SHS + UHN

ASP ANTIMICROBIAL STEWARDSHIP PROGRAM

Q2 REPORT

FISCAL YEAR 2018 | 2019

@shsuhnasp

Sinai Health System

UHN Toronto General Toronto Western Princess Margaret Toronto Rehab Michener Institute

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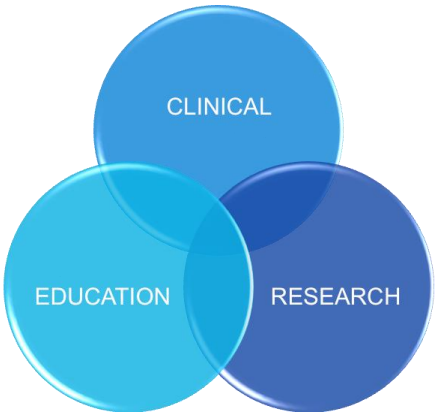
"Getting patients the right antibiotics, when they need them"

EXECUTIVE SUMMARY

The Sinai Health 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.) Table 1 summarizes antimicrobial usage and cost in the various units and services at SHS and UHN.

The Toronto General CVICU has seen an unusual increase in cost and consumption during Q2. These increases in cost and consumption can be attributed to a few patients with prolonged stays and complicated infectious issues. Also, this year the alloBMT service expanded from one unit to two units (14B and 14C). There has been approximately a 70% increase in total cost, however, once normalized by patient volume, it seems comparable to last year.

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	Same as previous YTD	↓
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	Same as previous YTD	↓

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

FISCAL YEAR 18/19 Q2 HIGHLIGHTS

Research – Published In This Quarter

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:

- Morris AM, Nakamachi Y, Dresser L, Husain S, McIntyre M, Mok K, Naik L, Nelson S, So M, Steinberg M, Bell CM. Forensic Antimicrobial Audit: A Necessary Step for Antimicrobial Stewardship Programs. *Journal of Antimicrobial Stewardship;* 2018 [in press].

- Morris AM, Bai A, Burry L, Dresser L, Ferguson N, Lapinsky SE, Lazar N, McIntyre M, Matelski J, Minnema B, Mok K, Nelson S, Poutanen SM, Singh JM, So M, Steinberg M, Bell CM. Long-term effects of phased implementation of antimicrobial stewardship in academic intensive care units: 2007-2015. *Crit Care Med* [revisions submitted].

- Valbuena V, Bai AD, Showler A, Mahbuba M, Steinberg M, Bell CM, Morris AM. Mandatory infectious diseases consultation leads to improved process measure adherence in the management of *Staphylococcus aureus* bacteremia: A multicenter, quasi-control study. *Official Journal of the Association of Medical Microbiology and Infectious Disease Canada* [revisions submitted].

Abstracts and Poster Presentations

- Quinn KL, Campitelli MA, Diong C, Bell CM, Stall N, Daneman N, Morris AM, Jeffs L, Maxwell CJ, Bronskill SE. Using antibiotic prescribing patterns to identify physicians who favor high-risk medications and those of questionable benefit. Poster presentation at 5th Canadian Frailty Network Conference, Toronto, September 20-21, 2018.

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. Co-investigators: Chaim Bell, Lianne Jeffs, Jeff Bloom, David Tannenbaum. Funded by 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. Co-investigators: Andrew Morris, Noah Ivers, Yoshiko Nakamachi. Funded by AHSC AFP Innovation Fund

- A Multi-centre Investigation of the Management and Outcomes of Community-onset Escherichia coli Bacteremia. Principal Investigator: Andrew Morris. Co-investigators: Michael Bonares, Sam Thrall, Das Pavani. Funded by PSI Resident Research Grant and SHS DoM Resident Research Grant.

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

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)** 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 are being 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. The ASP made the **decision to redesign ICU ASP interventions**. Over the past nine years, the ASP had employed an academic detailing model of three to five times a week. ICU staff who attended the multi-weekly ASP rounds were well-entrenched in the expectations of stewardly antimicrobial prescribing and there was an appetite for change.

To that end, the ASP has moved to (1) **JEDI (Judicious Evaluation of antimicrobial Decision Making in the ICU) rounds**. This initiative is being led by **Linda Dresser (ASP Pharmacist),** whereby the ASP team **audits appropriateness** of antimicrobial prescribing of all patients 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 the criteria for appropriateness developed locally using a modified-Delphi process. This initiative went live in the TGH MSICU in October 2017, TGH CVICU December 2017, TWH MSNICU March 2018, and the MSH ICU June 2018.

The second component of our new ICU initiative is being led by **Linda Jorgoni (ASP Nurse Leader)** and is known as (2) **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 system during the head-to-toe assessment. The components of the infection system include temperature, white blood count, antimicrobials, indication for antimicrobial use, and any other relevant information that pertains to the infection. This intervention is designed to change nursing practice using different behaviour change strategies (e.g. audit and feedback). We are currently collecting data to evaluate the intervention and to identify barriers to nursing engagement in antimicrobial stewardship.

Together these two new ICU ASP initiatives have been well-received due to the tremendous amount of work that went into engaging key stakeholders prior to implementation. The stakeholders in all the ICUs have been very informative in their feedback throughout the process allowing for continuous learning and improvement.

Provincial, National, and International Role

In Q2, and following a visit from the **Ministry of Health and Long-Term Care (MOHLTC)**, the SHS-UHN ASP has partnered with the MOHLTC and has co-developed an Ontario Strategy for antimicrobial resistance (AMR). Specifically, the proposed strategy includes:

- 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

In Q2, the SHS-UHN Antimicrobial Stewardship Program received a **grant by the Ontario Ministry of Health and Long-Term Care (MOHLTC)** and was tasked to provide awareness, education, and practical tools to community-based clinicians province-wide. As many of the concepts involving antimicrobial resistance (AMR) and antimicrobial stewardship (AMS) are relatively new to community-based clinicians, the initial strategy to improve antimicrobial usage is to provide background, syndrome-based information and decision aids to pharmacists. Community pharmacists are in the unique position where they "touch" every community antibiotic prescription before it is dispensed. Community pharmacists will be provided with education and practical tools (scripting, fax templates) to facilitate stewardship conversations and interventions with both patients and prescribers. The SHS-UHN ASP held a focus group on July 25, 2018 with a sample of community pharmacists from across Ontario to understand their needs as they relate to Antimicrobial Resistance and Stewardship and validate the provincial strategy.

The SHS-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).

In the fall of 2018, and with the support of PHAC (Public Health Agency of Canada), BD (Becton Dickinson), NCAS (National Centre for Antimicrobial Stewardship) in Australia, the SHS-UHN ASP implemented an antimicrobial survey tool across Canada. This tool, NAPS (National Antimicrobial Prescribing Survey), will collect information about antibiotic prescriptions, accompanying diagnoses, and the appropriateness of the prescription. Mount Sinai Hospital and Toronto Western Hospital will partake in this survey.

CANresist

Aligned with the Federal Government's plan on addressing AMR, Tackling Antimicrobial Resistance and Antimicrobial Use – A Pan Canadian Framework for Action, CAN*resist* was created and has brought together over 150 of Canada's best researchers in AMR and AMS. The CAN*resist* directorate consists of Drs. Andrew Morris (SHS-UHN ASP), David Patrick (BCCDC), and J. Scott Weese (University of Guelph), and Yoshiko Nakamachi (SHS-UHN ASP). Our network research members remain committed and active participants in the CAN*resist* network.

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 elective course in Year 3 dedicated to Antimicrobial Stewardship, which is led by **Miranda So**, Assistant Professor and SHS-UHN ASP Pharmacist.

Dr. 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.

FISCAL YEAR 18/19 Q2 RESULTS

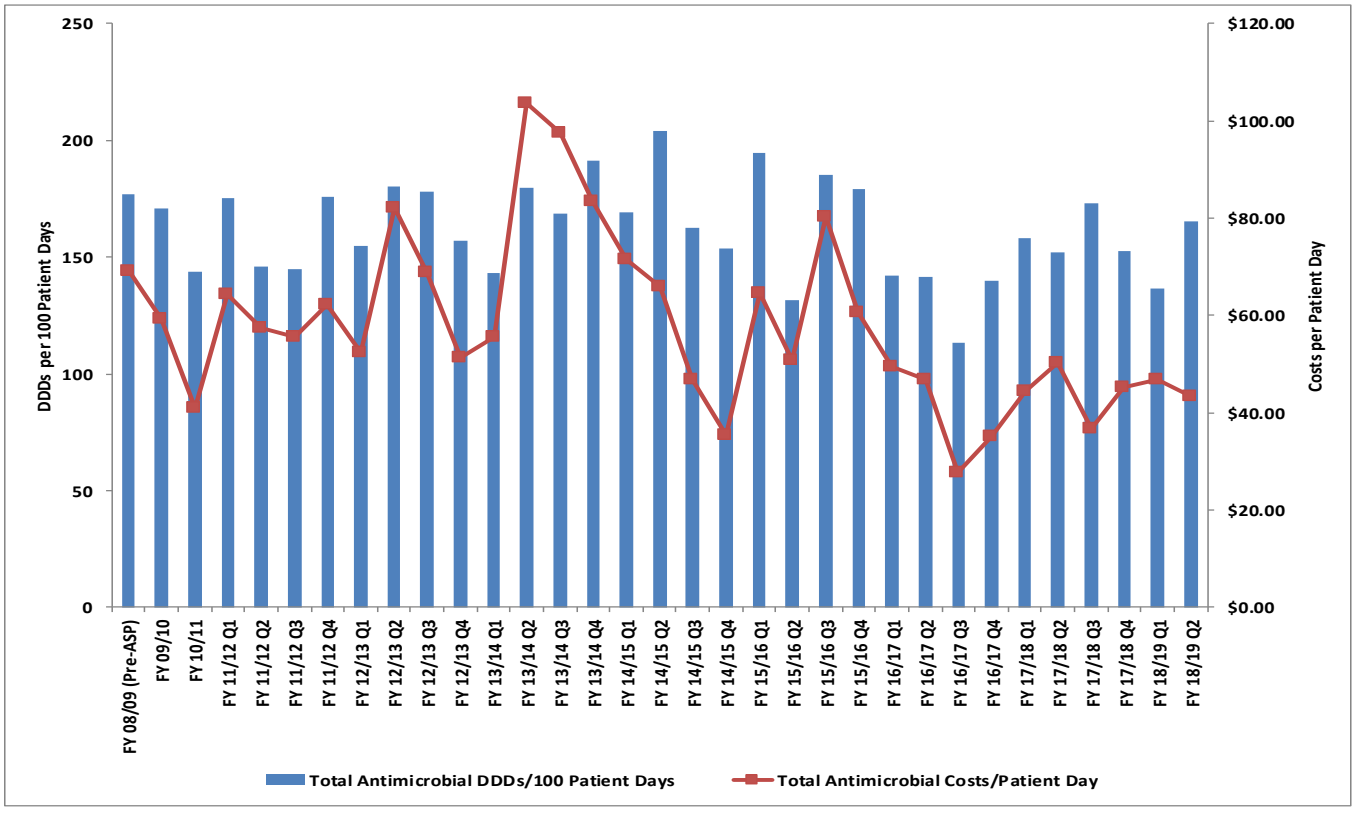
CRITICAL CARE

Mount Sinai Hospital: Medical Surgical ICU

The FY 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 2.6% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 5.2% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 6.6% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 4.1% compared to YTD last year.
- NB: Patients transferred from Princess Margaret accounted for 13% of patient visits and 56% of the antimicrobial costs.

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



To view **Appendix 1: FY 18/19 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 2.7% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days decreased (↓) by 2.0% compared to YTD last year.

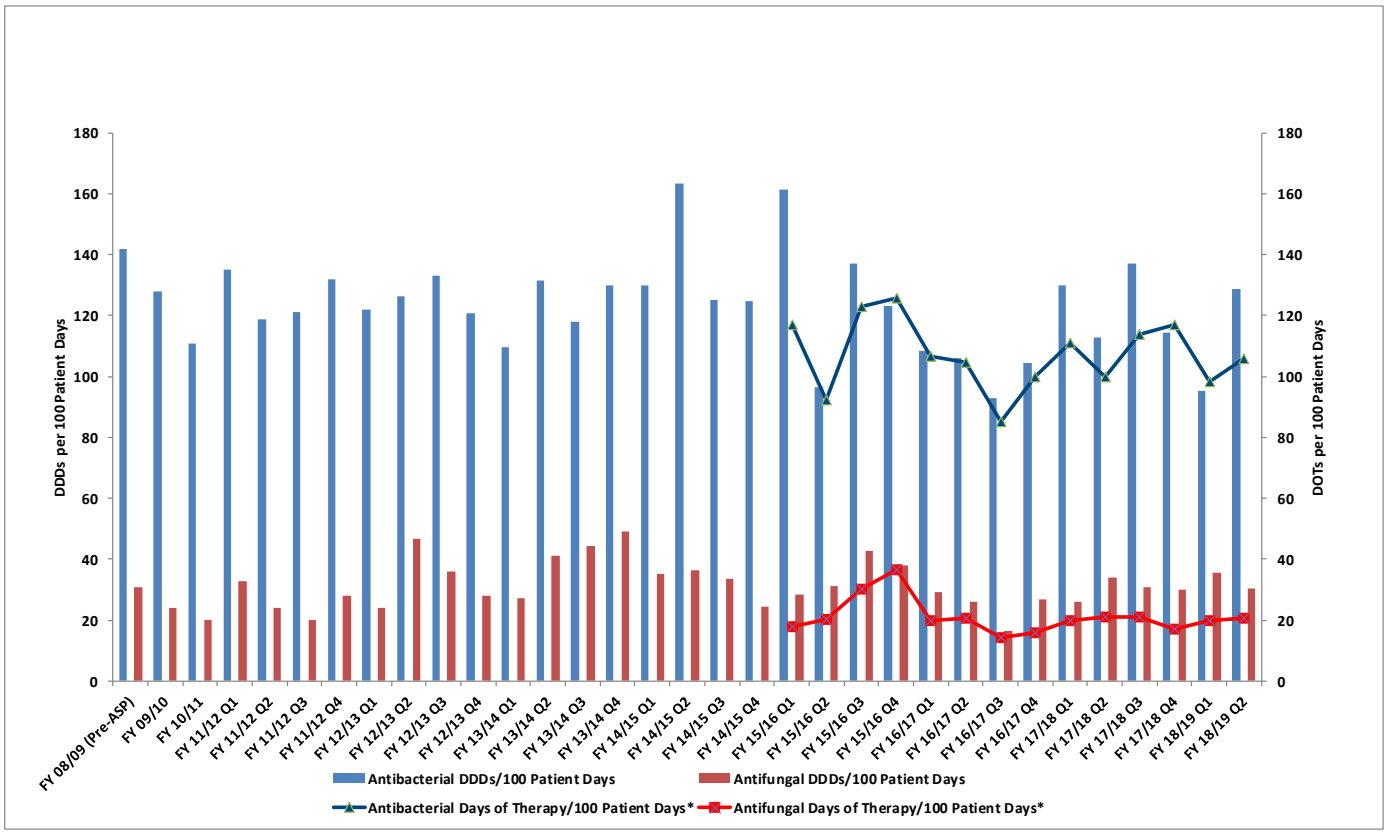


Table 2: Mount Sinai Hospital: Medical Surgical ICU

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	FY 18/19 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**	**137**	**165**			**151**	**155**
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	127	123	136	116	103	123	95	129			112	121
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	35	41	25	32	25	30	36	30			33	30
Total Antimicrobial Costs	$332,724	$285,975	$193,129	$279,859	$291,470	$424,044	$232,814	$274,258	$187,684	$206,738	$59,573	$55,625			$115,198	$113,240
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**	**$46.76**	**$43.36**			**$45.05**	**$47.54**
Systemic Antibacterial Costs	$174,339	$142,134	$95,773	$125,339	$134,811	$108,886	$92,928	$68,246	$57,257	$80,561	$21,787	$18,547			$40,334	$40,209
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	$17.10	$14.46			$15.77	$16.88
Systemic Antifungal Costs	$143,100	$132,519	$88,998	$141,877	$144,811	$296,573	$134,504	$189,661	$119,234	$112,610	$36,410	$34,620			$71,030	$68,983
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	$28.58	$26.98			$27.78	$28.96
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	111	109	115	99	110	98	106			102	105
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	17	21	27	18	20	20	21			20	21
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 (0.78)	0 (0.00)			1 (0.39)	2 (0.84)
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	5.09	4.76			4.93	4.34
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	11.6	15.7			13.7	14.6
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	2.3	1.9			2.1	3.8
ICU Ventilator Days	NA	3286	2934	2677	2749	3069	2597	2504	2231	2845	663	633			1296	1582
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	4.02	3.93			3.98	3.86

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	FY 18/19 Q1	FY 18/19 Q2	FY 18/19 Q3	FY 18/19 Q4	FY 18/19 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	$31,567.12	$19,542.79			$51,109.91	$52,275.00
	$21.14	$25.42	$31.77	$37.79	$31.80	$23.12	$9.78	$18.48	$23.11	$14.70			$18.96	$23.25
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	$28,005.70	$36,082.01			$64,087.71	$60,965.00
	$179.02	$181.58	$249.91	$317.64	$170.89	$231.26	$191.53	$155.98	$153.88	$172.64			$163.91	$197.30
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	$59,572.82	$55,624.80			$115,197.62	$113,239.58
	$44.26	$61.97	$69.91	$87.40	$54.30	$67.17	$27.93	$35.78	$38.48	$36.17			$37.33	$44.29

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)

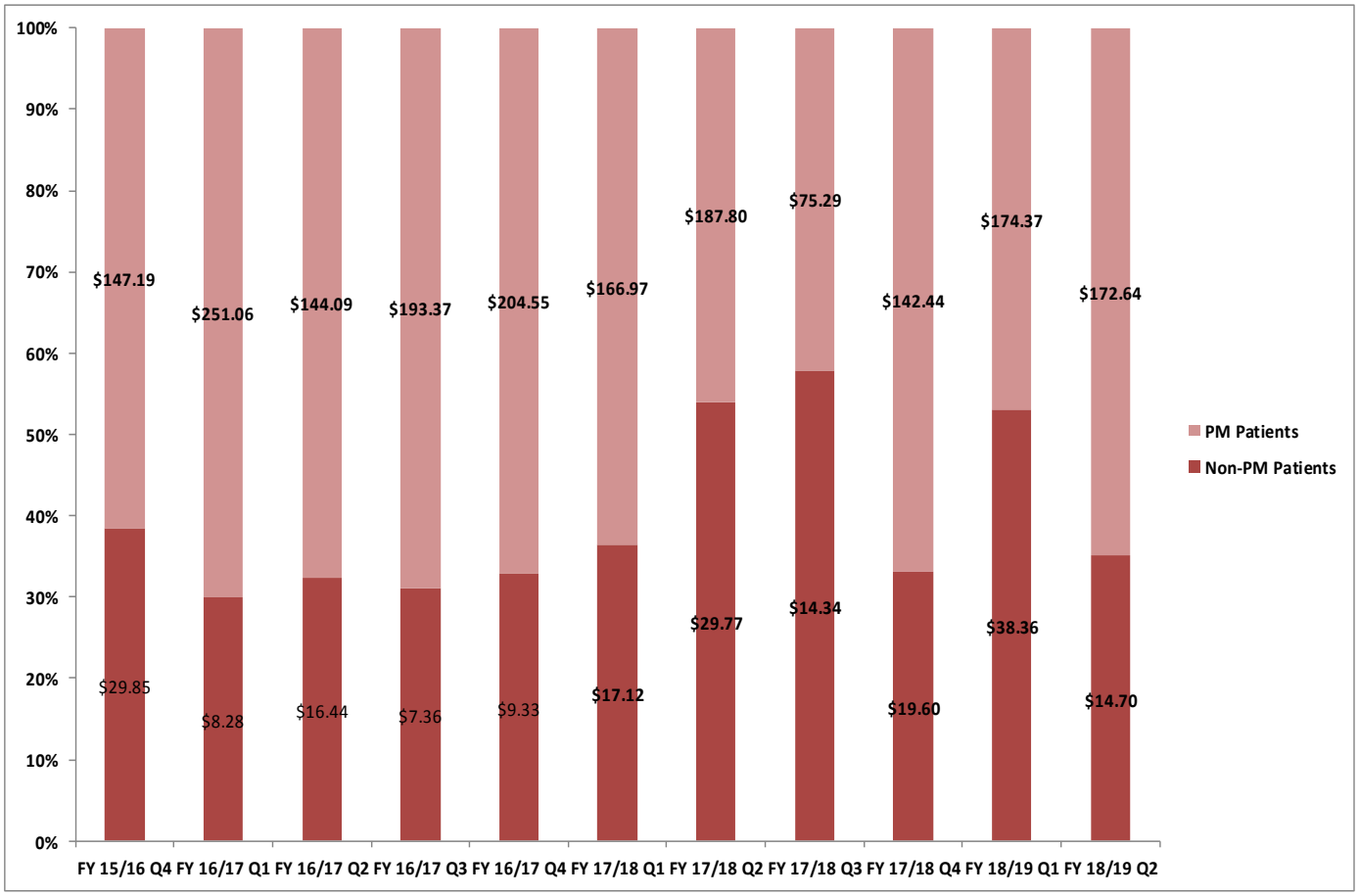
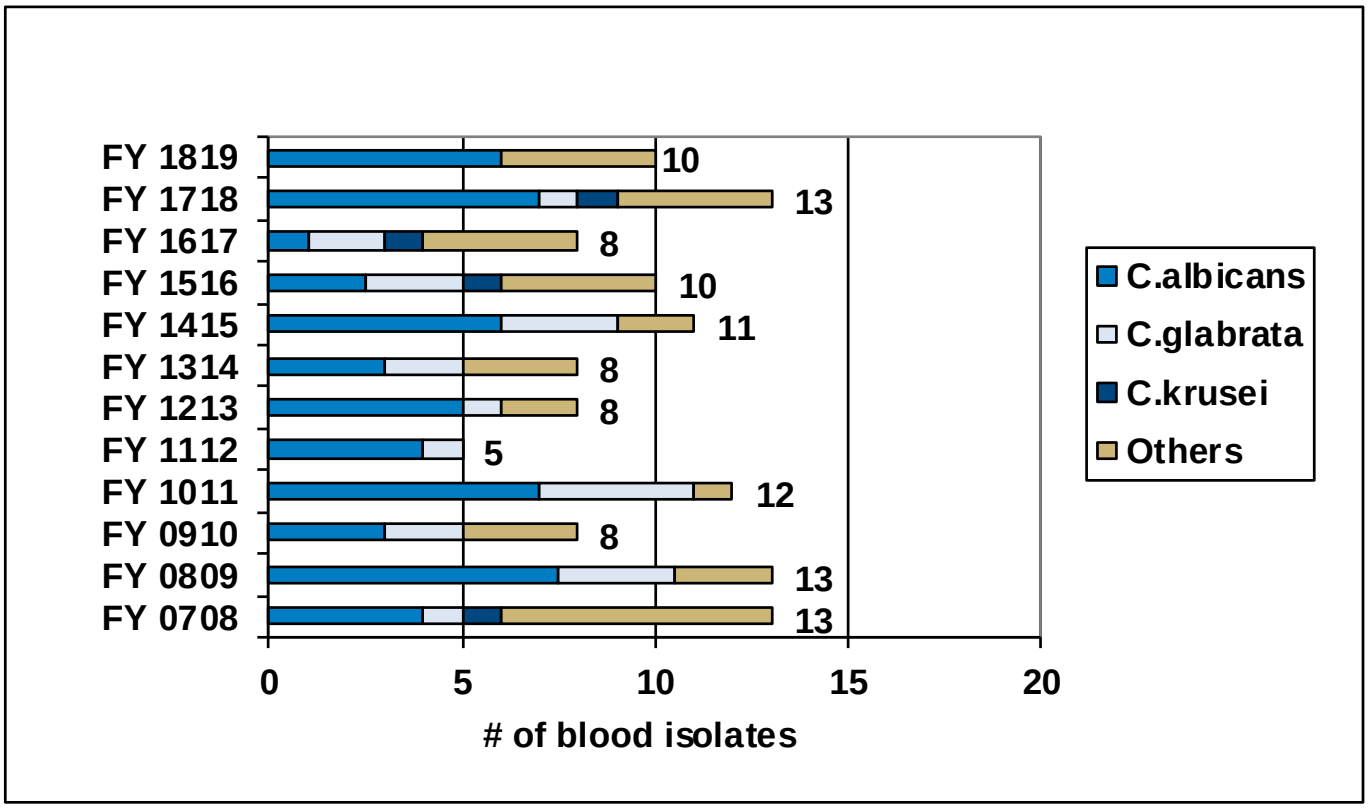
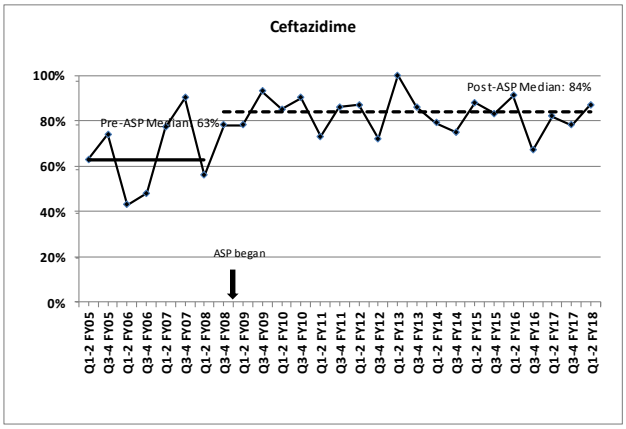


