



FISCAL YEAR 2014 | 2015 Q4 REPORT



TABLE OF CONTENTS

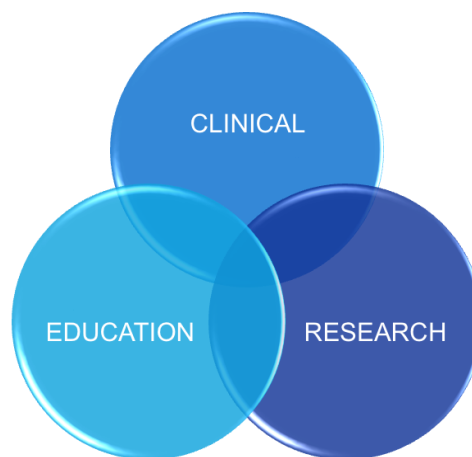
EXECUTIVE SUMMARY	4
FISCAL YEAR 14/15 Q4 RESULTS	7
CRITICAL CARE.....	7
MOUNT SINAI HOSPITAL: MEDICAL SURGICAL ICU.....	7
MOUNT SINAI HOSPITAL: NEONATAL ICU.....	11
TORONTO GENERAL HOSPITAL: CARDIOVASCULAR ICU	12
TORONTO GENERAL HOSPITAL: MEDICAL SURGICAL ICU	15
TORONTO WESTERN HOSPITAL: MEDICAL, SURGICAL, AND NEUROSURGICAL ICU ...	18
EMERGENCY DEPARTMENT.....	21
MOUNT SINAI HOSPITAL: EMERGENCY DEPARTMENT	21
TORONTO GENERAL HOSPITAL/TORONTO WESTERN HOSPITAL: EMERGENCY DEPARTMENT AND PRINCESS MARGARET REACH	21
GENERAL INTERNAL MEDICINE.....	22
MOUNT SINAI HOSPITAL: GENERAL INTERNAL MEDICINE.....	22
TORONTO GENERAL HOSPITAL: GENERAL INTERNAL MEDICINE	23
TORONTO WESTERN HOSPITAL: GENERAL INTERNAL MEDICINE.....	24
IMMUNOCOMPROMISED HOST	25
PRINCESS MARGARET CANCER CENTRE: LEUKEMIA SERVICE	25

PRINCESS MARGARET CANCER CENTRE: ALLOGENEIC BONE MARROW TRANSPLANT	28
TORONTO GENERAL HOSPITAL: MULTI-ORGAN TRANSPLANT	31
BEST PRACTICE GUIDELINES AND ALGORITHMS	32
RESEARCH.....	33
EDUCATION.....	33
PROVINCIAL ROLE.....	35
NATIONAL ROLE.....	36
STRATEGIC PLANNING	37
APPENDIX 1: FY 14/15 Q4 TOP 5 ANTIMICROBIALS BY USAGE (DDDS PER 100 PATIENT DAYS) AND EXPENDITURES BY ICU SITE.....	38
APPENDIX 2: GENERAL INTERNAL MEDICINE FY 14/15 Q4 TOP 5 ANTIMICROBIALS BY USAGE (DDDS PER 100 PATIENT DAYS) AND EXPENDITURES	39
APPENDIX 3: ANTIMICROBIAL USAGE BY ROUTE OF ADMINISTRATION (TOTAL ANTIMICROBIALS) – GENERAL INTERNAL MEDICINE	40
APPENDIX 4: E. COLI ISOLATES FROM BLOOD AND RESPIRATORY SYSTEM: NON-ESBL VS. ESBL – PRINCESS MARGARET CANCER CENTRE: LEUKEMIA AND ALLOGENEIC BONE MARROW TRANSPLANT	41

“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). We look forward to working with Bridgepoint now that it is part of Sinai Health System.

There is a general trend of decreased consumption and expenditures for antimicrobials in our ICUs, on inpatient General Internal Medicine, and on the Leukemia wards. There are two adult intensive care units (TGH MSICU and CVICU) where increases in expenditures (and consumption) have been identified. A thorough review of the factors involved is being undertaken with the ASP team and ICU site leaders. There is also an increase in expenditures in Allogeneic Bone Marrow Transplant at Princess Margaret Cancer Centre, 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
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	↓	↑



Decrease compared to previous YTD



Increase of < 10% compared to previous YTD



Increase of > 10% compared to previous YTD

FISCAL YEAR 14/15 Q4 HIGHLIGHTS

Research

This quarter, five manuscripts have been submitted to medical journals and are currently undergoing peer review.

Grants Awarded

Approximately \$1.2M CAD has been awarded to ASP this fiscal year.

Best Practices

Several algorithms have been developed, including the **First Episode Clostridium Difficile (CDI) Management Algorithm**, which was implemented into practice across UHN and MSH along with electronic order sets to support the use of the algorithm. TGH, TWH, and PM inpatients were audited for adherence to the CDI Management Algorithm. Education on the CDI algorithm includes in-the-moment education to primary nurses caring for patients with CDI, educational in-services to

multidisciplinary clinicians, and promotion of the CDI eLearning module. During increased CDI activity and outbreaks in inpatient units, additional educational in-services on the CDI algorithm were provided, as well as monitoring and feedback of antimicrobial use.

ASP nurse-focused initiative aimed at reducing overtreatment of **Asymptomatic Bacteriuria**. Key deliverables of this initiative include an updated policy on urine cultures, audit, and feedback to pilot units and educational sessions and urine culture surveys to assess nurse behaviour and sentiment practices towards urine cultures.

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 and to SASS (Students for Antimicrobial Stewardship Society).



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 has completed the on-line course, and three more cohorts are scheduled for 2015.

FISCAL YEAR 14/15 Q4 RESULTS

CRITICAL CARE

Mount Sinai Hospital: Medical Surgical ICU

FY 14/15 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 1.4% compared to last year.
- Antimicrobial costs per patient day decreased (↓) by 26.5% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 5.5% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 31.8% compared to YTD last year.
- NB: Princess Margaret patients accounted for 14% of patient visits and 42% 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 and Costs												
Total Antimicrobial DDDs/100 Patient Days	177	171	144	167	170	167	139	190	146	135	164	167
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	127	123	114	158	117	108	136	123
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	35	36	22	28	25	23	25	36
Total Antimicrobial Costs	\$332,724	\$285,975	\$193,129	\$279,859	\$291,470	\$422,634	\$73,753	\$74,842	\$48,682	\$35,538	\$232,814	\$422,634
Total Antimicrobial Costs/Patient Day	\$69.01	\$59.23	\$40.95	\$59.22	\$62.37	\$85.07	\$63.55	\$63.21	\$43.54	\$32.51	\$62.54	\$85.07
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$125,339	\$134,811	\$108,886	\$21,472	\$27,743	\$28,685	\$15,028	\$92,928	\$108,886
Systemic Antibacterial Costs/Patient Days	\$36.16	\$29.44	\$20.31	\$26.94	\$28.85	\$21.92	\$18.01	\$23.43	\$25.66	\$13.75	\$20.71	\$21.92
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$141,877	\$144,811	\$295,163	\$50,915	\$45,396	\$19,119	\$19,075	\$134,504	\$295,163
Systemic Antifungal Costs/Patient Days	\$29.68	\$27.45	\$18.87	\$30.50	\$30.99	\$59.41	\$42.71	\$38.34	\$17.10	\$17.45	\$40.53	\$59.41
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)	3 (2.74)	7 (1.59)	4 (0.91)
ICU Average Length of Stay (days)	5.84	5.57	5.67	5.51	5.24	6.10	5.42	5.11	5.25	4.97	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	19.7	13.9	15.3
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	5.8	2.6	3.2
ICU Ventilator Days	NA	3286	2934	2677	2749	3069	630	678	607	682	2597	3069
ICU Multiple Organ Dysfunction Score (MODS)	4.00	4.04	4.12	4.25	4.62	4.87	4.97	4.98	4.28	4.68	4.73	4.87
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	n/a	5123	998	1437	1227	1179	4841	5123
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	n/a	1200	182	264	263	199	908	1200

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/).

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 Q4 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)	\$43,892 (\$40.64)	\$43,620 (\$68.05)	\$31,320 (\$32.06)	\$16,562 (\$14.93)	\$135,395 (\$35.56)	\$149,877 (\$37.54)
PMH Patients	\$114,392 (\$179.02)	\$191,928 (\$181.58)	\$182,188 (\$249.91)	\$272,757 (\$317.16)	\$29,861 (\$339.33)	\$31,222 (\$152.3)	\$17,361 (\$68.62)	\$18,975 (\$225.9)	\$97,419 (\$154.63)	\$272,757 (\$317.16)
Total	\$193,129 (\$44.26)	\$279,859 (\$61.97)	\$291,470 (\$69.91)	\$422,634 (\$87.11)	\$73,753 (\$63.14)	\$74,842 (\$88.47)	\$48,682 (\$39.58)	\$35,538 (\$29.79)	\$232,814 (\$52.47)	\$422,634 (\$87.11)

