

SHS + UHN

ASP

ANTIMICROBIAL
STEWARDSHIP
PROGRAM



Q4 REPORT

FISCAL YEAR 2016 | 2017



@shsuhnaspp



Sinai
Health
System



UHN

Toronto General
Toronto Western
Princess Margaret
Toronto Rehab
Michener Institute

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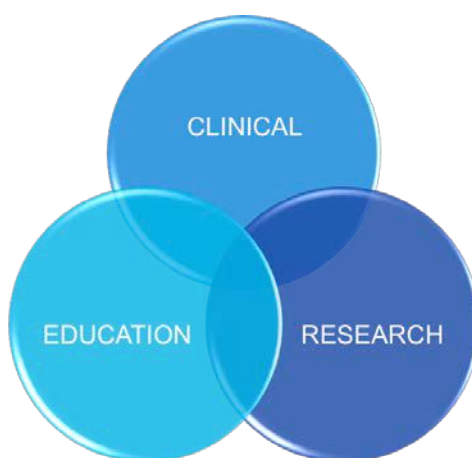
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“Getting patients the right antibiotics, when they need them”

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) and University Health Network (Princess Margaret Cancer Centre, Toronto General Hospital, Toronto Rehabilitation Institute, and Toronto Western Hospital).

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.)

There is a general trend of decreased antimicrobial consumption and cost in the MSH ICU, TWH ICU, PMCC Leukemia service, and the Multi-Organ Transplant Program (MOTP) – cost only increased 0.3%. Antimicrobial consumption in the TGH CVICU is decreasing, however, cost has increased primarily due to the reintroduction of micafungin prophylaxis in heart transplant patients. There is a slight increase in antimicrobial consumption in the TGH ICU, with a decrease in cost. Costs are decreasing in the MSH NICU, with an increase in usage. The MSH GIM ward is showing a decrease in consumption, while there has been a rise in consumption and cost this past quarter in the TGH GIM and the TWH GIM. These increases can be attributed to antifungal usage. The Allogeneic Bone Marrow Transplant Program (allo-BMT) experienced an increase in consumption and cost this past quarter.

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	↓	↑



Decrease compared to previous YTD



Increase of < 10% compared to previous YTD



Increase of > 10% compared to previous YTD

FISCAL YEAR 16/17 Q4 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 MD, 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. *Leuk Lymphoma*. 2017 Jan. Vol 58 (4) 834-841
- Hughes JS, Huo X, Falk L, Hurford A, Lan K, Coburn B, Morris AM, Wu J. Benefits and unintended consequences of antimicrobial de-escalation: Implications for stewardship programs. [PLoS One](#). 2017 Feb 9;12(2):e0171218. doi: 10.1371/journal.pone.0171218. eCollection 2017.
- 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. *Eur J Clin Microbiol Infect Dis*. 2017; DOI 10.1007/s10096-017-2914-y
- 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 [in press].
- 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 [in press].

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

Best Practices

Several algorithms and best practice guidelines have been developed and implemented into practice across UHN and SHS. Our algorithms were developed with clinician and project stakeholder feedback, and the formatting is based on Human Factors Engineering principles allowing for ease of use: easier to navigate and print for frontline clinicians. The algorithms and best practices can be found [here](#) on our ASP website.

An **ASP nurse-focused initiative** aimed at reducing overtreatment of **Asymptomatic Bacteriuria** is currently in progress. Key deliverables of this initiative include building on the work done during the pilot project in FY15/16: refining the updated policy on urine cultures, providing audit and feedback to selected units, and educational sessions and urine culture surveys to assess nurse behaviour and sentiments towards urine cultures. The updated policy was approved and is currently in practice. Educational sessions with/without audit and feedback are currently underway. 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. Our ASP nurse-focused initiative is being led by our ASP Nurse Leader, Linda Jorgoni. **This ASP Nurse Leader position is the first of its kind in Canada.**

Miranda So (ASP Pharmacist) and Dr. Shahid Husain continue to work closely with the **Multi-Organ Transplant Program** to develop “Guidelines for Common Infections in Solid Organ Transplant Patients”. The draft guidelines are undergoing consultative reviews with stakeholders, content experts and key opinion leaders.

Provincial, National, and International Role

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.

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.

Following the commitment to the three aforementioned activities, the SHS-UHN ASP also hosted a visit from the Federal Health Minister, The Honourable Jane Philpott, to demonstrate the various initiatives our program has implemented over the years and the inter-relationship of the various patient domains (Primary Care, Acute Care, Long-term Care) as they relate to AMR and AMS. 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) and **SASS** (Students for Antimicrobial Stewardship Society).



FISCAL YEAR 16/17 Q4 RESULTS

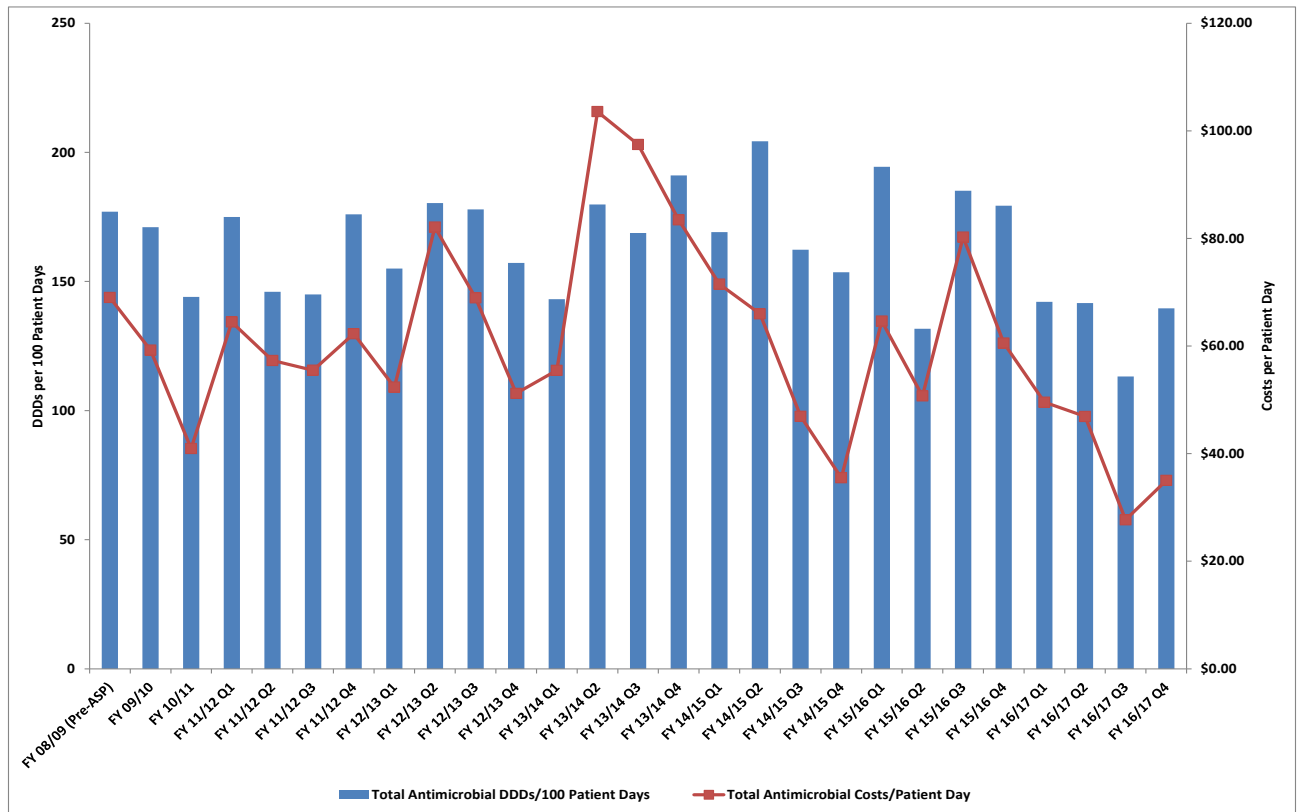
CRITICAL CARE

Mount Sinai Hospital: Medical Surgical ICU

The FY 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 22.2% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 38.1% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 32.9% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 40.6% compared to YTD last year.
- NB: Patients transferred from Princess Margaret accounted for 12% of patient visits and 68% of the antimicrobial costs.

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



To view **Appendix 1: FY 16/17 Q4 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 13.5% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days decreased (↓) by 33.8% compared to YTD last year.

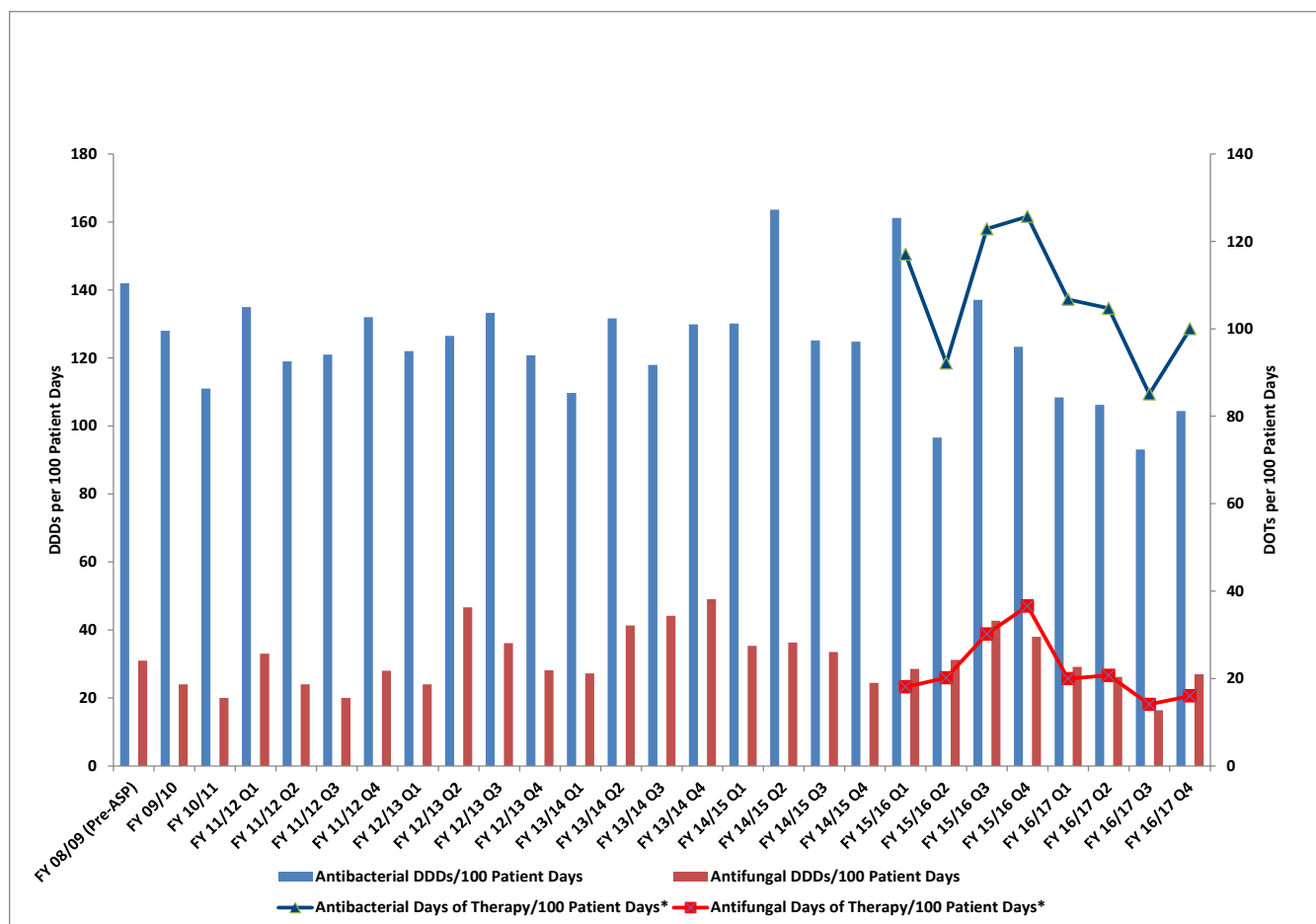


Table 2: Mount Sinai Hospital: Medical Surgical ICU

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	FY16/17 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	173	142	142	113	140	135	173	
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	127	123	136	129	108	106	93	104	103	129	
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	35	41	25	36	29	26	16	27	25	36	
Total Antimicrobial Costs	\$332,724	\$285,975	\$193,129	\$279,859	\$291,470	\$424,044	\$232,814	\$288,165	\$59,907	\$53,895	\$30,330	\$43,552	\$187,684	\$288,165	
Total Antimicrobial Costs/Patient Day	\$69.01	\$59.23	\$40.95	\$59.22	\$62.37	\$85.36	\$62.54	\$64.57	\$49.55	\$46.91	\$27.70	\$35.01	\$39.96	\$64.57	
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$125,339	\$134,811	\$108,886	\$92,928	\$81,102	\$15,318	\$14,278	\$12,000	\$15,661	\$57,257	\$81,102	
Systemic Antibacterial Costs/Patient Day	\$36.16	\$29.44	\$20.31	\$26.94	\$28.85	\$21.92	\$20.71	\$18.17	\$12.67	\$12.43	\$10.96	\$12.59	\$12.19	\$18.17	
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$141,877	\$144,811	\$296,573	\$134,504	\$190,714	\$42,494	\$35,494	\$16,636	\$24,610	\$119,234	\$190,714	
Systemic Antifungal Costs/Patient Day	\$29.68	\$27.45	\$18.87	\$30.50	\$30.99	\$59.70	\$40.53	\$42.73	\$35.15	\$30.89	\$15.19	\$19.78	\$25.39	\$42.73	
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	111	109	115	107	105	85	100	99	115	
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	17	21	27	20	21	14	16	18	27	
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)	0 (0.00)	0 (0.00)	0 (0.00)	2 (1.61)	2 (0.43)	5 (1.12)	
ICU Average Length of Stay (Days)	5.84	5.57	5.67	5.51	5.24	6.10	5.26	4.45	4.18	4.33	4.05	4.22	4.195	4.45	
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.5	17.04	15.3	13.9	14.2	9.5	12.7	14.6	13.0	12.5	14.2	
ICU Readmission Rate Within 48 Hrs (as a %)	3.2	2.9	2.7	2.7	1.86	3.2	2.6	2.1	3.2	0.0	3.2	3.5	2.5	2.1	
ICU Ventilator Days	NA	3286	2934	2677	2749	3069	2597	2504	552	616	427	636	2231	2504	
ICU Multiple Organ Dysfunction Score (MODS)	4.00	4.04	4.12	4.25	4.62	4.87	4.73	4.43	3.6	3.95	3.86	4.27	3.92	4.43	

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), 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 Q1	FY 16/17 Q2	FY 16/17 Q3	FY 16/17 Q4	FY 16/17 YTD	Previous YTD
Non-PM Patients	\$78,737	\$87,931	\$109,283	\$150,870	\$135,395	\$71,509	\$17,979	\$17,441	\$9,446	\$14,301	\$59,167	\$78,181
	(\$21.14)	(\$25.42)	(\$31.77)	(\$37.54)	(\$37.70)	(\$23.5)	(\$8.28)	(\$16.44)	(\$7.36)	(\$9.33)	(\$19.78)	(\$23.12)
PM Patients	\$114,392	\$191,928	\$182,188	\$273,174	\$97,419	\$202,749	\$41,928	\$36,454	\$20,884	\$29,251	\$128,517	\$209,985
	(\$179.02)	(\$181.58)	(\$249.91)	(\$317.64)	(\$135.68)	(\$218.05)	(251.06)	(\$144.09)	(\$193.37)	(\$204.55)	(\$191.53)	(\$231.26)
Total	\$193,129	\$279,859	\$291,470	\$424,044	\$232,814	\$274,258	\$59,907	\$53,895	\$30,330	\$43,552	\$187,684	\$288,165
	(\$44.26)	(\$61.97)	(\$69.91)	(\$87.40)	(\$52.46)	(\$67.17)	(25.62)	(\$41.02)	(\$21.79)	(\$25.99)	(27.93)	(\$67.17)

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.

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 PM Patient Cost for FY 16/17 Q3. That figure has now been corrected.

Mount Sinai Hospital: Medical Surgical ICU Proportional Antimicrobial Costs for PM and Non-PM Patients (with costs/patient day indicated)

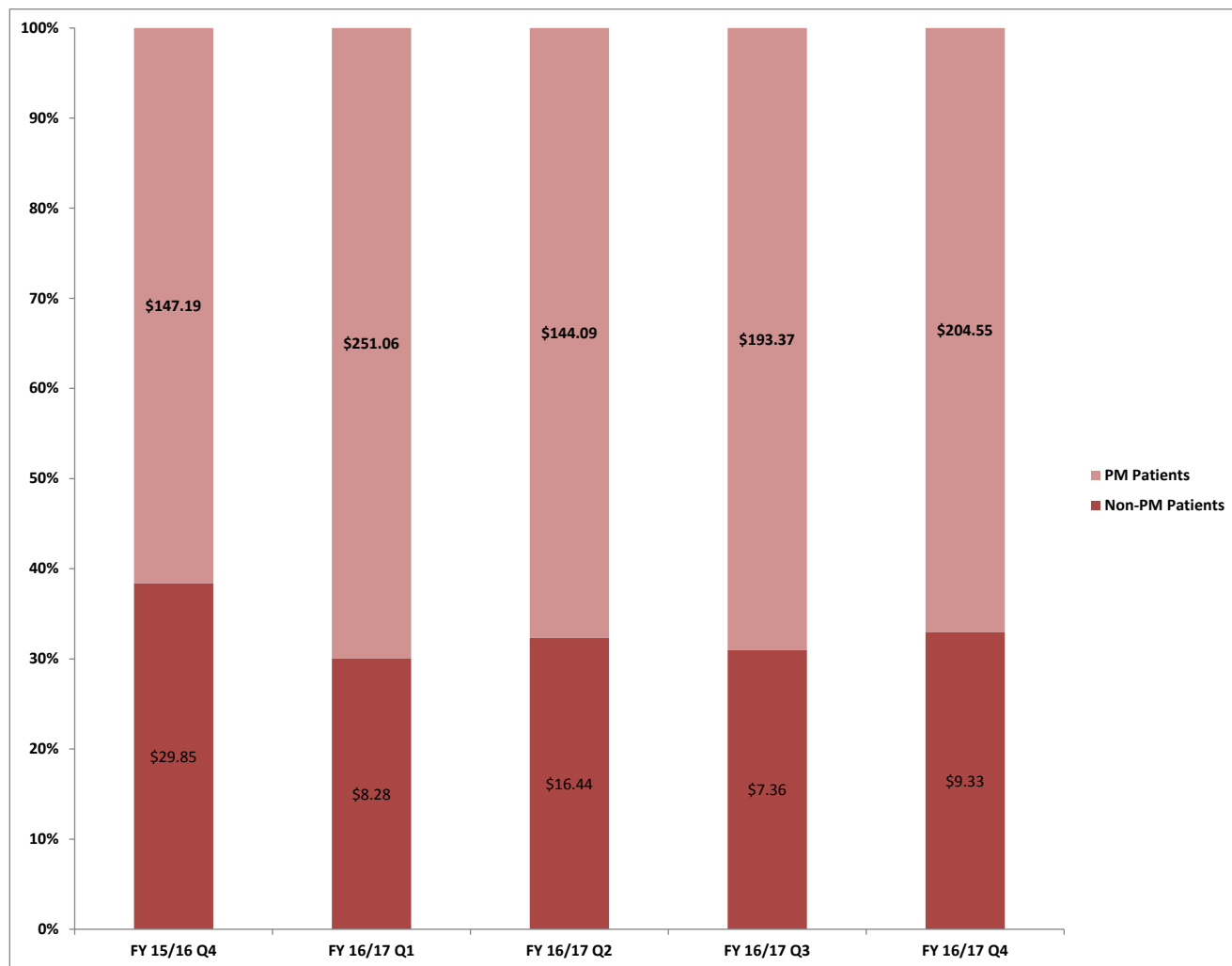
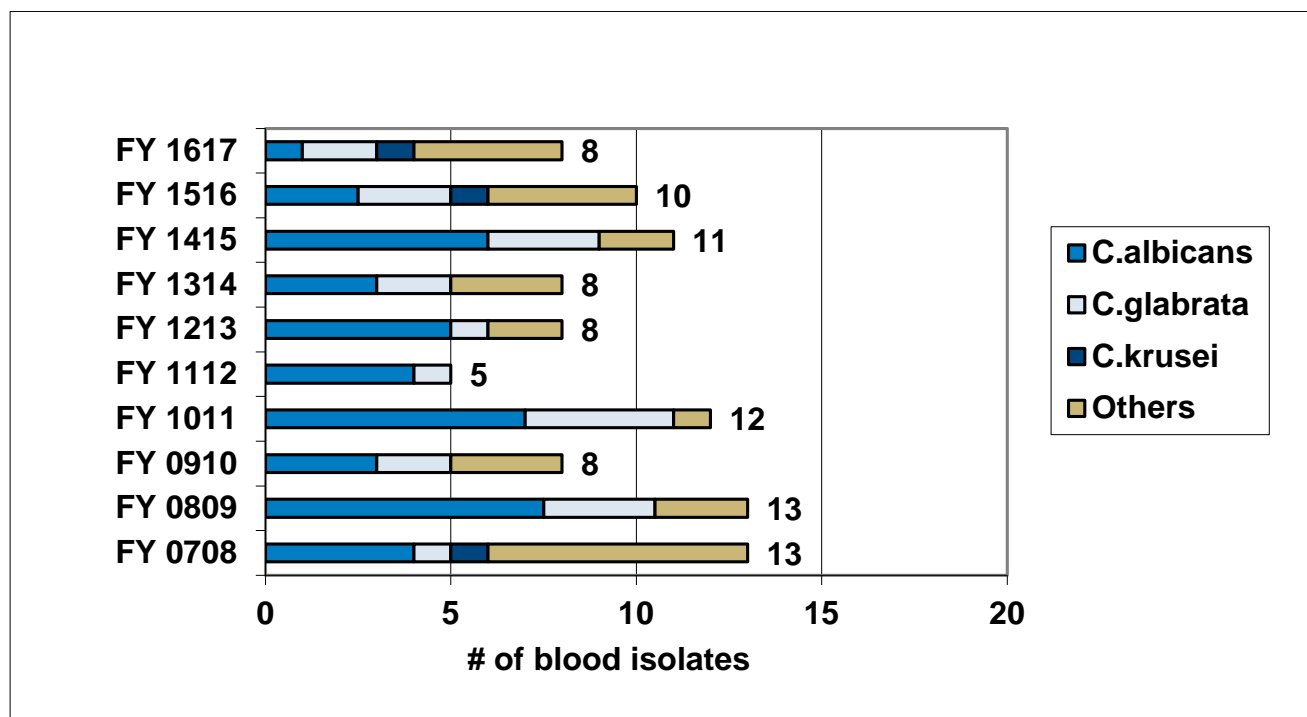
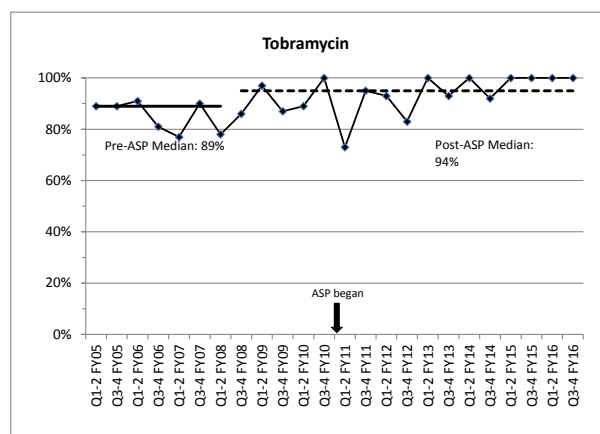
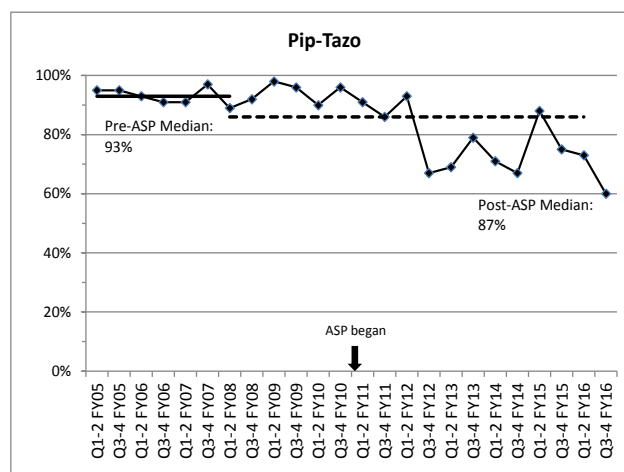
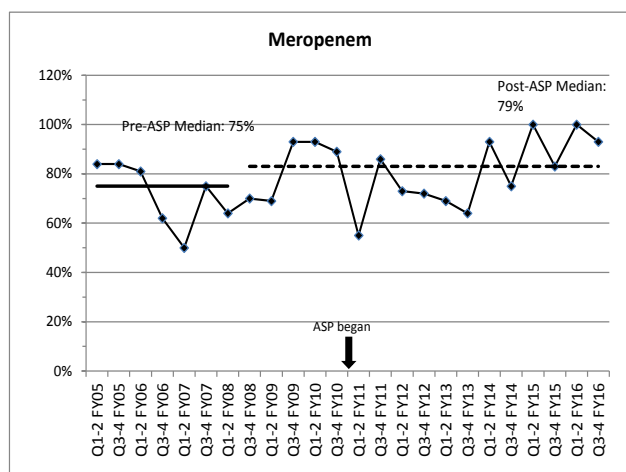
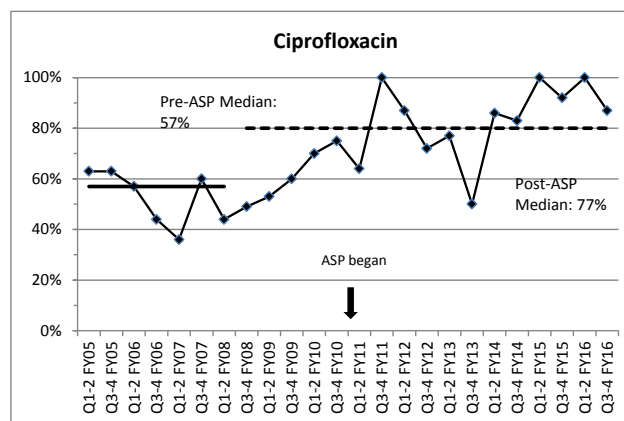
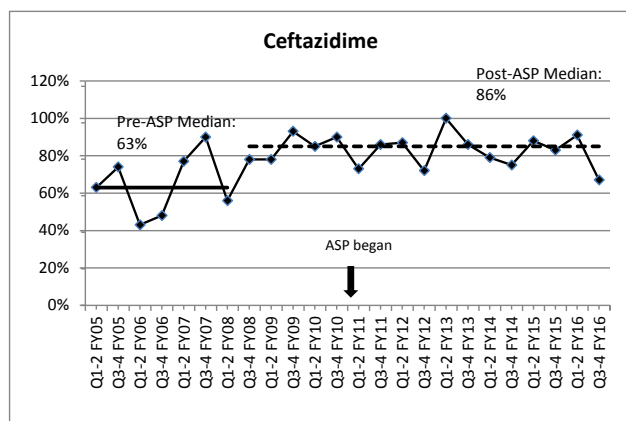


Table 4: Yeast Species Isolated in Blood – Mount Sinai Hospital: Medical Surgical ICU



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 considered to be the standard metric for antimicrobial consumption for neonates. The FY 16/17 Q4 summary includes:

- Antimicrobial days of therapy (DOT) per 100 patient days increased (↑) by 25.2% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 8.2% compared to YTD last year.

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

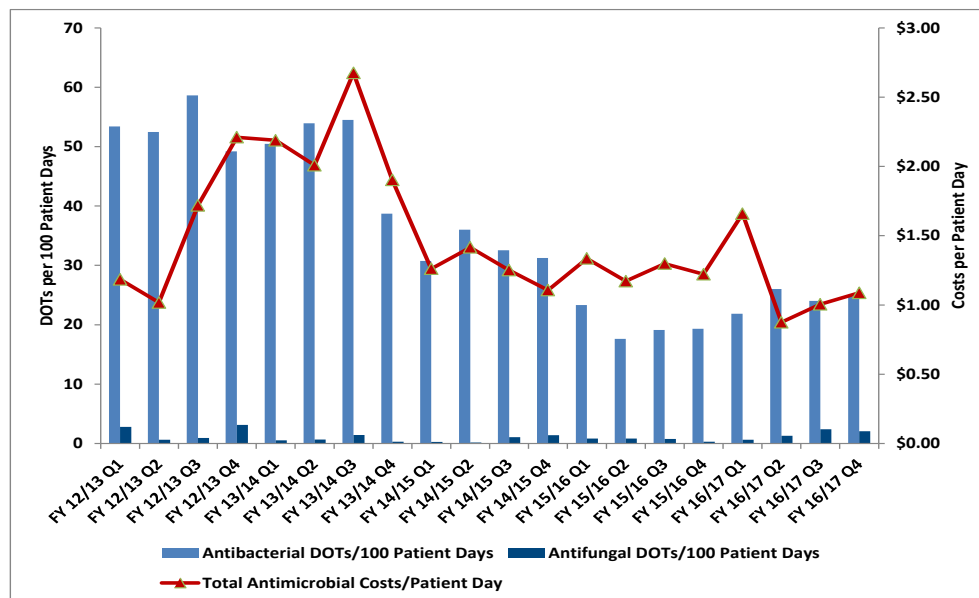


Table 5: Mount Sinai Hospital: Neonatal ICU

Indicators	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY16/17 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	22.5	27.3	26.4	26.8	25.8	20.6
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.5	48.7	32.7	19.9	21.9	26.0	24.0	24.8	24.2	19.9
Systemic Antifungal DOTs/100 Patient Days	2.2	1.8	0.7	0.8	0.7	0.6	1.3	2.4	2.1	1.6	0.7
Total Antimicrobial Costs	\$16,415	\$17,682	\$26,162	\$21,371	\$21,232	\$7,022	\$3,870	\$4,328	\$4,398	\$19,618	\$21,232
Total Antimicrobial Costs/Patient Day	\$1.31	\$1.51	\$2.17	\$1.26	\$1.26	\$1.66	\$0.88	\$1.01	\$1.09	\$1.15	\$1.26
Systemic Antibacterial Costs	\$14,783	\$16,505	\$25,290	\$20,516	\$20,804	\$6,810	\$3,719	\$4,065	\$3,652	\$18,247	\$20,804
Systemic Antibacterial Costs/Patient Day	\$1.18	\$1.41	\$2.10	\$1.21	\$1.23	\$1.61	\$0.84	\$0.94	\$0.90	\$1.07	\$1.23
Systemic Antifungal Costs	\$1,632	\$1,177	\$872	\$855	\$428	\$212	\$151	\$263	\$746	\$1,372	\$428
Systemic Antifungal Costs/Patient Day	\$0.13	\$0.10	\$0.07	\$0.05	\$0.03	\$0.050	\$0.03	\$0.06	\$0.18	\$0.08	\$0.03

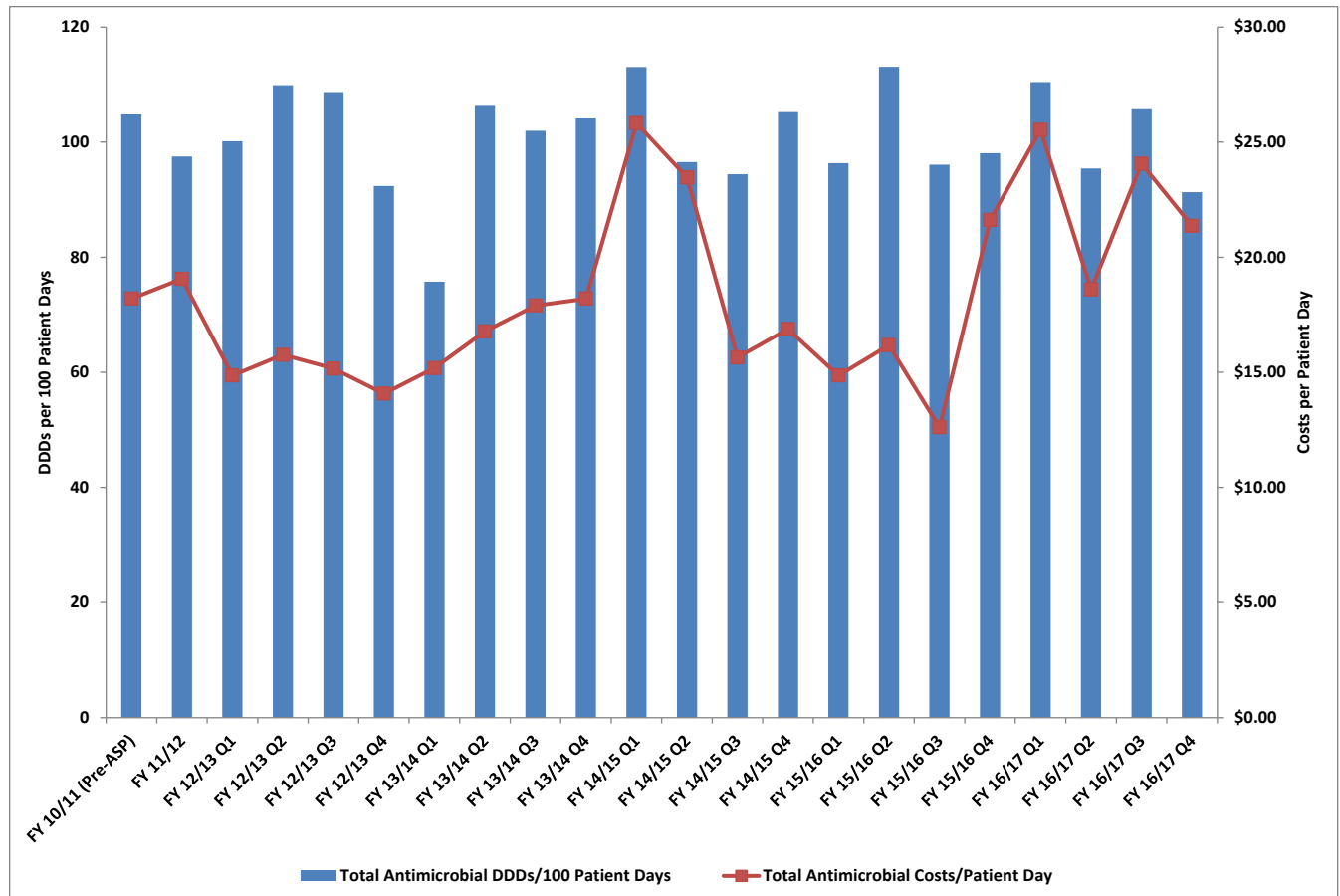
Notes: Effective January 15, 2014, the NICU changed to a mixed-acuity model of care. Prior to this, ASP reported level 3 pharmacy data only. As of January 15, pharmacy data includes both level 2 and level 3 usage and cost. Patient days include both level 2 and 3 days; January level 2 days were determined 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 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 0.2% compared to YTD last year.
 - Antimicrobial costs per patient day increased (↑) by 37.3% compared to YTD last year.
 - Antibacterial costs per patient day increased (↑) by 12.6% compared to YTD last year.
 - Antifungal costs per patient day increased (↑) by 120.4% 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.

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 0.7% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 8.5% compared to YTD last year.

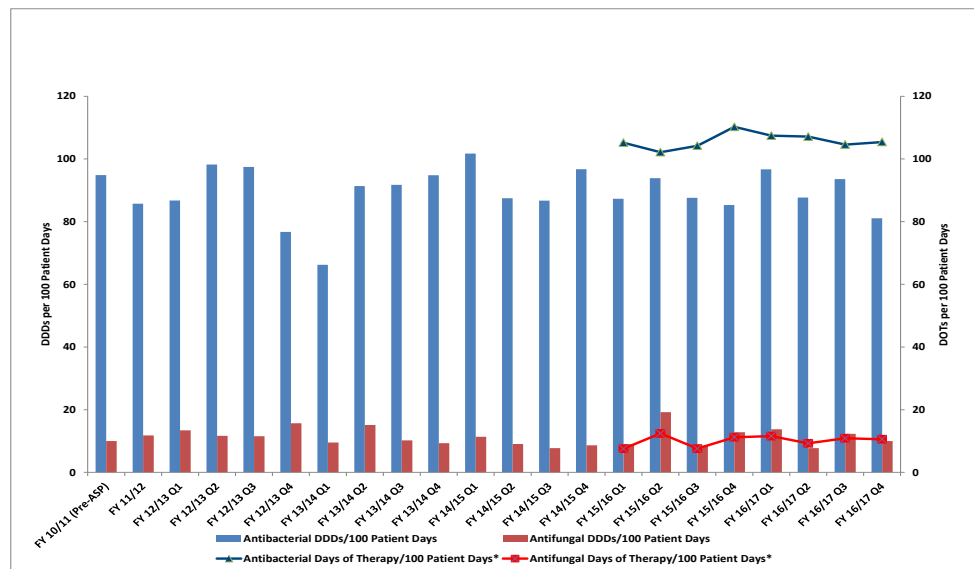


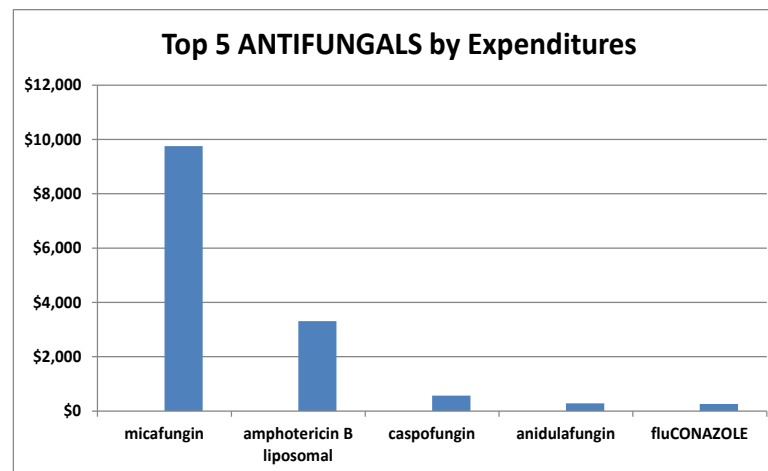
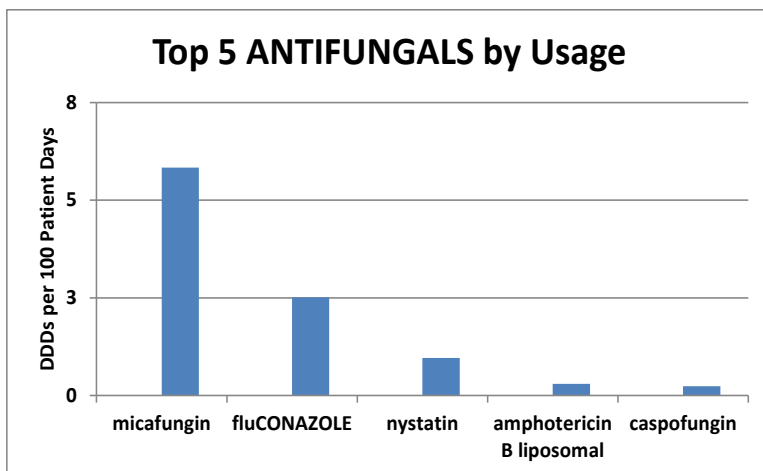
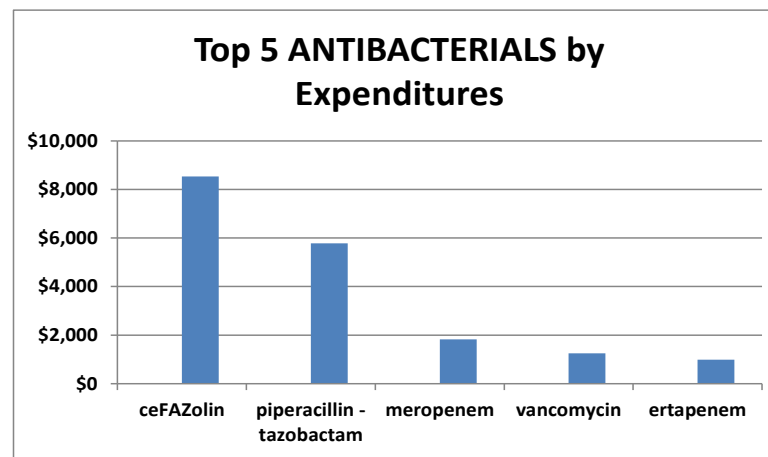
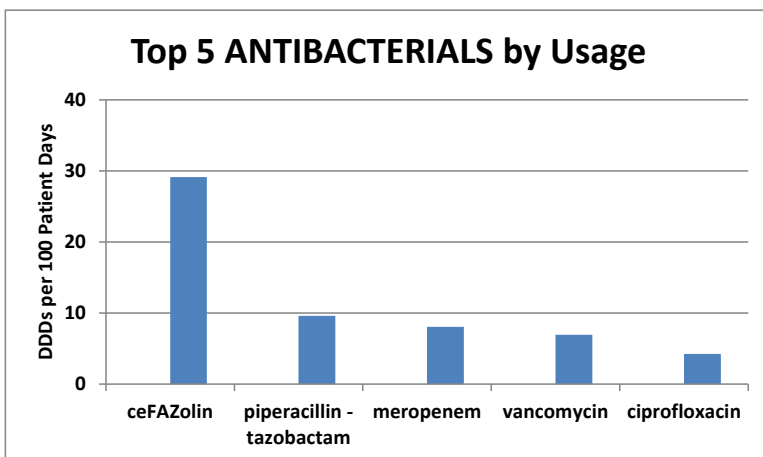
Table 6: Toronto General Hospital: Cardiovascular ICU

Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	FY16/17 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	110	95	106	91	101	101
Systemic Antibacterial DDDs/100 Patient Days	95	86	89	86	93	89	97	88	94	81	90	89
Systemic Antifungal DDDs/100 Patient Days	10	12	13	11	9	13	14	8	12	10	11	13
Total Antimicrobial Costs	\$108,172	\$108,464	\$85,916	\$100,736	\$129,314	\$110,716	\$44,457	\$30,843	\$42,085	\$35,709	\$153,093	\$110,716
Total Antimicrobial Costs/Patient Day	\$18.20	\$19.06	\$14.99	\$17.00	\$20.46	\$16.34	\$25.54	\$18.59	\$24.06	\$21.36	\$22.44	\$16.34
Systemic Antibacterial Costs	\$100,375	\$99,261	\$74,232	\$80,204	\$91,366	\$85,343	\$28,103	\$21,865	\$25,485	\$21,330	\$96,782	\$85,343
Systemic Antibacterial Costs/Patient Day	\$16.89	\$17.44	\$12.95	\$13.54	\$14.45	\$12.60	\$16.14	\$13.18	\$14.57	\$12.76	\$14.19	\$12.60
Systemic Antifungal Costs	\$7,797	\$9,204	\$11,684	\$20,532	\$37,948	\$25,373	\$16,354	\$8,977	\$16,600	\$14,379	\$56,311	\$25,373
Systemic Antifungal Costs/Patient Day	\$1.31	\$1.62	\$2.04	\$3.47	\$6.00	\$3.75	\$9.39	\$5.41	\$9.49	\$8.60	\$8.26	\$3.75
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	129	105	107	107	105	105	106	105
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	28	10	12	9	11	11	11	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)	1 (0.57)	2 (1.21)	2 (1.14)	1 (0.6)	6 (0.88)	7 (1.03)
ICU Average Length of Stay (days)	3.12	2.95	2.97	3.20	3.46	3.45	3.13	3.39	4.26	3.12	3.48	3.45
ICU Mortality Rate (as a %)	3.5	3.0	3.0	4.6	4.6	4.0	4.6	4.2	3.46	2.65	3.73	4.0
ICU Readmission Rate Within 48 Hrs (as a %)	1.6	2.2	1.8	2.2	2.4	1.6	1.9	1.8	1.6	2.66	1.99	1.6
Central Line Infection Rate (per 1000 pt days)	0.73	0.17	0.34	0.16	0.15	0.53	0.0	1.66	1.13	0.57	0.84	0.53
Ventilator-Associated Pneumonia Rate (per 1,000 pt days)	2.99	2.80	1.91	1.73	2.81	0.94	1.89	3.55	6.19	4.59	4.06	0.94
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.51	5.77	5.60	5.83	6.15	5.83	6.03	6.14	6.04	5.83
ICU Ventilator Days	3015	3571	3676	4049	3925	4239	1056	1803	969	1089	4917	4239

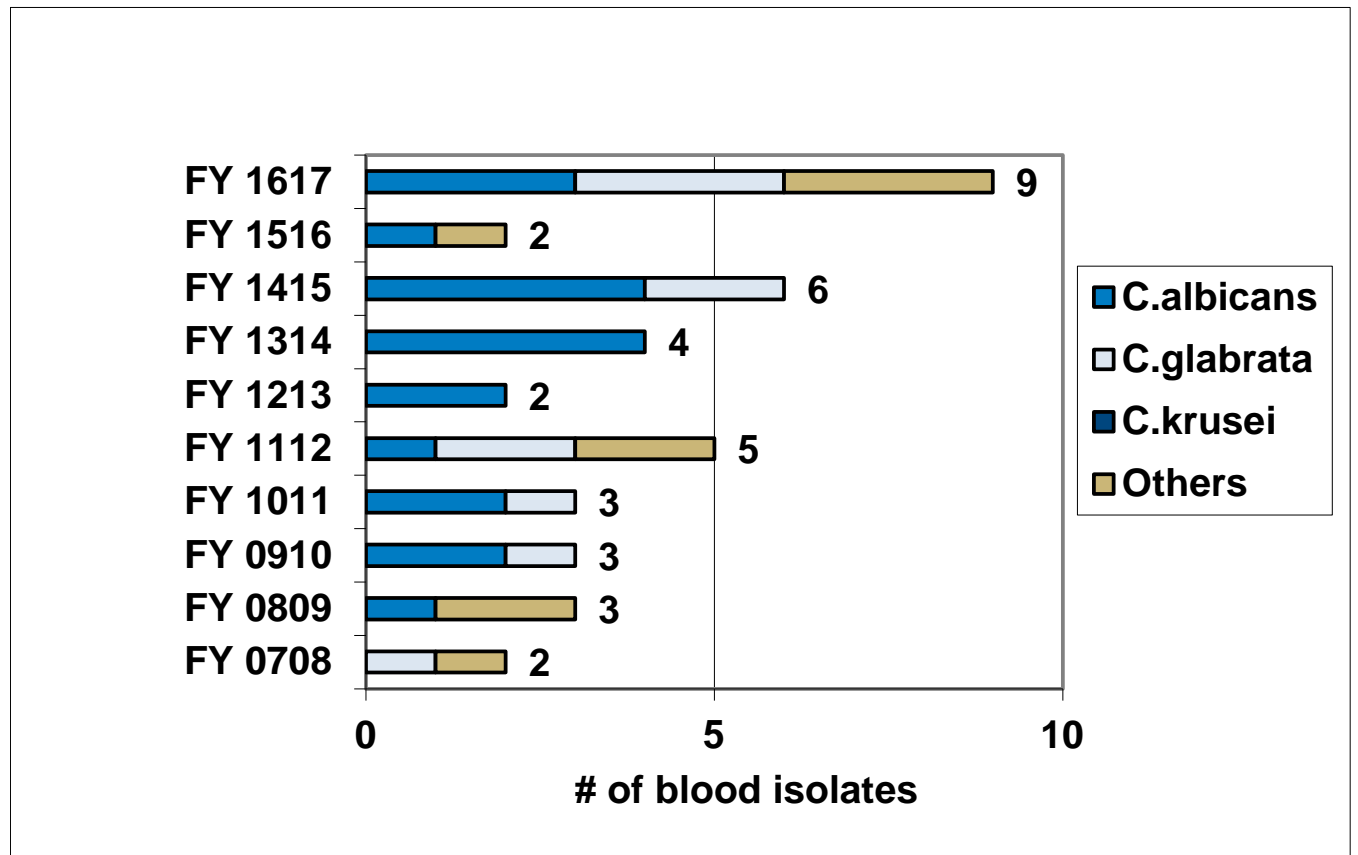
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior 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 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures



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

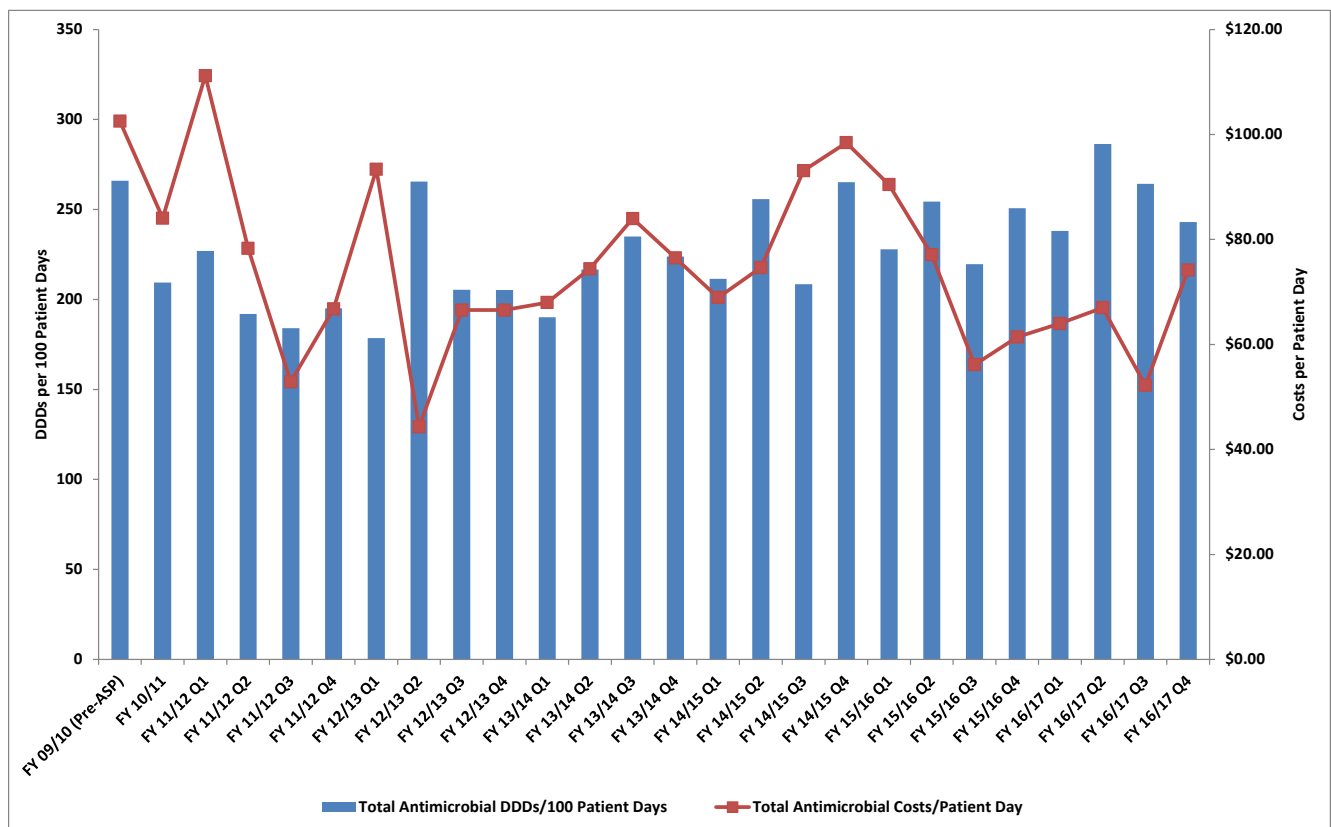


Toronto General Hospital: Medical Surgical ICU

FY 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 7.9% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 9.2% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 0.6% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 16.7% compared to YTD last year.

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



To view **Appendix 1: FY 16/17 Q4 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 6.8% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days increased (↑) by 11.9% compared to YTD last year.

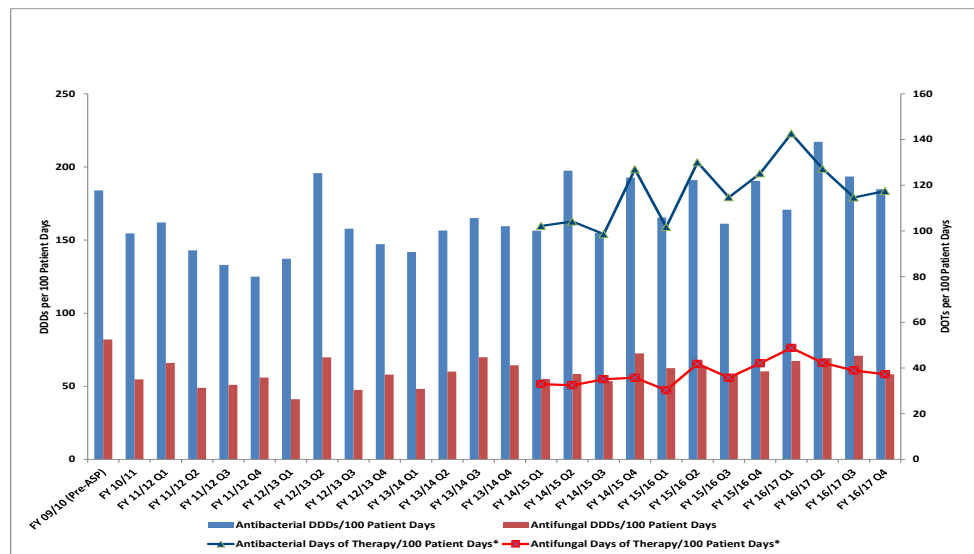


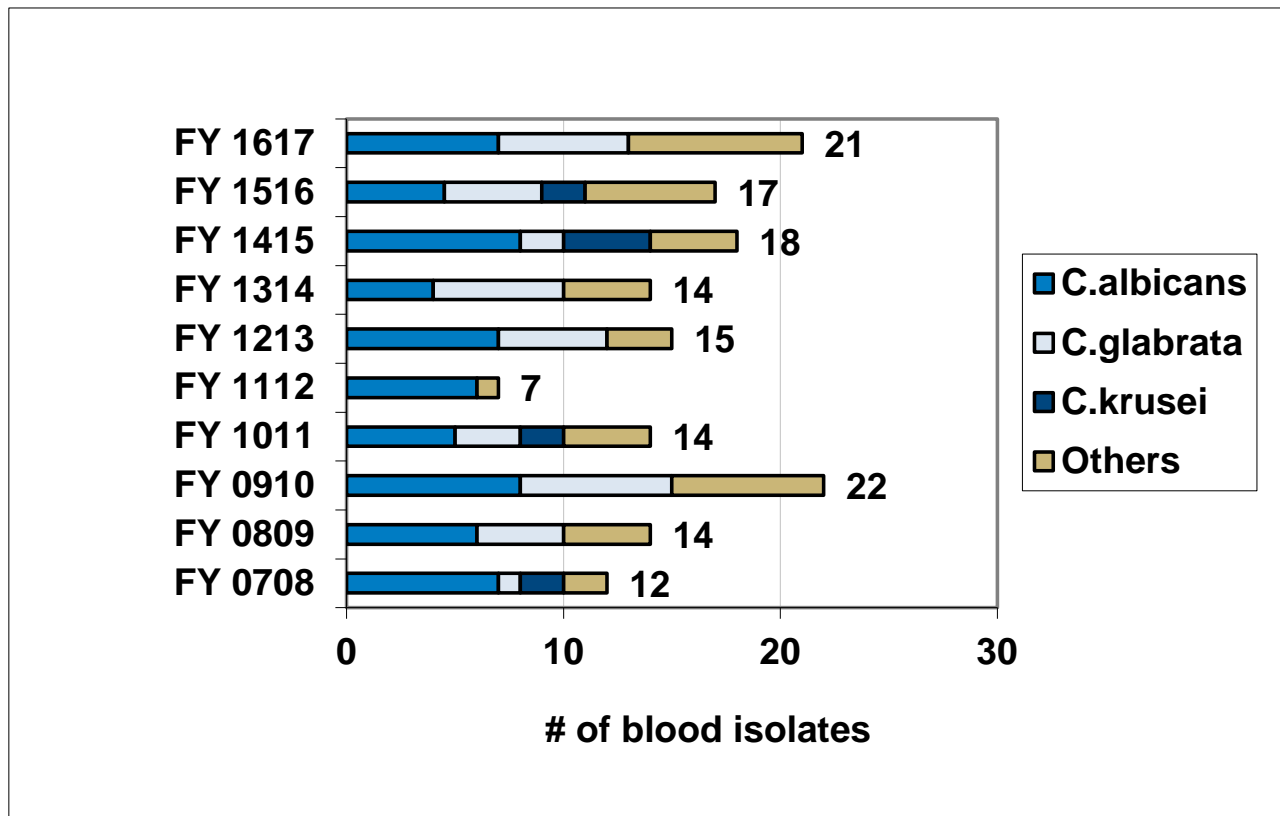
Table 9: Toronto General Hospital: Medical Surgical ICU

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 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	238	286	264	243	258	239
Systemic Antibacterial DDDs/100 Patient Days	184	155	143	159	156	175	178	171	217	193	185	191	178
Systemic Antifungal DDDs/100 Patient Days	82	55	55	54	61	60	64	67	69	71	58	66	61
Total Antimicrobial Costs	\$701,451	\$629,472	\$567,532	\$473,613	\$584,018	\$686,577	\$587,950	\$155,901	\$148,810	\$101,125	\$151,255	\$557,091	\$587,950
Total Antimicrobial Costs/Patient Day	\$102.52	\$84.06	\$76.93	\$63.75	\$75.71	\$83.65	\$71.06	\$64.00	\$67.00	\$52.21	\$74.18	\$64.53	\$71.06
Systemic Antibacterial Costs	\$390,209	\$375,436	\$292,355	\$231,171	\$225,557	\$293,126	\$254,392	\$78,696	\$75,922	\$52,335	\$60,154	\$267,107	\$254,392
Systemic Antibacterial Costs/Patient Day	\$57.03	\$50.14	\$39.63	\$31.12	\$29.24	\$35.71	\$30.75	\$32.31	\$34.18	\$27.02	\$29.50	\$30.94	\$30.75
Systemic Antifungal Costs	\$311,242	\$254,036	\$275,176	\$242,443	\$358,461	\$393,451	\$333,559	\$77,205	\$72,888	\$48,790	\$91,101	\$289,984	\$333,559
Systemic Antifungal Costs/Patient Day	\$45.49	\$33.93	\$37.30	\$32.63	\$46.47	\$47.94	\$40.31	\$31.69	\$32.82	\$25.19	\$44.68	\$33.59	\$40.31
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	107.9	118.3	143	127	115	117	126	118
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	34.1	37.7	49	42	39	37	42	38
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)	3 (1.23)	7 (3.15)	1 (0.52)	4 (1.96)	15 (1.74)	10 (1.21)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.79	8.22	8.08	7.62	8.77	9.68	6.2	7.11	7.94	7.62
ICU Mortality Rate (as a %)	16.2	15.7	16.3	16.0	17.8	17.2	17.2	16.4	17.4	15.5	17.9	16.8	17.2
ICU Readmission Rate Within 48 Hrs (as a %)	3.8	4.4	4.4	2.8	3.5	3.0	3.4	2.7	5.4	1.82	2.8	3.2	3.4
ICU Ventilator Days	5399	6256	6507	6458	24620	7330	7048	2161	2319	1486	1691	7657	7048
Apache II Score	n/a	n/a	16.1	15.775	15.9	15.1	15.4	16.5	16.4	16.6	17.3	16.7	15.4

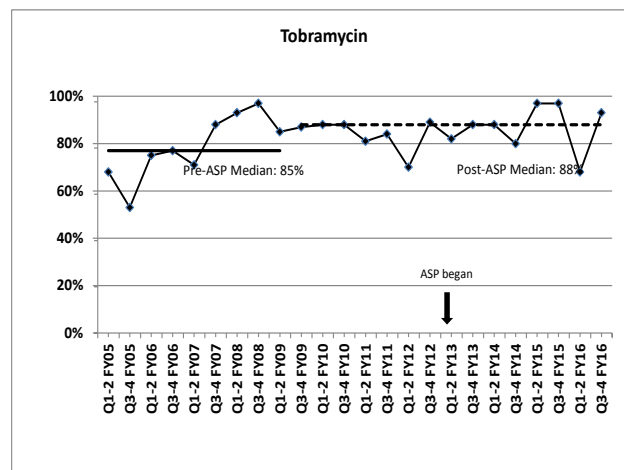
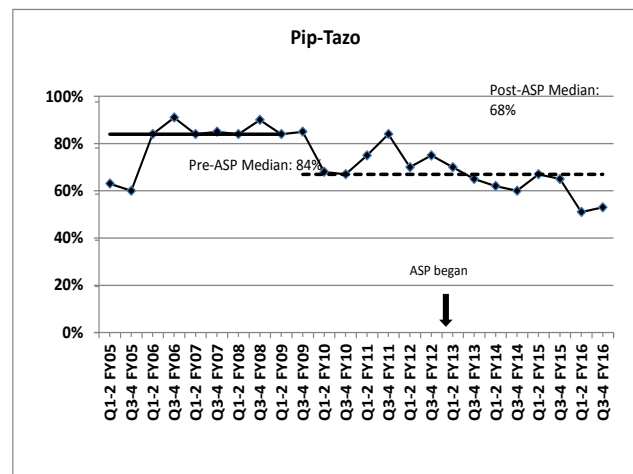
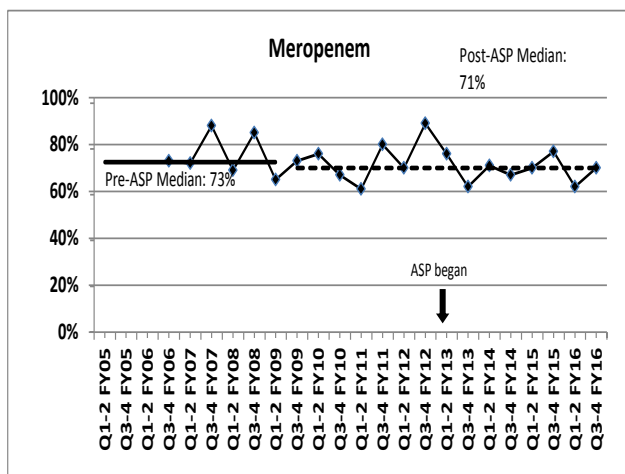
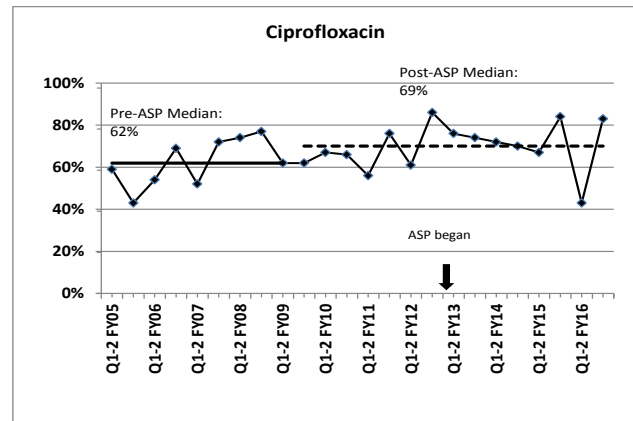
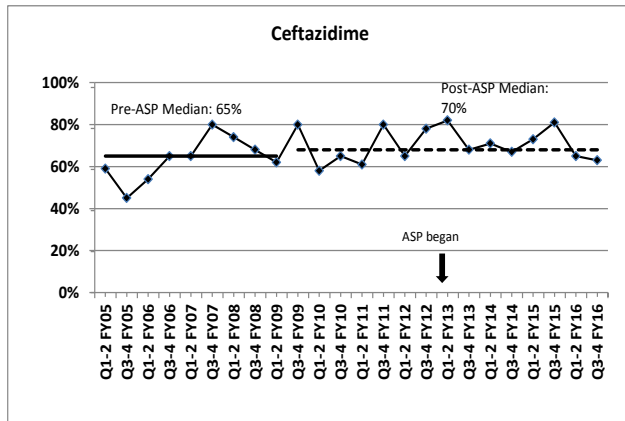
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.
Data Sources: Antimicrobial DDD and Costs (Centricity). *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior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

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

Table 10: Yeast Species Isolated in Blood – Toronto General Hospital: Medical Surgical ICU



TGH MSICU Pseudomonas Susceptibility

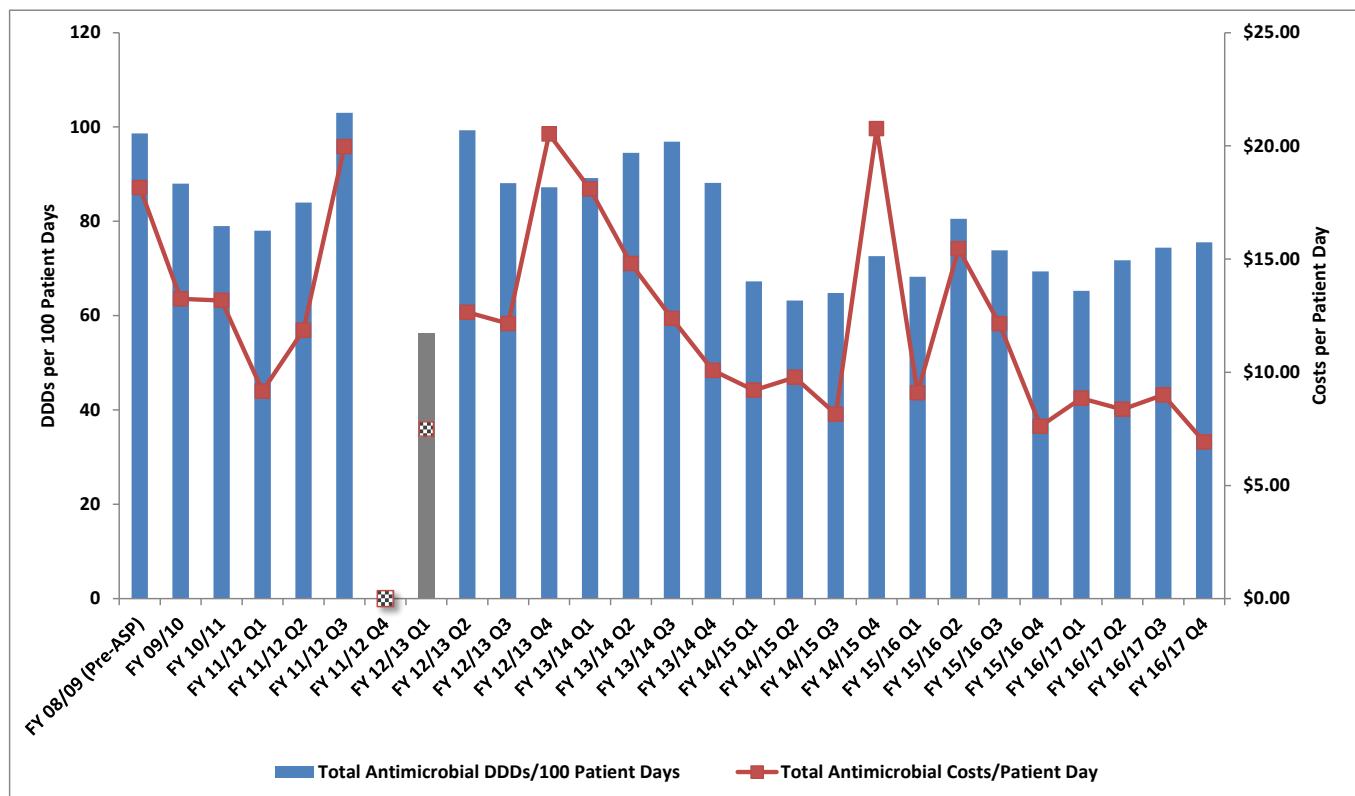


Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

The FY 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 1.8% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 25.4% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 10.2% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 47.1% compared to YTD last year.

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

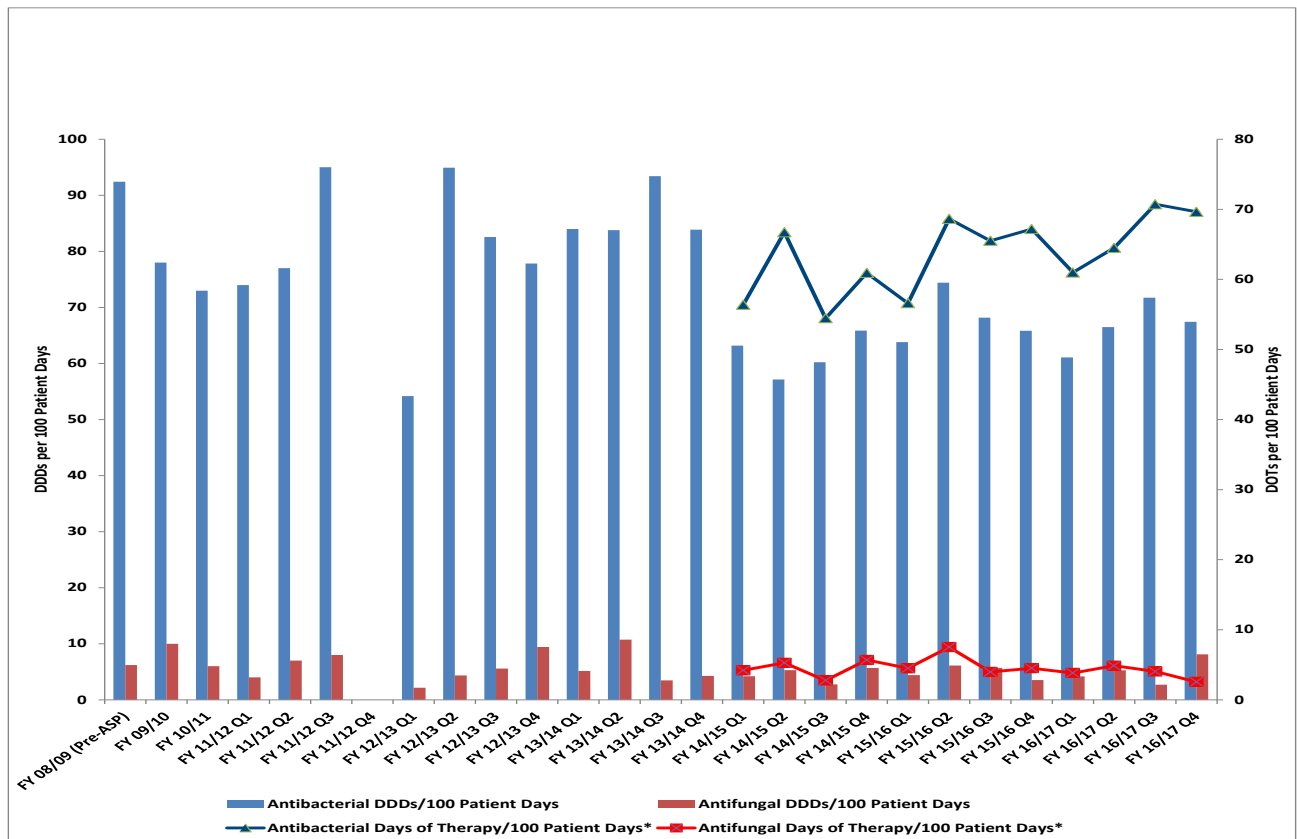


Due to an error in the Centricity Pharmacy database, we are not able to provide accurate DDD data and utilization cost for the Toronto Western Hospital ICU for FY 11/12 Q4. This also affected the recovery in FY 12/13 Q1 so neither quarter is reflected in the above graph.

To view **Appendix 1: FY 16/17 Q4 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 2.8% compared to YTD last year.
- Antifungal Days of Therapy (DOT) per 100 patient days decreased (↓) by 26.3% 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 11: 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	FY16/17 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	73	65	72	74	76	72	73
Systemic Antibacterial DDDs/100 Patient Days	92	78	73	77	78	86	62	68	61	66	72	67	67	68
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	5	6	5	5	4	5	3	8	5	5
Total Antimicrobial Costs	\$136,758	\$100,408	\$101,191	\$105,899	\$102,978	\$120,538	\$138,014	\$127,293	\$25,988	\$24,792	\$27,159	\$20,733	\$98,672	\$127,293
Total Antimicrobial Costs/Patient Day	\$18.16	\$13.24	\$13.17	\$13.60	\$13.37	\$13.49	\$11.97	\$11.10	\$8.85	\$8.36	\$9.00	\$6.92	\$8.28	\$11.10
Systemic Antibacterial Costs	\$123,314	\$87,445	\$79,280	\$89,784	\$70,099	\$85,916	\$89,382	\$74,877	\$14,840	\$18,598	\$17,093	\$19,337	\$69,868	\$74,877
Systemic Antibacterial Costs/Patient Day	\$16.37	\$11.53	\$10.32	\$11.53	\$9.10	\$9.61	\$7.75	\$6.53	\$5.05	\$6.27	\$5.66	\$6.45	\$5.86	\$6.53
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$16,115	\$32,879	\$34,623	\$48,631	\$52,416	\$11,148	\$6,194	\$10,066	\$1,396	\$28,805	\$52,416
Systemic Antifungal Costs/Patient Day	\$1.79	\$1.71	\$2.85	\$2.07	\$4.27	\$3.87	\$4.22	\$4.57	\$3.80	\$2.09	\$3.34	\$0.47	\$2.42	\$4.57
Antibacterial Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	n/a	60	65	61	64	71	70	67	65
Antifungal Days of Therapy/100 Patient Days*	n/a	n/a	n/a	n/a	n/a	n/a	4	5	4	5	4	3	4	5
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)	1 (0.34)	3 (1.01)	2 (0.66)	2 (0.67)	8 (0.67)	9 (0.78)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.71	7.98	7.68	8.7	8.0	10.88	7.4	8.2	11.4	9.5	8.0
ICU Mortality Rate (as a %)	19.6	19.9	18.1	17.0	16.4	17.1	19.0	17.9	19.2	15.3	16.0	23.7	18.5	17.9
ICU Readmission Rate Within 48 Hrs (as a %)	3.9	4.7	4.9	3.21	3.00	3.85	3.40	2.54	1.23	1.09	1.12	1.9	1.34	2.54
ICU Ventilator Days	4617	6305	5960	5578	4947	5523	5180	5414	1371	1010	1389	1167	4937	5414
ICU Apache II Score	15.0	14.7	13.7	13.8	12.9	12.8	13.2	13.0	13.6	12.9	13.8	15.7	14.0	13.0

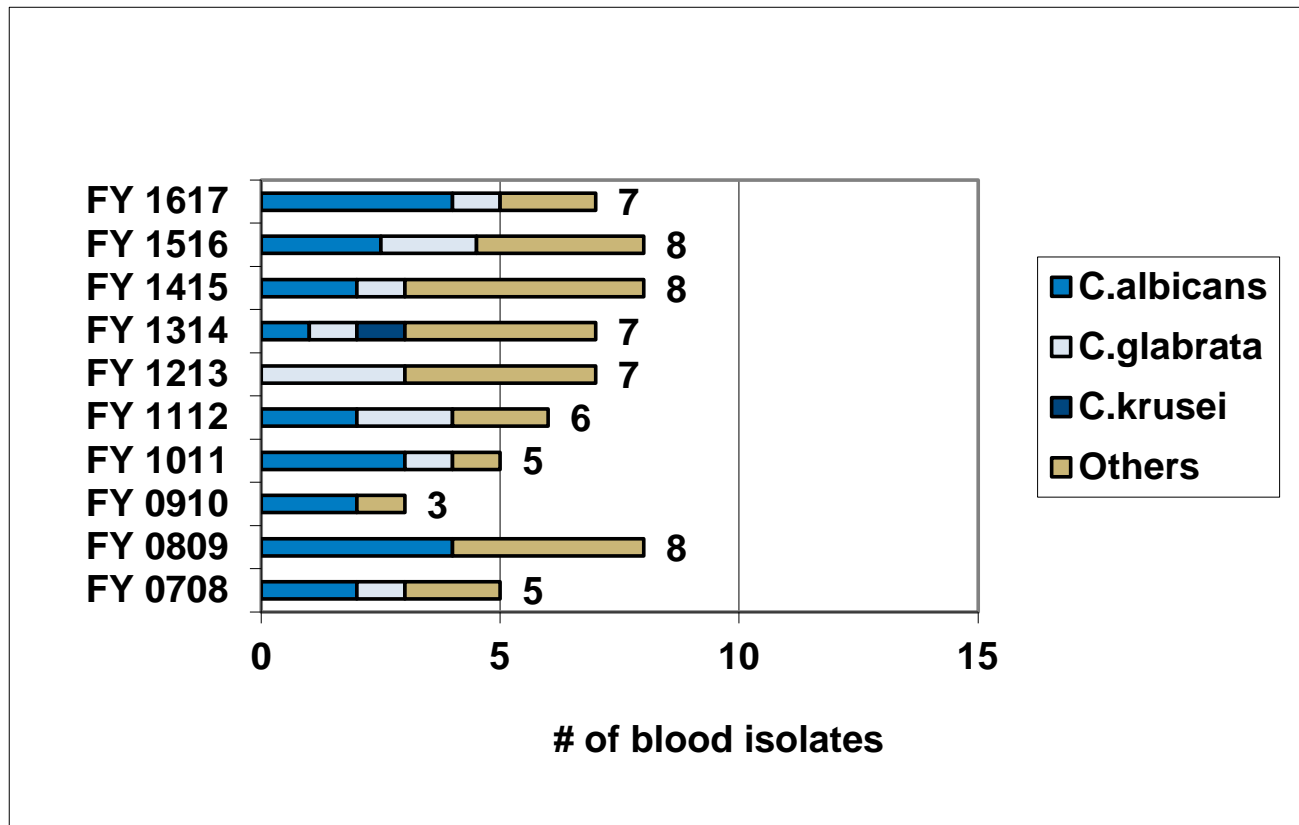
Notes: Q4 13/14 data consists of MSNICU patients (including eight ICU II patients).

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

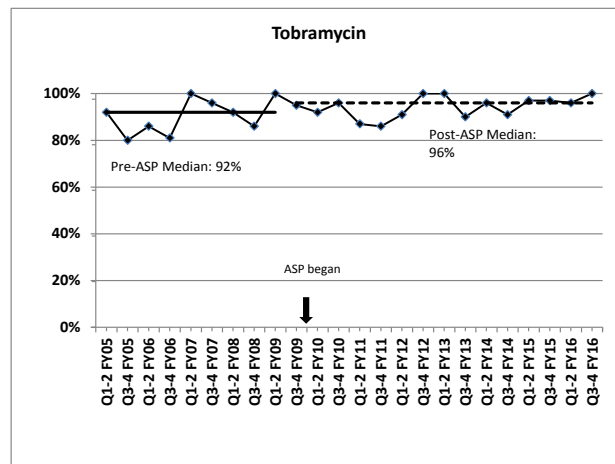
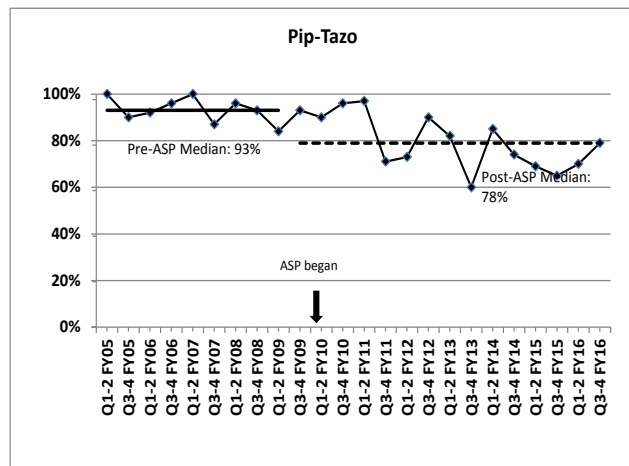
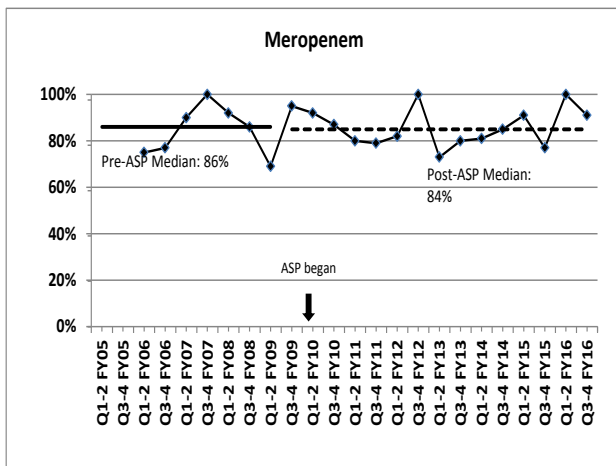
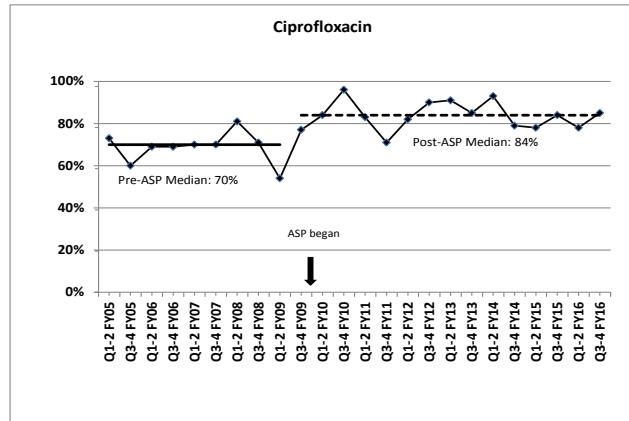
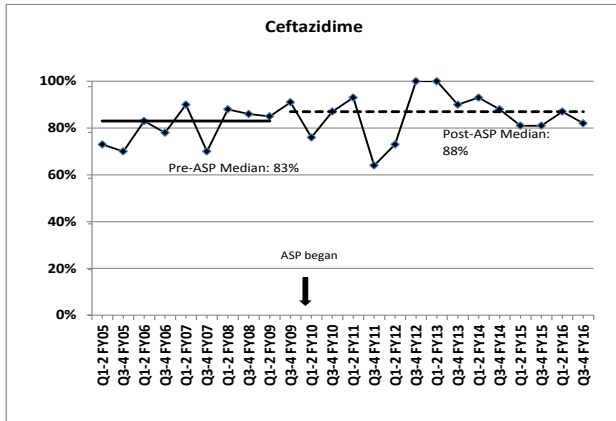
Data Sources: Antimicrobial DDD and Costs (Centricity) *An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

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

Table 12: Yeast Species Isolated in Blood – Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU



TWH MSICU Pseudomonas Susceptibility



EMERGENCY DEPARTMENT

Mount Sinai Hospital: Emergency Department

The FY 16/17 Q4 summary includes:

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.

SNAP SCORE CARD

For the Month of January

5-35 minutes	5 - 35 minutes	5-35minutes	5-35minutes	5-35 minutes	35-65minutes
36-40 minutes	36-40 minutes	36-40minutes	36-40minutes	36-40minutes	36-70minutes
> 40 minutes	>40minutes	>40minutes	>40minutes	>40minutes	>70minutes
Time to MD Assessment	Time to RN Assessment	Time to Blood Culture	Time to Lactate	Time to 1st Bolus	Time to Antibiotic
0:49	1:48	0:16	0:16	0:31	1:50
1:10	0:40	0:00	0:00	0:40	2:46
0:00	0:00	0:00	0:00	0:00	0:00
1:05	0:00	0:16	0:00	0:11	0:25
2:26	0:00	0:22	0:22	0:23	0:00
0:46	0:00	0:19	0:23	1:48	1:00
0:00	0:00	0:00	0:18	0:00	2:27
0:50	1:05	0:00	0:00	1:01	1:16
0:45	0:32	0:00	0:00	0:28	1:10
2:54	0:52	0:00	0:00	0:00	0:00
1:08	0:53	0:28	0:00	1:05	2:00
0:00	0:00	0:16	0:17	0:00	0:10

TOTAL NUMBER OF CASES	12
TOTAL NUMBER OF CASES CANCELLED	1
TOTAL PATIENTS DISCHARGED FROM ED	3
TOTAL PATIENTS TRANSFERRED TO FLOOR	9

Note: 0:00 time means that pertinent assessments or interventions were started before SNAP algorithm was assigned.

SNAP SCORE CARD

For the Month of February 2017

5-35 minutes	5 - 35 minutes	5-35minutes	5-35minutes	5-35 minutes	35-65minutes
36-40 minutes	36-40 minutes	36-40minutes	36-40minutes	36-40minutes	66-70minutes
> 40 minutes	>40minutes	>40minutes	>40minutes	>40minutes	>70minutes
Time to MD Assessment	Time to RN Assessment	Time to Blood Culture	Time to Lactate	Time to 1st Bolus	Time to Antibiotic
1:11	1:16	0:00	0:00	0:00	0:32
n/a	n/a	n/a	n/a	n/a	n/a
2:34	1:58	n/a	n/a	n/a	n/a
1:38	0:00	0:09	0:09	0:25	6:50
0:16	0:00	0:00	0:00	1:08	1:01
0:00	0:00	0:00	0:00	0:32	2:35

TOTAL NUMBER OF CASES	6
TOTAL NUMBER OF CASES CANCELLED	1
TOTAL PATIENTS DISCHARGED FROM ED	2
TOTAL PATIENTS TRANSFERRED TO FLOOR	4

Note: 0:00 time means that pertinent assessments or interventions were started before SNAP algorithm was assigned.

SNAP SCORE CARD

For the Month of March 2017

5-35 minutes	5- 35 minutes	5-35minutes	5-35minutes	5-35 minutes	35-65minutes
36-40 minutes	36-40 minutes	36-40minutes	36-40minutes	36-40minutes	66-70minutes
> 40 minutes	>40minutes	>40minutes	>40minutes	>40minutes	>70minutes

Time to MD Assessment	Time to RN Assessment	Time to Blood Culture	Time to Lactate	Time to 1st Bolus	Time to Antibiotic
0:00	0:00	n/a	0:36	0:00	n/a
1:47	1:32	0:00	0:00	0:00	1:13
0:45	0:25	0:01	0:00	0:00	1:05
0:00	0:00	0:00	0:00	0:00	n/a
2:35	2:12	0:00	0:00	0:25	0:42
0:00	0:00	0:31	4:18	2:18	1:45
1:53	0:23	0:31	0:00	1:10	0:25
0:00	0:13	0:00	0:00	0:00	1:09
0:00	0:00	0:14	0:11	0:20	1:21
0:00	0:00	1:34	0:20	0:48	n/a
0:00	0:00	0:07	0:02	0:15	n/a

TOTAL NUMBER OF CASES	11
TOTAL NUMBER OF CASES CANCELLED	0
TOTAL PATIENTS DISCHARGED FROM ED	4
TOTAL PATIENTS TRANSFERRED TO FLOOR	7

Note: 0:00 time means that pertinent assessments or interventions were started before SNAP algorithm was assigned.

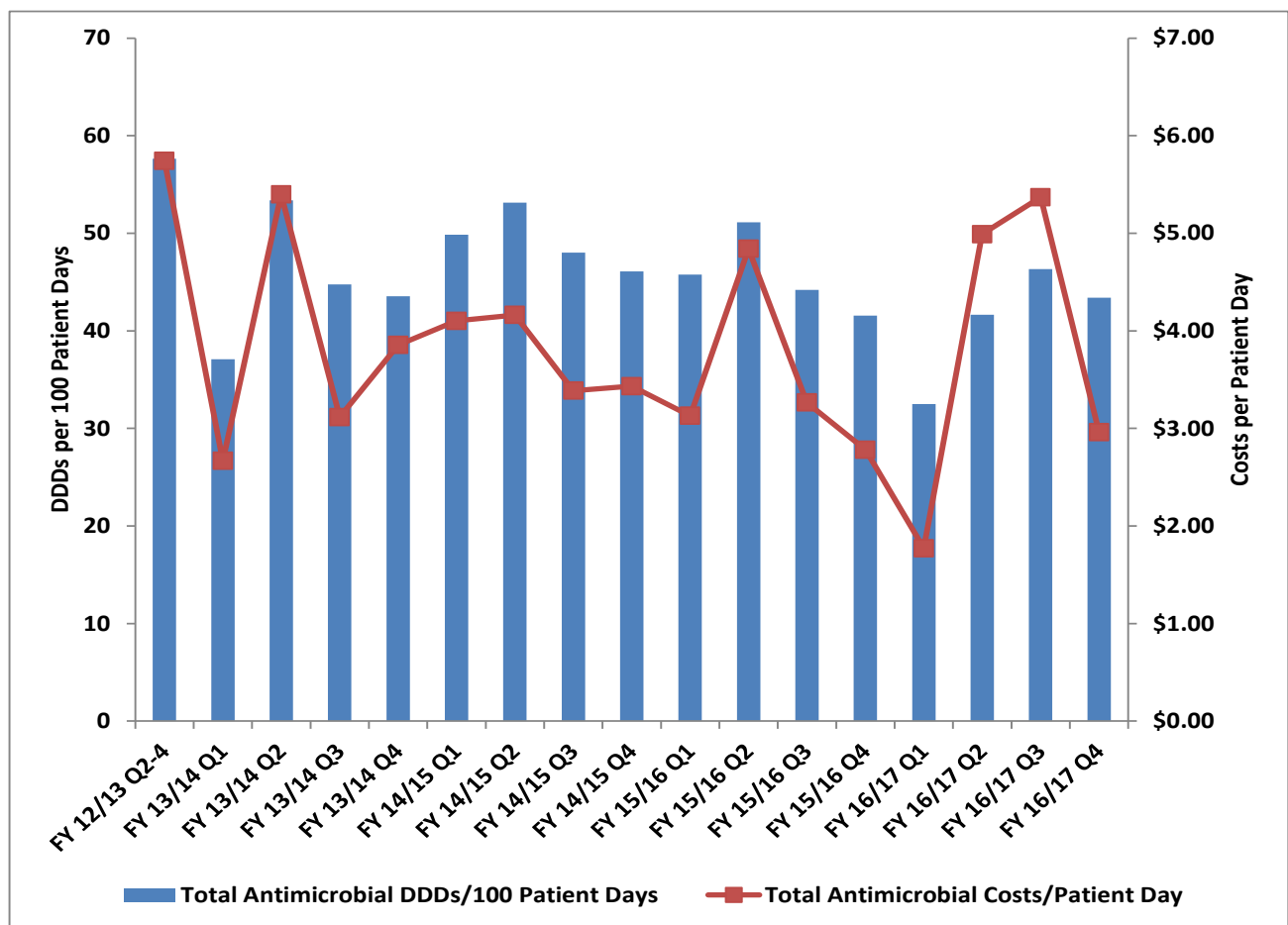
GENERAL INTERNAL MEDICINE

Mount Sinai Hospital: General Internal Medicine

The FY 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 10.5% compared to YTD last year.
 - Antimicrobial costs per patient day increased (↑) by 5.9% compared to YTD last year.
 - Antibacterial costs per patient day decreased (↓) by 19.7% compared to YTD last year.
 - Antifungal costs per patient day increased (↑) by 169.5% 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 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

Table 13: Mount Sinai Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY16/17 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs										
Total Antimicrobial DDDs/100 Patient Days	58	45	48	46	33	42	46	43	41	46
Systemic Antibacterial DDDs/100 Patient Days	53	41	43	41	29	36	42	40	37	41
Systemic Antifungal DDDs/100 Patient Days	3	3	3	3	3	5	3	2	3	3
Total Antimicrobial Costs	\$125,012	\$123,737	\$128,661	\$127,250	\$15,988	\$39,950	\$43,635	\$26,710	\$126,283	\$127,250
Total Antimicrobial Costs/Patient Day	\$5.74	\$3.76	\$3.63	\$3.49	\$1.77	\$4.99	\$5.37	\$2.96	\$3.69	\$3.49
Systemic Antibacterial Costs	\$105,621	\$99,731	\$104,822	\$104,257	\$13,286	\$19,255	\$22,149	\$23,727	\$78,418	\$104,257
Systemic Antibacterial Costs/Patient Day	\$4.85	\$3.03	\$2.96	\$2.86	\$1.47	\$2.41	\$2.73	\$2.63	\$2.29	\$2.86
Systemic Antifungal Costs	\$15,422	\$20,153	\$16,352	\$16,631	\$2,353	\$20,028	\$18,406	\$1,225	\$42,012	\$16,631
Systemic Antifungal Costs/Patient Day	\$0.71	\$0.61	\$0.46	\$0.46	\$0.26	\$2.50	\$2.26	\$0.14	\$1.23	\$0.46
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)	8 (1.26)	0 (0)	1 (0.16)	9 (0.35)	7 (0.28)

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).

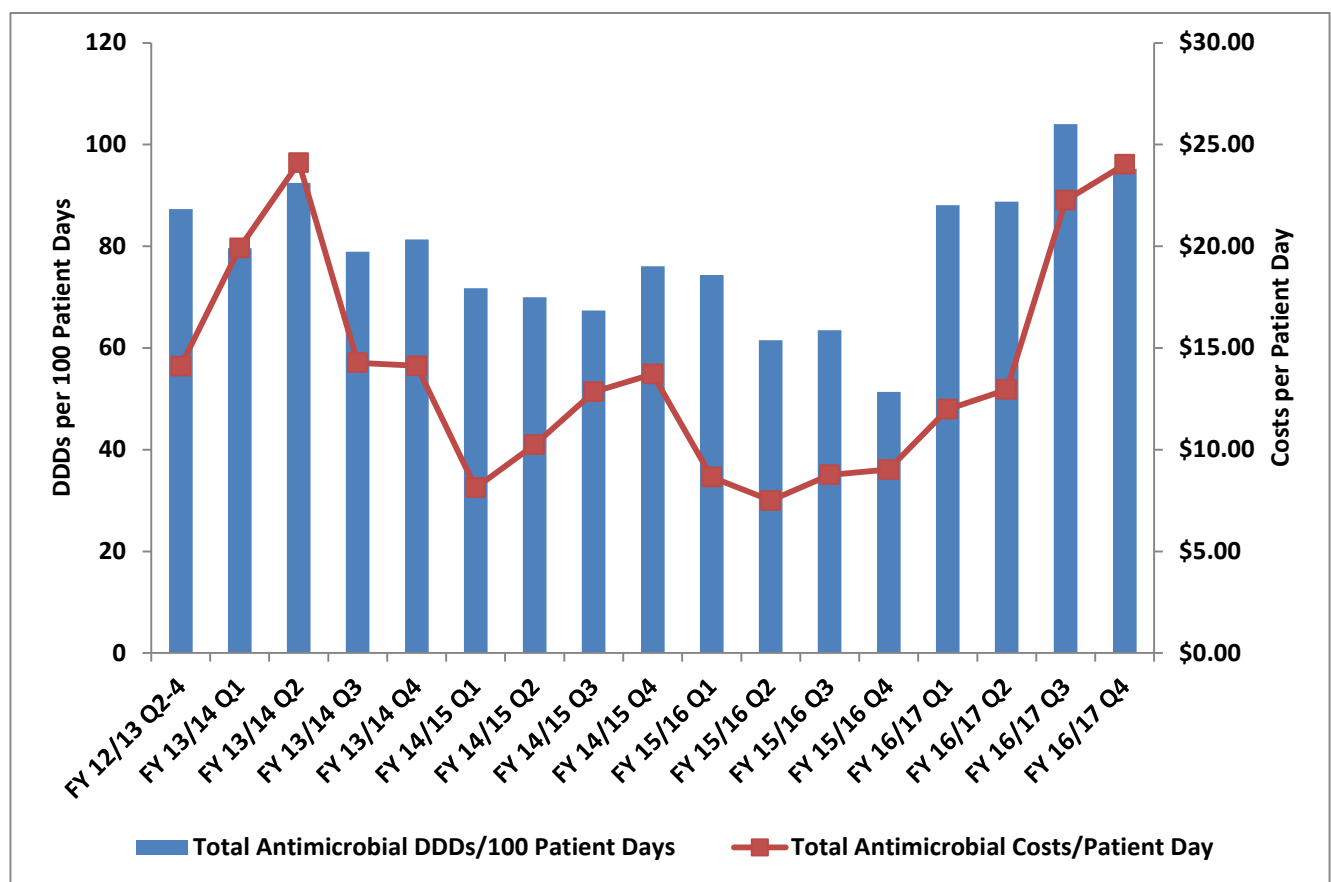
Historical antimicrobial usage and cost data updated due to the discovery that selected added drug dosages (Fluconazole 400mg/200ml bag, Pip-Tazo 13.5gm vial, Daptomycin 500mg vial) were not included in the report. Data have been revised to include Fluconazole starting August 2013, Pip-Tazo January 2015,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

Toronto General Hospital: General Internal Medicine

The FY 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 49.8% compared to YTD last year.
 - Antimicrobial costs per patient day increased (↑) by 109.5% compared to YTD last year for TGH.
 - Antibacterial costs per patient day increased (↑) by 64.3% compared to YTD last year.
 - Antifungal costs per patient day increased (↑) by 191.4% 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 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

Table 14: Toronto General Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY16/17 Performance					YTD of Previous Year
	Q1	Q2	Q3	Q4	YTD					
Antimicrobial Usage and Costs										
Total Antimicrobial DDDs/100 Patient Days	87	83	83	63	88	89	104	95	94	63
Systemic Antibacterial DDDs/100 Patient Days	77	70	73	55	71	75	83	81	78	55
Systemic Antifungal DDDs/100 Patient Days	11	13	10	8	17	14	21	15	16	8
Total Antimicrobial Costs	\$279,644	\$471,342	\$352,036	\$313,464	\$83,645	\$91,225	\$153,219	\$166,698	\$494,787	\$313,464
Total Antimicrobial Costs/Patient Day	\$14.10	\$18.05	\$13.30	\$8.48	\$11.99	\$12.96	\$22.26	\$24.02	\$17.77	\$8.48
Systemic Antibacterial Costs	\$171,817	\$225,491	\$221,389	\$202,012	\$48,975	\$58,426	\$71,801	\$70,898	\$250,100	\$202,012
Systemic Antibacterial Costs/Patient Day	\$8.67	\$8.64	\$8.36	\$5.47	\$7.02	\$8.30	\$10.43	\$10.22	\$8.98	\$5.47
Systemic Antifungal Costs	\$107,827	\$245,851	\$130,647	\$111,452	\$34,671	\$32,799	\$81,418	\$95,800	\$244,687	\$111,452
Systemic Antifungal Costs/Patient Day	\$5.44	\$9.42	\$4.93	\$3.02	\$4.97	\$4.66	\$11.83	\$13.81	\$8.79	\$3.02
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)	1 (0.14)	1 (0.14)	2 (0.29)	1 (0.14)	5 (0.19)	14 (0.6)

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.

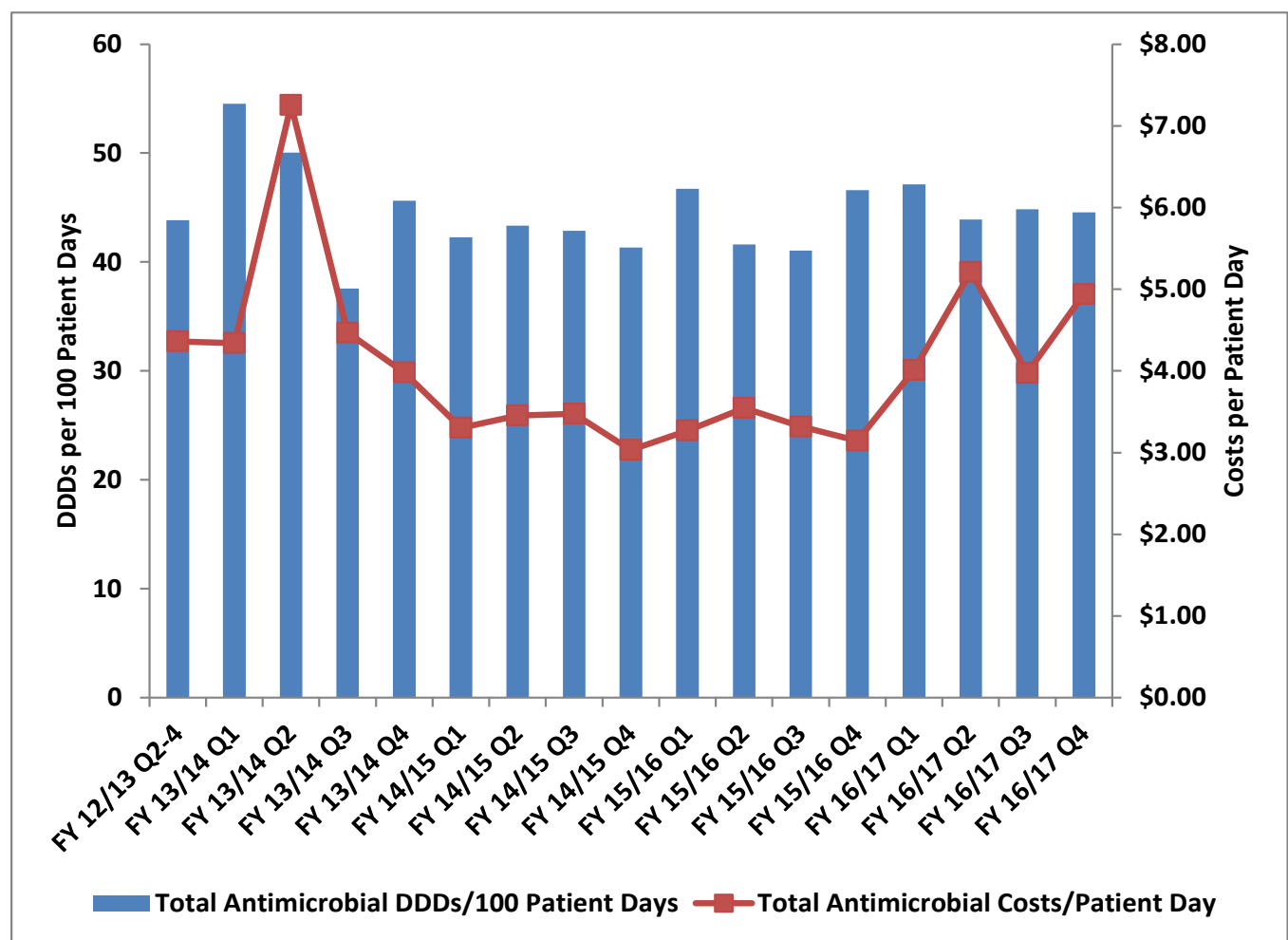
Toronto Western Hospital: General Internal Medicine

The FY 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 2.5% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 36.3% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 13.4% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 877.9% 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 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

Table 15: Toronto Western Hospital: General Internal Medicine

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY 14/15	FY 15/16	FY16/17 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs										
Total Antimicrobial DDDs/100 Patient Days	44	47	42	44	47	44	45	45	45	44
Systemic Antibacterial DDDs/100 Patient Days	41	44	40	42	44	41	41	42	42	42
Systemic Antifungal DDDs/100 Patient Days	3	3	3	2	3	3	4	3	3	2
Total Antimicrobial Costs	\$74,737	\$115,919	\$110,889	\$108,612	\$32,853	\$41,568	\$33,084	\$38,709	\$146,214	\$108,612
Total Antimicrobial Costs/Patient Day	\$4.36	\$5.01	\$3.32	\$3.32	\$4.01	\$5.21	\$3.98	\$4.94	\$4.52	\$3.32
Systemic Antibacterial Costs	\$60,999	\$93,779	\$103,080	\$105,744	\$26,872	\$25,503	\$31,373	\$34,757	\$118,506	\$105,744
Systemic Antibacterial Costs/Patient Day	\$3.56	\$4.05	\$3.09	\$3.23	\$3.28	\$3.20	\$3.77	\$4.44	\$3.67	\$3.23
Systemic Antifungal Costs	\$13,738	\$22,140	\$7,810	\$2,868	\$5,981	\$16,064	\$1,711	\$3,952	\$27,708	\$2,868
Systemic Antifungal Costs/Patient Day	\$0.80	\$0.96	\$0.23	\$0.09	\$0.73	\$2.01	\$0.21	\$0.50	\$0.86	\$0.09
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)	1 (0.12)	5 (0.63)	2 (0.24)	2 (0.26)	10 (0.31)	7 (0.21)

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 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 3.4% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 5.7% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 11.3% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 3.5% compared to YTD last year.
- Due to an increase in allo-BMT patients being placed on the leukemia units, starting on September 12, 2016, Dr. Uday Deotare (and the allo-BMT team) are at ASP rounds every Monday.

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

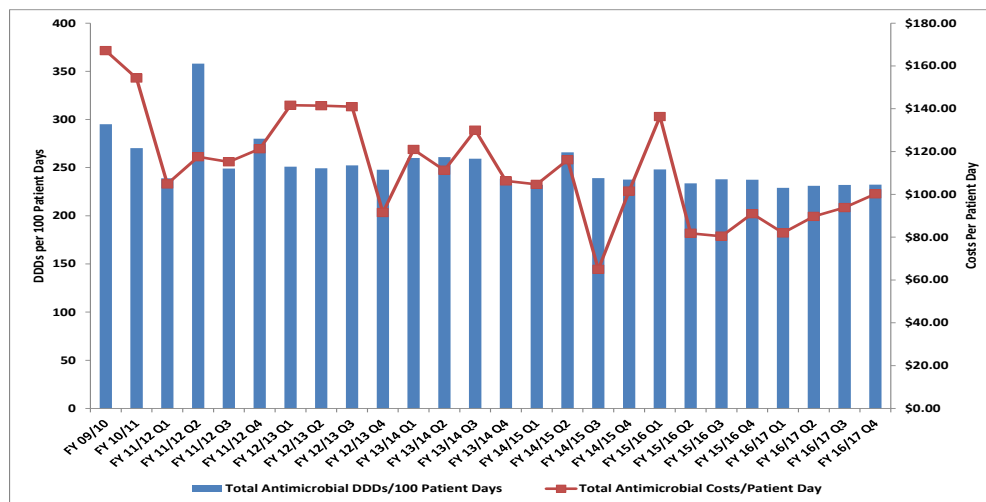


Table 16: Princess Margaret Cancer Centre: Leukemia Service

Indicators	FY16/17 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	Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs													
Total Antimicrobial DDDs/100 Patient Days	295	270	239	250	255	244	239	229	231	232	232	231	239
Systemic Antibacterial DDDs/100 Patient Days	191	163	134	146	138	136	138	134	133	132	131	132	138
Systemic Antifungal DDDs/100 Patient Days	104	107	105	104	117	108	101	95	98	100	102	99	101
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$1,310,857	\$1,695,539	\$1,534,499	\$1,412,805	\$1,479,103	\$322,206	\$358,666	\$388,880	\$399,770	\$1,469,522	\$1,479,103
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$115.13	\$128.91	\$117.10	\$96.46	\$96.98	\$81.99	\$89.71	\$93.82	\$100.24	\$91.50	\$96.98
Systemic Antibacterial Costs	\$659,034	\$609,747	\$663,175	\$422,438	\$485,263	\$471,597	\$403,399	\$88,244	\$86,349	\$103,803	\$98,337	\$376,733	\$403,399
Systemic Antibacterial Costs/Patient Day	\$62.28	\$57.33	\$58.24	\$45.85	\$37.03	\$32.20	\$26.45	\$22.45	\$21.60	\$25.04	\$24.66	\$23.46	\$26.45
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$647,637	\$1,092,448	\$1,049,236	\$941,208	\$1,075,705	\$233,962	\$272,317	\$285,078	\$301,433	\$1,092,789	\$1,075,705
Systemic Antifungal Costs/Patient Day	\$104.84	\$96.99	\$56.88	\$83.06	\$80.07	\$64.26	\$70.53	\$59.53	\$68.11	\$68.78	\$75.59	\$68.04	\$70.53
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)	3 (0.76)	4 (1.00)	3 (0.72)	3 (0.75)	13 (0.81)	14 (0.92)

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

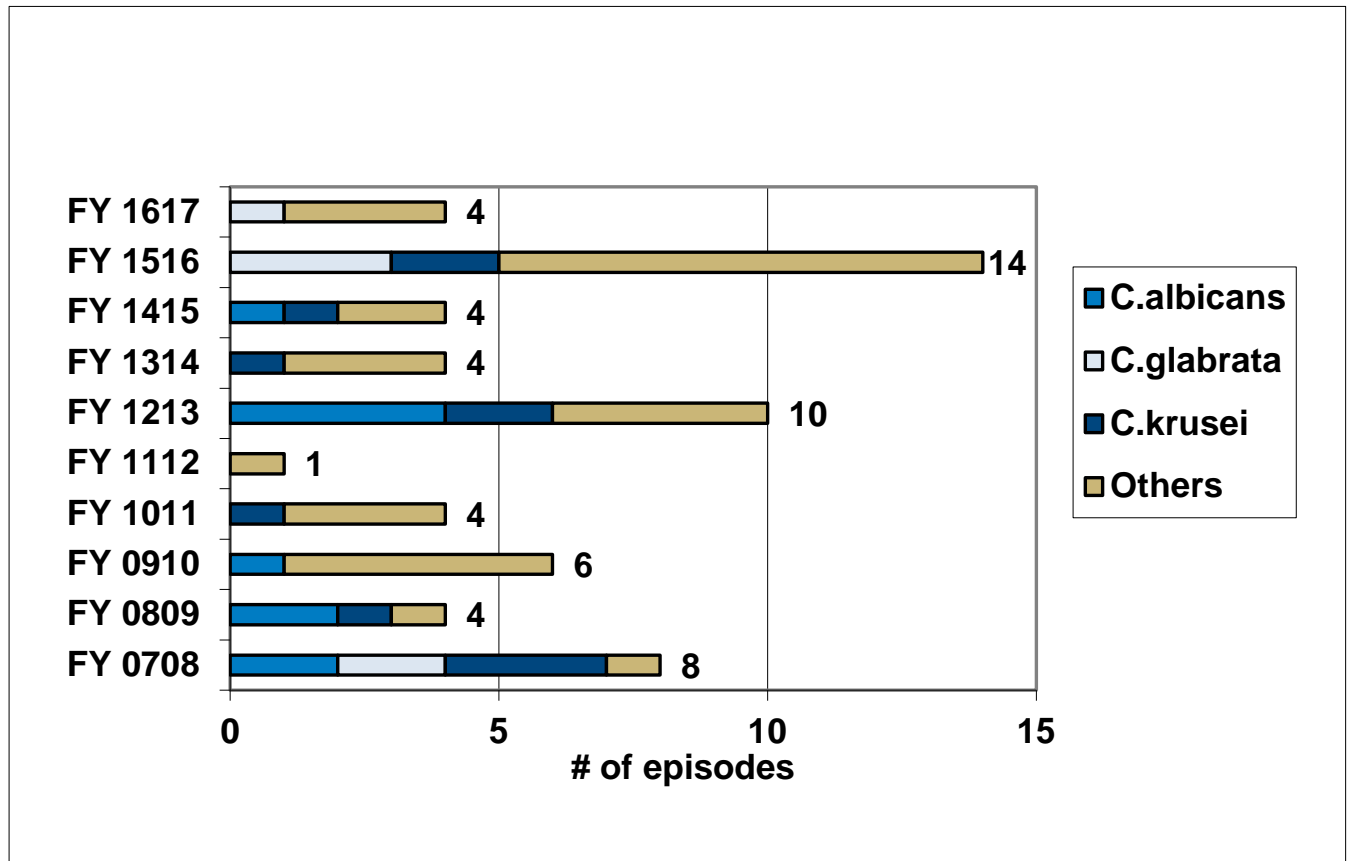
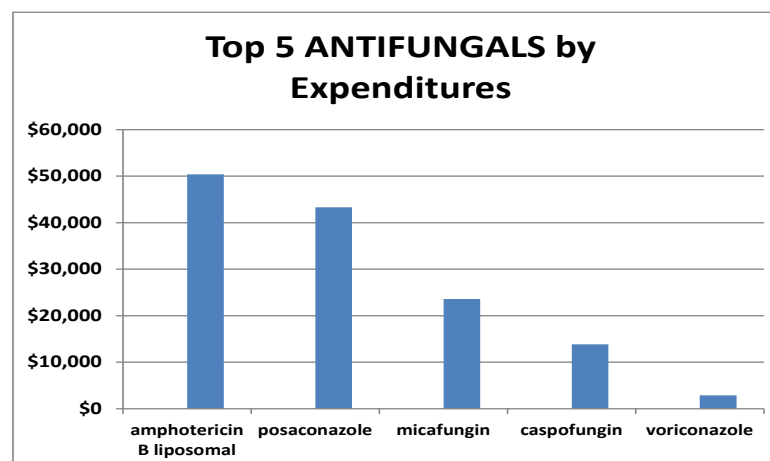
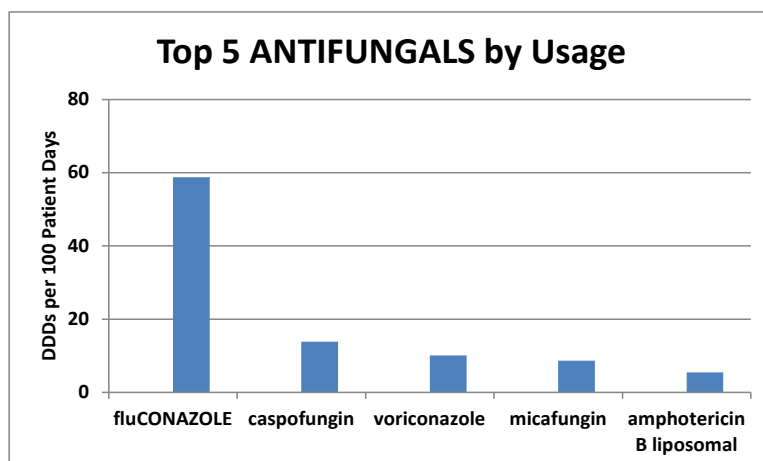
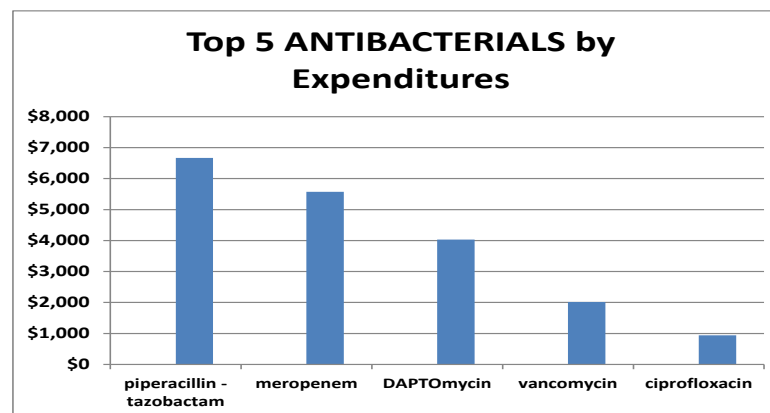
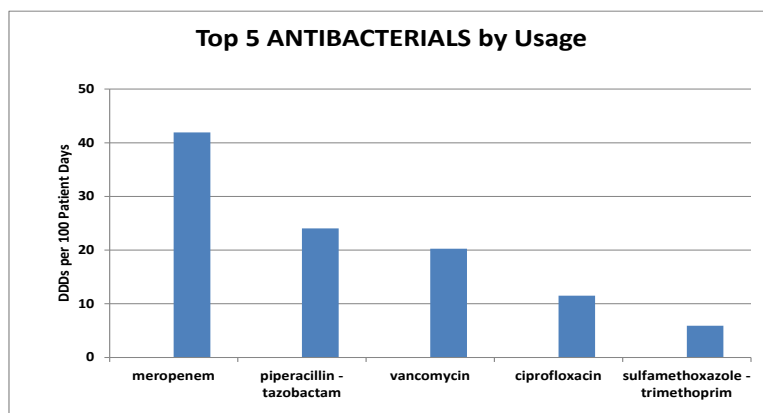


Table 18: Princess Margaret Cancer Centre: Leukemia FY 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures



Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

The FY 16/17 Q4 summary includes:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 1.8% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 24.1% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 7.1% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 27.3% compared to YTD last year.

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

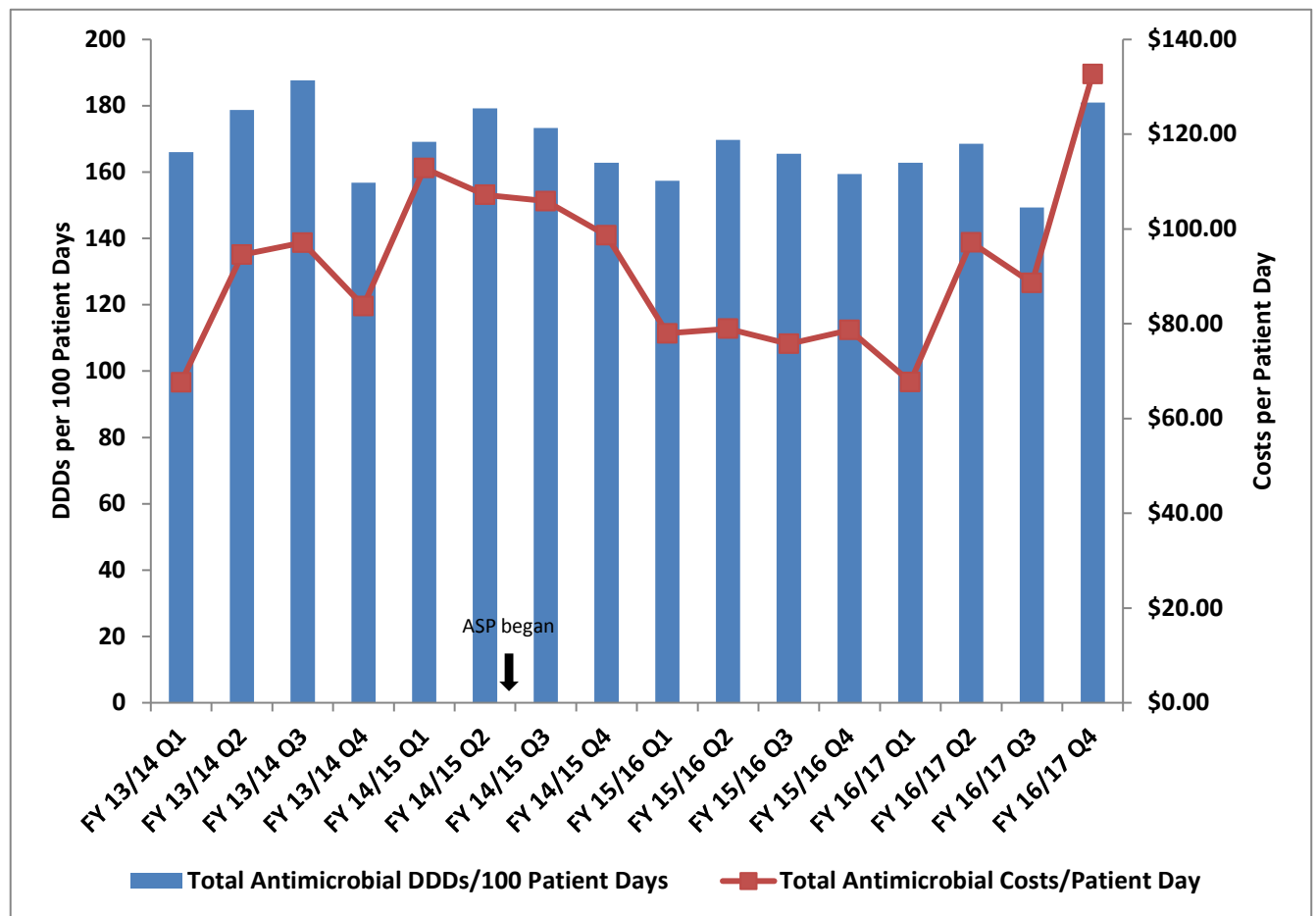


Table 19: Yeast Species Isolated in Blood – Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

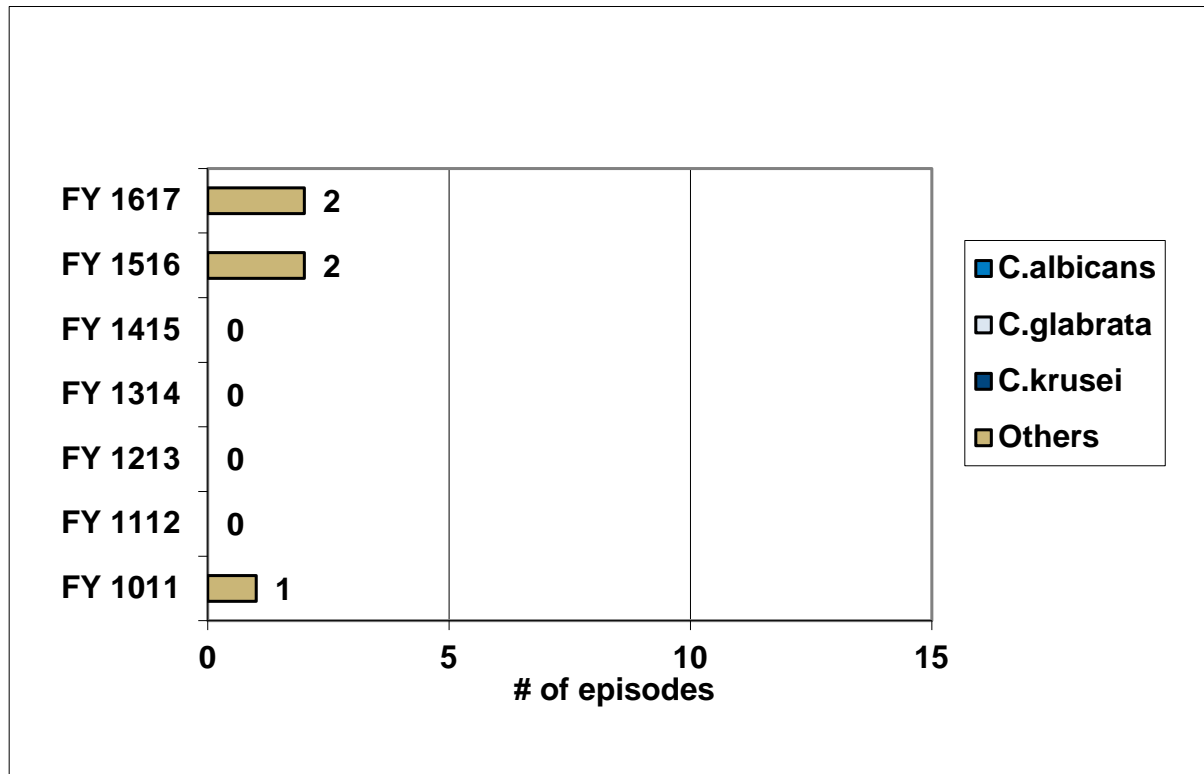


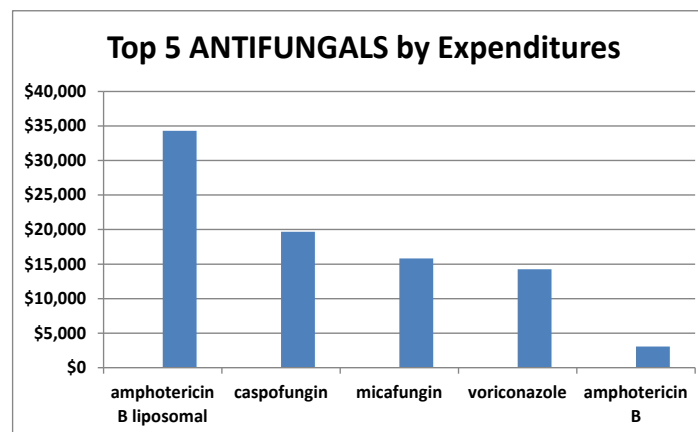
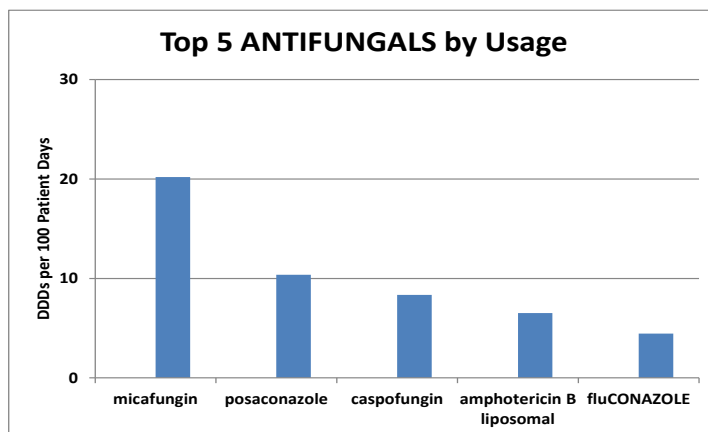
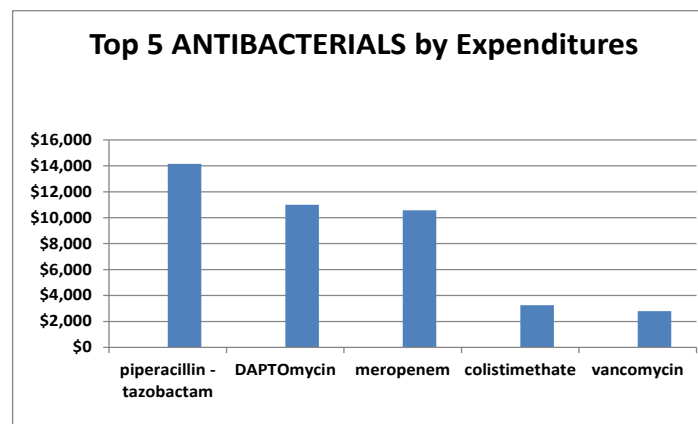
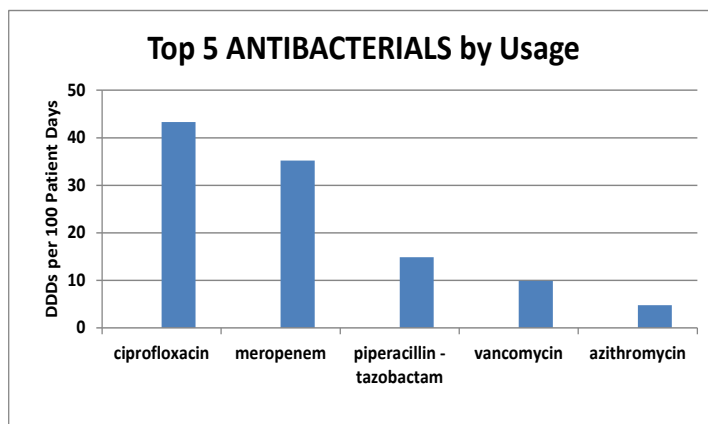
Table 20: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

Indicators	FY 13/14	FY 14/15	FY 15/16	FY16/17 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs									
Total Antimicrobial DDDs/100 Patient Days	172	171	163	163	169	149	181	166	163
Systemic Antibacterial DDDs/100 Patient Days	114	104	107	121	115	106	126	117	107
Systemic Antifungal DDDs/100 Patient Days	59	67	56	42	54	43	55	49	56
Total Antimicrobial Costs	\$416,614	\$512,300	\$381,633	\$82,396	\$117,181	\$100,461	\$155,111	\$455,148	\$381,633
Total Antimicrobial Costs/Patient Day	\$85.65	\$106.13	\$77.62	\$67.70	\$97.16	\$88.59	\$132.69	\$96.31	\$77.62
Systemic Antibacterial Costs	\$75,219	\$78,038	\$60,088	\$15,066	\$12,535	\$13,323	\$20,943	\$61,867	\$60,088
Systemic Antibacterial Costs/Patient Day	\$15.46	\$16.17	\$12.22	\$12.38	\$10.39	\$11.75	\$17.92	\$13.09	\$12.22
Systemic Antifungal Costs	\$341,395	\$434,261	\$321,545	\$67,330	\$104,646	\$87,138	\$134,168	\$393,281	\$321,545
Systemic Antifungal Costs/Patient Day	\$70.19	\$89.97	\$65.39	\$55.32	\$86.77	\$76.84	\$114.77	\$83.22	\$65.39
Patient Care Outcomes									
Hospital-Acquired C. difficile Cases (rate per 1,000 patient days)	4 (0.82)	12 (2.49)	7 (1.42)	2 (1.64)	2 (1.66)	4 (3.53)	2 (1.71)	10 (2.12)	7 (1.42)

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 21: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures



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

The FY 16/17 Q4 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 increased (↑) by 0.3% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) 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: Multi-Organ Transplant Program (MOTP) Antimicrobial Consumption and Costs Per Patient Day

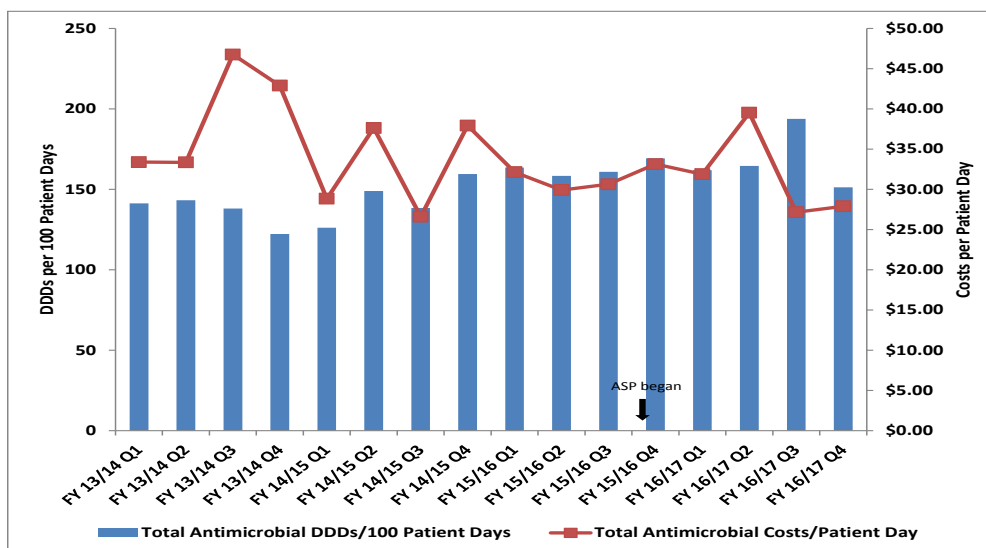


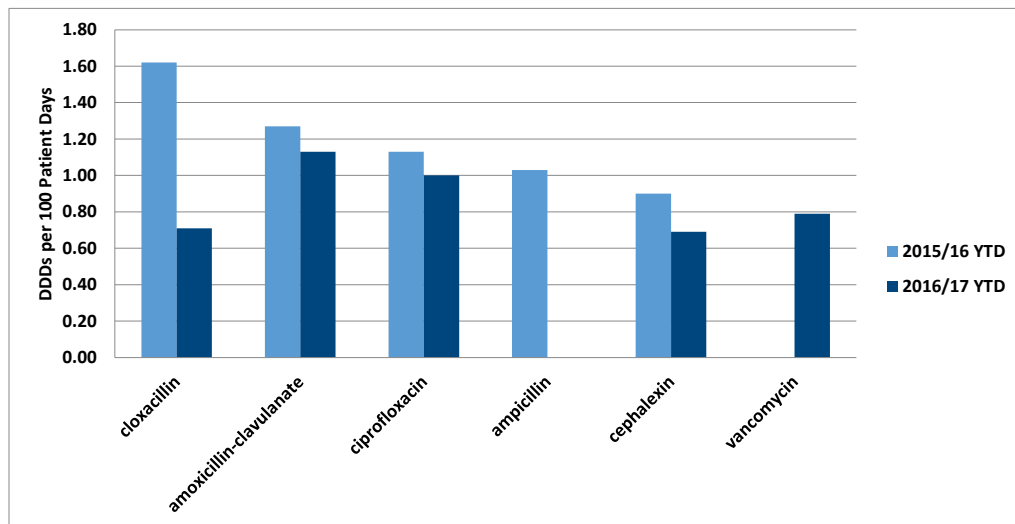
Table 22: Toronto General Hospital: Multi-Organ Transplant Program (MOTP)

Indicators	FY 13/14	FY 14/15	FY 15/16	FY16/17 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs									
Total Antimicrobial DDDs/100 Patient Days	136	143	163	162	165	147	151	156	163
Systemic Antibacterial DDDs/100 Patient Days	93	98	112	109	116	100	109	108	112
Systemic Antifungal DDDs/100 Patient Days	43	45	51	53	49	48	42	48	51
Total Antimicrobial Costs	\$837,263	\$725,411	\$709,892	\$221,447	\$282,753	\$201,881	\$197,947	\$904,028	\$709,892
Total Antimicrobial Costs/Patient Day	\$39.16	\$32.69	\$31.47	\$31.88	\$39.51	\$27.15	\$27.89	\$31.57	\$31.47
Systemic Antibacterial Costs	\$327,831	\$379,748	\$342,941	\$110,803	\$123,064	\$106,005	\$112,393	\$452,266	\$342,941
Systemic Antibacterial Costs/Patient Day	\$15.33	\$17.11	\$15.20	\$15.95	\$17.20	\$14.26	\$15.83	\$15.79	\$15.20
Systemic Antifungal Costs	\$509,433	\$345,664	\$366,951	\$110,644	\$159,689	\$95,875	\$85,554	\$451,762	\$366,951
Systemic Antifungal Costs/Patient Day	\$23.82	\$15.58	\$16.26	\$15.93	\$22.32	\$12.90	\$12.05	\$15.78	\$16.26
Patient Care Outcomes									
Hospital-Acquired C. Difficile Cases (rate per 1,000 patient days)	14 (0.65)	18 (0.81)	11 (0.49)	4 (0.58)	6 (0.84)	4 (0.54)	3 (0.42)	17 (0.59)	11 (0.49)

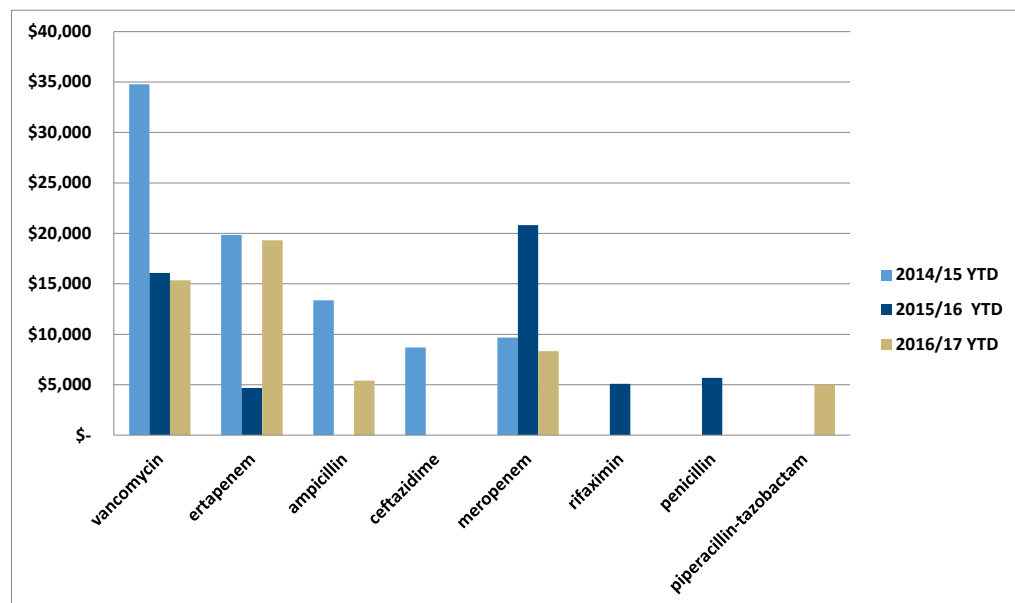
BRIDGEPOINT HEALTH

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)

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 MD, 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. *Leuk Lymphoma*. 2017 Jan. Vol 58 (4) 834-841

- Hughes JS, Huo X, Falk L, Hurford A, Lan K, Coburn B, Morris AM, Wu J. Benefits and unintended consequences of antimicrobial de-escalation: Implications for stewardship programs. [PLoS One](#). 2017 Feb 9;12(2):e0171218. doi: 10.1371/journal.pone.0171218. eCollection 2017.
- 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. *Eur J Clin Microbiol Infect Dis*. 2017; DOI 10.1007/s10096-017-2914-y
- 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 [in press].
- 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 [in press].

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

Grant 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

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) 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.

The ASP team has also been providing expert guidance to PSASS (Pharmacy 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

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.

The SHS-UHN ASP hosted a visit from the Federal Health Minister, The Honourable Jane Philpott, to demonstrate the various initiatives our program has implemented over the years and the inter-relationship of the various patient domains (Primary Care, Acute Care, Long-term Care) as they relate to AMR and AMS. 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.

HealthCareCAN CHA Learning

Our program has also partnered with CHA Learning, the professional development branch of HealthCareCAN, to develop materials for a course in change leadership in the healthcare setting.

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

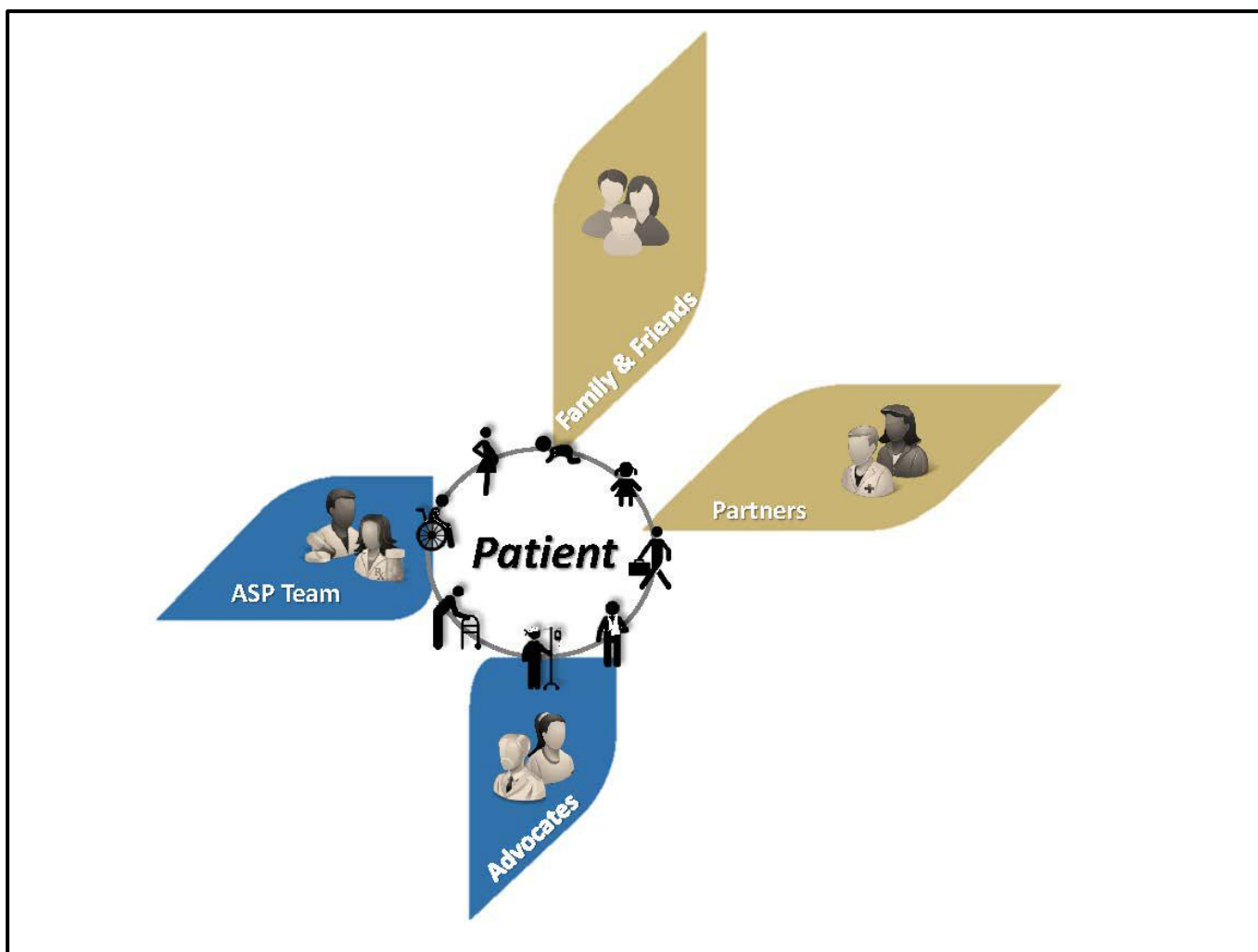
Dr. Andrew Morris is the chair of AMMI Canada's Antimicrobial Stewardship and Resistance Committee. Dr. Linda Dresser is a pharmacist member of this committee.

ASP Rotations at SHS and UHN

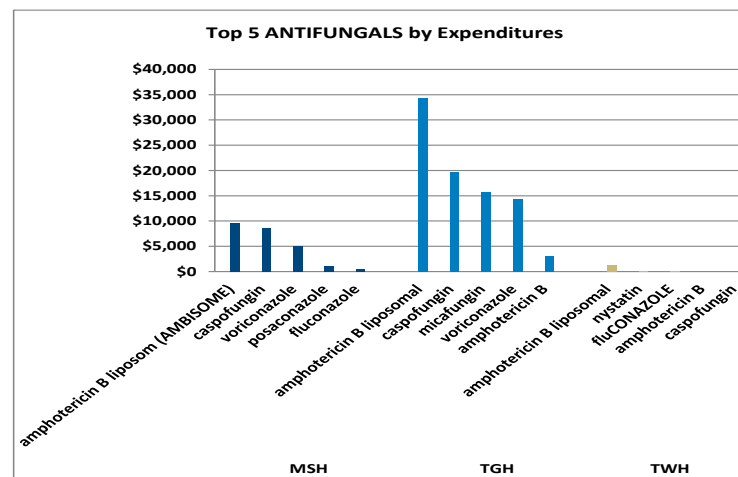
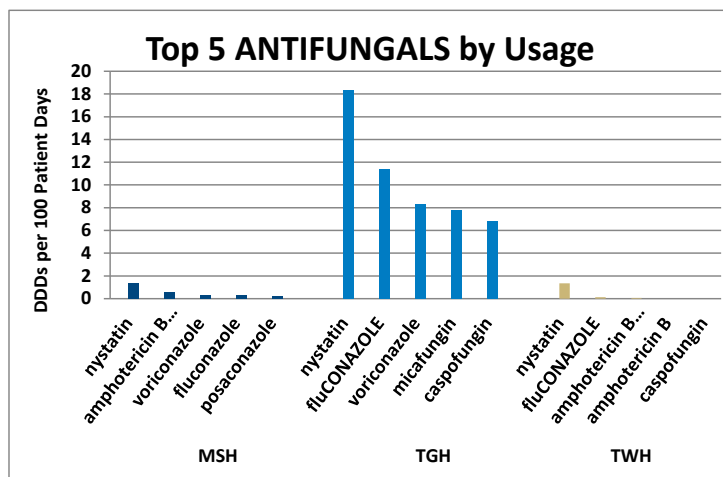
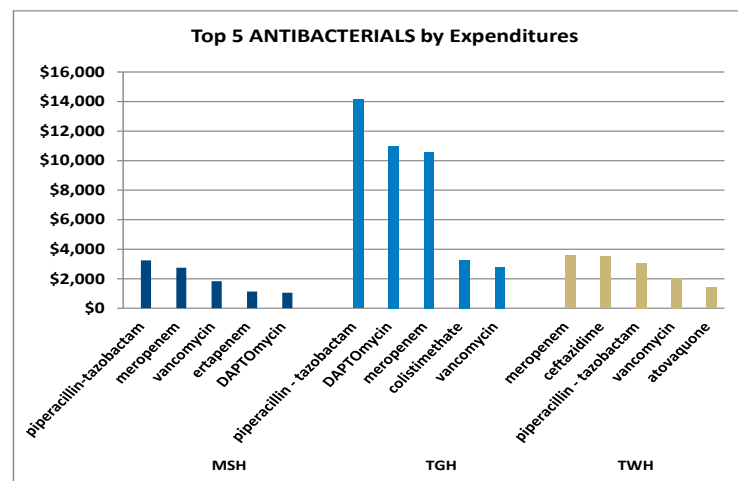
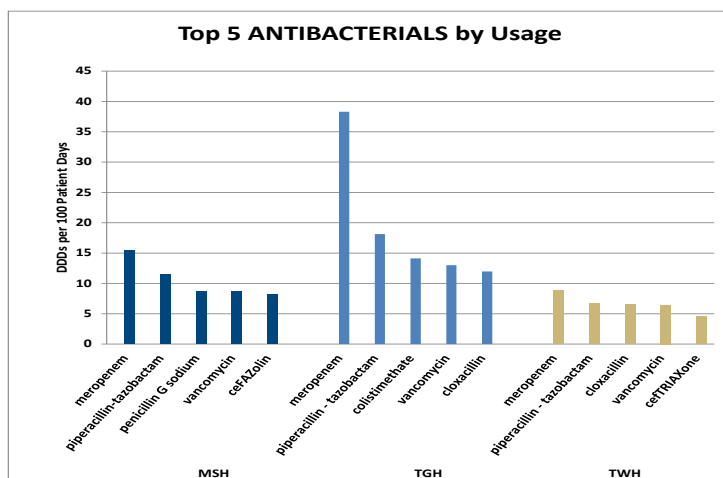
The SHS-UHN ASP continues to provide ASP rotations for residents and fellows from across the country and internationally.

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 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site



Appendix 2: General Internal Medicine FY 16/17 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures

