

**MSH + UHN**  
**ASP** **ANTIMICROBIAL  
STEWARDSHIP  
PROGRAM**



# Q4 REPORT:

FISCAL YEAR 2013 | 2014

**MOUNT SINAI HOSPITAL**  
Joseph and Wolf Lebovic Health Complex  
Bright Minds. Big Hearts. The Best Medicine.

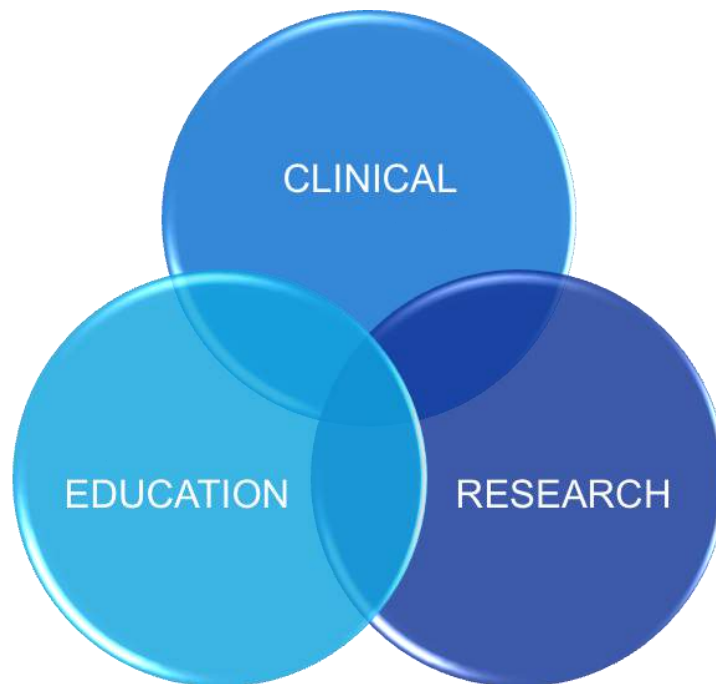


**UHN**  
Toronto General  
Toronto Western  
Princess Margaret  
Toronto Rehab  
**COURAGE LIVES HERE**

*“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.*

## KEY HIGHLIGHTS

### ✦ ANTIMICROBIAL CONSUMPTION AND COSTS:

The ASP continues to work with clinical teams across all four hospitals. Antimicrobial consumption and costs by site are included below. Detailed tables and graphs are appended. There is a trend of increased use and/or expenditures for antimicrobials in adult intensive care units, necessitating a more thorough review of the factors involved. We will be focusing on understanding this trend and, if possible, reversing it over the next fiscal year.

#### MOUNT SINAI HOSPITAL ICU

The ASP continues to work with the Mount Sinai Hospital (MSH) Intensive Care Unit (ICU). FY 13/14 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) remained largely unchanged (i.e. decreased by 2%) compared to last year.
- Antimicrobial costs per patient day increased (↑) by 36% compared to last year. The substantial increase in costs—despite no increase in overall consumption—is due to an increase in antifungal costs. This is related to patient-specific illness, requiring prolonged use of expensive antifungal therapy beginning in the second quarter.

NB: Princess Margaret patients accounted for 19% of patient visits and 65% of the antimicrobial costs.

#### TORONTO WESTERN HOSPITAL ICU

The ASP continues to work with the Toronto Western Hospital ICU. FY 13/14 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 11% compared to last year.
- Antimicrobial costs per patient day remained largely unchanged (i.e. increased by 1%) compared to last year.

#### TORONTO GENERAL HOSPITAL MEDICAL SURGICAL ICU

The ASP continues to work with the Toronto General Hospital MSICU. FY 13/14 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 11% compared to last year.
- Antimicrobial costs per patient day increased (↑) by 24% compared to last year.

#### TORONTO GENERAL HOSPITAL CARDIOVASCULAR ICU

The ASP continues to work with the Toronto General Hospital CVICU. FY 13/14 highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) decreased (↓) by 5% compared to last year.
- Antimicrobial costs per patient day increased (↑) by 14% compared to last year.

#### MOUNT SINAI HOSPITAL NEONATAL ICU

We have collected days of therapy (DOT) as the metric for antimicrobial consumption, which is considered to be the standard for neonates. FY 13/14 highlights include:

- Antimicrobial days of therapy (DOT) per 100 patient days decreased (↓) by 19% compared to last year.
- Antimicrobial costs per patient day have increased (↑) by 44% compared to last year (\$1.51 to \$2.18).

#### PRINCESS MARGARET CANCER CENTRE: LEUKEMIA SERVICE

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

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) increased (↑) by 7.5% compared to last year.

- Antimicrobial costs per patient day decreased (↓) by 6% compared to last year.

Apart from prospective audit and feedback rounds with leukemia, the ASP team is also working with nurse practitioners at the REACH/Transfusion Clinic during case rounds every 2 weeks. The ASP has completed data collection for a quality improvement project to determine the indications and investigations involved prior to initiating antimicrobials in REACH and Transfusion Clinic (TFC) for leukemia/Bone Marrow Transplant (BMT) patients (“REACH/TFC Antimicrobial ‘Spot Audit’” project). Data preparation and analysis will begin in June 2014. The ASP team has had a “kick-off” meeting with the BMT team and is working on plans to provide stewardship service to the BMT unit.

#### ✦ BEST PRACTICE GUIDELINES & ALGORITHMS:

- Dissemination of the High-Risk Febrile Neutropenia Protocol for Patients with Malignant Hematological Diseases has been completed for the following groups: staff/fellows/clinical associates at leukemia and BMT; pharmacy (MSH and UHN); ICU (MSH and UHN); GIM (TGH and MSH); ED (TGH); satellite sites (e.g. Southlake Regional Health Centre). Hosting sites: intranet pages for leukemia and ED, and MSH-UHN ASP website under “Best Practices”. The High-Risk Protocol is also a recurring topic discussed at GIM ASP Noon Rounds. The ASP team is in collaboration with Dr. Sam Sabbah to create a UHN ED Pre-Printed Order Set for the High-Risk Protocol.
- The final draft of the Pulmonary Infiltrate Protocol has been completed, and is currently being formatted for integration into the High-Risk Protocol. The ASP team is grateful for the time and expertise provided by the Pulmonary Infiltrate Protocol Working Group.
- Febrile Neutropenia Protocol for Solid Tumor and Lymphoma Patients is awaiting consultation and review by expert groups across UHN and MSH. It is formatted the same way as the High-Risk Protocol but with a different colour scheme to distinguish it clearly from the High-Risk protocol for end-users.
- Clinical summaries have been developed and available on the ASP website for a series of common and important conditions. These were developed in collaboration with various stakeholders, including Infectious Diseases, Pharmacy, Infection Prevention and Control and Microbiology. <http://www.antimicrobialstewardship.com/antimicrobial-stewardship-clinical-summaries>
- The ASP collaborated with the Emergency Department to complete the MSH Emergency Department sepsis recognition and management algorithm in April 2014. Implementation of the algorithm into the practice setting, with a marketing and knowledge translation strategy, is slated for June 2014.
- The ASP is collaborating 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 project working group is developing a draft CDI recognition and management algorithm with the aim to have it ready for review in June 2014.

#### ✦ RESEARCH:

Multiple research projects continue, with many important projects nearing completion and being prepared for submission to key medical journals. The following manuscripts have been submitted to medical journals and are currently undergoing peer review:

- Antimicrobial stewardship using prospective audit and feedback in tertiary intensive care units: a multi-site prospective study
- Usefulness of screening for methicillin-resistant *Staphylococcus aureus* in guiding empiric therapy for *S. aureus* bacteremia
- A National Survey of Critical Care Physicians’ Knowledge, Attitudes and Perceptions of Antimicrobial Stewardship Programs accepted by Journal of Intensive Care Medicine

The following manuscripts are currently in preparation for submission:

- A Point Prevalence Study to Evaluate Clinical Compliance with an Interdisciplinary Ventilator Associated Pneumonia Algorithm in the Intensive Care Unit

- *Staphylococcus aureus* bacteremia in patients with chronic kidney disease not treated with dialysis: a retrospective study
- A normal transthoracic echocardiogram rules out infective endocarditis in low-risk patients with *Staphylococcus aureus* bacteremia: results from a multicentre cohort study
- Hospital cost analysis of *Staphylococcus aureus* bacteremia

The following projects are currently undergoing the final stages of data analysis and manuscript development:

- Analysis of Investigations, Treatments and Outcomes associated with *Staphylococcus aureus* Bacteremia in the Greater Toronto Area
- Analysis of Investigations, Antifungal Treatments, and Outcomes Associated with Patients with Acute Myeloid Leukemia Undergoing First Remission-Induction Chemotherapy at Princess Margaret Hospital

#### **✦ EDUCATION:**

The ASP team has been providing ongoing education and skills training related to stewardship principles to General Internal Medicine Pharmacists at both MSH and UHN. This is part of the General Internal Medicine initiative. Education has been provided by the ASP team to physicians and medical trainees through several forums, including ASP/ID noon rounds which provide case-based education, ASP pocket cards developed as a tool for medical trainees and a mobile online resource to provide efficient access to resources.

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, with Miranda So (ASP Pharmacist) as the course coordinator and contribution from other ASP team members. The curricular design and implementation was accepted as a poster at the Joint Canadian Pharmacists Association and Association of Faculties of Pharmacy Conference in Saskatoon, SK.

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 Linda Dresser and other ASP team members. There are 13 sites across Ontario participating in the grant. A series of lectures on stewardship principles and therapeutic topics are being delivered over an 8-month period with each site gathering and reporting baseline and ongoing antimicrobial consumption data. Impact of the program at each site will be measured by antimicrobial consumption data and a survey of participants. Many of the clinical team members have participated to date by recording lectures for the education modules.

As well, a medical animation series related to antimicrobial stewardship was developed and 6 animations are featured on the ASP website and ASP YouTube page. The very first animation has also been featured by AMMI Canada and Canadian Healthcare News. Link to the Medical Animation Video on the ASP YouTube site: <http://www.youtube.com/user/TorontoASP>

#### **✦ PROVINCIAL ROLE:**

##### CAHO ASP ARTIC Project:

This past quarter marked the completion of the CAHO ASP ARTIC Project which was led by the MSH-UHN ASP team. This two-year provincial initiative commenced in January 2012 with the primary objective to have every participating hospital successfully introduce and sustain an antimicrobial stewardship program in their ICU. A successfully established program would report outcome measures regularly and accurately, and be able to receive feedback on their performance compared to peer ICUs in CAHO member hospitals.

At project completion, all 14 participating ICUs from the academic hospitals across Ontario (11 adult, 3 pediatric) successfully met the objective and project milestones. ASPs in adult ICUs showed a 23% reduction in antimicrobial consumption, and 16% reduction in antimicrobial cost. Similarly, ASPs in pediatric ICUs showed a reduction in consumption ranging from 17-34% in defined daily doses, and cost differences were modest, and highly varied. *C. difficile* rates were too low to offer any meaningful and/or interpretable results.

A final project report was submitted to the Council of Academic Hospitals of Ontario (CAHO) and the participating sites. The MSH-UHN ASP presented highlights of this project at a meeting on March 3rd, 2014 to the Ontario Minister of Health and Long-Term Care, the CEO of Health Quality Ontario, as well as CAHO board members and the stakeholders of the 14 participating ICUs. In June, Dr. Andrew Morris will also be presenting the results of this initiative to the 24 CEOs of the academic hospitals across Ontario.

Critical Care Services Ontario (CCSO):

It has been previously mentioned that the MSH-UHN ASP has been working with Critical Care Services Ontario (CCSO) in developing reports for the three new antimicrobial indicators in the Critical Care Information System (CCIS). All ICUs across the province have been entering data in CCIS for these indicators since January 21<sup>st</sup>, 2013, and these new reports went “live” April 1st, 2014 and are now available to all adult ICUs. The antimicrobial reports in CCIS, allow all adult ICUs in the province to report on their antimicrobial consumption (days of antibacterial therapy, days of antifungal therapy), and ICU-onset *C. difficile*, and compare against other ICUs within their corporation, against peer hospitals, and within their LHIN. This is the first such provincial network of antimicrobial utilization implemented anywhere in Canada, and is also the first of its kind globally.

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.

Team members are part of a Provincial Working Group exploring the outpatient management of febrile neutropenia.

✦ **NATIONAL ROLE:**

Accreditation Canada:

The MSH-UHN ASP has partnered with Accreditation Canada in a new national initiative to assist hospitals across Canada in setting up an antimicrobial stewardship program (ASP). The partnership involves the development and delivery of a series of on-line workshops, and interactive group webinars. The team has identified gaps in knowledge and process relating to antimicrobial stewardship in both academic and community hospitals, and our collaborative efforts will help these sites meet Accreditation Canada’s Required Organizational Practice for Antimicrobial Stewardship. The MSH-UHN ASP team has been developing content for the on-line modules for the first phase of this joint initiative. The on-line workshop series will be available in early November 2014.

Association of Medical Microbiology and Infectious Diseases Canada

Dr. Andrew Morris delivered a plenary lecture at the annual meeting of this specialty association on antimicrobial stewardship in Victoria, British Columbia.

✦ **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

MOUNT SINAI HOSPITAL: ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY13/14 Performance					YTD of Previous Year
						Q1	Q2	Q3	Q4	YTD	
<b>Antimicrobial Usage &amp; Costs</b>											
<b>Total Antimicrobial DDDs/100 Patient Days</b>	177	171	144	167	170	143	176	162	184	167	170
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	127	110	132	118	129	123	127
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	35	27	37	38	42	36	35
<b>Total Antimicrobial Costs</b>	\$332,724	\$285,975	\$193,129	\$279,859	\$291,470	\$64,634	\$127,482	\$119,279	\$111,239	\$422,634	\$291,470
<b>Total Antimicrobial Costs/Patient Day</b>	\$69.01	\$59.23	\$40.95	\$59.22	\$62.37	\$55.48	\$103.31	\$97.05	\$90.15	\$85.07	\$62.37
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$125,339	\$134,811	\$21,387	\$34,127	\$24,866	\$28,507	\$108,886	\$134,811
Systemic Antibacterial Costs/Patient Days	\$36.16	\$29.44	\$20.31	\$26.94	\$28.85	\$18.36	\$27.66	\$20.23	\$23.10	\$21.92	\$28.85
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$141,877	\$144,811	\$40,572	\$89,203	\$86,153	\$79,235	\$295,163	\$144,811
Systemic Antifungal Costs/Patient Days	\$29.68	\$27.45	\$18.87	\$30.50	\$30.99	\$34.83	\$72.29	\$70.10	\$64.21	\$59.41	\$30.99
<b>Patient Care Outcomes</b>											
Hospital acquired C. difficile cases (rate per 1,000 pt days)	NA	NA	NA	5 (1.07)	8 (1.71)	0 (0.0)	1 (0.81)	1 (0.81)	2 (1.49)	4 (0.91)	8 (1.71)
ICU Average Length of Stay (days)	5.84	5.57	5.67	5.51	5.24	6.06	5.39	6.88	6.02	6.10	5.24
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.5	17.04	16.3	13.9	11.7	19.3	15.3	17.0
ICU Readmission Rate within 48 hrs (as a %)	3.2	2.9	2.7	2.7	1.86	4.0	3.9	2.2	2.8	3.2	1.9
ICU Ventilator Days	NA	3286	2934	2677	2749	747	748	780	794	3069	2749
ICU Multiple Organ Dysfunction Score (MODS)	4.00	4.04	4.12	4.25	4.62	4.73	4.69	4.70	5.36	4.87	4.62

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

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs + 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 WESTERN HOSPITAL: ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY13/14 Performance					YTD of Previous Year
						Q1	Q2	Q3	Q4*	YTD	
<b>Antimicrobial Usage &amp; Costs</b>											
<b>Total Antimicrobial DDDs/100 Patient Days</b>	101	88	79	83	83	90	95	98	88	92	83
Systemic Antibacterial DDDs/100 Patient Days	94	78	73	77	78	85	85	94	84	87	78
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	5	5	11	3	4	6	5
<b>Total Antimicrobial Costs</b>	\$138,502	\$100,408	\$101,191	\$105,899	\$102,978	\$37,529	\$28,499	\$25,556	\$28,936	\$120,520	\$102,978
<b>Total Antimicrobial Costs/Patient Day</b>	\$18.39	\$13.24	\$13.17	\$13.60	\$13.37	\$18.09	\$14.80	\$12.37	\$10.08	\$13.49	\$13.37
Systemic Antibacterial Costs	\$123,278	\$87,445	\$79,280	\$89,784	\$70,099	\$20,426	\$23,389	\$17,171	\$24,912	\$85,898	\$70,099
Systemic Antibacterial Costs/Patient Days	\$16.37	\$11.53	\$10.32	\$11.53	\$9.10	\$9.85	\$12.15	\$8.31	\$8.68	\$9.61	\$9.10
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$16,115	\$32,879	\$17,103	\$5,109	\$8,386	\$4,025	\$34,623	\$32,879
Systemic Antifungal Costs/Patient Days	\$1.79	\$1.71	\$2.85	\$2.07	\$4.27	\$8.25	\$2.65	\$4.06	\$1.40	\$3.87	\$4.27
<b>Patient Care Outcomes</b>											
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)	3 (1.45)	3(1.55)	3(1.45)	3 (1.05)	12 (1.34)	5 (0.65)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.71	7.98	6.17	9.69	7.42	7.63	7.68	7.98
ICU Mortality Rate (as a %)	19.6	19.9	18.1	17.0	16.4	14.3	21.4	15.0	18.3	17.1	16.4
ICU Readmission Rate w within 48 hrs (as a %)	3.9	4.7	4.9	3.21	3.00	5.56	4.29	3.72	1.68	3.85	3
ICU Ventilator Days	4617	6305	5960	5578	4947	1339	1297	1303	1584	5523	4947
ICU Apache II Score	15.0	14.7	13.7	13.8	12.9	12.7	13.3	11.5	13.7	12.8	12.9

**Notes:**

\* Q4 13/14 data consists of MSNICU patients (including 8 ICU II patients).

\*\*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 1<sup>st</sup> quarter of fiscal 12/13. Use of Centricity data resumes effective 2<sup>nd</sup> 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.whooc.no/atc\\_ddd\\_index/](http://www.whooc.no/atc_ddd_index/))

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

Data Sources: Antimicrobial DDD and Costs (Centricity)



## TORONTO GENERAL HOSPITAL: MSICU

Indicators	FY 09/10 (Pre-ASP)	FY 10/11	FY 11/12	FY 12/13	FY13/14 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
<b>Antimicrobial Usage &amp; Costs</b>										
<b>Total Antimicrobial DDDs/100 Patient Days</b>	266	208	200	214	192	295	237	224	237	214
Systemic Antibacterial DDDs/100 Patient Days	184	153	141	160	144	224	167	159	174	160
Systemic Antifungal DDDs/100 Patient Days	82	55	55	54	49	71	70	64	63	54
<b>Total Antimicrobial Costs</b>	\$701,451	\$627,540	\$572,443	\$472,334	\$127,286	\$168,046	\$155,962	\$155,866	\$607,161	\$472,334
<b>Total Antimicrobial Costs/Patient Day</b>	\$102.52	\$83.81	\$77.60	\$63.58	\$67.99	\$86.31	\$83.99	\$76.48	\$78.71	\$63.58
Systemic Antibacterial Costs	\$390,209	\$373,504	\$288,775	\$229,892	\$46,929	\$74,461	\$61,185	\$63,318	\$245,893	\$229,892
Systemic Antibacterial Costs/Patient Days	\$57.03	\$49.88	\$39.15	\$30.95	\$25.07	\$38.24	\$32.95	\$31.07	\$31.88	\$30.95
Systemic Antifungal Costs	\$311,242	\$254,036	\$275,176	\$242,443	\$80,357	\$93,585	\$94,777	\$92,548	\$361,268	\$242,443
Systemic Antifungal Costs/Patient Days	\$45.49	\$33.93	\$37.30	\$32.63	\$42.93	\$48.07	\$51.04	\$45.41	\$46.83	\$32.63
<b>Patient Care Outcomes</b>										
Hospital acquired C. difficile cases (rate per 1,000 pt days)	10 (1.46)	10 (1.33)	11 (1.49)	11 (1.48)	2 (1.07)	2 (1.03)	5 (2.69)	3 (1.47)	12 (1.56)	11 (1.48)
ICU Average Length of Stay (days)	8.24	8.61	8.85	7.79	8.10	7.30	8.99	8.99	8.22	7.79
ICU Mortality Rate (as a %)	16.2	15.7	16.3	16.0	19.2	14.7	19.3	18.1	17.8	16
ICU Readmission Rate within 48 hrs (as a %)	3.8	4.4	4.4	2.8	5.8	3.5	2.7	2.0	3.5	2.8
ICU Ventilator Days	5399	6256	6507	6458	1704	1791	1609	1938	7042	6458
Apache II score	n/a	n/a	16.1	15.775	15.0	14.6	14.6	16	15.1	15.8

**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 1<sup>st</sup> quarter of fiscal 12/13. Use of Centricity data resumes effective 2<sup>nd</sup> 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.whooc.no/atc\\_ddd\\_index/](http://www.whooc.no/atc_ddd_index/))

