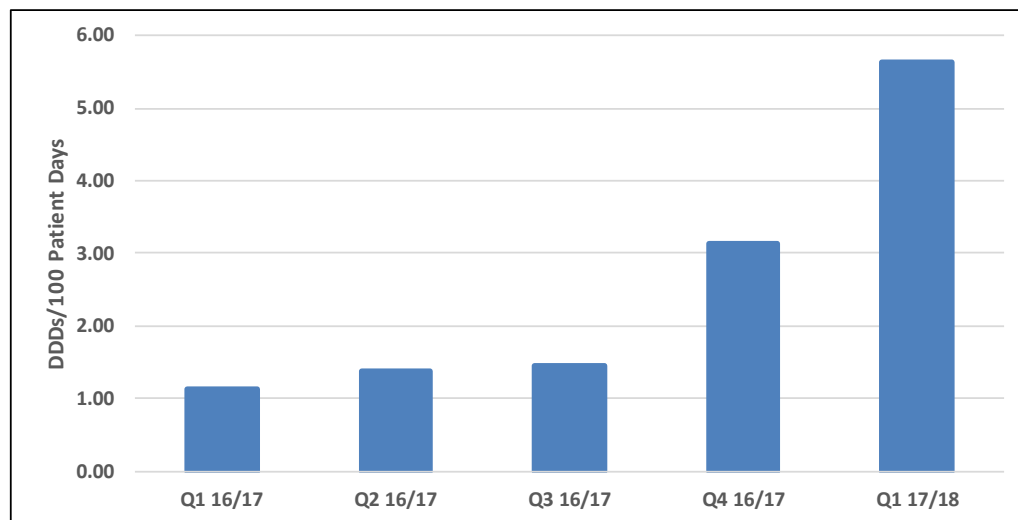


Table 27: Toronto General Hospital: Multi-Organ Transplant Program (MOTP)

Indicators	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs										
Total Antimicrobial DDDs/100 Patient Days	136	143	211	156	229				229	162
Systemic Antibacterial DDDs/100 Patient Days	93	98	112	108	166				166	109
Systemic Antifungal DDDs/100 Patient Days	43	45	99	48	63				63	53
Total Antimicrobial Costs	\$837,263	\$725,411	\$709,892	\$904,028	\$225,964				\$225,964	\$221,447
Total Antimicrobial Costs/Patient Day	\$39.16	\$32.69	\$31.47	\$31.57	\$42.51				\$42.51	\$31.88
Systemic Antibacterial Costs	\$327,831	\$379,748	\$342,941	\$452,266	\$127,428				\$127,428	\$110,803
Systemic Antibacterial Costs/Patient Day	\$15.33	\$17.11	\$15.20	\$15.79	\$23.98				\$23.98	\$15.95
Systemic Antifungal Costs	\$509,433	\$345,664	\$366,951	\$451,762	\$98,536				\$98,536	\$110,644
Systemic Antifungal Costs/Patient Day	\$23.82	\$15.58	\$16.26	\$15.78	\$18.54				\$18.54	\$15.93
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)	4 (0.75)				4 (0.75)	4 (0.58)

Table 28: Daptomycin Use – Toronto General Hospital: Multi-Organ Transplant Program (MOTP)



TORONTO REHABILITATION INSTITUTE

Toronto Rehabilitation Institute: Bickle

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 20.6% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 60.4% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 59.9% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 80.0% compared to YTD last year.

