

MSH + UHN

ASP

ANTIMICROBIAL
STEWARDSHIP
PROGRAM



Q4 REPORT

FISCAL YEAR 2011 | 2012

MOUNT SINAI HOSPITAL
Joseph and Wolf Lebovic Health Complex



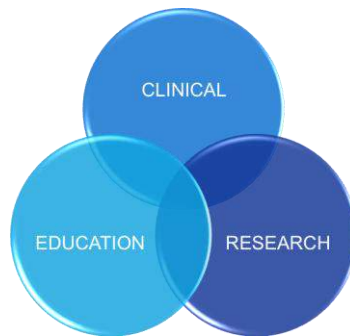
University Health Network
Toronto General Hospital | Toronto Western Hospital | Princess Margaret Hospital



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

EXECUTIVE SUMMARY

The Mount Sinai-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, MSc, FRCPC

Director, Antimicrobial Stewardship Program
 Mount Sinai Hospital/University Health Network
 Associate Professor, Department of Medicine
 University of Toronto

Shahid Husain, MD, MS

Director, Transplant Infectious Diseases
 Division of Infectious Diseases and Multi-Organ Transplantation
 University Health Network
 Associate Professor, Department of Medicine
 University of Toronto

Chaim Bell, MD, PhD, FRCPC

CIHR/CPSI Chair in Patient Safety & Continuity of Care
 Mount Sinai Hospital
 Associate Professor, Institute of Health Policy,
 Management, & Evaluation
 University of Toronto

Susy Hota, MD, MSc, FRCPC

Infectious Diseases Specialist
 Hospital Epidemiologist
 Infection Prevention and Control
 University Health Network
On maternity leave

PHARMACISTS TEAM

Linda Dresser, PharmD, FCSHP

Pharmacotherapy Specialist - Antimicrobial
 Stewardship
 University Health Network
 Assistant Professor, Leslie Dan Faculty of Pharmacy
 University of Toronto

Sandra Nelson, PharmD

Clinical Practice Leader - Infectious Diseases & Antimicrobial
 Stewardship
 Mount Sinai Hospital

Kevin Duplisea, PharmD

Pharmacotherapy Specialist - Antimicrobial
 Stewardship
 University Health Network

Miranda So, PharmD

Pharmacotherapy Specialist - Antimicrobial Stewardship
 University Health Network

OPERATIONS TEAM

Tanaz Jivraj, RN, BScN, MBA

Project Manager, Antimicrobial Stewardship Program
 Mount Sinai Hospital

Yoshiko Nakamachi, RN, BScN, BA

Project Manager CAHO, Antimicrobial Stewardship Program
 Mount Sinai Hospital

Marilyn Steinberg, RN

Research Coordinator, Antimicrobial Stewardship
 Program
 Mount Sinai Hospital

Lopa Naik, BSc, MCA

Technical Analyst, Antimicrobial Stewardship Program
 University Health Network

Melanie Thomson, BA, CHIM

Data Analyst, Antimicrobial Stewardship Program
 Mount Sinai Hospital
On maternity leave

KEY HIGHLIGHTS

- ✦ **ANTIMICROBIAL CONSUMPTION AND COSTS:** The ASP continues to work with clinical teams across all 4 hospitals. Further decreases in FY 11/12 antimicrobial costs were seen in Toronto General Hospital Intensive Care Unit (ICU) and Princess Margaret Hospital compared to the previous year. At Mount Sinai Hospital, antimicrobial usage and costs continue to decrease for all patients other than those originating from Princess Margaret Hospital. Toronto Western Hospital ICU data is not available for FY 11/12 Q4 due to an error in the Pharmacy Centricity database.
- ✦ **BEST PRACTICE GUIDELINES & ALGORITHMS:** A VAP algorithm developed by a multi-disciplinary Working Group was reported in the last Quarterly Report. The VAP algorithm was introduced at MSH ICU in November 2011, TGH ICU in June 2012 and planned for TWH ICU in July 2012. Algorithms for community-acquired pneumonia (CAP) and skin and soft tissue infections for ER use is being developed under the auspices of the Toronto Central LHIN ER group
- ✦ **RESEARCH:** Multiple research projects are underway. Two studies regarding the ASP Team in the ICU have recently been completed. One manuscript has already been submitted for publication and is pending review.
- ✦ **EDUCATION:** The ASP has projects prepared for university students over the summer.
- ✦ **PROVINCIAL ROLE:** The Council of Academic Hospitals of Ontario (CAHO) ASP in the ICUs ARTIC (Advancing Research to Improve Care) Project was launched in January 2012. The MSH-UHN ASP team continues to work with CAHO and the Ministry of Health and Long-Term Care Critical Care Secretariat to implement antimicrobial stewardship programs in the ICUs of 12 academic health sciences centres across Ontario.
- ✦ **NATIONAL LEADERSHIP:** The MSH-UHN ASP has successfully worked with Accreditation Canada on developing antimicrobial stewardship best practices as a Required Organizational Practice for the upcoming Accreditation Cycle. The MSH-UHN ASP was also recognized as Leading Practice during Mount Sinai Hospital's Accreditation in February 2012.

LOOKING FORWARD

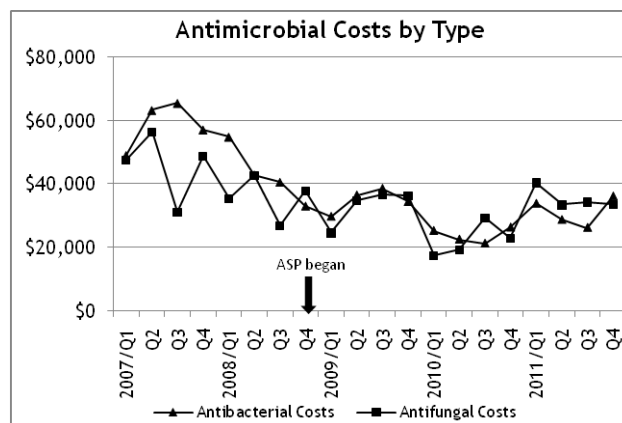
- ✦ **EXPANDING TO CLINICAL AREAS AT MSH & UHN:** As part of the CAHO-ARTIC project we will expand our prospective audit and feedback programs to the CVICU at TGH and the NICU at MSH. The team is in the process of re-evaluating the initial GIM model and will work with the key stakeholders to expand the ASP-GIM collaboration in the fall.
- ✦ **RESEARCHER JOINING MOUNT SINAI HOSPITAL:** Dr. Chaim Bell, a long-standing member of our ASP team, will join the staff of MSH as a clinician scientist in summer 2012, and will have expanded responsibilities with the Antimicrobial Stewardship Program to expand its research mandate.
- ✦ **BUILDING PARTNERSHIPS:** The ASP has partnered with Infectious Diseases to provide core infectious diseases educational sessions to the general internal medicine residents. An ASP pharmacist will partner with an ID physician to provide case based education to the residents as part of the formal educational series. Each case will incorporate principles of antimicrobial stewardship.
- ✦ **BROADENING EDUCATION ELECTRONICALLY:** The MSH-UHN ASP external website is scheduled to be completed in summer 2012. Stay tuned!
- ✦ **STRATEGIC PLANNING:** The MSH-UHN ASP is currently undergoing strategic planning. We hope to have a plan to ensure that all of our patients receive the right antimicrobials, when they need them.

MOUNT SINAI HOSPITAL (SUPPORTED BY PFIZER CANADA INC.)

INTENSIVE CARE UNIT

The ASP began working in the MSH ICU in February 2009. Full results on data collected are in the Appendix, but key highlights are summarized below:

- ✦ FY 11/12 antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased by 12.5% compared to last year, but remains decreased by 8.5% compared to FY 08/09 (pre-ASP).
- ✦ PMH Patients: In FY 11/12 PMH accounted for 68% of all ICU antimicrobial costs in MSH ICU, compared to 59% last year. While PMH patients accounted for 19% of patients in the ICU for FY 11/12 and 15% for FY 10/11. Antimicrobial cost per patient day for PMH patients has increased by 4% from last year.



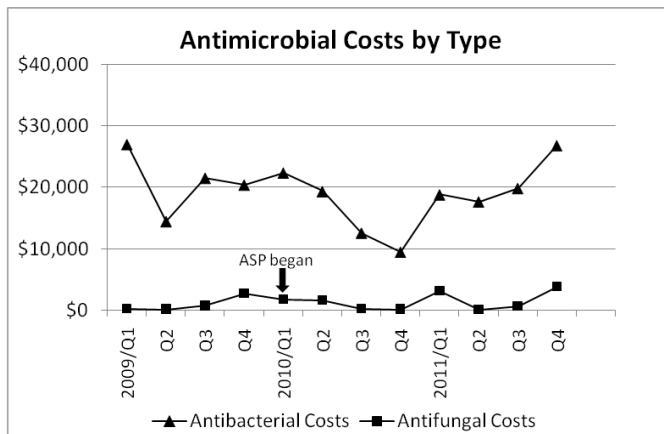
MSH ICU Total Antimicrobial Costs (Antimicrobial Costs per patient day)		
	FY 10/11	FY 11/12
Non-PMH Patients	\$78,737 (\$22.27)	\$90,507 (\$22.54)
PMH Patients	\$114,392 (\$163.42)	\$189,340 (\$170.42)
Total	\$193,129 (\$40.95)	\$279,847 (\$60.24)

- ✦ There were 3 cases of yeast isolated in blood in Q4, resulting in 6 cases for FY 11/12.
- ✦ There were 5 cases of ICU acquired *Clostridium difficile* in FY 11/12, resulting in a rate of 1.08 cases per 1,000 patient days.
- ✦ Patient care outcomes continue to be monitored and are in the Appendix.
- ✦ *Pseudomonas aeruginosa* susceptibilities trending data is available in the Appendix.

GENERAL SURGERY (14TH FLOOR)

The ASP began working with the General Surgery Teams at MSH in March 2010. Outcome data are available in the [Appendix](#), but key highlights are summarized below:

- ✦ FY 11/12 antimicrobial consumption has decreased 15% compared to prior to the ASP, with a 6% increase in costs per patient day.
- ✦ There have been 2 cases of yeast isolated in blood in FY 11-12 Q4.



GENERAL INTERNAL MEDICINE (GIM)

The ASP started working with GIM at Mount Sinai (and at TWH) on March 6, 2012. The ASP has been working with Team C as part of this pilot phase, meeting with the team (including the GIM pharmacist for Team C) each Tuesday and Friday afternoon. Feedback and data for this pilot team is currently being reviewed and discussed with GIM.

PRINCESS MARGARET HOSPITAL (14A, 15B AND 15C)

LEUKEMIA SERVICE

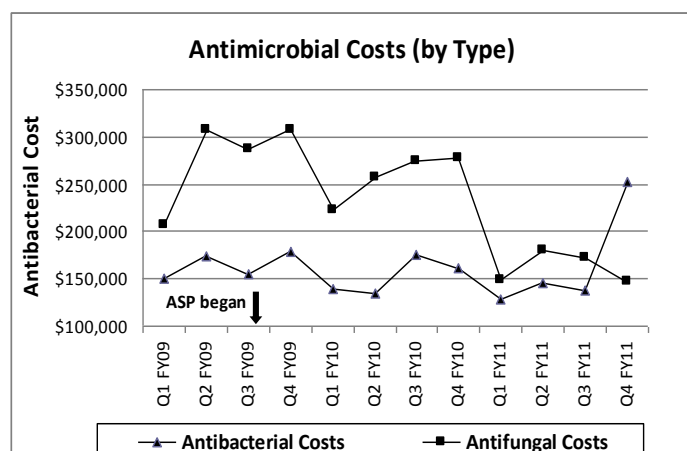
The ASP team for Princess Margaret Hospital (PMH) meets with the PMH Leukemia team three times per week (Mon, Wed, Fri) to review all leukemia patients. Interests in the ASP have increased, and rounds are now well attended by clinicians from Oncology, Pharmacy, as well as trainees.

The ASP team is working on an updated Febrile Neutropenia Management Pathway, which is expected for first round of review and consultation with a wide spectrum of clinical groups at PMH in late July/early August. It is hoped to generate lots of interesting and productive discussions with the care teams to improve patient care.

Outcome data are available in the [Appendix](#), but are summarized below:

✦ FY 11/12 antimicrobial costs per patient day have decreased by 25% compared to FY 10/11 (\$115.13 vs. \$154.32). This decrease is driven by a decrease in systemic antifungal cost per patient day of 41.4% (FY 2011/12: \$56.88 vs. FY 2010/11: \$96.99), while consumption has remained largely unchanged. Systemic antibacterial cost and consumption per patient day has remained stable comparing FY 11/12 to FY 10/11.

✦ FY 11/12 Q4 also saw an increase in systemic antibacterial costs to \$76.57/patient day from \$51.19/patient day in Q3.

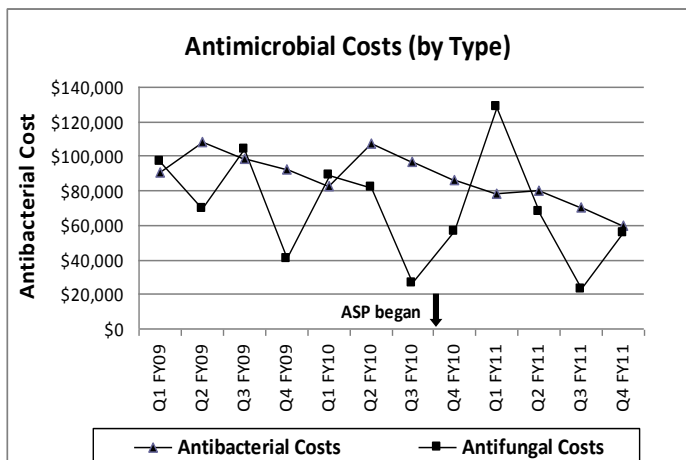


TORONTO GENERAL HOSPITAL

INTENSIVE CARE UNIT

The ASP started its work at the TGH ICU in October 2010. Outcome data are available in the [Appendix](#), but are summarized below:

- + FY 11/12 antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has decreased by 4% compared to FY 10/11. Total antimicrobial costs have decreased by 9% compared to the previous year.
- + FY 11/12 antibacterial costs are 23% lower, but antifungal costs are 8% higher overall compared to FY 10/11.
- + There were 2 cases of yeast isolated in blood in Q4, resulting in 8 cases for FY 11/12.
- + The nosocomial-acquired *C. difficile* rate was 1.49 per 1,000 patient days for FY 11/12 compared to 1.33 for FY 10/11.
- + Patient care outcomes continued to be monitored and are available in the Appendix.
- + *Pseudomonas aeruginosa* susceptibilities trending data is available in the Appendix.
- + We are working with SIMS and Case Costing to identify patients that are part of the Multi-Organ Transplant Program.



GENERAL INTERNAL MEDICINE (GIM)

The ASP started working with GIM at Toronto General in March 2012 and is now on hold. GIM pilots at Toronto Western and Mount Sinai Hospital are being reviewed through feedback and data.

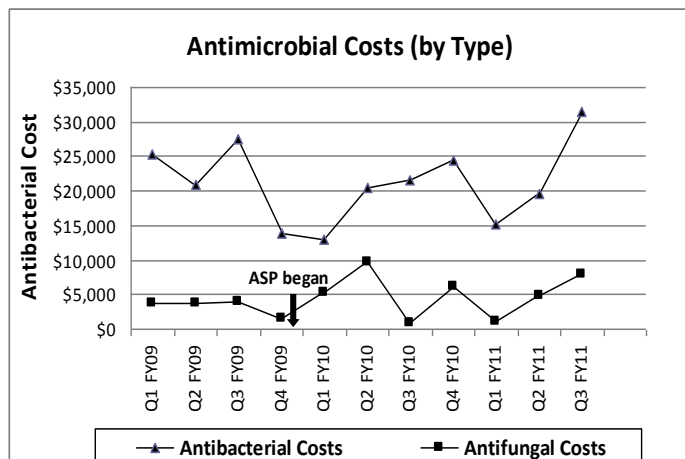
TORONTO WESTERN HOSPITAL

INTENSIVE CARE UNIT

The ASP started its work at the TWH ICU in December 2009. The ASP pharmacist meets with the TWH ICU team four times per week (Mon, Tue, Wed, Fri).

***FY 11/12 Q4 Data Note*:** Due to an error in the Centricity Pharmacy database we are not able to provide accurate DDD data and utilization cost for the TWH ICU for FY 11/12 Q4. Cost estimates are available in the Appendix. The ASP team is working with UHN Pharmacy to resolve this issue.

- ✦ Weekly Friday noon teaching rounds continue, where each ICU Fellow takes turns delivering an informal therapeutic discussion to the ICU medical team on an antimicrobial stewardship-related topic.
- ✦ Readmissions have remained steady from FY 10/11 to FY 11/12.
- ✦ There was 1 case of yeast isolated in blood in Q4, resulting in 7 cases for FY 11/12.
- ✦ The nosocomial-acquired *C. difficile* rate was 1.66 per 1000 pt days for FY 11/12 compared to 0.52 for FY 10/11.
- ✦ An introduction to antimicrobial stewardship presentation has been incorporated into ASP educational rounds, starting in the summer of 2012, and will be incorporated into the orientation of each new group of residents and fellows.
- ✦ *Pseudomonas aeruginosa* susceptibilities trending data is available in the Appendix.



GENERAL INTERNAL MEDICINE (GIM)

The ASP started working with GIM at Toronto Western in March 2012. Currently, the ASP team is rounding twice weekly (Tue and Thur). Feedback from the GIM team members about the interactions has been extremely positive. The most apparent strength of the ASP on GIM has been the creation of a 'safe learning environment' for medical trainees to ask antimicrobial-related questions and to develop a rational approach to antimicrobial prescribing.

- ✦ In collaboration with Dr. Lisa Richardson, there are plans underway to incorporate antimicrobial stewardship teaching into the senior residents' teaching schedule.

ASP WORKING GROUPS

In addition to prospective audit and feedback, the ASP has been focusing on reducing variation in practice when there is no clear clinical or evidence-based explanation for the variation to improve patient outcomes. The ASP has begun collaborations with various stakeholders to develop working groups to improve care by reducing variation in practice.

The **Ventilator-Associated Pneumonia (VAP) Working Group** is a multi-disciplinary group, which includes Pharmacists, Physicians, Respiratory Therapists, Radiologists and Nursing. This group has developed a VAP algorithm that was shared with colleagues across MSH and UHN for feedback. The VAP algorithm was introduced at MSH ICU in November 2011, TGH ICU in June 2012 and planned for TWH ICU in July 2012.

In conjunction with the Toronto Central (TC) LHIN ER group (ER Physician Lead: Dr. Howard Ovens) algorithms for the diagnosis and management of basic infectious diseases are being developed for TC-LHIN Emergency Departments. Currently, the **Community-Acquired Pneumonia (CAP) Working Group** and **Skin and Soft Tissue Infection (SSTI) Working Group** are in the midst of developing their algorithms.

TORONTO ANTIMICROBIAL STEWARDSHIP CORRIDOR (TASC)

A subgroup of TASC members, led by Monique Pitre, met in March to continue developing a TASC Antimicrobial Stewardship Handbook that could be used at any of the TASC sites.

ANTIMICROBIAL STEWARDSHIP PROGRAM RESEARCH

The ASP continues to pursue the model that all of its activities should be based on the best available evidence, should be studied to observe real-world outcomes, and should contribute to modern medical practice with knowledge translation. Some of this research is listed below.

ANTIMICROBIAL STEWARDSHIP IN THE ICU

Two studies investigating the effects of a multidisciplinary Antimicrobial Stewardship Program in Intensive Care Units have been completed. The objective of the first study was to determine if an ASP altered treatment of non-sterile culture sites, de-escalation and cost. Data was collected from the MSH ICU pre- and post-ASP implementation. The manuscript has been completed and submitted to a Critical Care journal for publication. The second project examined the effects of an ASP on antimicrobial prescribing practices in three diverse intensive care units (MSH, TGH & TWH). Data collection has been completed and analyzed and the manuscript is in the final stages of preparation prior to being submitted for publication.

STAPHYLOCOCCUS AUREUS BACTERAEMIA

A multi-site research project examining the management and outcomes of patients with *S. aureus* bacteraemia at several TASC hospitals continues, with data collection expected to be completed

this summer. An audit of data capture has been carried out at almost all sites. This project will capture approximately 1400 episodes of *S. aureus* bacteraemia at 7 hospitals across the GTA.

SEPSIS PROJECT

Data collection has been completed for a retrospective analysis of sepsis outcomes at MSH from April, 2010 through March, 2011. This chart review included all patients admitted through the ED with a diagnosis of sepsis, severe sepsis, and/or septic shock. Analysis looked at time to recognition of sepsis, process of care, length of ICU stay, time to discharge and mortality. Dr. Christine McDonald won first prize for her work on this project at the Hollenberg Research Competition, Mount Sinai Hospital-University Health Network, Department of Medicine, University of Toronto.

ADDITIONAL RESEARCH PROJECTS

Additional ongoing and upcoming studies include:

- ✦ Data collection for a study that examines how thoracic CT scans influence the use of antifungal agents and patient outcomes in AML patients.
- ✦ A survey of Canadian intensivists to determine their knowledge, perceptions and attitudes towards ASPs has been funded through a grant from the Canadian Critical Care Trials Group. The survey will be distributed in September 2012. An ICU Fellows survey is also in progress.

ANTIMICROBIAL STEWARDSHIP PROGRAM EDUCATION

One of the ASP's mandates is to increase the antimicrobial stewardship capacity locally, provincially, and nationally. All of the clinical members of the ASP play a role in stewardship education, giving one-on-one advice to healthcare providers, having teaching sessions within the hospitals, supervising trainees, giving rounds to colleagues at other institutions, or developing educational curricula.

ANTIMICROBIAL STEWARDSHIP LEADERSHIP

COUNCIL OF ACADEMIC HOSPITALS OF ONTARIO (CAHO) ADOPTING RESEARCH TO IMPROVE CARE (ARTIC) PROGRAM

Under the initiative of the CAHO ASP Project, the ASP Project Team members will provide clinicians at the participating sites peer support, education, and assist in the evaluation and reporting of project outcomes. The ASP Project Team consists of: ASP Pharmacists and Infectious Diseases Physicians, Intensivists, Research Methodologists, and Project Management. The 12 Academic Health Sciences Centres participating in the CAHO ASP project will be provided with:

- ✦ a package of educational materials/tools needed to provide and/or receive antimicrobial stewardship advice in the ICU;

- ✦ an education and orientation session that will acquaint participants to the project and offer education on the nuances of prospective audit and feedback;
- ✦ a series of online education modules for participants to use either as resources or for the purpose of educating colleagues;
- ✦ ongoing project management support to help with issues surrounding program development, data collection and management and to ensure that implementation proceeds in a timely and straightforward manner;
- ✦ timely ASP Pharmacist and ASP Physician support; and
- ✦ scientific evaluation and reporting of the outcomes to formally evaluate the relationship between antimicrobial stewardship (in the form of prospective audit and feedback) and antimicrobial utilization, antimicrobial resistance, C. difficile, and patient outcomes in the intensive care unit.

DATABASE

The MSH-UHN ASP database will be an integrated, web-based database that combines clinical, laboratory, administrative, pharmacy, and radiology (CLAPR) data. Having an ASP database will have many benefits including patient safety, quality improvement, time saving, cost saving, etc. The ASP database will be housed on the UHN virtual server, with all ASP members having log-in access to the database. Data security will be a priority. A separate data repository will be created for all active patients of each hospital and each data repository will be stored on their respective hospital servers. Data will be available in near-real time. One single user interface that will present consolidated data from both UHN & MSH data repository will be built.

We have completed requirements gathering, data analysis, technical design, architectural design, and initial user interface design. Things are moving relatively quickly on the UHN side. The ASP has been working with MSH Informatics and is currently completing a Privacy Impact Assessment.

WEBSITE

The MSH-UHN ASP External website (www.antimicrobialstewardship.com) is scheduled to be completed in summer 2012. A prototype has been received and is being reviewed by the ASP team.

ACKNOWLEDGEMENTS

We would like to thank the following individuals for their efforts in working in with the ASP team and for their help in making this report possible: **Dr. Donna Lowe, Dr. Allison McGeer, Dr. Michael Gardam, Karen Ong, Monique Pitre, Dr. Susan Poutanen, Patrick Cheng, Yelena Katsaga** and **many others** (omissions unintentional).

NEXT QUARTERLY REPORT

The next quarterly report is expected in Fall 2012.

APPENDIX

MOUNT SINAI HOSPITAL ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY11/12 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs									
Total Antimicrobial DDDs/100 Patient Days	177	171	144	175	146	145	176	162	144
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	135	119	121	132	128	111
Systemic Antifungal DDDs/100 Patient Days	31	24	20	33	24	20	28	27	20
Total Antimicrobial Costs	\$332,724	\$285,975	\$193,129	\$78,186	\$63,212	\$63,014	\$75,435	\$279,847	\$193,129
Total Antimicrobial Costs/Patient Day	\$69.01	\$59.23	\$40.95	\$64.46	\$57.31	\$55.50	\$62.29	\$60.24	\$40.95
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$33,962	\$28,821	\$26,325	\$36,269	\$125,376	\$95,773
Systemic Antibacterial Costs/Patient Days	\$36.16	\$29.44	\$20.31	\$28.00	\$26.13	\$23.20	\$29.95	\$26.98	\$20.31
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$40,409	\$33,465	\$34,368	\$33,624	\$141,865	\$88,998
Systemic Antifungal Costs/Patient Days	\$29.68	\$27.45	\$18.87	\$33.31	\$30.34	\$30.30	\$27.77	\$30.54	\$18.87
Patient Care Outcomes									
Hospital acquired C. difficile cases (rate per 1,000 pt days)	NA	NA	NA	1 (0.82)	2 (1.81)	0	2 (1.65)	5 (1.08)	NA
ICU Average Length of Stay (days)	5.84	5.57	5.67	5.53	6.45	4.81	5.29	5.51	5.67
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.4	17.6	13.7	18.1	16.5	16.3
ICU Readmission Rate within 48 hrs (as a %)	3.2	2.9	2.7	1.0	1.8	5.5	2.1	2.7	2.7
ICU Ventilator Days	NA	3286	2934	781	659	569	668	2677	2934
ICU Multiple Organ Dysfunction Score (MODS)	4.00	4.04	4.12	4.07	3.59	4.80	4.55	4.25	4.12

Notes:

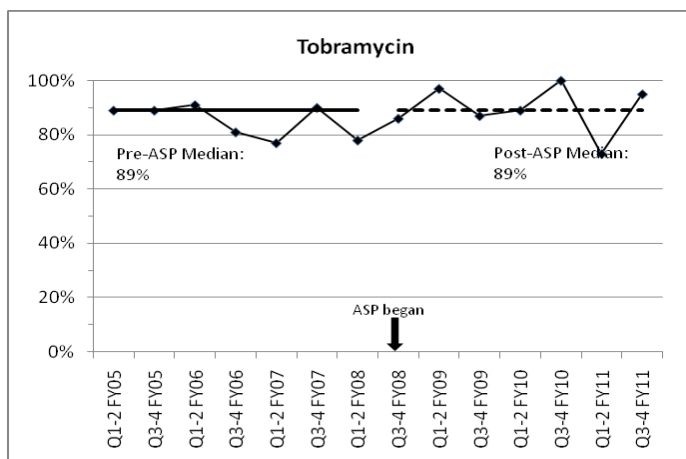
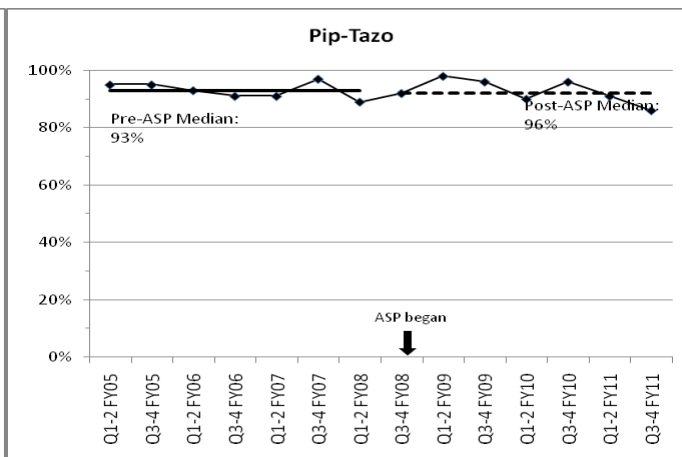
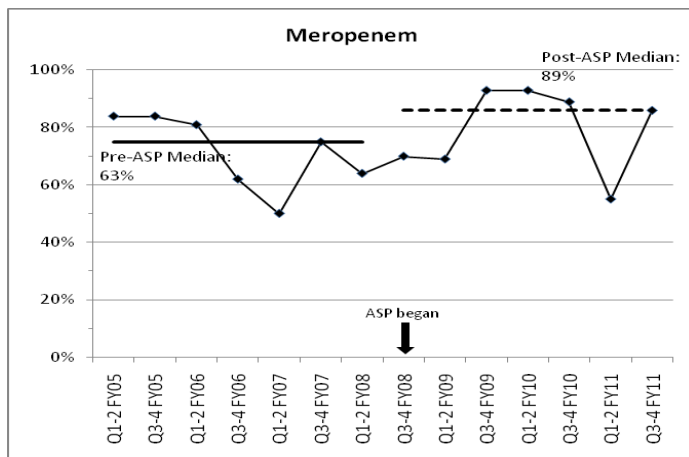
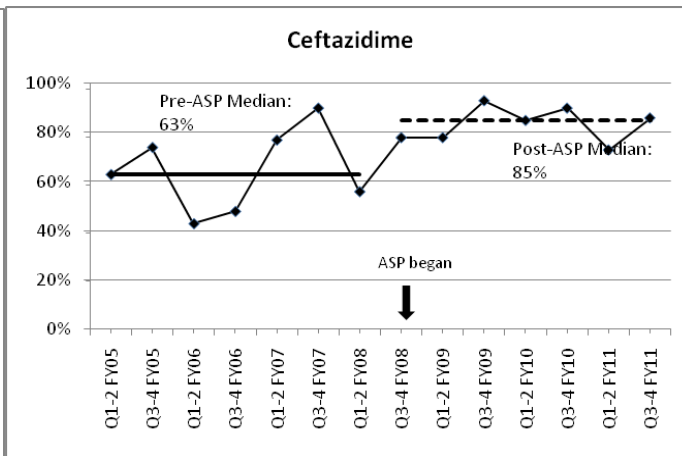
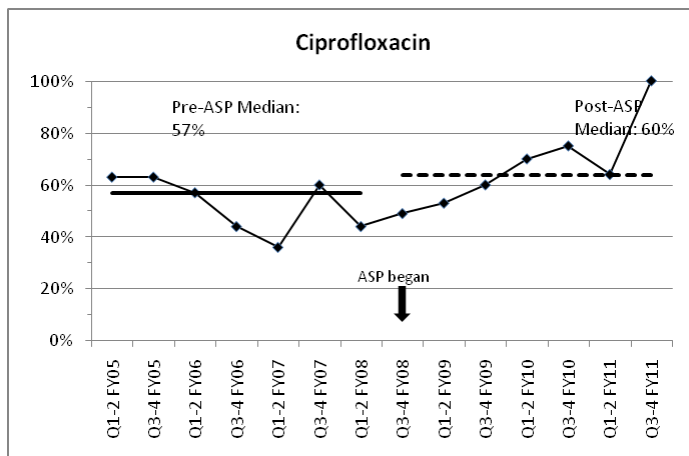
Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, http://www.whooc.no/atc_ddd_index/)

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs + 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)

Antimicrobial Susceptibility and Pathogen Surveillance

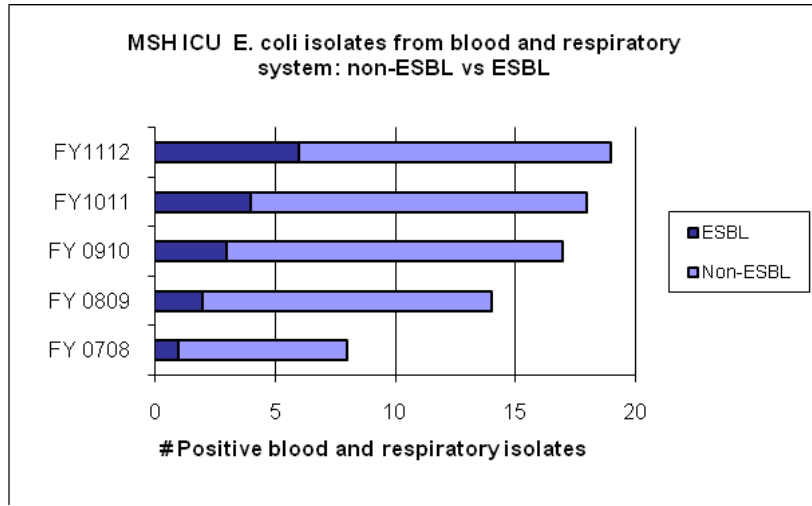
Pseudomonas Susceptibility - MSH ICU



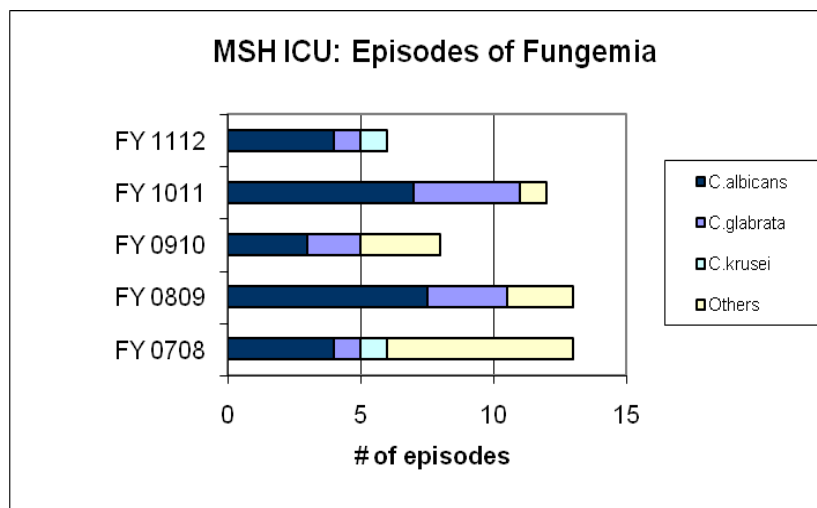
Note: Antimicrobial susceptibility data updated bi-annually

Antimicrobial Susceptibility and Pathogen Surveillance cont.

E.Coli isolates: Blood, Respiratory



Yeast Species Isolated in Blood - MSH ICU



14TH FLOOR

Indicators	FY 09/10 (Pre-ASP)	FY 10/11	FY11/12 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	63.0	52.1	50.4	53.5	52.1	57.2	53.4	52.1
Systemic Antibacterial DDDs/100 Patient Days	58.2	48.0	49.7	49.7	47.1	45.5	48.0	48.0
Systemic Antifungal DDDs/100 Patient Days	3.9	3.8	0.7	3.6	4.8	9.8	4.8	3.8
Total Antimicrobial Costs	\$89,313	\$68,375	\$22,120	\$17,914	\$20,656	\$34,120	\$94,809	\$68,375
Total Antimicrobial Costs/Patient Day	\$4.71	\$3.73	\$4.52	\$3.96	\$4.31	\$7.06	\$4.98	\$3.73
Systemic Antibacterial Costs	\$83,359	\$63,907	\$18,817	\$17,665	\$19,846	\$26,831	\$83,159	\$63,907
Systemic Antibacterial Costs/Patient Days	\$4.39	\$3.49	\$3.85	\$3.91	\$4.15	\$5.55	\$4.37	\$3.49
Systemic Antifungal Costs	\$4,152	\$4,071	\$3,131	\$138	\$634	\$3,818	\$7,720	\$4,071
Systemic Antifungal Costs/Patient Days	\$0.22	\$0.22	\$0.64	\$0.03	\$0.13	\$0.79	\$0.41	\$0.22
Patient Care Outcomes								
Hospital acquired C. difficile cases (rate per 1,000 patient days)								
14th Floor Average Length of Stay (days)	6.2	6.7	6.2	6.7	7.1	7.0	6.7	6.7
14th Floor Mortality Rate (as a %)	0.7	0.6	0.7	0.6	0.9	0.3	0.6	0.6
14th Floor Isolation Days per 100 patient days	8.6	10.1	TBD					10.1

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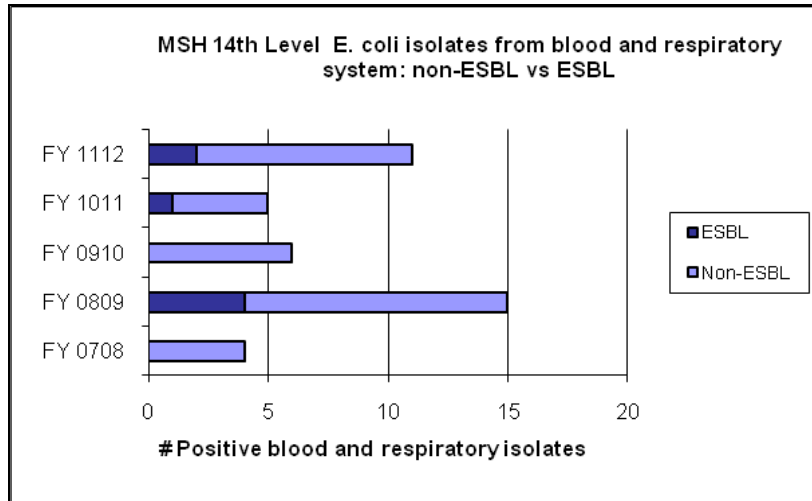
Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, http://www.whooc.no/atc_ddd_index/)

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

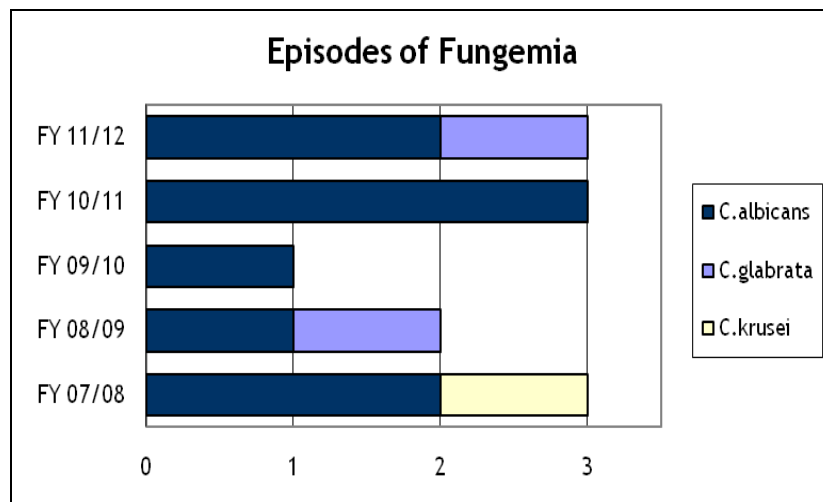
Data Sources: Antimicrobial DDD and Costs (Pharmnet)

Antimicrobial Susceptibility and Pathogen Surveillance cont.

E.Coli isolates: Blood, Respiratory



Yeast Species Isolated in Blood - MSH 14th Level



PRINCESS MARGARET HOSPITAL

Indicators	FY 09/10	FY 10/11	FY11/12 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	295	274	239	358	249	280	282	274
Systemic Antibacterial DDDs/100 Patient Days	191	167	133	245	138	143	164	167
Systemic Antifungal DDDs/100 Patient Days	104	107	105	112	111	93	105	107
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$276,357	\$324,308	\$311,337	\$398,856	\$1,310,857	\$1,641,331
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$104.88	\$117.55	\$115.18	\$121.27	\$115.13	\$154.32
Systemic Antibacterial Costs	\$659,034	\$609,747	\$128,151	\$144,814	\$138,378	\$251,832	\$663,175	\$609,747
Systemic Antibacterial Costs/Patient Days	\$62.28	\$57.33	\$48.63	\$52.49	\$51.19	\$76.57	\$58.24	\$57.33
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$148,205	\$179,494	\$172,959	\$146,979	\$647,637	\$1,031,584
Systemic Antifungal Costs/Patient Days	\$104.84	\$96.99	\$56.24	\$65.06	\$63.99	\$44.69	\$56.88	\$96.99
Patient Care Outcomes								
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	6 (0.56)	7 (0.65)	4 (1.51)	3 (1.08)	3 (0.92)	4 (1.21)	14 (1.17)	7 (0.65)

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/)

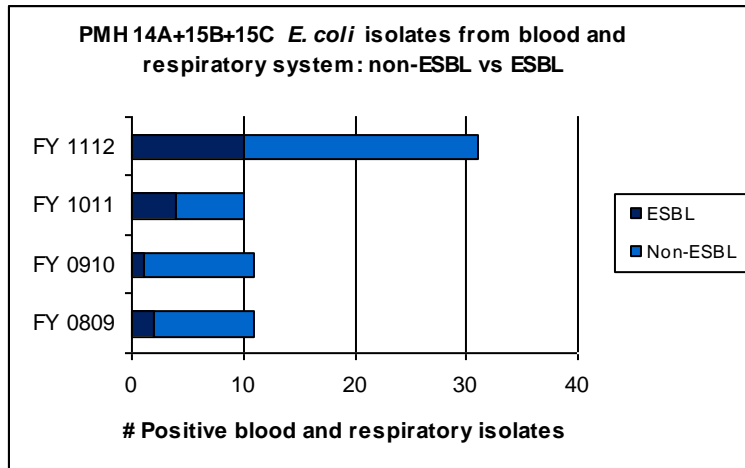
Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs + systemic antivirals; non-systemic antimicrobials are excluded

Data Sources: Antimicrobial DDD and Costs (Centricity)

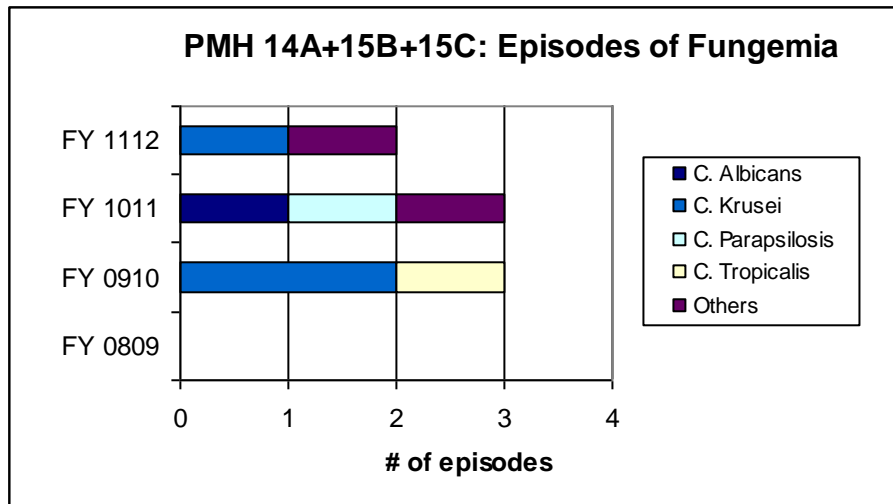
Q4 (i.e. January to March 2012) contains 15C data

Antimicrobial Susceptibility and Pathogen Surveillance

E.Coli isolates: Blood and Respiratory



Yeast Species Isolated in Blood - PMH



TORONTO GENERAL HOSPITAL

Indicators	FY 09/10 (Pre-ASP)	FY 10/11	FY11/12 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	266	208	227	192	184	195	200	208
Systemic Antibacterial DDDs/100 Patient Days	184	153	162	143	133	125	141	153
Systemic Antifungal DDDs/100 Patient Days	82	55	66	49	51	56	55	55
Total Antimicrobial Costs	\$701,451	\$627,540	\$206,820	\$147,767	\$93,445	\$124,412	\$572,443	\$627,540
Total Antimicrobial Costs/Patient Day	\$102.52	\$83.81	\$111.19	\$78.31	\$52.88	\$66.78	\$77.60	\$83.81
Systemic Antibacterial Costs	\$390,209	\$373,504	\$78,213	\$79,716	\$70,585	\$60,261	\$288,775	\$373,504
Systemic Antibacterial Costs/Patient Days	\$57.03	\$49.88	\$42.05	\$42.24	\$39.95	\$32.35	\$39.15	\$49.88
Systemic Antifungal Costs	\$311,242	\$254,036	\$128,607	\$68,052	\$22,859	\$55,659	\$275,176	\$254,036
Systemic Antifungal Costs/Patient Days	\$45.49	\$33.93	\$69.14	\$36.06	\$12.94	\$29.88	\$37.30	\$33.93
Patient Care Outcomes								
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	10 (1.46)	10 (1.33)	2 (1.07)	1 (0.52)	6 (3.39)	2 (1.07)	11 (1.49)	10 (1.33)
ICU Average Length of Stay (days)	8.24	8.61	6.90	8.30	7.40	8.20	7.83	8.61
ICU Mortality Rate (as a %)	16.2	15.7	15.8	23.0	15.0	12.6	16.4	15.7
ICU Readmission Rate within 48 hrs (as a %)	3.8	4.4	1.3	4.2	4.1	6.5	4.0	4.4
ICU Ventilator Days	5399	6256	1420	1438	1525	1592	5975	6256
ICU Bed Occupancy (days)	18.59	20.45	20.27	20.62	19.12	20.27	20.07	20.45

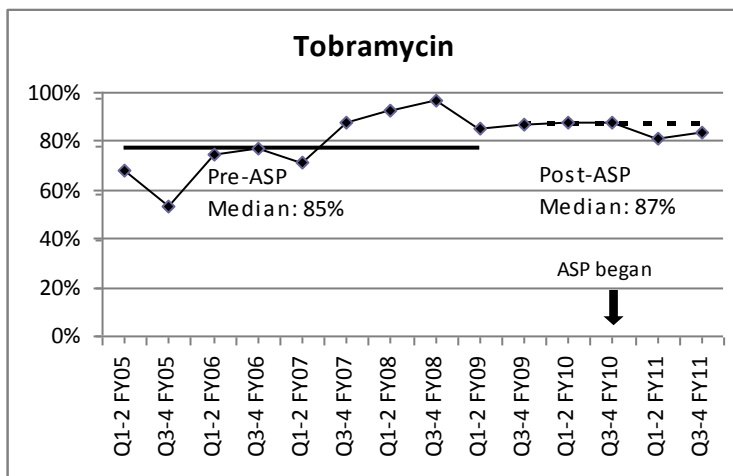
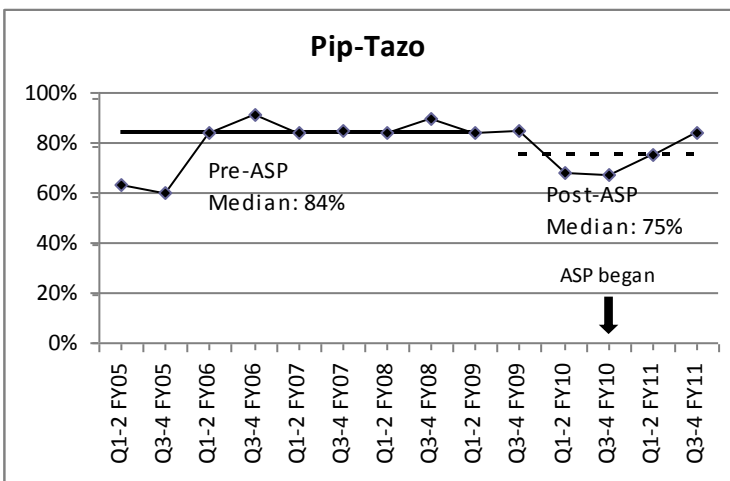
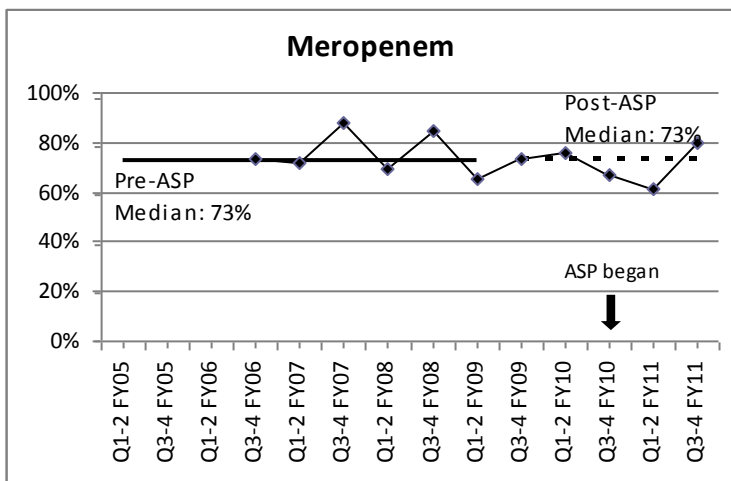
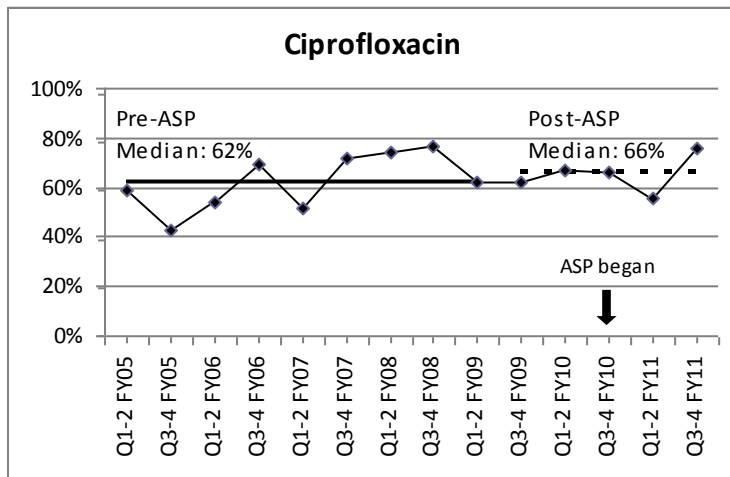
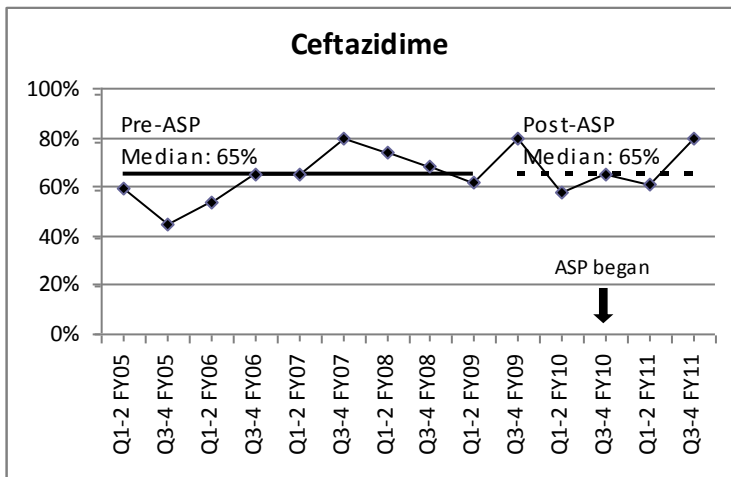
Notes:

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 (Centricity)

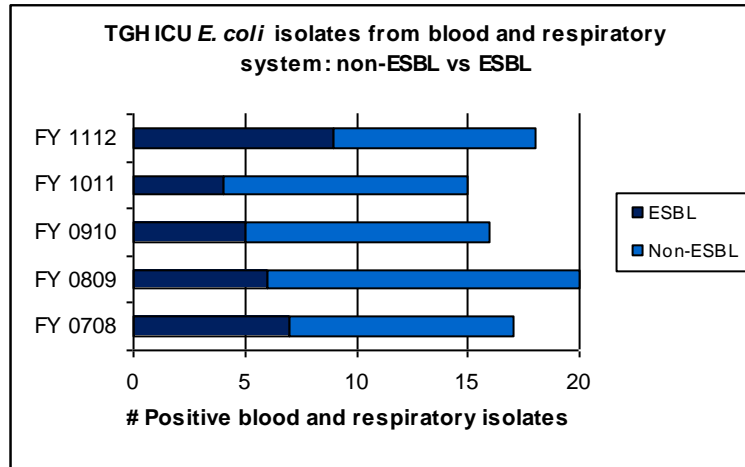
Antimicrobial Susceptibility and Pathogen Surveillance

Pseudomonas Susceptibility - TGH ICU

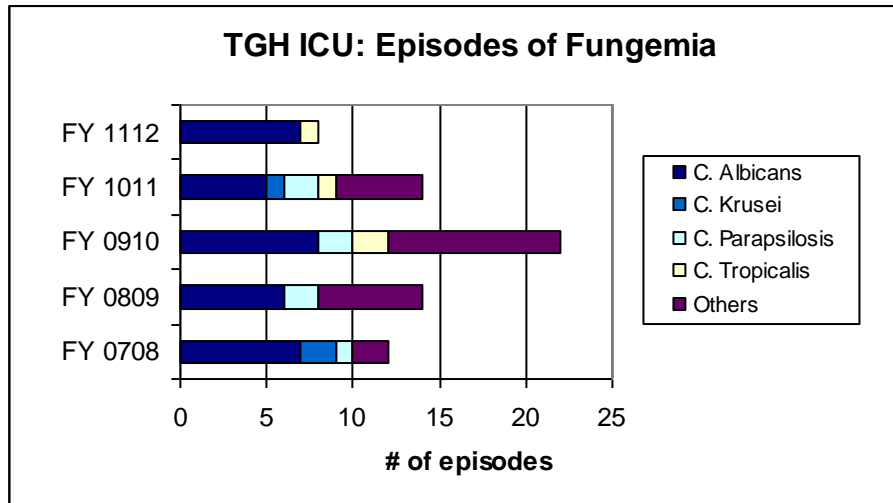


Antimicrobial Susceptibility and Pathogen Surveillance

E.Coli isolates: Blood and Respiratory



Yeast Species Isolated in Blood - TGH ICU



TORONTO WESTERN HOSPITAL

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY11/12 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs									
Total Antimicrobial DDDs/100 Patient Days	101	88	79	78	84	103	*	134 *	79
Systemic Antibacterial DDDs/100 Patient Days	94	78	73	74	77	95	*	125 *	73
Systemic Antifungal DDDs/100 Patient Days	6	10	6	4	7	8	*	10 *	6
Total Antimicrobial Costs	\$138,502	\$100,408	\$101,191	\$16,251	\$24,364	\$39,455	\$41,752 **	\$121,823	\$101,191
Total Antimicrobial Costs/Patient Day	\$18.39	\$13.24	\$13.17	\$9.17	\$11.86	\$19.97	\$21.04 **	\$15.64	\$13.17
Systemic Antibacterial Costs	\$123,278	\$87,445	\$79,280	\$15,226	\$19,586	\$31,491	\$34,654 ***	\$100,957	\$79,280
Systemic Antibacterial Costs/Patient Days	\$16.37	\$11.53	\$10.32	\$8.59	\$9.54	\$15.94	\$17.47 ***	\$12.96	\$10.32
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$1,025	\$4,778	\$7,965	\$7,098 ****	\$20,866	\$21,911
Systemic Antifungal Costs/Patient Days	\$1.79	\$1.71	\$2.85	\$0.58	\$2.33	\$4.03	\$3.58 ****	\$2.68	\$2.85
Patient Care Outcomes									
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	6 (0.79)	9 (1.18)	4 (0.52)	1 (0.56)	3 (1.46)	4 (2.02)	5 (2.52)	13 (1.66)	4 (0.52)
ICU Average Length of Stay (days)	8.39	7.44	10.68	6.59	15.02	9.52	7.96	9.77	10.68
ICU Mortality Rate (as a %)	19.6	19.9	18.1	15.1	18.3	16.3	18.3	19.3	18.1
ICU Readmission Rate within 48 hrs (as a %)	3.9	4.7	4.9	3.4	4.9	1.6	3.7	4.9	4.9
ICU Ventilator Days	4617	6305	5960	1254	1519	1391	1457	5621	5960
ICU Apache II Score	14.98	14.65	13.73	12.90	14.40	13.50	14.30	13.78	13.73

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. Hence YTD DDD numbers are provided to account for FY 11/12 Q1-Q3.

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

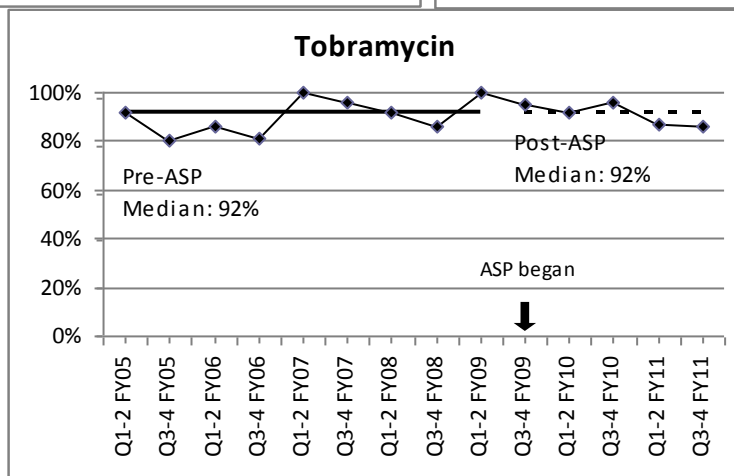
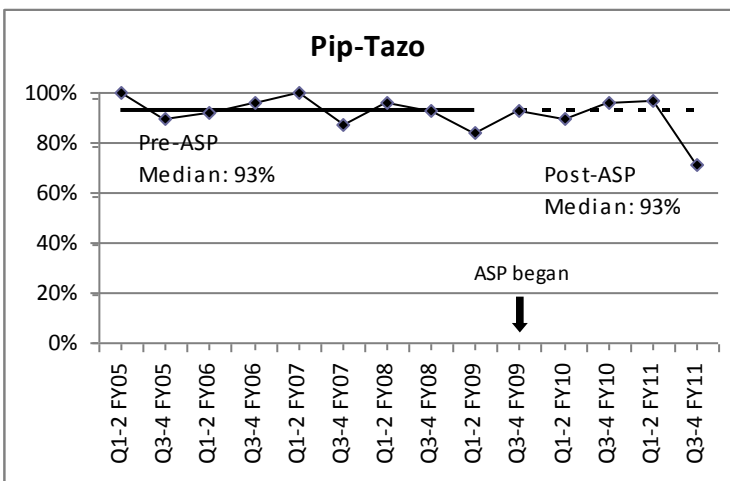
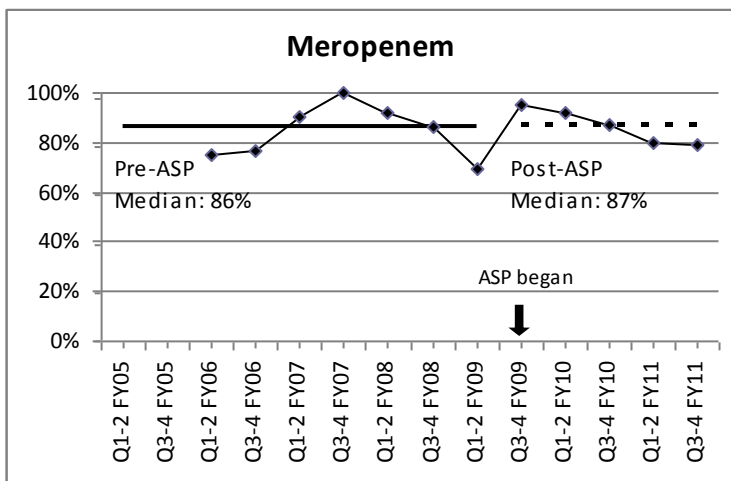
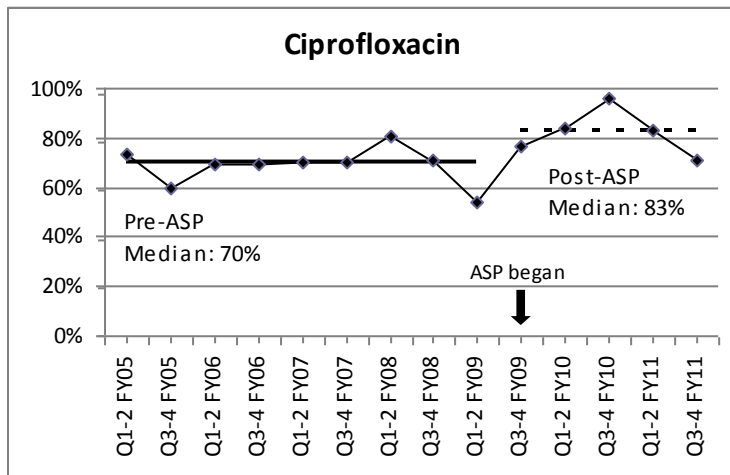
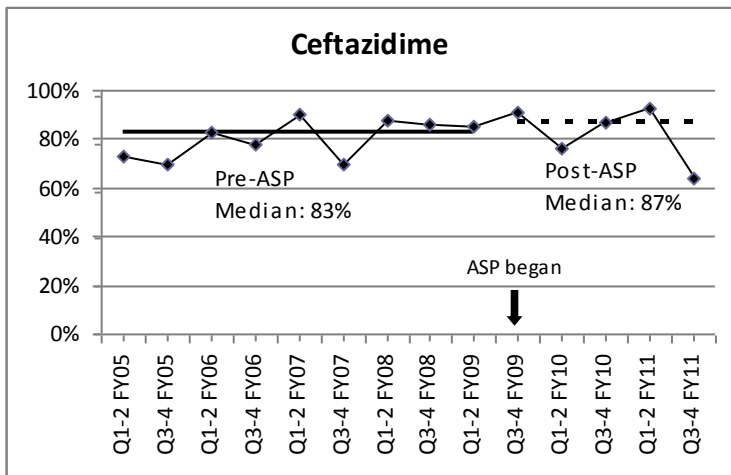
*** FY 11/12 Q4 Total Antibacterial Costs are calculated using 83% (based from proportion taken from FY 11/12 Q1-Q3) of the Total Antimicrobial Costs.

**** FY 11/12 Q4 Total Antifungal Costs are calculated using 17% (based from proportion taken from FY 11/12 Q1-Q3) of the Total Antimicrobial Costs.

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)

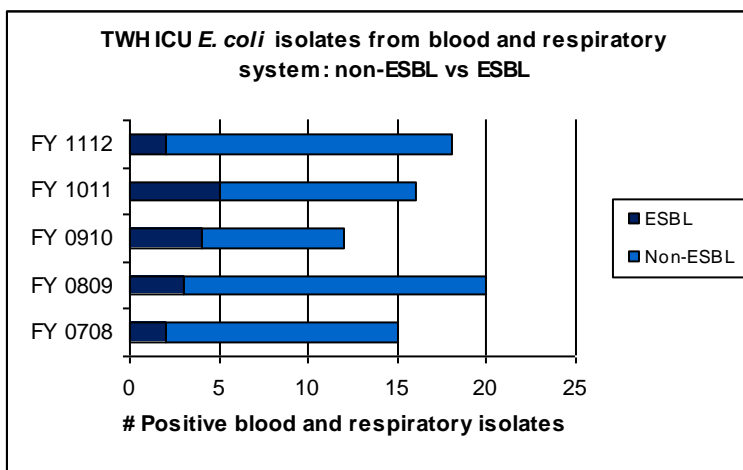
Antimicrobial Susceptibility and Pathogen Surveillance

Pseudomonas Susceptibility - TWH ICU



Antimicrobial Susceptibility and Pathogen Surveillance

E.Coli isolates: Blood and Respiratory



Yeast Species Isolated in Blood - TWH ICU

