

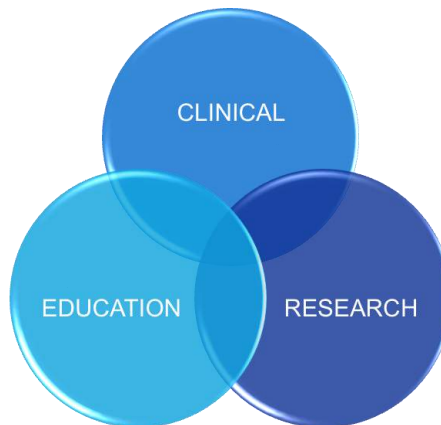


FY 2012 | 2013 ANNUAL REPORT

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

EXECUTIVE SUMMARY

The Mount Sinai Hospital-University Health Network Antimicrobial Stewardship Program (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 PDSA (Plan-Do-Study-Act) 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 (facilitated by Pfizer Canada’s financial support), alongside clinical care, to take a leadership role in increasing antimicrobial stewardship capacity and improving the quality of health care.



THE MSH-UHN ANTIMICROBIAL STEWARDSHIP TEAM

The MSH-UHN ASP team is a multi-disciplinary group comprised of physicians, pharmacists, microbiologists, project managers, data analysts and research coordinators.

PHYSICIAN TEAM

Andrew Morris, MD, SM, FRCPC

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PHARMACIST TEAM

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Pharmacotherapy Specialist – Antimicrobial Stewardship
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Miranda So, PharmD

Pharmacotherapy Specialist – Antimicrobial Stewardship
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OPERATIONS TEAM

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Project Manager, Antimicrobial Stewardship Program
 Mount Sinai Hospital/University Health Network

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Project Manager, CAHO Project
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 Mount Sinai Hospital

Marilyn Steinberg, RN

Research Coordinator, Antimicrobial Stewardship Program
 Mount Sinai Hospital

Lopa Naik, BSc, MCA (On maternity leave)

Technical Analyst, Antimicrobial Stewardship Program
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Melanie Thomson, BA, CHIM

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 Mount Sinai Hospital

Stephanie Olegario

Administrative Assistant, Antimicrobial Stewardship Program
 University Health Network

KEY HIGHLIGHTS

✦ ANTIMICROBIAL CONSUMPTION AND COSTS

The ASP continues to work with clinical teams across all 4 hospitals. Antimicrobial consumption and costs by site are included below. Detailed tables and graphs are appended.

MOUNT SINAI HOSPITAL ICU

The ASP has been working with the Mount Sinai Hospital (MSH) Intensive Care Unit (ICU) for 4 years, starting February 9, 2009. FY 12/13 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased by 2% compared to last year.
- Antimicrobial costs per patient day has increased by 5% compared to last fiscal year.
- Princess Margaret patients accounted for 17% of patient visits and 63% of the antimicrobial costs.

MSH ICU Total Antimicrobial Costs (Antimicrobial Costs per patient day)			
	FY 10/11	FY 11/12	FY 12/13
Non-Princess Margaret Patients	\$78,737 (\$21.14)	\$87,931 (\$25.42)	\$109,283 (\$31.77)
Princess Margaret Patients	\$114,392 (\$179.02)	\$191,928 (\$181.58)	\$182,188 (\$249.91)
Total	\$193,129 (\$44.26)	\$279,859 (\$61.97)	\$291,470 (\$69.91)

Note: Antimicrobial costs from PharmNet; ICU visits and patient days from CIHI DAD Database.

PRINCESS MARGARET LEUKEMIA SERVICE

The ASP continues to work with the Princess Margaret Leukemia Service (14A, 15B, 15C). FY 12/13 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has decreased by 10% compared to last year.
- Antimicrobial costs per patient day has increased by 12% compared to last year, due to an increase in antifungal costs (with antibacterial costs per patient day decreased by 21% compared to last year.)

TORONTO GENERAL HOSPITAL CARDIOVASCULAR ICU (CVICU)

The ASP continues to work with the Toronto General Hospital CVICU. FY 12/13 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased by 4% compared to last year.
- Antimicrobial costs per patient day has decreased by 21% compared to last year: antibacterial costs per patient day has decreased by 26% and antifungal costs per patient day has increased by 29% compared to last year.

TORONTO GENERAL HOSPITAL MSICU

The ASP continues to work with the Toronto General Hospital MSICU. FY 12/13 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased by 7% compared to last year.
- Antimicrobial costs per patient day have decreased by 18% compared to last year.

TORONTO WESTERN HOSPITAL ICU

The ASP continues to work with the Toronto Western Hospital ICU. FY 12/13 highlights include:

- Antimicrobial usage (using defined daily doses per 100 patient days) and antimicrobial costs per patient day have remained consistent compared to last year, with a slight decrease in antimicrobial costs per patient day.
- Analysis has determined that Ertapenem expenditures increased in FY 12/13 Q4, likely as a result of an increase in the number of ESBL *Escherichia coli* infections. We are monitoring this trend closely with Infection Prevention and Control.

MOUNT SINAI HOSPITAL NICU

The ASP initiative in the Neonatal Intensive Care Unit (NICU) was started in October 2012 with strong support from the neonatology group, led by Dr. Yenge Diambomba, Medical Director of the NICU. The program consists of daily prospective audit and feedback with the 2 clinical teams on all the neonates in the 36-bed unit. We have collected days of therapy (DOT) as the metric for antimicrobial consumption, which is considered to be the standard for neonates.

- FY 12/13 Q4 (January-March 2013) show a decrease of antimicrobial days of therapy by 22% compared to FY 11/12. We are working with the NICU team on collecting patient outcome data.

✦ BEST PRACTICE GUIDELINES & ALGORITHMS:

- VAP Algorithm: Implemented in the MSH ICU in November 2011, TGH ICU in June 2012, TWH ICU in July 2012 and the TGH CVICU in October 2012.
- *High Risk* Febrile Neutropenia Protocol: Thanks to support from Senior Leadership at Princess Margaret, the ASP team is currently consulting the expertise of UHN Healthcare Human Factors (HHF) to improve the usability and ergonomics of the protocol. Our goal is to ensure that these complex algorithms are interpreted with little ambiguity. HHF consultants have completed the field-testing and provided initial mock-ups of the revised algorithm. We anticipate that this process will improve knowledge translation as the protocol is rolled out in the new fiscal year.

✦ EDUCATION:

- TGH ICU: The ASP team provides an introduction to the Antimicrobial Stewardship program to the new ICU trainees as the beginning of each rotation cycle. The ASP pharmacist leads a teaching session for the ICU medical team once in each education cycle.
- TWH ICU: Weekly Friday afternoon stewardship teaching rounds continue to occur at TWH ICU. These rounds are an opportunity for an assigned ICU resident to present a patient cared for in the ICU during the previous week and to discuss antimicrobial stewardship challenges involved in the management of this patient with the ICU team, the ASP Pharmacist, and when possible, the infectious diseases physician on service.

✦ RESEARCH:

The ASP research program has had a very productive year, with multiple publications, poster presentations, oral presentations and grants awarded. These are summarized below:

PUBLICATIONS

Peer Reviewed

1. Katsios CM, Burry L, Nelson S, Bell CM, Jivraj T, Lapinsky SE, Wax RS, Christian M, Mehta S, Morris AM. An antimicrobial stewardship program improves antimicrobial treatment by culture site and the quality of antimicrobial prescribing in critically ill patients. *Crit Care* 2012, 16:R216.
2. Morris AM, Brener S, Dresser L, Daneman N, Dellit TH, Avdic E, Bell CM. Use of a structured panel process to define quality metrics for antimicrobial stewardship programs. *Infect Control Hosp Epidemiol.* 2012;33(5):500-6.
3. Hurford A, Morris AM, Fisman DN, Wu J. Linking antimicrobial prescribing to antimicrobial resistance in the ICU: Before and after an antimicrobial stewardship program. *Epidemics.* 2012;4(4):203-10.
4. Coburn B, Morris AM, Tomlinson G, Detsky AS. Does this adult patient with suspected bacteremia require blood cultures? *JAMA.* 2012;308(5):502-11. Epub 2012/08/02

GRANT FUNDING AWARDED

2012 - 2013 A Survey to Evaluate Intensivists' Knowledge, Attitudes and Perceptions of Antimicrobial Stewardship Programs in Canadian Intensive Care Units. Canadian Critical Care Trials Group. PI: Steinberg M. Collaborators: Bell C, Dresser L, Daneman N, Matte A, Smith O, Marinoff N, Morris A. \$2 500. [Grants].



- 2012 - 2013 Early Results and Lessons Learned from Ontario's Roll-out of Antimicrobial Stewardship Programs. CIHR Dissemination Grant. PI: Morris A. Collaborators: Bell, C, Steinberg M, Jivraj T, Nakamachi Y. \$24 000. [Grants].
- 2012 - 2013 Optimizing Infection Management in the EDR. University of Toronto Department of Medicine Physician Fund Campaign. Applicant: Andrew Morris. \$30 000 [Grants]
- 2013 - 2014 Developing and Evaluating an Educational Intervention to Guide in the Implementation of Antimicrobial Stewardship Programs in Community Hospitals Across Ontario. Canadian Society of Hospital Pharmacists. PI: Dresser L. Collaborators: Duplisea K, Nelson S, So M, Steinberg M, Bell C, Morris A. \$10 125 [Grants]
- 2013 - 2016 Development of an Antimicrobial Resistance Diversity Index (ARDI) to guide Initiatives and investment in public health, antimicrobial stewardship and infection control. CIHR CHRP Grant. Principal Applicants: Jainhong Wu, Andrew Morris. Collaborators: Troy Day, Amy Hurford, Allison McGeer, David Patrick, Gerry Wright. \$397 000 [Grants]

The full list of Abstracts and ongoing research projects are appended.

✦ PROVINCIAL ROLE:

The MSH-UHN ASP continues to lead the provincial initiative (CAHO ASP ARTIC project) assisting the academic hospitals throughout Ontario in implementing a stewardship program in their ICUs.

In its first year of operation, the project has had some key accomplishments, some of which are above and beyond the mandate of the ASP ICU ARTIC Project. Among these are:

- During a 10 month phased go-live period all the academic hospitals committed to this provincial project have successfully implemented their ASP resulting in 14 ICUs having a program in place. These ICUs are: UHN CVICU, Sick Kids PICU, The Ottawa Hospital CIVIC, St. Joseph's Healthcare Hamilton ICU, Mount Sinai Hospital NICU, Children's Hospital of Eastern Ontario PICU, Hamilton Health Sciences ICU East and ICU South, Health Sciences North ICU, London Health Sciences CCTC, North York General Hospital ICU, St. Michael's Neuro-Trauma ICU and MSICU, and Kingston General Hospital ICU. The Project Team continues to facilitate training and learning, and provides mentoring and expertise to the site teams. Data collection and analysis to occur in upcoming months.
- The MSH-UHN ASP worked with Critical Care Services Ontario (formerly known as the Critical Care Secretariat) to include three new antimicrobial indicators in the Critical Care Information System (CCIS). Antimicrobial data (days of antibacterial therapy, days of antifungal therapy), and ICU-onset *C. difficile* from all ICUs in the province, in both academic and community hospitals, are now collected on a daily basis. This is the first such provincial or state network of antimicrobial utilization implemented anywhere globally.
- The University of Toronto CEPD accredited the project's Education Day. ASP physicians, ASP pharmacists, Intensivists, site leads, and senior leadership from each of the academic hospitals in Ontario attended.
- The project team identified a gap in antimicrobial stewardship knowledge transfer, and developed Education Modules on common ASP principles to fill this gap.
- The project team developed a full day, on-site program at MSH-UHN for site participants including key concepts of ASP research, shadowing of ASP rounds in several ICUs, education on roles, responsibilities and challenges of the ASP Pharmacist and ASP Physician, and principles of ASP metrics. This training was developed in response to each site's specific learning needs.