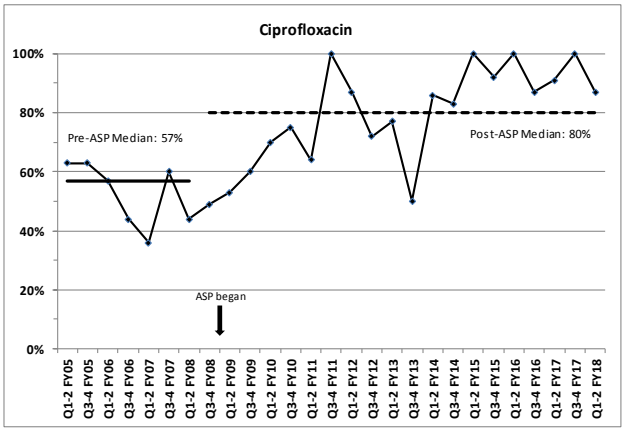
Table 4: Yeast Species Isolated in Blood – Mount Sinai Hospital: Medical Surgical ICU

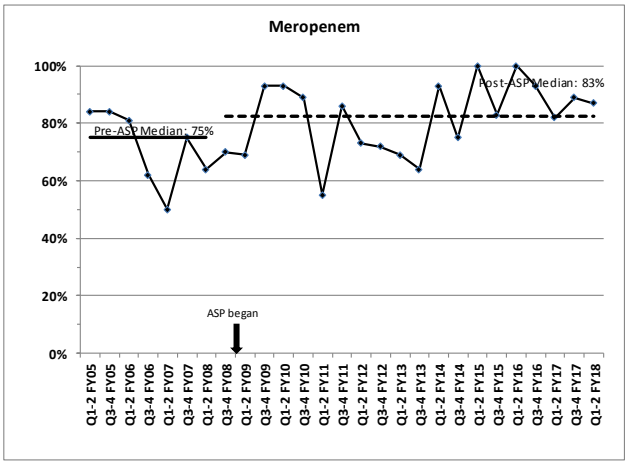


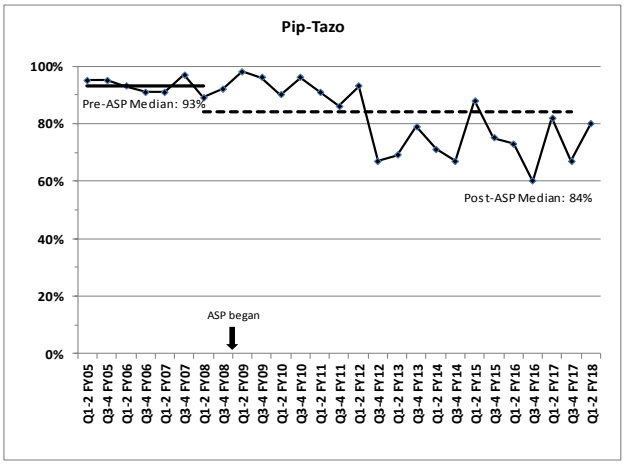
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

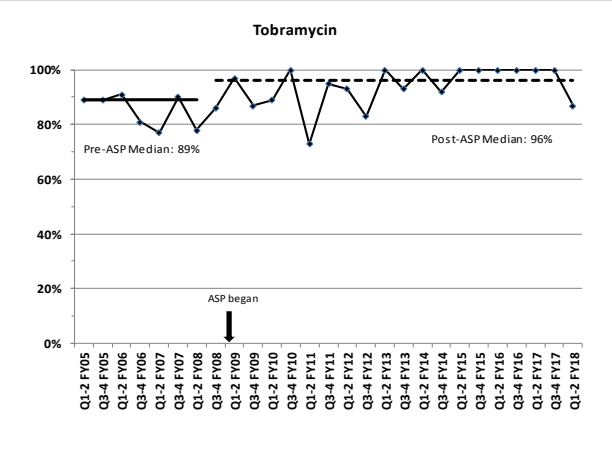
MSH ICU Pseudomonas Susceptibility











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 18/19 Q2 summary includes:

- Antimicrobial days of therapy (DOT) per 100 patient days decreased (↓) by 0.4% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 78.6% compared to YTD last year.

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

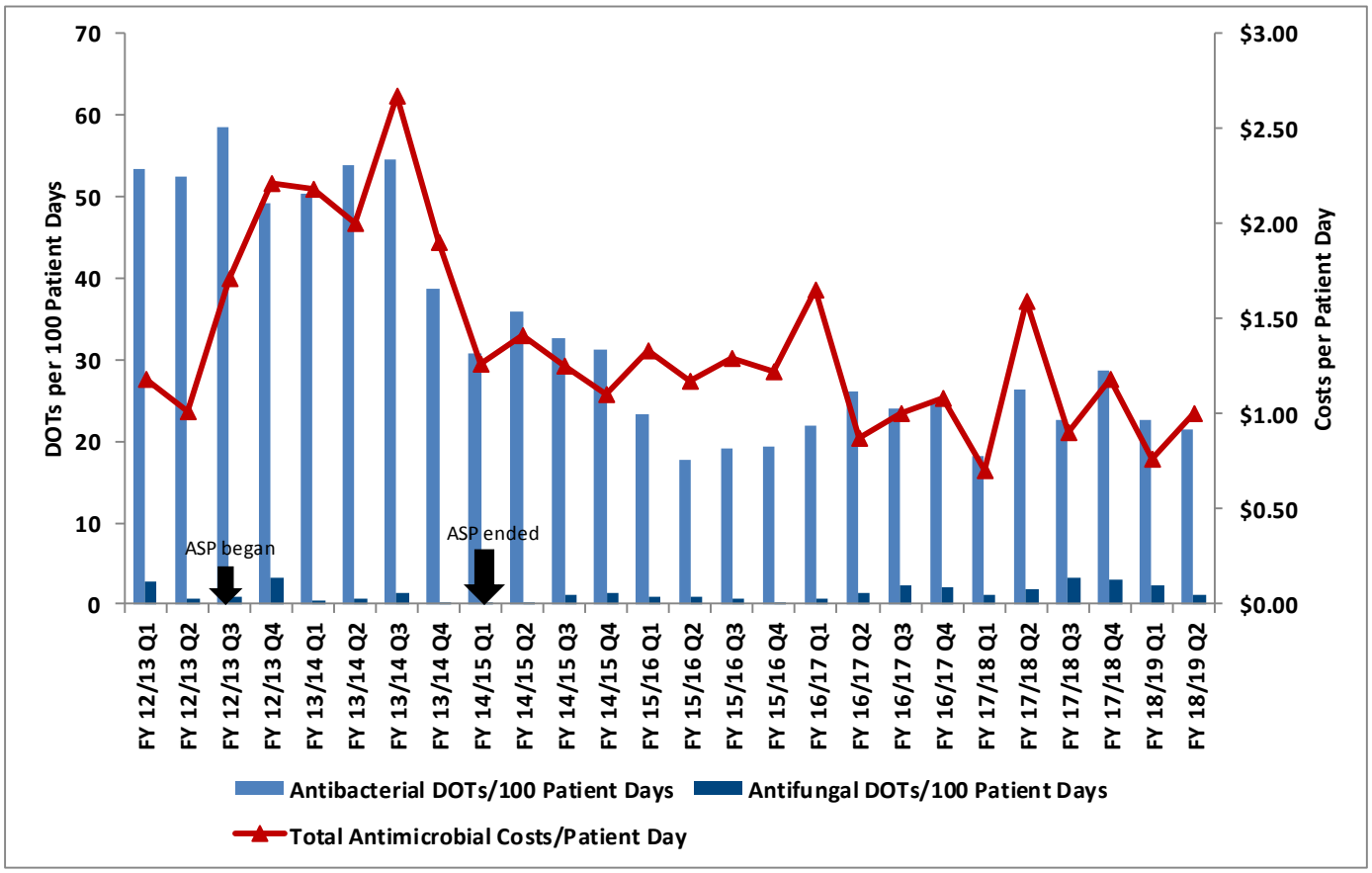


Table 5: Mount Sinai Hospital: Neonatal ICU

Indicators	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY18/19 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**	**24.9**	**22.6**			**23.8**	**23.9**
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.5	48.7	32.7	19.9	24.2	24.1	22.7	21.5			22.1	22.4
Systemic Antifungal DOTs/100 Patient Days	2.2	1.8	0.7	0.8	0.7	1.6	2.3	2.2	1.1			1.7	1.5
Total Antimicrobial Costs	$16,415	$17,682	$26,162	$21,371	$21,232	$19,618	$19,272	$3,456	$4,499			$7,955	$35,556
Total Antimicrobial Costs/Patient Day	**$1.31**	**$1.51**	**$2.17**	**$1.26**	**$1.26**	**$1.15**	**$1.09**	**$0.76**	**$1.00**			**$0.88**	**$4.12**
Systemic Antibacterial Costs	$14,783	$16,505	$25,290	$20,516	$20,804	$18,247	$18,042	$3,268	$4,293			$7,561	$9,312
Systemic Antibacterial Costs/Patient Day	$1.18	$1.41	$2.10	$1.21	$1.23	$1.07	$1.02	$0.72	$0.96			$0.84	$1.08
Systemic Antifungal Costs	$1,632	$1,177	$872	$855	$428	$1,372	$1,230	$102	$206			$308	$628
Systemic Antifungal Costs/Patient Day	$0.13	$0.10	$0.07	$0.05	$0.03	$0.08	$0.07	$0.022	$0.05			$0.03	$0.07

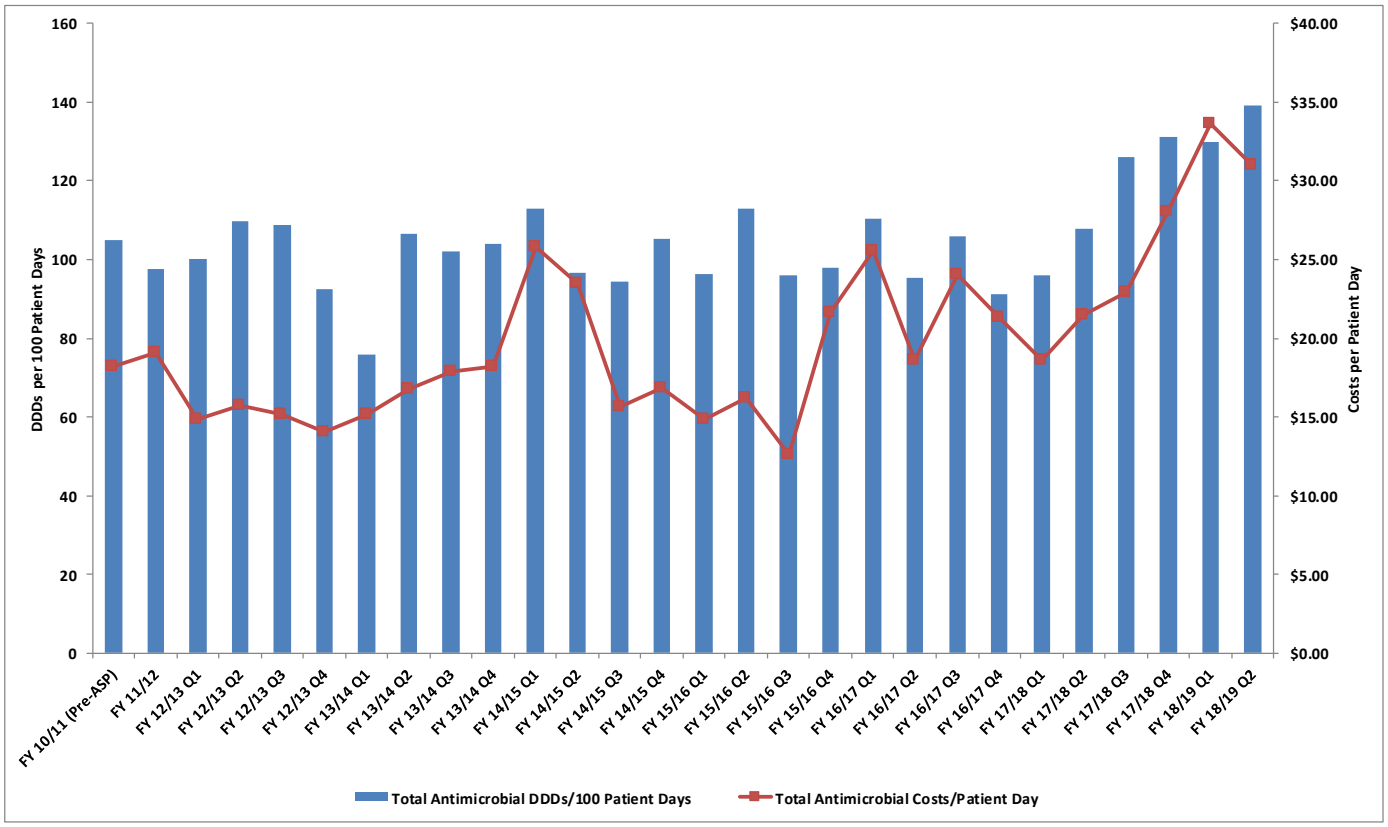
Notes: Effective January 15, 2014, the NICU changed to a mixed-acuity model of care. Prior to this, ASP reported level 3 pharmacy data only. As of January 15, pharmacy data includes both level 2 and level 3 usage and cost. Patient days include both level 2 and 3 days; January level 2 days were determined 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 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 31.9% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 60.4% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 45.7% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 98.4% 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
- These increases in cost and consumption are associated with a few patients with prolonged stays and complicated infectious issues.

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 21.3% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 84.1% compared to YTD last year.

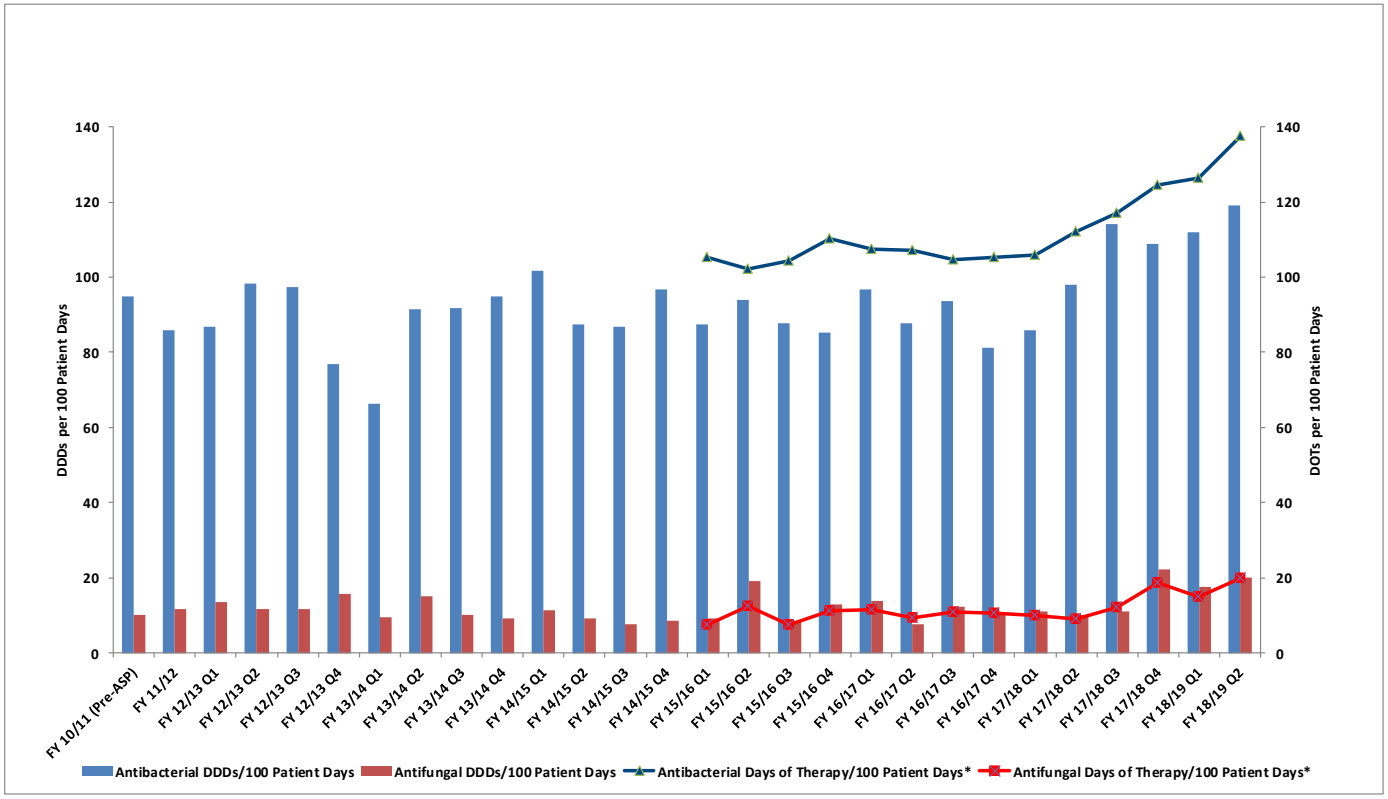


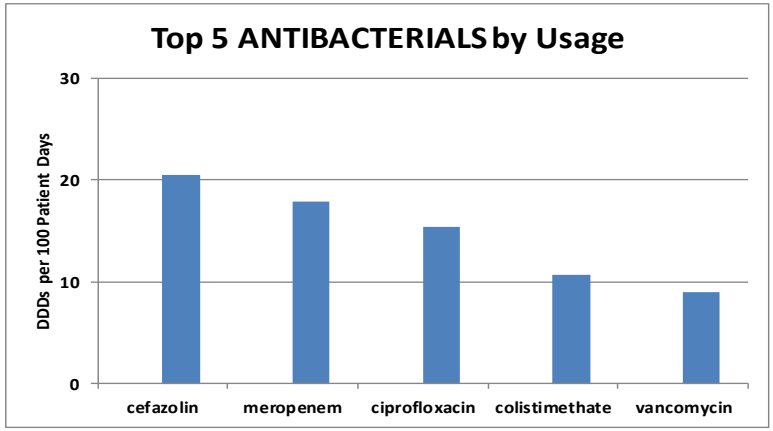
Table 6: Toronto General Hospital: Cardiovascular ICU