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

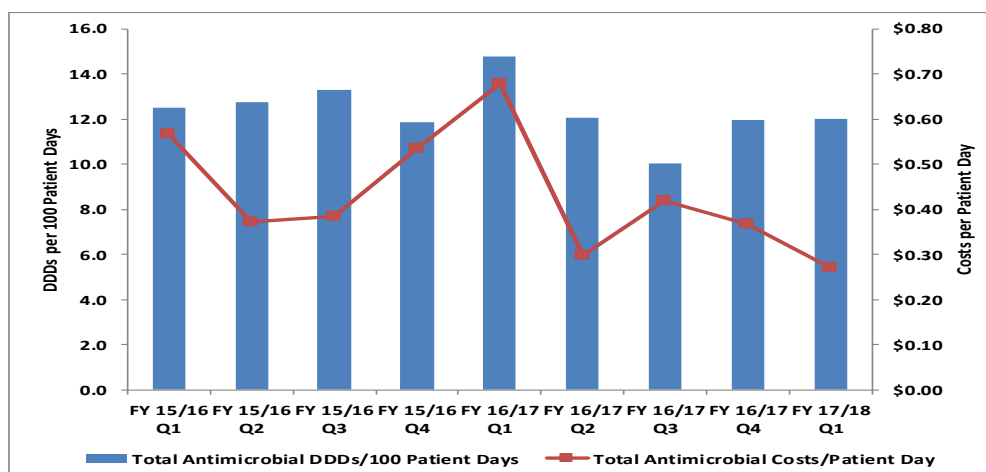


Table 29: Toronto Rehabilitation Institute: Bickle

Indicators			FY17/18 Performance					YTD of Previous Year
	FY 15/16	FY 16/17	Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs								
Total Antimicrobial DDDs/100 Patient Days	13	12	12				12	15
Systemic Antibacterial DDDs/100 Patient Days	11	11	11				11	12
Systemic Antifungal DDDs/100 Patient Days	2	2	1				1	2
Total Antimicrobial Costs	\$31,326	\$28,952	\$4,322				\$4,322	\$11,280
Total Antimicrobial Costs/Patient Day	\$0.46	\$0.44	\$0.27				\$0.27	\$0.68
Systemic Antibacterial Costs	\$29,933	\$23,571	\$4,264				\$4,264	\$10,981
Systemic Antibacterial Costs/Patient Day	\$0.44	\$0.36	\$0.26				\$0.26	\$0.66
Systemic Antifungal Costs	\$1,393	\$5,381	\$58				\$58	\$299
Systemic Antifungal Costs/Patient Day	\$0.02	\$0.08	\$0.00				\$0.00	\$0.02
Patient Care Outcomes								
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	7 (0.10)	7 (0.11)	2 (0.12)				2 (0.12)	4 (0.24)

Toronto Rehabilitation Institute: Lyndhurst

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 20.3% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 2.2% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 1.8% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 81.7% compared to YTD last year.

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

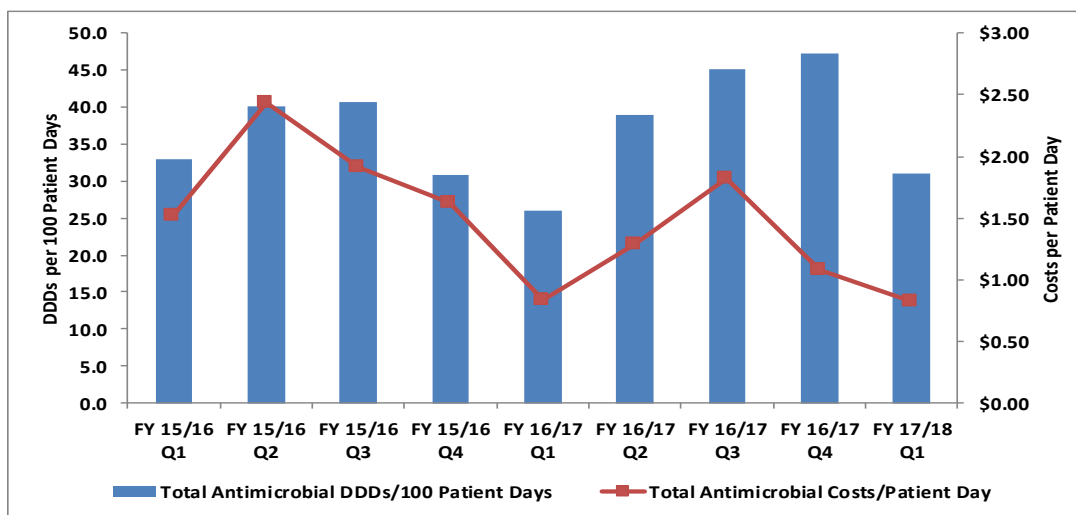


Table 30: Toronto Rehabilitation Institute: Lyndhurst

Indicators			FY17/18 Performance					YTD of Previous Year
	FY 15/16	FY 16/17	Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs								
Total Antimicrobial DDDs/100 Patient Days	36	39	31				31	26
Systemic Antibacterial DDDs/100 Patient Days	34	38	31				31	25
Systemic Antifungal DDDs/100 Patient Days	2	1	0				0	1
Total Antimicrobial Costs	\$35,817	\$23,520	\$3,957				\$3,957	\$3,824
Total Antimicrobial Costs/Patient Day	\$1.88	\$1.26	\$0.82				\$0.82	\$0.83
Systemic Antibacterial Costs	\$35,473	\$23,404	\$3,953				\$3,953	\$3,804
Systemic Antibacterial Costs/Patient Day	\$1.86	\$1.26	\$0.82				\$0.82	\$0.83
Systemic Antifungal Costs	\$344	\$116	\$4				\$4	\$20
Systemic Antifungal Costs/Patient Day	\$0.02	\$0.01	\$0.00				\$0.00	\$0.00
Patient Care Outcomes								
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	3 (0.16)	1 (0.05)	0 (0)				0 (0)	1 (0.22)

Toronto Rehabilitation Institute: University Centre

The FY 17/18 Q1 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 41.2% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 84.2% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 23.9% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 4976.4% compared to YTD last year.