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

Data Sources: Antimicrobial DDD and Costs (Centricity)

## TORONTO GENERAL HOSPITAL: CVICU

Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY 12/13	FY13/14 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
<b>Antimicrobial Usage &amp; Costs</b>									
<b>Total Antimicrobial DDDs/100 Patient Days</b>	115	98	102	76	107	103	104	97	102
Systemic Antibacterial DDDs/100 Patient Days	104	86	89	67	92	93	95	86	89
Systemic Antifungal DDDs/100 Patient Days	11	12	13	10	15	10	9	11	13
<b>Total Antimicrobial Costs</b>	\$117,356	\$107,795	\$85,596	\$23,405	\$23,142	\$27,380	\$26,809	\$100,736	\$85,596
<b>Total Antimicrobial Costs/Patient Day</b>	\$19.75	\$18.94	\$14.93	\$15.18	\$16.78	\$17.90	\$18.20	\$17.00	\$14.93
Systemic Antibacterial Costs	\$109,110	\$98,591	\$73,627	\$16,738	\$20,336	\$21,898	\$21,232	\$80,204	\$73,627
Systemic Antibacterial Costs/Patient Days	\$18.36	\$17.32	\$12.84	\$10.85	\$14.75	\$14.31	\$14.41	\$13.54	\$12.84
Systemic Antifungal Costs	\$8,246	\$9,204	\$11,969	\$6,667	\$2,807	\$5,482	\$5,577	\$20,532	\$11,969
Systemic Antifungal Costs/Patient Days	\$1.39	\$1.62	\$2.09	\$4.32	\$2.04	\$3.58	\$3.79	\$3.47	\$2.09
<b>Patient Care Outcomes</b>									
Hospital acquired C. difficile cases (rate per 1,000 pt days)	2 (0.34)	5 (0.88)	6 (1.05)	1 (0.65)	5(3.63)	1 (0.65)	0 (0.0)	7 (1.18)	6 (1.05)
ICU Average Length of Stay (days)	3.12	2.95	2.97	3.26	2.91	3.52	3.07	3.2	2.97
ICU Mortality Rate (as a %)	3.5	3.0	3.0	3.0	4.2	7.2	4.1	4.6	3.0
ICU Readmission Rate within 48 hrs (as a %)	1.6	2.2	1.8	2.4	2.4	2.8	1.3	2.2	1.8
Central Line Infection Rate (per 1000 pt days)	0.73	0.17	0.34	0.0	0.0	0.63	0.0	0.16	0.34
Ventilator Associated Pneumonia Rate (per 1000 pt days)	2.99	2.80	1.91	2.95	1.04	0.94	2.0	1.73	1.91
ICU Multiple Organ Dysfunction Score (MODS)	6.22	6.07	5.51	5.72	5.80	5.74	5.81	5.77	5.51
ICU Ventilator Days	3015	3571	3676	1018	963	1063	1005	4049	3676

**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 1<sup>st</sup> quarter of fiscal 12/13. Use of Centricity data resumes effective 2<sup>nd</sup> 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.whocc.no/atc\\_ddd\\_index/](http://www.whocc.no/atc_ddd_index/))

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

Data Sources: Antimicrobial DDD and Costs (Centricity)

## MOUNT SINAI HOSPITAL: NICU

Indicators	FY 11/12	FY 12/13	FY13/14 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
<b>Antimicrobial Usage &amp; Costs</b>								
<b>Total Antimicrobial DOTs/100 Patient Days</b>	67.3	55.4	49.2	48.8	50.0	34.5	44.9	55.4
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.5	48.7	48.2	48.5	34.2	44.2	53.5
Systemic Antifungal DOTs/100 Patient Days	2.2	1.8	0.6	0.7	1.4	0.3	0.7	1.8
<b>Total Antimicrobial Costs</b>	\$16,415	\$17,682	\$6,195	\$5,243	\$7,159	\$7,672	\$26,270	\$17,682
<b>Total Antimicrobial Costs/Patient Day</b>	\$1.31	\$1.51	\$2.15	\$1.90	\$2.57	\$2.13	\$2.18	\$1.51
Systemic Antibacterial Costs	\$14,783	\$16,505	\$6,131	\$5,196	\$6,498	\$7,562	\$25,387	\$16,505
Systemic Antibacterial Costs/Patient Days	\$1.18	\$1.41	\$2.13	\$1.88	\$2.33	\$2.10	\$2.11	\$1.41
Systemic Antifungal Costs	\$1,632	\$1,177	\$64	\$47	\$661	\$111	\$883	\$1,177
Systemic Antifungal Costs/Patient Days	\$0.13	\$0.10	\$0.02	\$0.02	\$0.24	\$0.03	\$0.07	\$0.10

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<sup>th</sup>, 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.

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

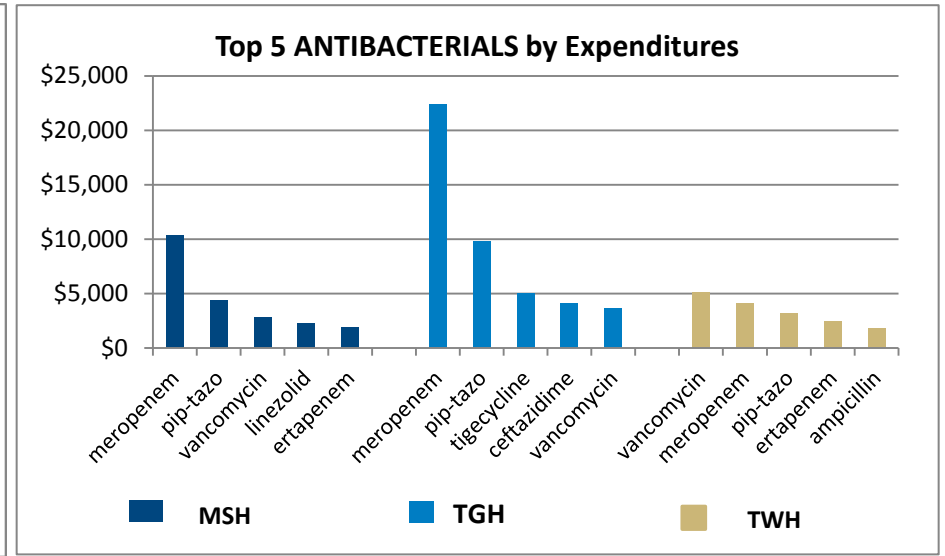
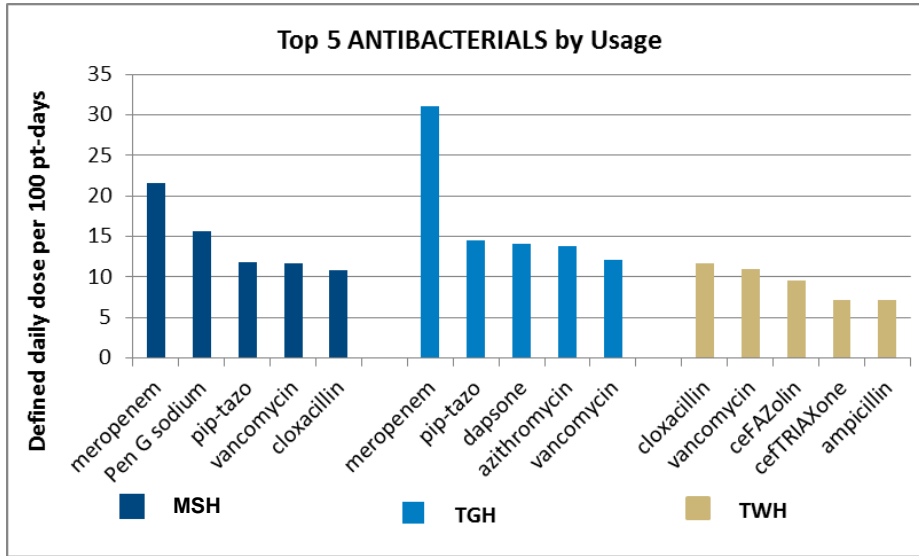
Indicators	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY13/14 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
<b>Antimicrobial Usage &amp; Costs</b>										
<b>Total Antimicrobial DDDs/100 Patient Days</b>	295	274	282	253	264	265	263	296	272	253
Systemic Antibacterial DDDs/100 Patient Days	191	167	164	149	146	145	145	166	150	149
Systemic Antifungal DDDs/100 Patient Days	104	107	105	104	117	120	118	130	121	104
<b>Total Antimicrobial Costs</b>	\$1,768,317	\$1,641,331	\$1,310,857	\$1,695,539	\$392,066	\$362,634	\$427,800	\$452,834	\$1,635,334	\$1,695,539
<b>Total Antimicrobial Costs/Patient Day</b>	\$167.12	\$154.32	\$115.13	\$128.91	\$120.93	\$111.24	\$129.95	\$136.81	\$121.33	\$128.91
Systemic Antibacterial Costs	\$659,034	\$609,747	\$663,175	\$422,438	\$124,075	\$123,513	\$128,209	\$125,480	\$501,277	\$422,438
Systemic Antibacterial Costs/Patient Days	\$62.28	\$57.33	\$58.24	\$45.85	\$38.27	\$37.89	\$38.95	\$37.91	\$38.25	\$45.85
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$647,637	\$1,092,448	\$267,990	\$239,121	\$299,590	\$327,354	\$1,134,056	\$1,092,448
Systemic Antifungal Costs/Patient Days	\$104.84	\$96.99	\$56.88	\$83.06	\$82.66	\$73.35	\$91.01	\$98.90	\$86.54	\$83.06
<b>Patient Care Outcomes</b>										
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	6 (0.56)	7 (0.65)	14 (1.17)	5 (0.51)	2 (0.62)	2(0.61)	2(0.61)	5 (1.51)	11 (0.84)	5 (0.51)

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

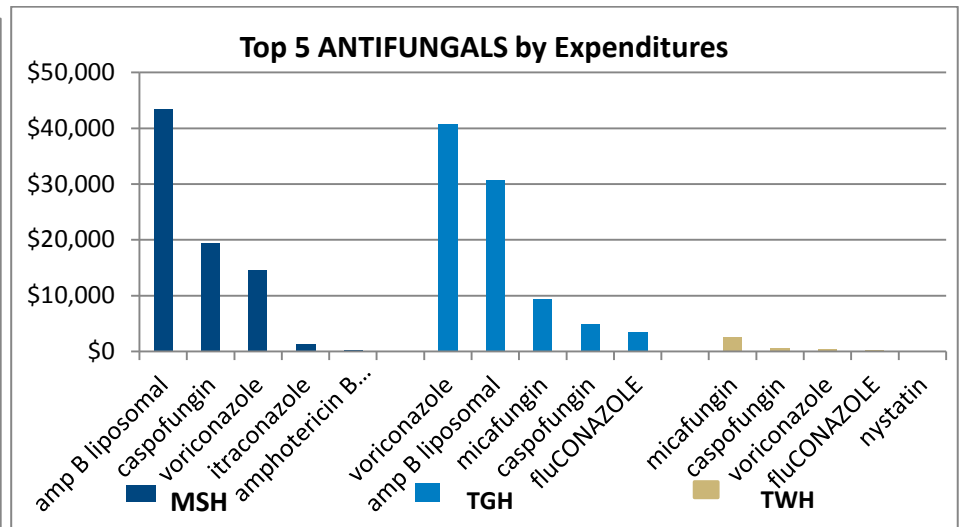
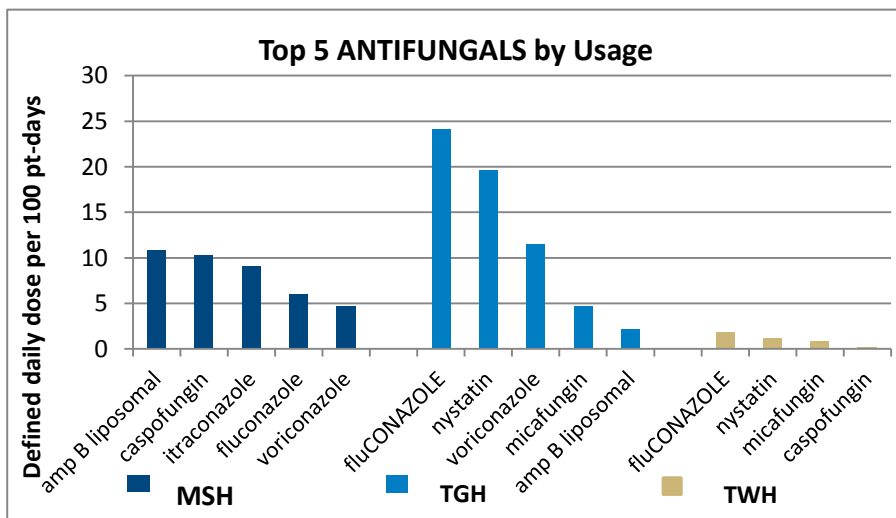
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials and antivirals are excluded

Data Sources: Antimicrobial DDD and Costs (Centricity)

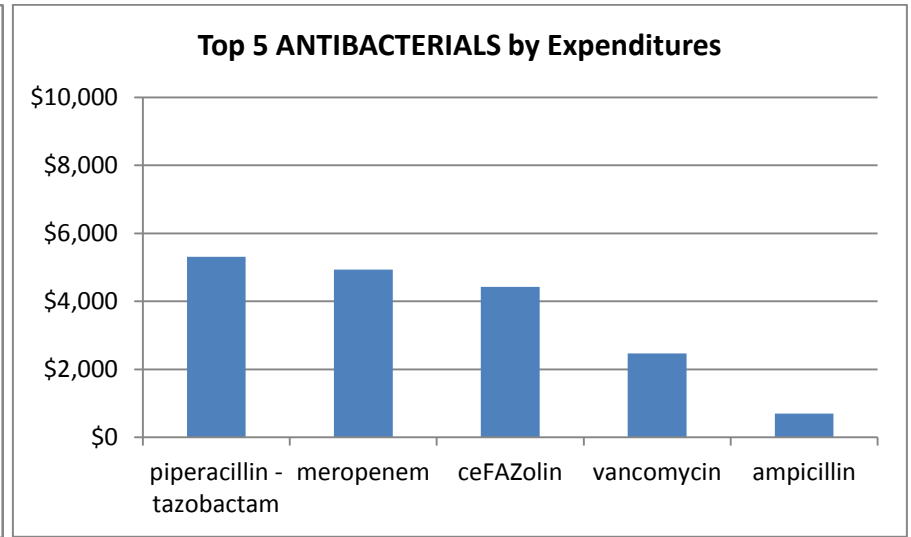
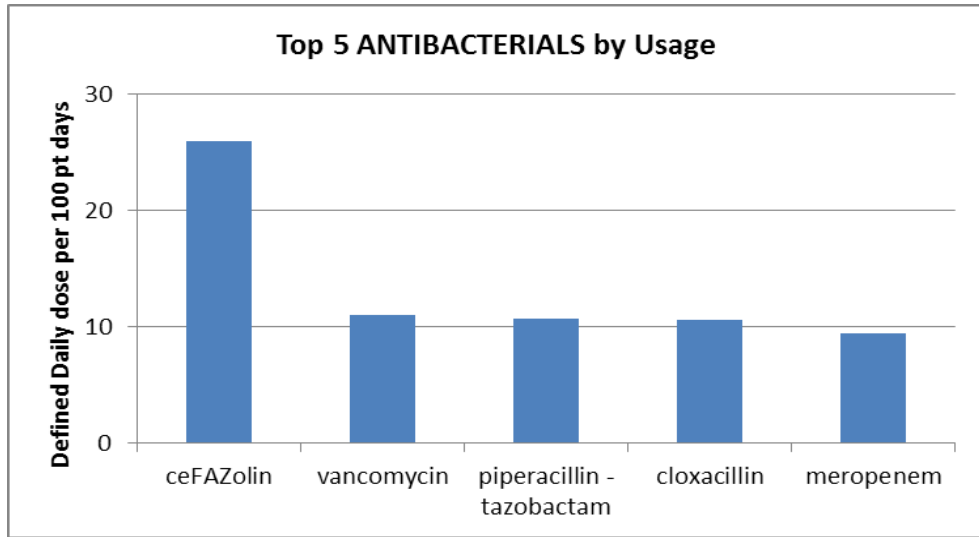
**FY 13/14 Q4 Top 5 ANTIBACTERIALS by Usage (DDD per 100 patient-days) and Expenditures**



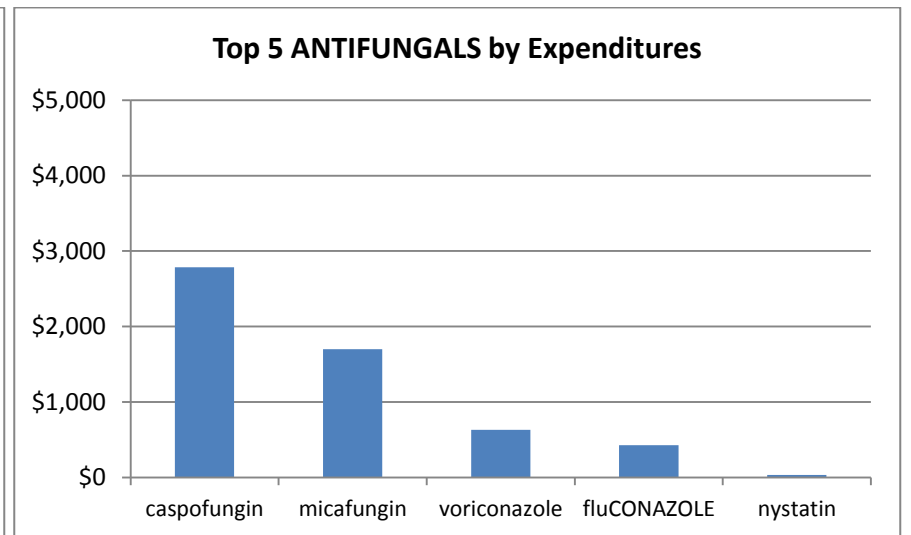
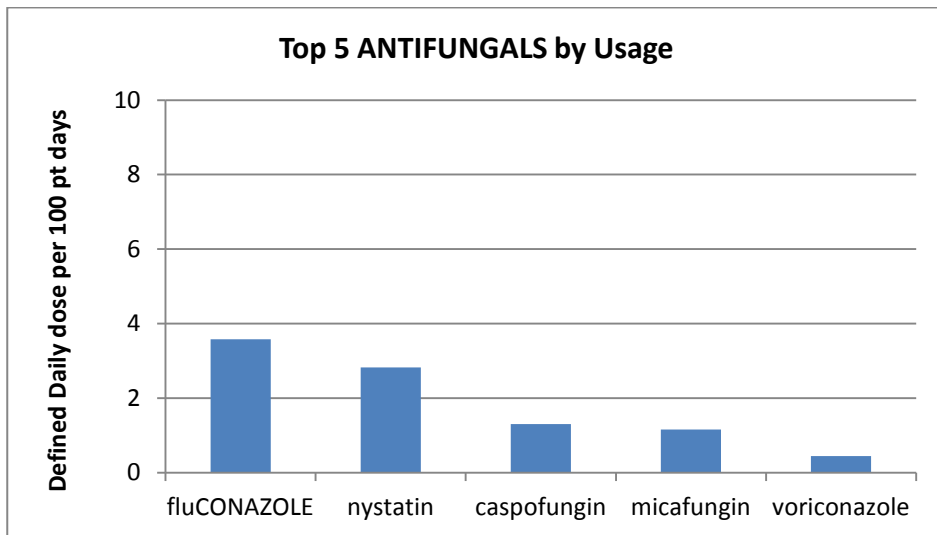
**FY 13/14 Q4 Top 5 ANTIFUNGALS by Usage (DDD per 100 patient-days) and Expenditures**



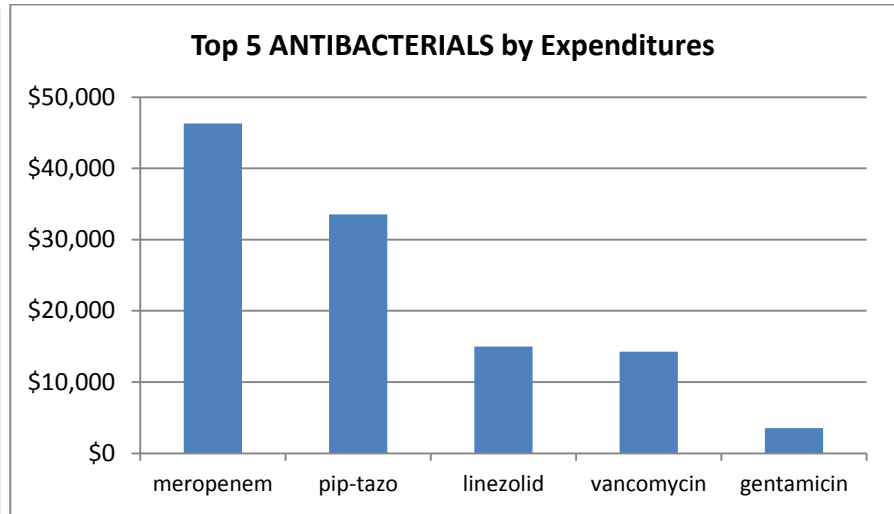
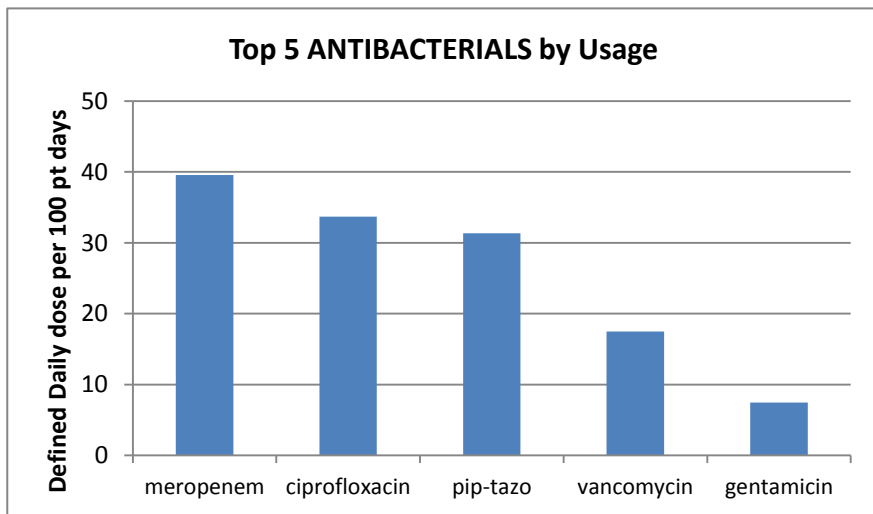
**TGH CVICU FY 13/14 Q4 Top 5 ANTIBACTERIALS by Usage (DDDs per 100 patient-days) and Expenditures**



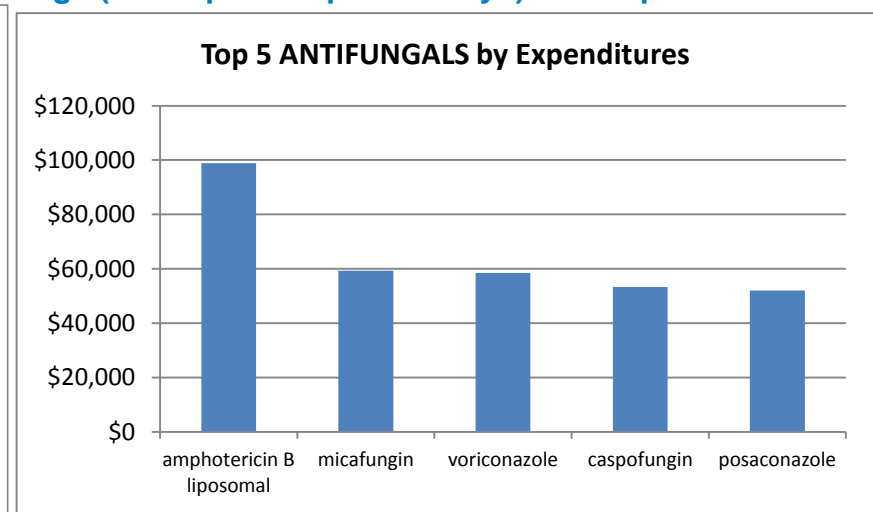
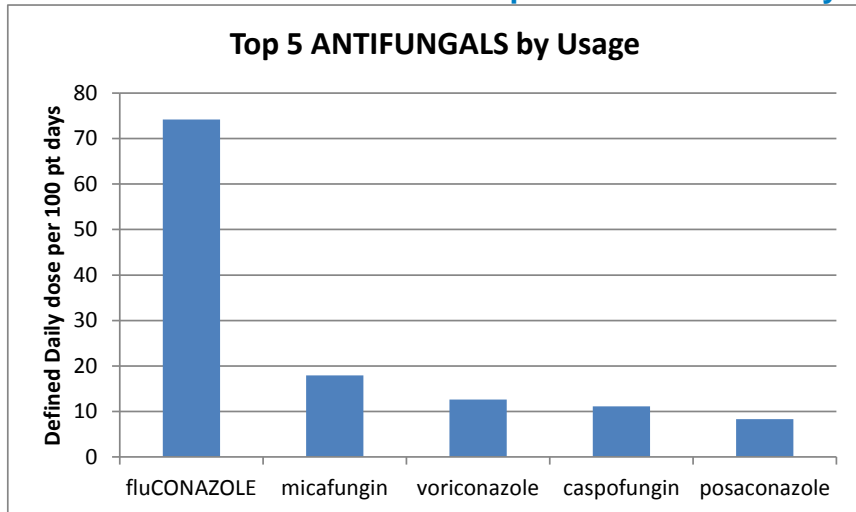
**TGH CVICU FY 13/14 Q4 Top 5 ANTIFUNGALS by Usage (DDDs per 100 patient-days) and Expenditures**



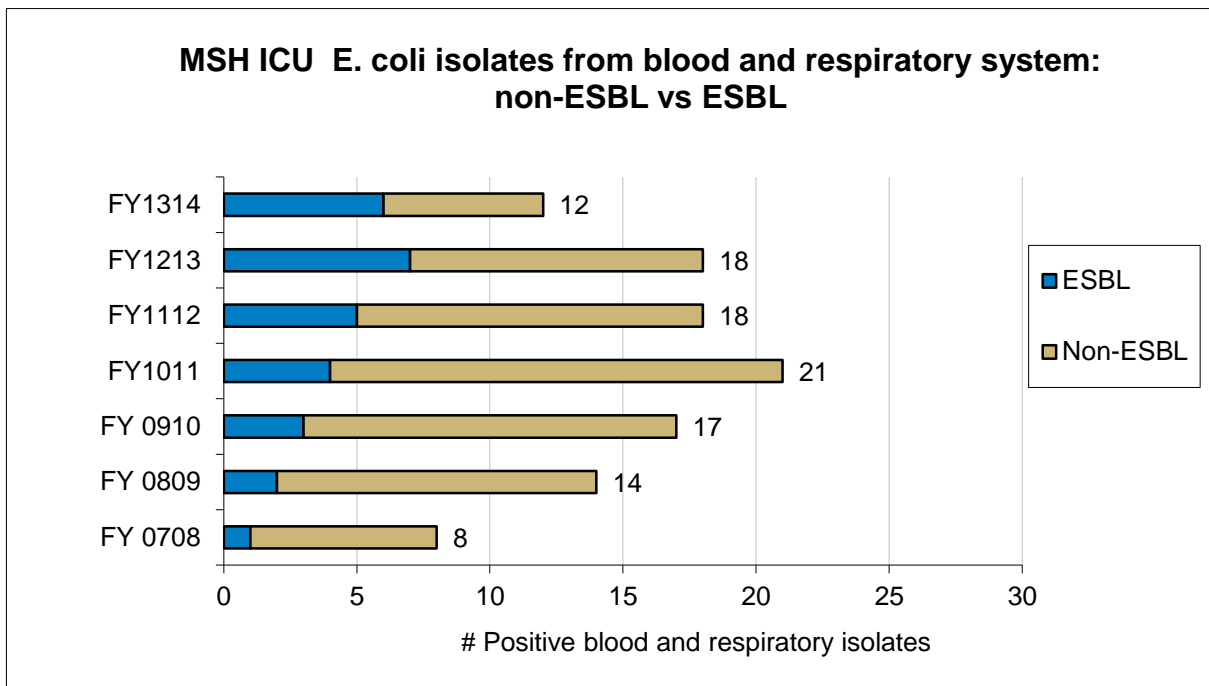
**PM Leukemia FY 13/14 Q4 Top 5 ANTIBACTERIALS by Usage (DDDs per 100 patient-days) and Expenditures**



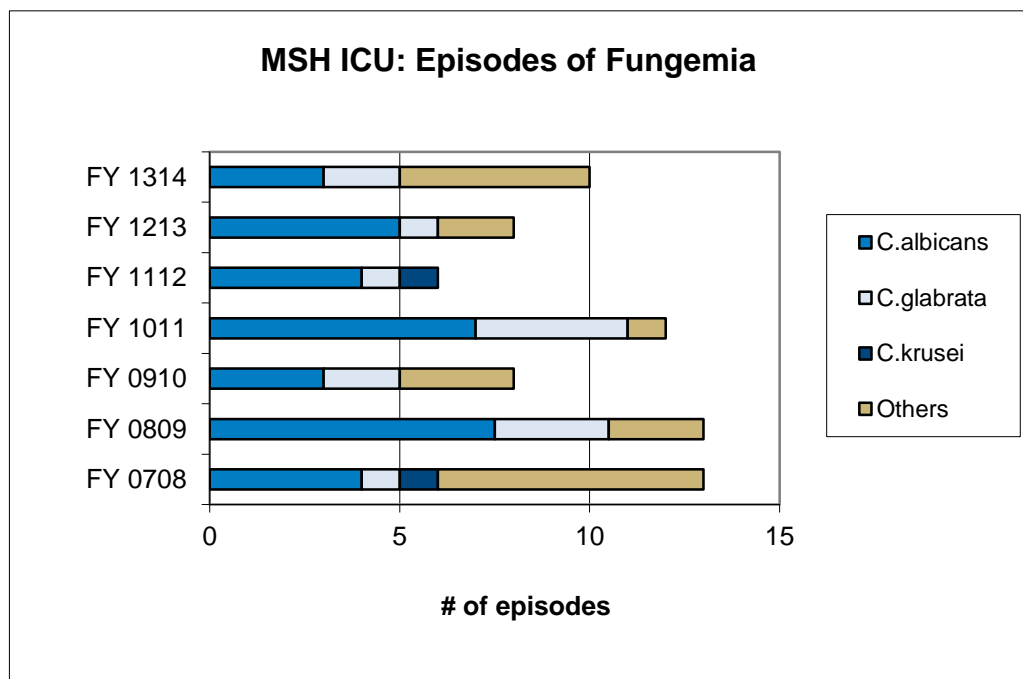
**PM Leukemia FY 13/14 Q4 Top 5 ANTIFUNGALS by Usage (DDDs per 100 patient-days) and Expenditures**



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

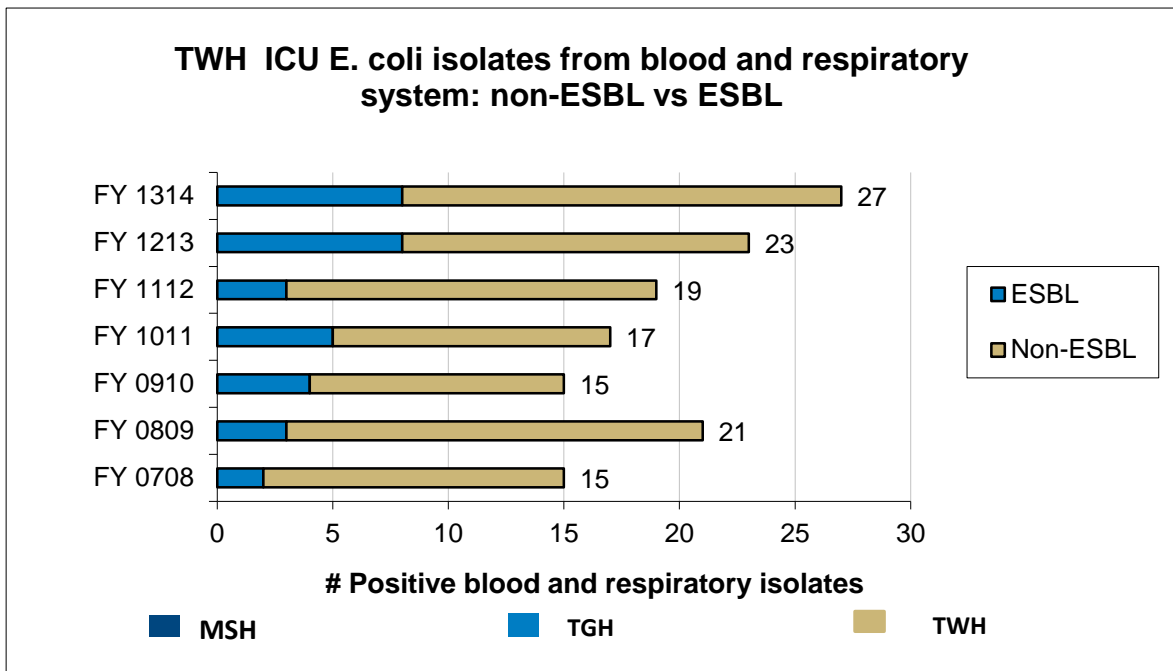


**Yeast Species Isolated in Blood – MSH ICU**

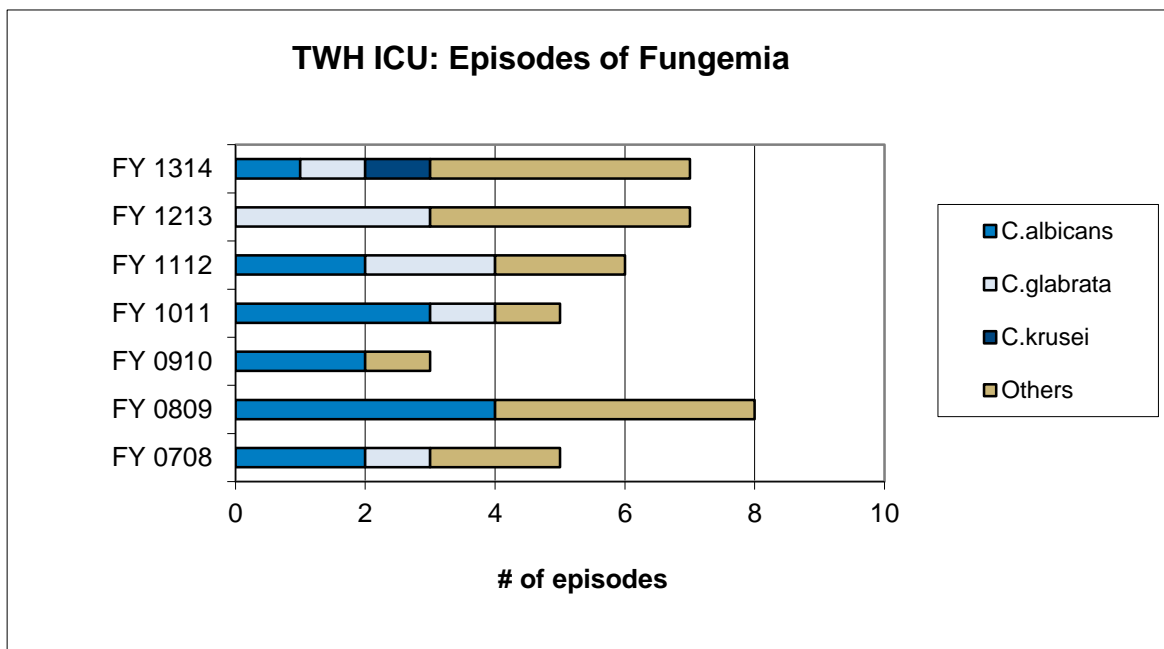




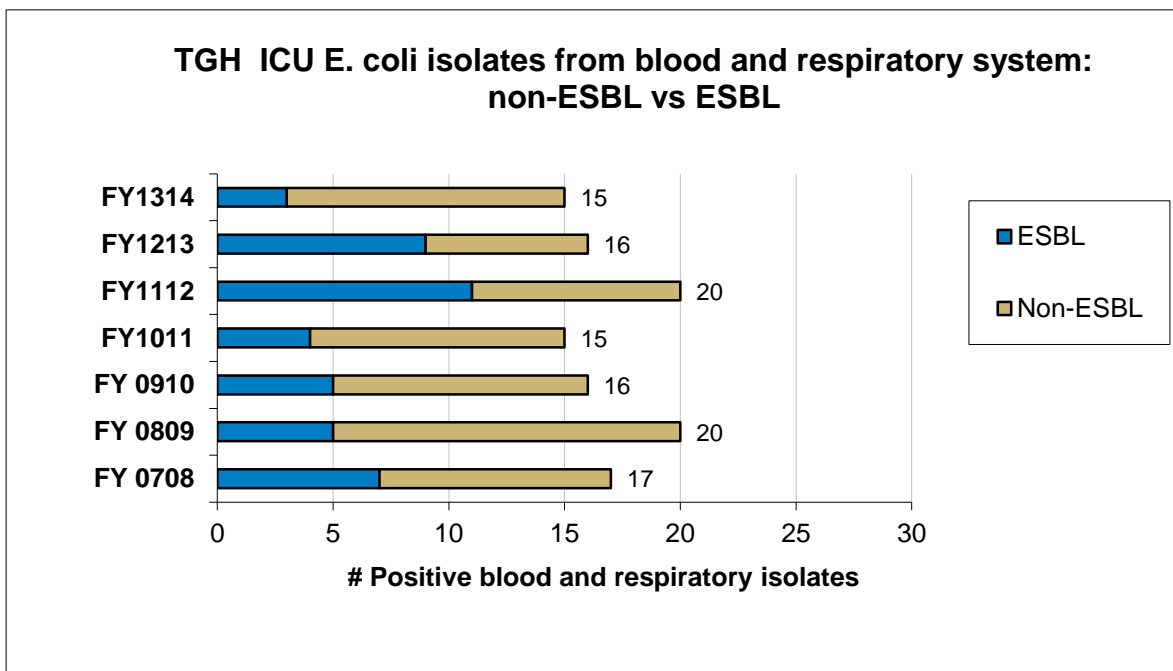
Antimicrobial Susceptibility and Pathogen Surveillance  
*E. Coli* isolates: Blood and Respiratory



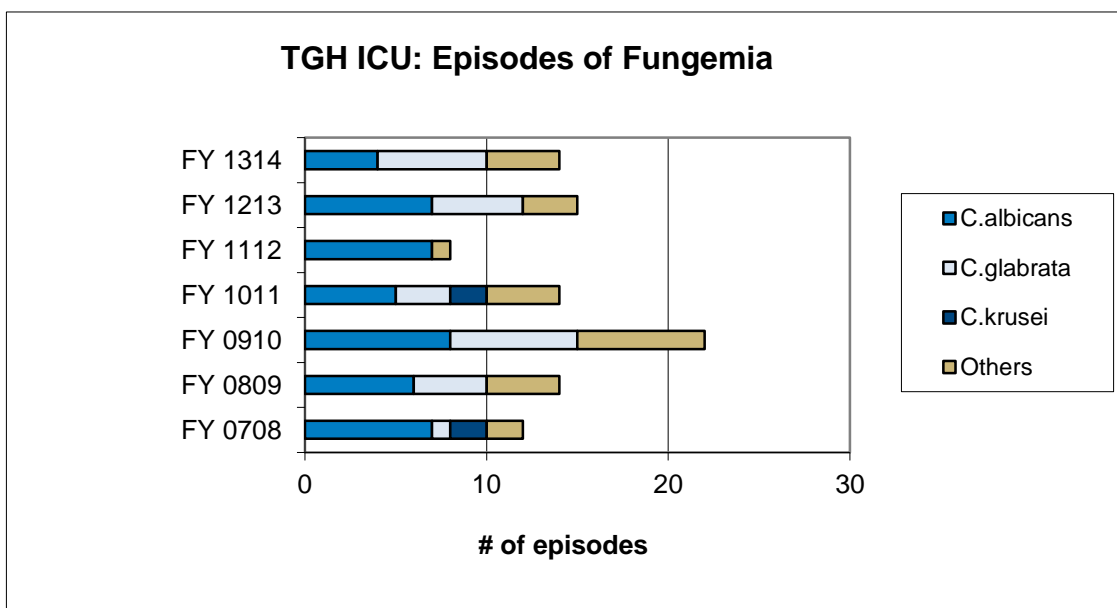
Yeast Species Isolated in Blood – TWH ICU



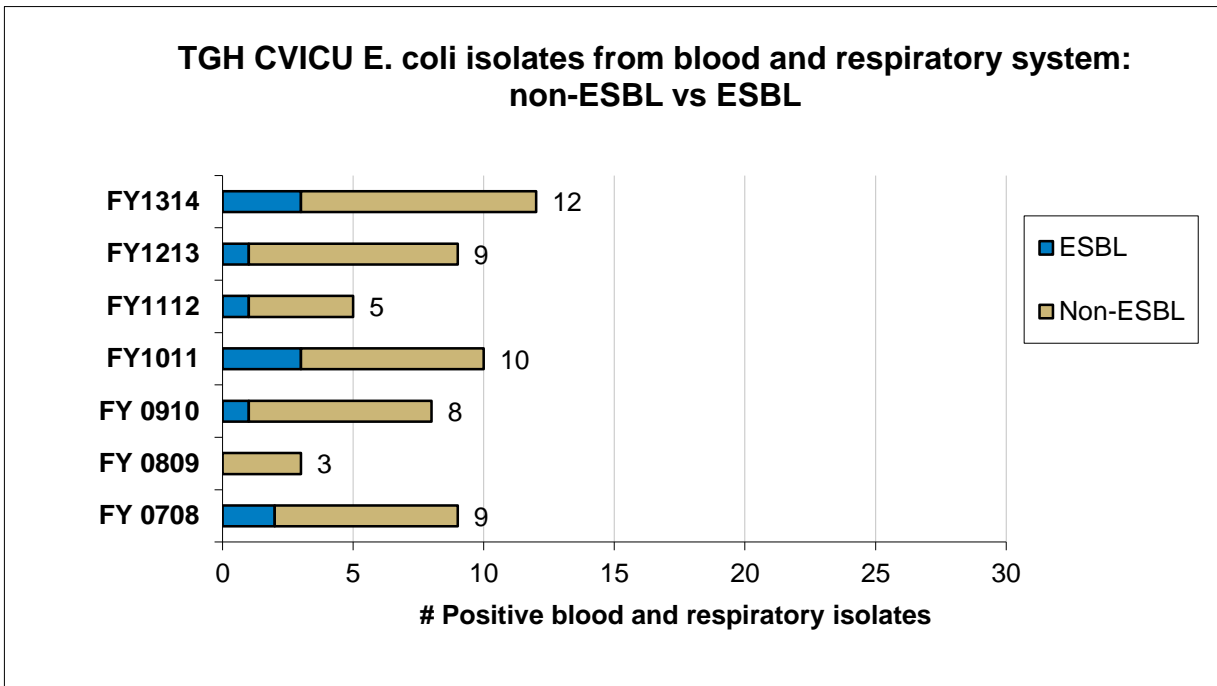
Antimicrobial Susceptibility and Pathogen Surveillance  
*E. Coli* isolates: Blood and Respiratory



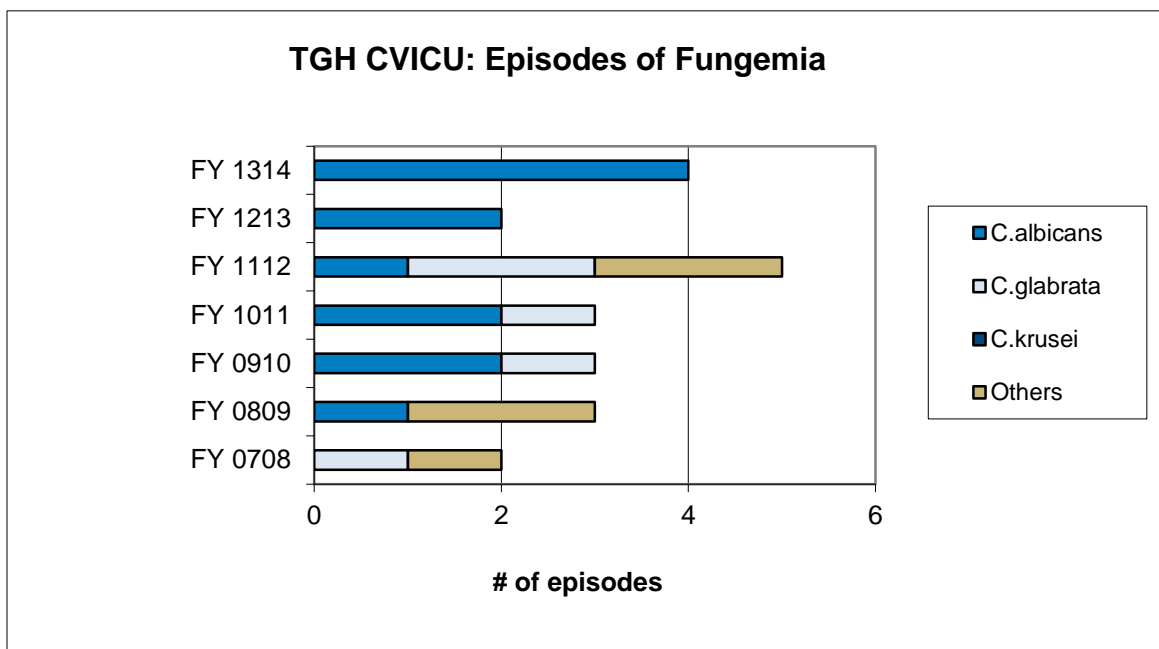
Yeast Species Isolated in Blood – TGH ICU



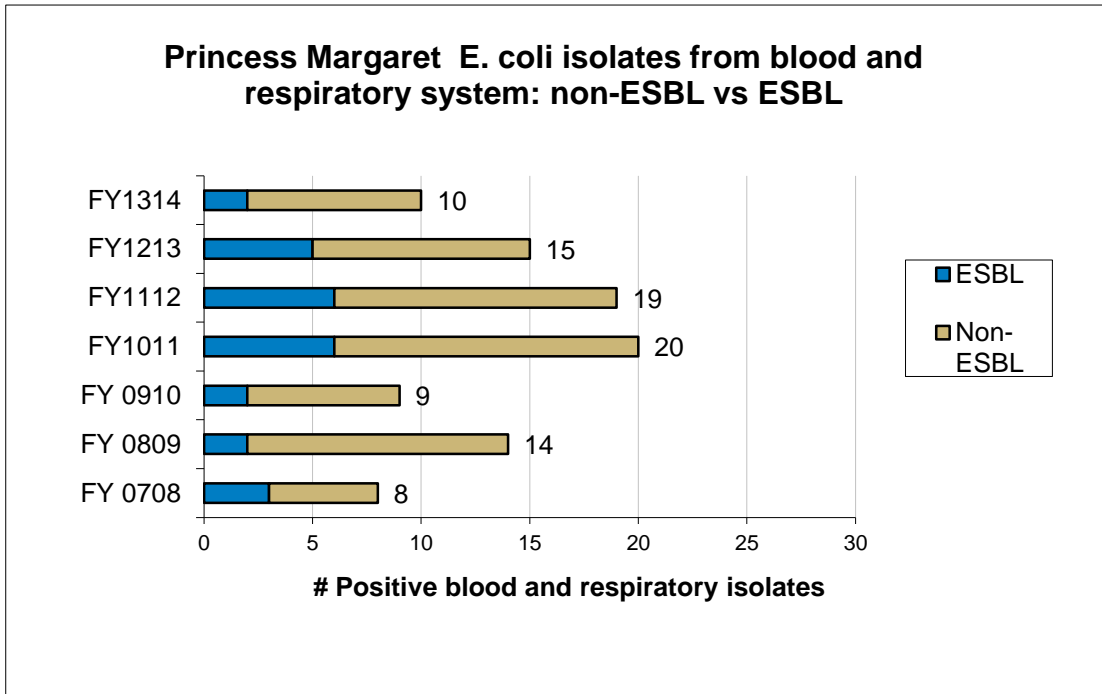
Antimicrobial Susceptibility and Pathogen Surveillance  
*E. Coli* isolates: Blood and Respiratory



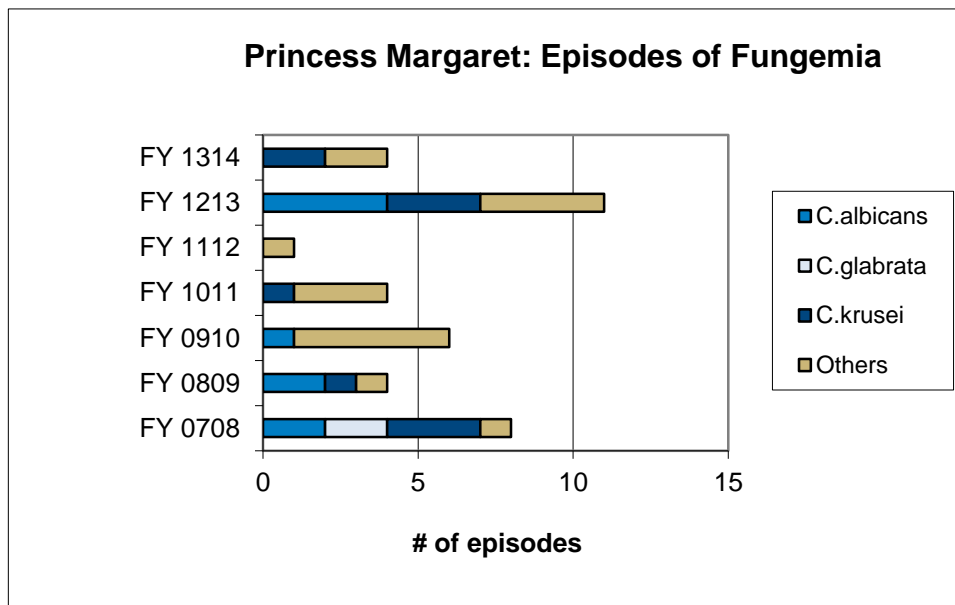
Yeast Species Isolated in Blood – CVICU



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



Yeast Species Isolated in Blood – Princess Margaret

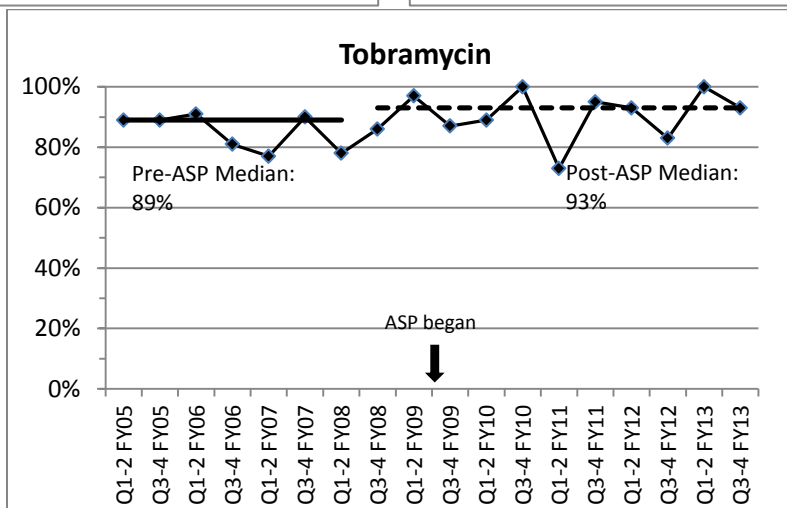
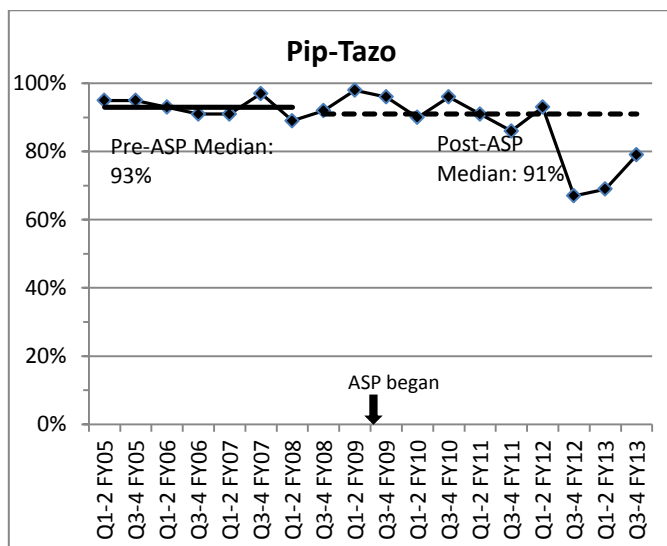
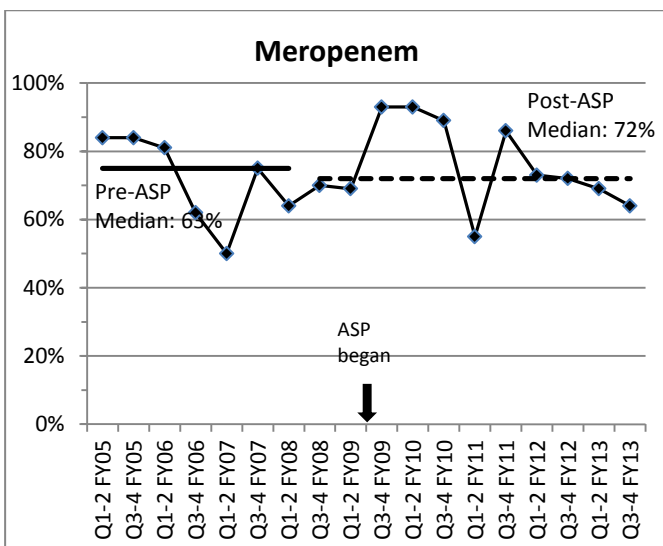
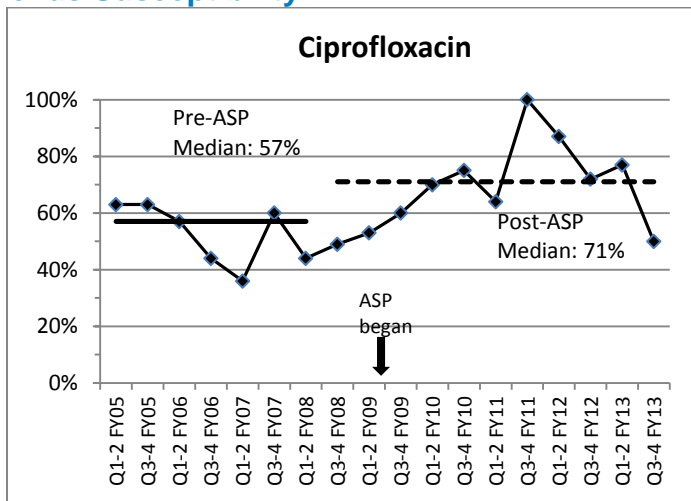
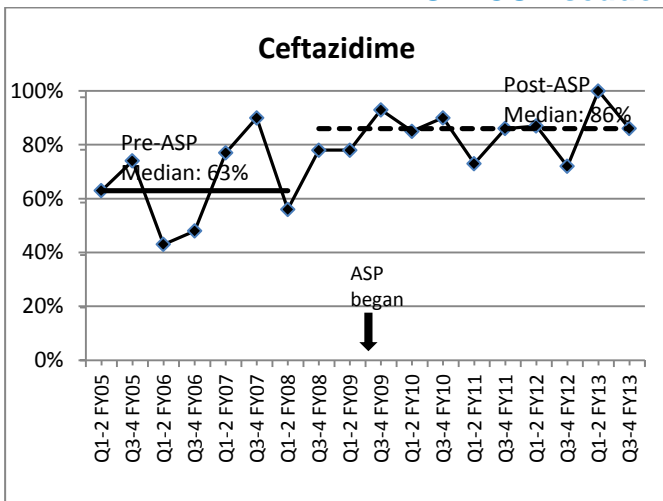


### MSH ICU Total Antimicrobial Costs

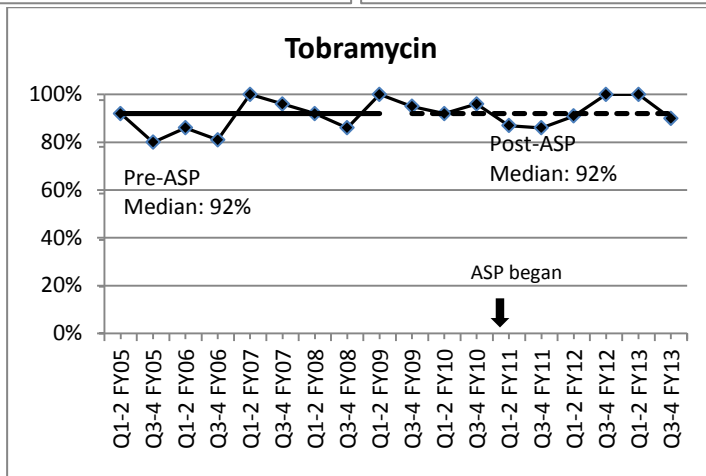
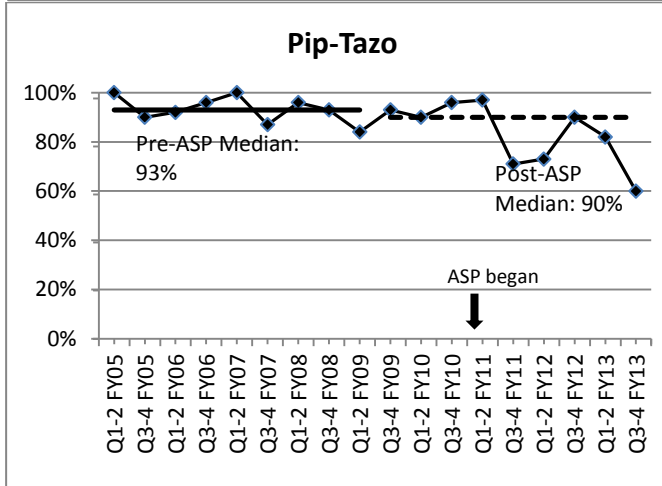
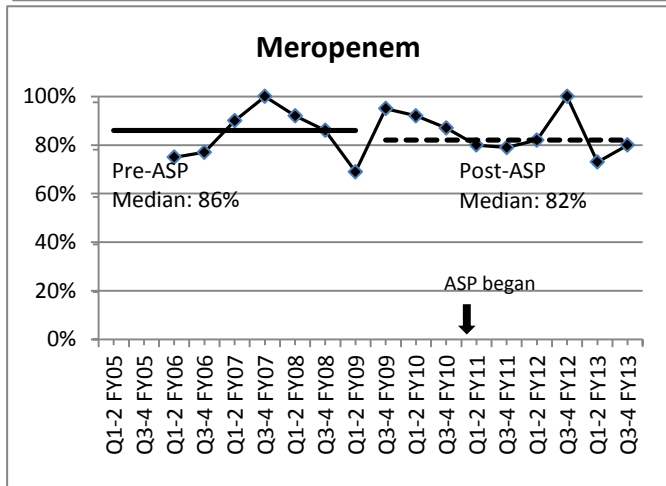
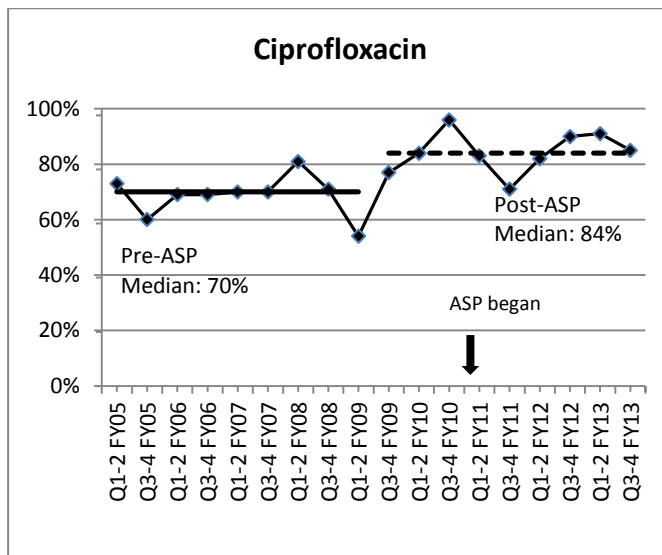
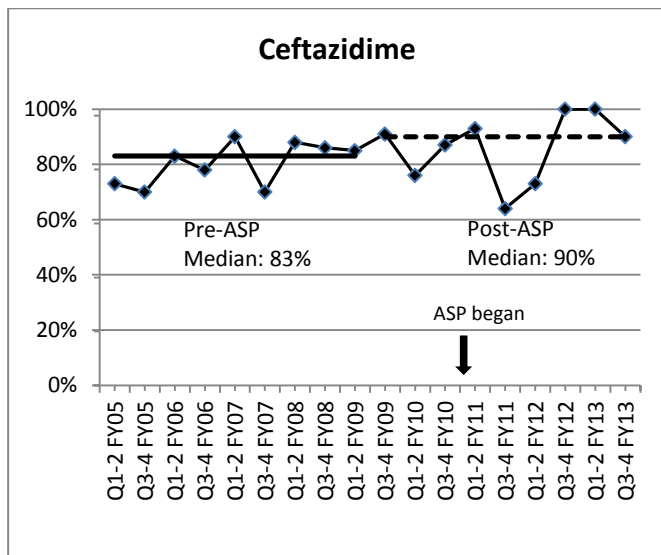
MSH ICU Total Antimicrobial Costs (Antimicrobial Costs per patient day)									
	FY 10/11	FY 11/12	FY 12/13	FY 13/14 Q1	FY 13/14 Q2	FY 13/14 Q3	FY 13/14 Q4	FY 13/14 YTD	Previous YTD
Non-PMH Patients	\$78,737 (\$21.14)	\$87,931 (\$25.42)	\$109,283 (\$31.77)	\$17,975 (\$17.33)	\$35,568 (\$47.81)	\$45,162 (\$47.49)	\$51,172 (\$44.58)	\$149,877 (\$37.54)	\$109,283 (\$31.77)
PMH Patients	\$114,392 (\$179.02)	\$191,928 (\$181.58)	\$182,188 (\$249.91)	\$46,659 (\$192.01)	\$91,914 (\$399.63)	\$74,117 (\$298.86)	\$60,067 (366.26)	\$272,757 (\$317.16)	\$182,188 (\$249.91)
Total	\$193,129 (\$44.26)	\$279,859 (\$61.97)	\$291,470 (\$69.91)	\$64,634 (\$50.50)	\$127,482 (\$130.89)	\$119,279 (\$96.12)	\$111,239 (\$83.20)	\$422,634 (\$87.11)	\$291,470 (\$69.91)

Note: 13/14 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.

**MSH ICU Pseudomonas Susceptibility**



**TWH ICU Pseudomonas Susceptibility**



**TGH MSICU Pseudomonas Susceptibility**