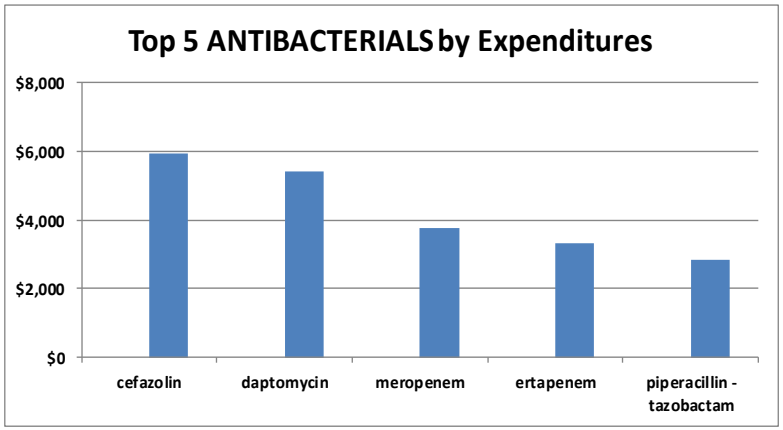
Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19 Performance					YTD of Previous Year
									Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs														
Total Antimicrobial DDDs/100 Patient Days	**105**	**98**	**102**	**97**	**102**	**101**	**101**	**115**	**130**	**139**			**135**	**102**
Systemic Antibacterial DDDs/100 Patient Days	95	86	89	86	93	89	90	102	112	119			116	92
Systemic Antifungal DDDs/100 Patient Days	10	12	13	11	9	13	11	14	18	20			19	10
Total Antimicrobial Costs	$108,172	$108,464	$85,916	$100,736	$129,314	$110,716	$153,093	$160,790	$53,453	$54,330			$107,784	$70,270
Total Antimicrobial Costs/Patient Day	**$18.20**	**$19.06**	**$14.99**	**$17.00**	**$20.46**	**$16.34**	**$22.44**	**$22.80**	**$33.62**	**$30.96**			**$32.22**	**$20.08**
Systemic Antibacterial Costs	$100,375	$99,261	$74,232	$80,204	$91,366	$85,343	$96,782	$112,228	$38,222	$32,352			$70,574	$50,654
Systemic Antibacterial Costs/Patient Day	$16.89	$17.44	$12.95	$13.54	$14.45	$12.60	$14.19	$15.92	$24.04	$18.43			$21.10	$14.48
Systemic Antifungal Costs	$7,797	$9,204	$11,684	$20,532	$37,948	$25,373	$56,311	$48,562	$15,231	$21,978			$37,209	$19,616
Systemic Antifungal Costs/Patient Day	$1.31	$1.62	$2.04	$3.47	$6.00	$3.75	$8.26	$6.89	$9.58	$12.52			$11.12	$5.61
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	129	105	106	115	126	138			132	109
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	28	10	11	13	15	20			18	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)	0 (0)	0 (0)			0 (0)	8 (2.29)
ICU Average Length of Stay (days)	3.12	2.95	2.97	3.20	3.46	3.45	3.48	3.22	3.84	3.46			3.65	3.145
ICU Mortality Rate (as a %)	3.5	3.0	3.0	4.6	4.6	4.0	3.7	4.3	2.3	2.8			2.25	4.6
ICU Readmission Rate Within 48 Hrs (as a %)	1.6	2.2	1.8	2.2	2.4	1.6	2.0	2.0	1.4	1.9			1.7	2.2
Central Line Infection Rate (per 1000 pt days)	0.73	0.17	0.34	0.16	0.15	0.53	0.84	2.41	0.0	1.60			0.80	1.0
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	3.51	2.94			3.23	2.585
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.51	5.77	5.60	5.83	6.04	5.44	3.76	4.13			3.95	6.01
ICU Ventilator Days	3015	3571	3676	4049	3925	4239	4917	4555	854	1022			1876	2252

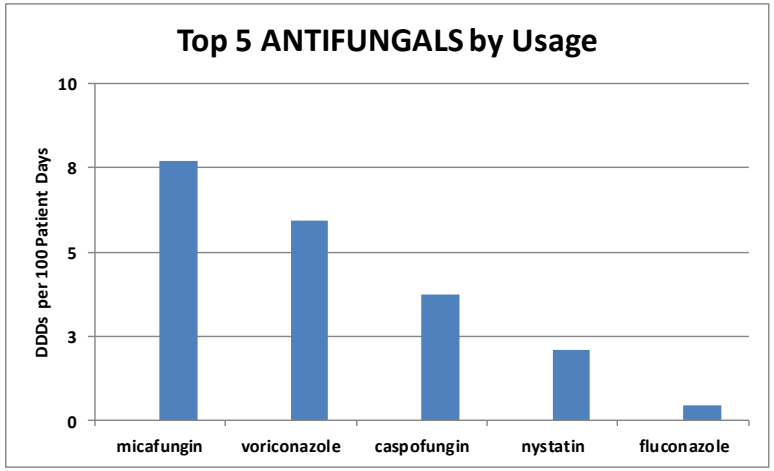
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior 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 18/19 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures







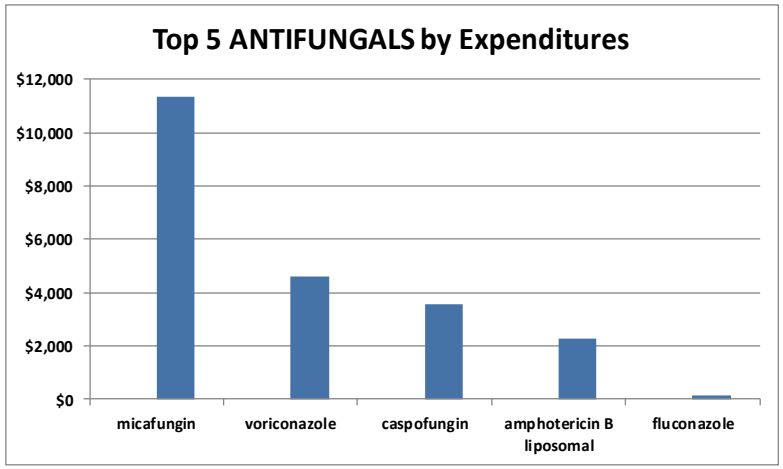


Table 8: Daptomycin Use – Toronto General Hospital Cardiovascular ICU

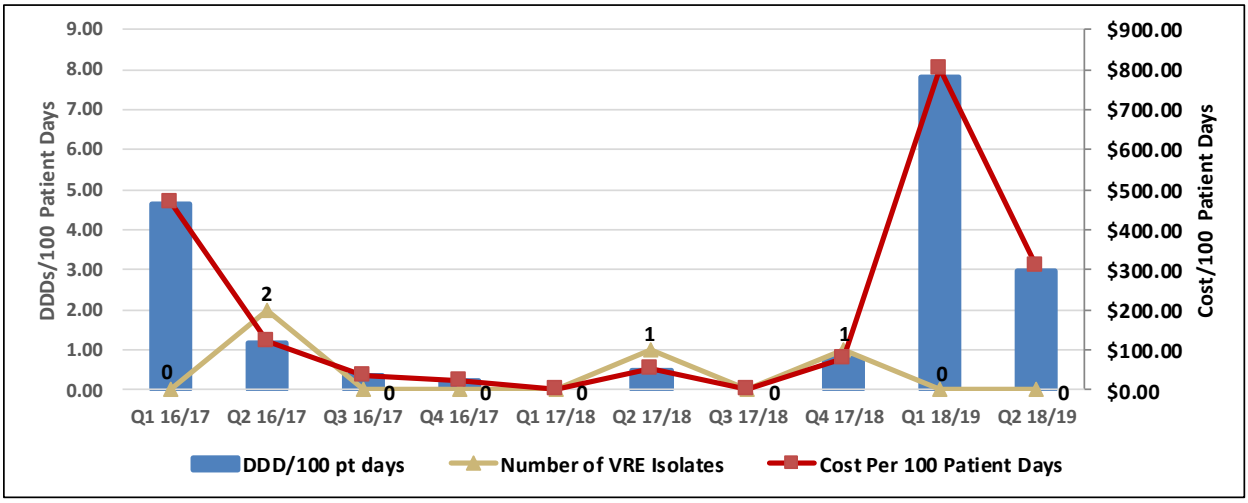
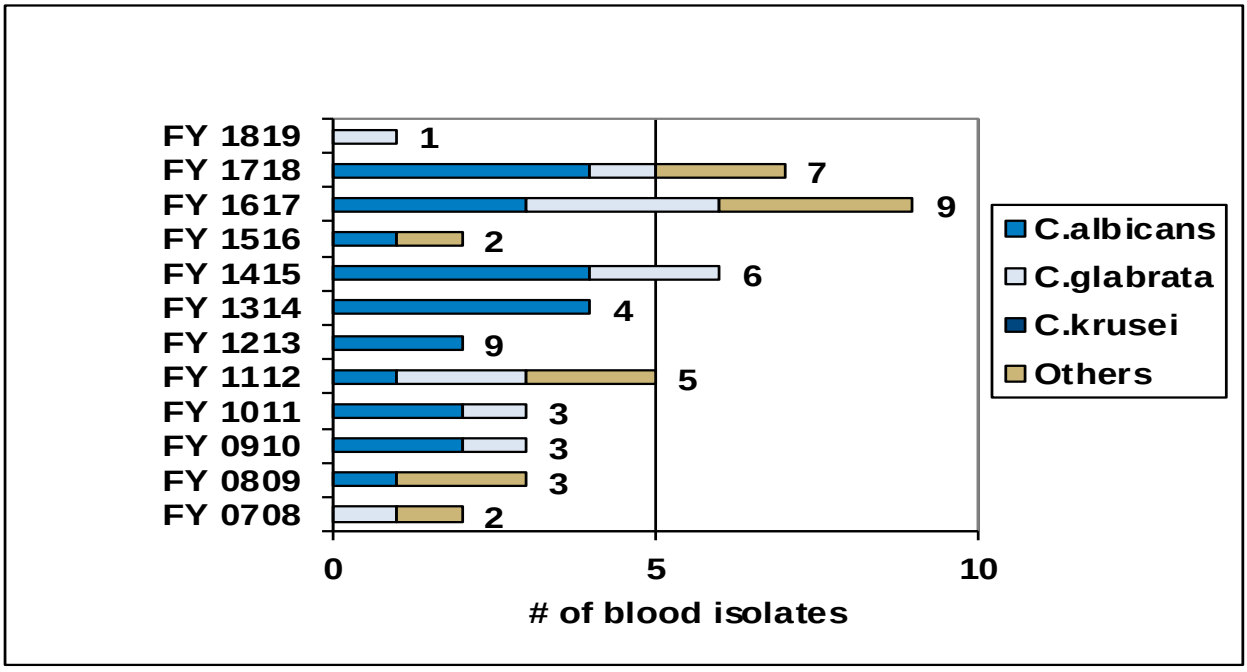


Table 9: Yeast Species Isolated in Blood – Toronto General Hospital Cardiovascular ICU



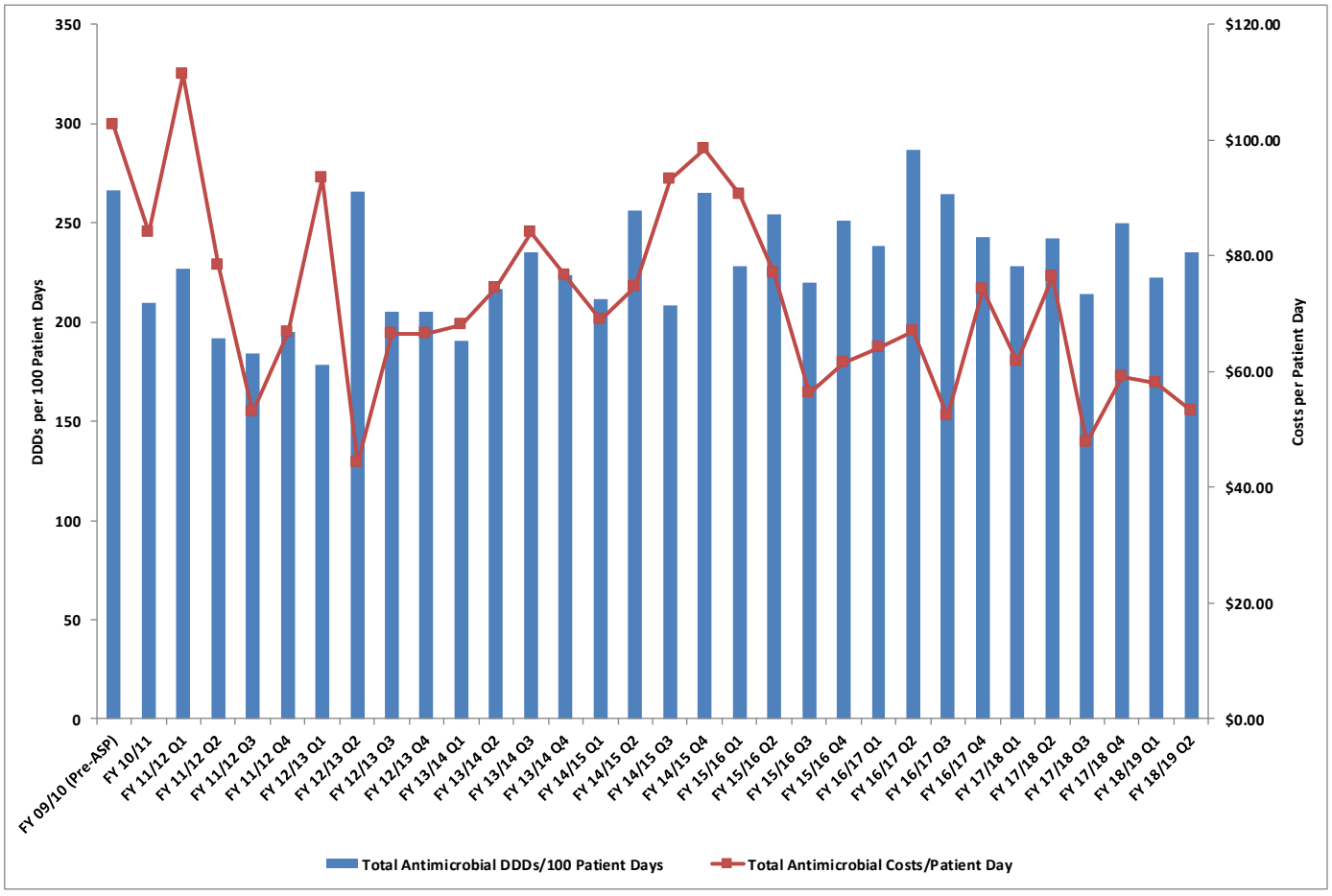
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

Toronto General Hospital: Medical Surgical ICU

The FY 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 2.8% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 19.7% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 3.3% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 39.8% compared to YTD last year.

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



To view **Appendix 1: FY 18/19 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 1.3% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 4.2% compared to YTD last year.

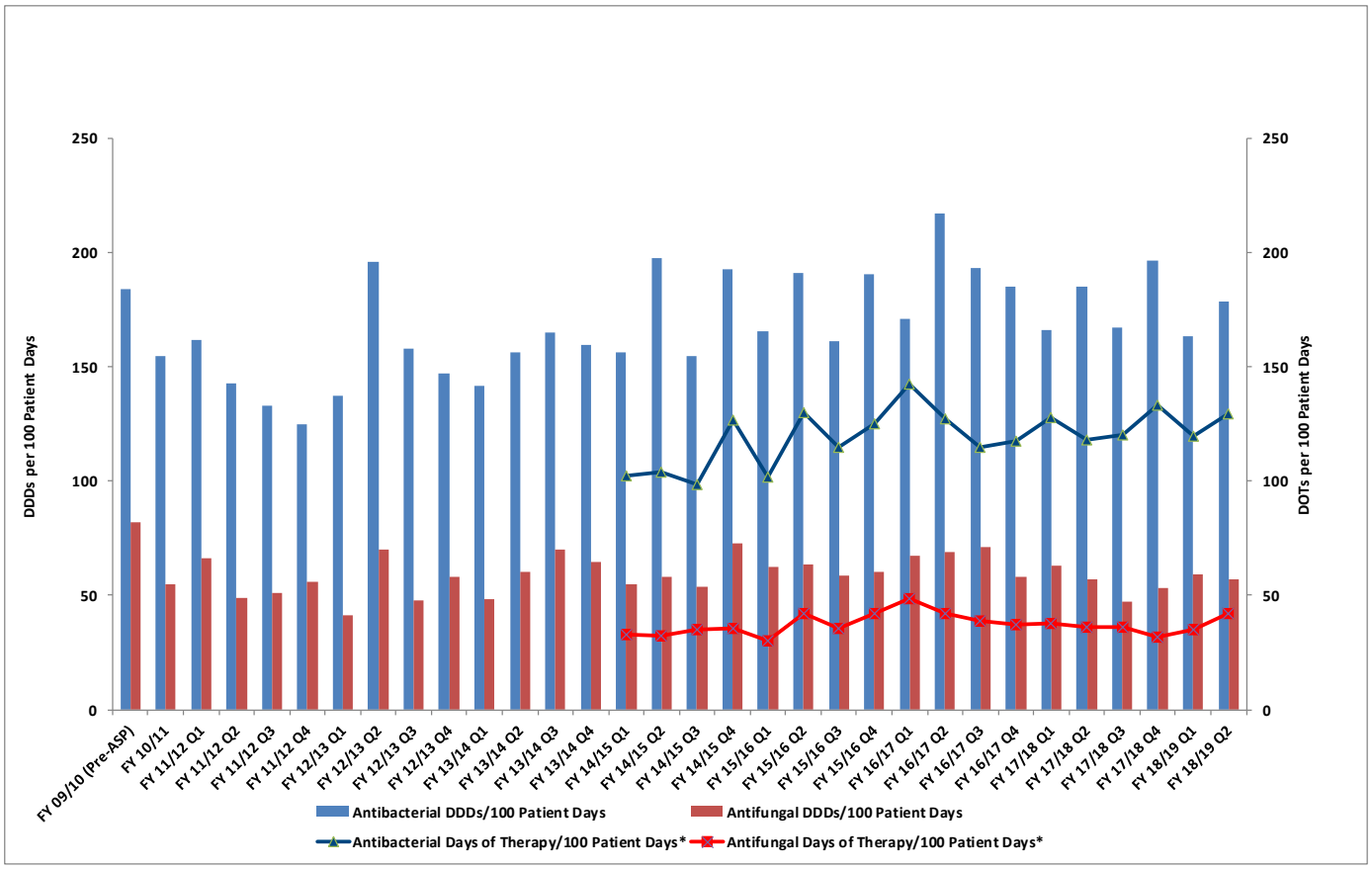


Table 10: Toronto General Hospital: Medical Surgical ICU

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	FY 18/19 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs															
Total Antimicrobial DDDs/100 Patient Days	**266**	**209**	**199**	**213**	**217**	**235**	**239**	**258**	**234**	**222**	**235**			**229**	**235**
Systemic Antibacterial DDDs/100 Patient Days	184	155	143	159	156	175	178	191	179	163	178			171	176
Systemic Antifungal DDDs/100 Patient Days	82	55	55	54	61	60	84	66	55	59	57			58	60
Total Antimicrobial Costs	$701,451	$629,472	$567,532	$473,613	$584,018	$686,577	$587,950	$557,091	$521,004	$137,236	$127,078			$264,314	$287,066
Total Antimicrobial Costs/Patient Day	**$102.52**	**$84.06**	**$76.93**	**$63.75**	**$75.71**	**$83.65**	**$71.06**	**$64.53**	**$61.18**	**$58.03**	**$53.24**			**$55.62**	**$69.26**
Systemic Antibacterial Costs	$390,209	$375,436	$292,355	$231,171	$225,557	$293,126	$254,392	$267,107	$259,216	$77,195	$81,453			$158,649	$133,953
Systemic Antibacterial Costs/Patient Day	$57.03	$50.14	$39.63	$31.12	$29.24	$35.71	$30.75	$30.94	$30.44	$32.64	$34.12			$33.39	$32.32
Systemic Antifungal Costs	$311,242	$254,036	$275,176	$242,443	$358,461	$393,451	$333,559	$289,984	$261,788	$60,041	$45,625			$105,665	$153,113
Systemic Antifungal Costs/Patient Day	$45.49	$33.93	$37.30	$32.63	$46.47	$47.94	$40.31	$33.59	$30.74	$25.39	$19.11			$22.24	$36.94
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	107.9	118.3	126	125	120	129			125	123
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	34.1	37.7	42	35	35	42			38	37
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)	3 (1.27)	3 (1.26)			6 (1.26)	5 (1.21)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.79	8.22	8.08	7.62	7.94	7.10	7.24	8.57			7.91	6.60
ICU Mortality Rate (as a %)	16.2	15.7	16.3	16.0	17.8	17.2	17.2	16.8	15.7	15.7	18.0			16.82	15.8
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	4.7	3.0			3.85	3.3
ICU Ventilator Days	5399	6256	6507	6458	24620	7330	7048	7657	7670	1892	1983			3875	3628
Apache II Score	n/a	n/a	16.1	15.8	15.9	15.1	15.4	16.7	16.9	16.6				16.60	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: Daptomycin Use – Toronto General Hospital: Medical Surgical ICU