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

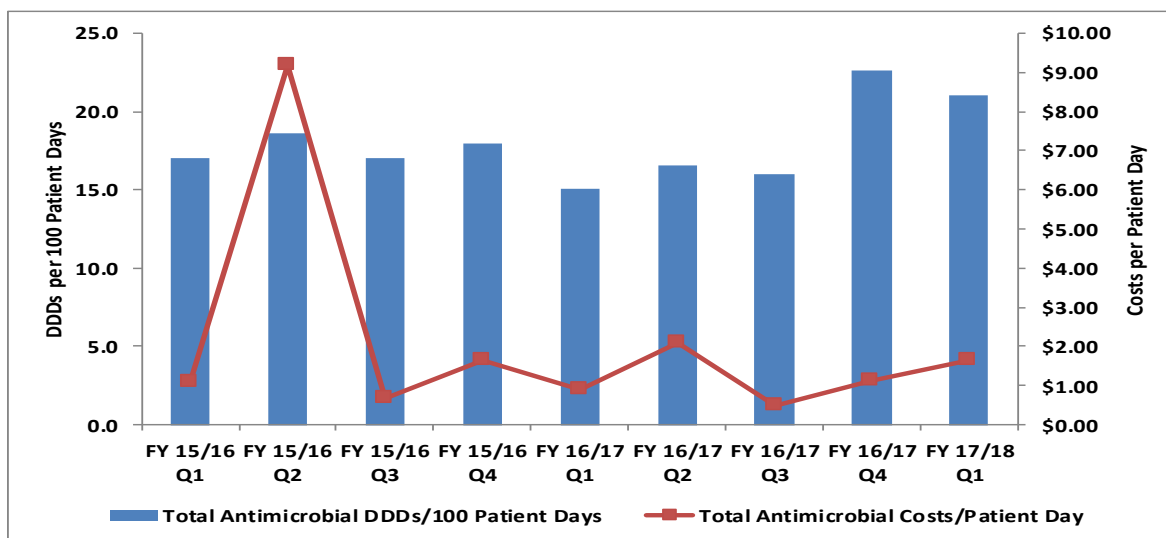


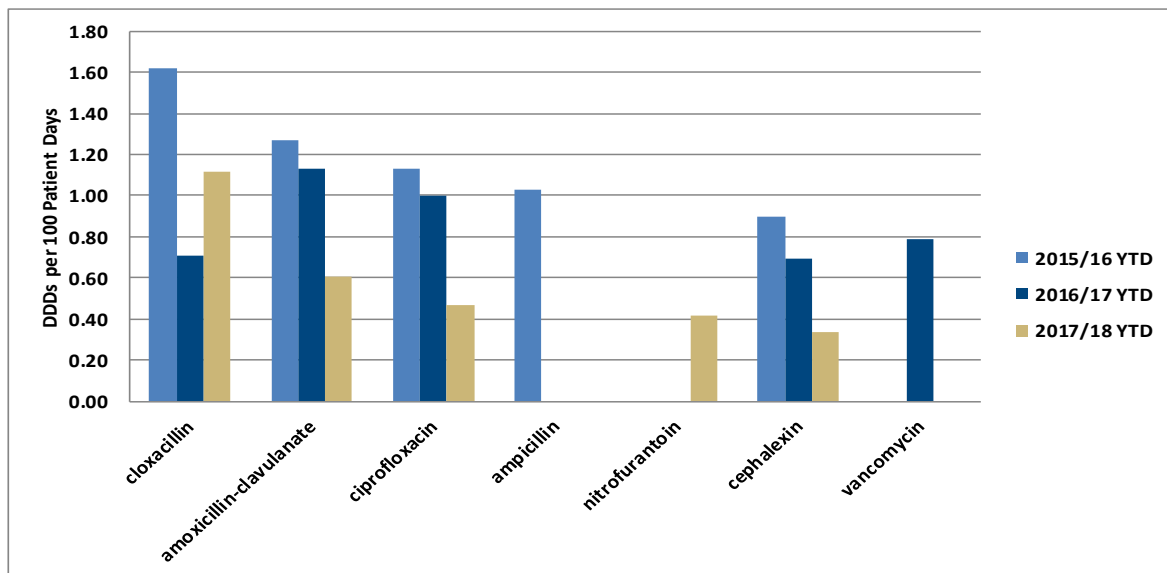
Table 31: Toronto Rehabilitation Institute: University Centre

Indicators			FY17/18 Performance					YTD of Previous Year
	FY 15/16	FY 16/17	Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs								
Total Antimicrobial DDDs/100 Patient Days	18	18	21				21	15
Systemic Antibacterial DDDs/100 Patient Days	16	15	20				20	14
Systemic Antifungal DDDs/100 Patient Days	1	3	2				2	1
Total Antimicrobial Costs	\$154,345	\$58,364	\$22,096				\$22,096	\$11,298
Total Antimicrobial Costs/Patient Day	\$3.09	\$1.14	\$1.66				\$1.66	\$0.90
Systemic Antibacterial Costs	\$52,505	\$30,908	\$8,928				\$8,928	\$11,053
Systemic Antibacterial Costs/Patient Day	\$1.05	\$0.60	\$0.67				\$0.67	\$0.88
Systemic Antifungal Costs	\$1,840	\$27,456	\$13,168				\$13,168	\$244
Systemic Antifungal Costs/Patient Day	\$0.04	\$0.54	\$0.99				\$0.99	\$0.02
Patient Care Outcomes								
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	2 (0.04)	2 (0.04)	1 (0.08)				1 (0.08)	1 (0.08)

