



# FISCAL YEAR 2014 | 2015 Q3 REPORT



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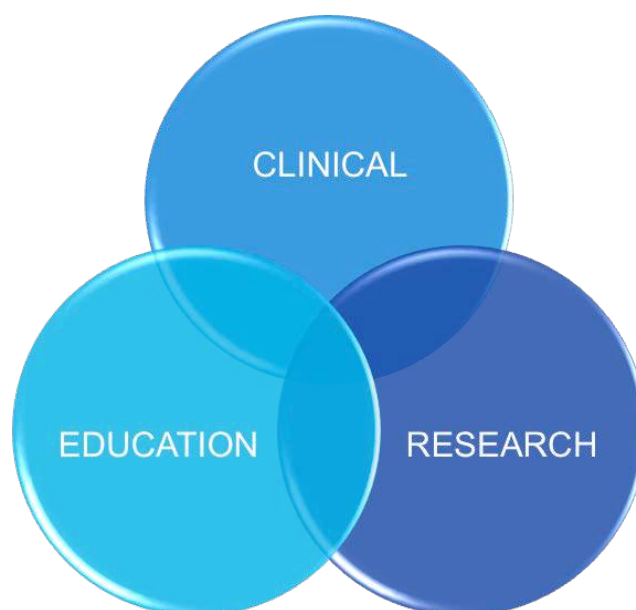
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*“Getting patients the right antibiotics, when they need them”*

## EXECUTIVE SUMMARY

The Mount Sinai Hospital-University Health Network Antimicrobial Stewardship Program (MSH-UHN ASP) has been active since 2009. The MSH-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 quality improvement methodology to pursue the best possible clinical outcomes for its patients, relying heavily on patient-centred data.



*The MSH-UHN ASP uses research and education, alongside clinical care, to take a leadership role in increasing antimicrobial stewardship capacity and improving the quality of health care.*

## ANTIMICROBIAL CONSUMPTION AND COSTS

The ASP continues to work with clinical teams across all five hospitals (Mount Sinai Hospital, Princess Margaret, Toronto General, Toronto Rehab, and Toronto Western). There is a general trend of decreased use and expenditures for antimicrobials per patient day in our ICUs and in General Internal Medicine, as well as in Immunocompromised Host. However, there are two adult intensive care units where an increase in consumption has been identified. One possible explanation is an antifungal prophylaxis regimen. A thorough review of the factors involved is being undertaken with the ASP team and ICU site leaders. There is also an increase in cost at Princess Margaret Cancer Centre – Allogeneic Bone Marrow Transplant, primarily due to an increase in antifungal costs.



**Table 1: Summary of Antimicrobial Usage and Cost by Hospital/Unit**

Hospital/Unit	Antimicrobial Usage	Antimicrobial Cost
<b>Mount Sinai Hospital: Medical Surgical ICU</b>	↔	↓
<b>Mount Sinai Hospital: Neonatal ICU</b>	↓	↓
<b>Toronto General Hospital: Cardiovascular ICU</b>	↑	↑
<b>Toronto General Hospital: Medical Surgical ICU</b>	↑	↓
<b>Toronto Western Hospital: Medical Surgical Neurosurgical ICU</b>	↓	↓
<b>Mount Sinai Hospital: General Internal Medicine</b>	↑	↑
<b>Toronto General Hospital: General Internal Medicine</b>	↓	↓
<b>Toronto Western Hospital: General Internal Medicine</b>	↓	↓
<b>Princess Margaret Cancer Centre: Leukemia Service</b>	↓	↓
<b>Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant</b>	↓	↑

## FISCAL YEAR 14/15 Q3 HIGHLIGHTS

**Research:** Six manuscripts have been submitted to peer-reviewed medical journals and are currently provisionally accepted for publication pending revisions.

**Grants:** Approximately \$1M CAD has been awarded to the ASP.

**Best Practices:** Several algorithms continue to be developed, including the First Episode Clostridium Difficile (CDI) Management Algorithm, which was implemented into practice across UHN and MSH on November 17, 2014. An e-learning module and electronic order sets at both UHN and MSH have been developed.

**Provincial and National Role:** The MSH-UHN ASP continues to be a leader in antimicrobial stewardship and is currently working with and providing expert guidance to over 30 hospitals. We continue to partner with Accreditation Canada in the development and delivery of an online ASP course and a series of interactive group webinars. The first cohort of this online course has registered and the course has commenced.

## FISCAL YEAR 14/15 Q3 RESULTS

### CRITICAL CARE

#### Mount Sinai Hospital: Medical Surgical ICU

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) remained largely unchanged (i.e. increased by 1.3%) compared to last year.
- Antimicrobial costs per patient day decreased (↓) by 23.1% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 11.9% compared to last year.
- Antifungal costs per patient day decreased (↓) by 26.2% compared to last year.
- NB: Princess Margaret patients accounted for 17% of patient visits and 40% of the antimicrobial costs.

**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	FY14/15 Performance					YTD of Previous Year
							Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs												
Total Antimicrobial DDDs/100 Patient Days	177	171	144	167	170	167	139	190	146		164	162
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	127	123	114	158	117		136	123
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	35	36	22	28	25		25	33
Total Antimicrobial Costs	\$332,724	\$285,975	\$193,129	\$279,859	\$291,470	\$422,634	\$73,753	\$74,842	\$48,682		\$197,277	\$192,116
Total Antimicrobial Costs/Patient Day	\$69.01	\$59.23	\$40.95	\$59.22	\$62.37	\$85.07	\$63.55	\$63.21	\$43.54		\$62.54	\$81.34
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$125,339	\$134,811	\$108,886	\$21,472	\$27,743	\$28,685		\$77,900	\$55,514
Systemic Antibacterial Costs/Patient Days	\$36.16	\$29.44	\$20.31	\$26.94	\$28.85	\$21.92	\$18.01	\$23.43	\$25.66		\$20.71	\$23.50
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$141,877	\$144,811	\$295,163	\$50,915	\$45,396	\$19,119		\$115,429	\$129,775
Systemic Antifungal Costs/Patient Days	\$29.68	\$27.45	\$18.87	\$30.50	\$30.99	\$59.41	\$42.71	\$38.34	\$17.10		\$40.53	\$54.94
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)	2 (1.67)	2 (1.68)	0 (0.00)		4 (1.14)	2 (0.55)
ICU Average Length of Stay (days)	5.84	5.57	5.67	5.51	5.24	6.10	5.42	5.11	5.25		5.26	6.10
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.5	17.04	15.3	14.8	14.6	12.3		13.9	13.9
ICU Readmission Rate within 48 hrs (as a %)	3.2	2.9	2.7	2.7	1.86	3.2	3.5	0.8	3.1		2.6	3.3
ICU Ventilator Days	NA	3286	2934	2677	2749	11646	630	678	607		1915	2275
ICU Multiple Organ Dysfunction Score (MODS)	4.00	4.04	4.12	4.25	4.62	4.87	4.97	4.98	4.28		4.74	4.71
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	n/a	5123	998	1437	1227		3662	3749
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	n/a	1200	182	264	263.00		709	844

**Notes:** Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whocc.no/atc\\_ddd\\_index/](http://www.whocc.no/atc_ddd_index/)).

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).

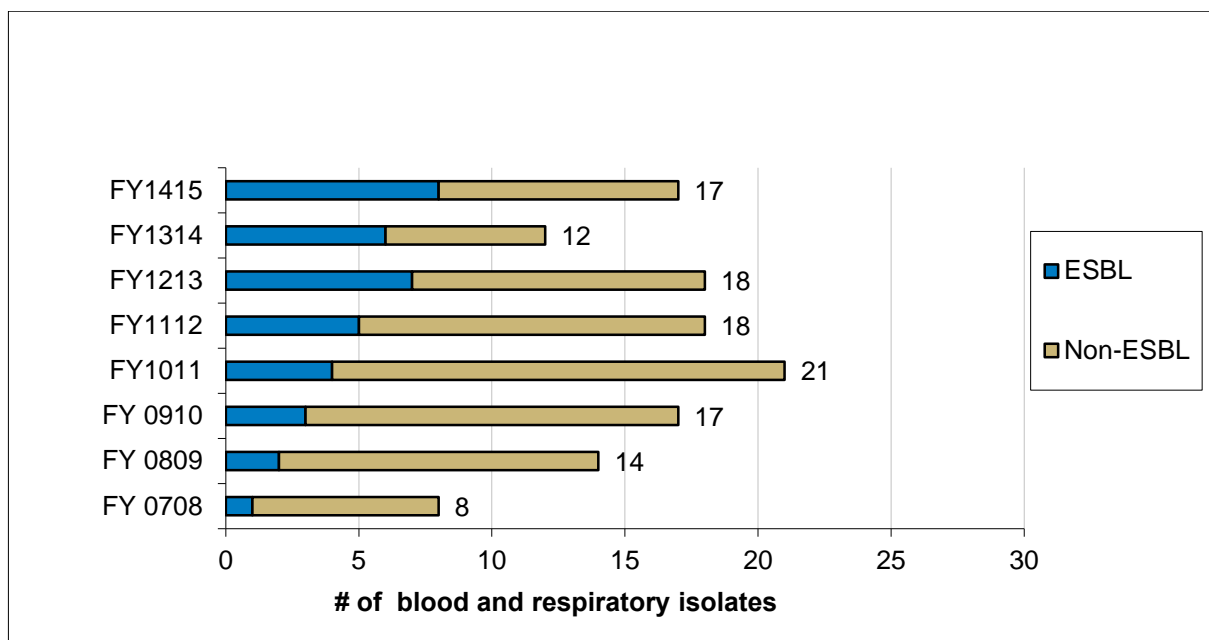
To view **Appendix 1: FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click [here](#).

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

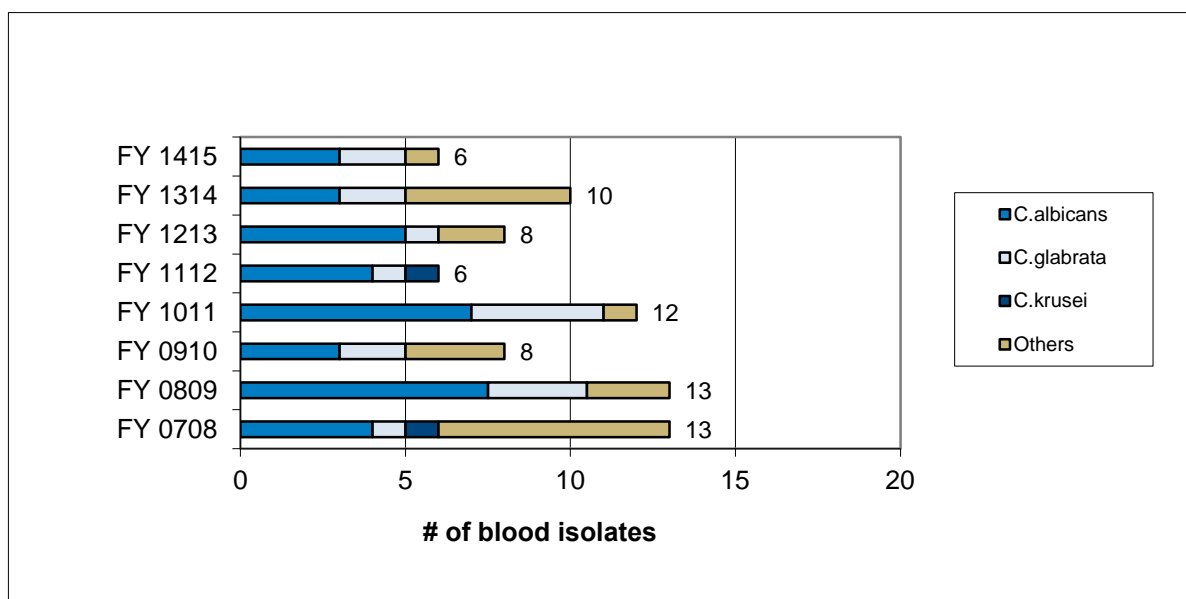
MSH ICU Total Antimicrobial Costs (Antimicrobial Costs per patient day)										
	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15 Q1	FY 14/15 Q2	FY 14/15 Q3	FY 14/15 Q4	FY 14/15 YTD	Previous YTD
Non-PMH Patients	\$78,737 (\$21.14)	\$87,931 (\$25.42)	\$109,283 (\$31.77)	\$149,877 (\$37.54)	\$43,634 (\$42.24)	\$43,620 (\$67)	\$31,320 (\$32.06)		\$118,574 (\$51.78)	\$98,705 (\$35.01)
PMH Patients	\$114,392 (\$179.02)	\$191,928 (\$181.58)	\$182,188 (\$249.91)	\$272,757 (\$317.16)	\$29,861 (\$271.46)	\$31,222 (\$156.89)	\$17,361 (\$68.62)		\$78,444 (\$197.68)	\$212,690 (\$305.59)
Total	\$193,129 (\$44.26)	\$279,859 (\$61.97)	\$291,470 (\$69.91)	\$422,634 (\$87.11)	\$73,753 (\$64.19)	\$74,842 (\$88.05)	\$48,682 (\$39.58)		\$197,277 (\$74.33)	\$311,395 (\$88.59)

Note: 14/15 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.

**Table 4: E. coli Isolates From Blood and Respiratory System: Non-ESBL vs. ESBL  
– Mount Sinai Hospital: Medical Surgical ICU**



**Table 5: Yeast Species Isolated in Blood – Mount Sinai Hospital: Medical Surgical ICU**





## Mount Sinai Hospital: Neonatal ICU

NICU ASP rounds have been temporarily on hold due to ongoing challenges with human resources. We hope to reassess in Q1 of FY15-16. However, we have continued to collect data. Specifically, days of therapy (DOT) is our metric for antimicrobial consumption, which is considered to be the standard for neonates. FY 14/15 Q3 highlights include:

- Antimicrobial days of therapy (DOT) per 100 patient days decreased (↓) by 37.3% compared to YTD last year.
- Antimicrobial costs per patient day have decreased (↓) by 42.8% compared to YTD last year (\$2.29 to \$1.31).

**Table 6: Mount Sinai Hospital: Neonatal ICU**

Indicators	FY 11/12	FY 12/13	FY 13/14	FY14/15 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs									
Total Antimicrobial DOTs/100 Patient Days	67.3	55.4	49.4	31.0	36.2	33.6		33.7	53.8
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.5	48.7	30.8	36.0	32.5		33.2	52.9
Systemic Antifungal DOTs/100 Patient Days	2.2	1.8	0.7	0.3	0.2	1.1		0.5	0.9
Total Antimicrobial Costs	\$16,415	\$17,682	\$26,162	\$4,945	\$6,038	\$5,635		\$16,617	\$19,304
Total Antimicrobial Costs/Patient Day	\$1.31	\$1.51	\$2.17	\$1.26	\$1.42	\$1.25		\$1.31	\$2.29
Systemic Antibacterial Costs	\$14,783	\$16,505	\$25,290	\$4,939	\$5,597	\$5,277		\$15,813	\$18,532
Systemic Antibacterial Costs/Patient Days	\$1.18	\$1.41	\$2.10	\$1.26	\$1.31	\$1.17		\$1.25	\$2.20
Systemic Antifungal Costs	\$1,632	\$1,177	\$872	\$5	\$441	\$358		\$805	\$772
Systemic Antifungal Costs/Patient Days	\$0.13	\$0.10	\$0.07	\$0.001	\$0.10	\$0.08		\$0.06	\$0.09

**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.

Patient Care Outcome data is underway.

## Toronto General Hospital: Cardiovascular ICU

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 7.6% compared to last year.
- Antimicrobial costs per patient day increased (↑) by 30.2% compared to last year.
- Antibacterial costs per patient day increased (↑) by 9.6% compared to last year.
- Antifungal costs per patient day increased (↑) by 111.6% compared to last year. (Note: There continued to be a different antifungal prophylaxis regimen for heart transplant recipients in place until the end of October 2014 that contributed to this difference.)

**Table 7: Toronto General Hospital: Cardiovascular ICU**

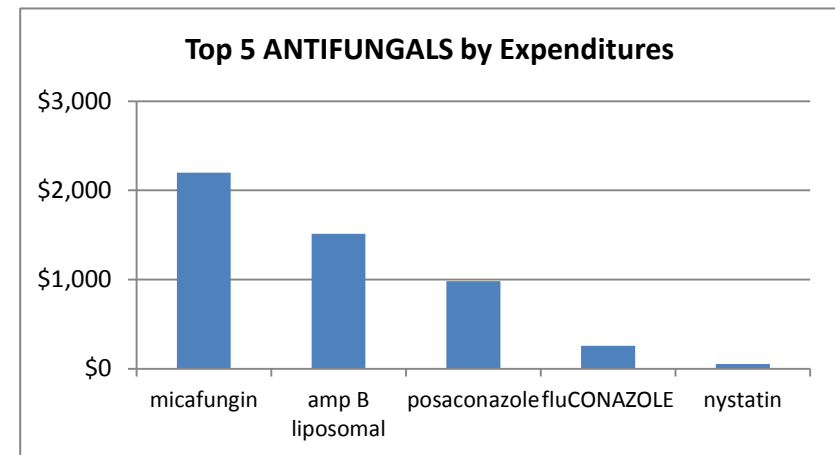
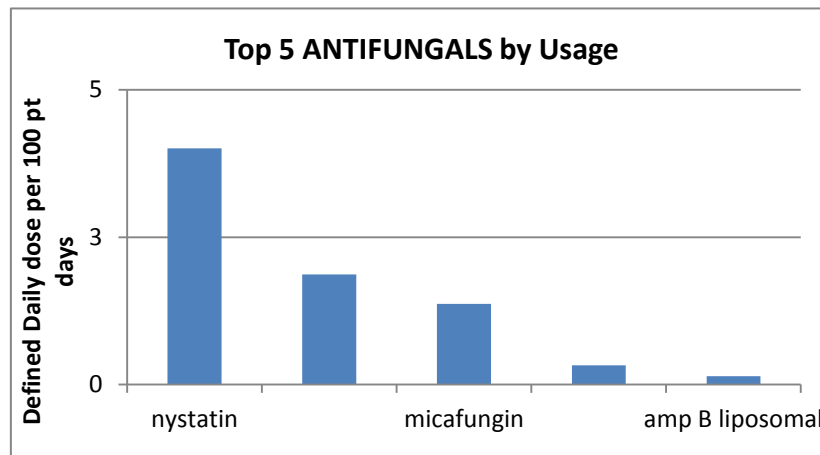
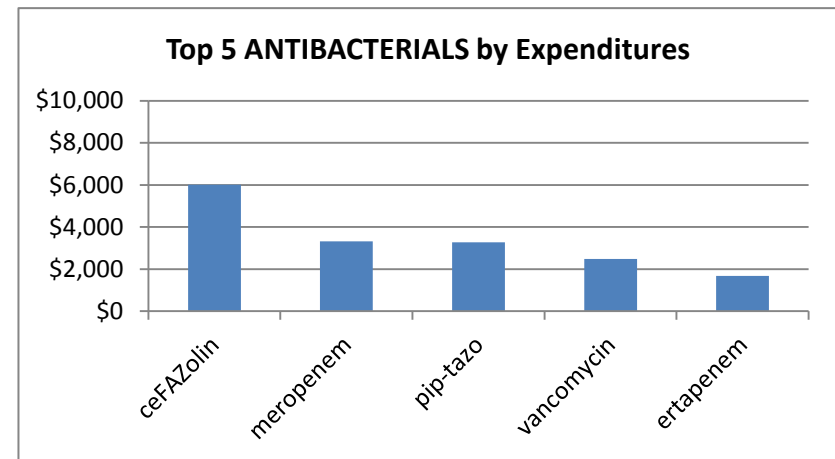
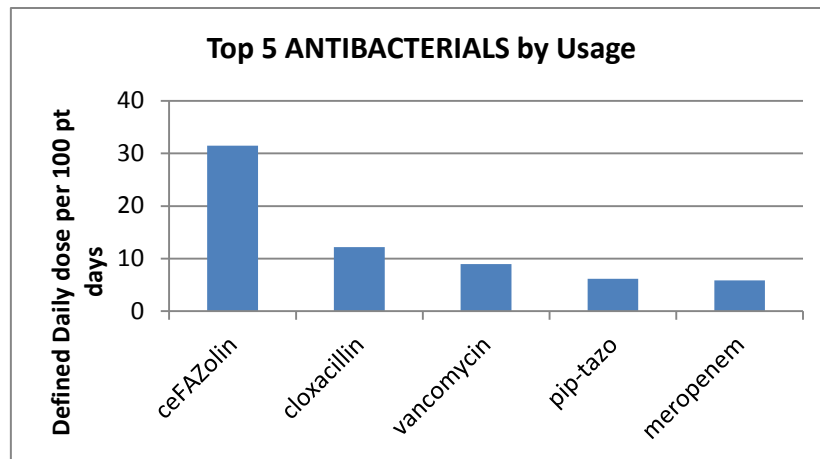
Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY 12/13	FY 13/14	FY 14/15 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs										
Total Antimicrobial DDDs/100 Patient Days	105	98	102	97	113	97	94		101	94
Systemic Antibacterial DDDs/100 Patient Days	95	86	89	86	102	87	87		92	83
Systemic Antifungal DDDs/100 Patient Days	10	12	13	11	11	9	8		9	11
Total Antimicrobial Costs	\$108,172	\$108,464	\$85,916	\$100,736	\$41,955	\$35,869	\$25,126		\$102,951	\$73,927
Total Antimicrobial Costs/Patient Day	\$18.20	\$19.06	\$14.99	\$17.00	\$25.82	\$23.47	\$15.65		\$21.63	\$16.61
Systemic Antibacterial Costs	\$100,375	\$99,261	\$74,232	\$80,204	\$22,588	\$26,402	\$20,124		\$69,114	\$58,971
Systemic Antibacterial Costs/Patient Days	\$16.89	\$17.44	\$12.95	\$13.54	\$13.90	\$17.28	\$12.53		\$14.52	\$13.25
Systemic Antifungal Costs	\$7,797	\$9,204	\$11,684	\$20,532	\$19,367	\$9,467	\$5,002		\$33,837	\$14,955
Systemic Antifungal Costs/Patient Days	\$1.31	\$1.62	\$2.04	\$3.47	\$11.92	\$6.20	\$3.11		\$7.11	\$3.36
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)	1 (0.62)	0 (0.0)	2 (1.25)		1 (0.32)	6 (2.05)
ICU Average Length of Stay (days)	3.12	2.95	2.97	3.20	3.04	3.65	3.62		3.44	3.23
ICU Mortality Rate (as a %)	3.5	3.0	3.0	4.6	3.5	6.3	4.2		4.6	4.8
ICU Readmission Rate within 48 hrs (as a %)	1.6	2.2	1.8	2.2	1.3	2.3	4.2		2.6	2.5
Central Line Infection Rate (per 1000 pt days)	0.73	0.17	0.34	0.16	0.0	0.64	0.00		0.2	0.22
Ventilator Associated Pneumonia Rate (per 1000 pt days)	2.99	2.80	1.91	1.73	2.69	4.00	4.16		3.57	1.64
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.51	5.77	5.70	5.60	5.76		5.70	5.80
ICU Ventilator Days	3015	3571	3676	4049	1116	1003	961		3080	3044
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	2113	2147	1429		5689	n/a
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	682	669	80		1431	n/a

**Notes:** Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whooc.no/atc\\_ddd\\_index/](http://www.whooc.no/atc_ddd_index/)).

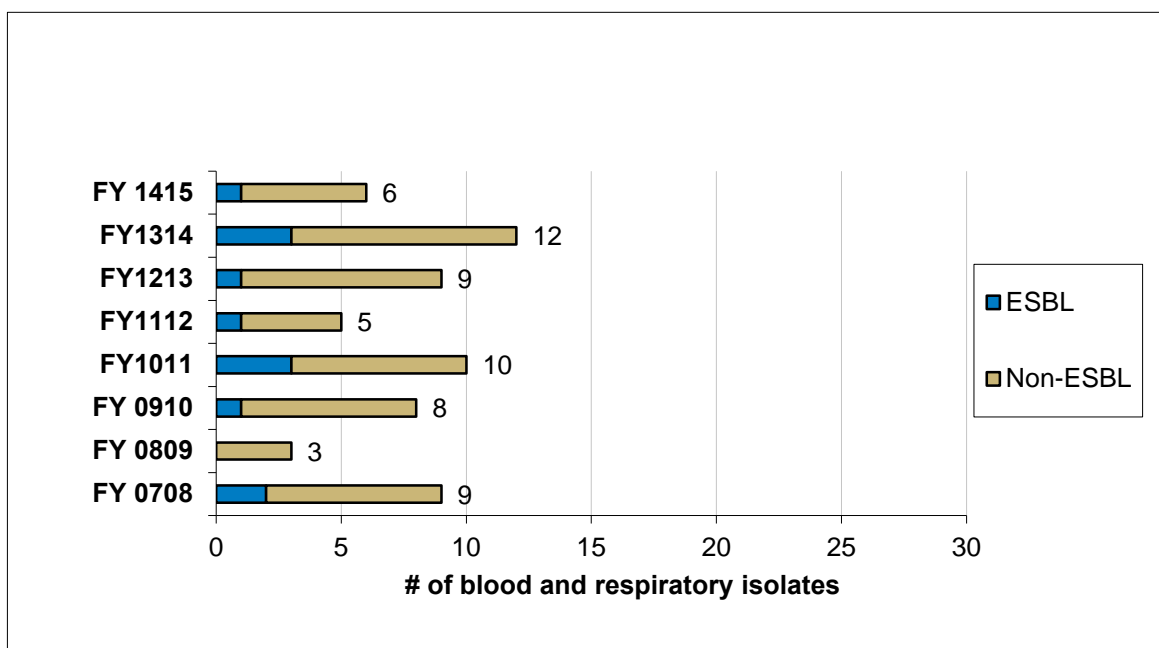
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.

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.

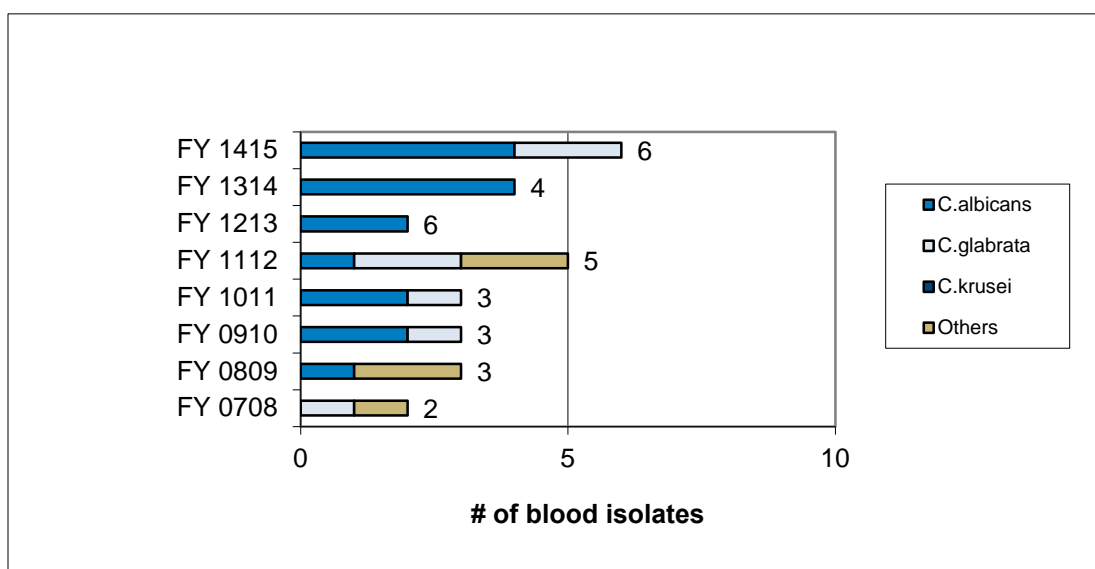
Table 8: TGH CVICU FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 patient-days) and Expenditures



**Table 9: E. coli Isolates From Blood and Respiratory System: Non-ESBL vs. ESBL  
– Toronto General Hospital Cardiovascular ICU**



**Table 10: Yeast Species Isolated in Blood – Toronto General Hospital Cardiovascular ICU**



## Toronto General Hospital: Medical Surgical ICU

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 9.2% compared to last year.
- Antimicrobial costs per patient day decreased (↓) by 4.8% compared to last year.
- Antibacterial costs per patient day increased (↑) by 22.0% compared to last year.
- Antifungal costs per patient day decreased (↓) by 21.2% compared to last year.

**Table 11: 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 Performance					YTD of Previous Year
						Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs											
Total Antimicrobial DDDs/100 Patient Days	266	209	199	213	217	211	256	209		234	214
Systemic Antibacterial DDDs/100 Patient Days	184	155	143	159	156	156	197	155		177	154
Systemic Antifungal DDDs/100 Patient Days	82	55	55	54	61	55	58	54		57	59
Total Antimicrobial Costs	\$701,451	\$629,472	\$567,532	\$473,613	\$584,018	\$143,079	\$154,439	\$189,913		\$487,430	\$428,152
Total Antimicrobial Costs/Patient Day	\$102.52	\$84.06	\$76.93	\$63.75	\$75.71	\$68.92	\$74.64	\$93.09		\$71.78	\$75.43
Systemic Antibacterial Costs	\$390,209	\$375,436	\$292,355	\$231,171	\$225,557	\$61,329	\$83,205	\$68,345		\$144,534	\$162,240
Systemic Antibacterial Costs/Patient Days	\$57.03	\$50.14	\$39.63	\$31.12	\$29.24	\$29.54	\$40.22	\$33.50		\$34.87	\$28.58
Systemic Antifungal Costs	\$311,242	\$254,036	\$275,176	\$242,443	\$358,461	\$81,749	\$71,234	\$121,568		\$152,983	\$265,913
Systemic Antifungal Costs/Patient Days	\$45.49	\$33.93	\$37.30	\$32.63	\$46.47	\$39.38	\$34.43	\$59.59		\$36.91	\$46.85
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)	4 (1.93)	3 (1.45)	2 (0.98)		9 (1.46)	9 (1.59)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.79	8.22	7.53	8.77	8.57		8.26	8.14
ICU Mortality Rate (as a %)	16.2	15.7	16.3	16.0	17.8	16.0	16.4	15.7		16.0	17.7
ICU Readmission Rate within 48 hrs (as a %)	3.8	4.4	4.4	2.8	3.5	4.5	2.5	2.3		3.2	4.0
ICU Ventilator Days	5399	6256	6507	6458	24620	1764	1847	1818		5429	5104
Apache II score	n/a	n/a	16.1	15.775	15.9	15.2	14.4	14.6		14.7	15.1
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	n/a	2113.0	2147	2011		6271	n/a
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	n/a	682.0	669	716		2067	n/a

**Notes:** Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whooc.no/atc\\_ddd\\_index/](http://www.whooc.no/atc_ddd_index/)).

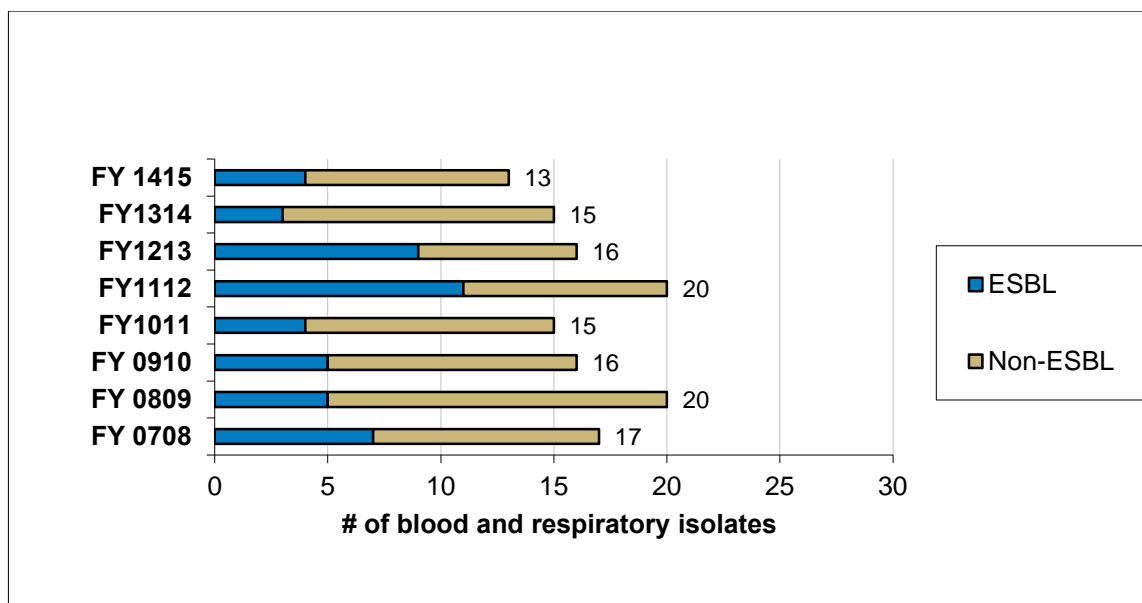
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.

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.

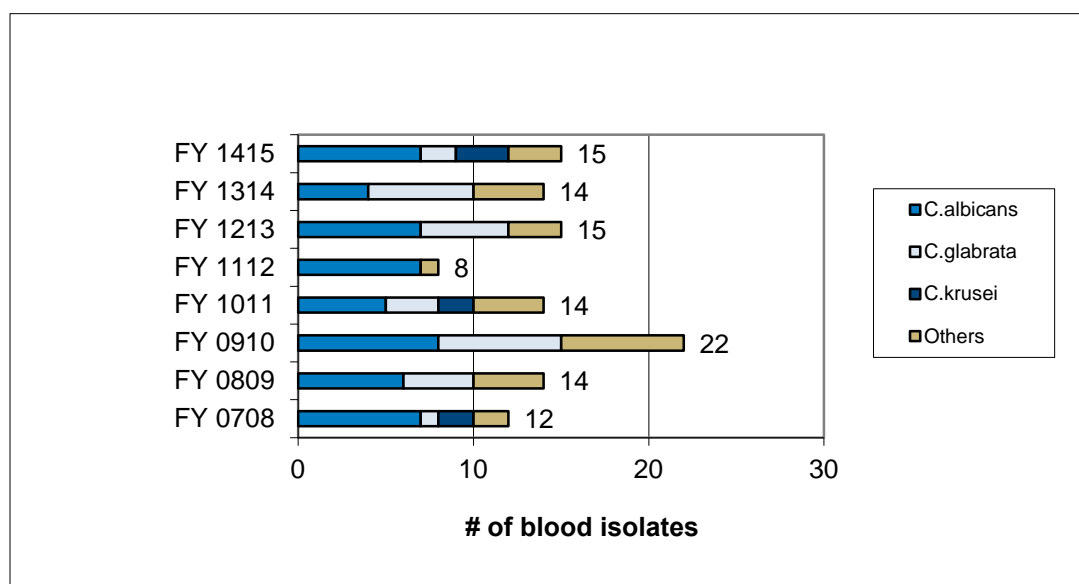
To view **Appendix 1: FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click [here](#).



**Table 12: E. coli Isolates From Blood and Respiratory System: Non-ESBL vs. ESBL – Toronto General Hospital: Medical Surgical ICU**



**Table 13: Yeast Species Isolated in Blood – Toronto General Hospital: Medical Surgical ICU**



## Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 30.4% compared to last year.
- Antimicrobial costs per patient day decreased (↓) by 40.1% compared to last year.
- Antibacterial costs per patient day decreased (↓) by 27.6% compared to last year.
- Antifungal costs per patient day decreased (↓) by 64.9% compared to last year.

**Table 14: 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	FY14/15 Performance					YTD of Previous Year
							Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs												
Total Antimicrobial DDDs/100 Patient Days	99	88	79	83	83	92	67	63	65		65	93
Systemic Antibacterial DDDs/100 Patient Days	92	78	73	77	78	86	63	57	60		60	87
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	5	6	4	6	5		5	6
Total Antimicrobial Costs	\$136,758	\$100,408	\$101,191	\$105,899	\$102,978	\$120,538	\$27,064	\$28,314	\$22,981		\$78,359	\$91,602
Total Antimicrobial Costs/Patient Day	\$18.16	\$13.24	\$13.17	\$13.60	\$13.37	\$13.49	\$9.21	\$9.77	\$8.16		\$9.05	\$15.10
Systemic Antibacterial Costs	\$123,314	\$87,445	\$79,280	\$89,784	\$70,099	\$85,916	\$20,587	\$22,878	\$19,572		\$63,037	\$61,004
Systemic Antibacterial Costs/Patient Days	\$16.37	\$11.53	\$10.32	\$11.53	\$9.10	\$9.61	\$7.00	\$7.90	\$6.95		\$7.28	\$10.06
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$16,115	\$32,879	\$34,623	\$6,477	\$5,436	\$3,409		\$15,322	\$30,598
Systemic Antifungal Costs/Patient Days	\$1.79	\$1.71	\$2.85	\$2.07	\$4.27	\$3.87	\$2.20	\$1.88	\$1.21		\$1.77	\$5.04
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)	4 (1.36)	3 (1.04)	3 (1.06)		10 (1.16)	9 (1.48)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.71	7.98	7.68	8.43	8.95	7.17		8.2	7.69
ICU Mortality Rate (as a %)	19.6	19.9	18.1	17.0	16.4	17.1	22.5	17.4	16.5		18.9	17.6
ICU Readmission Rate within 48 hrs (as a %)	3.9	4.7	4.9	3.21	3.00	3.85	3.70	2.86	4.38		3.60	4.55
ICU Ventilator Days	4617	6305	5960	5578	4947	5523	1501	1403	1108		4012	3939
ICU Apache II Score	15.0	14.7	13.7	13.8	12.9	12.8	13.9	13.1	12.4		13.1	12.5
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	n/a	n/a	1275	1454	1126		3855	n/a
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	n/a	n/a	95	115	57		267	n/a

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

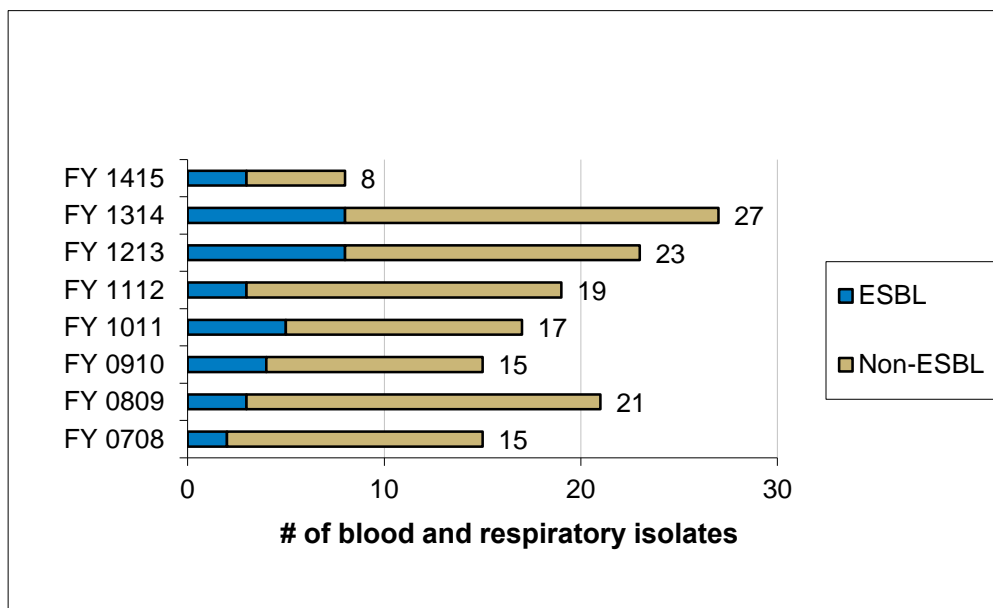
Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whocc.no/atc\\_ddd\\_index/](http://www.whocc.no/atc_ddd_index/)).

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

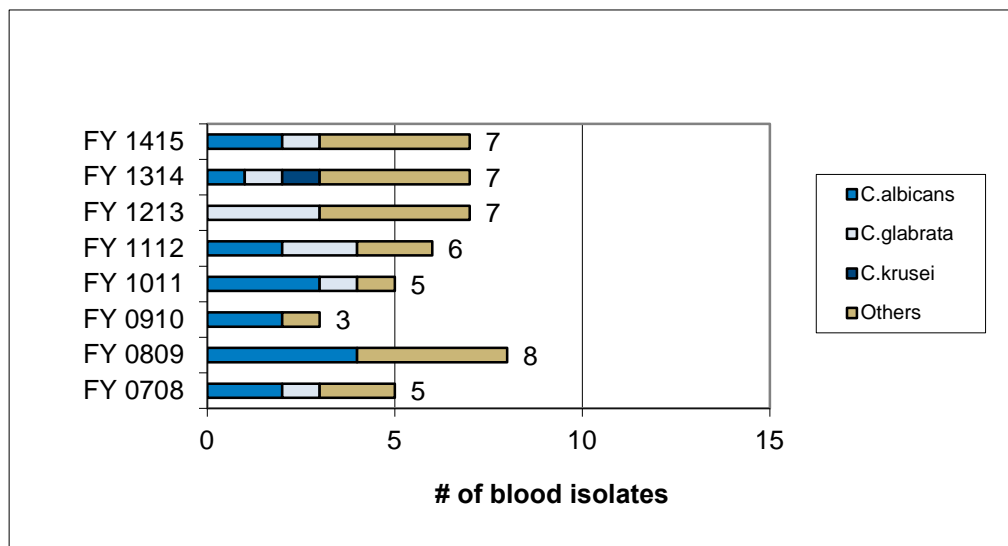
Data Sources: Antimicrobial DDD and Costs (Centricity) \*An error in DDD calculation for Pip-tazo was detected in Q3 2013; all historical data prior to this was rerun, resulting in minor changes to antibacterial DDDs.

To view **Appendix 1: FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site**, please click [here](#).

**Table 15: E. coli Isolates: Blood and Respiratory System: Non-ESBL vs. ESBL – Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU**



**Table 16: Yeast Species Isolated in Blood – Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU**



## EMERGENCY DEPARTMENT

### **Mount Sinai Hospital: Emergency Department**

FY 14/15 Q3 highlights include:

#### Sepsis Project

The SNAP (Sepsis Now A Priority) algorithm has been in practice in the Mount Sinai Hospital Emergency Department for five months. An initial chart audit of 30 patients entered into the algorithm (as of December 2014) revealed that 53% (16/30) of patients had a diagnosis of sepsis. Of those, 19% (3/16) had severe sepsis and 6% (1/16) had septic shock. Data collected to date has demonstrated the timelines of the algorithm are being met and septic patients are being flagged and treated swiftly. Ongoing post-implementation review will evaluate patient outcomes, including mortality, morbidity, length of stay, and process measures (i.e. time to diagnosis, time to appropriate fluid resuscitation, antibiotics, etc.).

In addition to the three-month chart audit, there will be a six-month project audit to further understand how the algorithm is affecting practice in the Emergency Department, as well as patient outcomes, prior to considering collaborating with the Emergency Departments at Toronto General and Toronto Western.

### **Toronto General Hospital/Toronto Western Hospital: Emergency Department and Princess Margaret REACH**

FY 14/15 Q3 highlights include:

With support from Princess Margaret's senior leadership, the ASP team continues to work with Dr. Sam Sabbah, Assistant Director, Emergency Department, UHN, to create an order set of the febrile neutropenia protocol. Our goal is to reduce the variability in the management of neutropenic fever across all entry points into the UHN system.

## GENERAL INTERNAL MEDICINE

### Mount Sinai Hospital: General Internal Medicine

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 10.9% compared to last year.
- Antimicrobial costs per patient day increased (↑) by 2.6% compared to last year.
- Antibacterial costs per patient day increased (↑) by 2.5% compared to last year.
- Antifungal costs per patient day decreased (↓) by 2.5% compared to last year.
- Note: Usage data calculated for patients admitted by admission to GIM medical service at MSH.

**Table 17: Mount Sinai Hospital: General Internal Medicine**

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY14/15 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	58	45	50	53	47		50	45
Systemic Antibacterial DDDs/100 Patient Days	53	41	43	49	43		45	42
Systemic Antifungal DDDs/100 Patient Days	3	3	5	4	3		4	2
Total Antimicrobial Costs	\$125,012	\$123,737	\$34,962	\$36,096	\$27,837		\$98,895	\$88,995
Total Antimicrobial Costs/Patient Day	\$5.74	\$3.76	\$4.10	\$4.15	\$3.22		\$3.82	\$3.72
Systemic Antibacterial Costs	\$105,621	\$99,731	\$24,251	\$30,922	\$25,042		\$80,215	\$72,233
Systemic Antibacterial Costs/Patient Days	\$4.85	\$3.03	\$2.84	\$3.56	\$2.89		\$3.10	\$3.02
Systemic Antifungal Costs	\$15,422	\$20,153	\$9,106	\$4,740	\$1,815		\$15,661	\$14,840
Systemic Antifungal Costs/Patient Days	\$0.71	\$0.61	\$1.07	\$0.55	\$0.21		\$0.61	\$0.62
Patient Care Outcomes								
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	16 (0.64)	8 (0.32)	4 (0.62)	1 (0.15)	1 (0.15)		6 (0.31)	6 (0.32)

**Notes:** Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whocc.no/atc\\_ddd\\_index/](http://www.whocc.no/atc_ddd_index/)).

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).

To view **Appendix 2: General Internal Medicine FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

To view **Appendix 3: Antimicrobial Usage by Route of Administration (Total Antimicrobials) – General Internal Medicine**, please click [here](#).



## Toronto General Hospital: General Internal Medicine

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 10.0% compared to last year.
- Antimicrobial costs per patient day decreased (↓) by 40.9% compared to last year for TGH.
- Antibacterial costs per patient day decreased (↓) by 11.5% compared to last year.
- Antifungal costs per patient day decreased (↓) by 64.7% compared to last year.
- Note: Usage data calculated for patients admitted to primary GIM units at TGH.

**Table 18: Toronto General Hospital: General Internal Medicine**

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY14/15 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	87	83	72	70	84		75	84
Systemic Antibacterial DDDs/100 Patient Days	77	70	66	62	75		67	71
Systemic Antifungal DDDs/100 Patient Days	11	13	6	8	9		8	13
Total Antimicrobial Costs	\$279,644	\$471,342	\$55,318	\$69,655	\$107,725		\$232,697	\$378,801
Total Antimicrobial Costs/Patient Day	\$14.10	\$18.05	\$8.12	\$10.25	\$16.02		\$11.44	\$19.37
Systemic Antibacterial Costs	\$171,817	\$225,491	\$37,386	\$54,197	\$64,416		\$155,999	\$169,544
Systemic Antibacterial Costs/Patient Days	\$8.67	\$8.64	\$5.49	\$7.97	\$9.58		\$7.67	\$8.67
Systemic Antifungal Costs	\$107,827	\$245,851	\$17,941	\$15,458	\$43,309		\$76,707	\$209,257
Systemic Antifungal Costs/Patient Days	\$5.44	\$9.42	\$2.63	\$2.27	\$6.44		\$3.77	\$10.70
Patient Care Outcomes								
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	15 (0.76)	16 (0.61)	5 (0.73)	6 (0.88)	3 (0.45)		14 (0.92)	9 (0.46)

Notes: Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whocc.no/atc\\_ddd\\_index/](http://www.whocc.no/atc_ddd_index/)).

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.

To view **Appendix 2: General Internal Medicine FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

To view **Appendix 3: Antimicrobial Usage by Route of Administration (Total Antimicrobials) – General Internal Medicine**, please click [here](#).

## Toronto Western Hospital: General Internal Medicine

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 9.4% compared to last year.
- Antimicrobial costs per patient day decreased (↓) by 36.2% compared to last year.
- Antibacterial costs per patient day decreased (↓) by 23.8% compared to last year.
- Antifungal costs per patient day decreased (↓) by 80.4% compared to last year.
- Note: Usage data calculated for patients admitted to primary GIM units at TWH.

**Table 19: Toronto Western Hospital: General Internal Medicine**

Indicators	FY 12/13 (Q2-4)	FY 13/14	FY14/15 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	44	47	42	43	43		43	47
Systemic Antibacterial DDDs/100 Patient Days	41	44	40	40	39		40	44
Systemic Antifungal DDDs/100 Patient Days	3	3	2	3	4		3	3
Total Antimicrobial Costs	\$74,737	\$115,919	\$26,879	\$29,457	\$29,440		\$85,775	\$92,568
Total Antimicrobial Costs/Patient Day	\$4.36	\$5.01	\$3.30	\$3.45	\$3.48		\$3.41	\$5.35
Systemic Antibacterial Costs	\$60,999	\$93,779	\$26,480	\$28,490	\$24,999		\$79,969	\$72,205
Systemic Antibacterial Costs/Patient Days	\$3.56	\$4.05	\$3.26	\$3.34	\$2.95		\$3.18	\$4.18
Systemic Antifungal Costs	\$13,738	\$22,140	\$399	\$967	\$4,441		\$5,806	\$20,362
Systemic Antifungal Costs/Patient Days	\$0.80	\$0.96	\$0.05	\$0.11	\$0.52		\$0.23	\$1.18
Patient Care Outcomes								
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	7 (0.41)	14 (0.6)	2 (0.25)	2 (0.23)	4 (0.47)		8 (0.32)	9 (0.52)

**Notes:** Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whooc.no/atc\\_ddd\\_index/](http://www.whooc.no/atc_ddd_index/)).

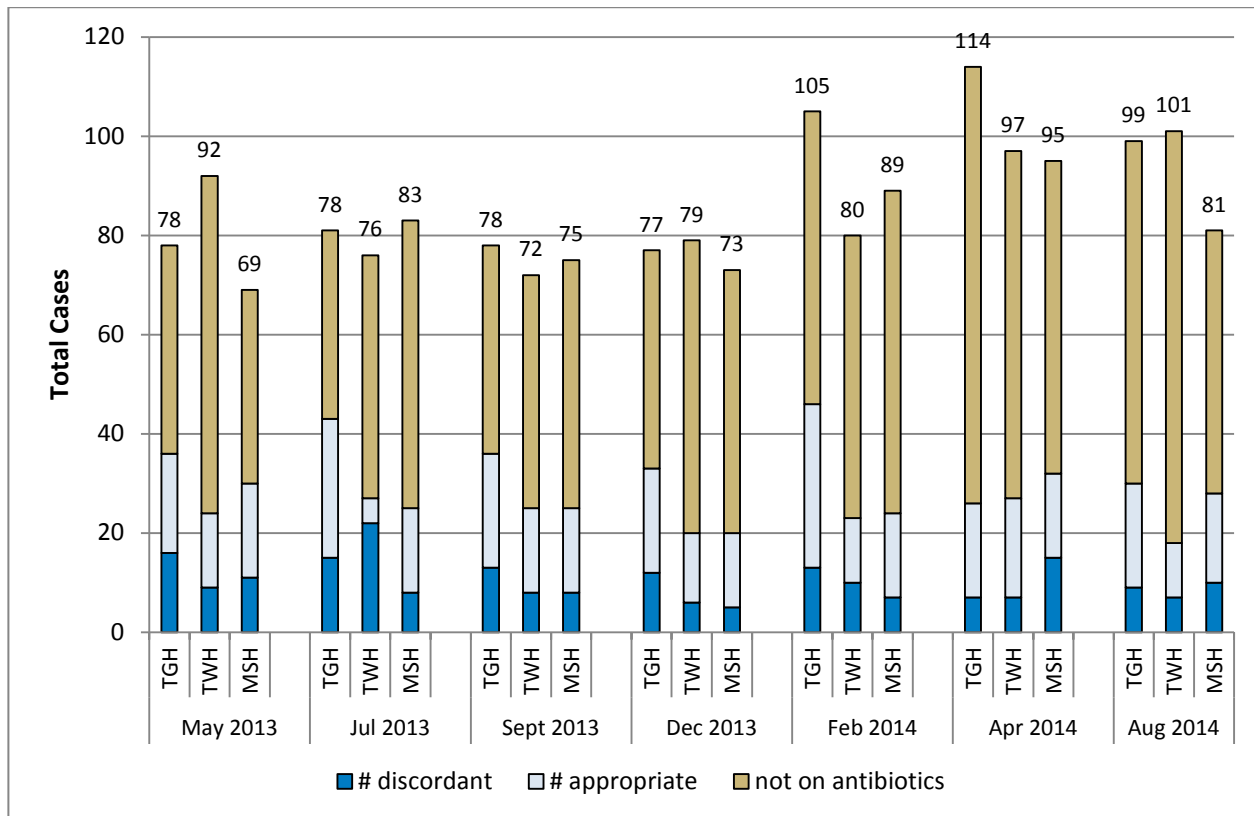
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.

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.

To view **Appendix 2: General Internal Medicine FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**, please click [here](#).

To view **Appendix 3: Antimicrobial Usage by Route of Administration (Total Antimicrobials) – General Internal Medicine**, please click [here](#).

**Table 20: General Internal Medicine Spot Audit Results**



## IMMUNOCOMPROMISED HOST

### Princess Margaret Cancer Centre: Leukemia Service

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 5.4% compared to last year.
- Antimicrobial costs per patient day decreased (↓) by 21.5% compared to last year.
- Antibacterial costs per patient day decreased (↓) by 16.9% compared to last year.
- Antifungal costs per patient day decreased (↓) by 23.7% compared to last year.

**Table 21: Princess Margaret Cancer Centre: Leukemia Service**

Indicators	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY14/15 Performance					YTD of Previous Year
						Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs											
Total Antimicrobial DDDs/100 Patient Days	295	270	239	250	255	232	266	239		246	260
Systemic Antibacterial DDDs/100 Patient Days	191	163	134	146	128	132	145	128		135	142
Systemic Antifungal DDDs/100 Patient Days	104	107	105	104	121	100	120	111		110	118
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$1,310,857	\$1,695,539	\$1,534,499	\$368,143	\$425,519	\$246,826		\$1,040,489	\$1,182,716
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$115.13	\$128.91	\$117.10	\$104.68	\$116.14	\$64.95		\$94.75	\$120.76
Systemic Antibacterial Costs	\$659,034	\$609,747	\$663,175	\$422,438	\$485,263	\$107,426	\$131,409	\$111,346		\$350,181	\$376,014
Systemic Antibacterial Costs/Patient Days	\$62.28	\$57.33	\$58.24	\$45.85	\$38.25	\$30.54	\$35.86	\$29.30		\$31.89	\$38.39
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$647,637	\$1,092,448	\$1,049,236	\$260,718	\$294,110	\$135,480		\$690,308	\$806,702
Systemic Antifungal Costs/Patient Days	\$104.84	\$96.99	\$56.88	\$83.06	\$86.54	\$74.13	\$80.27	\$35.65		\$62.86	\$82.37
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)	2 (0.57)	3 (0.82)	5 (1.32)		10 (0.91)	6 (0.61)

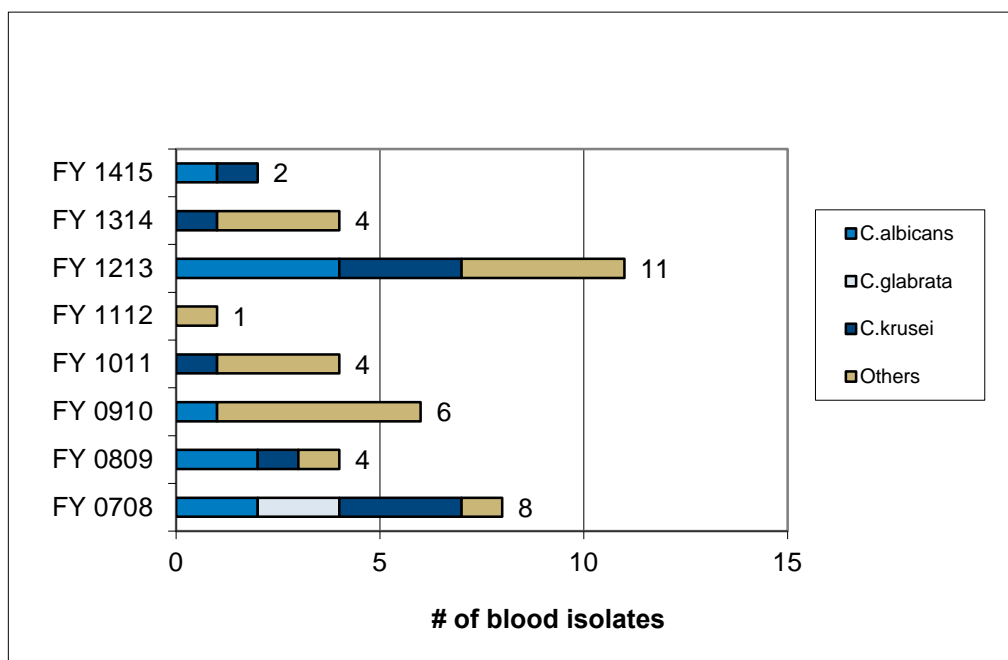
**Notes:** Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whocc.no/atc\\_ddd\\_index/](http://www.whocc.no/atc_ddd_index/)).

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.

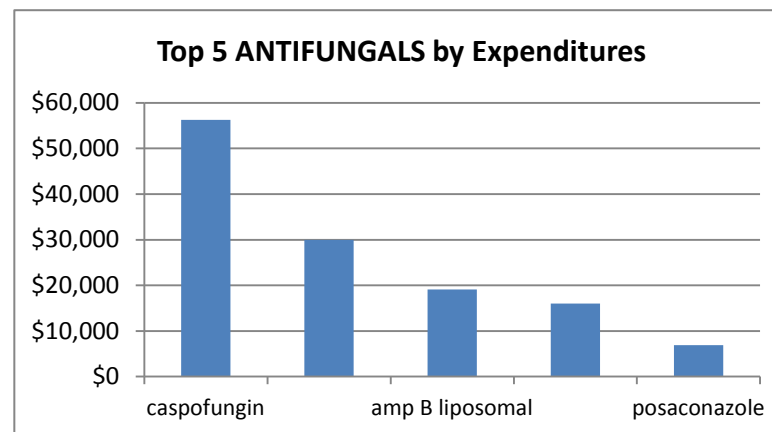
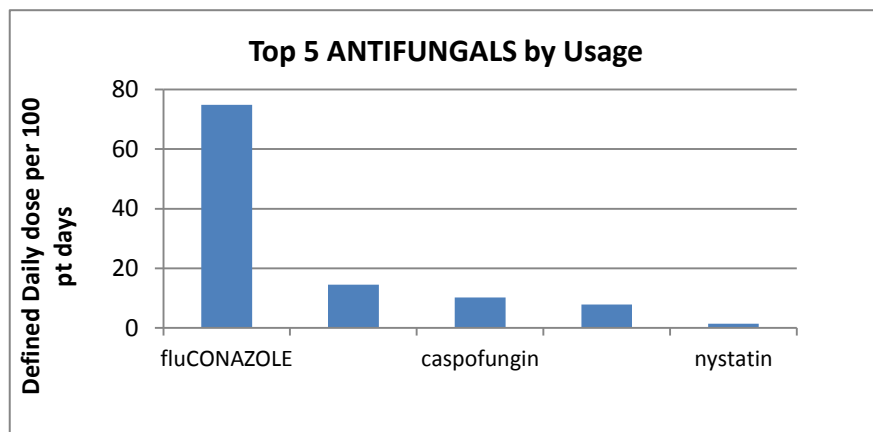
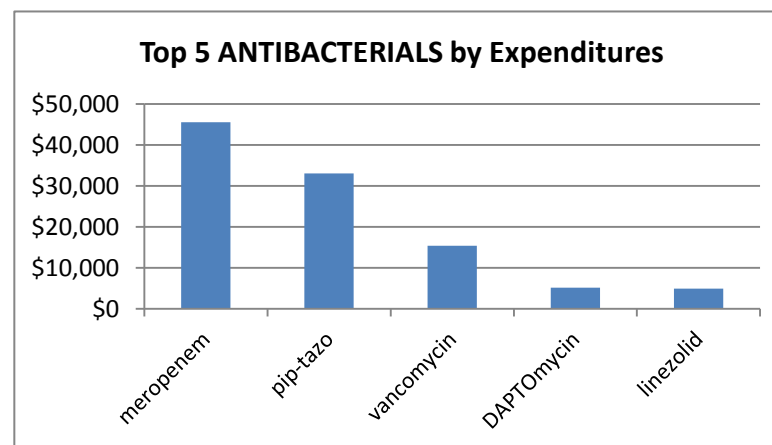
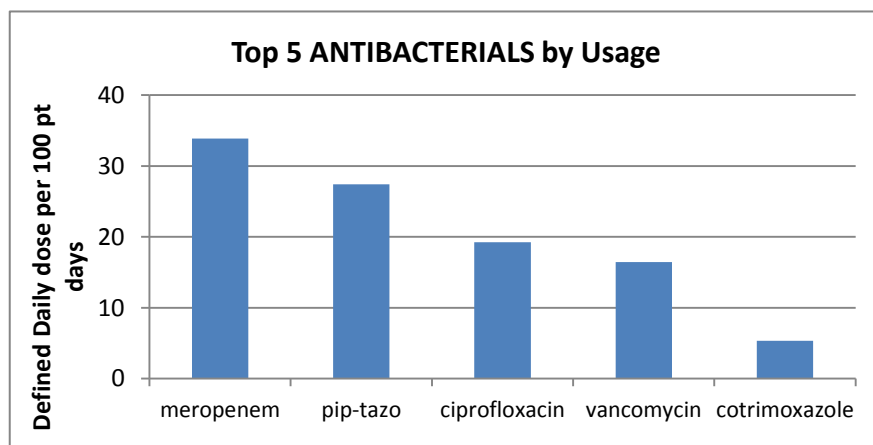
To view **Appendix 4: E. coli Isolates From Blood and Respiratory System: Non-ESBL vs. ESBL – Princess Margaret Cancer Centre Leukemia and Allogeneic Bone Marrow Transplant**, please click [here](#).

**Table 22: Yeast Species Isolated in Blood – Princess Margaret Cancer Centre:  
 Leukemia Service**





**Table 23: Princess Margaret Cancer Centre: Leukemia FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures**



## **Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant**

FY 14/15 Q3 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 2.0% compared to last year.
- Antimicrobial costs per patient day increased (↑) by 25.9% compared to last year.
- Antibacterial costs per patient day increased (↑) by 1.1% compared to last year.
- Antifungal costs per patient day increased (↑) by 31.6% compared to last year.
- Note: The ASP team also started prospective audit and feedback rounds with the Allogeneic BMT team in September 2014.

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

Indicators	FY 13/14	FY14/15 Performance					YTD of Previous Year
		Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs							
Total Antimicrobial DDDs/100 Patient Days	172	169	179	173		174	177
Systemic Antibacterial DDDs/100 Patient Days	114	106	116	98		107	117
Systemic Antifungal DDDs/100 Patient Days	59	63	63	75		67	61
Total Antimicrobial Costs	\$416,614	\$134,492	\$130,570	\$129,470		\$394,532	\$315,545
Total Antimicrobial Costs/Patient Day	\$85.65	\$112.83	\$107.20	\$105.86		\$108.60	\$86.29
Systemic Antibacterial Costs	\$75,219	\$20,024	\$19,834	\$19,364		\$59,222	\$58,970
Systemic Antibacterial Costs/Patient Days	\$15.46	\$16.80	\$16.28	\$15.83		\$16.30	\$16.13
Systemic Antifungal Costs	\$341,395	\$114,468	\$110,736	\$110,106		\$335,310	\$256,575
Systemic Antifungal Costs/Patient Days	\$70.19	\$96.03	\$90.92	\$90.03		\$92.30	\$70.16
Patient Care Outcomes							
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	4 (0.82)	2 (1.68)	5 (4.11)	4 (3.27)		11 (3.03)	3 (0.82)

Notes: Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, [http://www.whocc.no/atc\\_ddd\\_index/](http://www.whocc.no/atc_ddd_index/)).

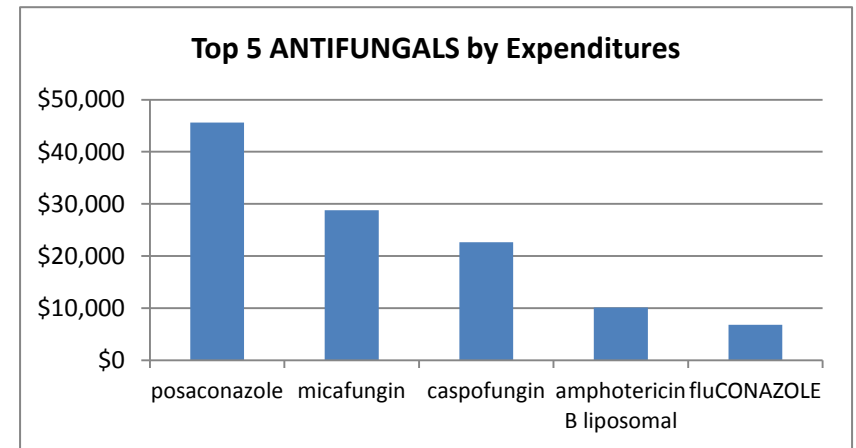
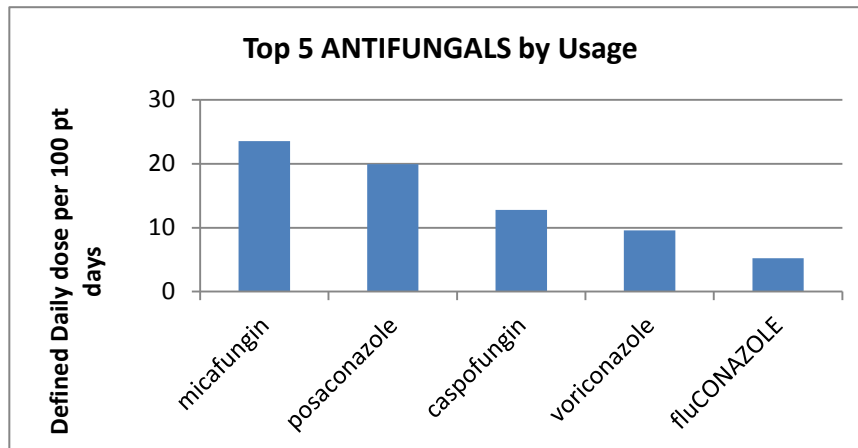
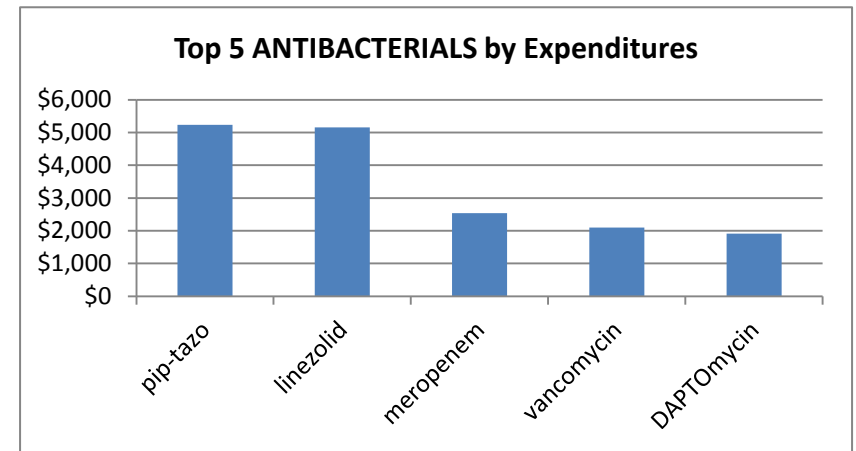
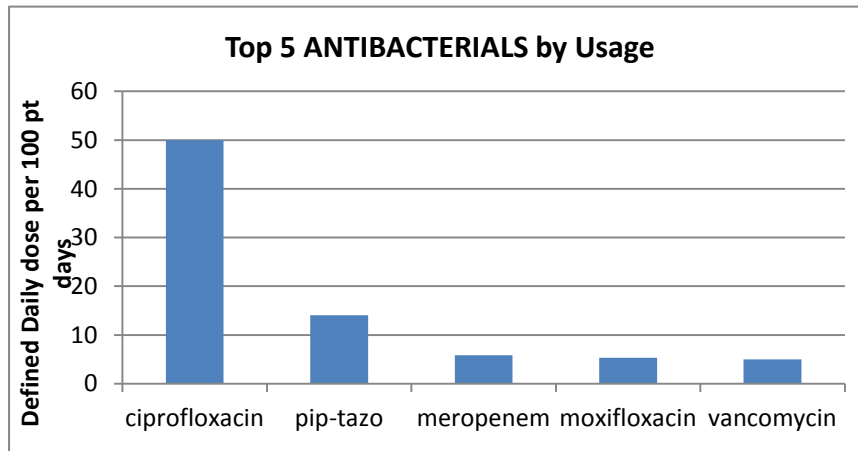
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded.

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.

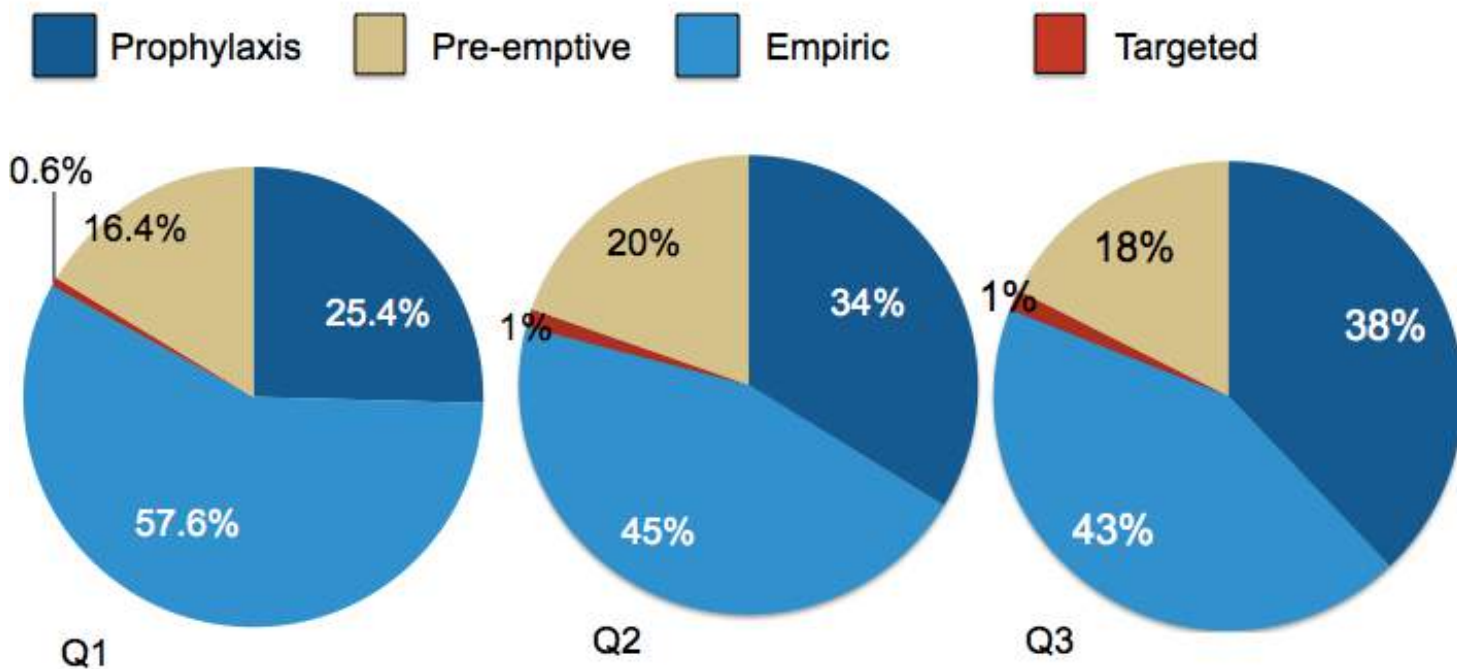
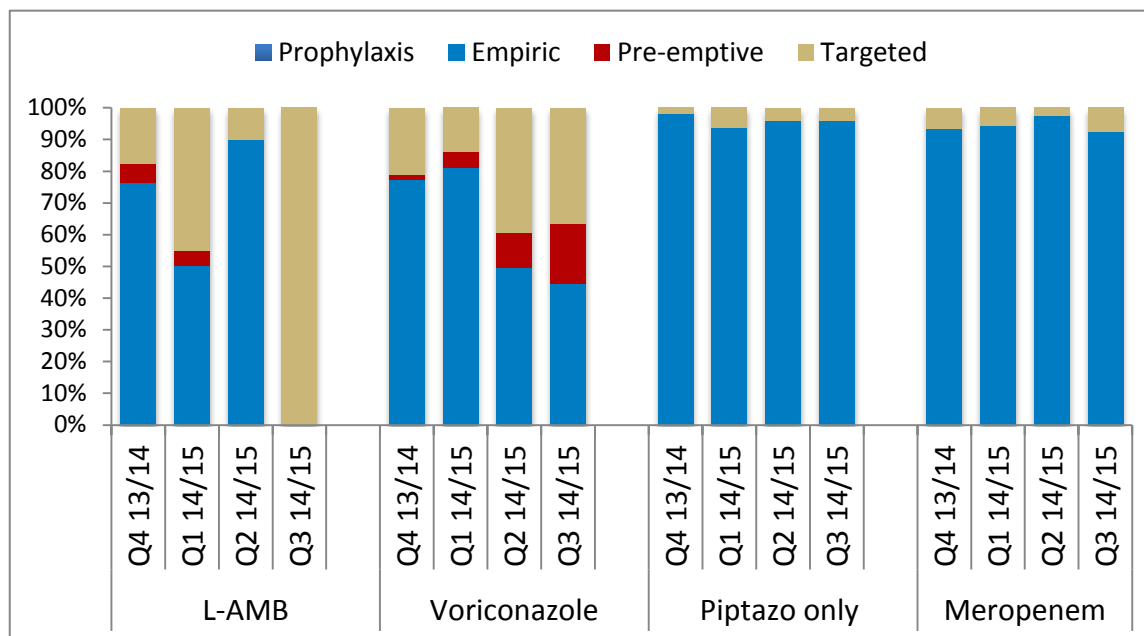
**\*No candidemia cases were identified in Allogeneic Bone Marrow Transplant in 2013/14 or Q1-3 14/15.**

To view **Appendix 4: E. coli Isolates From Blood and Respiratory System: Non-ESBL vs. ESBL – Princess Margaret Cancer Centre Leukemia and Allogeneic Bone Marrow Transplant**, please click [here](#).

**Table 25: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant 14/15 Q3 Top 5 Antimicrobials by Usage (DDD per 100 patient days) and Expenditures**



**Table 26: Princess Margaret Cancer Centre: Febrile Neutropenia Drugs of Select Antimicrobials in Four Rolling Quarters**



## **Toronto General Hospital: Multi-Organ Transplant**

FY 14/15 Q3 highlights include:

- An inter-disciplinary ASP-MOTP working group has been meeting quarterly to review antimicrobial costs/ consumption and identify some deliverables for antimicrobial stewardship. Members of the working group include ASP team members (Dr. Husain and Miranda So) and representatives from Pharmacy, Nursing, Quality of Care Committee, and Infection Prevention and Control, as well as the Clinical Director of MOTP.
- A series of point prevalence audits of antimicrobial use was undertaken in 2013, and currently another series is underway. This is to help determine baseline antimicrobial use and devise appropriate antimicrobial stewardship strategies.
- The ASP team has been providing expert advice to Gloria Leung (MOT RN), recipient of CAP Fellowship, in her project exploring the nurse's role in antimicrobial stewardship for MOT patients. Gloria's project focuses on first determining the perceptions, knowledge, and attitude of MOT RNs towards antimicrobial stewardship, followed by a series of corresponding educational modules and tools to facilitate nurses' engagement with antimicrobial stewardship.



## BEST PRACTICE GUIDELINES AND ALGORITHMS

- The High-Risk Febrile Neutropenia Protocol for Patients with Malignant Hematological Diseases was updated, and an additional section on Pulmonary Infiltrate Management was included. This protocol was presented and approved at Pharmacy and Therapeutics (P&T) Committees, as well as Medical Advisory Committees (MAC) at UHN and MSH. It has been posted on the ASP website, and a series of education sessions has been undertaken targeting various clinical end-user groups at all sites.
- The Febrile Neutropenia Protocol for Solid Tumor and Lymphoma Patients was also updated and approved by P&T and MAC at MSH and UHN. Similar to the High-Risk Protocol, it has been posted on the ASP website, while a series of education sessions has either been planned or completed with various clinical end-user groups.
- We will continue to audit compliance to the High-Risk Protocol. We previously presented the data in Q2.
- The ASP has completed data collection for a quality improvement project to determine the indications and investigations involved prior to initiating antimicrobials in REACH and Transfusion Clinic (TFC) for leukemia/Bone Marrow Transplant (BMT) patients ("REACH/TFC Antimicrobial 'Spot Audit'" project).
- Clinical summaries continue to be available on the [ASP website](#) for a series of common and important conditions. Whiteboard animation videos continue to be available on [our program's YouTube channel](#).
- The ASP collaborated with the Emergency Department to complete the MSH Emergency Department sepsis recognition and management algorithm. The algorithm was implemented into the Emergency Department in July and was effortlessly taken on by frontline clinicians and incorporated into their daily practice.
- The ASP collaborated with multiple key stakeholders across MSH and UHN on standardizing care related to the diagnosis and management of patients with *Clostridium Difficile* infection (CDI). The algorithm was launched in mid-November and involved extensive consultation, development, and revision with interdisciplinary stakeholders. An e-learning module was developed and launched in November. At present there is collaboration with IT to develop electronic order sets to support the algorithm.
- Single-day spot audits continue to be conducted at two- to three-month intervals for GIM patients receiving systemic antimicrobials. Audits are conducted by an ASP clinician (physician or pharmacist) looking at appropriateness, and a consensus panel, including a GIM physician and a pharmacist, convenes within one week of each audit.

## RESEARCH

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

The following manuscripts have been submitted to peer-reviewed medical journals and are currently provisionally accepted for publication pending revisions:

- Bai AD, Showler A, Burry L, Steinberg M, Ricciuto DR, Fernandes T, Chiu A, Raybardhan S, Science M, Fernando E, Bell CM, Morris AM. Impact of Infectious Disease Consultation on Quality of Care and Mortality in Staphylococcus aureus Bacteremia: Results from a Large Multicenter Cohort Study. Clin Infect Dis.
- Bai AD, Showler A, Burry L, Steinberg M, Ricciuto DR, Fernandes T, Chiu A, Raybardhan S, Science M, Fernando E, Bell CM, Morris AM. Comparative effectiveness of cefazolin versus cloxacillin as definitive antibiotic therapy for methicillin-susceptible Staphylococcus aureus bacteremia: results from a large multicenter cohort study. J Antimicrob Chemoth.
- Morris AM, Minnema B, Burry L, Dresser L, Duplisea K, Ferguson ND, Lapinsky S, Lazar NM, Nelson S, Poutanen SM, Singh JM, Tomlinson G, Bai AD, Bell CM. Antimicrobial stewardship using prospective audit and feedback in tertiary intensive care units: a multi-site prospective study. Crit Care Med
- Bai AD, Burry L, Showler A, Steinberg M, Ricciuto D, Fernandes T, Chiu A, Raybardhan S, Tomlinson G, Bell CM, Morris AM. Usefulness of previous screening for methicillin-resistant Staphylococcus aureus in guiding empiric therapy for S. aureus bacteremia. Can J Infect Dis Med
- Showler A, Burry L, Bai AD, Steinberg M, Ricciuto DR, Fernandes T, Chiu A, Raybardhan S, Science M, Fernando E, Bell CM, Morris AM. Use of transthoracic echocardiography in the management of low-risk Staphylococcus aureus bacteremia: results from a retrospective multicenter cohort study. JACC-Cardiovasc Imag.
- Thampi N, Showler A, Burry L, Bai AD, Steinberg M, Ricciuto DR, Bell CM, Morris, AM. Multicenter Study of Healthcare Costs of Patients Admitted to Hospital with Staphylococcus aureus Bacteremia. Am J Infect Control

The following abstracts were presented at conferences:

- Hughes J, Hurford A, Wu J, Morris AM. Constructing Syndrome-Specific Antibigrams for Catheter-Associated Bloodstream Infections Using Uncertainty Estimation and Colour. Poster presented at ICAAC – Interscience Conference on Antimicrobial Agents and Chemotherapy Annual Conference 2014, September 5-9, 2014; Washington DC
- Duplisea K, Nelson S, Bell CM, Morris AM, Bunce PE. A Process to Assess Appropriateness of Antimicrobial Prescribing in General Internal Medicine Using Point Prevalence Audits. Poster presented at 6<sup>th</sup> UofT C-QulPS Symposium, October 9, 2014; Toronto ON
- Showler A, Burry L, Bai AD, Steinberg M, Ricciuto DR, Fernandes T, Chiu A, Raybardhan S, Science M, Fernando E, Bell CM, Morris AM. A normal transthoracic echocardiogram rules out infective endocarditis in low-risk patients with Staphylococcus aureus bacteremia: results from a multi-center cohort study. Poster presented at IDWeek annual meeting, October 9-12, 2014, Philadelphia, PA
- West S, Morgan M, Dushenski D, McDonald C, Van Den Broek K, Morris A. SNAP—Sepsis Now a Priority: Development and Implementation of a Sepsis Algorithm in the Emergency Department of an Academic Hospital Using an Integrated Knowledge Translation Approach. Poster presented at Critical Care Canada Forum annual meeting, October 30-31, November 1, 2014, Toronto, ON

An additional six manuscripts have been either submitted or are close to submission for peer-reviewed publication.

#### Grants Awarded:

- CAHO ARTIC Spread Project: ARTIC CHILL – Community Hospital ICU Local Leadership. Principal Applicant: Andrew Morris. \$200,000 CAD.
- Technology Evaluation in the Elderly Network (TVN): FRAMING-LTC: Frailty and Recognizing Appropriate Medications IN Geriatrics and Long-Term Care. Principal Applicant: Andrew Morris. Co-Investigators: Chaim Bell, Susan Bronskill, Colleen Maxwell, Lianne Jeffs. \$596 906 CAD
- AHSC AFP Innovation Fund: Designing an Effective Outpatient Antimicrobial Stewardship Program to Reduce Unnecessary Antibiotic Use in Primary Care using a Mixed-Methods Collaborative Model. Co-Principal Applicants: Warren McIssac, Andrew Morris. Co-investigators: Chaim Bell, Lianne Jeffs, Jeff Bloom, David Tannenbaum. \$169,695 CAD

## 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 has provided 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](http://m.antimicrobialstewardship.com)) to provide efficient access to resources. Educational sessions are also being provided to pharmacists at all Toronto Rehab Institute (TRI) sites and will include education sessions for physicians at TRI in Q4.
- Twice a month the ASP team meets with all Nurse Practitioners from the Malignant Hematology programs 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 contribution from other ASP team members.
- A Canadian Society of Hospital Pharmacists Foundation Education grant, “Developing and Evaluating an Educational Intervention to Guide the Implementation of Antimicrobial Stewardship Programs in Community Hospitals Across Ontario”, was awarded to team member Linda Dresser and other ASP team members. Thirteen sites across Ontario are participating in the grant. A series of lectures on stewardship principles and therapeutic topics was delivered over an eight-month period, with each site gathering and reporting baseline and ongoing antimicrobial consumption data. The impact of the program at each site will be measured by antimicrobial consumption data and a survey of participants.

## PROVINCIAL ROLE

### ASP ARTIC CHILL Project

The ASP was awarded a grant for its ASP ARTIC CHILL (Community Hospital ICU Local Leadership) project, which will build on the successful implementation of ASPs in academic hospitals, led by the MSH-UHN ASP team during the two-year provincial CAHO ASP ICU ARTIC project (2012–2014). The goal of the ASP ARTIC CHILL project is to establish fully functional Antimicrobial Stewardship Programs (ASPs) within community hospital ICUs using a Hub/Spoke model to allow for a provincial ASP Community of Practice. The site leaders (Hubs) will act as coaches and mentors for ASP implementation at local community sites (Spokes). The aim is to optimize the use of antimicrobials in ICUs, specifically supporting the establishment of an ASP, ensuring that each Spoke is able to report results on antimicrobial use and *C Difficile* infection rates and meet Accreditation Canada's requirements. Initial project work has involved securing four Council of Academic Hospitals of Ontario (CAHO) ASP Hub site leads – London Health Science Centre, Hamilton Health Sciences, Lakeridge Health, and Children's Hospital of Eastern Ontario – who in turn will identify and guide 12 hospitals with ASP implementation within their ICUs. The central MSH-UHN ASP site is continuing to work to guide CAHO Hub leads throughout this early project phase and will be providing educational and process materials for all participating sites throughout the course of the project.

### Expert Consultation

The ASP continues to provide expert advice and consultation to various hospitals throughout the province. We have been engaged by, and are currently assisting, Sault Area Hospital, Guelph General Hospital, Huron Perth Healthcare Alliance (Clinton Public Hospital, St. Mary's Memorial Hospital, and Seaforth Community Hospital, Stratford General Hospital), and Alexandra Marine and General Hospital.

### Cancer Care Ontario

The MSH-UHN ASP team is grateful for the Senior Leadership team at Princess Margaret for the opportunity to share the *High-Risk* Protocol with other sites through Cancer Care Ontario.

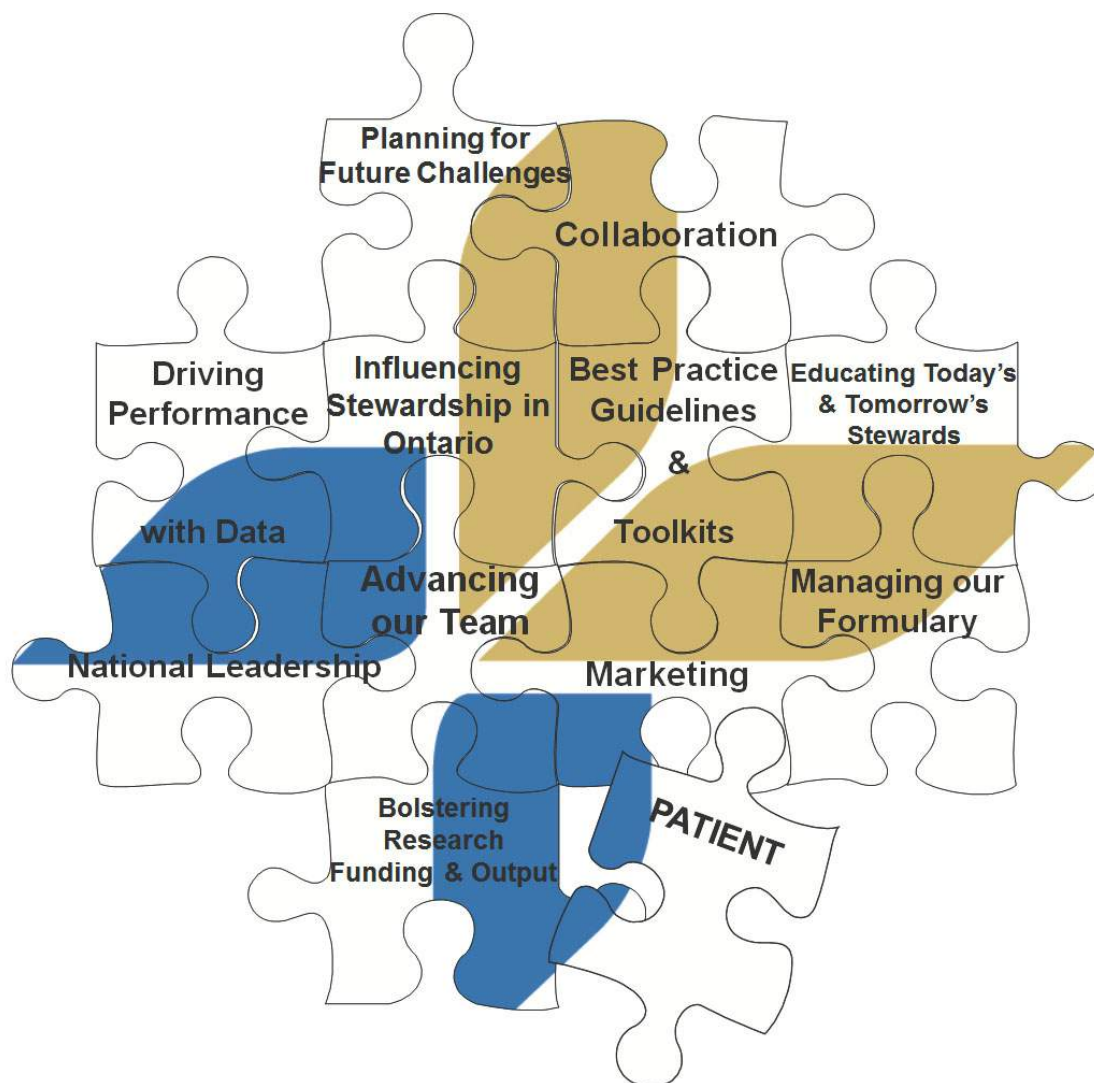
## NATIONAL ROLE

### Accreditation Canada

The MSH-UHN ASP has partnered with Accreditation Canada to assist hospitals across Canada in setting up an antimicrobial stewardship program (ASP). The partnership involves the development and delivery of an on-line course and a series of interactive group webinars. The first cohort of this on-line course has registered and the course has commenced.

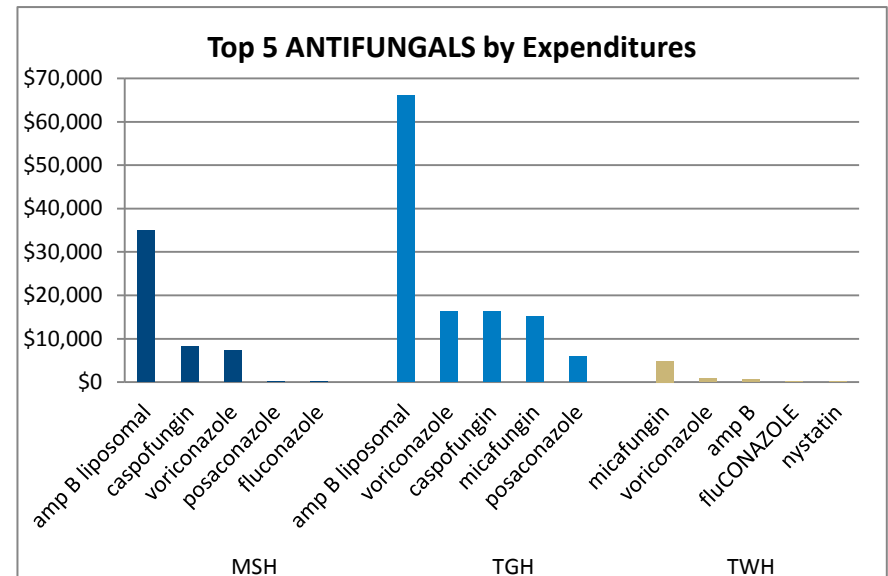
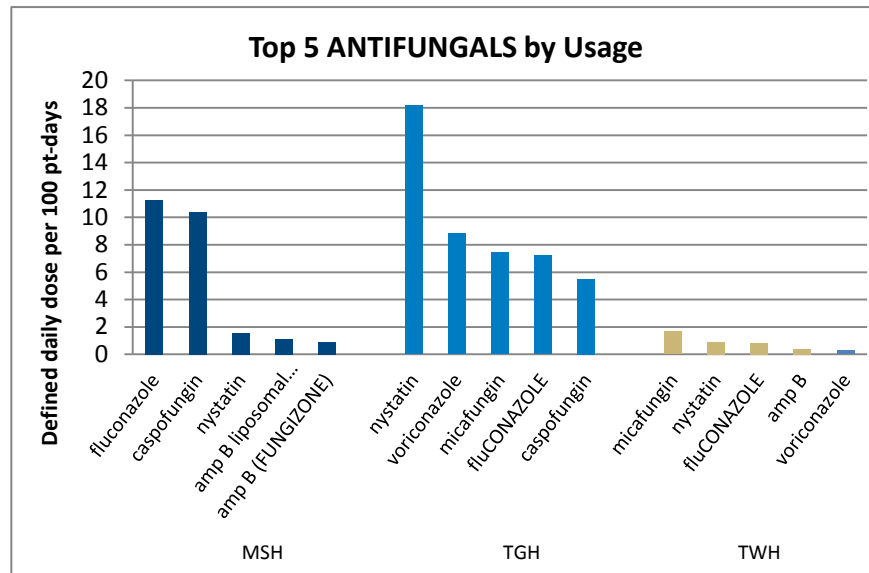
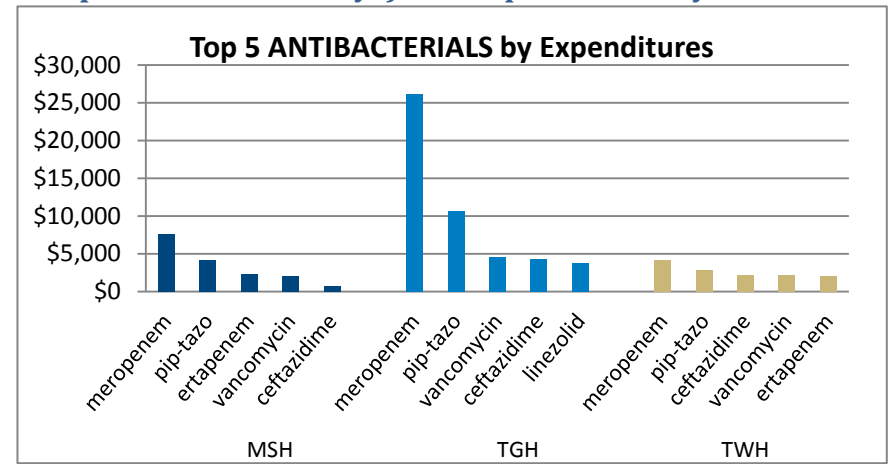
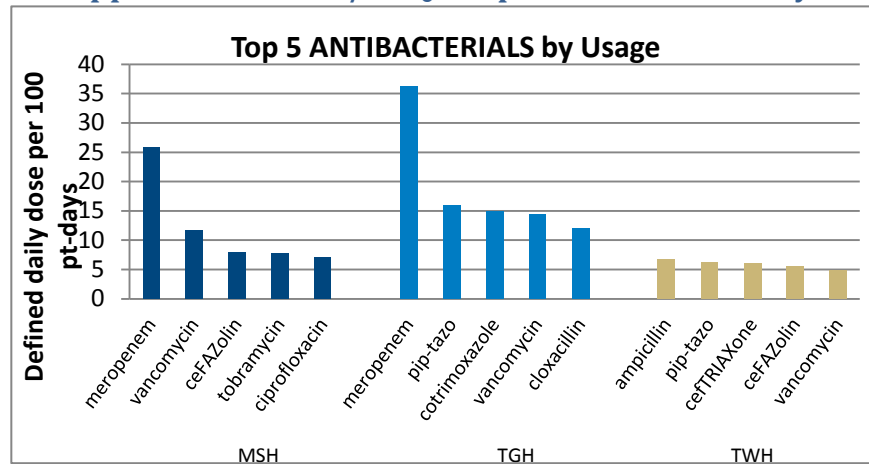
## STRATEGIC PLANNING

The ASP team developed the MSH-UHN ASP Strategic Plan 2013-2016. Please contact Yoshiko Nakamachi ([Yoshiko.Nakamachi@uhn.ca](mailto:Yoshiko.Nakamachi@uhn.ca)) if you would like a copy.



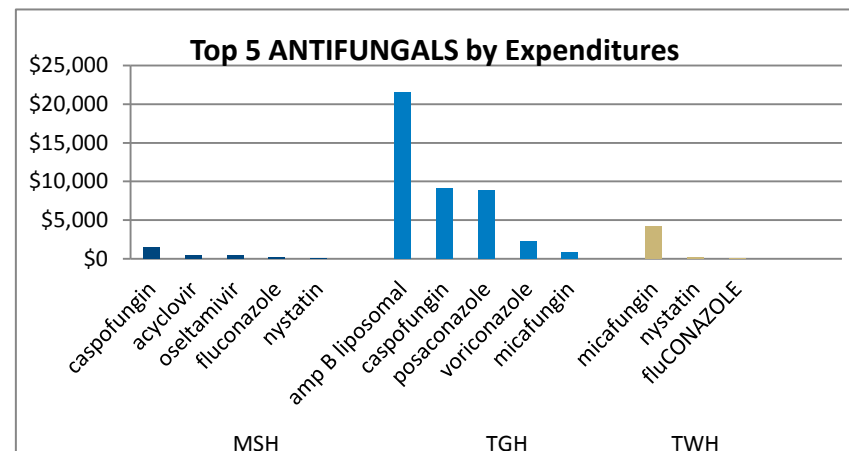
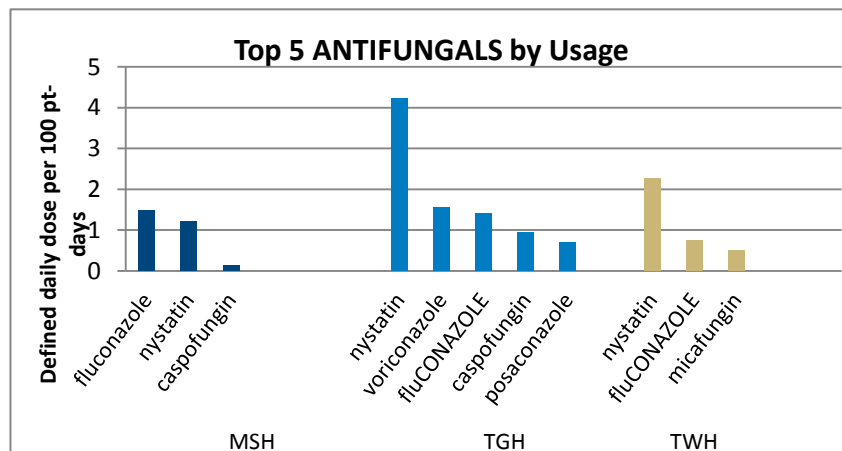
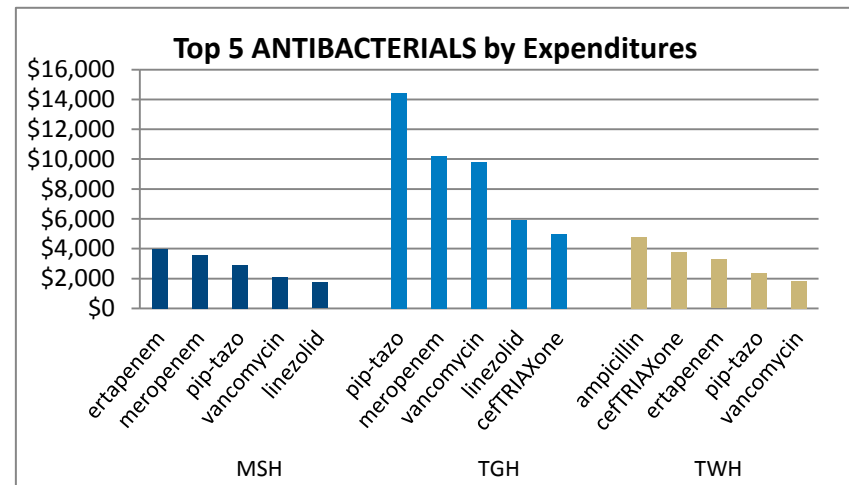
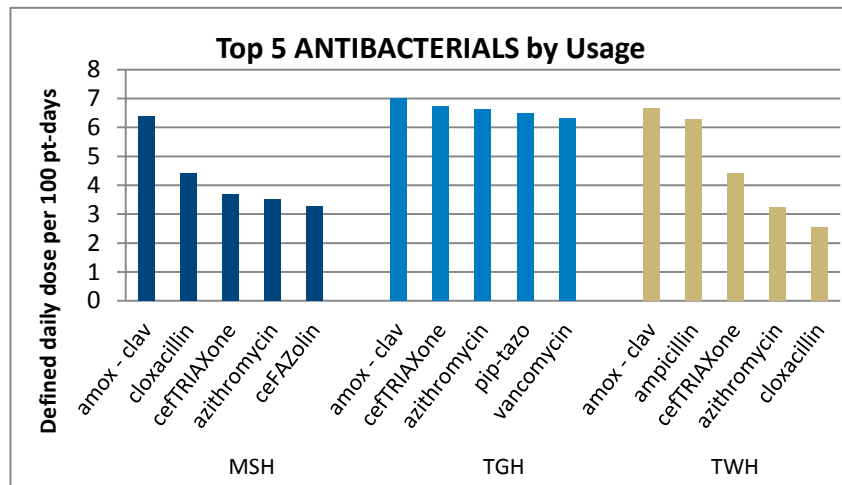


### Appendix 1: FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site

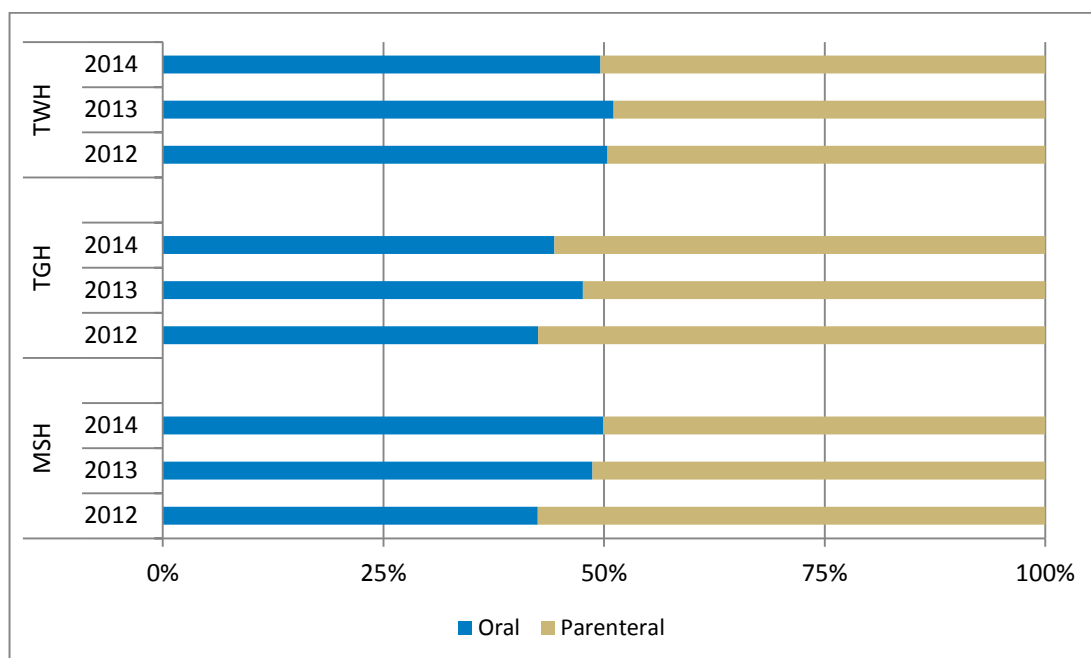




## Appendix 2: General Internal Medicine FY 14/15 Q3 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures



### Appendix 3: Antimicrobial Usage by Route of Administration (Total Antimicrobials) – General Internal Medicine



## Appendix 4: E. coli Isolates From Blood and Respiratory System: Non-ESBL vs. ESBL – Princess Margaret Cancer Centre: Leukemia and Allogeneic Bone Marrow Transplant