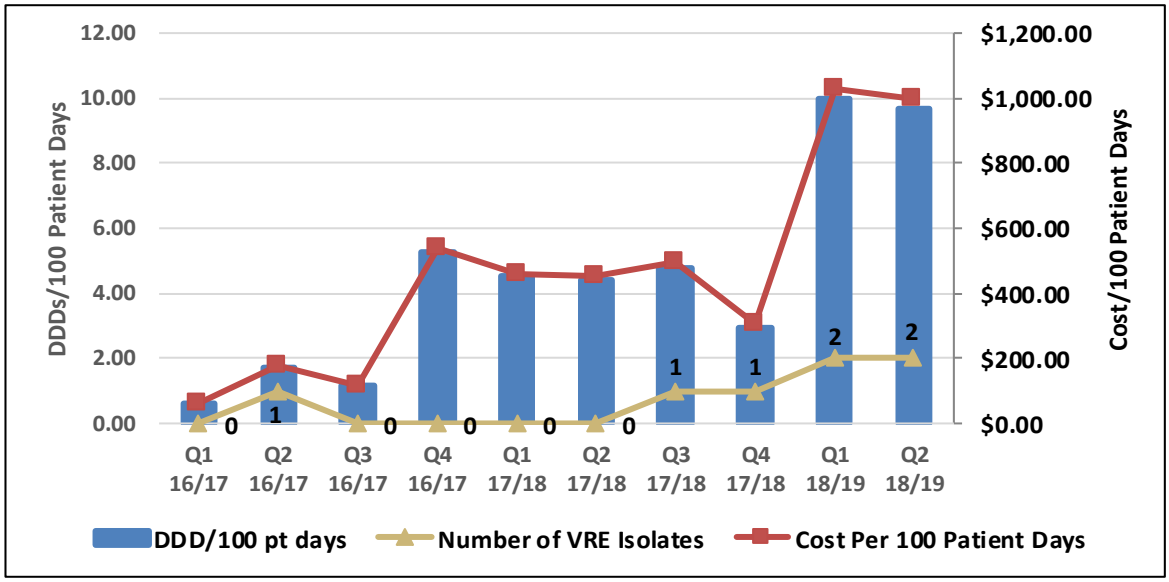
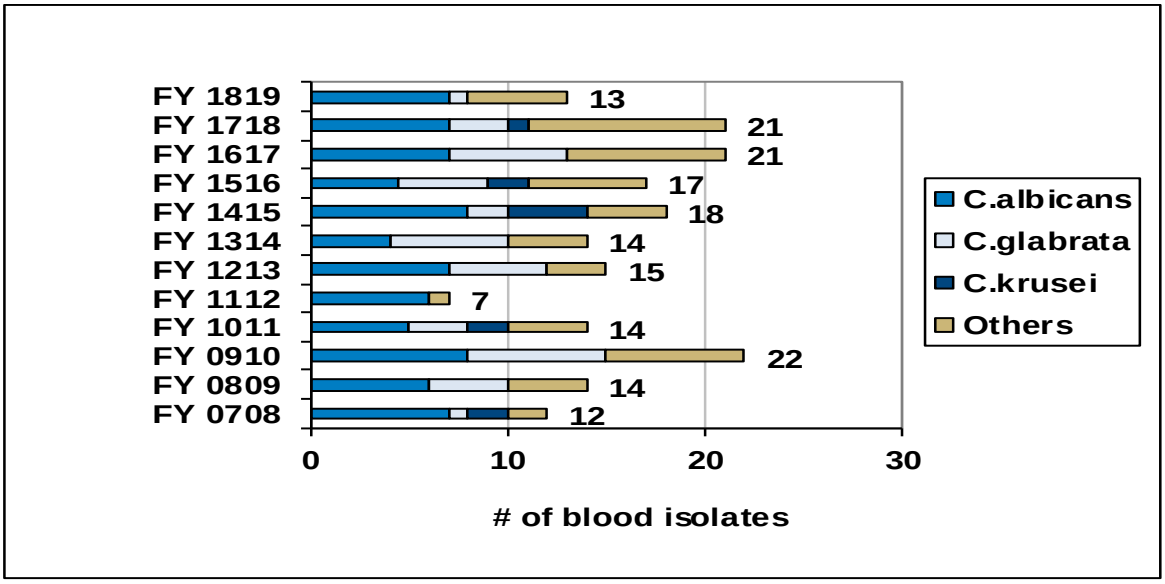
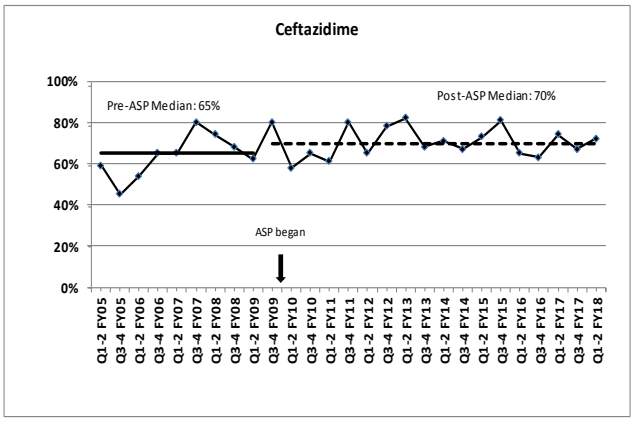


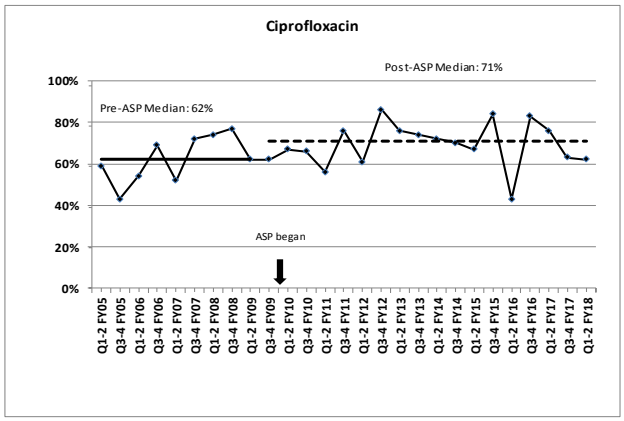
Table 12: Yeast Species Isolated in Blood – Toronto General Hospital: Medical Surgical ICU

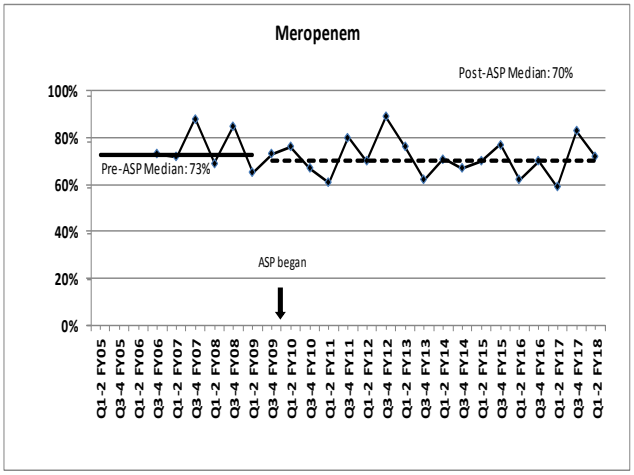


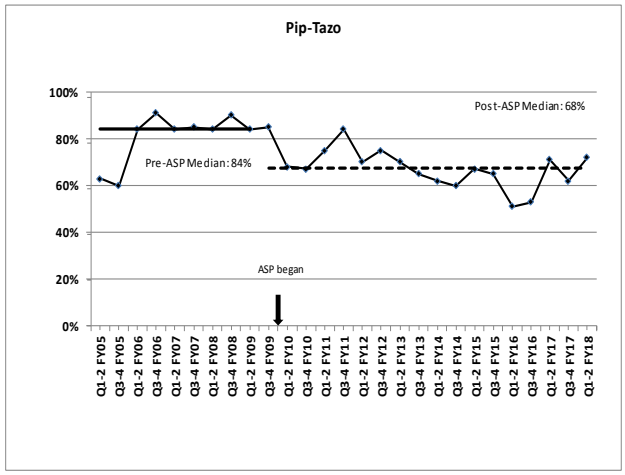
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

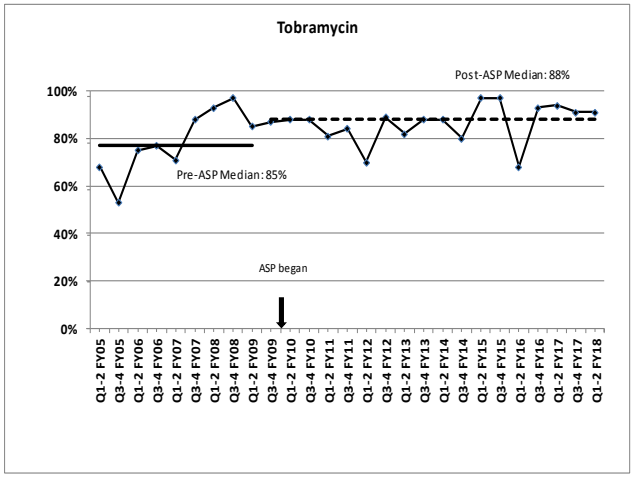
TGH MSICU Pseudomonas Susceptibility









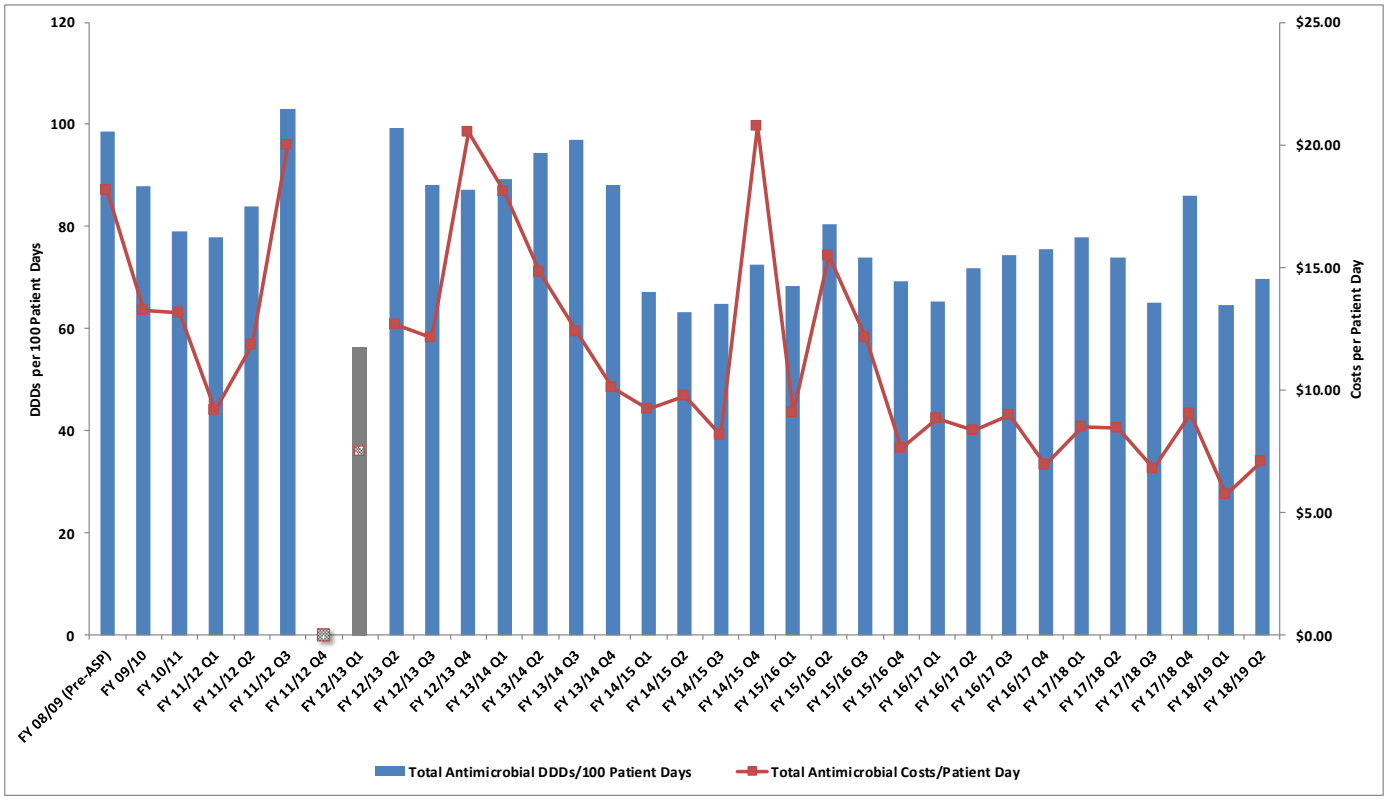


Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

The FY 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 11.5% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 24.2% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 21.7% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 39.0% compared to YTD last year.

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

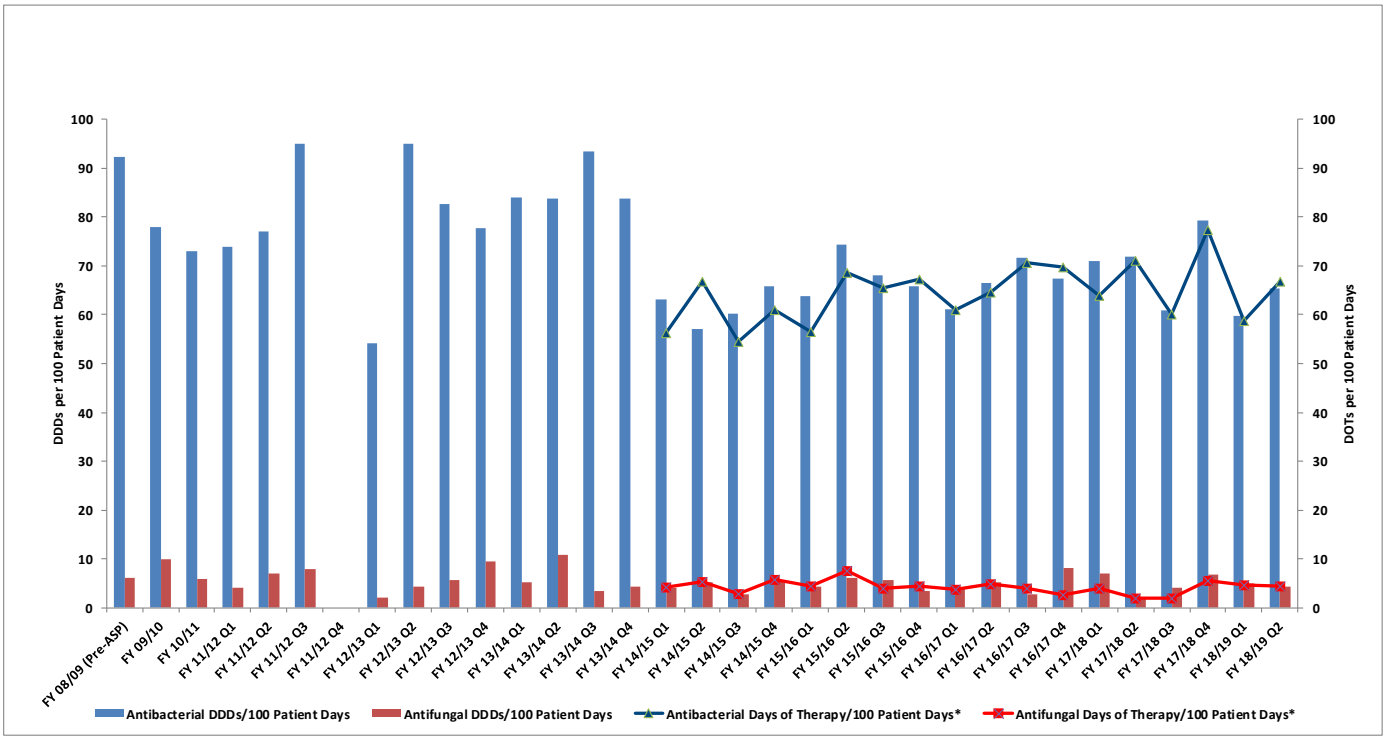


Due to an error in the Centricity Pharmacy database, we are not able to provide accurate DDD data and utilization cost for the Toronto Western Hospital ICU for FY 11/12 Q4. This also affected the recovery in FY 12/13 Q1 so neither quarter is reflected in the above graph.

To view **Appendix 1: FY 18/19 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 decreased (↓) by 7.2% 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 increased (↑) by 57.1% 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.

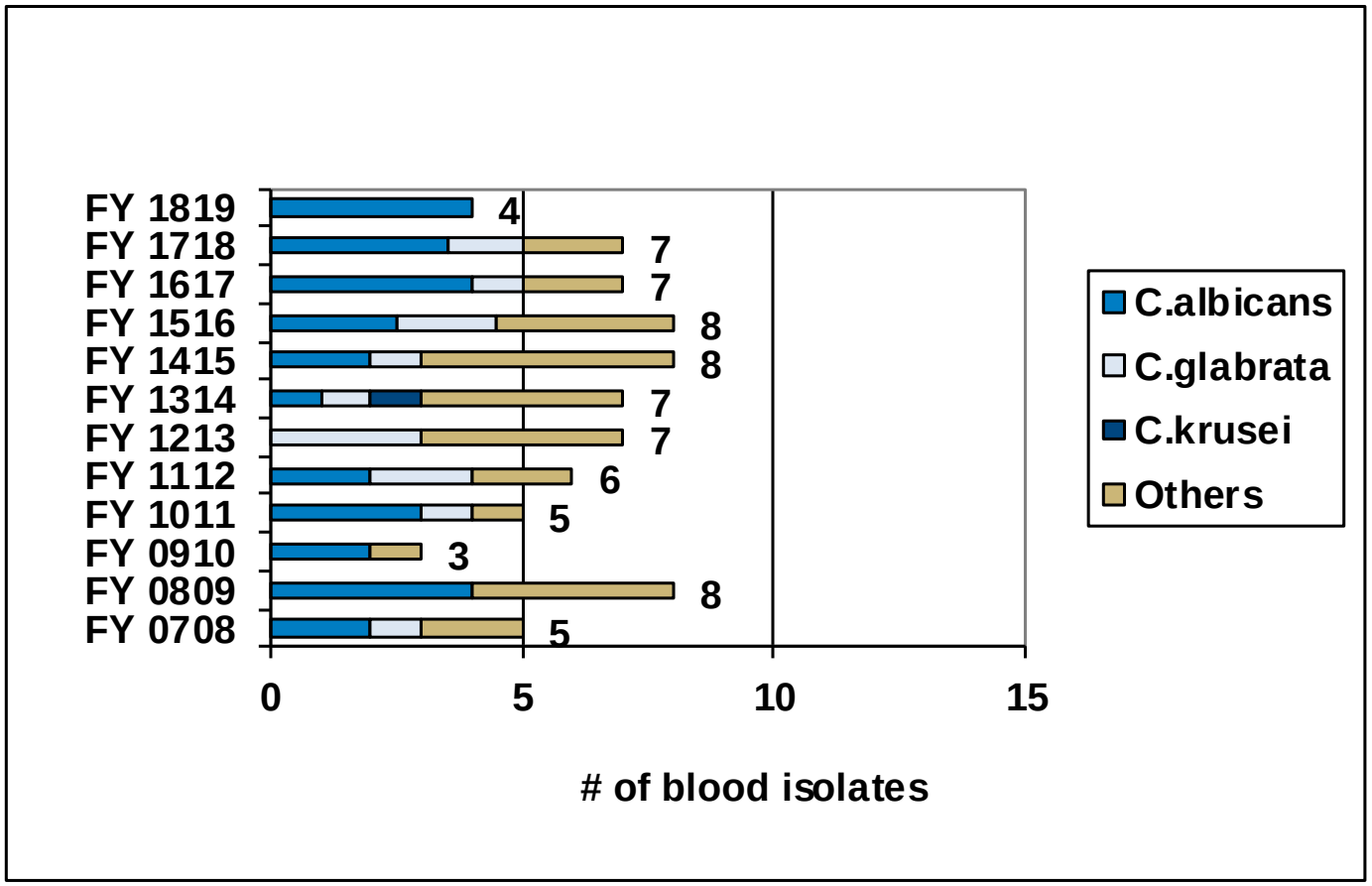
Table 13: Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

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	FY 17/18	FY18/19 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**	**65**	**70**			**67**	**76**
Systemic Antibacterial DDDs/100 Patient Days	92	78	73	77	78	86	62	68	67	71	60	65			63	72
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	5	6	5	9	5	5	5	4			5	4
Total Antimicrobial Costs	$136,758	$100,408	$101,191	$105,899	$102,978	$120,538	$138,014	$127,293	$98,672	$93,958	$17,004	$20,575			$37,579	$48,294
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**	**$5.73**	**$7.09**			**$6.40**	**$8.44**
Systemic Antibacterial Costs	$123,314	$87,445	$79,280	$89,784	$70,099	$85,916	$89,382	$74,877	$69,868	$73,007	$15,569	$17,715			$33,284	$41,434
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	$5.25	$6.10			$5.67	$7.24
Systemic Antifungal Costs	$13,444	$12,963	$21,911	$16,115	$32,879	$34,623	$48,631	$52,416	$28,805	$20,951	$1,435	$2,860			$4,295	$6,860
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	$0.48	$0.98			$0.73	$1.20
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	n/a	60	65	67	68	59	67			63	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
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)	4 (1.35)	6 (2.07)			10 (1.7)	3 (0.52)
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	8.17	9.2			8.665	7.68
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	15.5	10.0			12.77	14.645
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	3.24	3.98			3.61	3.075
ICU Ventilator Days	4617	6305	5960	5578	4947	5523	5180	5414	4937	4755	1267	1113			2380	2402
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				13.5	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.