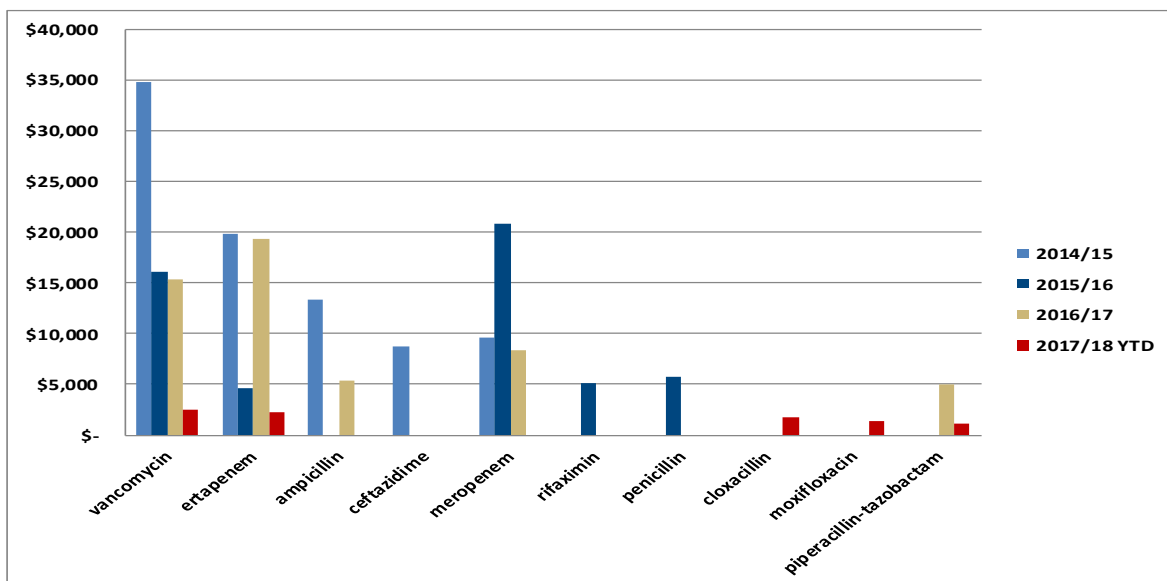
BRIDGEPOINT HEALTH

Bridgepoint Health: Hospital-Wide

Bridgepoint Health: Hospital-Wide Top 5 ANTIBACTERIALS by Usage



Bridgepoint Health: Hospital-Wide Top 5 ANTIBACTERIALS by Expenditures



Bridgepoint Health: Urinary Tract Infection (UTI) Audit

The Antimicrobial Stewardship Program – Bridgepoint Subcommittee initiated a UTI audit with an aim to decrease inappropriate utilization of antibiotics. The UTI audit was designed to determine if antimicrobials were used appropriately post-intervention (CME and guidelines were presented to physicians and education to nurses) for patients with positive urine cultures who have or have not met surveillance criteria for a UTI. One month (May 1 to 31, 2016) of collected data was analyzed and compared to data collected in 2014. Eighty-four of the urine culture reports on 64 patients were included in the audit.

Recent analysis of the data indicates no significant change has been observed post intervention. The results of this audit will initiate continuing steps to support nursing and physicians around UTIs and the appropriate interpretation of urine cultures and utilization of antibiotics. Prescriber-specific feedback is to be provided in the months to come.

Urinary Tract Infection Audit Report

	August-December 2014	May 2016
Cultures	167	50
% not meeting surveillance criteria	59% (98/167)	62% (31/50)
% of above receiving antibiotics	55% (53/98)	55% (17/31)
% organism resistant to antibiotics ordered	5.6% (3/53)	29% (5/17)

In Vitro Fertilization Clinic Involvement

The SHS-UHN ASP team collaborated with the Mount Sinai Fertility Clinic to review existing practice and literature surrounding antibiotic prophylaxis for transvaginal oocyte retrieval (TVOR) procedures. In Q1, Dr. Paul Bonnar and Katie Mok were invited to present at the Mount Sinai Fertility Rounds on the topic of “Antibiotic Prophylaxis for ART Procedures: Risks and Benefits”.

BEST PRACTICE GUIDELINES AND ALGORITHMS

- Dr. Shahid Husain and Miranda So have completed the Draft ASP MOT Common Infections Management Guidelines for Solid Organ Transplant Patients. The guidelines will undergo consultative reviews by content experts in MOT and Transplant Infectious Diseases in the coming months.
- The ASP-Allogeneic Bone Marrow Transplant Working Group was formed to update the antimicrobial prophylaxis guideline for allogeneic bone marrow transplant recipients, with support from Judy Costello, Dr. Andre Schuh, and Dr. Hans Messner. The working group will continue to meet to address any update as needed moving forward.
- **Miranda So** is the recipient of the **Canadian Society of Hospital Pharmacists Ontario Branch Information Technology Award** for the interactive High-Risk Febrile Neutropenia Protocol and the Solid Tumor Febrile Neutropenia Protocol.
- Clinical summaries continue to be available on the [ASP website](#) and on [mobile device web browsers](#) for a series of common and important conditions. Whiteboard animation videos continue to be available on [our program's YouTube channel](#).

RESEARCH

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

- Vallipuram J, Dhalla S, Bell CM, Dresser L, Han H, Husain S, Minden M, Paul NS, So M, Steinberg M, Vallipuram M, Wong G, Morris AM. Chest CT Scans are Frequently Abnormal in Asymptomatic Patients with Newly Diagnosed Acute Myeloid Leukemia. *Leukemia and Lymphoma*: 2017 Apr;58(4):834-41.
- Bai AD, Agarwal A, Steinberg M, Showler A, Burry L, Tomlinson GA, Bell CM, Morris AM. Clinical predictors and clinical prediction rules to estimate initial patient risk for infective endocarditis in *Staphylococcus aureus* bacteremia: a systematic review and meta-analysis. *Clin Microbiol Infect*. 2017 May 6: [Epub ahead of print].
- Sasson G, Bai AD, Showler A, Burry L, Steinberg M, Ricciuto DR, Fernandes T, Chiu A, Raybardhan S, Science M, Fernando E, Morris AM, Bell CM. Staphylococcus aureus bacteremia in immunosuppressed patients: a multicenter, retrospective cohort study. *Clin Microbiol Infect*. 2017 Jul;36(7): 1231-41.
- Bai AD, Steinberg M, Showler A, Burry L, Bhatia RS, Tomlinson GA, Bell CM, Morris AM. Diagnostic Accuracy of Transthoracic Echocardiography For Infective Endocarditis Findings Using Transesophageal Echocardiography as the Reference Standard: A Meta-Analysis. *J Am Soc Echocardiogr*. 2017 Jul;30(7): 639-46.e8.
- McIntyre M, Naik L, Bell CM, Morris AM. The development and assessment of a physician-specific antibiotic usage and spectrum feedback tool. *Open Forum Infect Dis*. Volume 4, Issue 3, 1 July 2017, ofx124, <https://doi.org/10.1093/ofid/ofx124>.

There are currently an additional five manuscripts that have been submitted to medical journals and are undergoing peer review, as well as four manuscripts that are close to ready for submission.

Abstracts

- Quinn KL, Bell CM, Daneman N, Morris AM, Jeffs L, Maxwell CJ, Bronskill SE. Going beyond antimicrobial stewardship to identify outliers in drug prescribing: a protocol for a cohort study of frail older adults. Oral Presentation: CFN Annual Conference, Toronto, Ontario, April 23-24, 2017
- Kruger S, Jeffs L, Bell CM, Morris AM, Bronskill SE, Maxwell CJ, Steinberg M, Zahradnik M. Potentially Inappropriate Medication Use in Long-Term Care: Preliminary Findings from a Qualitative Analysis. Oral Presentation: CFN Annual Conference, Toronto, Ontario, April 23-24, 2017
- So M, Morris AM, Bell CM, Humar A, Husain S. Effect of Academic Detailing with Prescribers for Antimicrobial Stewardship in Solid Organ Transplant Patients. Oral presentation; 2017 American Transplant Congress Chicago, Illinois, Apr 29 to May 3, 2017

- Natori Y, So M, Husain S, Bell CM, Morris AM. Impact of an Antimicrobial Stewardship Program to Reduce Drug-Resistant Bacteremia in Patients with Hematological Malignancies. Student poster presentation; AMMI Canada, Toronto, Ontario, May 3-6, 2017
- McIsaac W, Morris AM, Senthinathan A, Nakamachi Y, Steinberg M, Moineddin R, Dresser L, McIntyre M, Bell CM, Bloom J, Tannenbaum D. Designing an Effective Outpatient Antimicrobial Stewardship Program to Reduce Unnecessary Antibiotic Use in Primary Care using a Mixed-Methods Collaborative Model. 'Incubator stream' poster presentation; AMMI Canada, Toronto, Ontario, May 3-6, 2017
- Zahradnik M, Jeffs L, Morris AM, Nakamachi Y, Steinberg M, Kruger S, Bell CM, Law M. Using Quality Improvement Methods to Sustain Optimal Antimicrobial Use in the ICU Setting. Poster Presentation; AMMI Canada; Toronto, Ontario, May 3-6, 2017
- Zahradnik M, Jeffs L, Morris AM, Nakamachi Y, Steinberg M, Kruger S, Bell CM, Law M. Building Capacity to Improve & Sustain Antimicrobial Stewardship Programs in ICUs. Poster Presentation; Canadian Association for Health Services and Policy Research (CAHSPR); Toronto, Ontario, May 24-26, 2017

There are several manuscripts that have been submitted to medical journals and are undergoing peer review.