✦ STRATEGIC PLAN:

The ASP team went through a comprehensive planning process over the past year to develop the MSH-UHN ASP Strategic Plan 2013-2016. This was reviewed and approved by the MSH-UHN ASP Oversight Committee. Please contact Stephanie Olegario (Stephanie.Olegario@uhn.ca) if you would like a copy.

APPENDIX

MOUNT SINAI HOSPITAL: ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs										
Total Antimicrobial DDDs/100 Patient Days	177	171	144	167	155	180	178	157	170	167
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	122	126	133	121	127	128
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	24	47	36	28	35	33
Total Antimicrobial Costs	\$332,724	\$285,975	\$193,129	\$279,859	\$66,483	\$89,645	\$79,439	\$55,902	\$291,470	\$279,859
Total Antimicrobial Costs/Patient Day	\$69.01	\$59.23	\$40.95	\$59.22	\$52.35	\$82.09	\$68.96	\$51.19	\$62.37	\$59.22
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$125,339	\$31,853	\$41,372	\$37,850	\$23,737	\$134,811	\$125,339
Systemic Antibacterial Costs/Patient Days	\$36.16	\$29.44	\$20.31	\$26.94	\$25.08	\$37.89	\$32.86	\$21.74	\$28.85	\$26.94
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$141,877	\$30,446	\$44,706	\$39,798	\$29,861	\$144,811	\$141,877
Systemic Antifungal Costs/Patient Days	\$29.68	\$27.45	\$18.87	\$30.50	\$23.97	\$40.94	\$34.55	\$27.35	\$30.99	\$30.50
Patient Care Outcomes										
Hospital acquired C. difficile cases (rate per 1,000 pt days)	NA	NA	NA	5 (1.07)	3 (2.36)	3 (2.75)	2 (1.74)	0 (0.00)	8 (1.71)	5 (1.07)
ICU Average Length of Stay (days)	5.84	5.57	5.67	5.51	5.79	5.08	4.33	5.82	5.24	5.51
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.5	16.5	16.7	18.1	16.84	17.0	16.5
ICU Readmission Rate within 48 hrs (as a %)	3.2	2.9	2.7	2.7	0.8	2.4	0.9	3.4	1.9	2.7
ICU Ventilator Days	NA	3286	2934	2677	757	609	640	743	2749	2677
ICU Multiple Organ Dysfunction Score (MODS)	4	4.04	4.12	4.25	4.49	4.67	4.54	4.79	4.62	4.25

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).

PRINCESS MARGARET CANCER CENTRE: LEUKEMIA SERVICE (14A, 15B, 15C)

Indicators	FY 09/10	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs									
Total Antimicrobial DDDs/100 Patient Days	295	274	282	251	253	256	252	253	282
Systemic Antibacterial DDDs/100 Patient Days	191	167	164	139	147	158	152	149	164
Systemic Antifungal DDDs/100 Patient Days	104	107	105	112	105	98	100	104	105
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$1,310,857	\$464,387	\$465,192	\$465,654	\$300,306	\$1,695,539	\$1,310,857
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$115.13	\$141.62	\$141.44	\$140.94	\$91.53	\$128.91	\$115.13
Systemic Antibacterial Costs	\$659,034	\$609,747	\$663,175	\$178,027	\$180,794	\$138,395	\$105,874	\$603,090	\$663,175
Systemic Antibacterial Costs/Patient Days	\$62.28	\$57.33	\$58.24	\$54.29	\$54.97	\$41.89	\$32.27	\$45.85	\$58.24
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$647,637	\$286,360	\$284,398	\$327,259	\$194,432	\$1,092,448	\$647,637
Systemic Antifungal Costs/Patient Days	\$104.84	\$96.99	\$56.88	\$87.33	\$86.47	\$99.05	\$59.26	\$83.06	\$56.88
Patient Care Outcomes									
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	6 (0.56)	7 (0.65)	14 (1.17)	2 (.61)	1(.30)	1(.30)	1 (.30)	5 (.51)	14 (1.17)

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).

TORONTO GENERAL HOSPITAL: CVICU

Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY12/13 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	115	98	100	110	109	92	102	98
Systemic Antibacterial DDDs/100 Patient Days	104	86	87	98	97	77	89	86
Systemic Antifungal DDDs/100 Patient Days	11	12	13	12	12	16	13	12
Total Antimicrobial Costs	\$117,356	\$107,795	\$21,718	\$21,066	\$21,225	\$21,587	\$85,596	\$107,795
Total Antimicrobial Costs/Patient Day	\$19.75	\$18.94	\$14.86	\$15.76	\$15.16	\$14.07	\$14.93	\$18.94
Systemic Antibacterial Costs	\$109,110	\$98,591	\$18,169	\$18,433	\$18,782	\$18,244	\$73,627	\$98,591
Systemic Antibacterial Costs/Patient Days	\$18.36	\$17.32	\$12.43	\$13.79	\$13.42	\$11.89	\$12.84	\$17.32
Systemic Antifungal Costs	\$8,246	\$9,204	\$3,550	\$2,633	\$2,443	\$3,343	\$11,969	\$9,204
Systemic Antifungal Costs/Patient Days	\$1.39	\$1.62	\$2.43	\$1.97	\$1.74	\$2.18	\$2.09	\$1.62
Patient Care Outcomes								
Hospital acquired C. difficile cases (rate per 1,000 pt days)	2 (0.34)	5 (0.88)	0 (0.0)	3(2.24)	1 (0.71)	2 (1.30)	6 (1.05)	5 (0.88)
ICU Average Length of Stay (days)	3.12	2.95	3.03	2.81	2.78	3.26	2.97	2.95
ICU Mortality Rate (as a %)	3.5	3.0	3.8	2.6	2.3	3.5	3.0	3.0
ICU Readmission Rate within 48 hrs (as a %)	1.61	2.2	1.6	3.3	1.7	0.8	1.8	2.2
ICU Ventilator Days	3015	3571	944	818	910	1004	3676	3571
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.96	5.51	5.06	5.5	5.51	6.07

Notes:

* Due to an error in the Centricity Pharmacy data we are unable to provide accurate DDD data and utilization cost for the CVICU for the 4th quarter of fiscal 11/12 and 1st quarter of fiscal 12/13. Use of Centricity data resumes effective 2nd quarter of fiscal 12/13.

** FY 11/12 Q4 and FY 12/13 Q1 Total Antimicrobial, Total Antibacterial and Total Antifungal Costs and DDD are taken from the estimated Centricity cost/DDD, which is 95% of the General Ledger (GL) cost/DDD. 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 are excluded. Data Sources: Antimicrobial DDD and Costs (Centricity).

TORONTO GENERAL HOSPITAL: MSICU

Indicators	FY 09/10 (Pre-ASP)	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs									
Total Antimicrobial DDDs/100 Patient Days	266	208	200	179	266	205	205	214	200
Systemic Antibacterial DDDs/100 Patient Days	184	153	141	137	196	158	147	160	141
Systemic Antifungal DDDs/100 Patient Days	82	55	55	41	70	48	58	54	55
Total Antimicrobial Costs	\$701,451	\$627,540	\$572,443	\$85,182	\$170,194	\$86,342	\$130,616	\$472,334	\$572,443
Total Antimicrobial Costs/Patient Day	\$102.52	\$83.81	\$77.60	\$50.28	\$93.36	\$44.30	\$66.54	\$63.58	\$77.60
Systemic Antibacterial Costs	\$390,209	\$373,504	\$288,775	\$50,733	\$82,839	\$51,312	\$45,007	\$229,892	\$288,775
Systemic Antibacterial Costs/Patient Days	\$57.03	\$49.88	\$39.15	\$29.95	\$45.44	\$26.33	\$22.93	\$30.95	\$39.15
Systemic Antifungal Costs	\$311,242	\$254,036	\$275,176	\$34,448	\$87,356	\$35,030	\$85,609	\$242,443	\$275,176
Systemic Antifungal Costs/Patient Days	\$45.49	\$33.93	\$37.30	\$20.34	\$47.92	\$17.97	\$43.61	\$32.63	\$37.30
Patient Care Outcomes									
Hospital acquired C. difficile cases (rate per 1,000 pt days)	10 (1.46)	10 (1.33)	11 (1.49)	4 (2.36)	3 (1.65)	1(0.51)	3 (1.53)	11 (1.48)	11 (1.49)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.44	6.97	9.09	7.51	7.79	8.85
ICU Mortality Rate (as a %)	16.2	15.7	16.3	14.5	16.3	19.1	14.1	16.0	16.3
ICU Readmission Rate within 48 hrs (as a %)	3.8	4.4	4.4	2.6	3.9	2.4	2.5	2.8	4.4
ICU Ventilator Days	5399	6256	6507	1394	1567	1761	1736	6458	6507
Apache II score	n/a	n/a	16.1	15.0	16.3	16.3	15.5	15.8	16.1

Notes:

* Due to an error in the Centricity Pharmacy data we are unable to provide accurate DDD data and utilization cost for the TGH ICU for the 1st quarter of fiscal 12/13. Use of Centricity data resumes effective 2nd quarter of fiscal 12/13. FY 12/13 Q1 Costs and DDD are taken from the estimated Centricity cost, which is 95% of the GL cost. 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 (Centricity)

TORONTO WESTERN HOSPITAL: ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs										
Total Antimicrobial DDDs/100 Patient Days	101	88	79	83	56	99	88	87	83	83
Systemic Antibacterial DDDs/100 Patient Days	94	78	73	77	54	95	83	78	78	77
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	2	4	6	9	5	6
Total Antimicrobial Costs	\$138,502	\$100,408	\$101,191	\$105,899	\$13,632	\$23,470	\$24,401	\$41,475	\$102,978	\$105,899
Total Antimicrobial Costs/Patient Day	\$18.39	\$13.24	\$13.17	\$13.60	\$7.49	\$12.65	\$12.15	\$20.52	\$13.37	\$13.60
Systemic Antibacterial Costs	\$123,278	\$87,445	\$79,280	\$89,784	\$12,337	\$22,434	\$19,093	\$16,236	\$70,099	\$89,784
Systemic Antibacterial Costs/Patient Days	\$16.37	\$11.53	\$10.32	\$11.53	\$6.78	\$12.09	\$9.50	\$8.03	\$9.10	\$11.53
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$16,115	\$1,295	\$1,037	\$5,308	\$25,239	\$32,879	\$16,115
Systemic Antifungal Costs/Patient Days	\$1.79	\$1.71	\$2.85	\$2.07	\$0.71	\$0.56	\$2.64	\$12.49	\$4.27	\$2.07
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)	2 (1.10)	1(0.54)	1 (0.50)	1 (0.49)	5 (0.65)	13 (1.66)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.71	7.76	7.91	8.34	7.90	7.98	9.71
ICU Mortality Rate (as a %)	19.6	19.9	18.1	17.0	18.5	13.7	18.6	15.1	16.4	17.0
ICU Readmission Rate within 48 hrs (as a %)	3.9	4.7	4.9	3.21	1.3	2.1	4.2	4.5	3.0	3.21
ICU Ventilator Days	4617	6305	5960	5578	1114	1171	1288	1374	4947	5578
ICU Apache II Score	15.0	14.7	13.7	13.8	13.1	13.0	13.4	12.2	12.9	13.8

Notes:

* Due to an error in the Centricity Pharmacy data we are unable to provide accurate DDD data and utilization cost for the TWH ICU for the 4th quarter of fiscal 2011 and 1st quarter of fiscal 12/13. Use of Centricity data resumes effective 2nd quarter of fiscal 2012/13

** FY 11/12 Q4 Total Antimicrobial, Total Antibacterial and Total Antifungal Costs and DDD are taken from the estimated Centricity cost/DDD, which is 95% of the General Ledger (GL) cost/DDD.

*** FY 12/13 Q1 Total Antimicrobial, Total Antibacterial and Total Antifungal Costs are taken from the estimated Centricity cost, which is 95% of the GL cost.