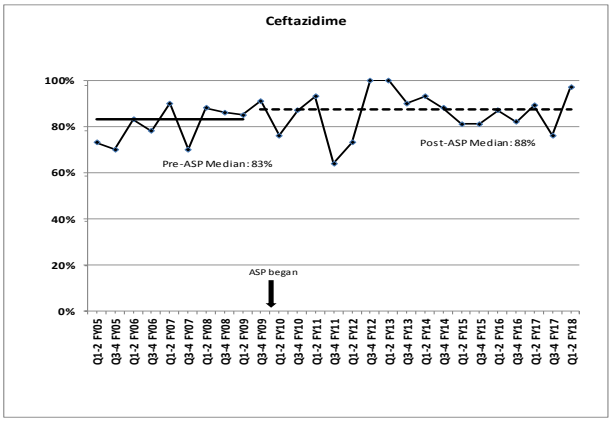
There was a calculation error for the ICU Readmission Rate for FY 16/17 Q3. That figure has now been corrected.

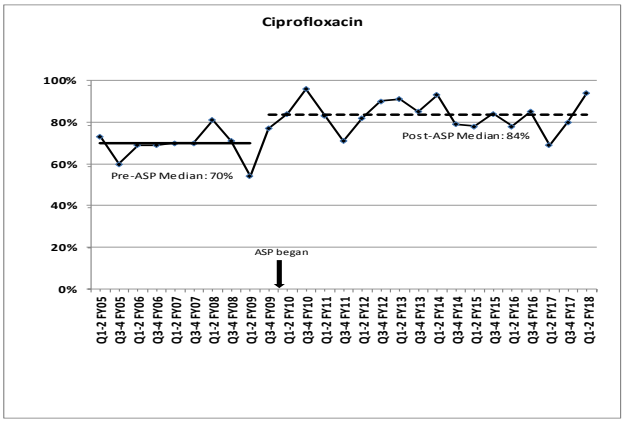
Table 14: Yeast Species Isolated in Blood – Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

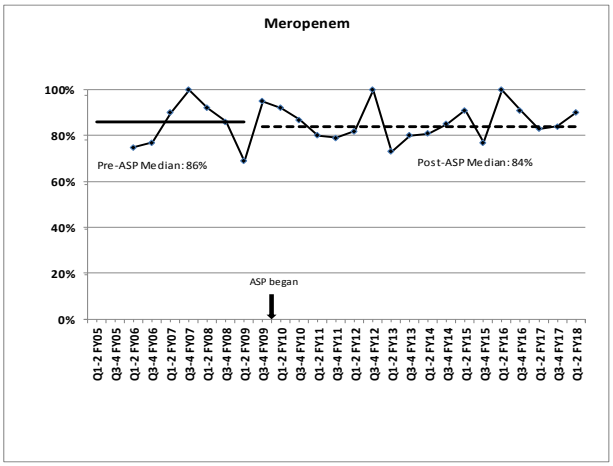


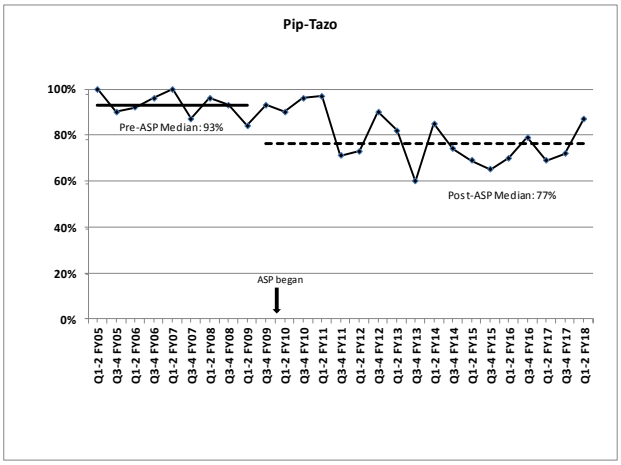
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

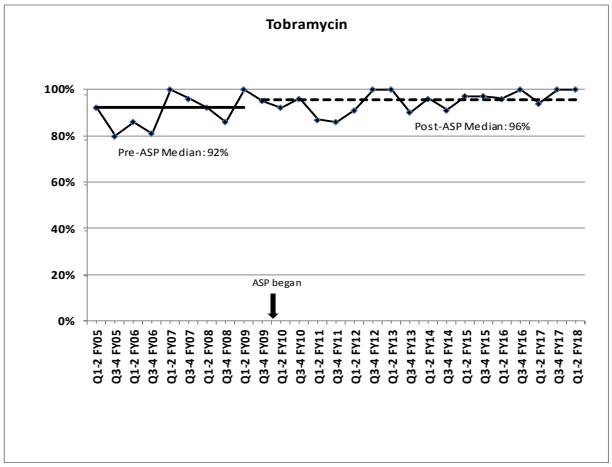
TWH MSNICU Pseudomonas Susceptibility









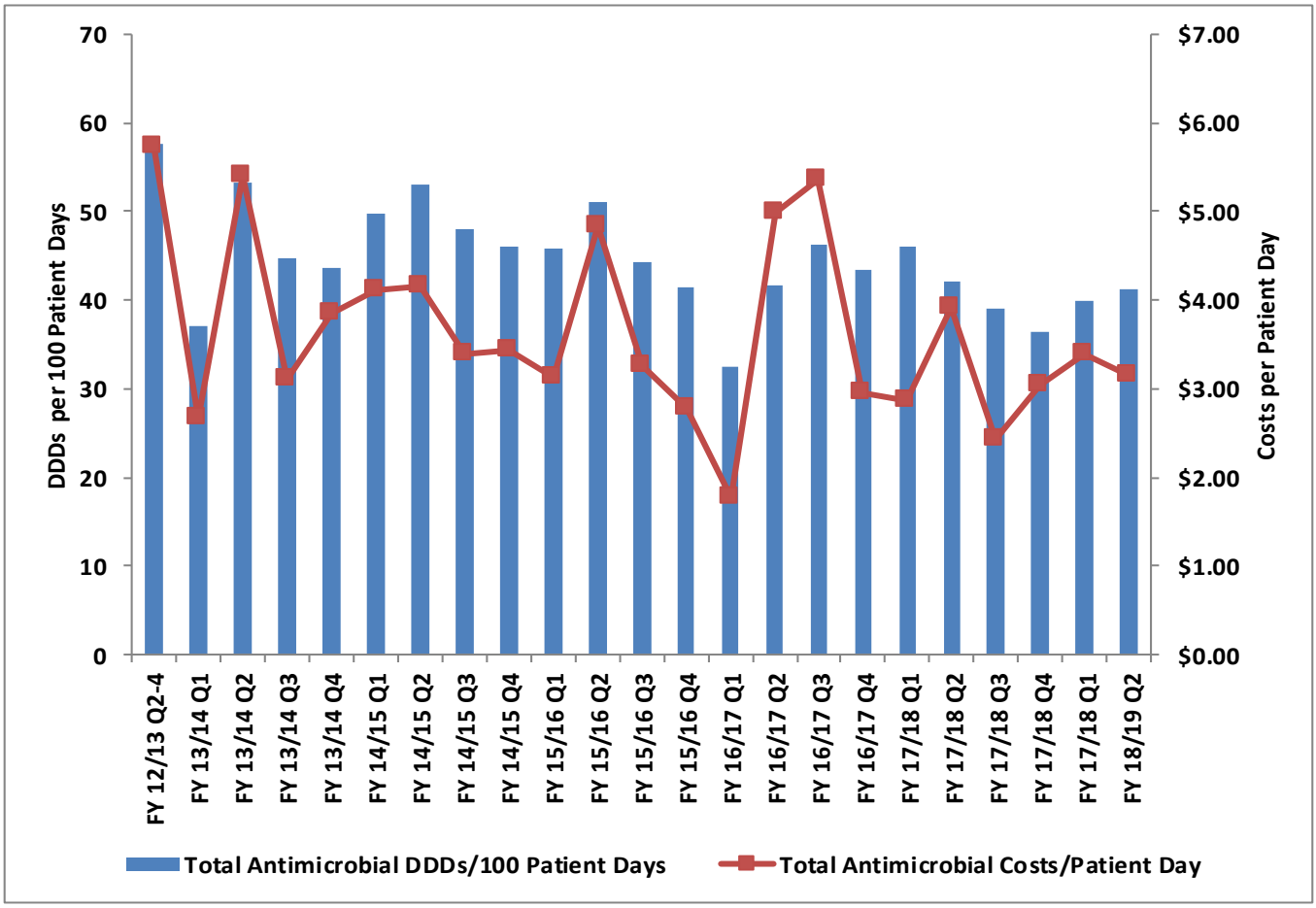


Mount Sinai Hospital: General Internal Medicine

The FY 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 7.7% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 18.7% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 11.7% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 60.4% 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 18/19 Q2 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	FY 18/19 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**	**41**			**41**	**44**
Systemic Antibacterial DDDs/100 Patient Days	53	41	43	39	37	37	35	37			36	41
Systemic Antifungal DDDs/100 Patient Days	3	3	3	3	3	3	4	3			4	3
Total Antimicrobial Costs	$125,012	$123,737	$128,661	$106,518	$126,283	$105,254	$21,352	$29,375			$50,727	$54,411
Total Antimicrobial Costs/Patient Day	**$5.74**	**$3.76**	**$3.63**	**$2.92**	**$3.69**	**$3.04**	**$2.35**	**$3.15**			**$2.76**	**$3.39**
Systemic Antibacterial Costs	$105,621	$99,731	$104,822	$84,173	$78,418	$81,436	$19,627	$25,381			$45,007	$44,417
Systemic Antibacterial Costs/Patient Day	$4.85	$3.03	$2.96	$2.31	$2.29	$2.35	$2.16	$2.72			$2.45	$2.77
Systemic Antifungal Costs	$15,422	$20,153	$16,352	$15,983	$42,012	$17,644	$1,154	$2,792			$3,946	$8,696
Systemic Antifungal Costs/Patient Day	$0.71	$0.61	$0.46	$0.44	$1.23	$0.51	$0.13	$0.30			$0.21	$0.54
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)	13 (0.55)	8 (1.36)	1 (0.16)			9 (0.75)	5 (0.43)

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).

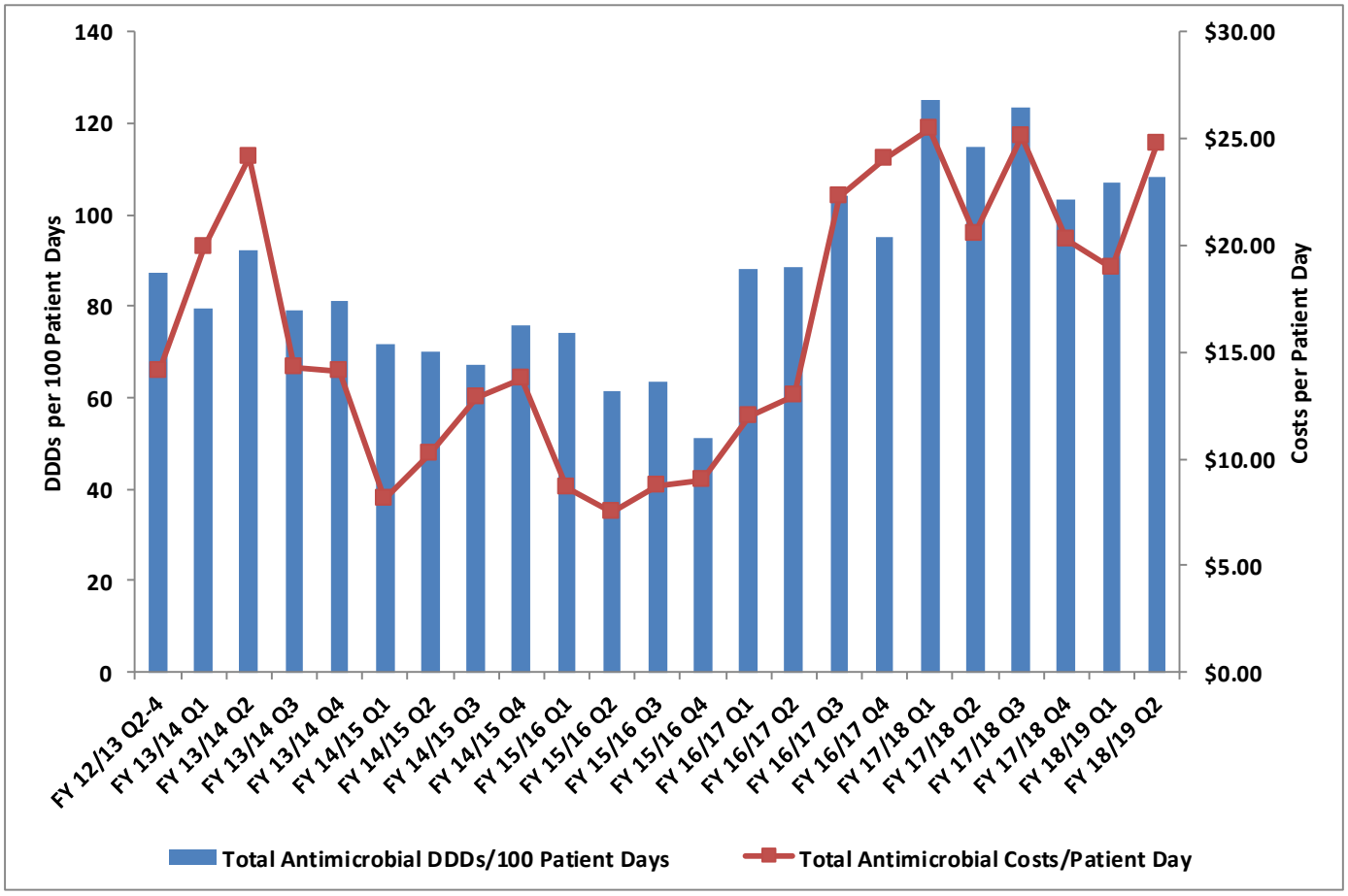
Historical antimicrobial usage and cost data updated due to the discovery that selected added drug dosages (Fluconazole 400mg/200ml bag, Pip-Tazo 13.5gm vial, Daptomycin 500mg vial) were not included in the report. Data have been revised to include Fluconazole starting August 2013, Pip-Tazo January 2015,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

Toronto General Hospital: General Internal Medicine

The FY 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 10.2% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 5.0% compared to YTD last year for TGH.
- Antibacterial costs per patient day decreased (↓) by 7.1% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 2.1% 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 18/19 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click **here**.

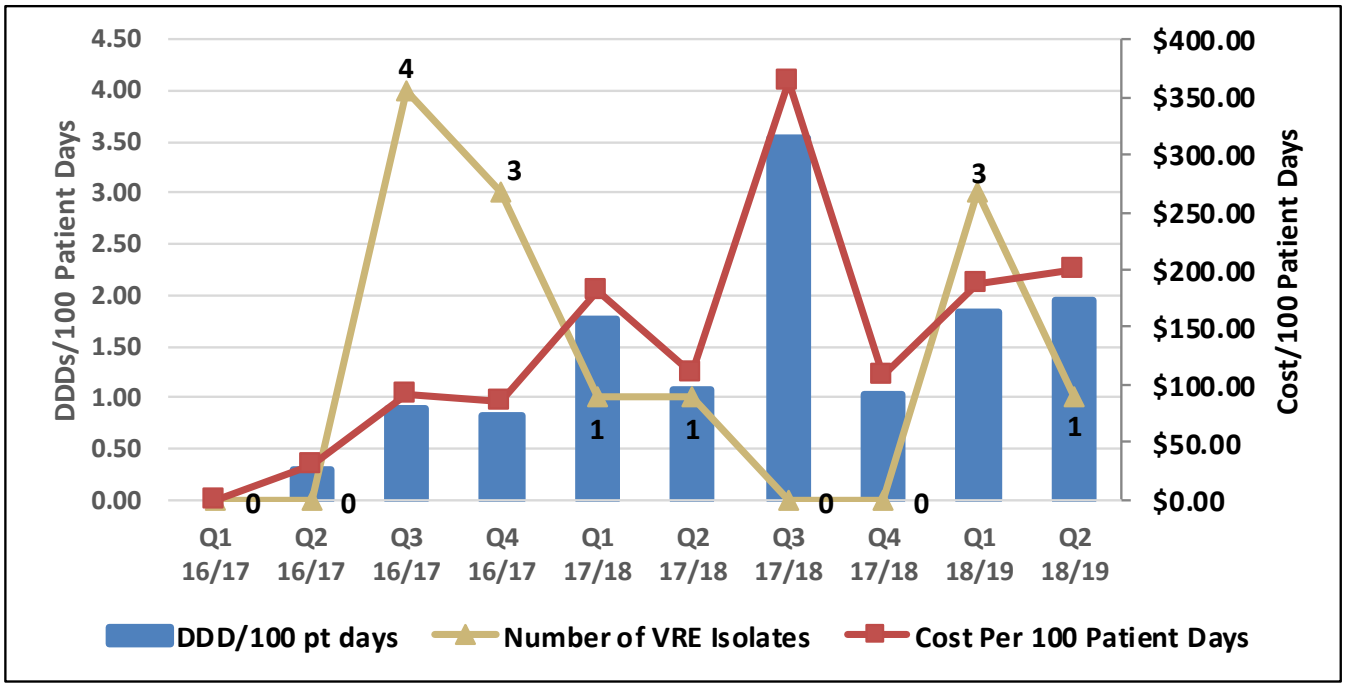
Table 16: Toronto General Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19 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**	**107**	**108**			**108**	**120**
Systemic Antibacterial DDDs/100 Patient Days	77	70	73	55	78	99	90	93			91	101
Systemic Antifungal DDDs/100 Patient Days	11	13	10	8	16	17	17	15			16	19
Total Antimicrobial Costs	$279,644	$471,342	$352,036	$313,464	$494,787	$640,238	$129,894	$170,938			$300,832	$324,689
Total Antimicrobial Costs/Patient Day	**$14.10**	**$18.05**	**$13.30**	**$8.48**	**$17.77**	**$22.84**	**$18.90**	**$24.74**			**$21.83**	**$22.98**
Systemic Antibacterial Costs	$171,817	$225,491	$221,389	$202,012	$250,100	$370,814	$81,410	$88,856			$170,266	$188,002
Systemic Antibacterial Costs/Patient Day	$8.67	$8.64	$8.36	$5.47	$8.98	$13.23	$11.84	$12.86			$12.36	$13.31
Systemic Antifungal Costs	$107,827	$245,851	$130,647	$111,452	$244,687	$269,424	$48,484	$82,082			$130,566	$136,686
Systemic Antifungal Costs/Patient Day	$5.44	$9.42	$4.93	$3.02	$8.79	$9.61	$7.05	$11.88			$9.47	$9.67
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)	2 (0.29)	1 (0.14)			3 (0.22)	7 (0.5)

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.

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



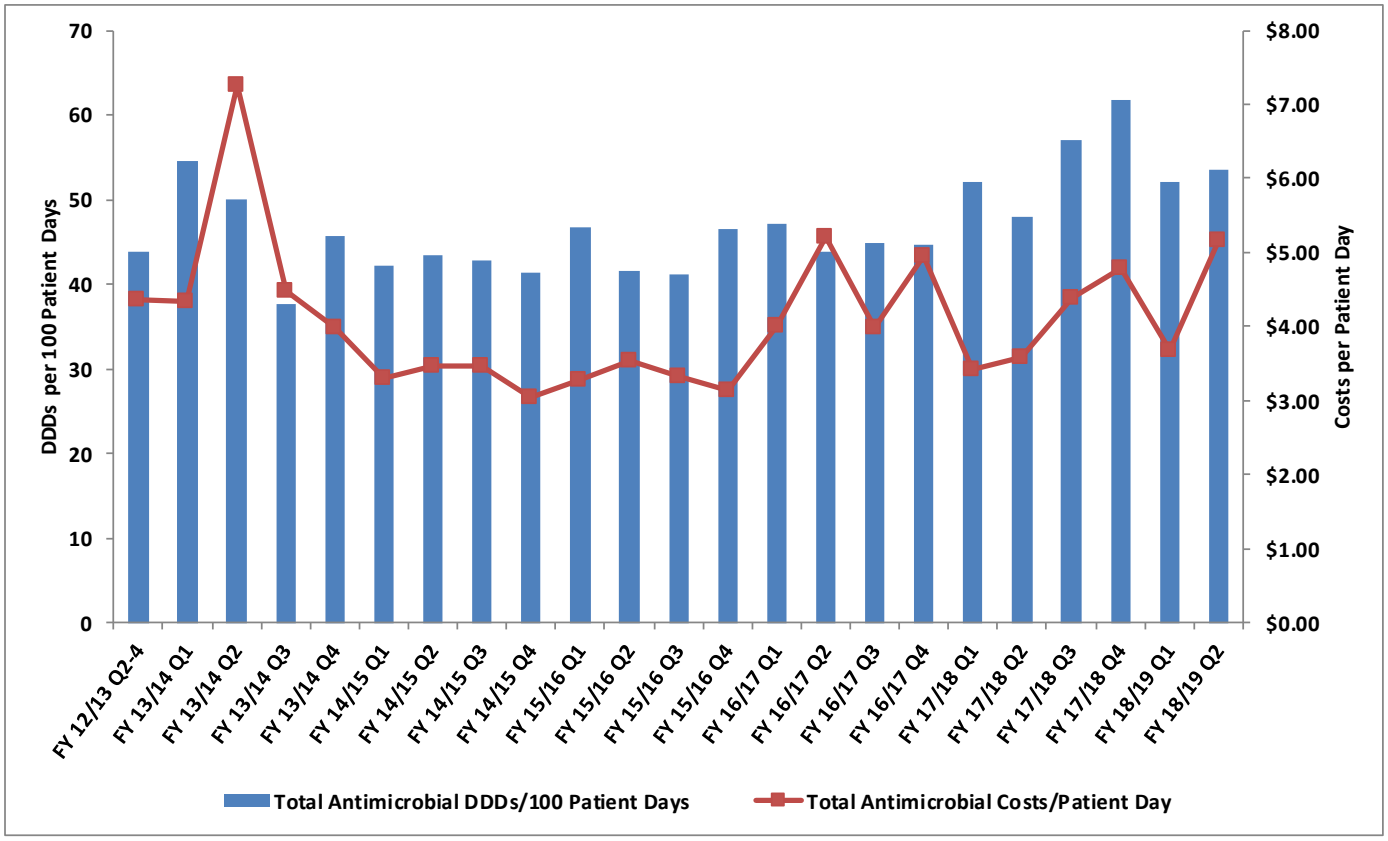
Toronto Western Hospital: General Internal Medicine

The FY 18/19 Q2 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 25.5% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 102.9% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 329.2% 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 18/19 Q2 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	FY 18/19 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**	**52**	**54**			**53**	**50**
Systemic Antibacterial DDDs/100 Patient Days	41	44	40	42	42	51	48	51			49	47
Systemic Antifungal DDDs/100 Patient Days	3	3	3	6	3	3	4	3			3	3
Total Antimicrobial Costs	$74,737	$115,919	$110,889	$108,612	$146,214	$121,275	$26,440	$35,978			$62,418	$53,160
Total Antimicrobial Costs/Patient Day	**$4.36**	**$5.01**	**$3.32**	**$3.32**	**$4.52**	**$4.04**	**$3.68**	**$5.16**			**$4.41**	**$3.51**
Systemic Antibacterial Costs	$60,999	$93,779	$103,080	$105,744	$118,506	$93,880	$25,699	$34,792			$60,491	$31,854
Systemic Antibacterial Costs/Patient Day	$3.56	$4.05	$3.09	$3.23	$3.67	$3.13	$3.57	$4.99			$4.27	$2.10
Systemic Antifungal Costs	$13,738	$22,140	$7,810	$2,868	$27,708	$6,569	$741	$1,186			$1,927	$480
Systemic Antifungal Costs/Patient Day	$0.80	$0.96	$0.23	$0.09	$0.86	$0.22	$0.10	$0.17			$0.14	$0.03
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)	3 (0.42)	3 (0.43)			6 (0.42)	6 (0.4)

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 18/19 Q2 summary includes:

- Current year-to-date (YTD) antimicrobial consumption in defined daily doses (DDDs) per 100 patient days increased (↑) by 0.5% compared to last year.
- YTD antimicrobial costs per patient day decreased (↓) by 9.7% compared to last year.
- YTD antibacterial costs per patient day decreased (↓) by 8.6% compared to last year.
- YTD antifungal costs per patient day decreased (↓) by 10.1% compared to last year.
- Miranda So, Dr. Husain, Dr. Morris, and Yoshiko Nakamachi have been working 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

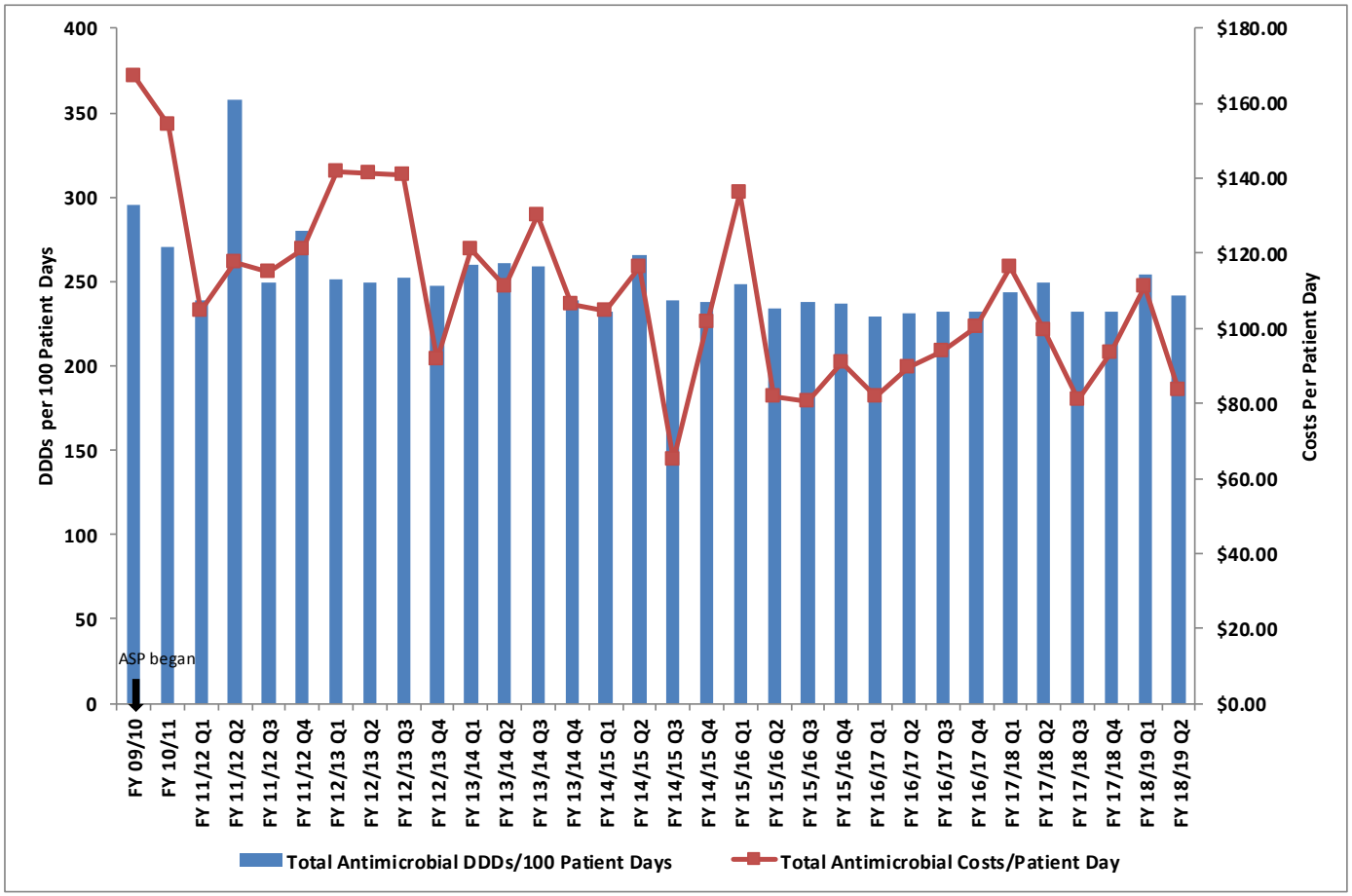


Table 19: Princess Margaret Cancer Centre: Leukemia Service

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 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**	**254**	**242**			**248**	**246**
Systemic Antibacterial DDDs/100 Patient Days	191	163	134	146	138	136	138	132	140	149	137			143	144
Systemic Antifungal DDDs/100 Patient Days	104	107	105	104	117	108	101	99	99	105	105			105	103
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	$445,771	$344,158			$789,930	$861,926
Total Antimicrobial Costs/Patient Day	**$167.12**	**$154.32**	**$115.13**	**$128.91**	**$117.10**	**$96.46**	**$96.98**	**$91.50**	**$97.45**	**$111.33**	**$83.68**			**$97.32**	**$107.81**
Systemic Antibacterial Costs	$659,034	$609,747	$663,175	$422,438	$485,263	$471,597	$403,399	$376,733	$433,025	$103,356	$105,233			$208,588	$224,840
Systemic Antibacterial Costs/Patient Day	$62.28	$57.33	$58.24	$45.85	$37.03	$32.20	$26.45	$23.46	$26.89	$25.81	$25.59			$25.70	$28.12
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	$342,416	$238,926			$581,342	$637,086
Systemic Antifungal Costs/Patient Day	$104.84	$96.99	$56.88	$83.06	$80.07	$64.26	$70.53	$68.04	$70.55	$85.52	$58.09			$71.62	$79.69
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)	1 (0.25)	2 (0.49)			3 (0.37)	10 (1.25)

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: Daptomycin Use – Princess Margaret Cancer Centre: Leukemia Service

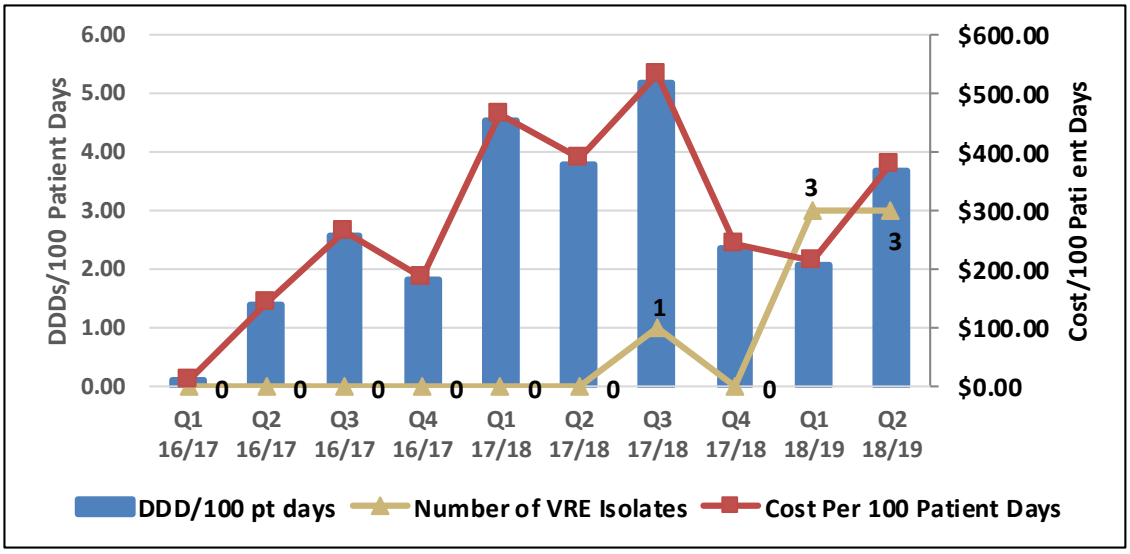
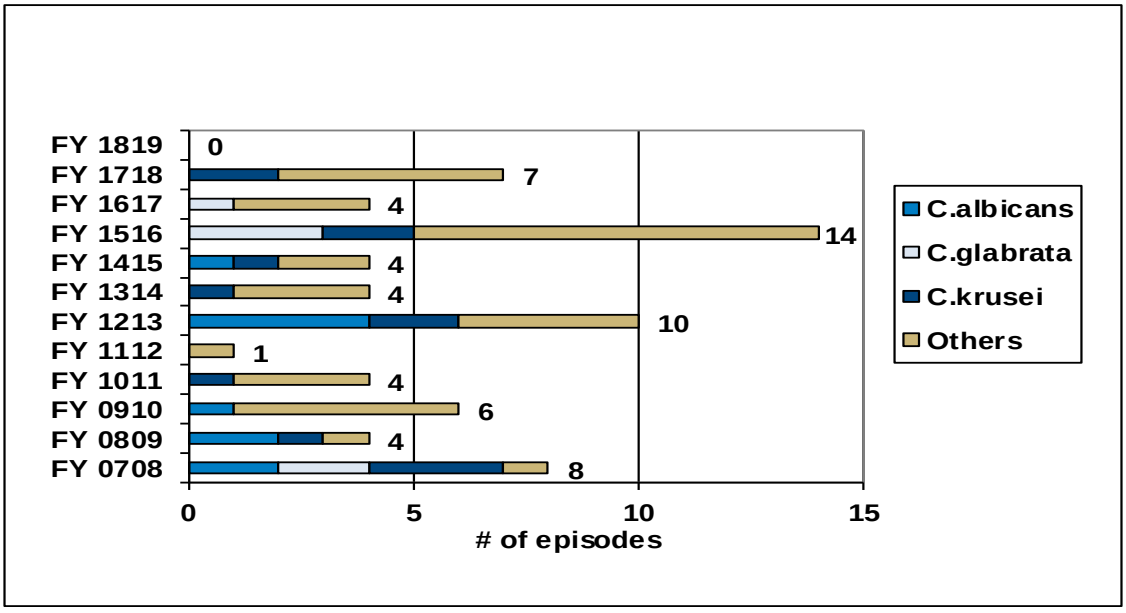
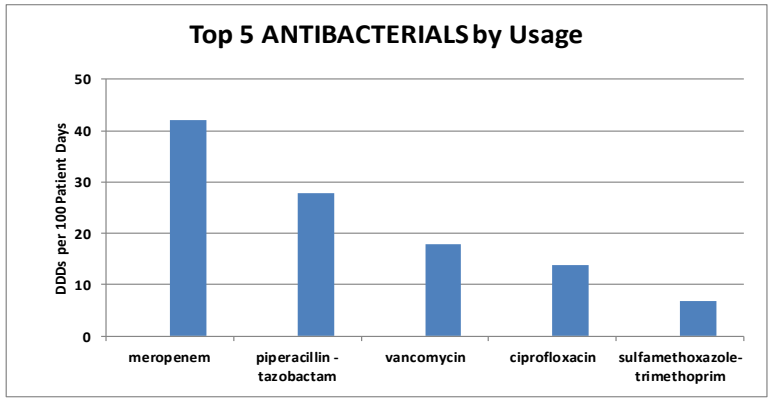


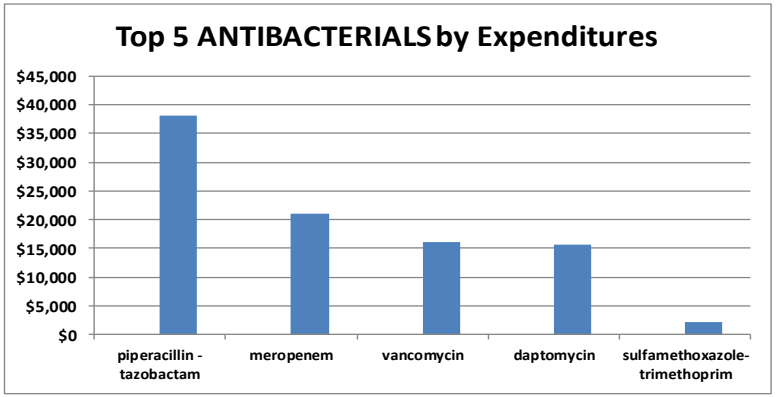
Table 21: Yeast Species Isolated in Blood – Princess Margaret Cancer Centre: Leukemia Service

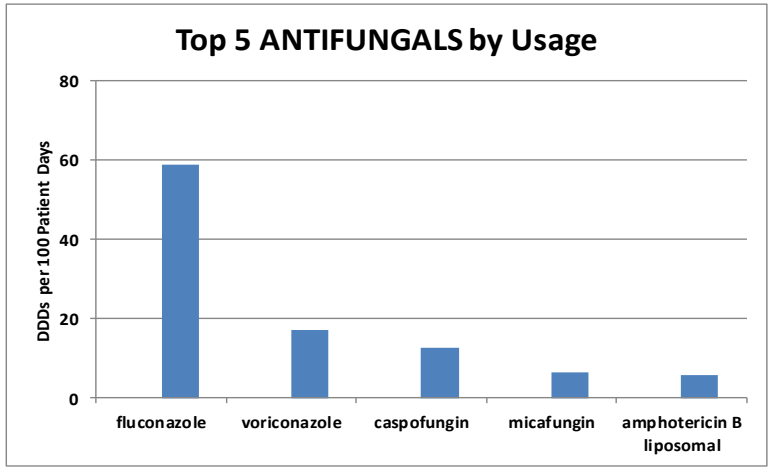


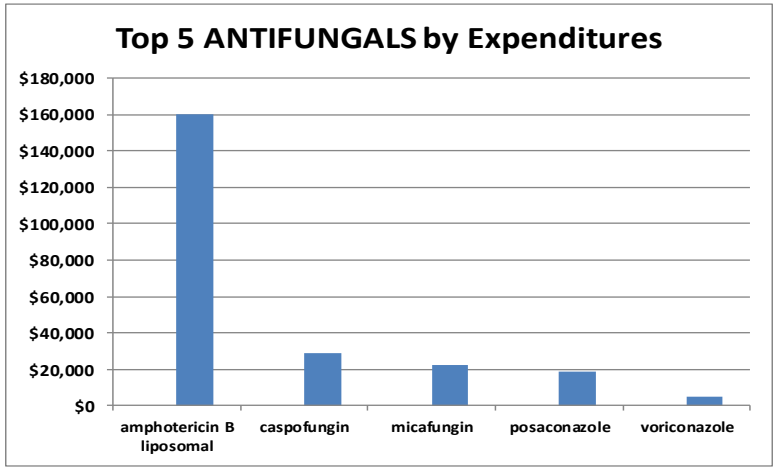
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

Table 22: Princess Margaret Cancer Centre: Leukemia FY 18/19 Q2 Top 5 Antimicrobials by Usage and Expenditures









Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

The FY 18/19 Q2 summary includes:

- Year-to-date (YTD) antimicrobial consumption in defined daily doses (DDDs) per 100 patient days decreased (↓) by 9.3% compared to last year.
- YTD antimicrobial costs per patient day increased (↑) by 1.6% compared to last year.
- YTD antibacterial costs per patient day increased (↑) by 10.5% compared to last year.
- YTD antifungal costs per patient day decreased (↓) by 0.2% compared to last year.

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

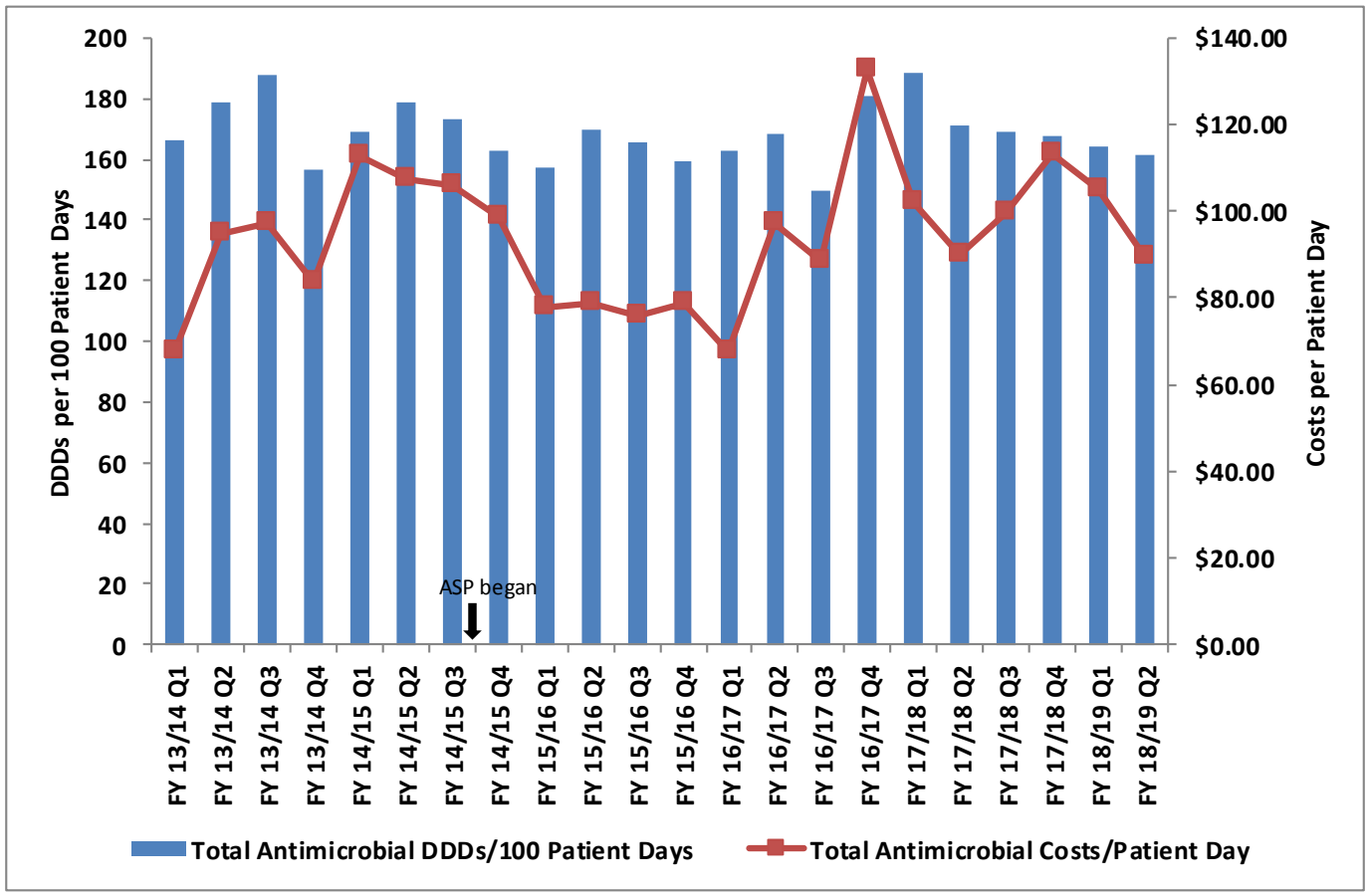


Table 23: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

Indicators	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19 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**	**162**			**163**	**180**
Systemic Antibacterial DDDs/100 Patient Days	114	104	107	107	123	112	108			110	131
Systemic Antifungal DDDs/100 Patient Days	59	67	56	56	50	52	54			53	48
Total Antimicrobial Costs	$416,614	$512,300	$381,633	$381,633	$689,940	$219,966	$198,199			$418,165	$245,422
Total Antimicrobial Costs/Patient Day	**$85.65**	**$106.13**	**$77.62**	**$77.62**	**$102.50**	**$105.25**	**$89.48**			**$97.13**	**$95.61**
Systemic Antibacterial Costs	$75,219	$78,038	$60,088	$60,088	$111,250	$47,172	$29,727			$76,899	$41,492
Systemic Antibacterial Costs/Patient Day	$15.46	$16.17	$12.22	$12.22	$16.53	$22.57	$13.42			$17.86	$16.16
Systemic Antifungal Costs	$341,395	$434,261	$321,545	$321,545	$578,690	$172,794	$168,472			$341,267	$203,930
Systemic Antifungal Costs/Patient Day	$70.19	$89.97	$65.39	$65.39	$85.97	$82.68	$76.06			$79.27	$79.44
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)	0 (0)	4 (1.81)			4 (0.93)	4 (1.56)