Grants Awarded

- AHSC AFP Innovation Fund: 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 Investigators: Warren McIsaac and Andrew Morris. Start date: January 2018.
- SHS Department of Medicine Resident Research Grant: A multi-centre investigation of the management and outcomes of community-acquired *Escherichia coli* bacteremia. Resident: Michael Bonares. Supervisor: Andrew Morris.

Research Studies

The following grant funded studies are progressing according to timelines:

- FRAMING-LTC: Frailty and Recognizing Appropriate Medications IN Geriatrics and Long-Term Care. Technology Evaluation in the Elderly Network (CFN). Principal Investigator: Andrew Morris. Co-Investigators: Chaim Bell, Susan Bronskill, Colleen Maxwell, Lianne Jeffs
- 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. Co-investigators: Chaim Bell, Lianne Jeffs, Jeff Bloom, David Tannenbaum

In addition to these funded projects, multiple unfunded research projects continue, led by various members of the SHS-UHN ASP team.

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 to physicians and medical trainees through several means, including ASP/ID case-based noon rounds, ASP pocket cards for medical trainees, and a mobile ASP web application (m.antimicrobialstewardship.com) to provide efficient access to resources.
- Twice 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. Miranda So (ASP Pharmacist and Assistant Professor) is the course coordinator, with contributions from other ASP team members.

PROVINCIAL ROLE

Expert Consultation

The ASP continues to provide expert advice and consultation to various hospitals throughout the province. We've assisted over 30 hospitals of various sizes and needs from large academic hospitals to community hospitals in rural areas.

Our team has partnered with Public Health Ontario in hosting an Ontario Antimicrobial Stewardship Roundtable. This roundtable meeting included a cross-section of experts in antimicrobial stewardship, including primary care, long-term care, acute care, and perspectives from the Assistant Deputy Minister, Health Systems Quality and Funding, and Strategy and Policy Advisor and Infectious Disease Policy and Programs Sections.

Subsequent to that roundtable, on June 28 the MoHLTC asked to meet with the SHS-UHN ASP to discuss an Ontario Strategy for antimicrobial resistance (AMR). Specifically, during their visit with our team, the proposed strategy included:

- Surveillance of antimicrobial use and feedback to users for peer comparison
 - Setting of standards for hospital-based reporting of usage and inclusion in HQO Quality-Improvement Plans
 - Having mandatory provincial point prevalence audits/surveys of antimicrobial use
- Setting standards for Antimicrobial Prescribing
- Moving to standardize and centralize antimicrobial purchasing province-wide
- Developing Human Resources in Antimicrobial Stewardship
- Developing and implementing a public awareness campaign regarding antimicrobial resistance and antimicrobial use.

The ASP team has also been providing expert guidance to PSASS (Pharmacy Students for Antimicrobial Stewardship Society), DSASS (Dental Students for Antimicrobial Stewardship Society), and SASS (Students for Antimicrobial Stewardship Society) to create awareness and promote antimicrobial stewardship principles to the next generation of prescribers. SASS is now a national initiative, with chapters in eight medical schools and one pharmacy school.



NATIONAL AND INTERNATIONAL ROLE

On June 15, 2017, ASP team members Dr. Andrew Morris, and Yoshiko Nakamachi were asked to appear as expert witnesses before the Standing Committee on Health in Ottawa. They were called upon to provide expert testimony on antimicrobial resistance during the 42nd Parliament, 1st session meeting. Dr. Morris spoke as a representative and as Chair of the Antimicrobial Stewardship and Resistance Committee, Association of Medical Microbiology and Infectious Disease Canada. Ms. Nakamachi spoke on behalf of the Canadian Nurses Association. This was the second of two meetings where expert witnesses in Canada were called upon to inform and answer questions from Members of Parliament on the current state of AMR in Canada and proposals on how to address this issue moving forward.

HealthCareCAN, Public Health Agency of Canada, and the National Collaborating Centre for Infectious Diseases

As previously reported, the SHS-UHN ASP has been working 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 and Resistance. Members of our ASP team led the Pan-Canadian Action Round Table with 50 experts and champions of change on AMR last June. The outcome of the Pan-Canadian Action Round Table led to the development of a National Action Plan on antimicrobial stewardship, with a focus on the human health context as part of a “One Health” approach. The Action Plan was circulated for review and comments by key influencers and stakeholders and was finalized. A follow-up meeting to this National Action Round Table also took place where experts in AMR and AMS reconvened. This expert group (the AMS Canada Steering Committee), which includes SHS-UHN ASP members (Dr. Andrew Morris and Yoshiko Nakamachi), identified and committed to three “table setting” activities in AMS that support a National Action Plan on AMR. Specifically, these three activities are as follows:

1. Developing an evaluation protocol to assess progress in national AMS efforts.
2. Modeling strategies for educating the public on AMR and AMS.
3. Developing and promoting national guidelines on antimicrobial use for primary care practitioners treating common infections.

In addition, a proposed solution was put forth for the Federal Government to commit substantial federal investment to support the provinces and territories in implementing national antimicrobial stewardship (AMS) initiatives in Canada as it relates to three key areas:

1. **Leadership, Governance, and Resources:** Canada needs a national leadership and governance structure for AMS with dedicated resources and the necessary authority and accountability for implementing AMS initiatives in a coordinated fashion.

2. **Data:** Accurate and validated data is required to determine baseline targets and benchmarks for appropriate antimicrobial use. While much work has been done to obtain and understand AMR data, the same is not true of AMU data on a national scale. The challenges include variability, established standards, and methodological knowledge gaps.
3. **Standardization and Best Practices:** Development and the dissemination of national-level guidelines for antimicrobial prescribing for common infections sets minimum expectations for when and when not to prescribe. Best practice guidelines also serve as a starting point by which to measure appropriate antimicrobial prescribing at a national level. Establishing minimum requirements for ASPs and AMS activities also sets minimum standards in all regions across Canada.

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 (interim).

Antimicrobial Resistance (AMR) Federal, Provincial, Territorial (F/P/T) Task Group

Yoshiko Nakamachi is an official member of the AMR Stewardship Task Group, which provides F/P/T advice and recommendations on priority human health activities in health care, community, agriculture settings.

Association of Medical Microbiology and Infectious Diseases Canada

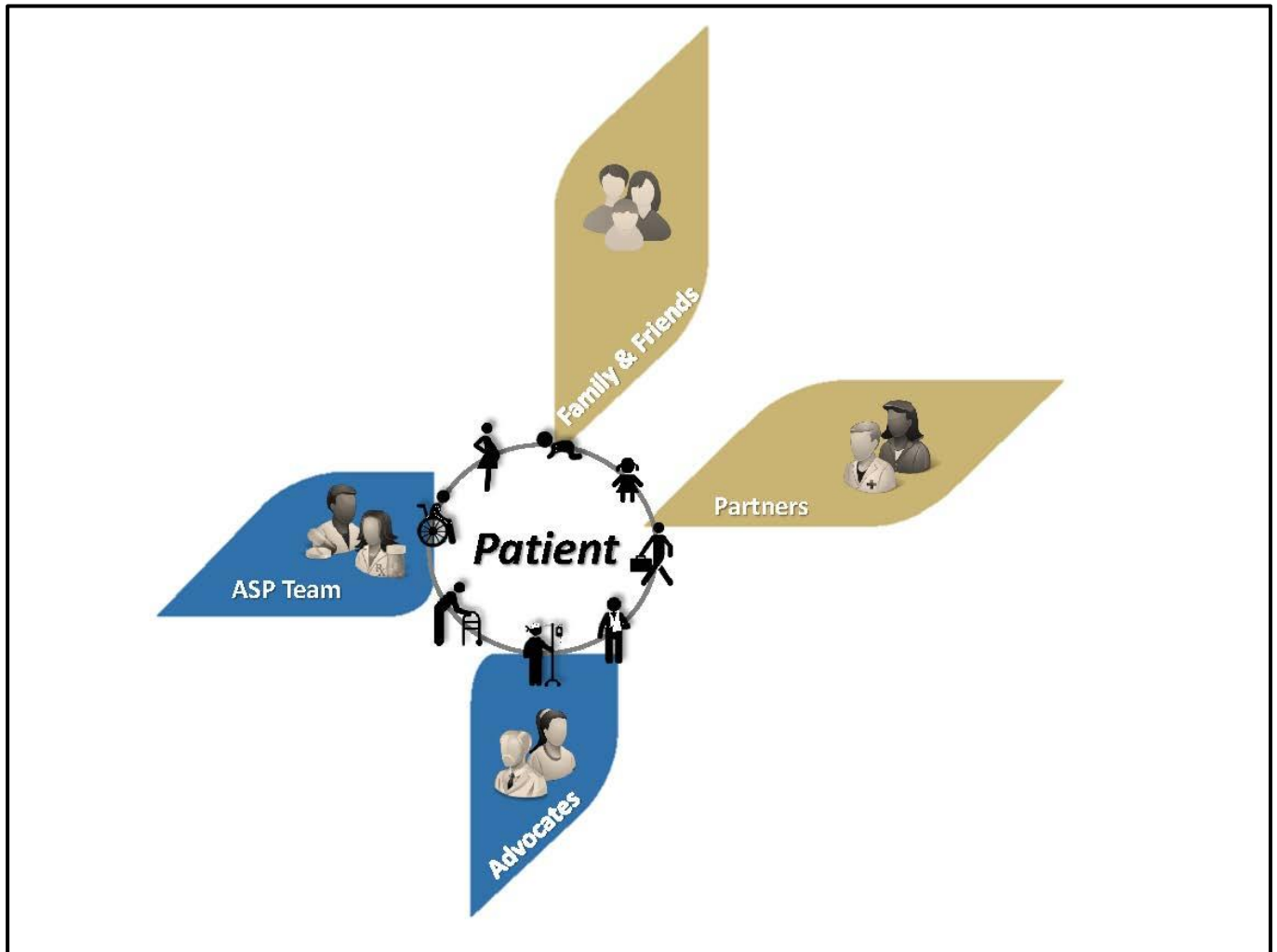
Dr. Andrew Morris is the chair of AMMI Canada's Antimicrobial Stewardship and Resistance Committee. Dr. Linda Dresser is a pharmacist member of this committee.

ASP Rotations at SHS and UHN

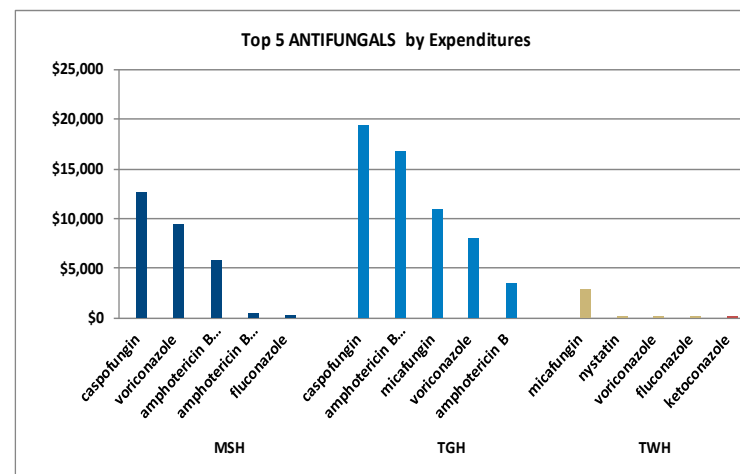
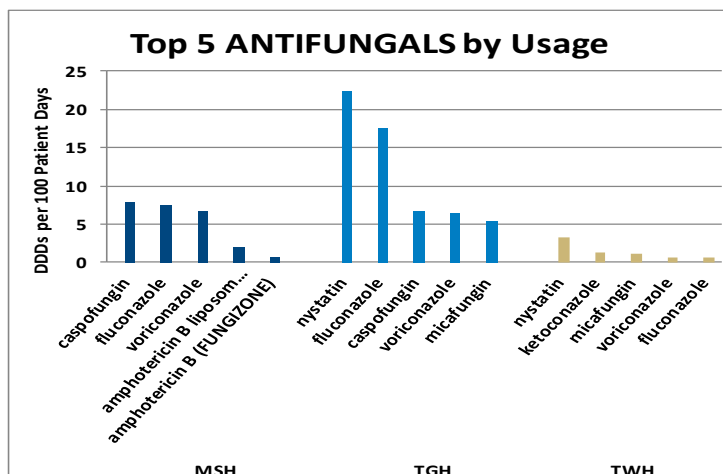
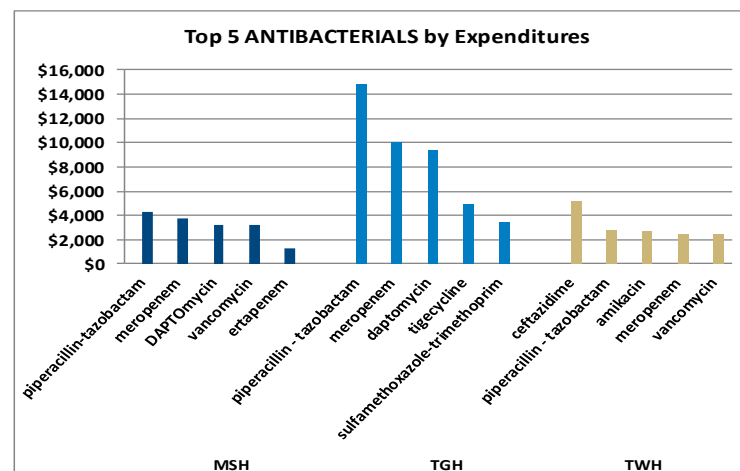
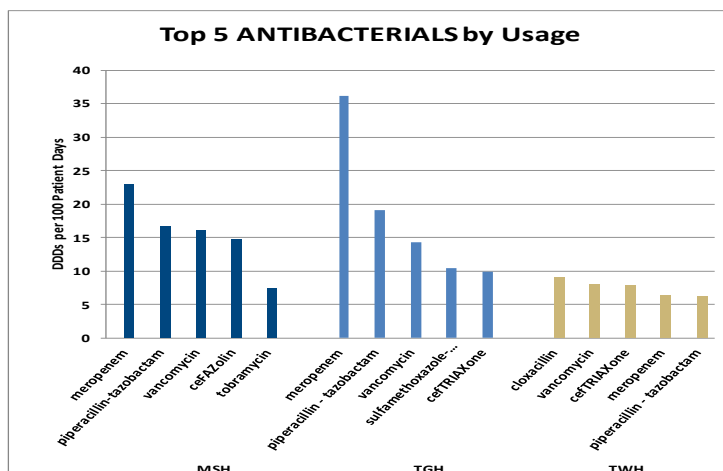
The SHS-UHN ASP continues to provide ASP rotations for residents and fellows from across the country and internationally.

STRATEGIC PLANNING

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



Appendix 1: FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site



Appendix 2: General Internal Medicine FY 17/18 Q1 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures