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**

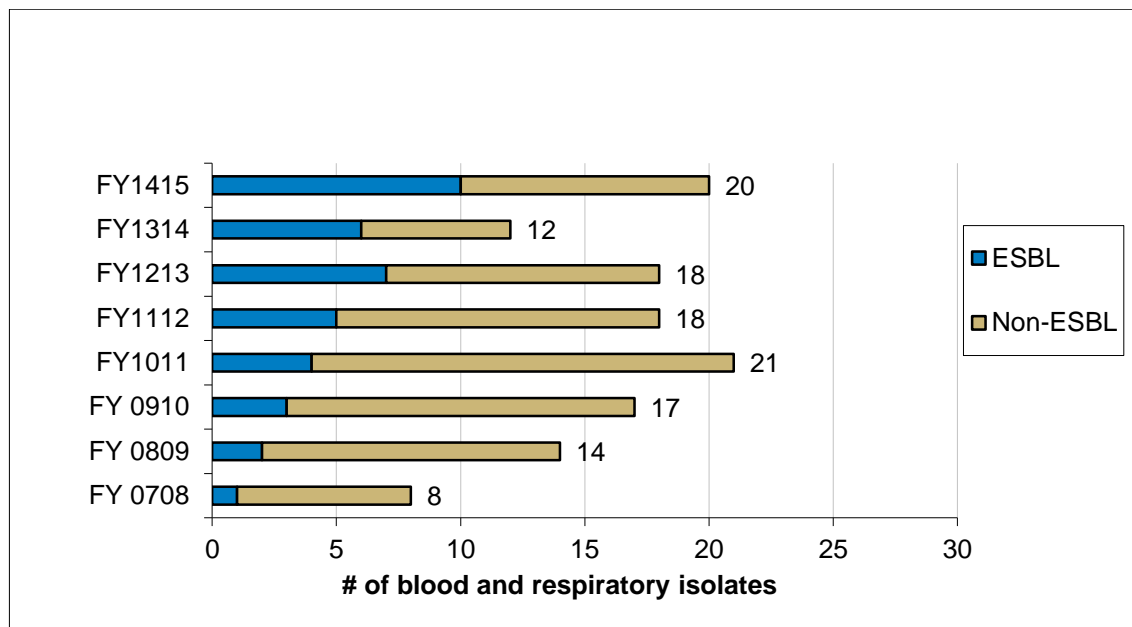
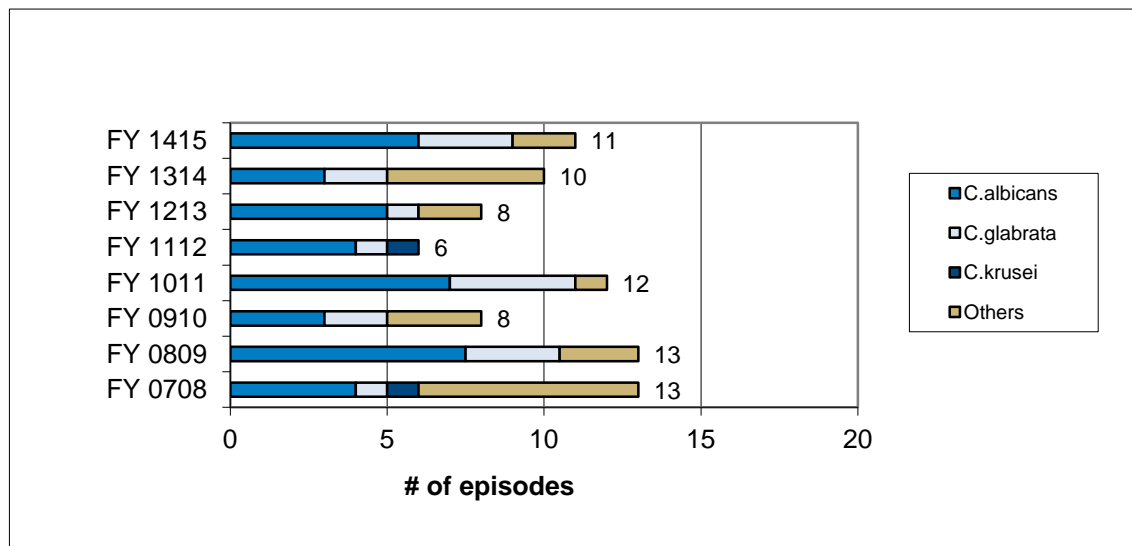
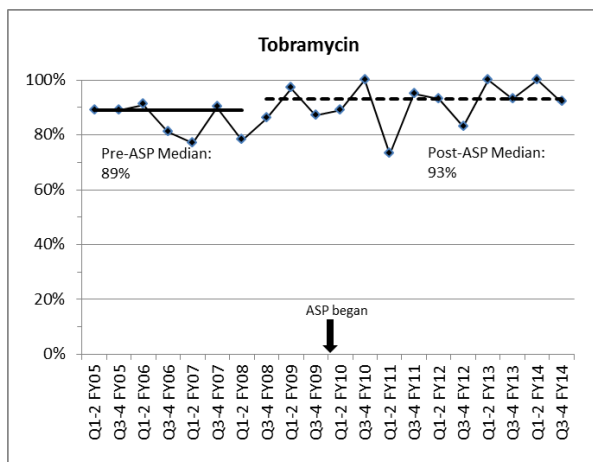
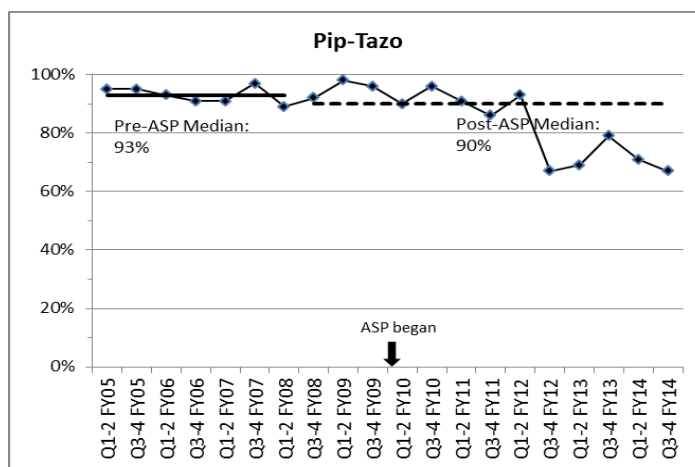
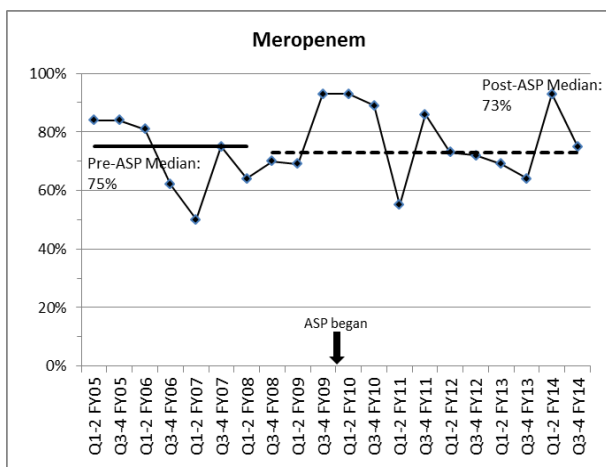
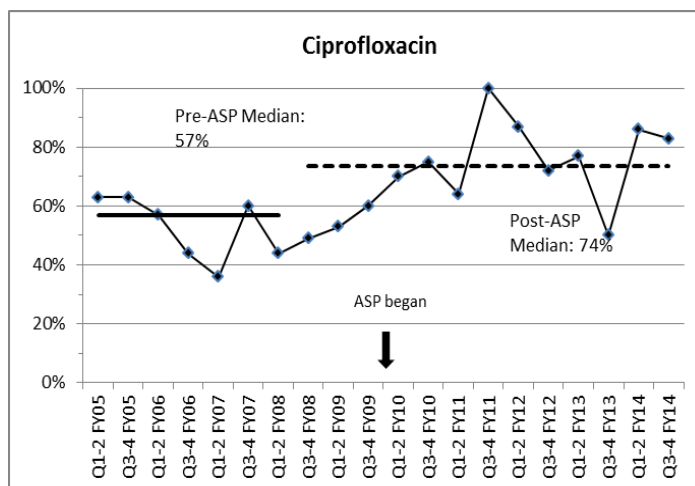
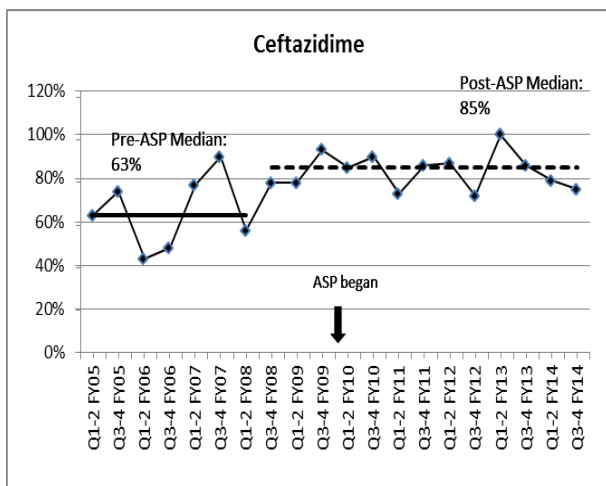


Table 5: Yeast Species Isolated in Blood – Mount Sinai Hospital: Medical Surgical ICU



MSH ICU Pseudomonas Susceptibility



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 Q4 highlights include:

- Antimicrobial days of therapy (DOT) per 100 patient days decreased (↓) by 32.2% compared to YTD last year.
- Antimicrobial costs per patient day have decreased (↓) by 42.1% compared to YTD last year (\$2.17 to \$1.26).

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 and Costs									
Total Antimicrobial DOTs/100 Patient Days	67.3	55.4	49.4	31.0	36.2	33.6	32.7	33.5	49.4
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.5	48.7	30.8	36.0	32.5	31.3	32.7	48.7
Systemic Antifungal DOTs/100 Patient Days	2.2	1.8	0.7	0.3	0.2	1.1	1.4	0.8	0.7
Total Antimicrobial Costs	\$16,415	\$17,682	\$26,162	\$4,945	\$6,038	\$5,635	\$4,754	\$21,371	\$26,162
Total Antimicrobial Costs/Patient Day	\$1.31	\$1.51	\$2.17	\$1.26	\$1.42	\$1.25	\$1.11	\$1.26	\$2.17
Systemic Antibacterial Costs	\$14,783	\$16,505	\$25,290	\$4,939	\$5,597	\$5,277	\$4,704	\$20,516	\$25,290
Systemic Antibacterial Costs/Patient Days	\$1.18	\$1.41	\$2.10	\$1.26	\$1.31	\$1.17	\$1.09	\$1.21	\$2.10
Systemic Antifungal Costs	\$1,632	\$1,177	\$872	\$5	\$441	\$358	\$50	\$855	\$872
Systemic Antifungal Costs/Patient Days	\$0.13	\$0.10	\$0.07	\$0.001	\$0.10	\$0.08	\$0.01	\$0.05	\$0.07

Notes: Effective January 15, 2014, the NICU changed to a mixed-acuity model of care. Prior to this, ASP reported level 3 pharmacy data only. As of January 15, pharmacy data includes both level 2 and level 3 usage and cost. Patient days include both level 2 and 3 days; January level 2 days were determined by dividing the total days for the month by 2, since the change occurred midway through the month.

Days of Therapy (DOT) was used as the metric for antimicrobial consumption, which is considered to be the standard for neonates.

Patient Care Outcome data is underway.

Toronto General Hospital: Cardiovascular ICU

FY 14/15 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 5.9% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 20.3% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 6.8% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 73.2% compared to YTD last year. (Note: The majority of this increase was driven by the heart transplant antifungal prophylaxis regimen, however there is a downward trend in Q3 and Q4.)

Table 7: Toronto General Hospital: Cardiovascular ICU

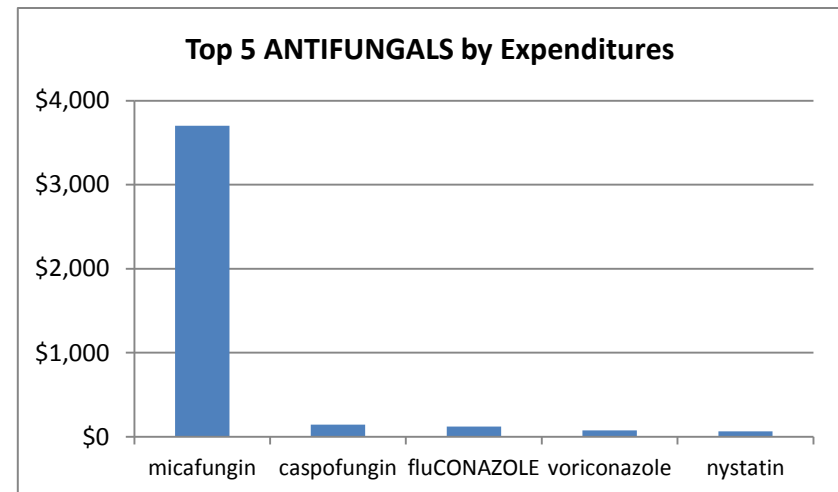
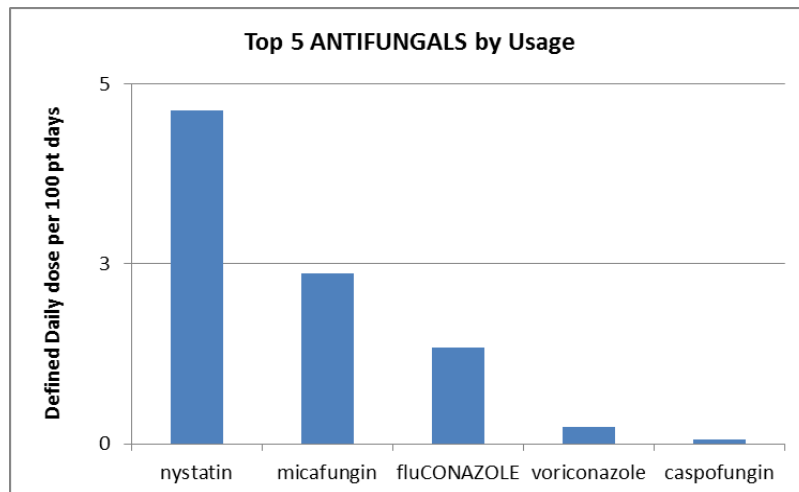
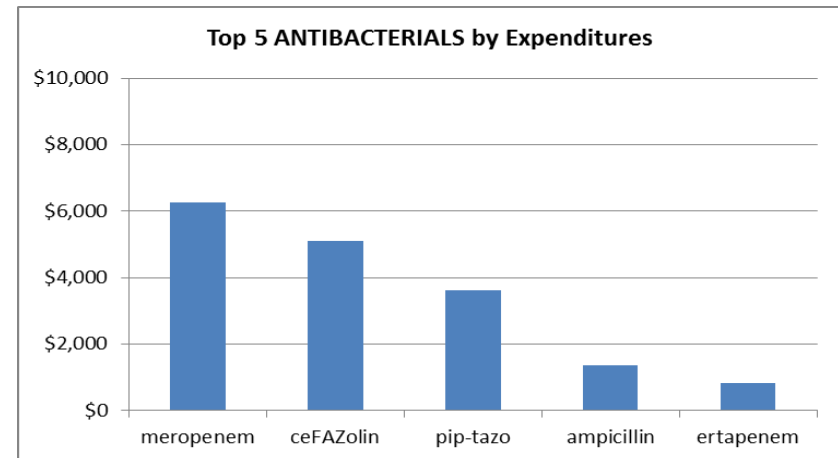
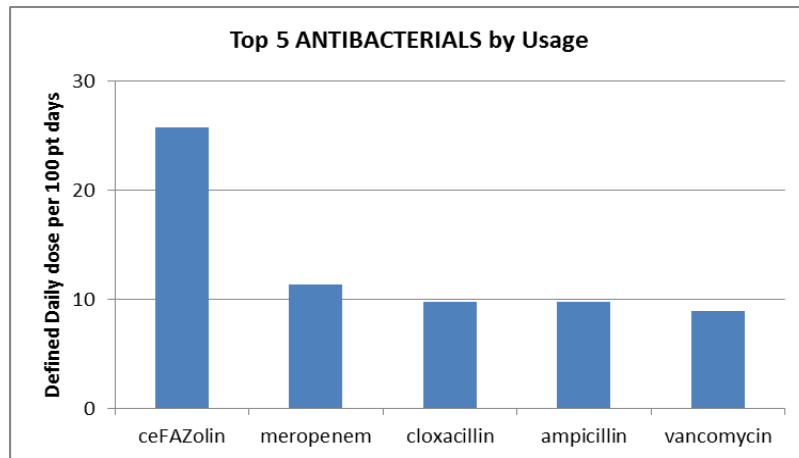
Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY 12/13	FY 13/14	FY 14/15 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs										
Total Antimicrobial DDDs/100 Patient Days	105	98	102	97	113	97	94	105	102	97
Systemic Antibacterial DDDs/100 Patient Days	95	86	89	86	102	87	87	97	93	86
Systemic Antifungal DDDs/100 Patient Days	10	12	13	11	11	9	8	9	9	11
Total Antimicrobial Costs	\$108,172	\$108,464	\$85,916	\$100,736	\$41,955	\$35,869	\$25,126	\$26,363	\$129,314	\$100,736
Total Antimicrobial Costs/Patient Day	\$18.20	\$19.06	\$14.99	\$17.00	\$25.82	\$23.47	\$15.65	\$16.88	\$20.46	\$17.00
Systemic Antibacterial Costs	\$100,375	\$99,261	\$74,232	\$80,204	\$22,588	\$26,402	\$20,124	\$22,252	\$91,366	\$80,204
Systemic Antibacterial Costs/Patient Days	\$16.89	\$17.44	\$12.95	\$13.54	\$13.90	\$17.28	\$12.53	\$14.25	\$14.45	\$13.54
Systemic Antifungal Costs	\$7,797	\$9,204	\$11,684	\$20,532	\$19,367	\$9,467	\$5,002	\$4,111	\$37,948	\$20,532
Systemic Antifungal Costs/Patient Days	\$1.31	\$1.62	\$2.04	\$3.47	\$11.92	\$6.20	\$3.11	\$2.63	\$6.00	\$3.47
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)	4 (2.56)	7 (1.11)	7 (1.18)
ICU Average Length of Stay (days)	3.12	2.95	2.97	3.20	3.04	3.65	3.62	3.53	3.46	3.2
ICU Mortality Rate (as a %)	3.5	3.0	3.0	4.6	3.5	6.3	4.3	4.6	4.6	4.6
ICU Readmission Rate within 48 hrs (as a %)	1.6	2.2	1.8	2.2	1.3	2.3	4.2	1.6	2.4	2.2
Central Line Infection Rate (per 1000 pt days)	0.73	0.17	0.34	0.16	0.0	0.64	0.00	0.0	0.2	0.16
Ventilator Associated Pneumonia Rate (per 1000 pt days)	2.99	2.80	1.91	1.73	2.69	4.00	4.16	0.0	2.81	1.73
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.51	5.77	5.70	5.60	5.76	5.1	5.60	5.77
ICU Ventilator Days	3015	3571	3676	4049	1116	1003	961	845	3925	4049
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	2113	2147	1429	1460	7149	n/a
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	682	669	80	104	1535	n/a

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/).

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 Q4 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**

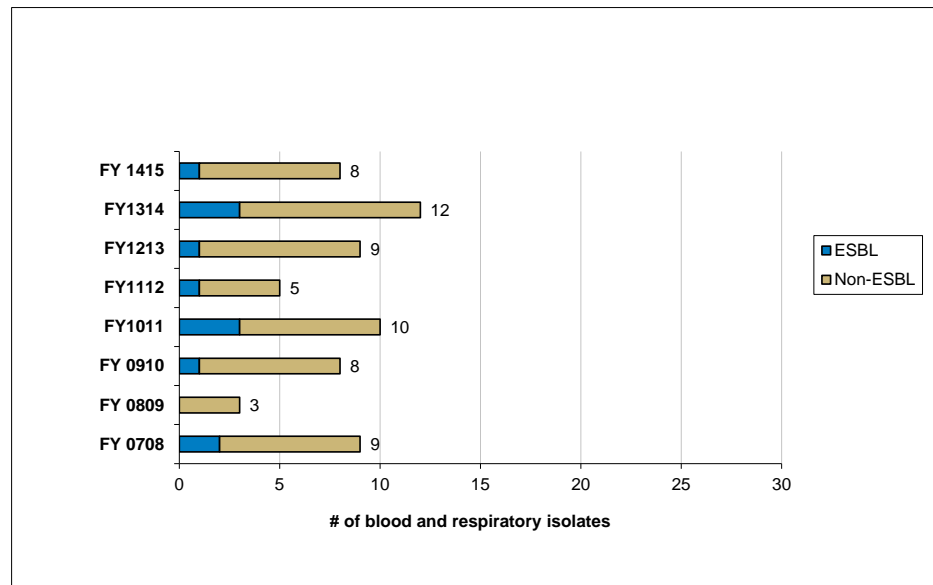
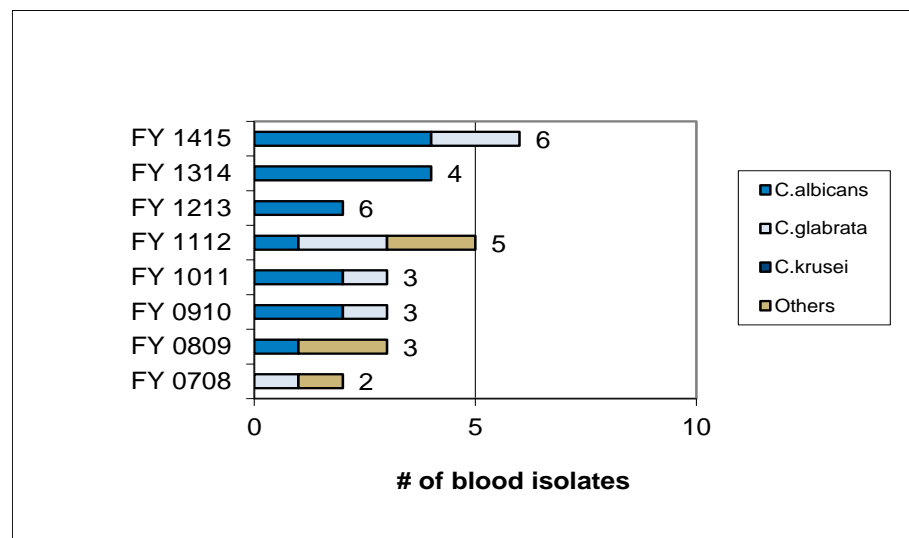


Table 10: Yeast Species Isolated in Blood – Toronto General Hospital Cardiovascular ICU



Toronto General Hospital: Medical Surgical ICU

FY 14/15 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 8.6% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 10.5% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 22.1% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 3.2% compared to YTD 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 and Costs											
Total Antimicrobial DDDs/100 Patient Days	266	209	199	213	217	211	256	209	265	235	217
Systemic Antibacterial DDDs/100 Patient Days	184	155	143	159	156	156	197	155	193	175	156
Systemic Antifungal DDDs/100 Patient Days	82	55	55	54	61	55	58	54	73	60	61
Total Antimicrobial Costs	\$701,451	\$629,472	\$567,532	\$473,613	\$584,018	\$143,079	\$154,439	\$189,913	\$199,146	\$686,577	\$584,018
Total Antimicrobial Costs/Patient Day	\$102.52	\$84.06	\$76.93	\$63.75	\$75.71	\$68.92	\$74.64	\$93.09	\$98.44	\$83.65	\$75.71
Systemic Antibacterial Costs	\$390,209	\$375,436	\$292,355	\$231,171	\$225,557	\$61,329	\$83,205	\$68,345	\$80,247	\$293,126	\$225,557
Systemic Antibacterial Costs/Patient Days	\$57.03	\$50.14	\$39.63	\$31.12	\$29.24	\$29.54	\$40.22	\$33.50	\$39.67	\$35.71	\$29.24
Systemic Antifungal Costs	\$311,242	\$254,036	\$275,176	\$242,443	\$358,461	\$81,749	\$71,234	\$121,568	\$118,899	\$393,451	\$358,461
Systemic Antifungal Costs/Patient Days	\$45.49	\$33.93	\$37.30	\$32.63	\$46.47	\$39.38	\$34.43	\$59.59	\$58.77	\$47.94	\$46.47
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)	1 (0.49)	10 (1.22)	12 (1.56)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.79	8.22	7.53	8.77	8.57	7.58	8.08	8.22
ICU Mortality Rate (as a %)	16.2	15.7	16.3	16.0	17.8	16.0	16.4	15.7	20.4	17.2	17.8
ICU Readmission Rate w ithin 48 hrs (as a %)	3.8	4.4	4.4	2.8	3.5	4.5	2.5	2.3	2.3	3.0	3.5
ICU Ventilator Days	5399	6256	6507	6458	24620	1764	1847	1818	1901	7330	24620
Apache II score	n/a	n/a	16.1	15.775	15.9	15.2	14.4	14.6	16.2	15.1	15.9
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	n/a	2113.0	2147	2011	2565	8836	n/a
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	n/a	682.0	669	716	723	2790	n/a

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/).

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 Q4 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

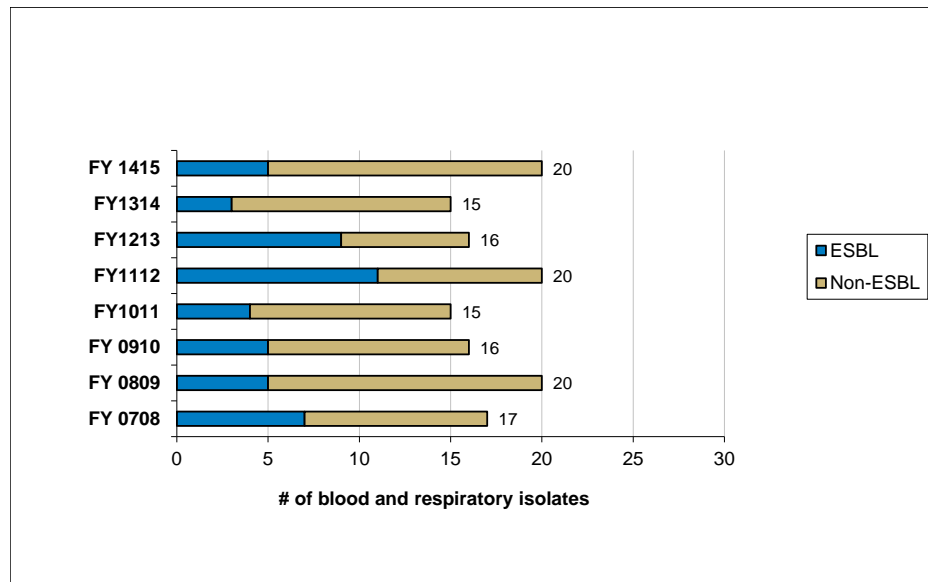
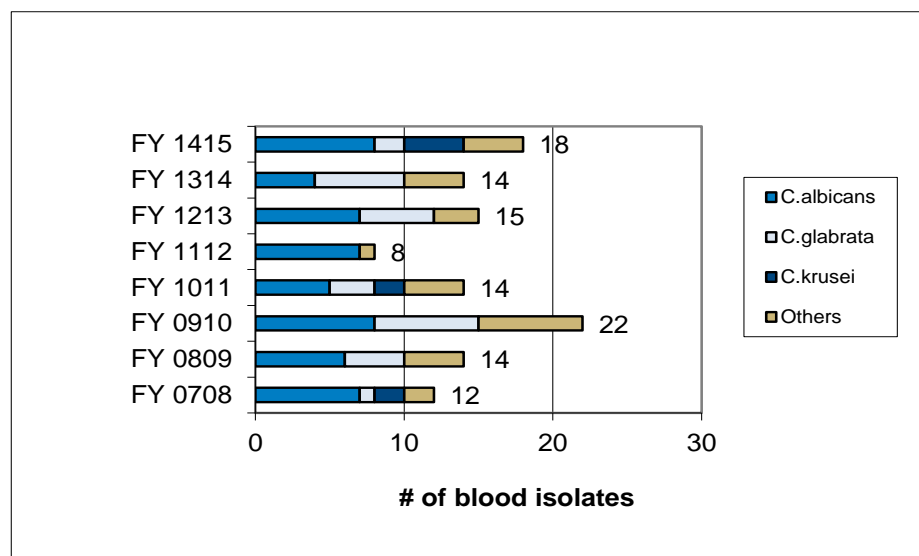
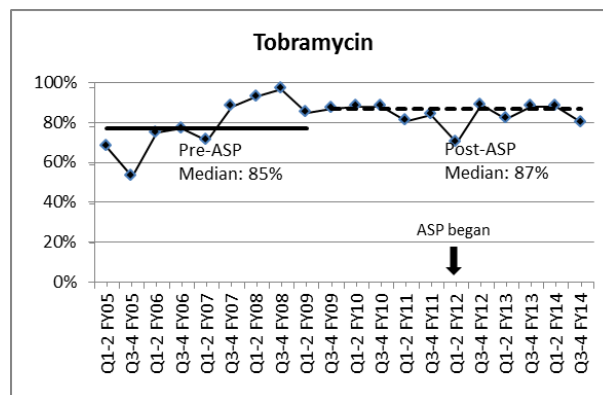
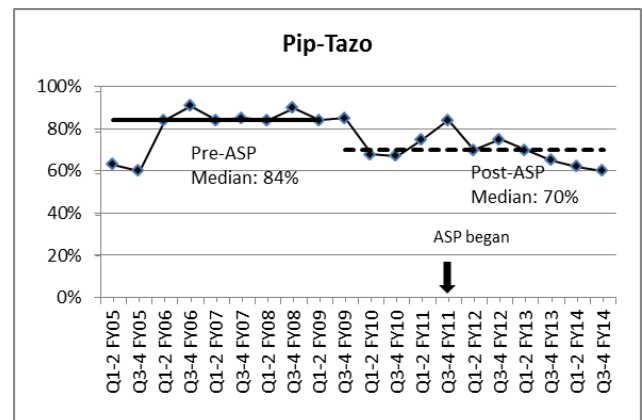
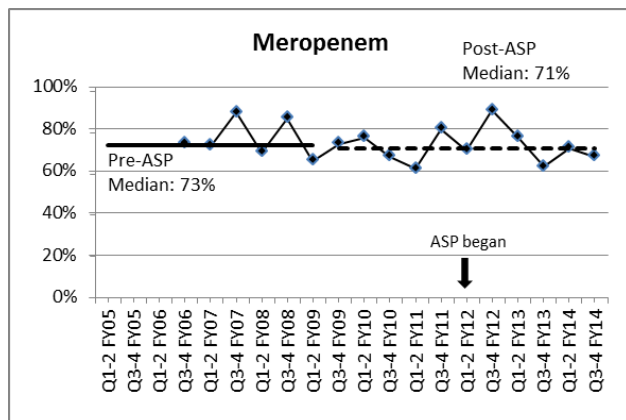
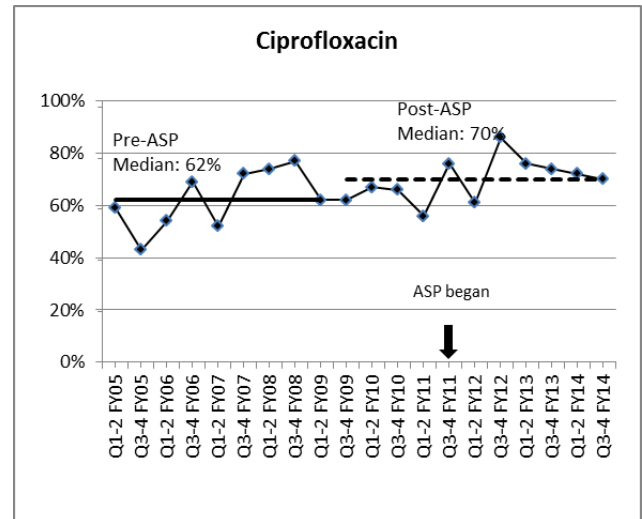
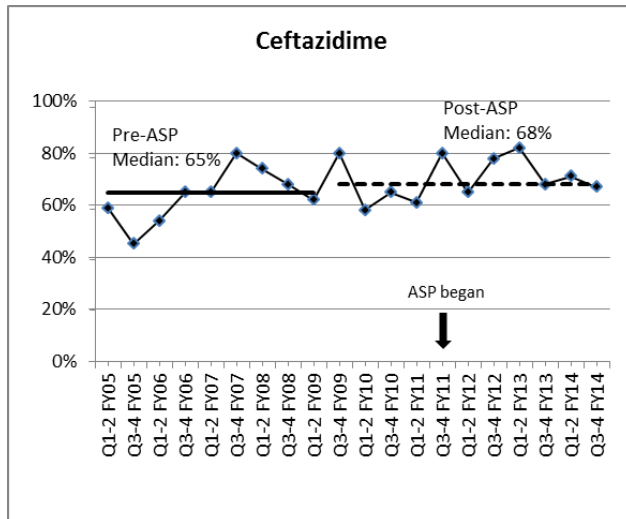


Table 13: Yeast Species Isolated in Blood – Toronto General Hospital: Medical Surgical ICU



TGH MSICU Pseudomonas Susceptibility



Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU

FY 14/15 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 27.0% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 11.3% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 19.4% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 8.9% compared to YTD 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 and Costs												
Total Antimicrobial DDDs/100 Patient Days	99	88	79	83	83	92	67	63	65	73	67	92
Systemic Antibacterial DDDs/100 Patient Days	92	78	73	77	78	86	63	57	60	66	62	86
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	5	6	4	6	5	7	5	6
Total Antimicrobial Costs	\$136,758	\$100,408	\$101,191	\$105,899	\$102,978	\$120,538	\$27,064	\$28,314	\$22,981	\$59,654	\$138,014	\$120,538
Total Antimicrobial Costs/Patient Day	\$18.16	\$13.24	\$13.17	\$13.60	\$13.37	\$13.49	\$9.21	\$9.77	\$8.16	\$20.76	\$11.97	\$13.49
Systemic Antibacterial Costs	\$123,314	\$87,445	\$79,280	\$89,784	\$70,099	\$85,916	\$20,587	\$22,878	\$19,572	\$26,345	\$89,382	\$85,916
Systemic Antibacterial Costs/Patient Days	\$16.37	\$11.53	\$10.32	\$11.53	\$9.10	\$9.61	\$7.00	\$7.90	\$6.95	\$9.17	\$7.75	\$9.62
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$16,115	\$32,879	\$34,623	\$6,477	\$5,436	\$3,409	\$33,309	\$48,631	\$34,623
Systemic Antifungal Costs/Patient Days	\$1.79	\$1.71	\$2.85	\$2.07	\$4.27	\$3.87	\$2.20	\$1.88	\$1.21	\$11.59	\$4.22	\$3.87
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)	0 (0.00)	10 (1.16)	12 (1.34)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.71	7.98	7.68	8.43	8.95	7.17	10.65	8.7	7.68
ICU Mortality Rate (as a %)	19.6	19.9	18.1	17.0	16.4	17.1	22.5	17.4	16.5	19.2	19	17.1
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	2.68	3.40	3.85
ICU Ventilator Days	4617	6305	5960	5578	4947	5523	1501	1403	1108	1168	5180	5523
ICU Apache II Score	15.0	14.7	13.7	13.8	12.9	12.8	13.9	13.1	12.4	13.2	13.2	12.8
Antibacterial Days of Therapy	n/a	n/a	n/a	n/a	n/a	n/a	1275	1454	1126	1319	5174	n/a
Antifungal Days of Therapy	n/a	n/a	n/a	n/a	n/a	n/a	95	115	57	123	390	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/).

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 Q4 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

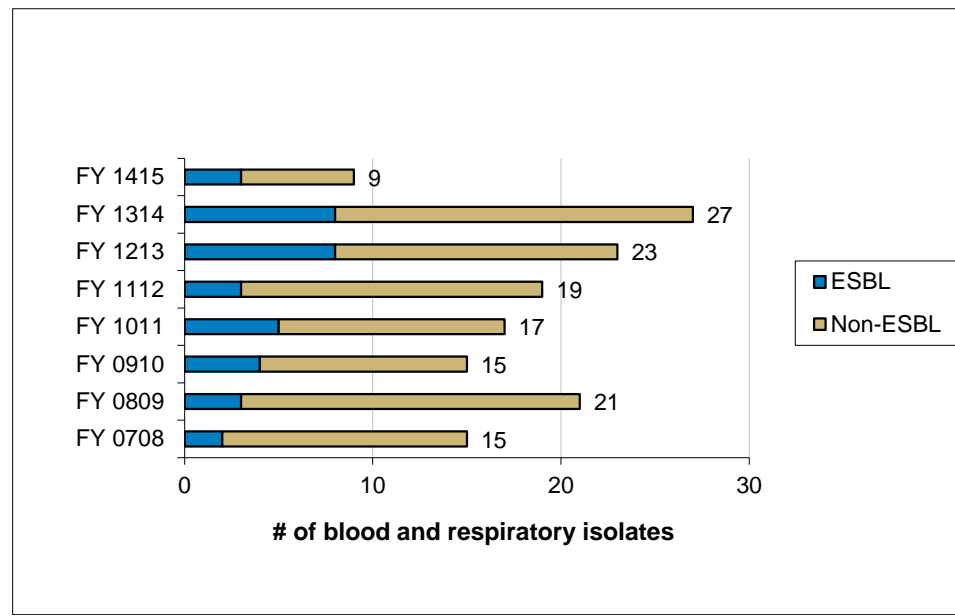
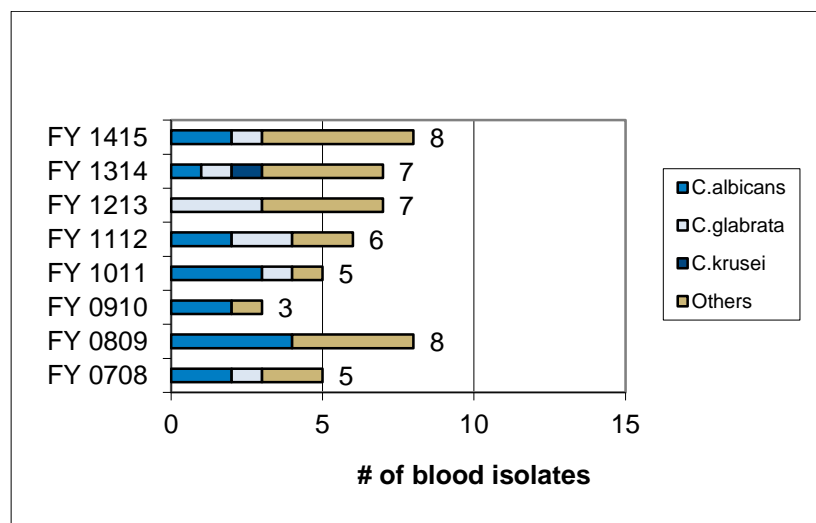
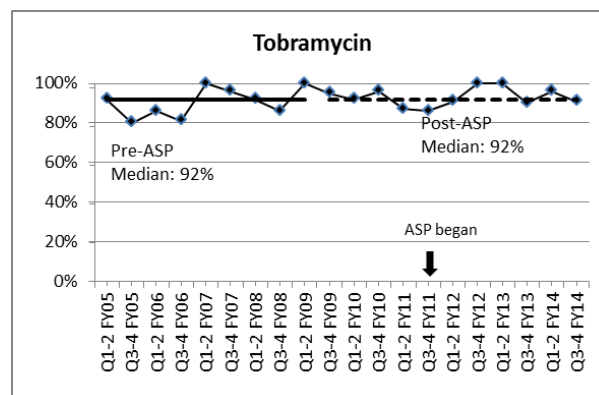
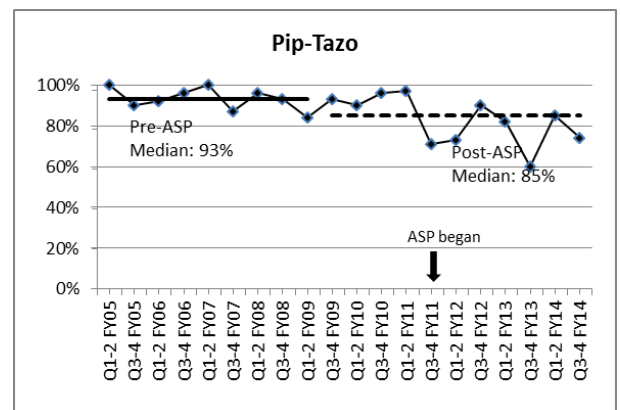
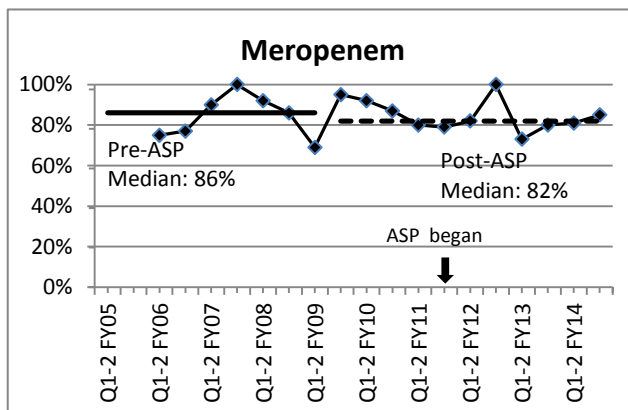
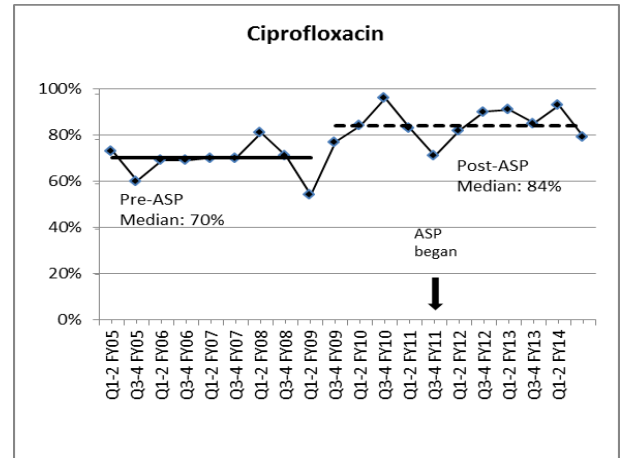
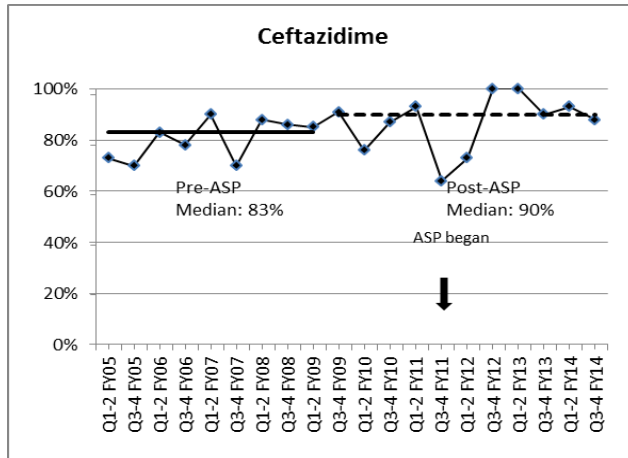


Table 16: Yeast Species Isolated in Blood – Toronto Western Hospital: Medical, Surgical, and Neurosurgical ICU



TWH ICU Pseudomonas Susceptibility



EMERGENCY DEPARTMENT

Mount Sinai Hospital: Emergency Department

FY 14/15 Q4 highlights include:

Sepsis Project

SNAP (Sepsis Now A Priority) Project: The SNAP algorithm continues to be effectively utilized in the Mount Sinai Emergency Department: targets are being met 90% of the time. In February, the sepsis pre-printed order set and algorithm were revised based on healthcare provider feedback in order to be more effective in practice. Data continues to be collected and reported back to frontline staff via weekly SNAP scorecards to highlight the patients who are being entered into the algorithm and if algorithm timelines are being met.

In addition to the three-month chart audit, a six-month project is currently underway 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 Q4 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 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 8.5% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 3.4% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 2.4% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 24.6% compared to YTD 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 and Costs								
Total Antimicrobial DDDs/100 Patient Days	58	45	50	53	47	44	48	45
Systemic Antibacterial DDDs/100 Patient Days	53	41	43	49	43	38	43	41
Systemic Antifungal DDDs/100 Patient Days	3	3	5	4	3	2	3	3
Total Antimicrobial Costs	\$125,012	\$123,737	\$34,962	\$36,096	\$27,837	\$29,765	\$128,661	\$123,737
Total Antimicrobial Costs/Patient Day	\$5.74	\$3.76	\$4.10	\$4.15	\$3.22	\$3.11	\$3.63	\$3.76
Systemic Antibacterial Costs	\$105,621	\$99,731	\$24,251	\$30,922	\$25,042	\$24,606	\$104,822	\$99,731
Systemic Antibacterial Costs/Patient Days	\$4.85	\$3.03	\$2.84	\$3.56	\$2.89	\$2.57	\$2.96	\$3.03
Systemic Antifungal Costs	\$15,422	\$20,153	\$9,106	\$4,740	\$1,815	\$690	\$16,352	\$20,153
Systemic Antifungal Costs/Patient Days	\$0.71	\$0.61	\$1.07	\$0.55	\$0.21	\$0.07	\$0.46	\$0.61
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)	1 (0.16)	7 (0.27)	8 (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/).

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 Q4 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 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 0.3% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 26.4% compared to YTD last year for TGH.
- Antibacterial costs per patient day decreased (↓) by 3.2% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 47.6% compared to YTD 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 and Costs								
Total Antimicrobial DDDs/100 Patient Days	87	83	72	70	84	108	83	83
Systemic Antibacterial DDDs/100 Patient Days	77	70	66	62	75	92	73	70
Systemic Antifungal DDDs/100 Patient Days	11	13	6	8	9	16	10	13
Total Antimicrobial Costs	\$279,644	\$471,342	\$55,318	\$69,655	\$107,725	\$119,339	\$352,036	\$471,342
Total Antimicrobial Costs/Patient Day	\$14.10	\$18.05	\$8.12	\$10.25	\$16.02	\$19.43	\$13.30	\$18.05
Systemic Antibacterial Costs	\$171,817	\$225,491	\$37,386	\$54,197	\$64,416	\$65,399	\$221,389	\$225,491
Systemic Antibacterial Costs/Patient Days	\$8.67	\$8.64	\$5.49	\$7.97	\$9.58	\$10.65	\$8.36	\$8.64
Systemic Antifungal Costs	\$107,827	\$245,851	\$17,941	\$15,458	\$43,309	\$53,940	\$130,647	\$245,851
Systemic Antifungal Costs/Patient Days	\$5.44	\$9.42	\$2.63	\$2.27	\$6.44	\$8.78	\$4.93	\$9.42
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)	1 (0.16)	15 (0.68)	16 (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/).

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 Q4 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 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 9.4% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 33.7% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 23.8% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 75.6% compared to YTD 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 and Costs								
Total Antimicrobial DDDs/100 Patient Days	44	47	42	43	43	41	42	47
Systemic Antibacterial DDDs/100 Patient Days	41	44	40	40	39	38	40	44
Systemic Antifungal DDDs/100 Patient Days	3	3	2	3	4	3	3	3
Total Antimicrobial Costs	\$74,737	\$115,919	\$26,879	\$29,457	\$29,440	\$25,114	\$110,889	\$115,919
Total Antimicrobial Costs/Patient Day	\$4.36	\$5.01	\$3.30	\$3.45	\$3.48	\$3.03	\$3.32	\$5.01
Systemic Antibacterial Costs	\$60,999	\$93,779	\$26,480	\$28,490	\$24,999	\$23,111	\$103,080	\$93,779
Systemic Antibacterial Costs/Patient Days	\$3.56	\$4.05	\$3.26	\$3.34	\$2.95	\$2.79	\$3.09	\$4.05
Systemic Antifungal Costs	\$13,738	\$22,140	\$399	\$967	\$4,441	\$2,004	\$7,810	\$22,140
Systemic Antifungal Costs/Patient Days	\$0.80	\$0.96	\$0.05	\$0.11	\$0.52	\$0.24	\$0.23	\$0.96
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)	3 (0.36)	11 (0.33)	14 (0.6)

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/).

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 Q4 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](#).

IMMUNOCOMPROMISED HOST

Princess Margaret Cancer Centre: Leukemia Service

FY 14/15 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 4.3% compared to YTD last year.
- Antimicrobial costs per patient day decreased (↓) by 17.6% compared to YTD last year.
- Antibacterial costs per patient day decreased (↓) by 13.1% compared to YTD last year.
- Antifungal costs per patient day decreased (↓) by 19.7% compared to YTD last year.

Table 20: Princess Margaret Cancer Centre: Leukemia Service

Indicators						FY14/15 Performance					YTD of Previous Year
	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage and Costs											
Total Antimicrobial DDDs/100 Patient Days	295	270	239	250	255	232	266	239	238	244	255
Systemic Antibacterial DDDs/100 Patient Days	191	163	134	146	138	132	145	128	138	136	138
Systemic Antifungal DDDs/100 Patient Days	104	107	105	104	117	100	120	111	99	108	117
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$1,310,857	\$1,695,539	\$1,534,499	\$368,143	\$425,519	\$246,826	\$372,316	\$1,412,805	\$1,534,499
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$115.13	\$128.91	\$117.10	\$104.68	\$116.14	\$64.95	\$101.56	\$96.46	\$117.10
Systemic Antibacterial Costs	\$659,034	\$609,747	\$663,175	\$422,438	\$485,263	\$107,426	\$131,409	\$111,346	\$121,417	\$471,597	\$485,263
Systemic Antibacterial Costs/Patient Days	\$62.28	\$57.33	\$58.24	\$45.85	\$37.03	\$30.54	\$35.86	\$29.30	\$33.12	\$32.20	\$37.03
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$647,637	\$1,092,448	\$1,049,236	\$260,718	\$294,110	\$135,480	\$250,900	\$941,208	\$1,049,236
Systemic Antifungal Costs/Patient Days	\$104.84	\$96.99	\$56.88	\$83.06	\$80.07	\$74.13	\$80.27	\$35.65	\$68.44	\$64.26	\$80.07
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)	3 (0.82)	13 (0.89)	11 (0.84)

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/).

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

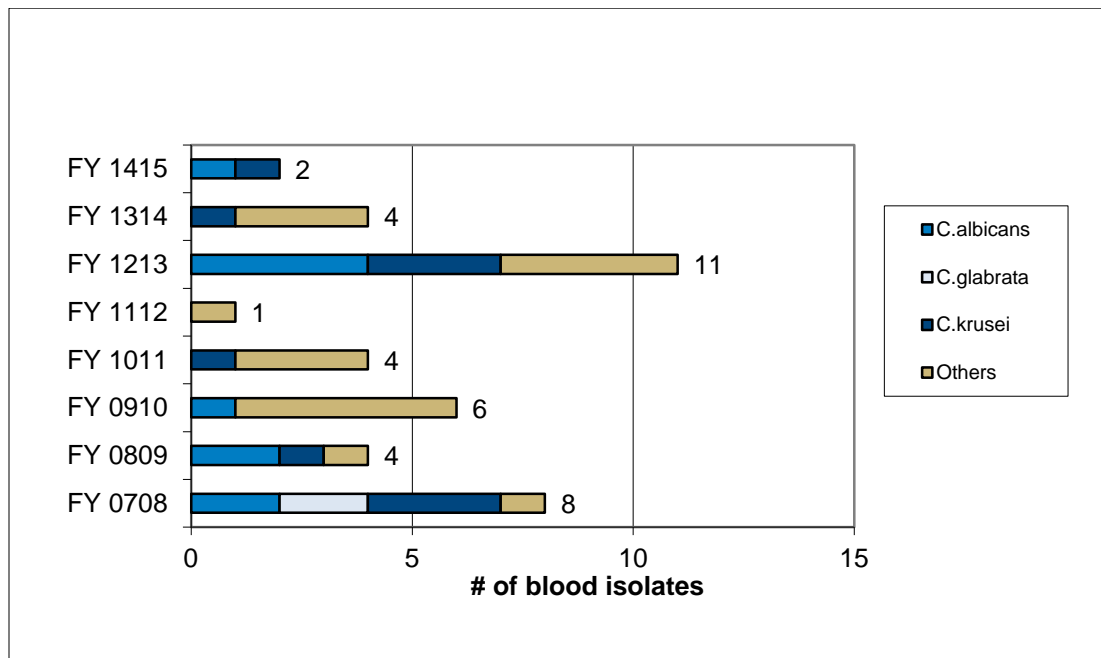
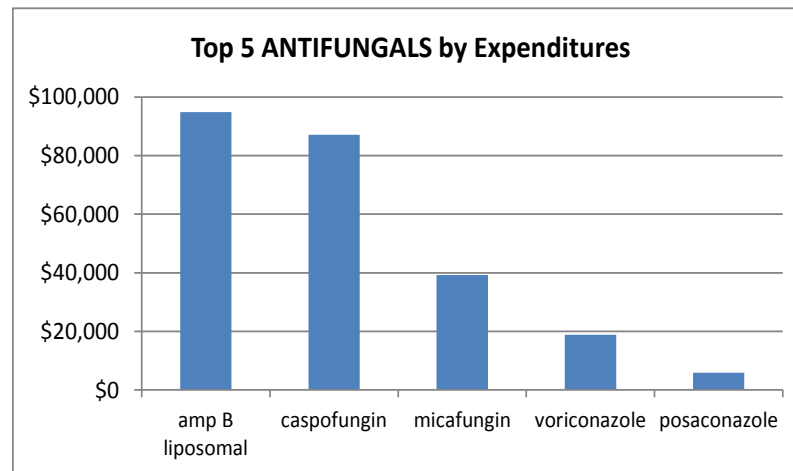
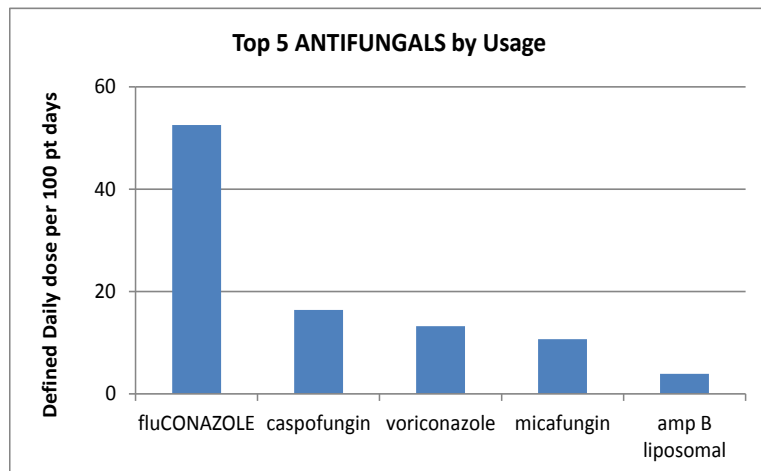
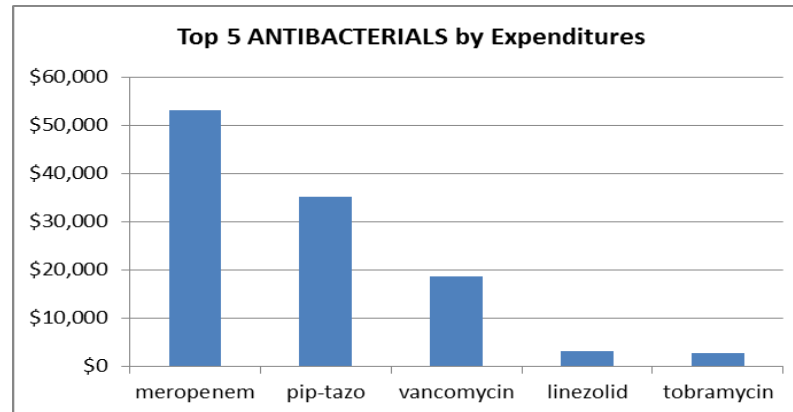
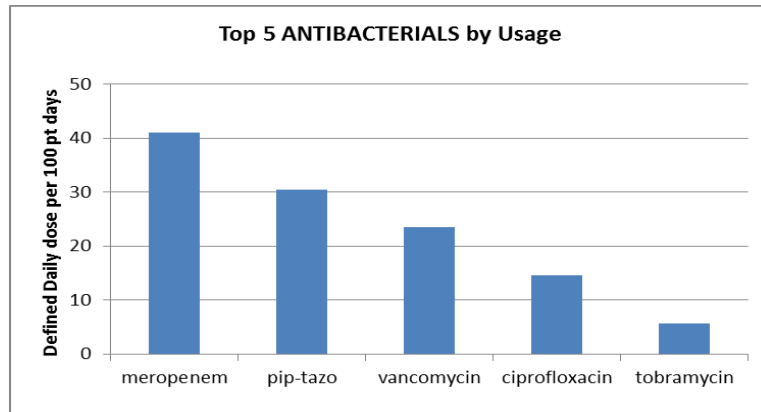


Table 22: Princess Margaret Cancer Centre: Leukemia FY 14/15 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures



Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant

FY 14/15 Q4 highlights include:

- Antimicrobial consumption (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 0.7% compared to YTD last year.
- Antimicrobial costs per patient day increased (↑) by 23.9% compared to YTD last year.
- Antibacterial costs per patient day increased (↑) by 4.5% compared to YTD last year.
- Antifungal costs per patient day increased (↑) by 28.2% compared to YTD last year.
- Note: The ASP team started prospective audit and feedback rounds with the Allogeneic BMT team in September 2014 (Q3).

Table 23: 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 and Costs							
Total Antimicrobial DDDs/100 Patient Days	172	169	179	173	163	171	172
Systemic Antibacterial DDDs/100 Patient Days	114	106	116	98	94	104	114
Systemic Antifungal DDDs/100 Patient Days	59	63	63	75	68	67	59
Total Antimicrobial Costs	\$416,614	\$134,492	\$130,570	\$129,470	\$117,767	\$512,300	\$416,614
Total Antimicrobial Costs/Patient Day	\$85.65	\$112.83	\$107.20	\$105.86	\$98.63	\$106.13	\$85.65
Systemic Antibacterial Costs	\$75,219	\$20,024	\$19,834	\$19,364	\$18,816	\$78,038	\$75,219
Systemic Antibacterial Costs/Patient Days	\$15.46	\$16.80	\$16.28	\$15.83	\$15.76	\$16.17	\$15.46
Systemic Antifungal Costs	\$341,395	\$114,468	\$110,736	\$110,106	\$98,951	\$434,261	\$341,395
Systemic Antifungal Costs/Patient Days	\$70.19	\$96.03	\$90.92	\$90.03	\$82.87	\$89.97	\$70.19
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)	1 (0.84)	12 (2.49)	4 (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/).

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 2014/15.**

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 24: Princess Margaret Cancer Centre: Allogeneic Bone Marrow Transplant 14/15 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 patient days) and Expenditures

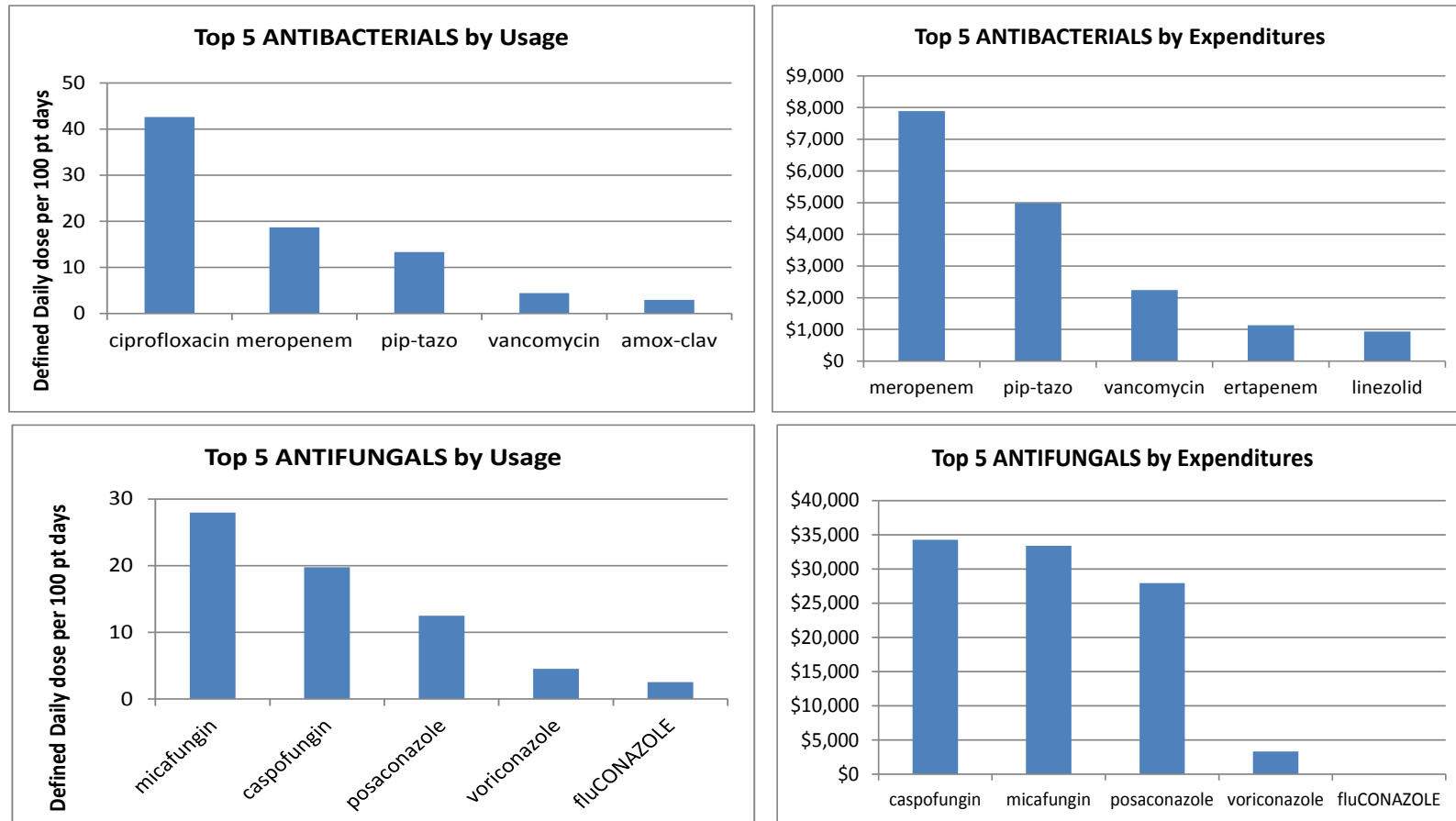
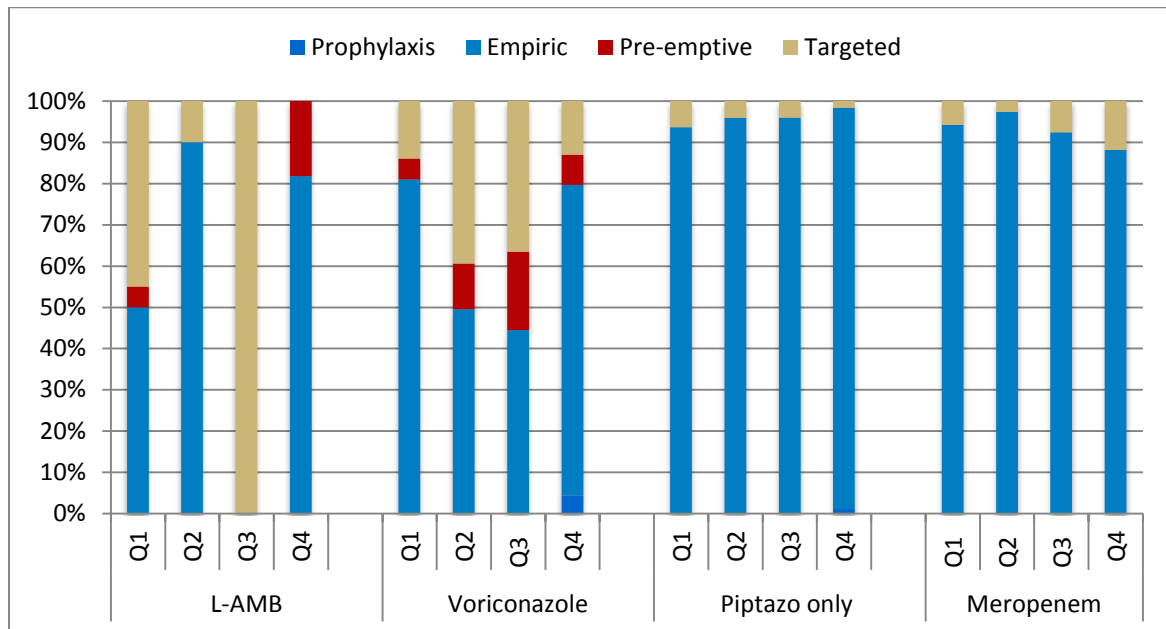
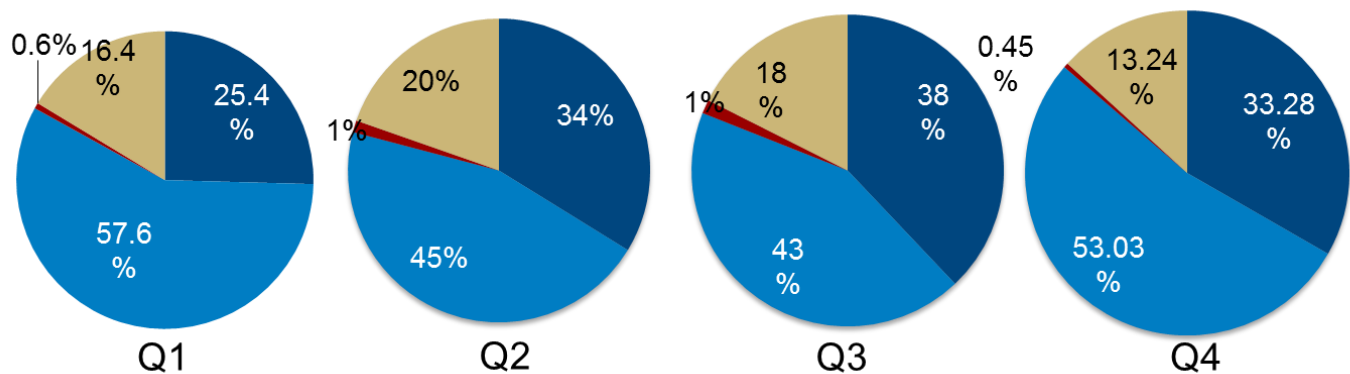


Table 25: Princess Margaret Cancer Centre: Febrile Neutropenia Drugs of Select Antimicrobials in Four Rolling Quarters



■ Prophylaxis ■ Pre-emptive ■ Empiric ■ Targeted



Toronto General Hospital: Multi-Organ Transplant

FY 14/15 Q4 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 approved and has been posted on the ASP website. A series of education sessions has been undertaken targeting various clinical end-user groups at all sites. We will continue to audit compliance to the High-Risk Protocol. Dr. Husain and Miranda So have been working with Autologous Bone Marrow Transplant Team to align our approach to the management and prevention of neutropenic fever for their patients in the ambulatory setting (day hospital).
- The Febrile Neutropenia Protocol for Solid Tumor and Lymphoma Patients was also updated and approved. 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.
- The ASP has completed baseline 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). Miranda So and Dr. Husain are working closely with the nurse practitioners to determine the project plan moving forward.
- 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, as well as 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 published, or are accepted for publication and are currently 'in press', in peer reviewed medical journals:

- 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*. 2015 May 15;60(10):1451-61. **(Lead article and Editor's choice)**
- 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*. 2015 May;70(5):1539-46 **(Featured in NEJM ID Journal Watch)**
- 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* 2015 Mar 11. doi: 10.1016/j.ajic. 2015.01.031. [Epub ahead of print]
- 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* [in press].
- 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*. [in press]

An additional five manuscripts have been submitted to medical journals and are currently undergoing peer review.

Grants Awarded:

- 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. \$169,695 CDN
 - Principal Investigators: Warren McIsaac, Andrew Morris
 - Co-investigators: Chaim Bell, Lianne Jeffs, Jeff Bloom, David Tannenbaum
 - Collaborators: Yoshiko Nakamachi, Linda Dresser, Mark McIntyre

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) to provide efficient access to resources.
- Twice a month the ASP team meets with all Nurse Practitioners from the Malignant Hematology programs for case rounds.
- The ASP team presented at Leukemia Academic Grand Rounds on "C. difficile infection in Immunocompromised Host" and also reviewed the algorithm with attendees.

- 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 Sciences 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 has been supporting and assisting the project Hub Leads secure Spoke sites. On February 6, the MSH-UHN ASP, in collaboration with the Council of Academic Hospitals of Ontario (CAHO) and Health Quality Ontario (HQP), hosted a 'train the trainer day'. This daylong event allowed the four project Hub Leads to come together, ask questions and learn key tips and tricks to allow them to lead the Spoke sites successfully through the different project phases. The MSH-UHN ASP program also led a project teleconference in March for both the Hub and Spoke sites. This teleconference allowed an opportunity for Hub and Spoke sites to network, as well as to discuss the data collection aspect of the project.

Expert Consultation

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

The ASP team has also been providing expert guidance to SASS (Students for Antimicrobial Stewardship Society) to create awareness and promote antimicrobial stewardship principles to the next generation of prescribers.



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 completed the course, and three more cohorts are scheduled for 2015.

Public Health Agency of Canada

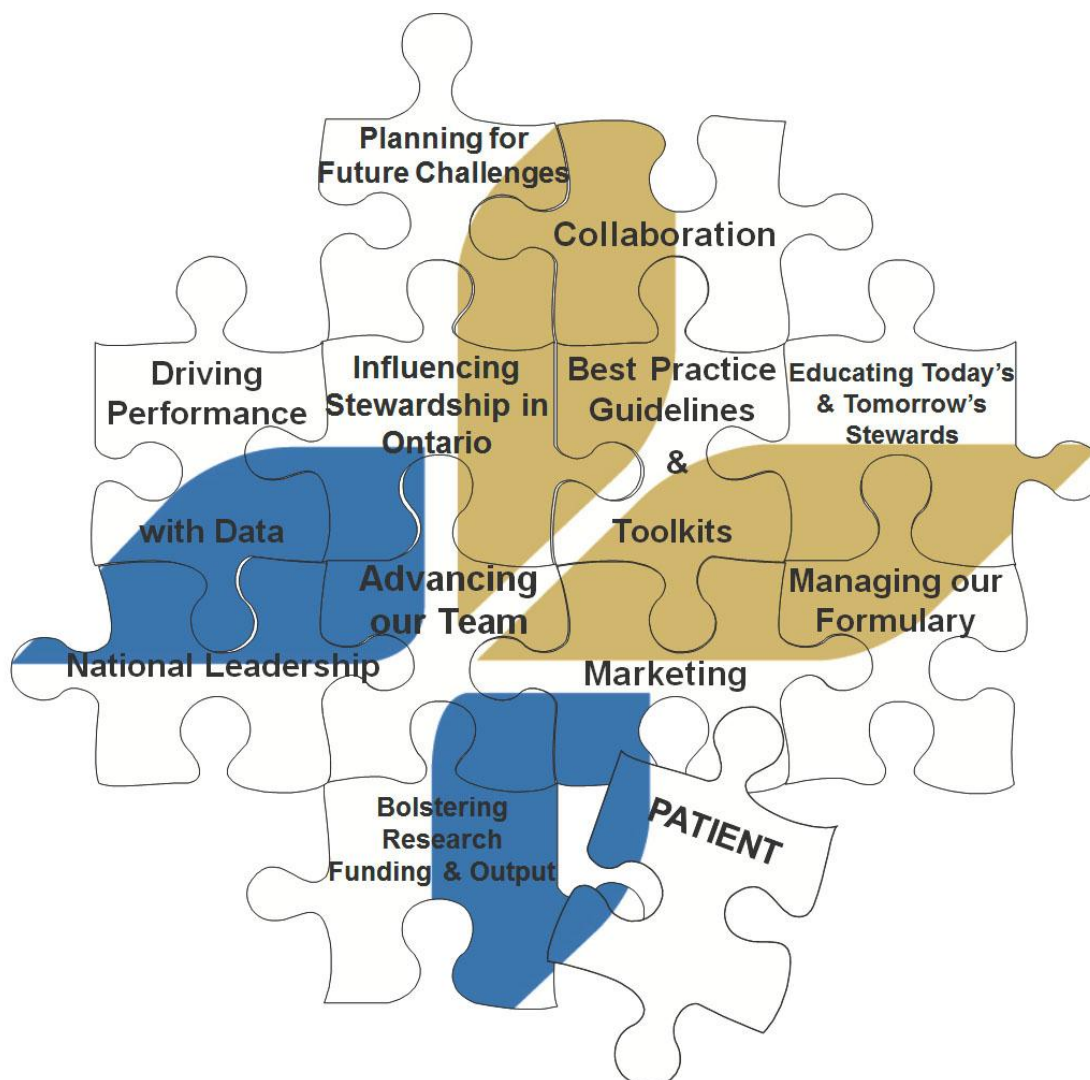
Dr. Andrew Morris has been invited to be a member of EAGAR (Expert Advisory Group on Antimicrobial Resistance).

ASP Rotations at MSH and UHN

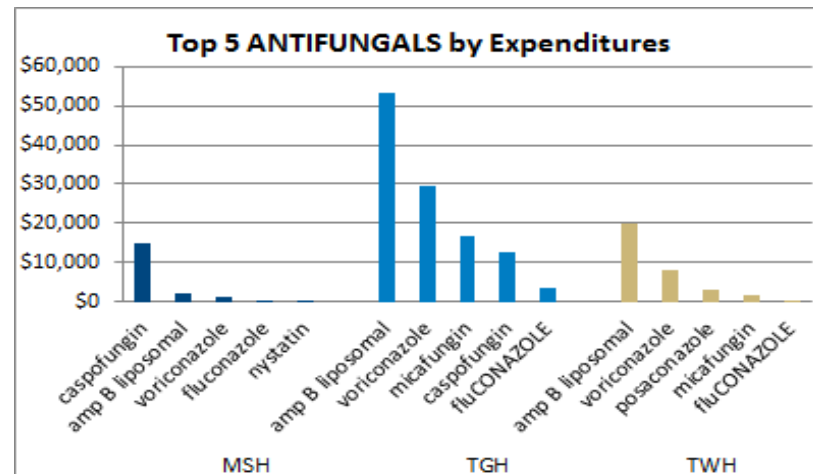
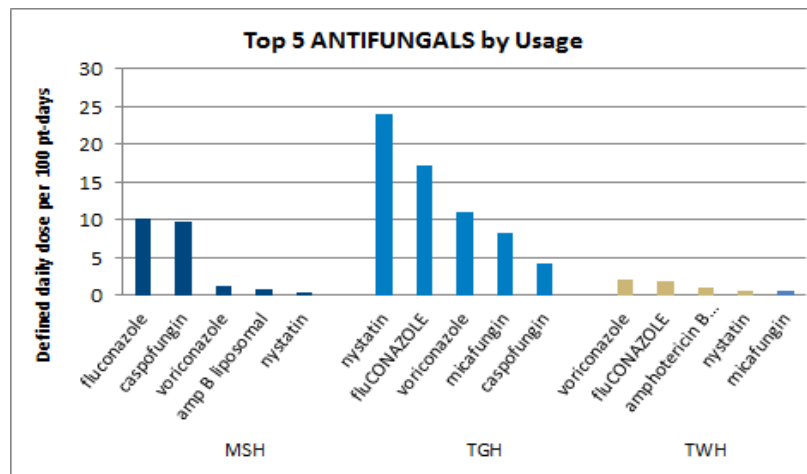
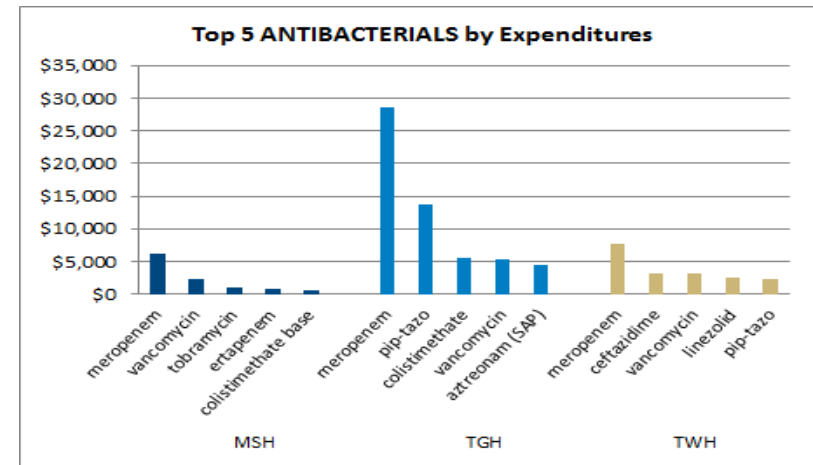
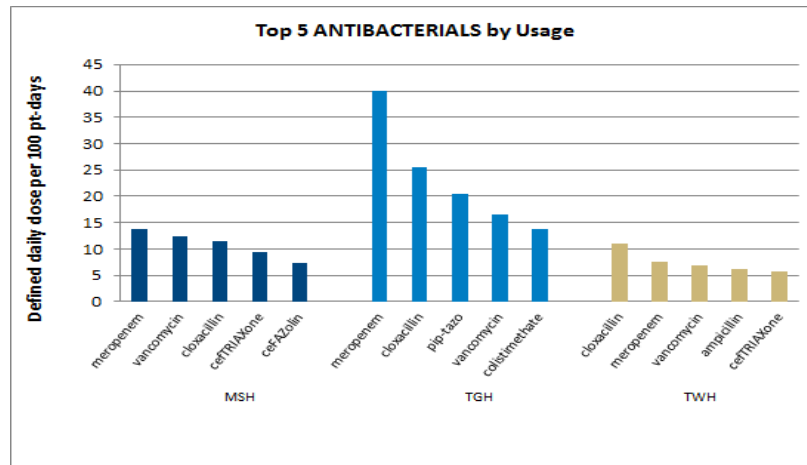
The MSH-UHN ASP continues to receive multiple requests for ASP rotations from residents and fellows across the country and internationally.

STRATEGIC PLANNING

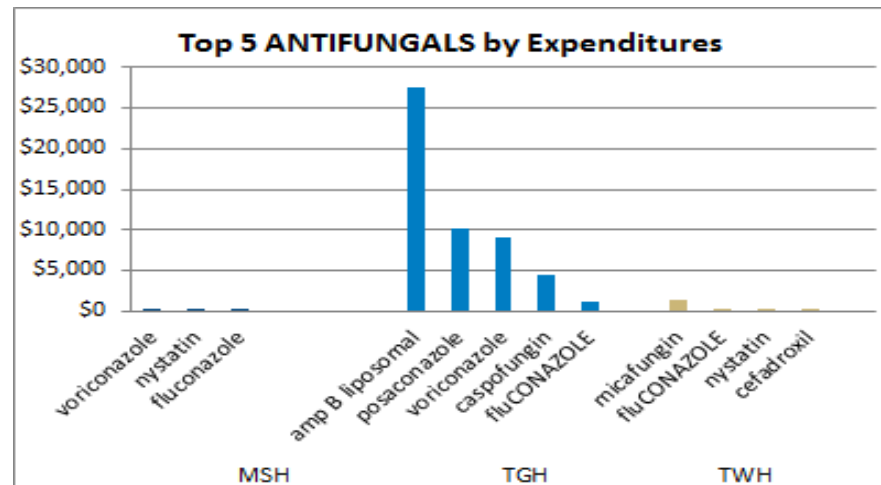
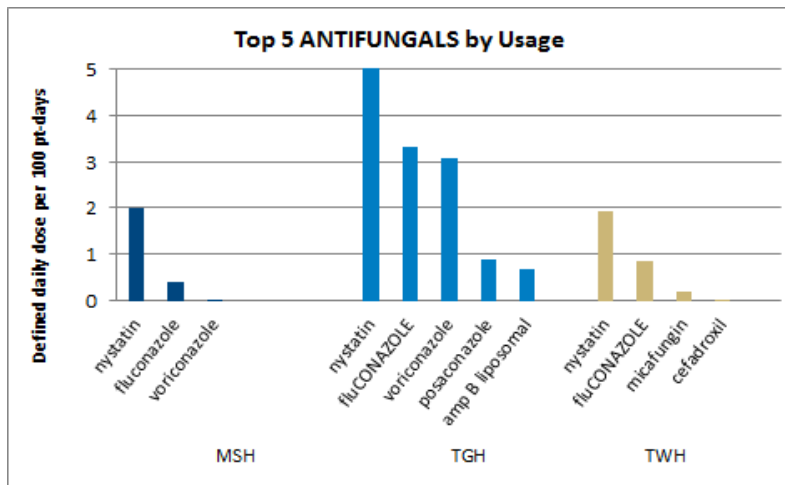
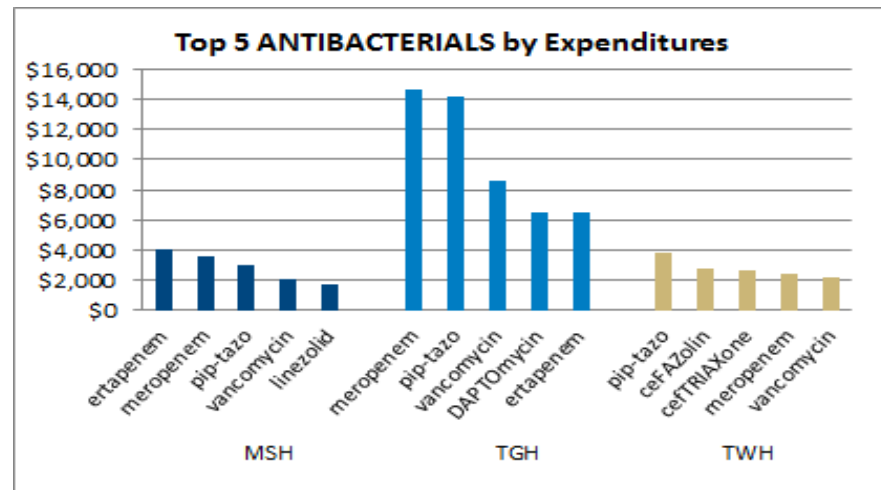
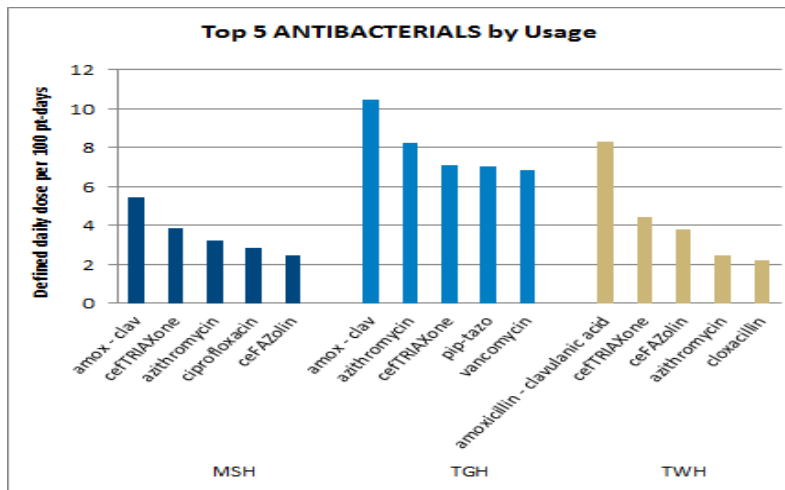
The ASP team developed the MSH-UHN ASP Strategic Plan 2013-2016. Please contact Yoshiko Nakamachi (Yoshiko.Nakamachi@uhn.ca) if you would like a copy.



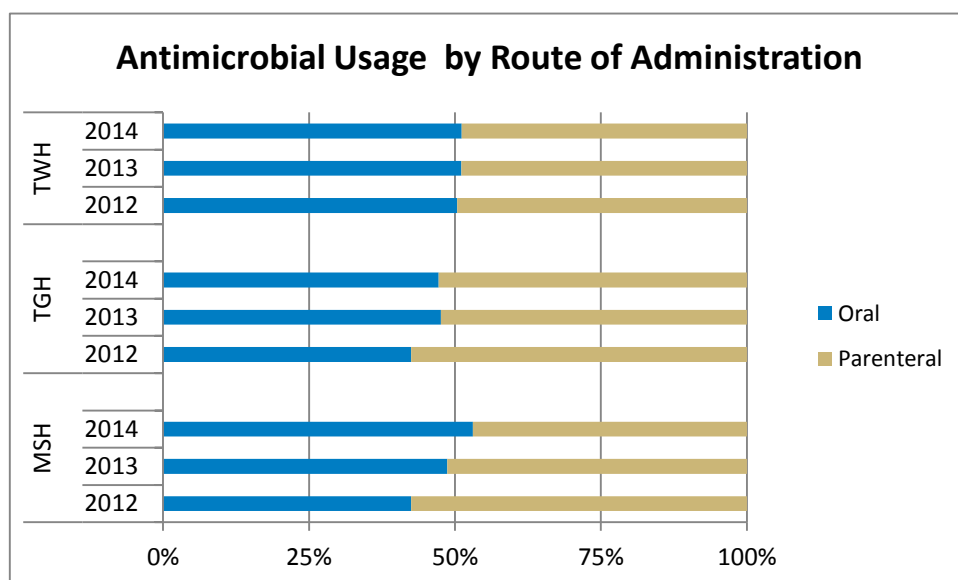
Appendix 1: FY 14/15 Q4 Top 5 Antimicrobials by Usage (DDDs per 100 Patient Days) and Expenditures by ICU Site



Appendix 2: General Internal Medicine FY 14/15 Q4 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