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

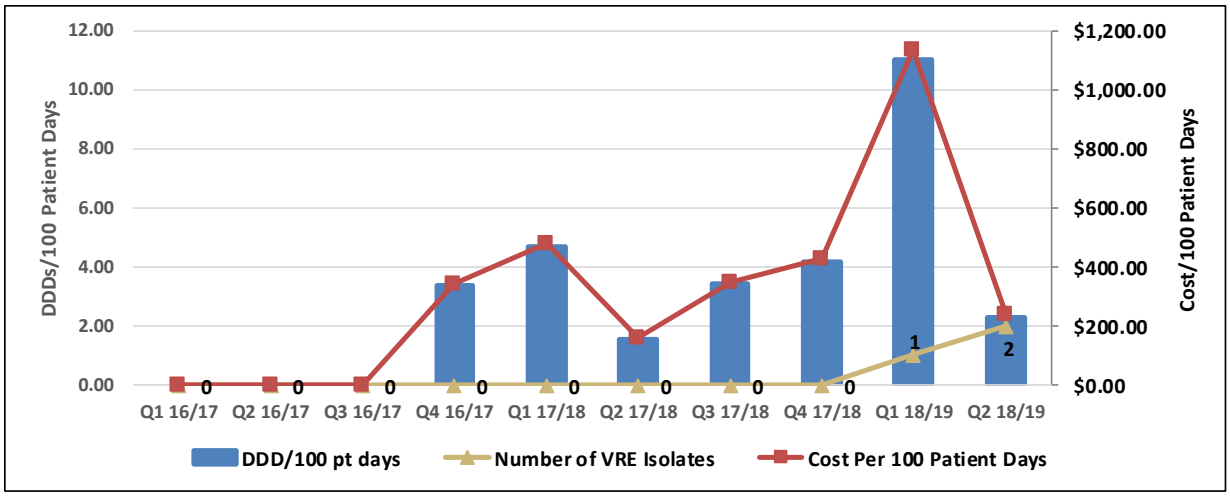
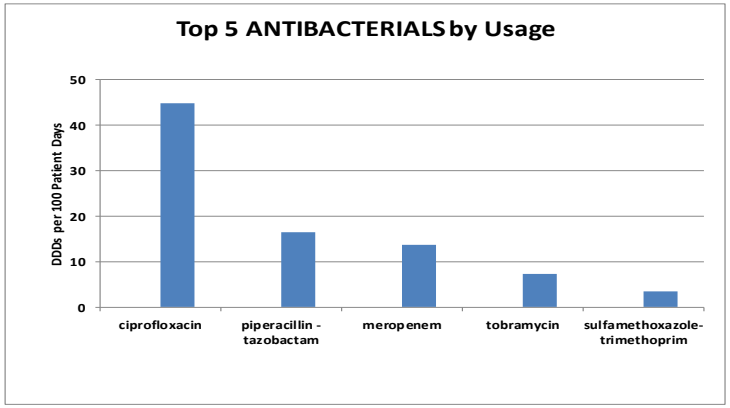
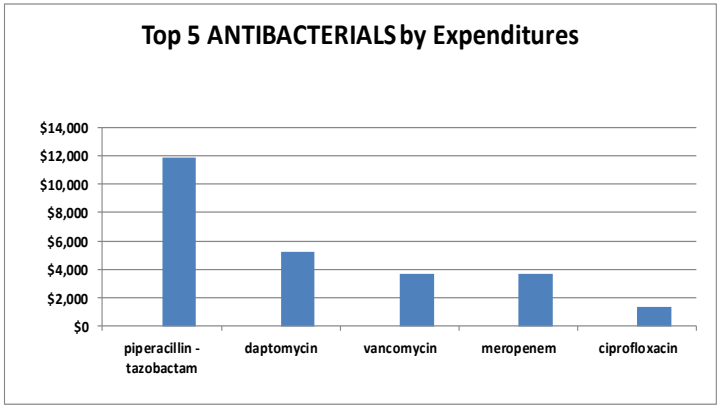


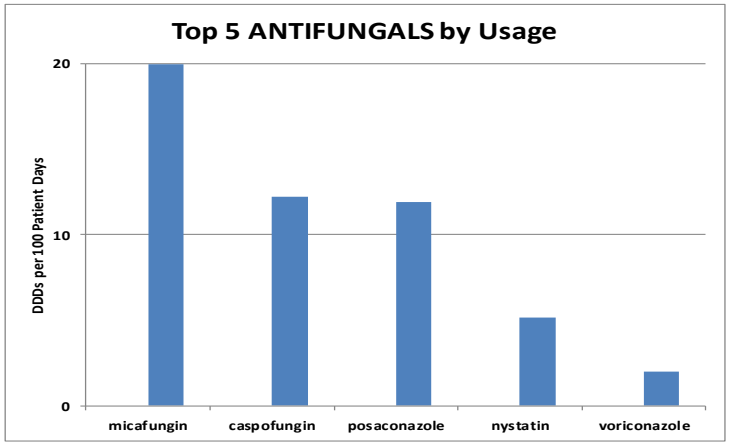
Table 25: Yeast Species Isolated in Blood – Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

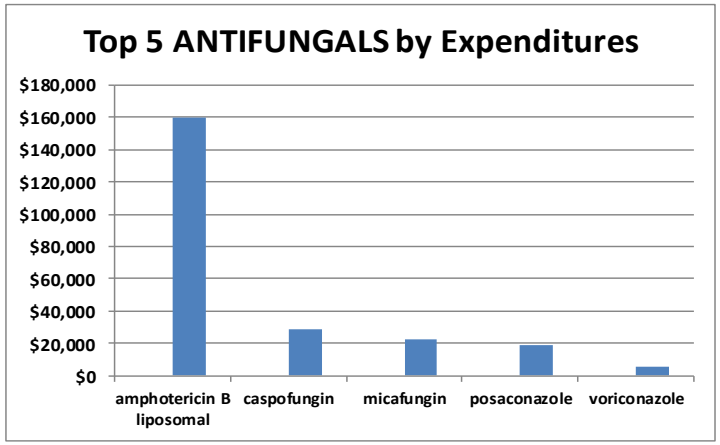
NB: In past Quarterly Reports, if a patient had more than one culture of different organisms, it was counted as 0.5 each. Starting with the Q3 2017/18 Quarterly Report and moving forward, it will be counted as 1.

Table 26: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant 18/19 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures









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

The FY 18/19 Q2 summary includes:

- Year-to-date (YTD) antimicrobial consumption in defined daily doses (DDDs) per 100 patient days decreased (↓) by 7.9% compared to last year.
- YTD antimicrobial costs per patient day decreased (↓) by 2.6% compared to last year.
- YTD antibacterial costs per patient day increased (↑) by 5.9% compared to last year.
- YTD antifungal costs per patient day decreased (↓) by 14.0% compared to last year.

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

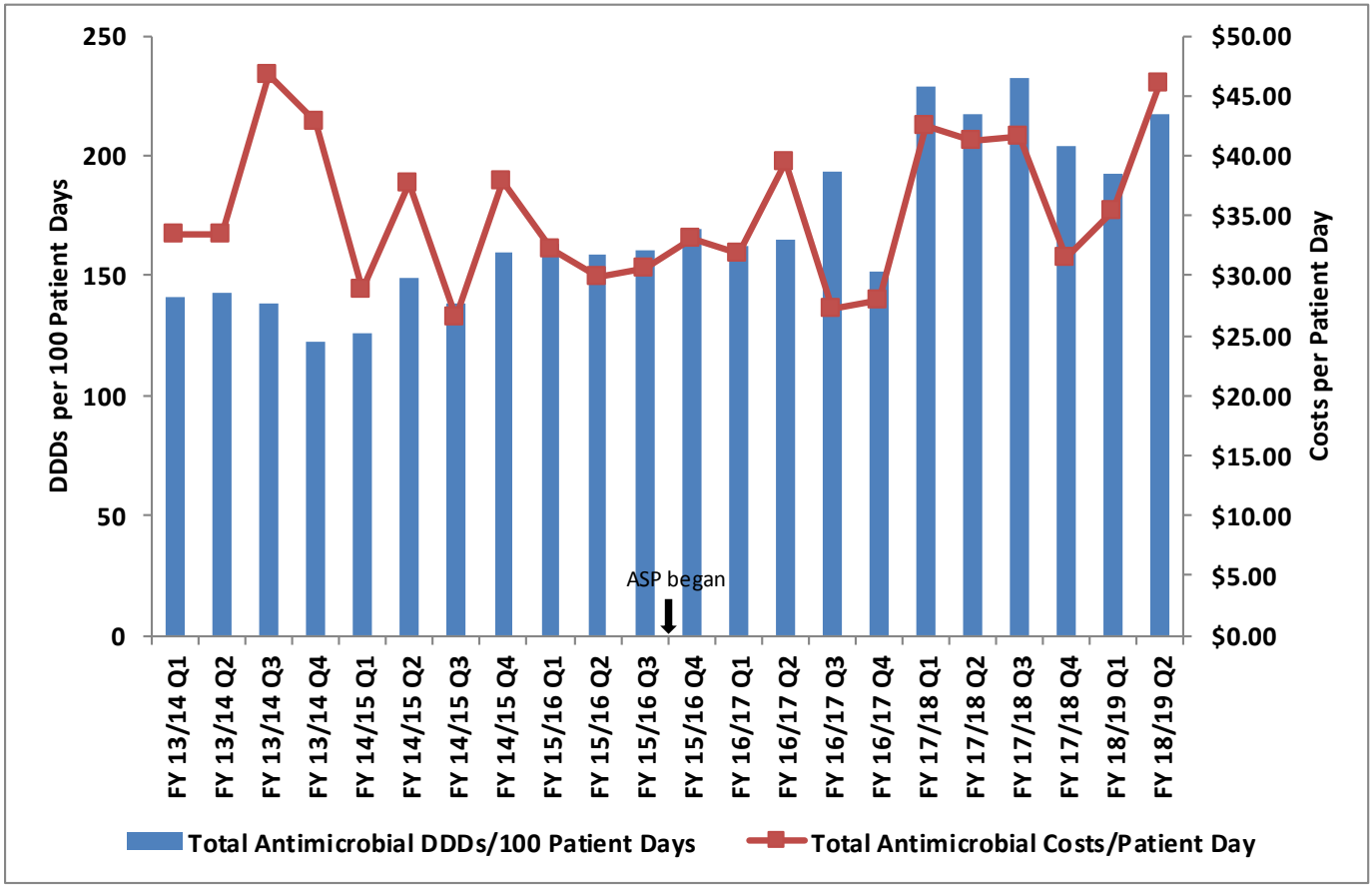


Table 27: Toronto General Hospital: Multi-Organ Transplant Program (MOTP)

Indicators	FY 13/14	FY 14/15	FY 15/16	FY 16/17	FY 17/18	FY 18/19 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**	**193**	**217**			**205**	**223**
Systemic Antibacterial DDDs/100 Patient Days	93	98	112	108	155	135	152			143	155
Systemic Antifungal DDDs/100 Patient Days	43	45	99	48	65	58	66			62	68
Total Antimicrobial Costs	$837,263	$725,411	$709,892	$904,028	$859,544	$177,441	$240,435			$417,876	$450,550
Total Antimicrobial Costs/Patient Day	**$39.16**	**$32.69**	**$31.47**	**$31.57**	**$40.78**	**$35.31**	**$46.05**			**$40.78**	**$41.88**
Systemic Antibacterial Costs	$327,831	$379,748	$342,941	$452,266	$519,656	$118,498	$141,504			$260,002	$257,845
Systemic Antibacterial Costs/Patient Day	$15.33	$17.11	$15.20	$15.79	$24.66	$23.58	$27.10			$25.38	$23.97
Systemic Antifungal Costs	$509,433	$345,664	$366,951	$451,762	$339,887	$58,943	$98,931			$157,874	$192,705
Systemic Antifungal Costs/Patient Day	$23.82	$15.58	$16.26	$15.78	$16.13	$11.73	$18.95			$15.41	$17.91
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)	2 (0.4)	3 (0.57)			5 (0.49)	6 (0.56)

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

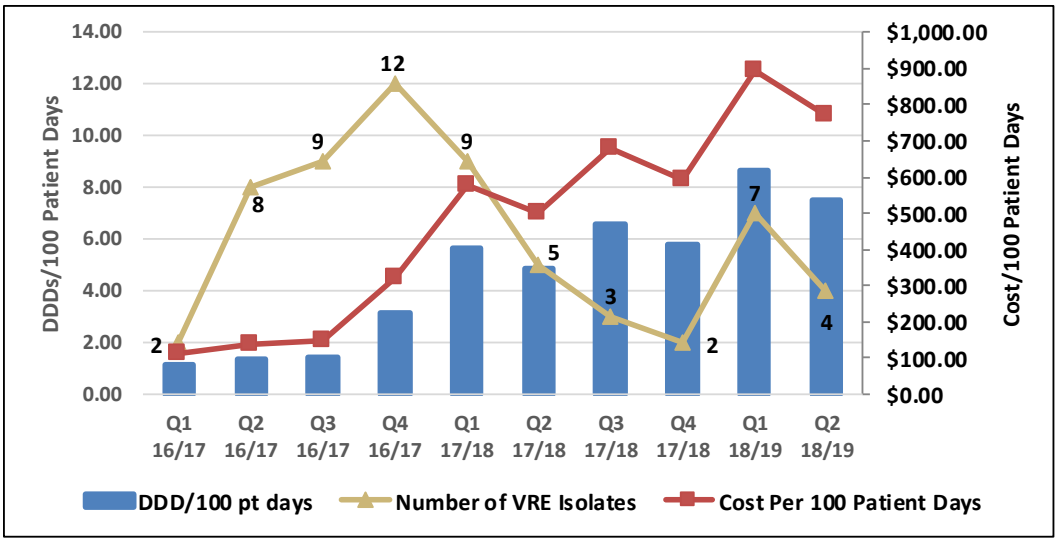
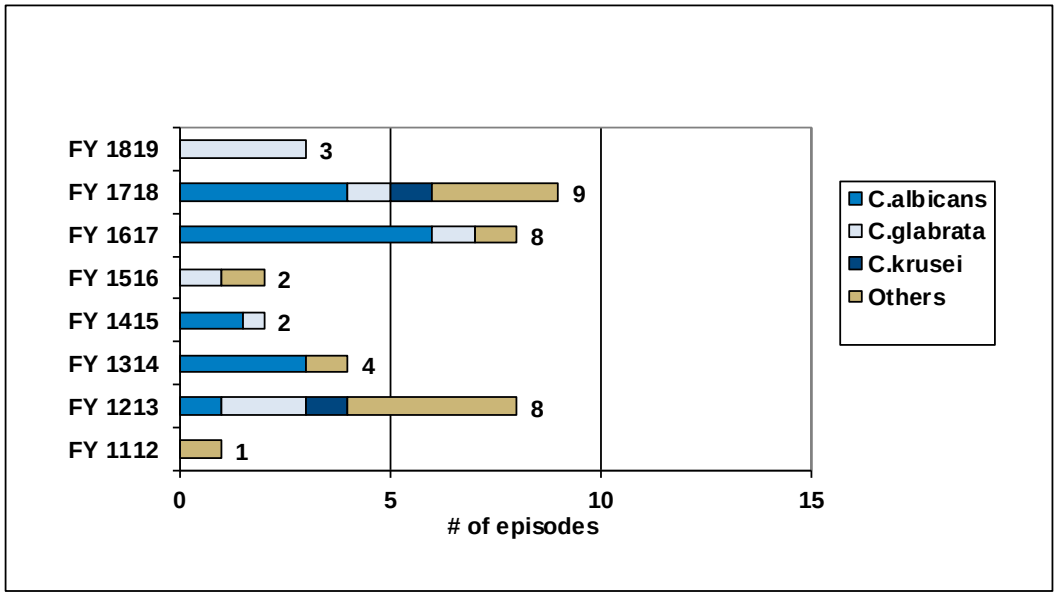


Table 29: Yeast Species Isolated in Blood – Toronto General Hospital: Multi-Organ Transplant Program (MOTP)



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 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 6.3% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 17.0% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 12.9% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 279.6% compared to YTD last year.

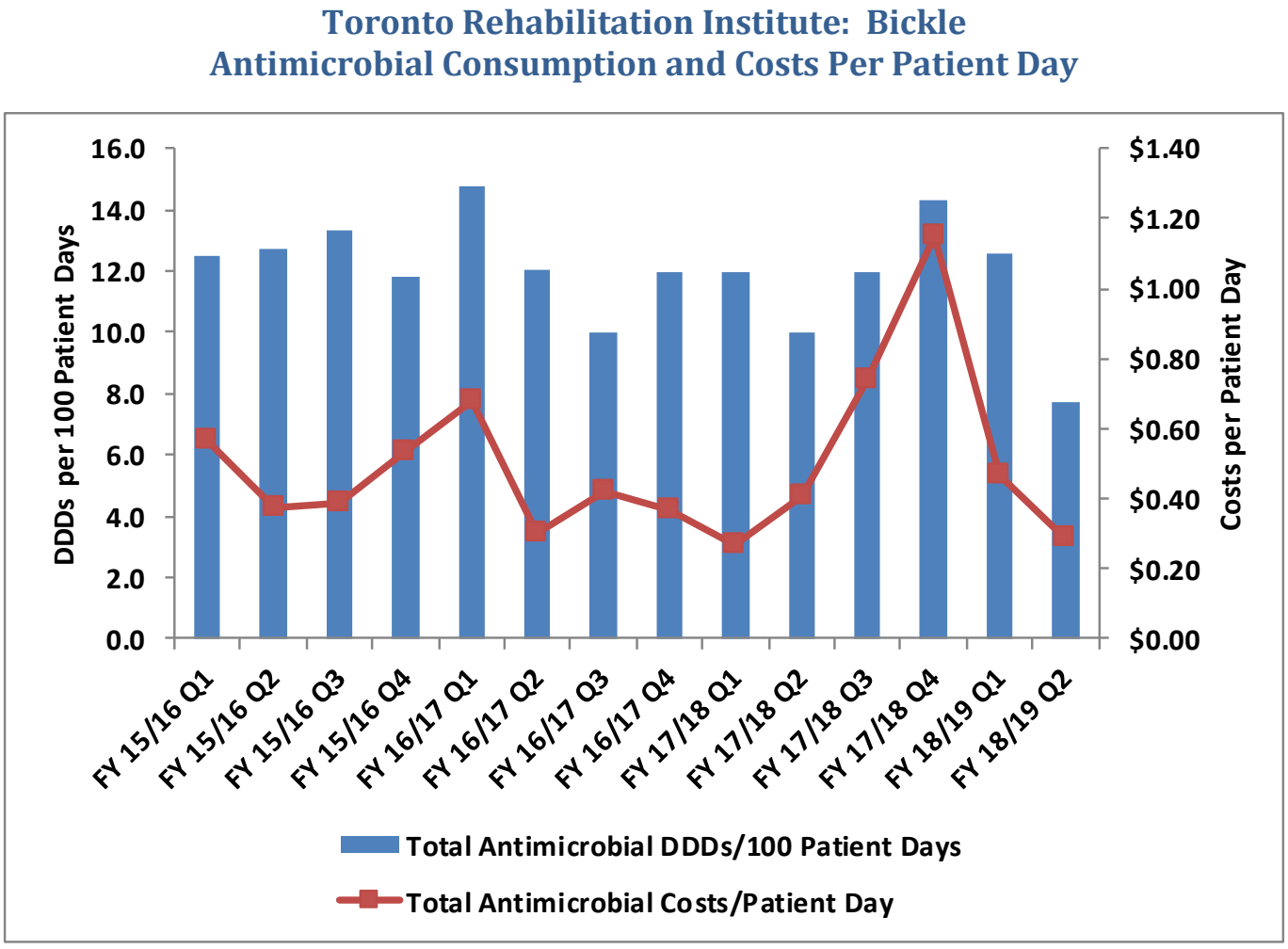


Table 30: Toronto Rehabilitation Institute: Bickle

Indicators	FY 15/16	FY 16/17	FY 17/18	FY18/19 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs									
Total Antimicrobial DDDs/100 Patient Days	**13**	**12**	**12**	**13**	**8**			**10**	**11**
Systemic Antibacterial DDDs/100 Patient Days	11	11	11	11	8			9	10
Systemic Antifungal DDDs/100 Patient Days	2	2	1	1	0			1	1
Total Antimicrobial Costs	$31,326	$28,952	$38,119	$7,472	$4,452			$11,924	$10,602
Total Antimicrobial Costs/Patient Day	**$0.46**	**$0.44**	**$0.63**	**$0.51**	**$0.29**			**$0.39**	**$0.34**
Systemic Antibacterial Costs	$29,933	$23,571	$26,056	$6,897	$4,431			$11,328	$10,439
Systemic Antibacterial Costs/Patient Day	$0.44	$0.36	$0.43	$0.47	$0.29			$0.38	$0.33
Systemic Antifungal Costs	$1,393	$5,381	$12,063	$575	$21			$596	$163
Systemic Antifungal Costs/Patient Day	$0.02	$0.08	$0.20	$0.04	$0.00			$0.02	$0.01
Patient Care Outcomes									
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	7 (0.10)	7 (0.11)	4 (0.07)	1 (0.07)	0 (0)			1 (0.03)	3 (0.1)

Toronto Rehabilitation Institute: Lyndhurst

The FY 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 1.6% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 40.9% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 26.2% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 11,714.2% compared to YTD last year.