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 + systemic antivirals; non-systemic antimicrobials are excluded. Data Sources: Antimicrobial DDD and Costs (Centricity)

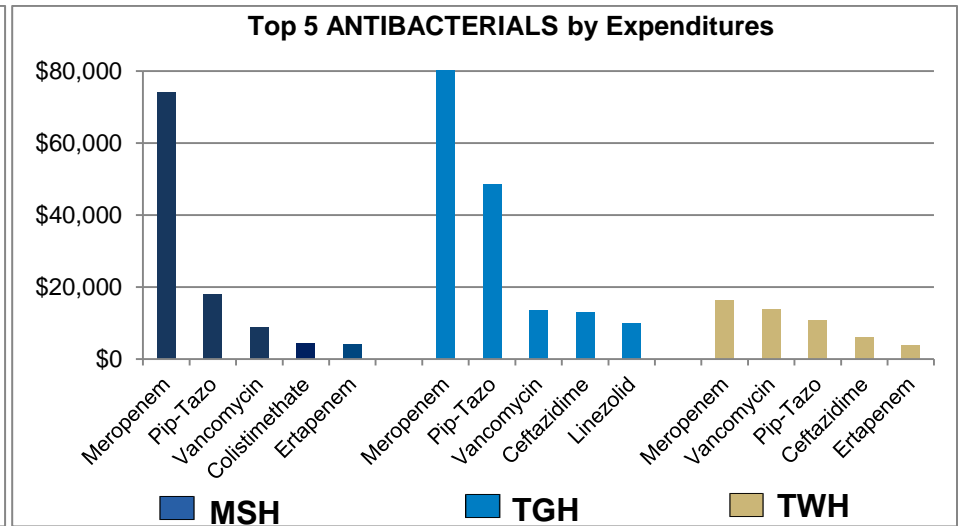
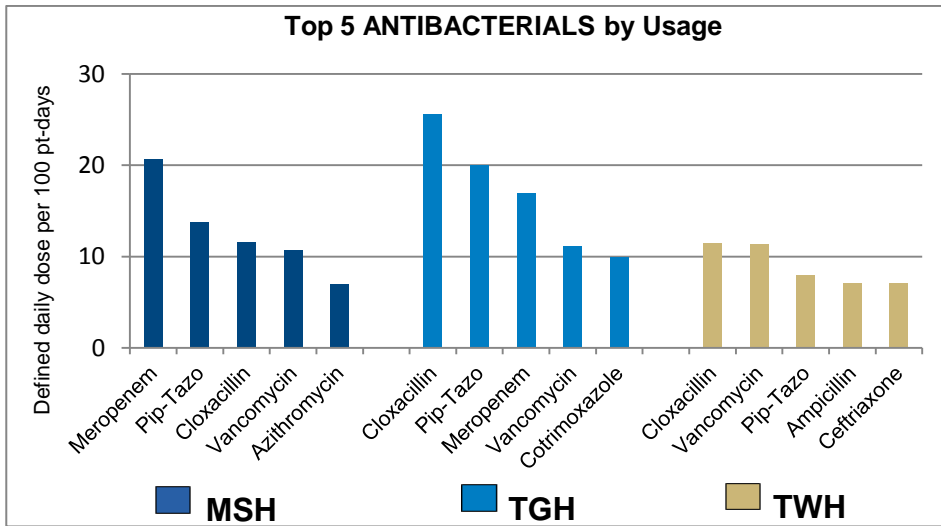
MOUNT SINAI HOSPITAL: NICU

Indicators	FY 11/12	FY12/13 Performance					YTD of Previous Year
		Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs							
Total Antimicrobial DOTs/100 Patient Days	67.3	56.2	53.1	59.6	52.8	55.5	67.3
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.4	52.5	58.6	49.6	53.6	65.1
Systemic Antifungal DOTs/100 Patient Days	2.2	2.8	0.7	0.9	0.9	1.8	2.2
Total Antimicrobial Costs	\$16,415	\$3,548	\$3,115	\$5,108	\$5,936	\$17,707	\$16,415
Total Antimicrobial Costs/Patient Day	\$1.31	\$1.18	\$1.02	\$1.72	\$2.22	\$1.51	\$1.31
Systemic Antibacterial Costs	\$14,783	\$3,095	\$3,035	\$4,929	\$5,471	\$16,530	\$14,783
Systemic Antibacterial Costs/Patient Days	\$1.18	\$1.03	\$0.99	\$1.66	\$2.05	\$1.41	\$1.18
Systemic Antifungal Costs	\$1,632	\$453	\$80	\$179	\$464	\$1,177	\$1,632
Systemic Antifungal Costs/Patient Days	\$0.13	\$0.15	\$0.03	\$0.06	\$0.17	\$0.10	\$0.13

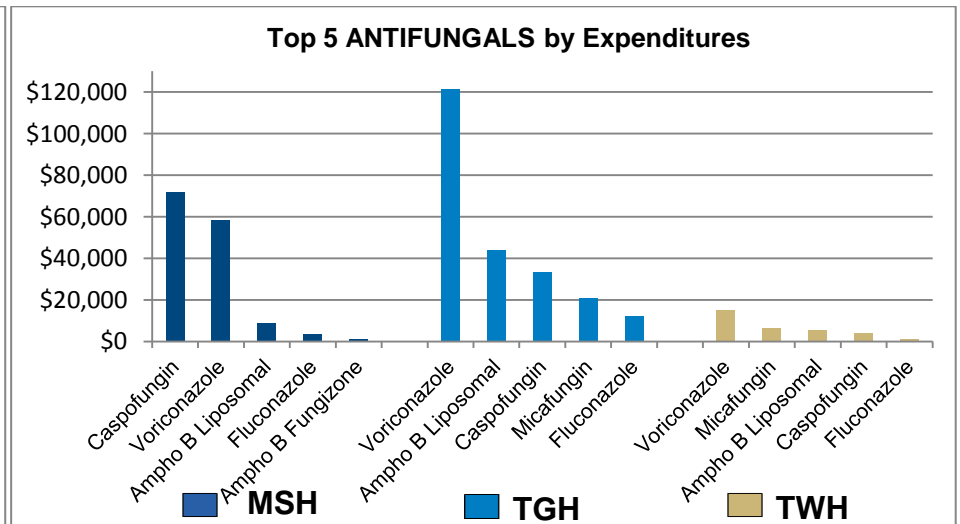
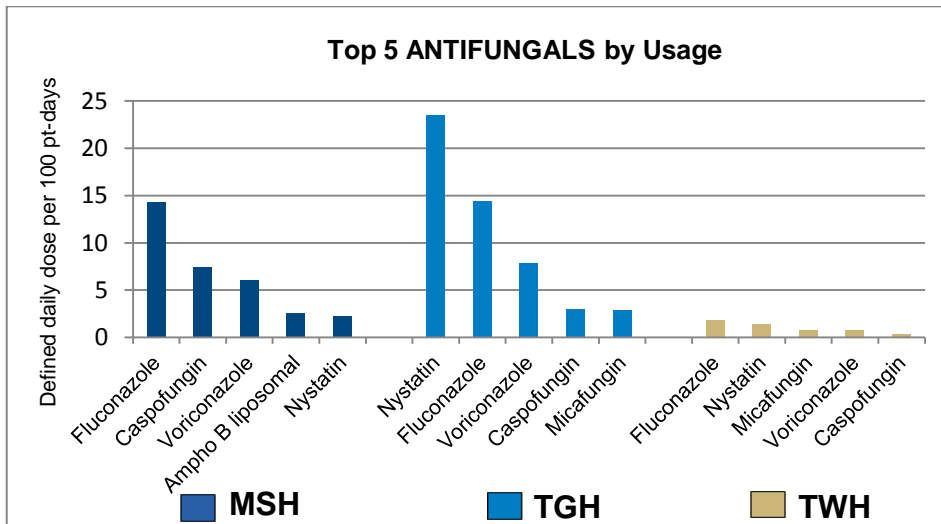
Notes:

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.

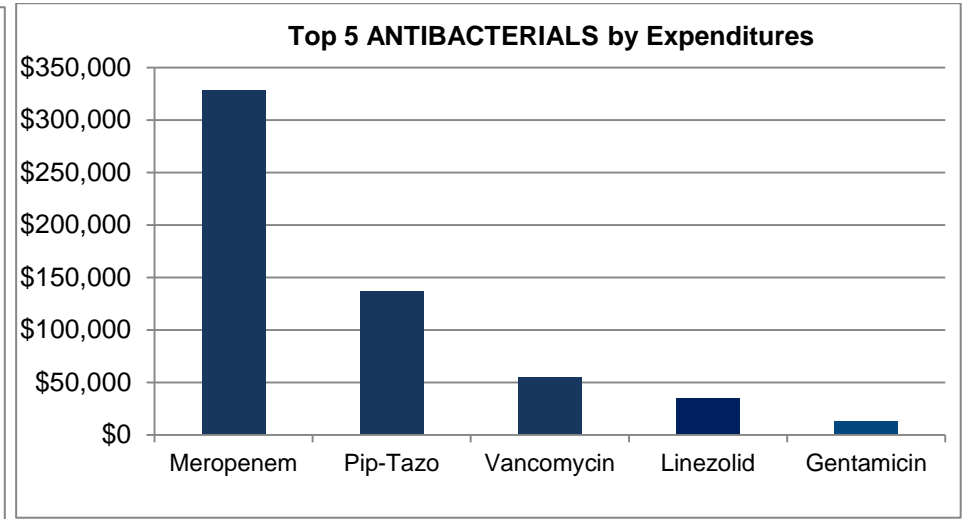
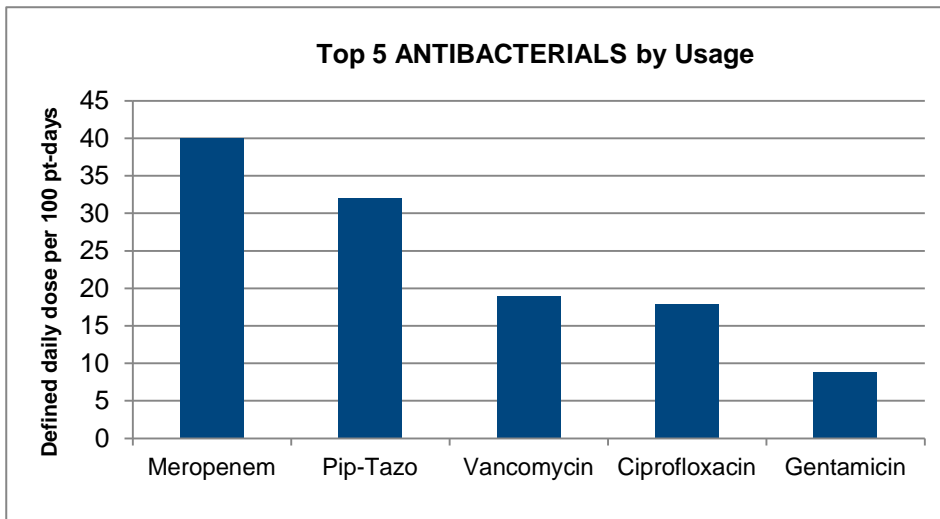
FY 12/13 Top 5 ANTIBACTERIALS by Usage (DDDs per 100 patient-days) and Expenditures



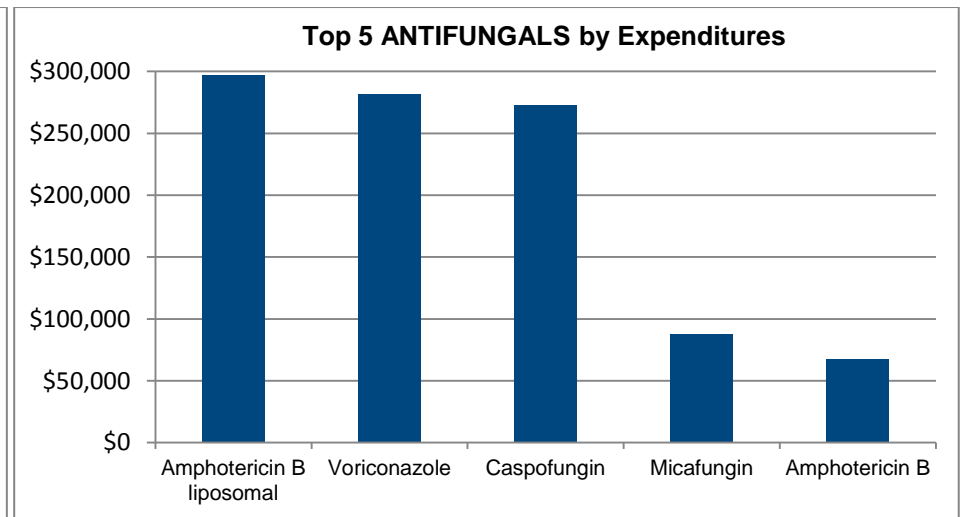
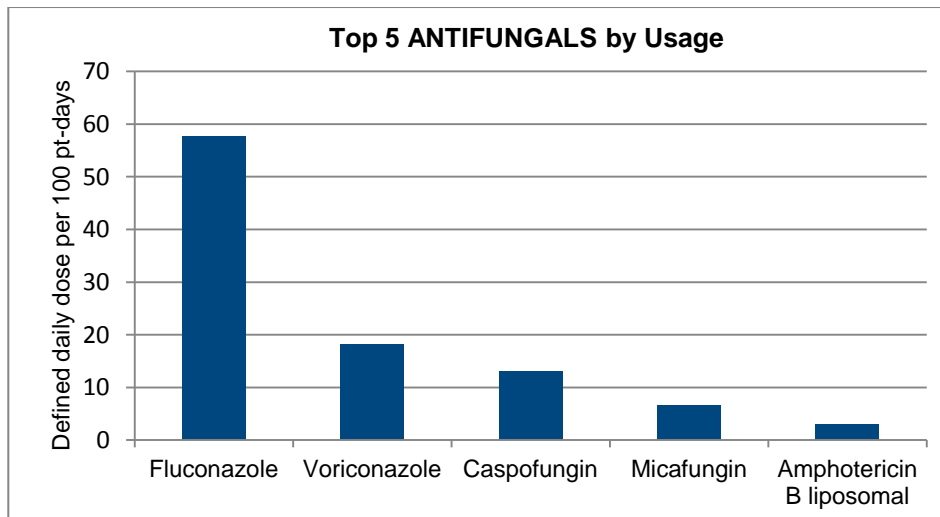
FY 12/13 Top 5 ANTIFUNGALS by Usage (DDDs per 100 patient-days) and Expenditures



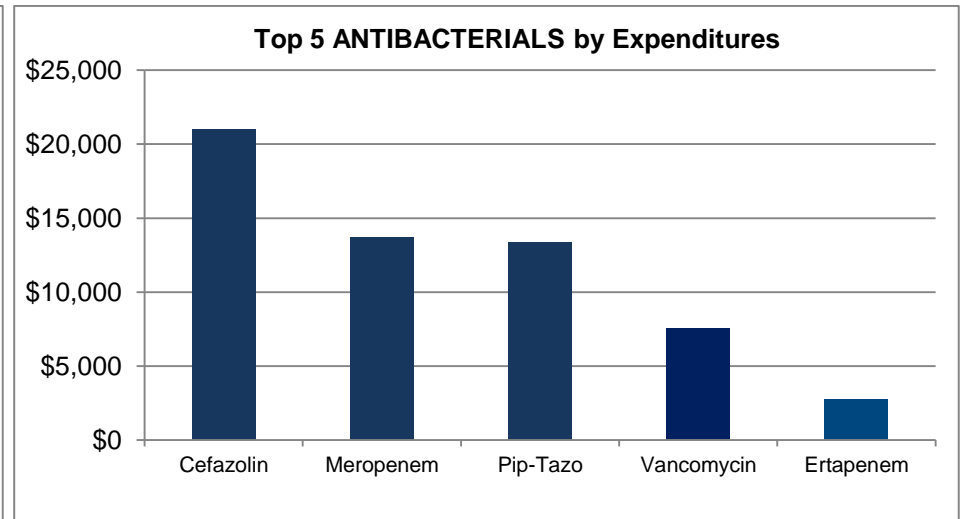
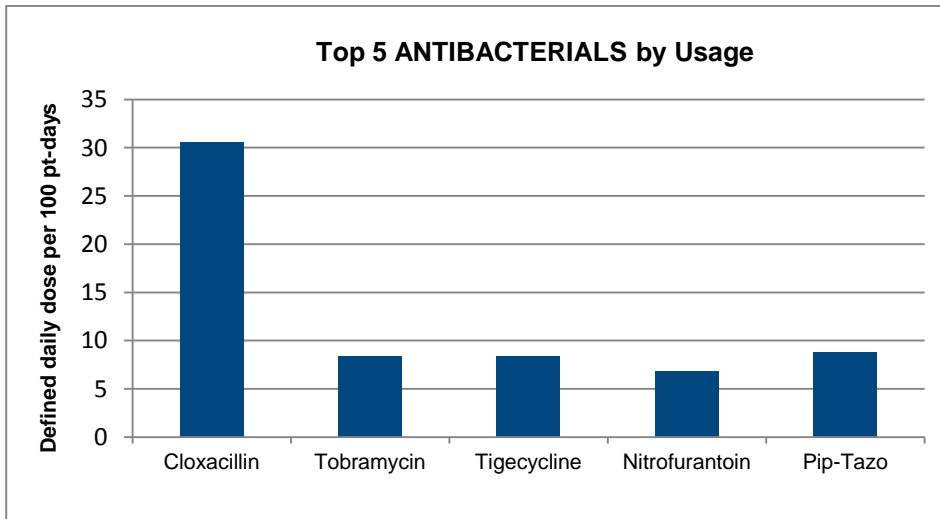
Princess Margaret Leukemia FY 12/13 Top 5 ANTIBACTERIALS by Usage (DDDs per 100 patient-days) and Expenditures



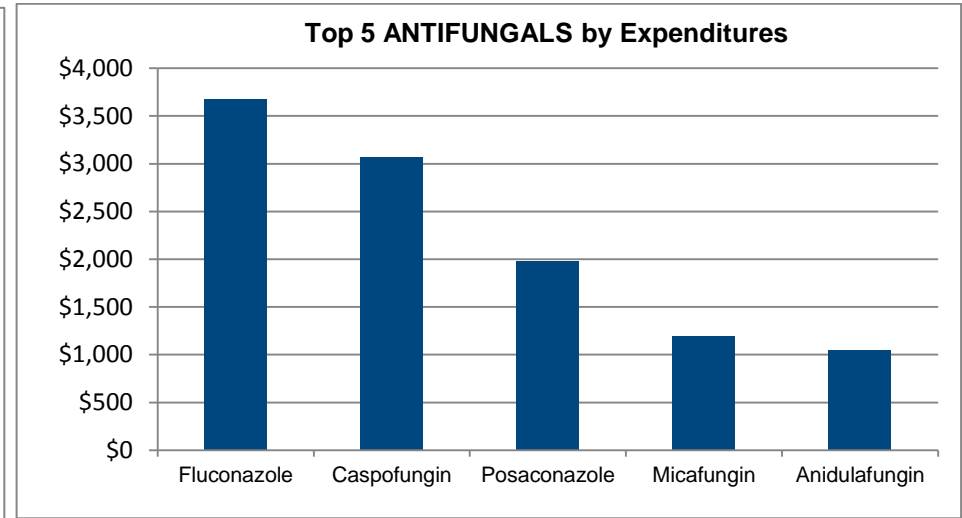
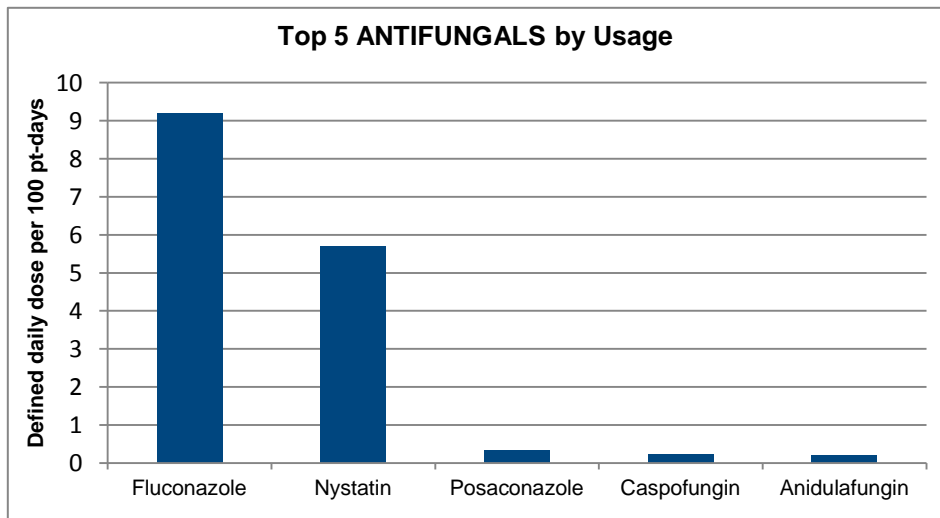
FY 12/13 Top 5 ANTIFUNGALS by Usage (DDDs per 100 patient-days) and Expenditures



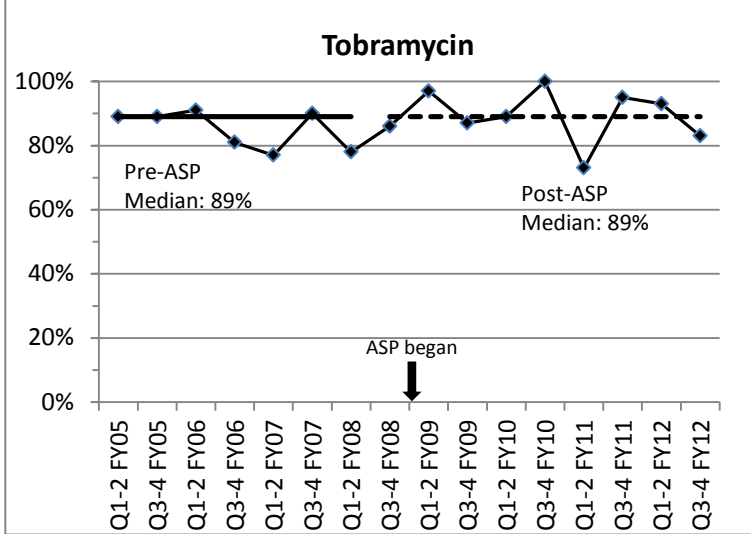
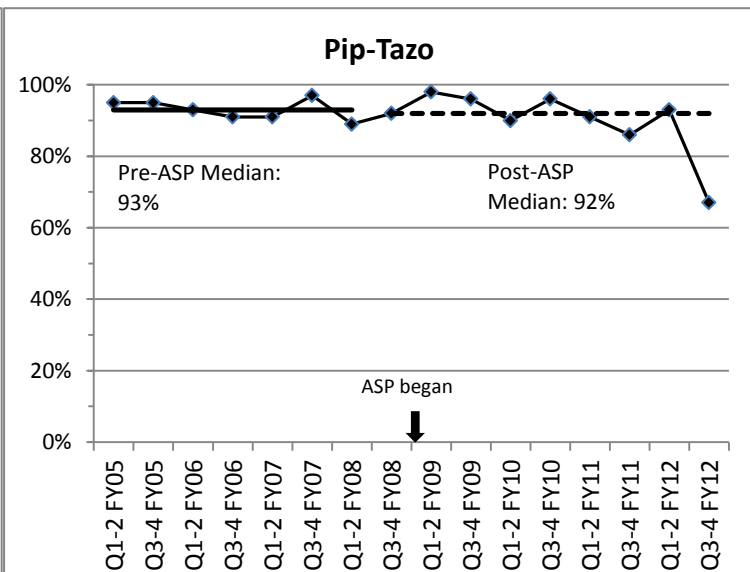
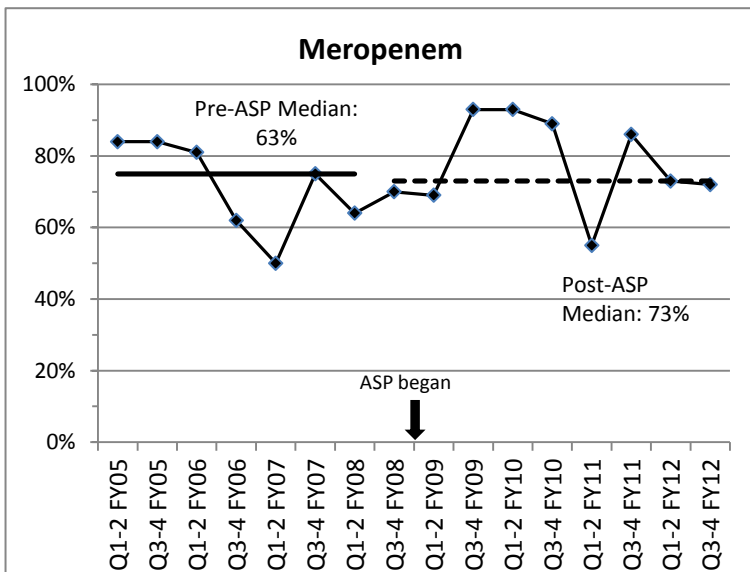
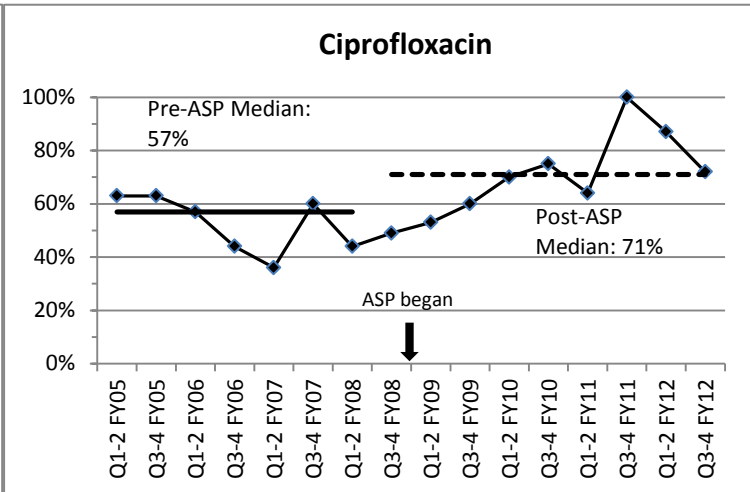
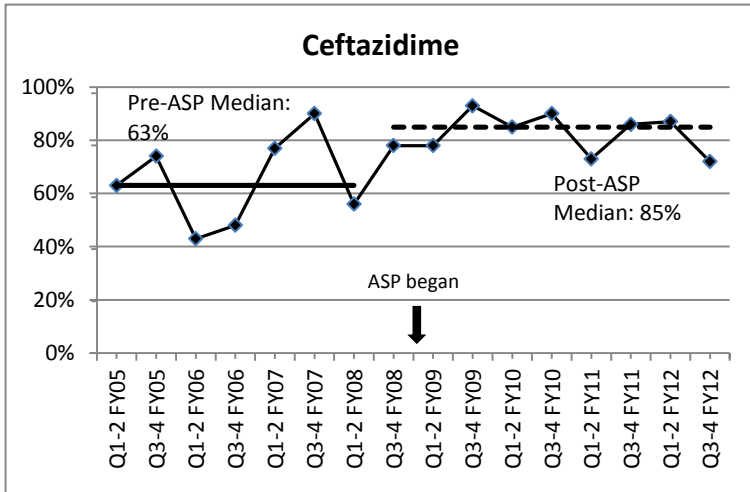
TGH CVICU FY 12/13 Top 5 ANTIBACTERIALS by Usage (DDD's per 100 patient-days) and Expenditures



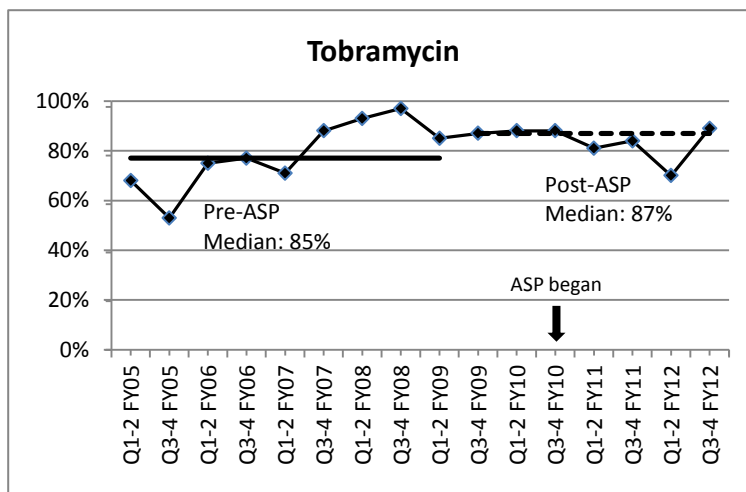
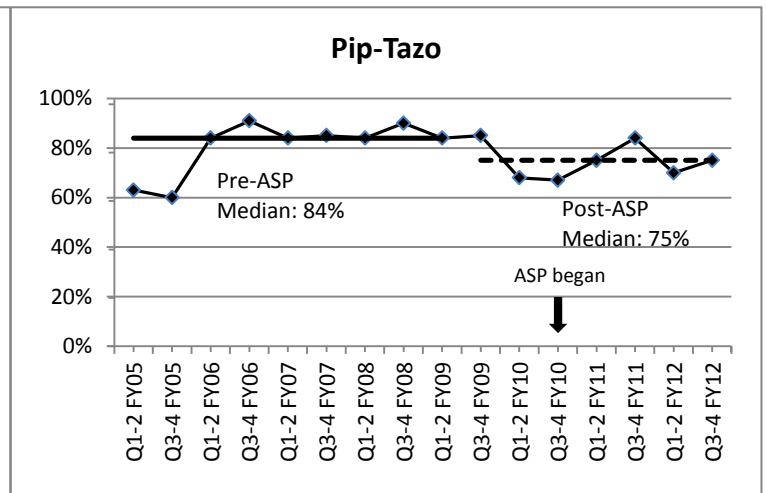
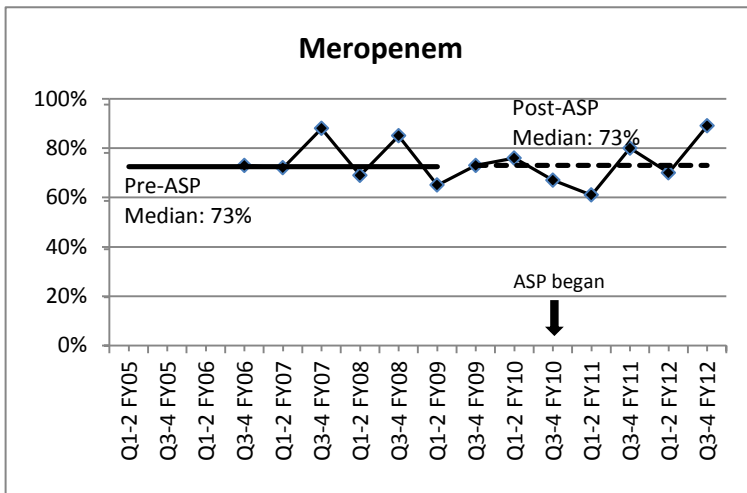
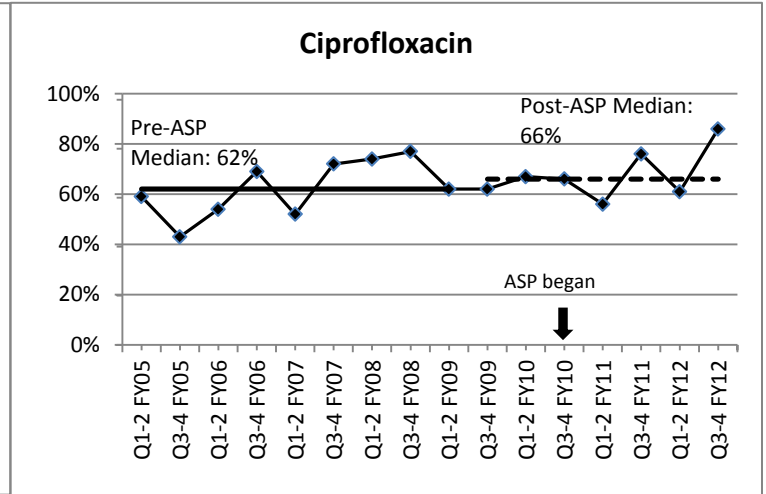
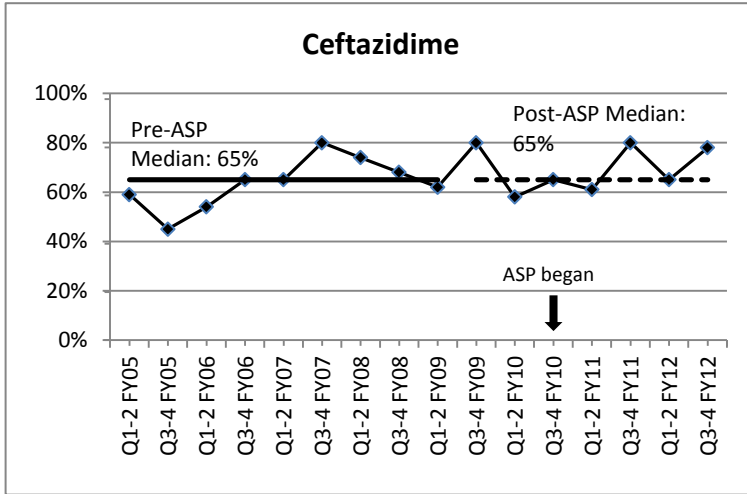
FY 12/13 Top 5 ANTIFUNGALS by Usage (DDD's per 100 patient-days) and Expenditures



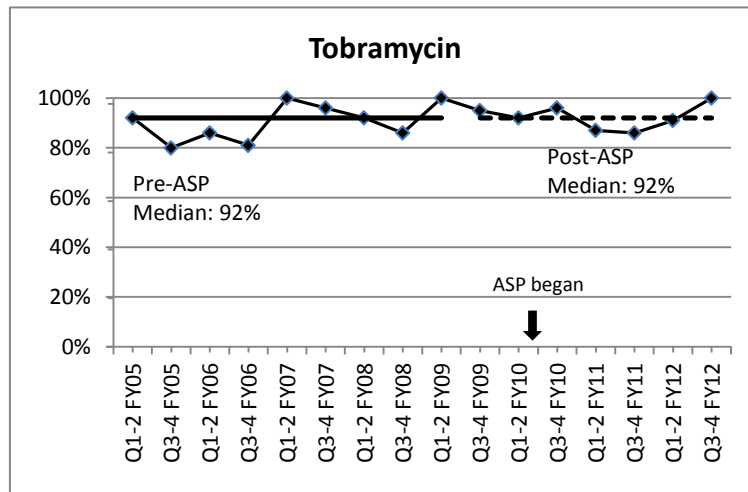
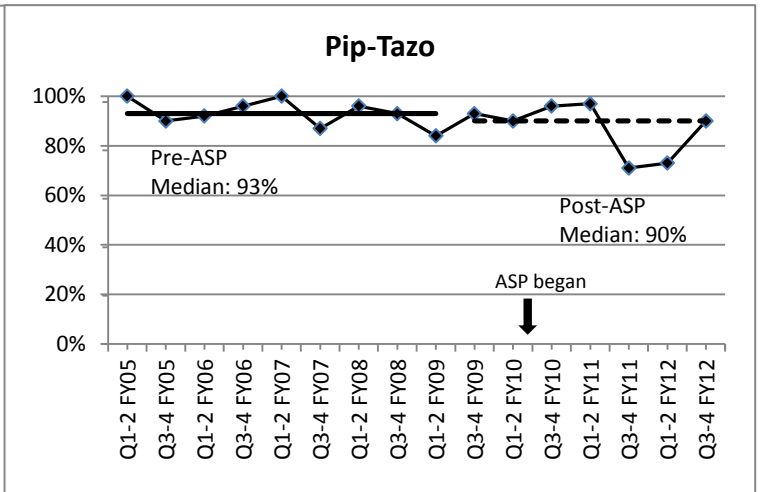
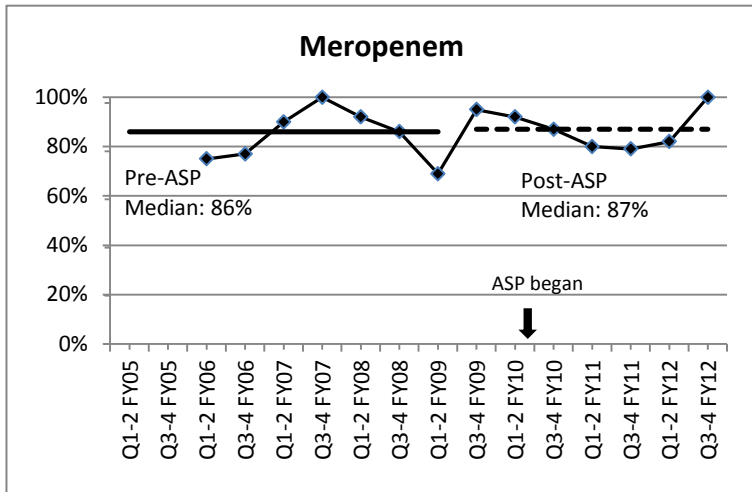
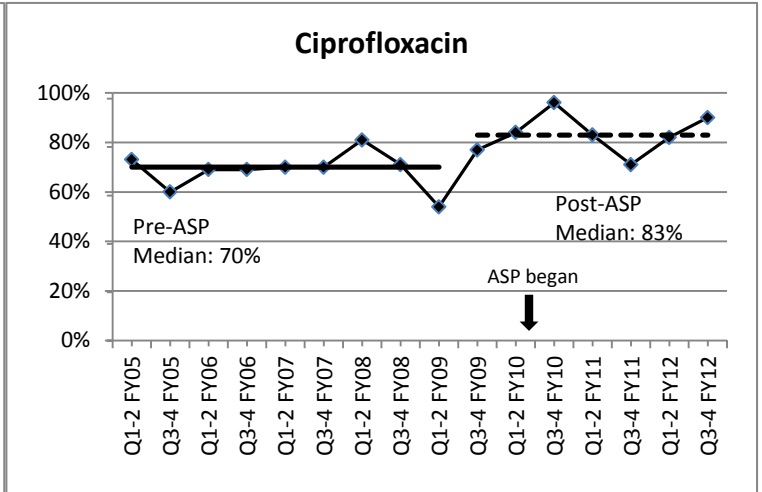
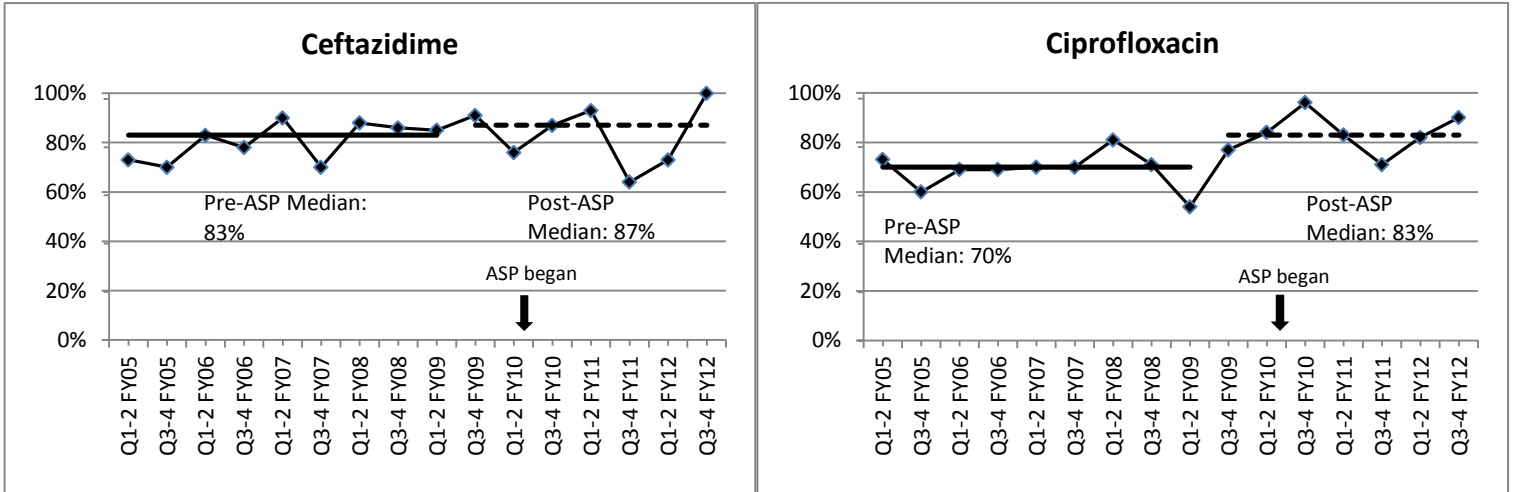
Antimicrobial Susceptibility and Pathogen Surveillance Pseudomonas Susceptibility – MSH ICU



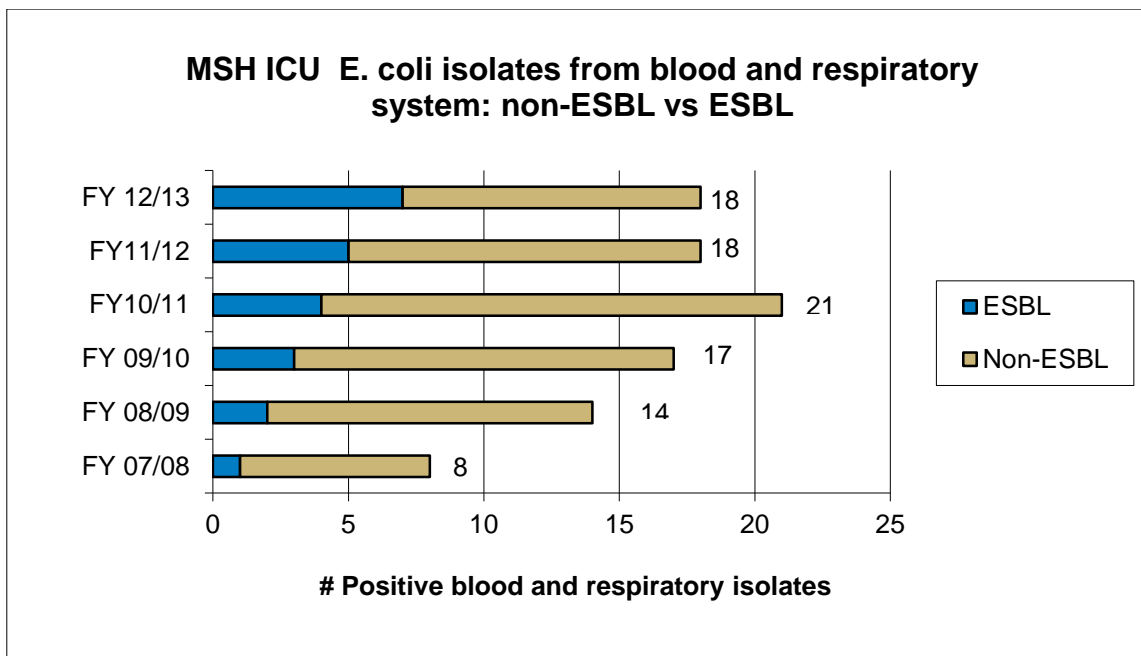
Antimicrobial Susceptibility and Pathogen Surveillance Pseudomonas Susceptibility – TGH ICU



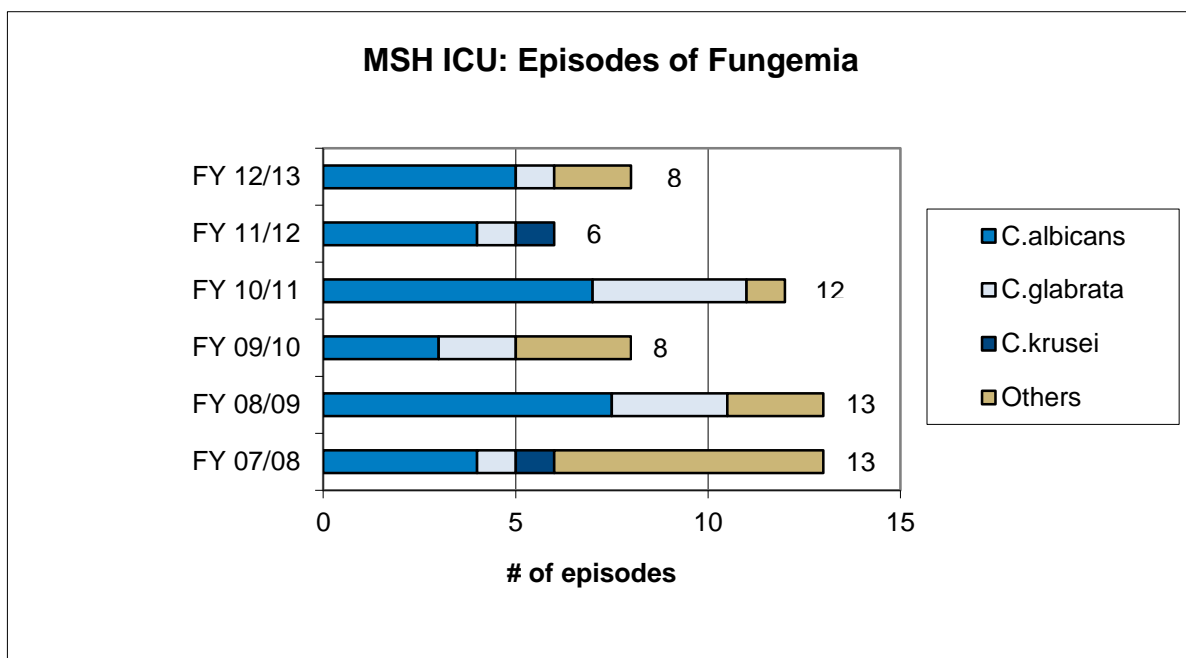
Antimicrobial Susceptibility and Pathogen Surveillance Pseudomonas Susceptibility – TWH ICU



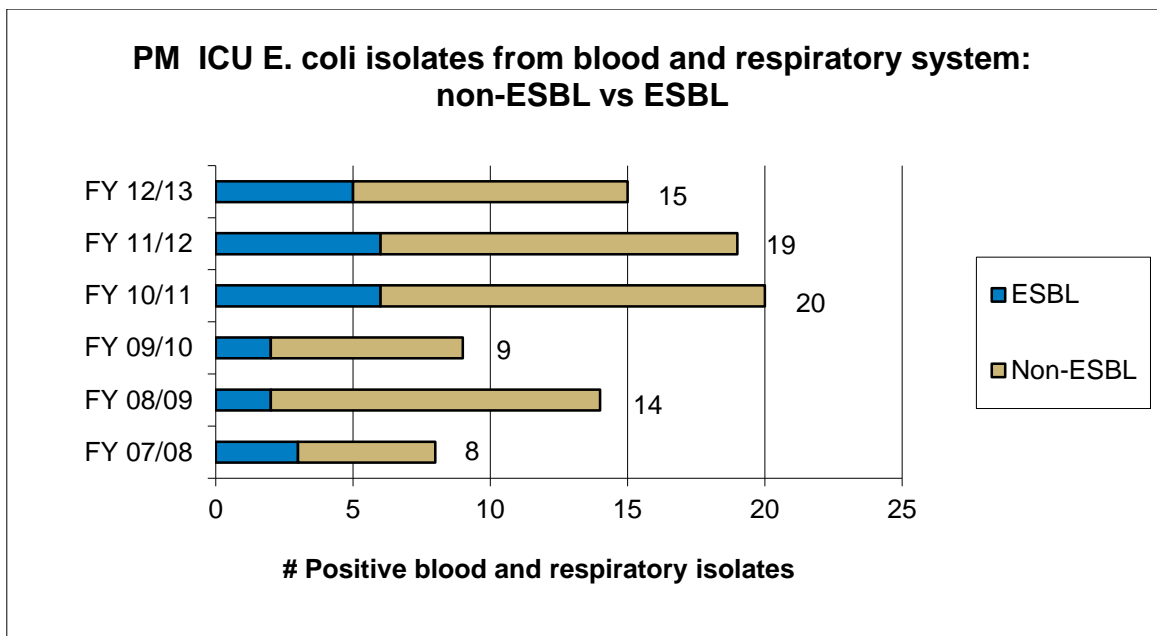
Antimicrobial Susceptibility and Pathogen Surveillance
***E.Coli* isolates: Blood and Respiratory**



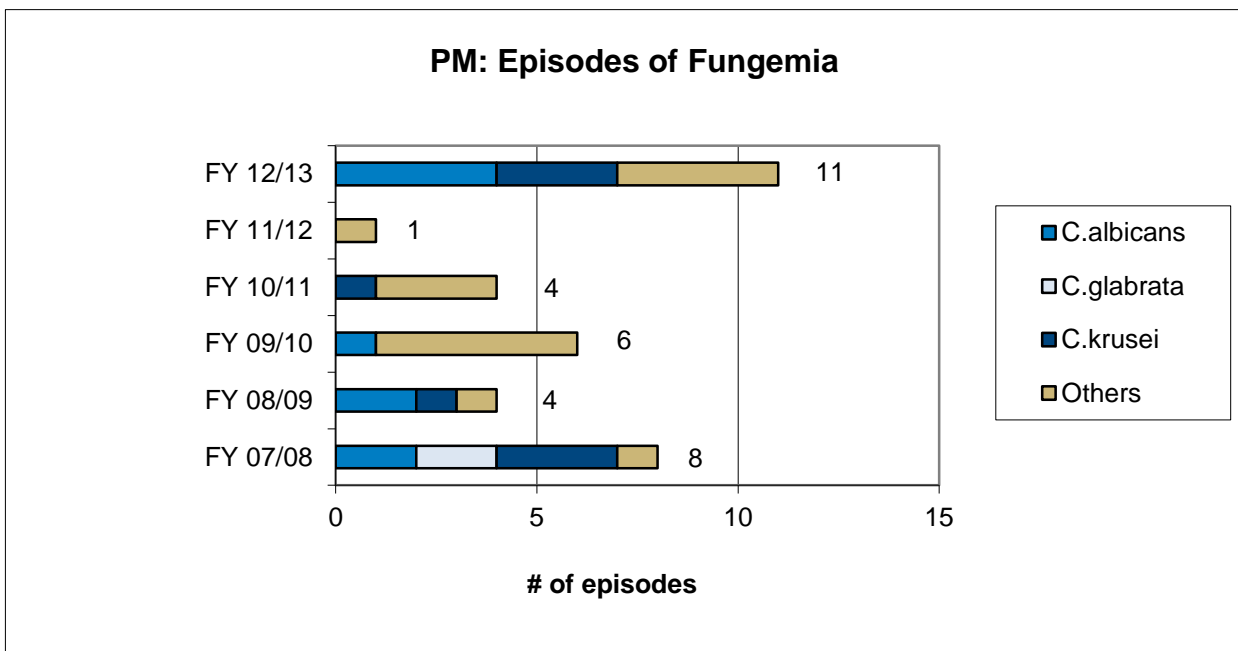
Yeast Species Isolated in Blood – MSH ICU



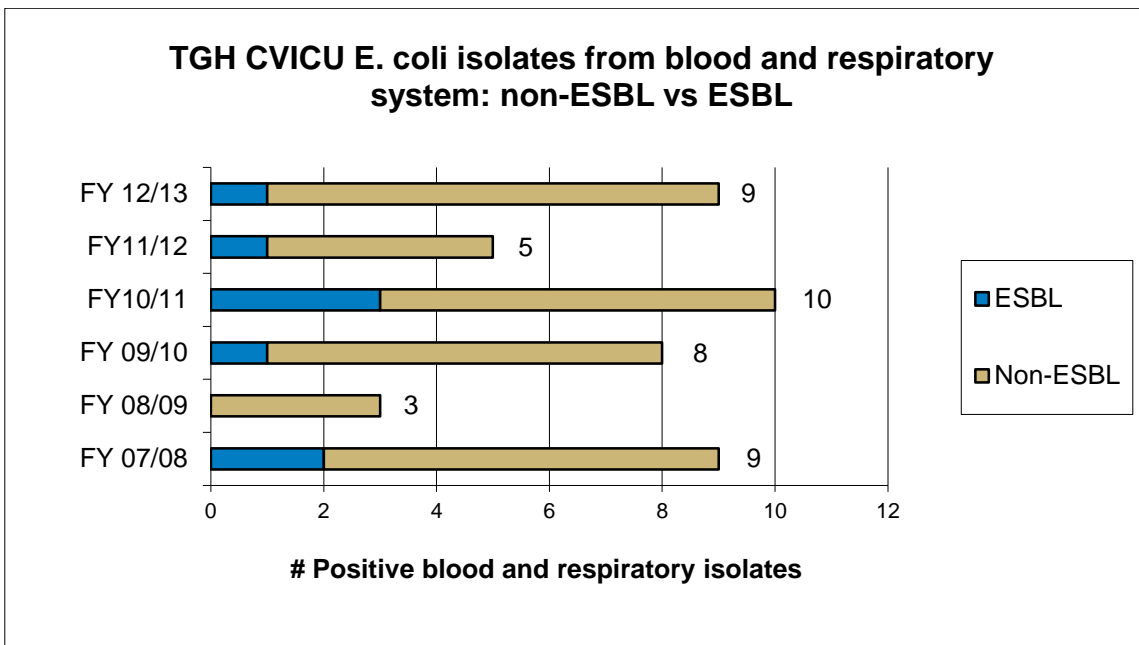
Antimicrobial Susceptibility and Pathogen Surveillance
***E.Coli* isolates: Blood and Respiratory**



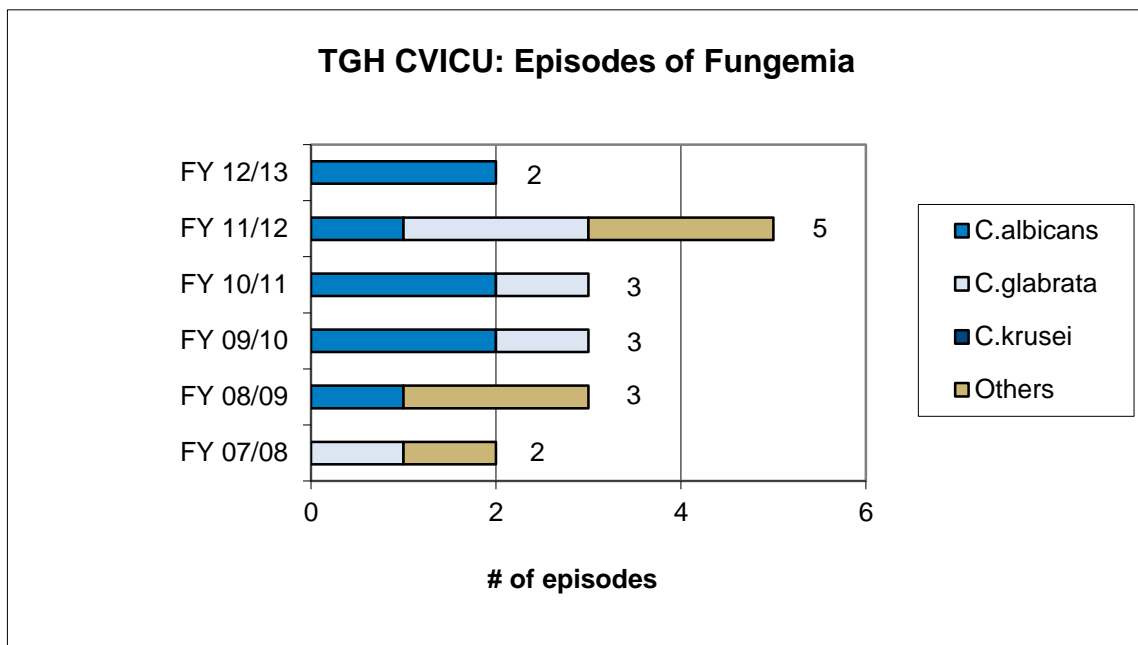
Yeast Species Isolated in Blood – Princess Margaret



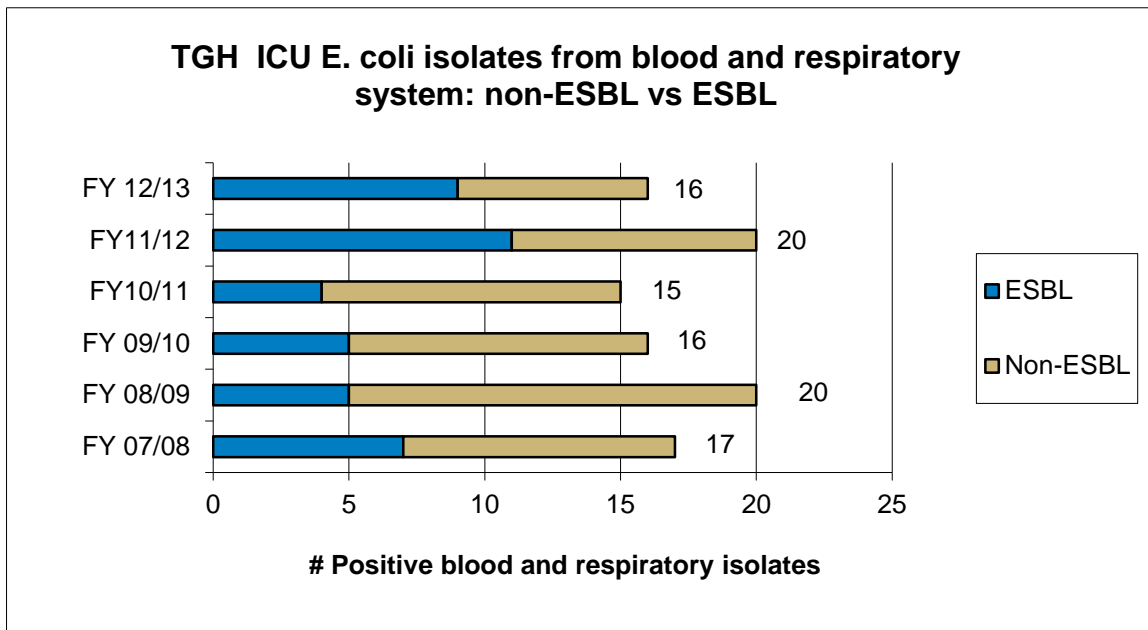
Antimicrobial Susceptibility and Pathogen Surveillance
***E.Coli* isolates: Blood and Respiratory**



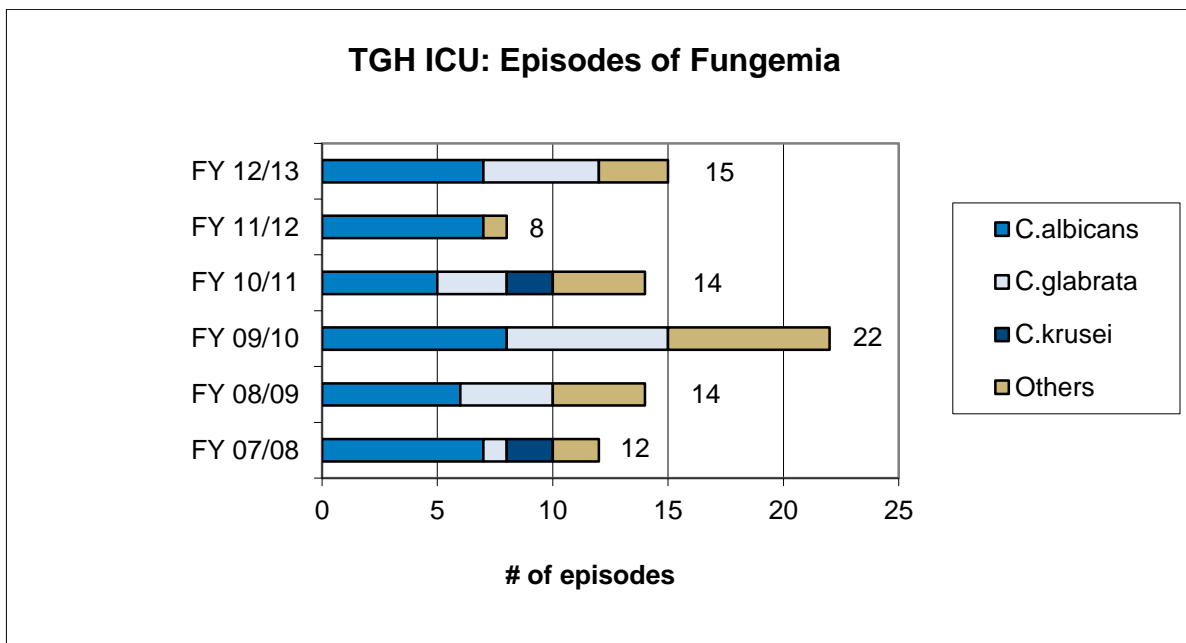
Yeast Species Isolated in Blood – CVICU



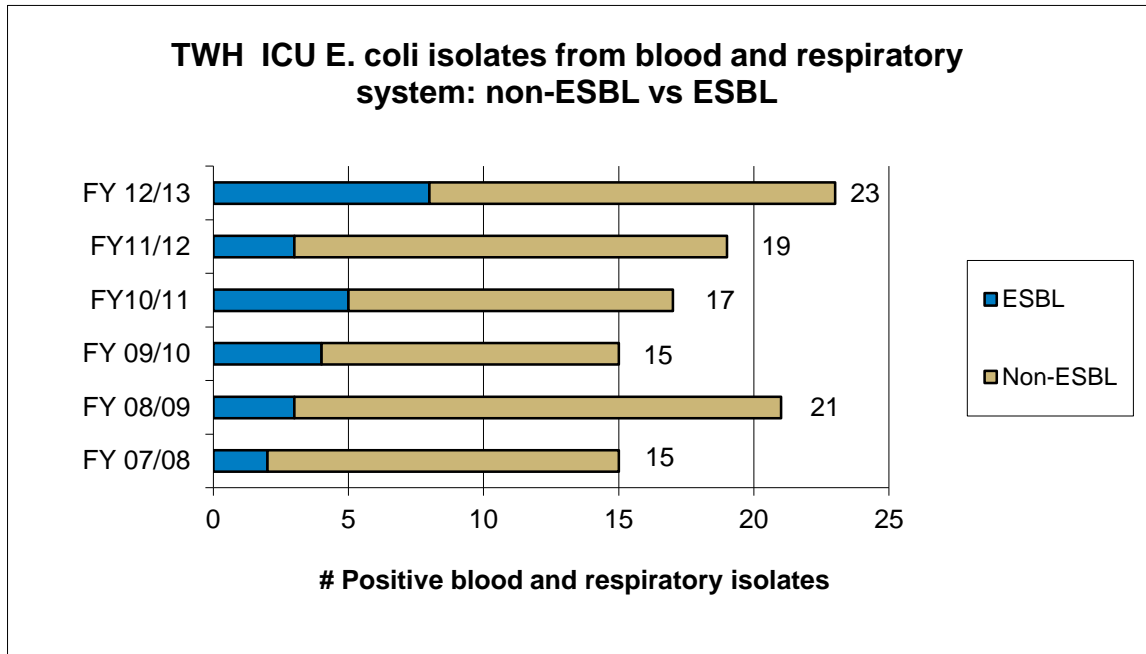
Antimicrobial Susceptibility and Pathogen Surveillance
***E.Coli* isolates: Blood and Respiratory**



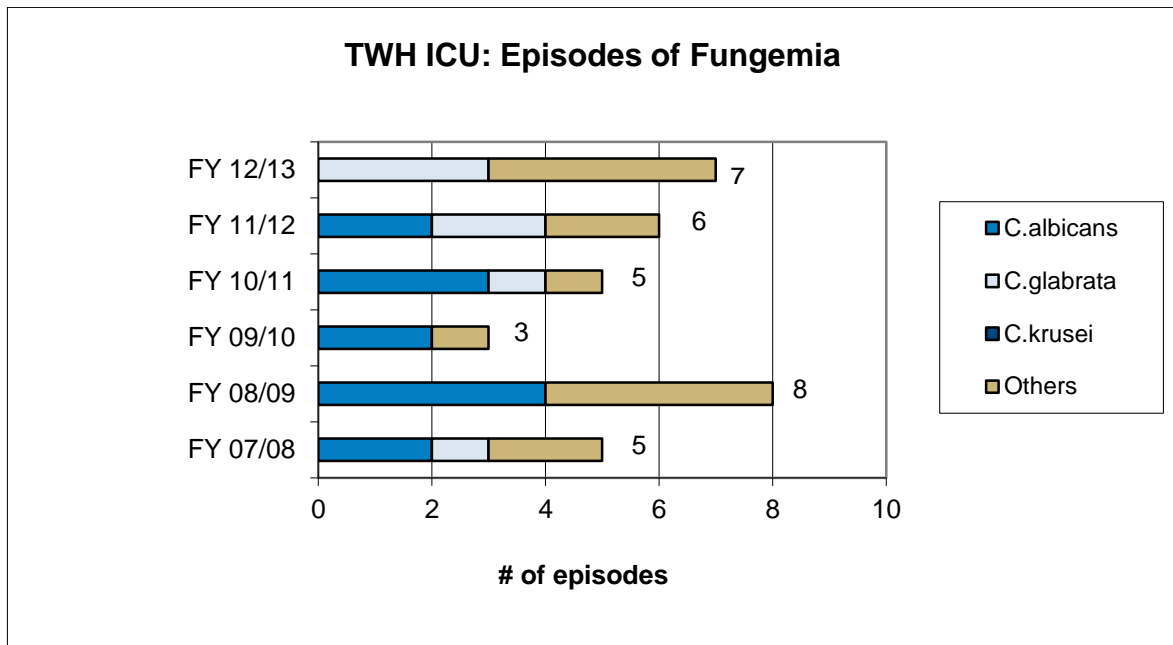
Yeast Species Isolated in Blood – TGH ICU



Antimicrobial Susceptibility and Pathogen Surveillance
***E.Coli* isolates: Blood and Respiratory**



Yeast Species Isolated in Blood – TWH ICU



APPENDIX

Abstracts

1. Dresser L, Steinberg M, So M, Bell C, Scales D, Morris A. A Survey to Evaluate Critical Care Trainees Perceptions of Antimicrobial Stewardship Programs in Intensive Care Units. Poster presentation to the Critical Care Canada Forum, October 2012, Toronto, ON, Canada. Oral presentation to AMMI Canada, April 2013
2. Duplisea K, Jivraj T, Poutanen S, Nelson S, Dresser L, Steinberg M, Lazar N, Lapinsky S, Singh J, Bell C, Morris A. Effect of Prospective Audit and Feedback as part of an ICU Antimicrobial Stewardship Program on Antimicrobial Susceptibility to *Pseudomonas aeruginosa*. Poster presentation to the Critical Care Canada Forum, October 2012, Toronto, ON, Canada. Poster presentation to AMMI Canada, April 2013.
3. Mohiuddin Q, Nelson S, Steinberg M, Jivraj T, Harris C, Burry L, Varga L, Lapinsky S, Bell C, Morris AM. A Point Prevalence Study to Evaluate Clinical Compliance with a Ventilator Associated Pneumonia Algorithm in the Intensive Care Unit. Poster presentation to the Critical Care Canada Forum, October 2012, Toronto, ON, Canada. Oral presentation to AMMI Canada, April 2013
4. Dresser L, Jivraj T, Steinberg M, Duplisea K, Nelson S, Poutanen S, Singh J, Lazar N, Lapinsky S, Morris A. Impact of an Antimicrobial Stewardship Prospective Audit and Feedback Program on Candidemia in the Intensive Care Unit. Poster presentation to the Critical Care Canada Forum, October 2012, Toronto, ON, Canada. Oral presentation to AMMI Canada, April 2013.
5. So M, Pivnick L, Steinberg M, Jivraj T, Lapinsky S, Morris A, Husain S. Evaluation of antimicrobial stewardship program on leukemia service through prospective audit and feedback. Poster presentation to the Critical Care Canada Forum, October 2012, Toronto, ON, Canada. Poster presentation to AMMI Canada, April 2013.

Ongoing Research Projects

There are multiple ongoing research projects, summarized below. These are at various stages of execution, with some currently undergoing the final stages of data analysis, in preparation for submission to high impact journals.

1. Evaluation of the Effectiveness and Impact of the Antimicrobial Stewardship Program (ASP) in the Intensive Care Unit
 - Principal Investigator: Dr. Andrew Morris
 - Co-investigators: Brian Minnema, Lisa Burry, Sandra Nelson, Tanaz Jivraj, Stephen Lapinsky, Randy Wax, Michael Christian, Sangeeta Mehta, Chaim Bell, Thomas Stewart
2. Analysis of Investigations, Treatments and Outcomes associated with Staphylococcus aureus Bacteremia in the Greater Toronto Area
 - Principal Investigator: Dr. Lisa Burry
 - Co-investigators: Adrienne Showler, Sandra Nelson, Tanaz Jivraj, Chaim Bell, Andrew Morris
 - Multiple sub-studies are associated with this study, including a financial analysis of hospital costs associated with SAB, led by Dr. Nisha Thampi, ASP fellow
3. Analysis of Investigations, Antifungal Treatments, and Outcomes Associated with Patients with Acute Myeloid Leukemia Undergoing First Remission-Induction Chemotherapy at Princess Margaret Hospital
 - Principal Investigator: Dr. Andrew Morris
 - Co-investigators: Janaki Vallipuram, Linda Dresser, Chaim Bell
4. A Point Prevalence Study to Evaluate Clinical Compliance with a Ventilator Associated Pneumonia Algorithm in the Intensive Care Unit
 - Principal Investigator: Dr. Andrew Morris
 - Co-investigators: Qasim Mohiuddin, Marilyn Steinberg, Linda Dresser, Chaim Bell
5. Evaluation of the Effectiveness and Impact of an Antimicrobial Stewardship Program in the Neonatal Intensive Care Unit
 - Principal Investigator: Andrew Morris, Nisha Thampi
 - Co-investigators: Bell C, Nelson S, Shah P

6. Effect of Prospective Audit and Feedback as part of an ICU Antimicrobial Stewardship Program on Antimicrobial Susceptibility to *Pseudomonas aeruginosa*.
 - Principal Investigator: Kevin Duplisea
 - Co-investigators: Jivraj T, Poutanen S, Nelson S, Dresser L, Steinberg M, Lazar N, Lapinsky S, Singh J, Bell C, Morris A.
7. Impact of an Antimicrobial Stewardship Prospective Audit and Feedback Program on Candidemia in the Intensive Care Unit
 - Principal Investigator: Linda Dresser
 - Co-investigators: Jivraj T, Steinberg M, Duplisea K, Nelson S, Poutanen S, Singh J, Lazar N, Lapinsky S, Morris A
8. Evaluating the Impact of Antimicrobial Stewardship Prospective Audit-and-Feedback Intervention in Patients with Malignant Haematological Diseases
 - Principal Investigators: Miranda So, Shahid Husain
 - Co-investigators: Andre Schuh, John Kuruvilla, Mark Minden, Muhammad Mamdani, Sue Poutenan, Marilyn Steinberg, Chaim Bell, Andrew Morris
9. Evaluation of the Safety and Efficacy of an Antimicrobial Stewardship Program on General Internal Medicine Service
 - Principal Investigators: Paul Bunce
 - Co-investigators: Linda Dresser, Kevin Duplisea, Sandra Nelson, Miranda So, Marilyn Steinberg, Andrew Morris