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

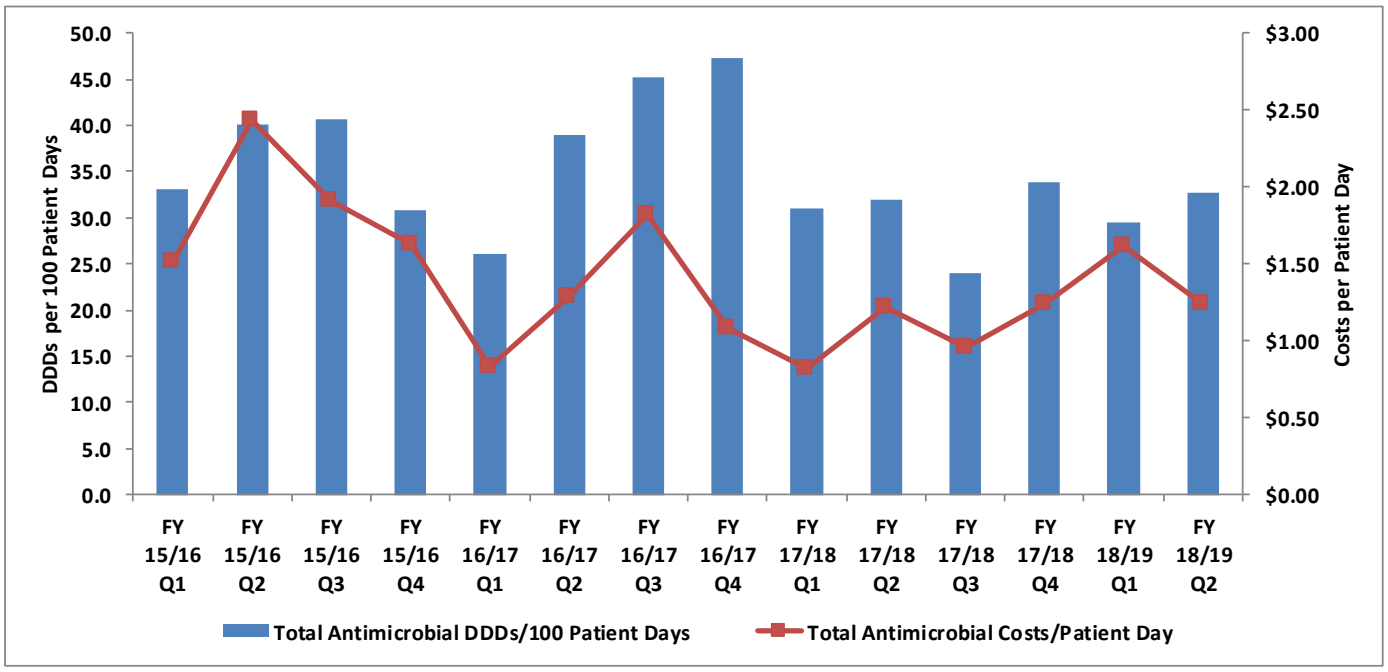


Table 31: Toronto Rehabilitation Institute: Lyndhurst

Indicators	FY 15/16	FY 16/17	FY 17/18	FY18/19 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs									
Total Antimicrobial DDDs/100 Patient Days	**36**	**39**	**30**	**30**	**33**			**31**	**32**
Systemic Antibacterial DDDs/100 Patient Days	34	38	30	29	32			31	32
Systemic Antifungal DDDs/100 Patient Days	2	1	1	1	0			0	0
Total Antimicrobial Costs	$35,817	$23,520	$19,991	$7,651	$5,909			$13,560	$9,696
Total Antimicrobial Costs/Patient Day	**$1.88**	**$1.26**	**$1.06**	**$1.62**	**$1.24**			**$1.43**	**$1.02**
Systemic Antibacterial Costs	$35,473	$23,404	$18,691	$7,629	$4,497			$12,125	$9,683
Systemic Antibacterial Costs/Patient Day	$1.86	$1.26	$0.99	$1.61	$0.95			$1.28	$1.01
Systemic Antifungal Costs	$344	$116	$1,300	$23	$1,412			$1,435	$12
Systemic Antifungal Costs/Patient Day	$0.02	$0.01	$0.07	$0.00	$0.30			$0.15	$0.00
Patient Care Outcomes									
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	3 (0.16)	1 (0.05)	1 (0.05)	0 (0)	0 (0)			0 (0)	0 (0)

Toronto Rehabilitation Institute: University Centre

The FY 18/19 Q2 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) remained the same compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 41.4% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 30.2% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 84.1% compared to YTD last year.

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

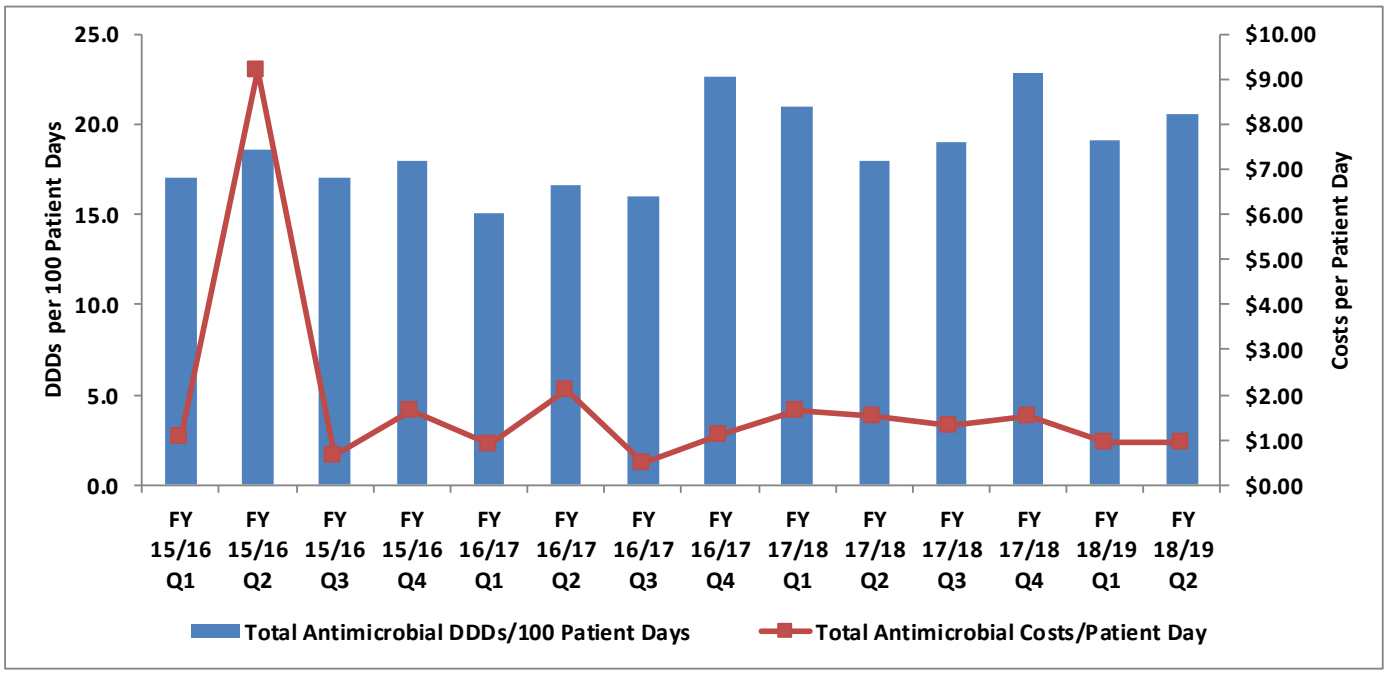
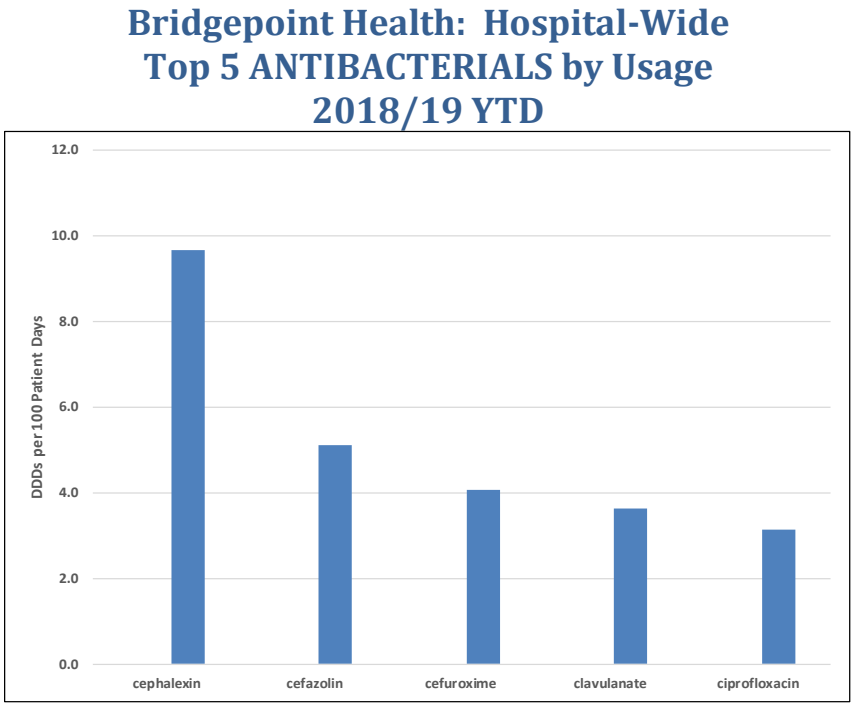
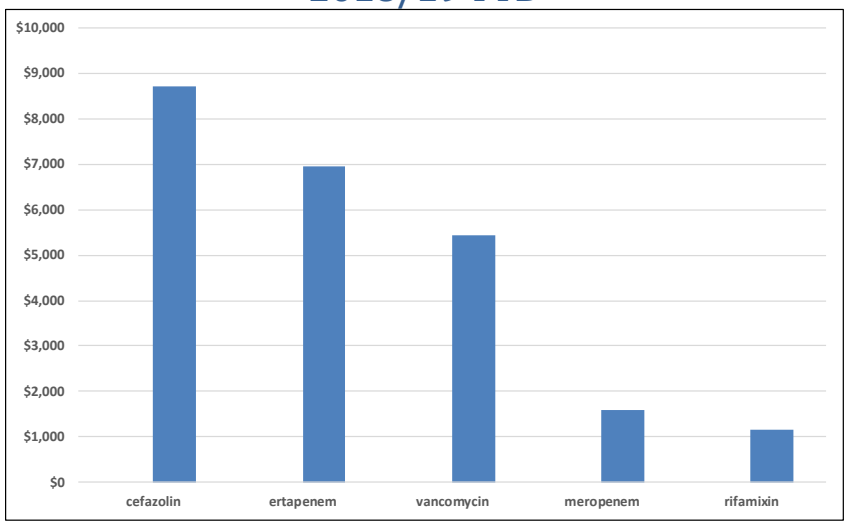


Table 32: Toronto Rehabilitation Institute: University Centre

Indicators	FY 15/16	FY 16/17	FY 17/18	FY18/19 Performance Q1	Q2	Q3	Q4	YTD	YTD of Previous Year
Antimicrobial Usage and Costs									
Total Antimicrobial DDDs/100 Patient Days	**18**	**18**	**18**	**19**	**21**			**20**	**20**
Systemic Antibacterial DDDs/100 Patient Days	16	15	15	16	17			17	18
Systemic Antifungal DDDs/100 Patient Days	1	3	3	3	3			3	2
Total Antimicrobial Costs	$154,345	$58,364	$58,364	$12,602	$11,617			$24,219	$42,576
Total Antimicrobial Costs/Patient Day	**$3.09**	**$1.14**	**$1.14**	**$0.94**	**$0.93**			**$0.93**	**$1.59**
Systemic Antibacterial Costs	$52,505	$30,908	$30,908	$10,982	$9,125			$20,107	$15,899
Systemic Antibacterial Costs/Patient Day	$1.05	$0.60	$0.60	$0.82	$0.73			$0.78	$0.60
Systemic Antifungal Costs	$1,840	$27,456	$27,456	$1,620	$2,492			$4,113	$26,677
Systemic Antifungal Costs/Patient Day	$0.04	$0.54	$0.54	$0.12	$0.20			$0.16	$1.00
Patient Care Outcomes									
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	2 (0.04)	2 (0.04)	2 (0.04)	0 (0)	0 (0)			0 (0)	1 (0.04)

Bridgepoint Health: Hospital-Wide





BEST PRACTICE GUIDELINES AND ALGORITHMS

- Dr. Shahid Husain and Miranda 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. Dr. Husain and Miranda 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 are currently in the process of reviewing and updating 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 to physicians and medical trainees through several means, including ASP/ID GIM case-based noon rounds, ASP pocket cards for medical trainees, and 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. Miranda So (ASP Pharmacist and Assistant Professor) is the course coordinator, with contributions from other ASP team members.
- The SHS-UHN ASP continues to provide ASP rotations for residents and fellows from across the country and internationally.

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.

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 is a pharmacist member of this committee.

Society for Hospital Epidemiology of America (SHEA)

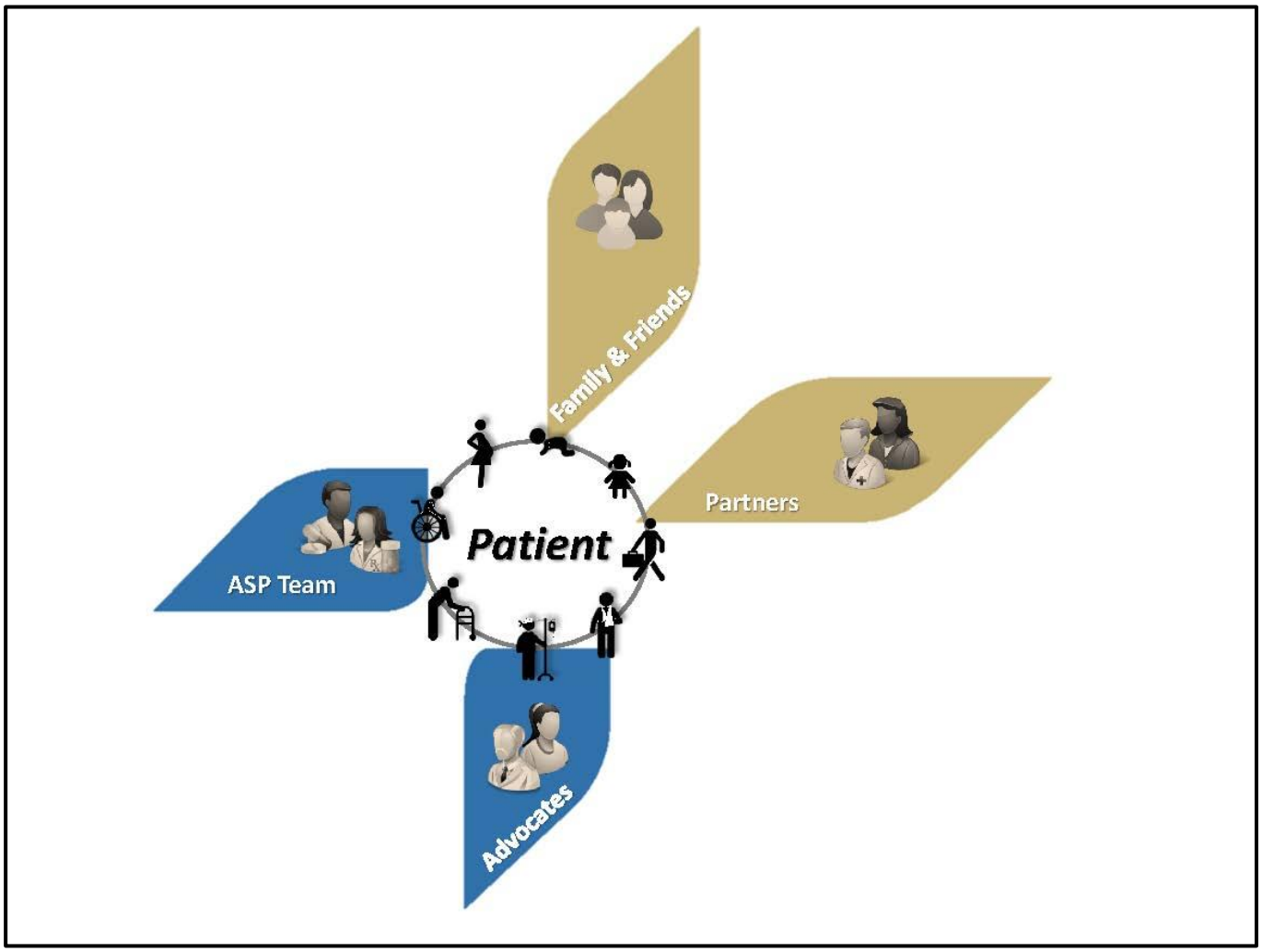
Dr. Andrew Morris is Chair of SHEA's Antimicrobial Stewardship and Resistance Committee.

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

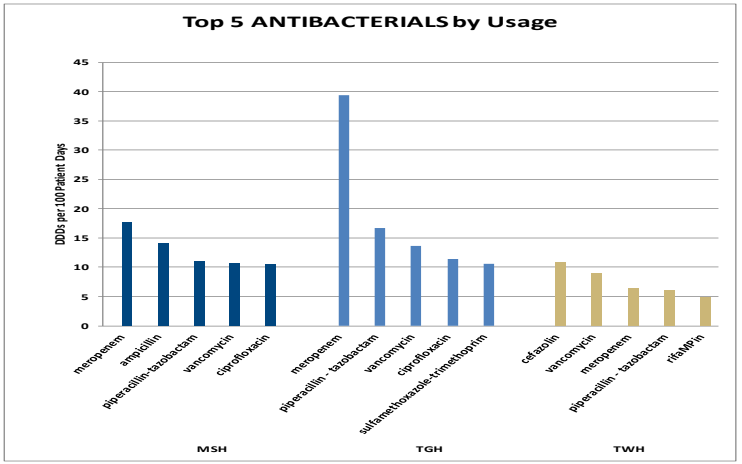
Yoshiko Nakamachi is a member of the Federal/Provincial/Territorial Pan-Canadian Antimicrobial Stewardship Task Group for the development of the Pan-Canadian AMR Action Plan.

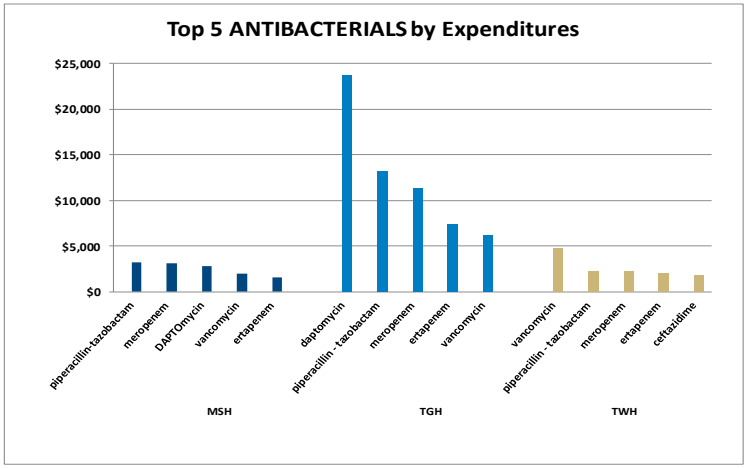
STRATEGIC PLANNING

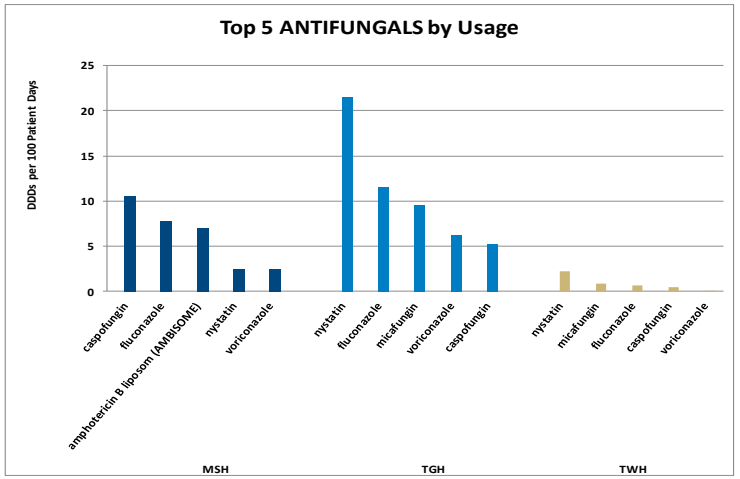
The ASP team developed the SHS-UHN ASP Strategic Plan 2016-2019. Please contact Yoshiko Nakamachi (Yoshiko.Nakamachi@uhn.ca) if you would like a copy.

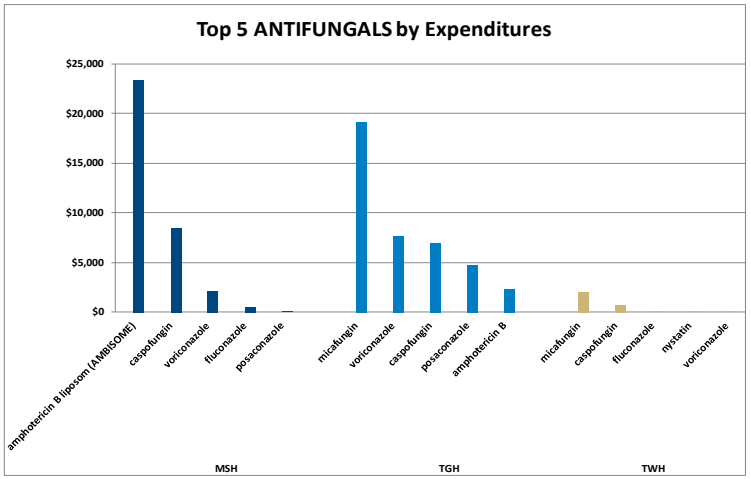


Appendix 1: FY 18/19 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site









Appendix 2: General Internal Medicine FY 18/19 Q2 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures