

MSH + UHN

ASP

ANTIMICROBIAL
STEWARDSHIP
PROGRAM



Q1 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.

Key Highlights of this quarterly report:

- ✦ **Antimicrobial Consumption & costs:** Antimicrobial stewardship activities at MSH and UHN in Quarter 1 have continued to be lower than prior to stewardship implementation.
- ✦ **Patient Safety:** In the Mount Sinai Hospital ICU, mortality rate and readmission rate have both decreased, despite an increase in the Multiple Organ Dysfunction Score (MODS), which measures patient acuity. The ICUs at Toronto General Hospital and Toronto Western Hospital continue to show decreases in mortality rate. Cesarean section infection rates at Mount Sinai Hospital have dropped markedly from 11% to 7.1% following a change in practice that included optimizing the timing of C-section antimicrobial prophylaxis.
- ✦ **Research:** The ASP held a successful CIHR-funded modified Delphi Panel with experts from across North America focused on defining indicators for antimicrobial stewardship in acute care settings.
- ✦ **Education:** Feedback from the 1st Toronto Course on Antimicrobial Stewardship was strongly positive, with 94.3% of participants answered “Strongly Agree” or “Agree” to rating this course as Excellent and 35% indicated a strong desire to attend a follow-up session in the future.
- ✦ **Personnel Changes:** The ASP is thrilled that **Kevin Duplisea**—a pharmacist who was providing part-time stewardship service at TWH—has joined as a full-time ASP team member. Miranda Soh, a pharmacist who previously worked at William Osler Health Centre, will join him. **Drs. Amita Woods** and **James Brunton** will be missed. Dr. Woods accepted a leadership role as a Pharmacy Clinical Site Leader at the Peter Munk Cardiac Centre & Family Health Team (TGH/TWH), and Dr. Brunton will return to the Infectious Diseases Consultation Service.
- ✦ **Partnerships:** The MSH ASP enters its third year partnering with Pfizer Canada. With the Antimicrobial Stewardship Course and other educational initiatives, growth in research productivity, and a website slated to go online in the fall of this 2011, Pfizer Canada’s commitment to antimicrobial stewardship is enabling stewardship growth throughout Canada.
- ✦ **Provincial Role:** The ASP is working with a variety of organizations to implement antimicrobial stewardship in ICUs throughout the province. Partnerships are being developed with the MOHLTC Critical Care Secretariat and the Council of Academic Hospitals of Ontario (CAHO), including the ASP being shortlisted in CAHO’s Adopting Research to Improve Care (ARTIC) Program.

The following table summarizes the activities of the MSH-UHN ASP in collaboration with a variety of colleagues:

SUMMARY OF CURRENT ASP ACTIVITIES AND RESULTS

LOCATION/ STAKEHOLDERS	METHODS	START DATE	HIGHLIGHTS
MSH Intensive Care Unit	Prospective audit and feedback	February 2009	FY 11/12 Q1 antimicrobial costs per patient day have decreased 7.1% and antimicrobial usage has decreased 2.8% compared to before ASP started in the ICU. Mortality and readmission rate have both decreased compared to before ASP started in the ICU.
MSH General Surgery	Prospective audit and feedback	March 2010	Antimicrobial consumption has been reduced since the introduction of the ASP by 21.8% and antimicrobial costs per patient day by 3.7% when comparing FY 11/12 Q1 to FY 09/10.
Outpatient Parental Antimicrobial Therapy (OPAT) Program	Capture-and-follow	December 2009	The OPAT program officially closed on August 31, 2011. A corporate decision was made to focus ASP resources on hospital inpatients.
PMH 14A & 15B/ Leukemia and Immunocompromised Host Service	Prospective audit and feedback	February 2010	Comparing FY 11/12 Q1 vs. FY 10/11, antimicrobial consumption has been reduced by approximately 13%. This has been accompanied by a 32% reduction in antimicrobial costs per patient day.
TWH Intensive Care Unit	Prospective audit and feedback	December 2009	Comparing FY 11/12 Q1 vs. FY 10/11, antimicrobial consumption has been reduced by approximately 1.4% but accompanied by approximately 30% reduction in antimicrobial costs per patient day.
TGH Intensive Care Unit	Prospective audit and feedback	October 2010	Antimicrobial consumption has been reduced since the introduction of the ASP by approximately 17%. This has been accompanied by approximately 16% reduction in antimicrobial costs per patient day.
ASP Working Groups	Best practice collaboration	January 2011	<p>The VAP inter-disciplinary Working Group has developed an algorithm that have been discussed and shared with colleagues across MSH and UHN. In November 2011, the VAP algorithm will be implemented at MSH ICU.</p> <p>The ASP is also leading a similar quality improvement process to recognize and manage Sepsis/Septic Shock.</p>

Greater Toronto Area/ Toronto Central LHIN, Teaching Hospitals,	Quarterly meetings; electronic communication; collaboration	January 2010	There are now 13 hospitals that are members of the Toronto Antimicrobial Stewardship Corridor (TASC), chaired by members Andrew Morris and Sandra Nelson. This group has also created a TASC Research Sub-Committee, to advance the research scope of antimicrobial stewardship within TASC. TASC and the ASP have been collaborating with the Best Practice in General Surgery (BPIGS) group to improve the management of intra-abdominal infections.
Hospital for Sick Children, MSH, North York General Hospital, Sunnybrook Health Sciences Centre, Trillium Health Centre, UHN	Research collaboration	September 2010	The <i>Staphylococcus aureus</i> bacteremia (SAB) research study collaborative among TASC members is close to completion. This study is retrospectively analyzing clinical features, diagnostic methods, clinical outcomes and resource utilization among over 1000 patients diagnosed with SAB. An ASP in the ICU project is underway to analyze the efficacy of an ASP in improving antimicrobial use and patient care among the MSH, TGH and TWH ICUs.
Expert Delphi Consensus Panel	Research/ Education Collaboration	June 2011	The MSH-UHN ASP held a successful Expert Delphi Consensus Panel on June 1 st , 2011, funded by the Canadian Institute of Health Research (CIHR).
Toronto/ Healthcare professionals throughout Canada	Education Course on Antimicrobial Stewardship	June 2011	The 1st Toronto Course on Antimicrobial Stewardship was successfully held by the MSH-UHN ASP on June 2-4 2011. Feedback has been very positive, with 94.3% of participants answered “Strongly Agree” or “Agree” to rating this course as Excellent and 35% indicated a strong desire to attend a follow-up session in the future.
Summer Students/Residents Research	Research/ Education Collaboration	July 2011	The MSH-UHN ASP summer student and resident projects included research with PMH, OPAT program, the ICU, the acute leukemia population, and renal transplant recipients.
Antimicrobial Stewardship Retreat		TBD	The MSH-UHN ASP is planning a Program Retreat to review the current state and set priorities going forward. Date is to be determined.

LOOKING FORWARD

CLINICAL

Moving forward into FY 2011/12 we hope to strengthen and expand our relationships with clinical services at MSH, PMH, TGH, and TWH as we plan to expand prospective audit-and-feedback to more medical and surgical services. Plans for expanding into the General Internal Medicine (GIM) services have begun. The ASP is focused on establishing best practices for common clinical syndromes. The ventilator-associated pneumonia algorithm—developed with multi-disciplinary input from MSH and UHN—is planned to for implementation at MSH in November 2011, and subsequently at both TGH and TWH ICUs. A similar process for sepsis is being worked on, led by Dr. Linda Dresser.

Although the ASP has had an ongoing human resource challenge, the hiring of two new pharmacists will provide much needed energy and manpower to serve our patients and colleagues better. Additionally, we are working with various stakeholders to develop an ASP database to improve the efficiency of the ASP.

RESEARCH

Using a stepped wedge design (whereby the same intervention is introduced sequentially at different sites), a research study will analyze the efficacy of an ASP in improving antimicrobial use and patient care among the MSH, TGH and TWH ICUs. Results should be available in Quarter 3 of this fiscal year.

ASP team members have been working with medical student Janaki Vallipuram and pharmacy student Sidika Dhalla to evaluate antifungal investigation and management in patients with newly diagnosed acute leukemia.

The MSH-UHN ASP hopes to have a Research Coordinator hired over the next 8 weeks. This will allow us to advance our research agenda, increasing research funding and publications.

EDUCATION

After the success of our first antimicrobial stewardship course in June, planning has begun for a second course for April 2012. Feedback has been very positive, with 94.3% of participants answered “Strongly Agree” or “Agree” to rating this course as Excellent.

ASP also plans to hold a separate follow up session to the first course. In a follow up needs assessment to the participants of the first course, 35% indicated a strong desire to attend a follow-up session sometime in the near future. There is a strong demand for an in-person session in Toronto or updates via webinars or Huddle.

ASP continues to use Huddle for sharing of information and best practice guidelines. An ASP website is in the developmental stages, which will result in an online resource for physicians, pharmacists and other healthcare providers and administrators both nationally and internationally. The website is expected to be completed Winter 2011/12.

MOUNT SINAI HOSPITAL (SUPPORTED BY PFIZER CANADA INC.)

INTENSIVE CARE UNIT

The ASP began working in the MSH ICU in February 2009. In FY 11/12, the ASP continues to round 3 days a week, a change that was made in FY 10/11 Q4. Full results on data collected are in the [Appendix](#), but are summarized below:

- FY 2011/12 Q1 antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased since last year, but still decreased by 2.8% compared to before the ASP started in the ICU. The decrease in usage was due to a decrease with systemic antibacterials, where the usage/100 patient days decreased by 7.2%, while usage for systemic antifungals/100 patient days increased 7.1%.
- Antimicrobial costs per patient day have also continued to decrease since beginning the program and for FY 10/11 have decreased by 7.1% compared to before the ASP was introduced in the ICU. Decreases were seen with systemic antibacterials of 22.4%, but an increase was seen with systemic antifungals of 11.7%.
- Antimicrobial costs for patients originating from PMH patients continues to be monitored, and remains high. The proportion of antimicrobial costs in the MSH ICU attributable to patients originating from PMH is approximately 60% of the total ICU costs.
- There has only been 1 case of yeast isolated in blood in FY 11-12 Q1.
- Since the introduction of the ASP in the MSH ICU, crude mortality has dropped from 19.9% in FY 2008/9 to 16.4% in 2011/12 Quarter 1.
- *Pseudomonas aeruginosa* susceptibilities are updated bi-annually. FY 10/11 Q3-Q4 data can be found in the Appendix. FY 11/12 data will be provided in the Q2 Report.

GENERAL SURGERY (14TH FLOOR)

The ASP began working with the General Surgery Teams at MSH in March 2010. Sandra Nelson performs prospective audit and feedback, and communicates with the surgical residents 2-3 times a week. Outcome data are available in the [Appendix](#), but are summarized below:

- 14th floor FY 11/12 Q1 antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has dropped by 18.7% compared to FY 09/10.
- 14th floor FY 11/12 Q1 antimicrobial costs per patient day have decreased 3.7% compared to FY 09/10. Systemic antibacterial showed the significant decreases in costs per patient day, however, systemic antifungal costs per patient day increased when compared to last year.

SURGICAL PROPHYLAXIS

Sandra Nelson is developing evidence and principle based guidelines for surgical prophylaxis at MSH. She is also conducting a retrospective study of current surgical prophylaxis practices. Amanda Israel, a medical student at UBC, conducted the chart review. The guidelines are expected to be ready by the fall. Once developed, the guidelines will be presented, along with the review of current practices, to the surgical groups for discussion and consensus. The goal is to have them implemented in the winter.

OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY (OPAT) PROGRAM

The OPAT program officially closed on August 31, 2011 as part of a restructuring of the ASP to focus resources on hospital inpatients.

Information was disseminated well before the August 31st closure (via email, phone, in person) in order to make the transition as smooth as possible.

Dr. Amita Woods accepted a leadership role as a Pharmacy Clinical Site Leader Position - Peter Munk Cardiac Centre & Family Health Team (TGH/ TWH). **Dr. James Brunton** will continue to work with the Infectious Diseases Consultation Service.

Ms. Lopa Naik will focus her efforts on ASP inpatient projects.

DATABASE

Ms. Pauline Feng, a volunteer summer student, helped to input some missing information into the OPAT database. The database is complete and is ready to be used for future analysis should the need arises.

PRINCESS MARGARET HOSPITAL

LEUKAEMIA SERVICE

The Antimicrobial Stewardship Program (ASP) continues thrice-weekly (Mon, Wed, Fri) rounds with the clinical associates and other key members of the Leukemia service (attending physicians, pharmacists, and nursing unit administrators) to review patients not being followed by the Immunocompromised Host Infectious Diseases Consultation Service on December 6, 2010.

In the coming months, the ASP hopes to continue improving the process of care, including standardizing current practices such as blood cultures (which have an impact on antimicrobial utilization), and use of antifungal agents.

Results from the past quarter represent **14.5% year-over-year reduction in antimicrobial consumption**, corresponding with a 25.7% reduction in antimicrobial costs/patient day (reflecting a **quarterly savings of approximately \$85K**).

For the next Quarterly Report, we hope to present patient-related outcomes such as mortality, transfers to the ICU and length of stay.

TORONTO WESTERN HOSPITAL

MEDICAL-SURGICAL INTENSIVE CARE UNIT

The ASP group continues to round with the ICU team on a regular basis. Audit-and-feedback with the TWH ICU started December 2009 and rounding times were reduced this quarter to four days per week.) UHN recently hired Dr. Kevin Duplisea. Dr. Duplisea's appointment included 25% of his time to be dedicated to antimicrobial stewardship activities (although he will be a full-time member of the MSH-UHN ASP in the next quarter), enabling Dr. Dresser to focus her attention to other clinical areas.

Full results are in the [Appendix](#), but are summarized below:

- There has been a **12.7% year-over-year quarterly increase in antimicrobial consumption to 78.1 DDD/100 patient-days**.
- **Year-over-year antimicrobial costs/patient-day were 1.5% less** than the prior fiscal.
- **Year-over-year ICU crude mortality is down by 1.7%** (to 15.1%) this quarter.

TORONTO GENERAL HOSPITAL

MEDICAL-SURGICAL INTENSIVE CARE UNIT

The ASP started collaborating with the TGH Medical-Surgical ICU in October 2010. Linda Dresser continues to round with the ICU team on weekday mornings, starting at 9:00, with Dr. Morris attending approximately twice per week. Full results are in the [Appendix](#), but are summarized below. (Note that we report year-over-year results for the 9-month period October to June):

- There has been a **17.3% reduction in antimicrobial consumption**, from 249.5 DDD/100 patient-days to 206.3 DDD/100 patient-days.
- There has been an **antimicrobial cost/pt-days reduction of 15.8%**, with a 6.8% reduction in overall costs despite a 10.4% increase in bed occupancy.
- Crude ICU mortality is largely unchanged at 15.9% (from 16.0% during the same period one year prior).

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. The first such working group is the **Ventilator-Associated Pneumonia (VAP) Working Group**, which includes Pharmacists, Physicians, Respiratory Therapists, Radiologists and Nursing. This group has developed a VAP algorithm which was shared with colleagues across MSH and UHN for feedback. Working on a tight time-schedule, this group has reviewed evidence, discussed feasibility of different approaches, and has been using Huddle to do some of the collaboration on-line to supplement in-person meetings. The VAP algorithm will be introduced at MSH ICU in November 2011 and will be evaluated using the Plan-Do-Study-Act (PDSA) methodology, and evaluation of the algorithm will occur concurrently.

The ASP has been working for approximately two years with the obstetrical program at Mount Sinai Hospital to reduce surgical site infection rates. Collaborating with Drs. Matthew Sermer (OB-GYN) and Jose Carvalho (obstetrical anesthesia), and other members of the healthcare team including nursing and infection control, the ASP has helped **drop C-section surgical site infection rates from 11% in 2009 to 7.1% this year.**

TORONTO ANTIMICROBIAL STEWARDSHIP CORRIDOR

The ASP and like-minded individuals in and around the Greater Toronto Area collaborate with the Toronto Antimicrobial Stewardship Corridor (TASC) and will have its 2 year anniversary in December 2011. The group currently includes antimicrobial stewardship representatives from 13 hospitals, including: Credit Vally Hospital, Mount Sinai Hospital, Hospital for Sick Children, North York General Hospital, St. John's Rehab, St. Joseph's Health Centre, St. Michael's, Sunnybrook Health Sciences Centre, The Scarborough Hospital, Toronto East General Hospital, Trillium Health Centre, William Osler Health Centre, University Health Network.

The TASC group continues to use Huddle to share documents/resources and collaborate online. The Huddle solution was purchased with a portion of the generous donation from Pfizer Canada.

TASC worked with the Best Practice In General Surgery (BPIGS) group to develop guidelines for antimicrobial use in intra-abdominal sepsis, and is now beginning to collaborate with the Toronto Central LHIN to develop clinical algorithms for common infectious syndromes presenting to the Emergency Department.

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 studies to observe real-world outcomes, and should contribute to modern medical practice with knowledge translation. Some of this research has been listed above.

ANTIMICROBIAL STEWARDSHIP IN THE ICU

This research project will be using the data accrued from the clinical activities of the ASP. Supervised by **Dr. Morris**, Infectious Diseases and Critical Care fellow **Dr. Brian Minnema** has received a resident research grant from Physicians' Services Incorporated and will be looking at clinical, microbiological and antimicrobial utilization outcomes in a "step-wedge" trial design. Much of the data has already been collected, although the study will be looking at data from all ICUs as far back as 2007, and following it forward to 2012. The study is expected to be completed June 2012.

STAPHYLOCOCCUS AUREUS BACTERAEMIA

Another research project involves examining the management and outcomes of patients with *S. aureus* bacteraemia at several TASC member hospitals. This project hopes to capture approximately 1000 episodes of *S. aureus* bacteraemia at the teaching hospitals. Because *S. aureus* bacteraemia is such an important disease, the ASP hopes to use this study to springboard clinical trials and quality improvement projects into the best management of *S. aureus* bacteraemia. The study is anticipated to take another 12-15 months to complete. An infectious diseases fellow (**Dr. Dan Ricciuto**) and a medical residents (**Dr. Adrienne Showler**) have contributed significantly in the development of this project. Dr. Lisa Burry (a former ASP member, and ongoing collaborator) has been leading this initiative. **Lopa Naik** has been instrumental in the development of the electronic database to support this project.

DELPHI PANEL

The MSH-UHN ASP held a successful an Expert Delphi Consensus Panel on June 1st, 2011 focused on defining indicators for antimicrobial stewardship in acute care settings, funded by a Canadian Institutes of Health Research (CIHR) Meeting Grant. Stakeholders included experts from across North America, representing the Centres for Disease Control, the Infectious Diseases Society of America, the Association of Medical Microbiology and Infectious Diseases Canada, Accreditation Canada, and the BC Centres for Disease Control. The knowledge generated during this process will be shared with Accreditation Canada, Ontario Ministry of Health and Long-Term Care, ISMP Canada, AMMI Canada and Public Health Agency of Canada.

ANTIFUNGAL USE IN PATIENTS RECEIVING INDUCTION THERAPY FOR ACUTE LEUKEMIA

Janaki Vallipuram and Sidika Dhalla, medical and pharmacy summer students, respectively, collaborating on a project evaluating antifungal therapy in patients with acute leukemia. Their work continues, with Janaki continuing her investigation into the role of CT scanning on antifungal therapy in patients with acute leukemia. A pharmacy student/resident will continue completing the work Sidika began looking at antifungal drug utilization in the same population.

SEPSIS

Dr. Christine McDonald, a resident in Internal Medicine (Supervisor: Dr. Morris), will be collaborating with Drs. Stephen Lapinsky and Dave Dushenski, and MSH Quality and Safety Consultant, to study sepsis and septic shock investigation and management as a first step to quality improvement in the care of patients with these conditions. A parallel project at UHN, involving Drs. Paul Ellis and Jeff Singh will be led by Dr. Linda Dresser, in the hopes of developing best practices in sepsis management.

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.

TORONTO COURSE ON ANTIMICROBIAL STEWARDSHIP “TAKING IT TO THE NEXT LEVEL”

The 1st Toronto Course on Antimicrobial Stewardship was successfully held by the MSH-UHN ASP on June 2-4, 2011. This course was an intense 3-days of interactive education consisting of small group case-based learning, dynamic lectures and keynote addresses. This course was accredited by University of Toronto's Continuing Education and Professional Development (CEPD). Attendees included ID physicians and pharmacists from across Canada. Speakers and Facilitators for this course came from across North America, although definitely showcased the MSH-UHN ASP.

Feedback has been very positive from attendees, with 94.3% of participants answered “Strongly Agree” or “Agree” to rating this course as Excellent. Planning has begun for a second course for April 2012. The ASP also plans to hold a separate follow up session to the first course. In a follow up needs assessment to the participants of the first course, 35% indicated a strong desire to attend a follow-up session sometime in the near future. There is a strong demand for an in-person session in Toronto or updates via webinars or Huddle. Desired topics include: more workshops/real scenarios, electronic data collection methods, ASP evaluation/benchmarking, IT topics, creating a business plan, ID topics.

PROVINCIAL ROLE: CANADIAN ACADEMIC HOSPITAL ORGANIZATION ADOPTING RESEARCH TO IMPROVE CARE (ARTIC) PROGRAM

The ASP collaborated with colleagues at Mount Sinai Hospital, Sunnybrook Health Sciences Centre, St. Michael's, and University Health Network to submit an application to the Council of Academic Hospitals of Ontario (CAHO) Adopting Research to Improve Care (ARTIC) Program to implement antimicrobial stewardship programs in intensive care units in Ontario Academic Hospitals in collaboration with the MOHLTC Critical Care Secretariat. The ASP proposal has been shortlisted as one of four applications for this prestigious grant. If chosen, the ASP will work with Ontario teaching hospitals to implement antimicrobial stewardship programs in their intensive care units.

ACKNOWLEDGEMENTS

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

NEXT QUARTERLY REPORT

The next quarterly report, for FY 11/12 Q2 is expected in December 2011/January 2012.

APPENDIX

MOUNT SINAI HOSPITAL ICU
Mount Sinai Hospital ICU Antimicrobial Cost and Usage

Note: Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage, although it does have limitations. Example of a DDD: the DDD for cefazolin is 3 g since the standard daily dose is 1 g IV q8h.

Key Performance Indicator	FY 08/09	FY 09/10	FY 10/11	FY 11/12 Q1	% Change (11/12)	
					Compared to Same Period Last Year (FY 10/11 Q1)	Compared to before ASP in ICU (FY 08/09)
Antimicrobial Usage and Costs						
Total Antimicrobial DDDs*/100 Patient Days	180	164	138	175	32.0%	-2.8%
Systemic Antibacterial DDDs/100 Patient Days	145	126	109	135	16.2%	-7.2%
Systemic Antifungal DDDs/100 Patient Days	31	28	24	33	103.7%	7.1%
Total Antimicrobial Costs	\$332,731	\$285,931	\$198,392	\$78,186	66.2%	-76.5%
Total Antimicrobial Costs/ Patient Day	\$69.39	\$59.22	\$42.02	\$64.46	65.4%	-7.1%
Systemic Antibacterial Costs	\$173,082	\$140,022	\$95,928	\$33,962	33.9%	-
Systemic Antibacterial Costs/Patient Day	\$36.10	\$29.00	\$20.32	\$28.00	33.2%	-22.4%
Systemic Antifungal Costs	\$143,019	\$132,475	\$90,453	\$40,409	130.8%	-
Systemic Antifungal Costs/Patient Day	\$29.83	\$27.44	\$19.16	\$33.31	129.7%	11.7%
Patient Care Indicators						
ICU Average Length of Stay (days)	5.81	5.57	5.65	5.53	-5.6%	-4.8%
ICU Mortality Rate	19.9%	17.5%	16.3%	16.4%	19.2%	-17.7%
ICU Readmission Rate	3.2%	2.9%	2.7%	1.0%	-67.6%	-70.3%
ICU Ventilator Days	N/A	3285	2941	781	12.7%	N/A
ICU MODS	4.00	4.03	1.44	4.08	N/A	2.0%

*DDD = Defined Daily Dose

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

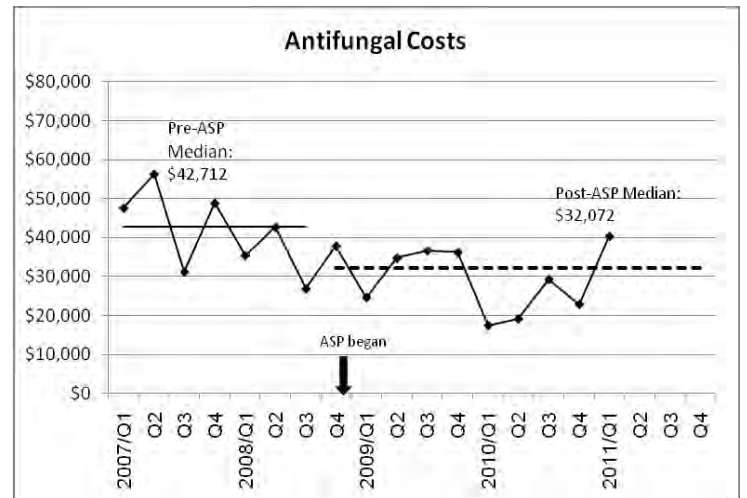
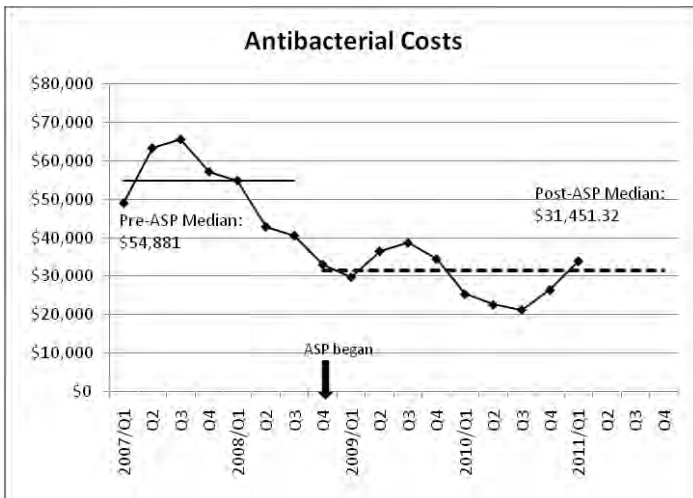
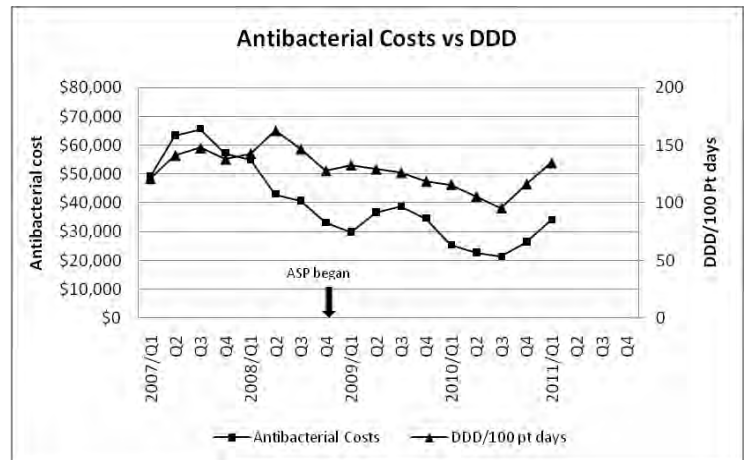
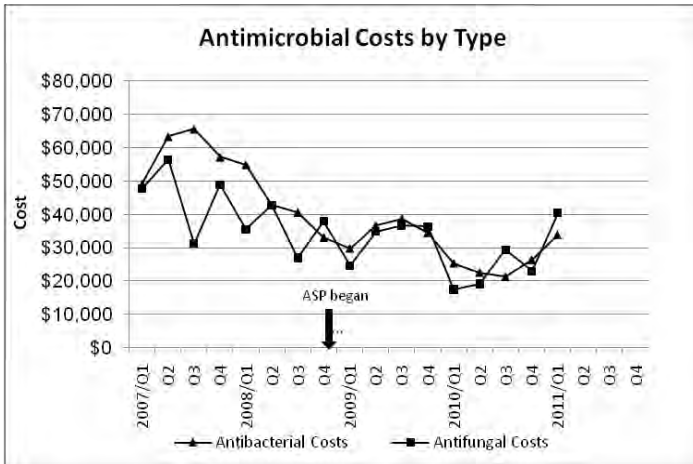
Note: FY 10/11 is currently being review, any updates will be available in the next Quarterly Report.

Antimicrobial Costs in MSH ICU, according to PMH or non-PMH origin

Antimicrobial Costs	FY 09/10	FY 10/11	FY 11/12 Q1
Total Antibacterial Costs	\$139,645	\$95,770.27	\$33,944.87
Non-PMH Patients	\$76,677	\$56,991.52	\$17,250.34
PMH Patients	\$62,968	\$38,778.75	\$16,694.53
Total Antifungal Costs	\$132,475	\$88,963.57	\$40,409.13
Non-PMH Patients	\$49,338	\$19,733.79	\$12,893.56
PMH Patients	\$83,137	\$69,229.78	\$27,515.57
Total Other Antimicrobial Costs	\$16,034	\$8,357.40	\$3,871.21
Non-PMH Patients	\$8,126	\$1,974.17	\$1,323.80
PMH Patients	\$7,908	\$6,383.23	\$2,547.41
Total All Antimicrobial Costs (antibacterial + antifungal + other)	\$288,154	\$193,091.24	\$78,225.21
Non-PMH Patients	\$134,140	\$78,699.48	\$31,467.70
PMH Patients	\$154,013	\$114,391.76	\$46,757.51

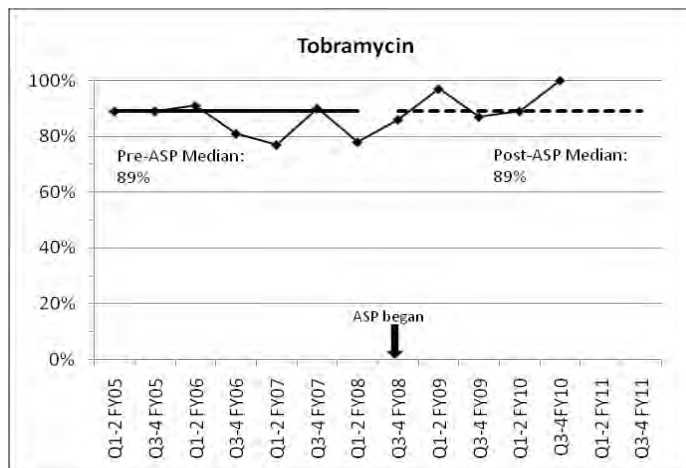
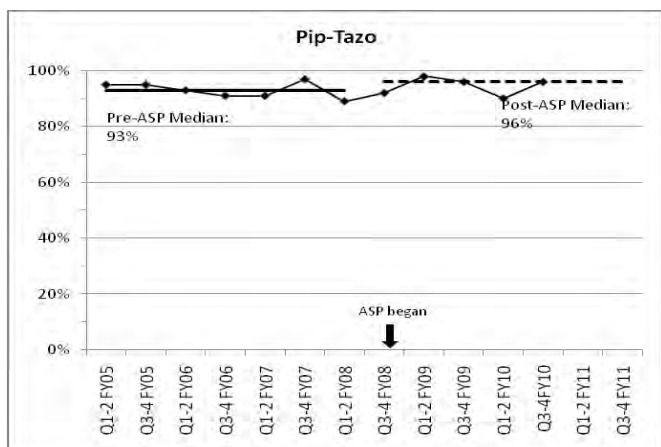
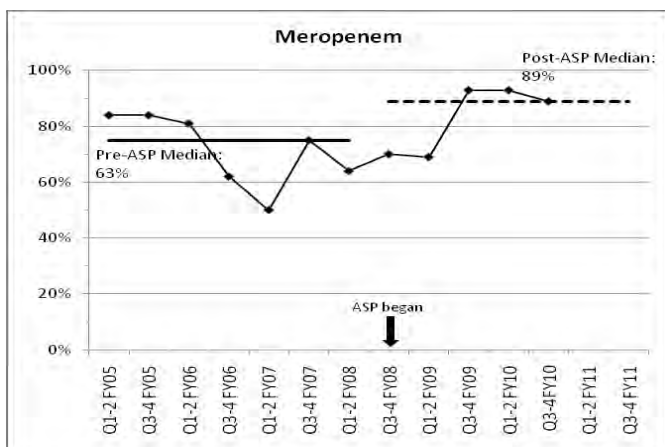
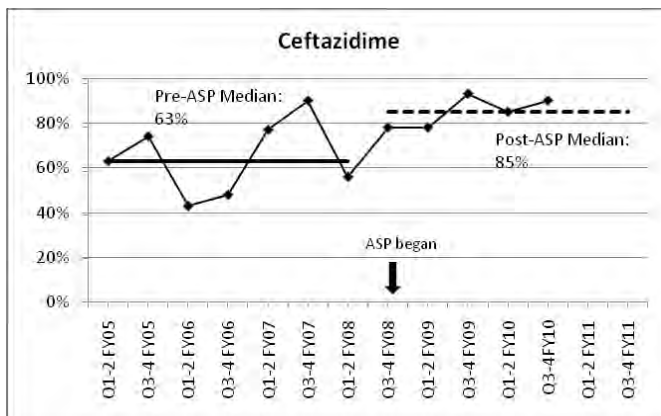
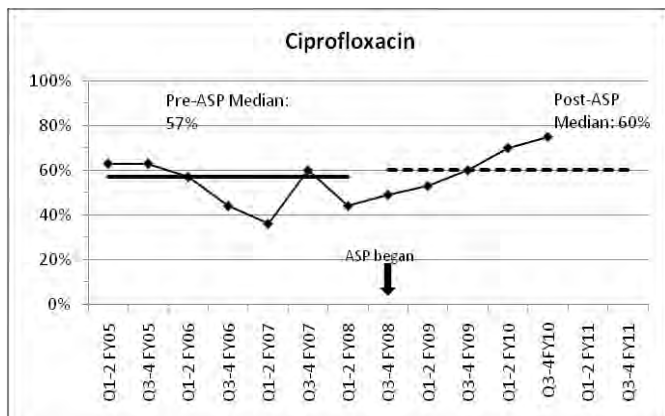
Note: Overall total antimicrobial cost differs slightly from that reported key performance indicator table above due to data run at different times on an open year.

MSH ICU Antimicrobial Costs and Usage cont.



Antimicrobial Susceptibility and Pathogen Surveillance

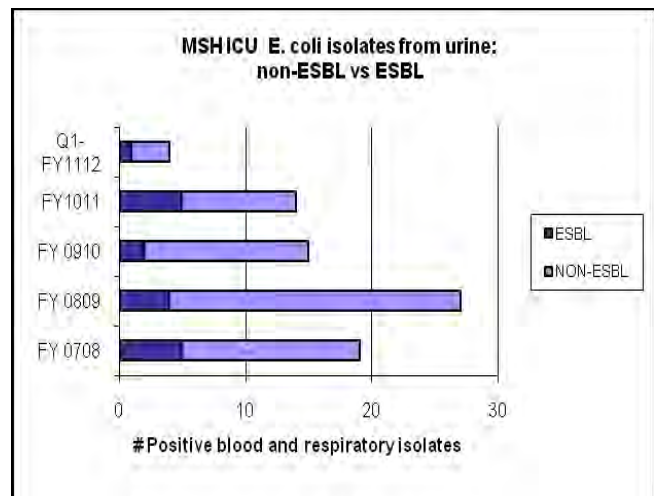
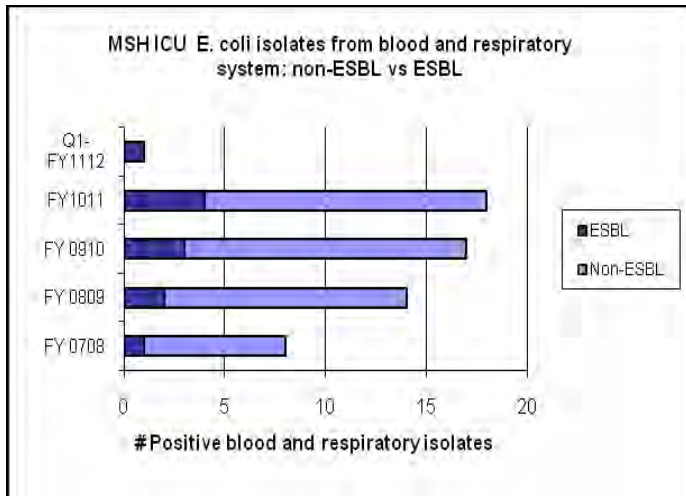
Pseudomonas Susceptibility - MSH ICU



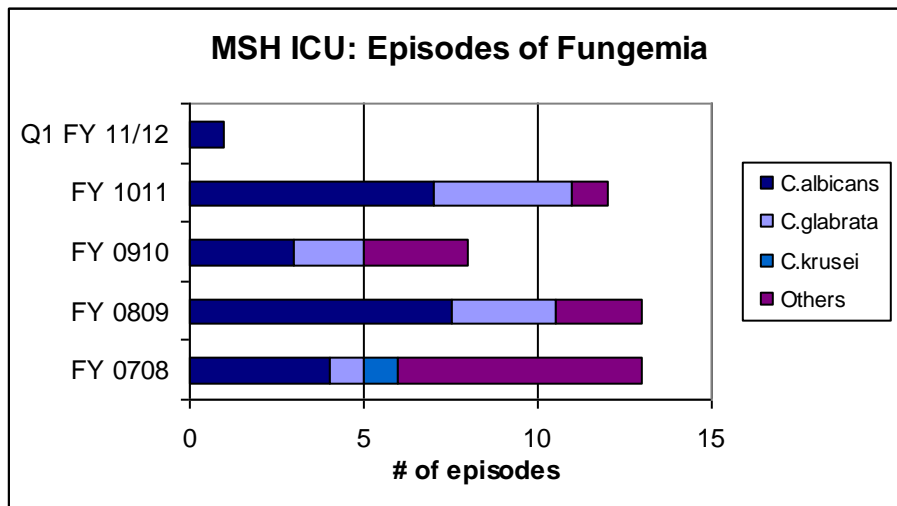
Note: Antimicrobial susceptibility data updated bi-annually

Antimicrobial Susceptibility and Pathogen Surveillance cont.

E.Coli isolates: Blood, Respiratory, Urine



Yeast Species Isolated in Blood - MSH ICU



14TH FLOOR

Mount Sinai Hospital 14th Floor Antimicrobial Usage and Costs

Key Performance Indicator	FY 09/10	FY 10/11	FY 11/12 Q1	% Change (11/12)	
				Compared to Same Period Last Year (FY 10/11 Q1)	Compared to before ASP started on 14 ^{**} (FY 09/10)
Antimicrobial Usage and Costs					
Total Antimicrobial DDDs*/100 Patient Days	62.0	49.2	50.4	7.5%	-18.7%
Systemic Antibacterial DDDs/100 Patient Days	59.9	47.2	49.7	10.2%	-17.1%
Systemic Antifungal DDDs/100 Patient Days	1.1	1.8	0.7	-53.3%	-38.9%
Total Antimicrobial Costs	\$89,053	\$67,986	\$22,120	-8.7%	-75.2%
Total Antimicrobial Costs/Patient Day	\$4.69	\$3.72	\$4.52	-8.9%	-3.7%
Systemic Antibacterial Costs	\$83,359	\$63,727	\$18,817	-15.9%	-77.4%
Systemic Antibacterial Costs/Patient Day	\$4.39	\$3.48	\$3.85	-15.8%	-12.4%
Systemic Antifungal Costs	\$3,853	\$3,862	\$3,131	77.2%	-18.8%
Systemic Antifungal Costs/Patient Day	\$0.20	\$0.21	\$0.64	77.8%	215.1%
Patient Care Indicators					
14th floor Average Length of Stay (days)	6.4	6.4	6.2	-7.5%	-3.1%
14th floor Mortality Rate	0.7%	0.6%	0.7%	75.0%	0.0%
14th floor Readmission Rate	3.1%	3.1%	1.8%	-50.0%	-41.9%
14th floor Isolation Days per 100 pt days	8.6	10.1	TBD	N/A	N/A

*DDD = Defined Daily Dose

** ASP started on 14th level in March 2010; data will be populated for this indicator beginning Q1 2011/12

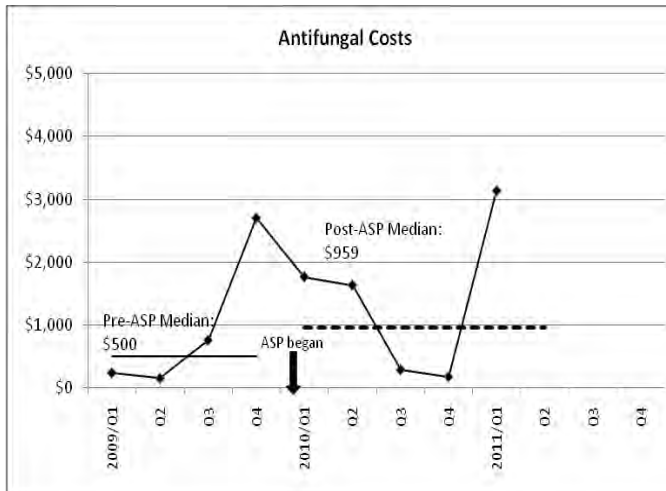
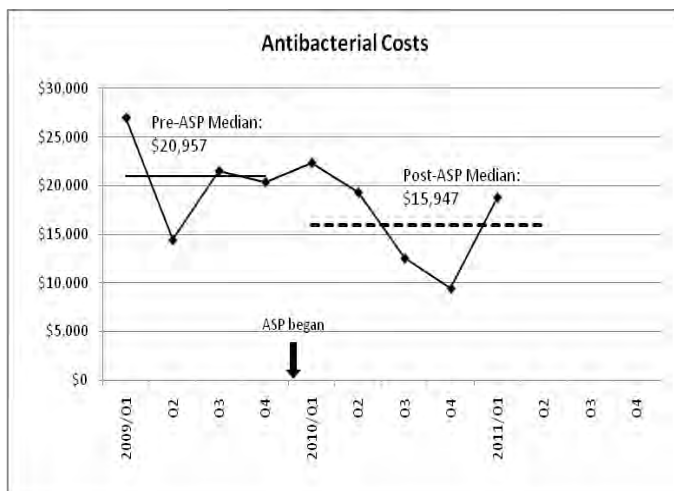
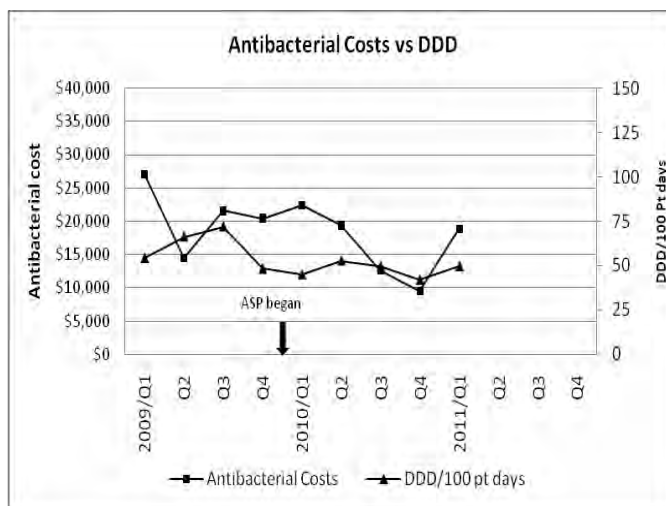
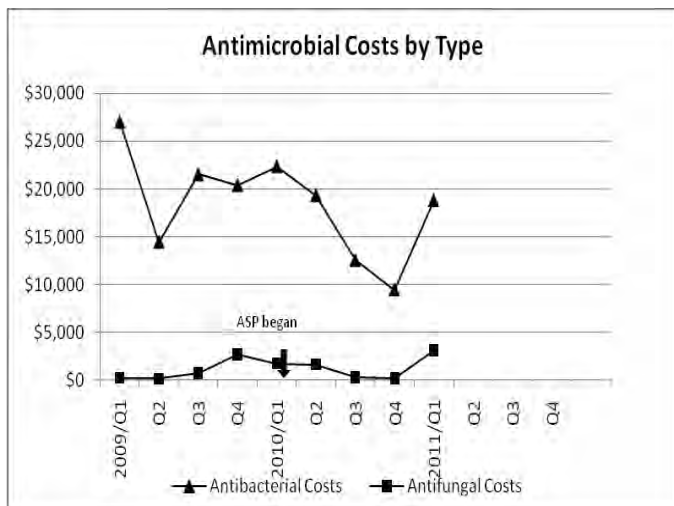
Total Antimicrobials is the sum of systemic antibacterial + systemic antifungal + systemic antivirals; non-systemic antimicrobials are excluded

*DDD = Defined Daily Dose

** ASP started on 14th level in March 2010; data will be populated for this indicator beginning Q1 2011/12

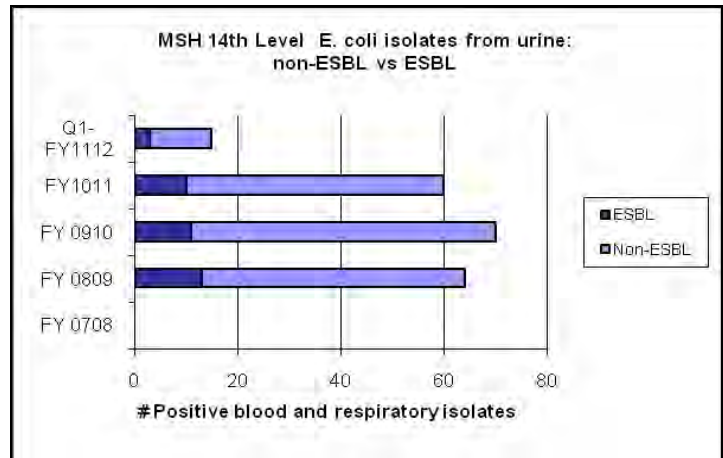
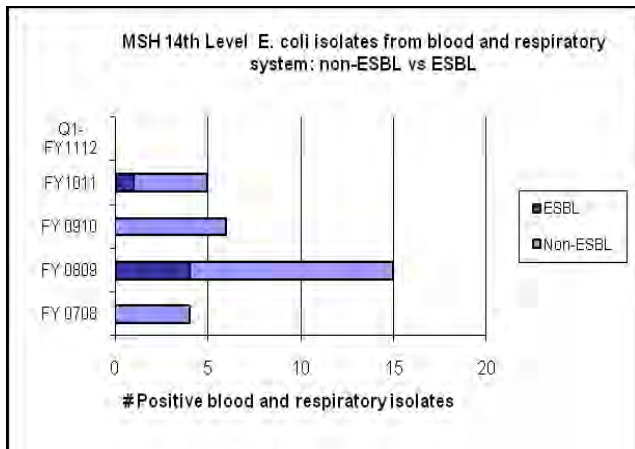
Note: for FY 10/11, one patient accounted for nearly all antifungal costs (\$1554) for the month of April, contributing significantly to the 200% increase for Q1-Q3 vs. same period last year.

Hospital 14th Floor Antimicrobial Usage and Costs cont.

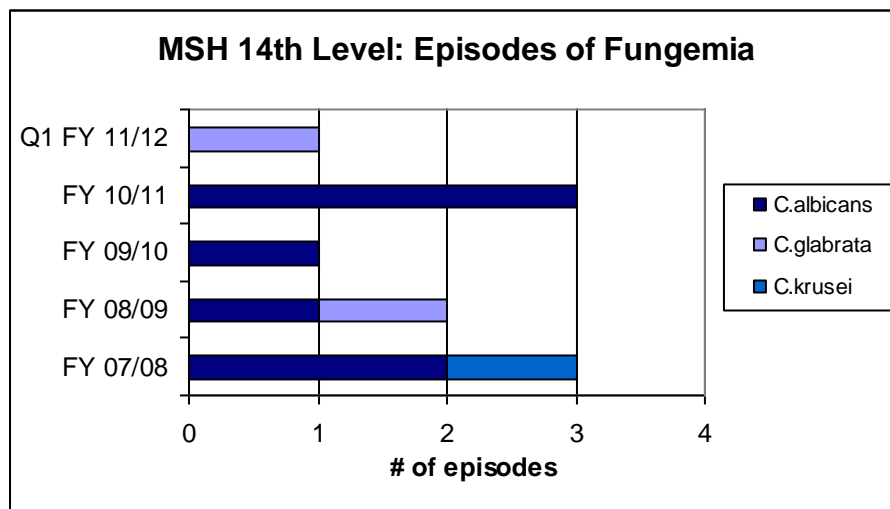


Antimicrobial Susceptibility and Pathogen Surveillance cont.

E.Coli isolates: Blood, Respiratory, Urine

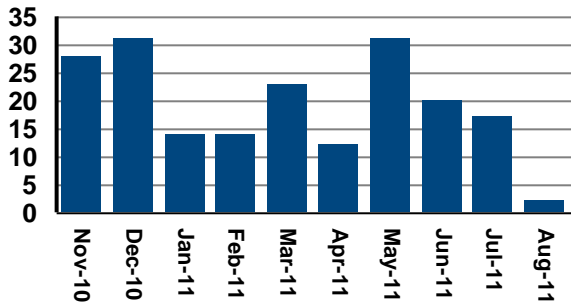


Yeast Species Isolated in Blood - MSH 14th Level

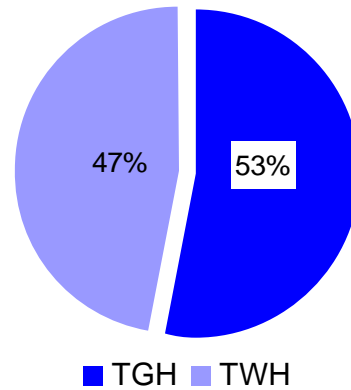


OUTPATIENT PARENTERAL ANTIMICROBIAL THERAPY (OPAT) PROGRAM

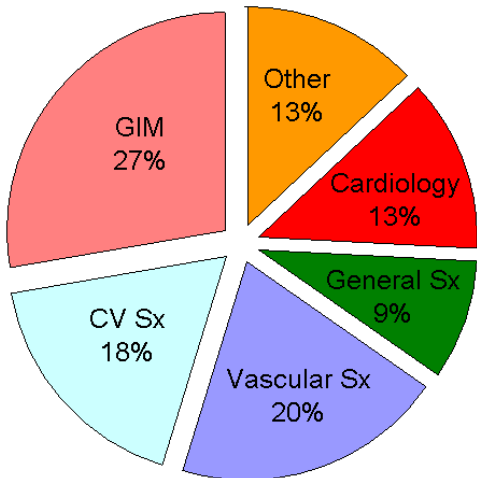
New Referrals to OPAT, by Month



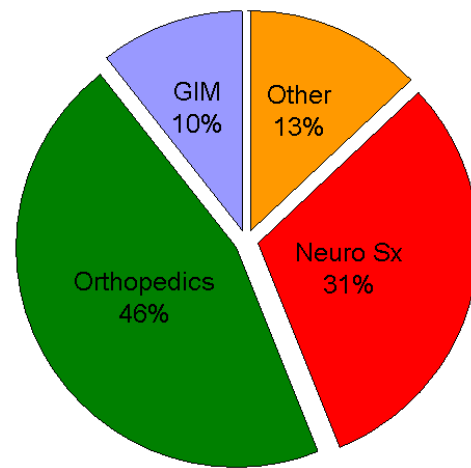
Patient Distribution



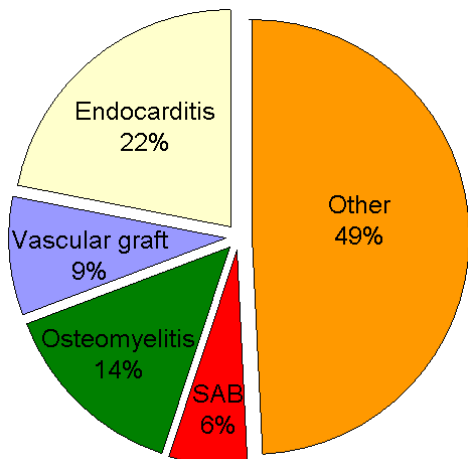
Referring Service, TGH



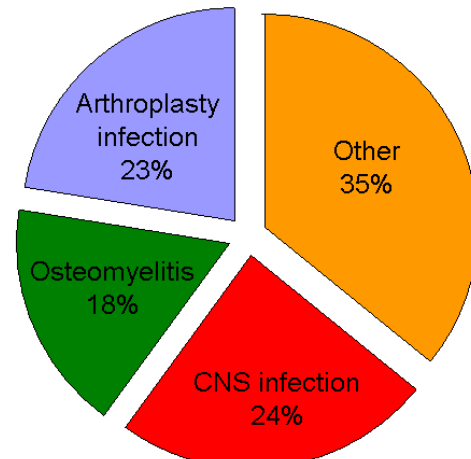
Referring Service, TWH



OPAT Diagnosis, TGH



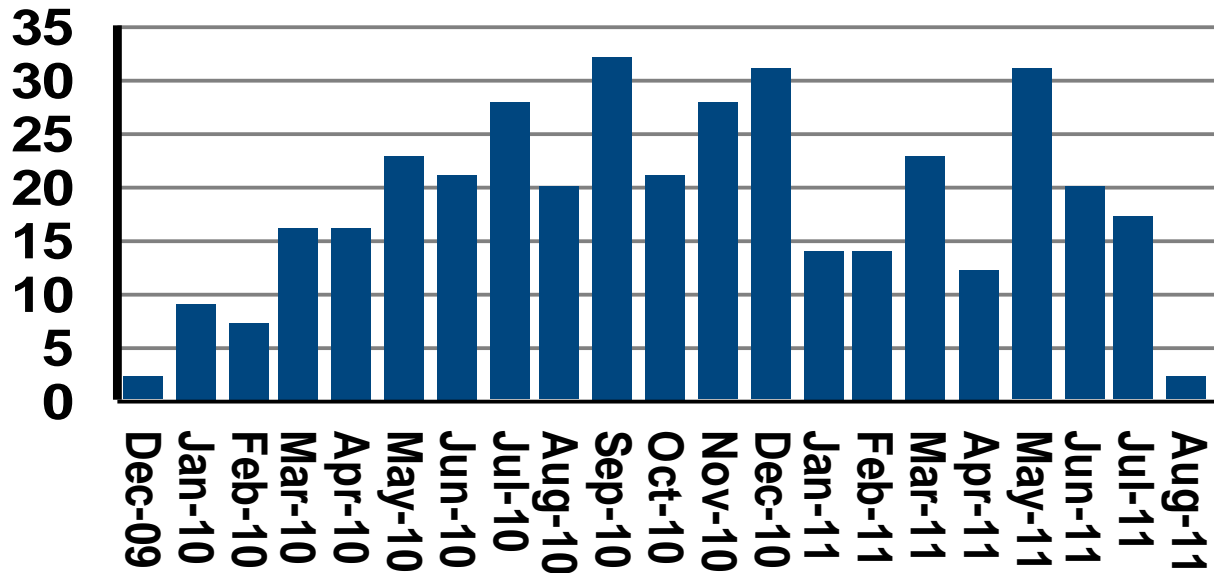
OPAT Diagnosis, TWH



Outpatient Parenteral Antimicrobial Therapy (OPAT) Program

FINAL SUMMARY (December 2009 to August 2011)

New Referrals to OPAT, by Month



Hospital	# Patients Referred
TGH	205
TWH	182

Site	Referring Service	# Patients Referred
TGH	Vascular Sx	41
	GIM	57
	General Sx	18
	CV Sx	36
	Cardiology	26
	Other	27
	Total	205

Site	Referring Service	# Patients Referred
TWH	Orthopedics	83
	Neuro Sx	56
	GIM	19
	Other	24
	Total	182

PRINCESS MARGARET HOSPITAL
PMH 14A & 15B Antimicrobial Usage and Costs

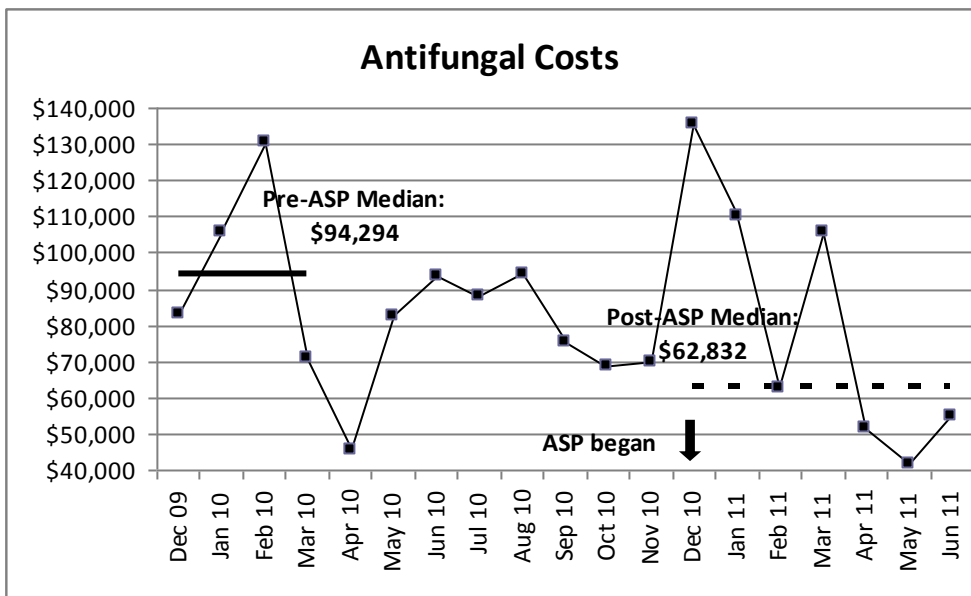
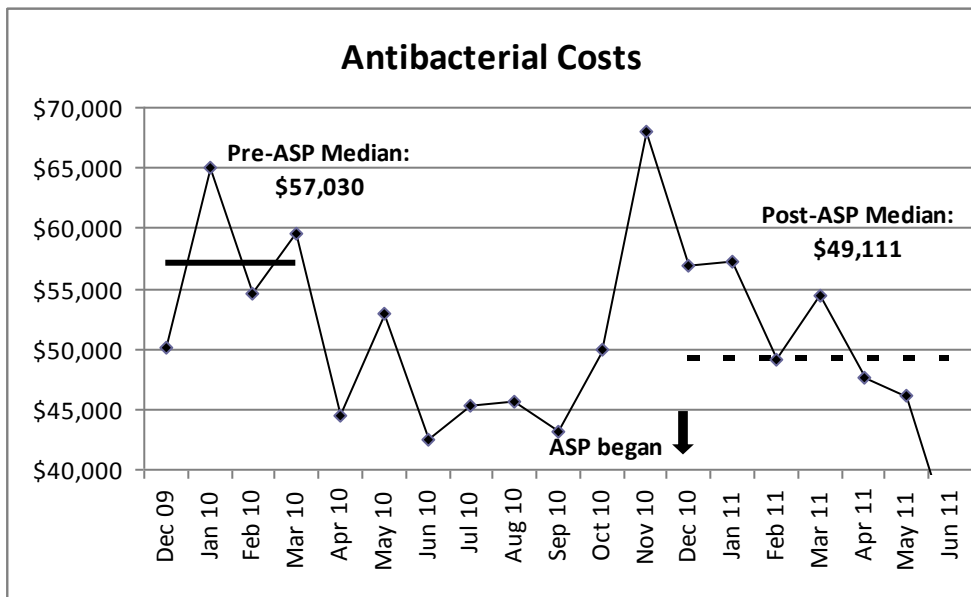
Key Performance Indicator	FY 09/10	FY 10/11	FY 11/12 Q1 (Apr - Jun)	Difference (FY 11/12 Q1 vs. FY 10/11 Q1)	
				% Change	Numerical Change
Antimicrobial Usage and Costs					
Total Antimicrobial DDDs*/100 Patient Days	295.2	274.3	238.6	-14.5%	-40.3
Systemic Antibacterial DDDs/100 Patient Days	190.8	166.8	133.2	-22.1%	-37.8
Systemic Antifungal DDDs/100 Patient Days	104.4	107.4	105.4	-2.4%	-2.6
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$276,357	-23.6%	-\$85,382
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$104.88	-25.7%	-\$36.31
Systemic Antibacterial Costs	\$659,034	\$609,747	\$128,151	-8.3%	-\$11,655
Systemic Antibacterial Costs/Patient Day	\$62.28	\$57.33	\$48.63	-10.9%	-\$5.94
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$148,205	-33.2%	-\$73,727
Systemic Antifungal Costs/Patient Day	\$104.84	\$96.99	\$56.24	-35.1%	-\$30.38

Note:

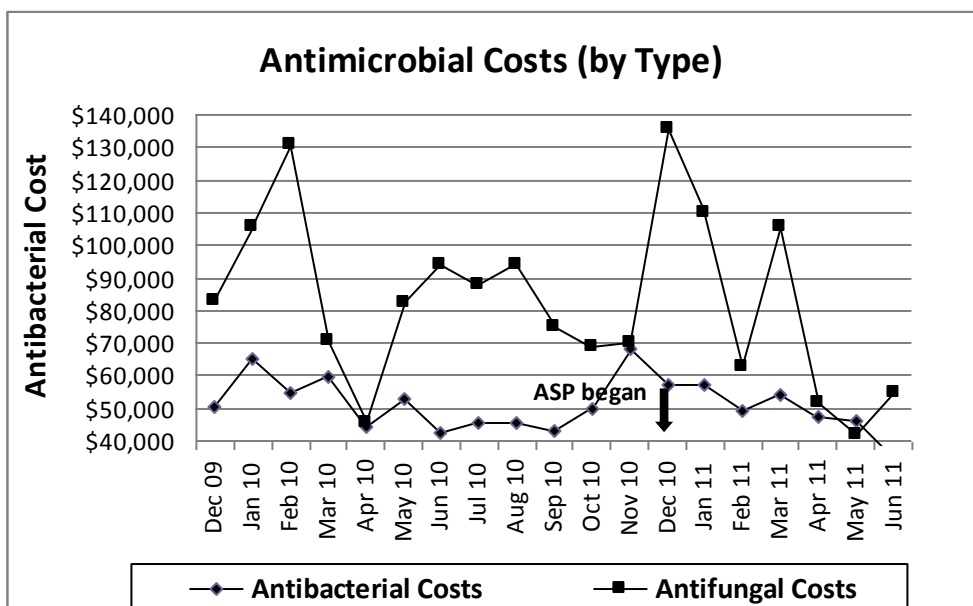
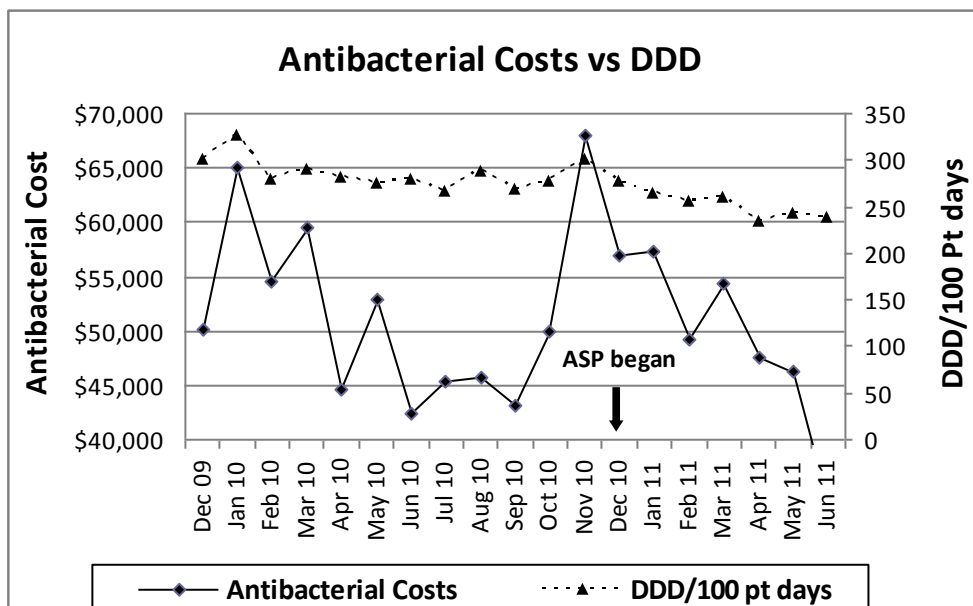
* DDD = Defined Daily Dose

** ASP restarted at PMH 14A & 15B in December 2010

PMH I4A & 15B Antimicrobial Usage and Costs

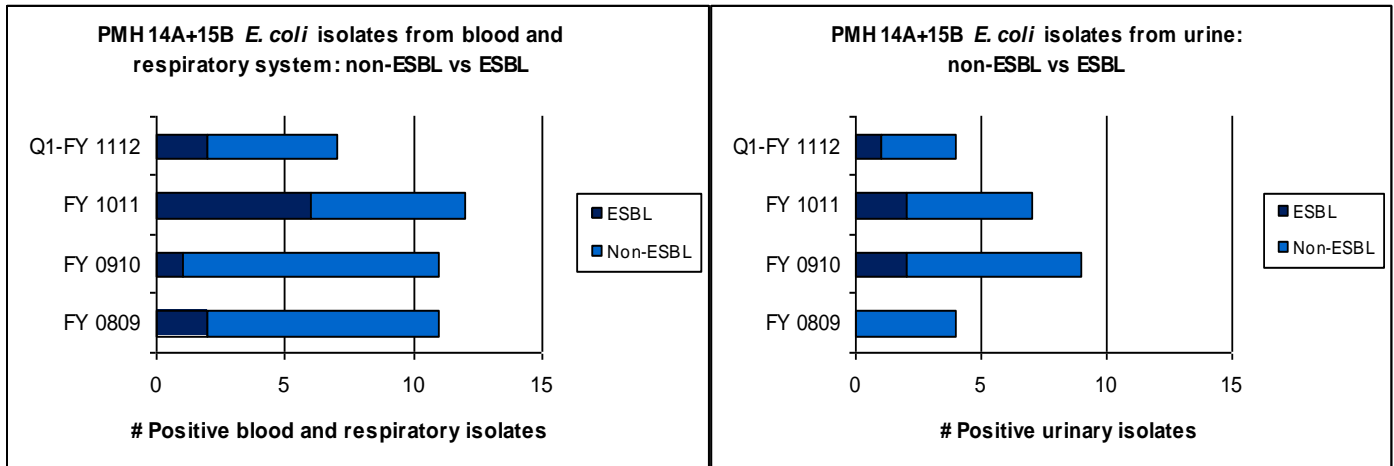


PMH I4A & 15B Antimicrobial Usage and Costs

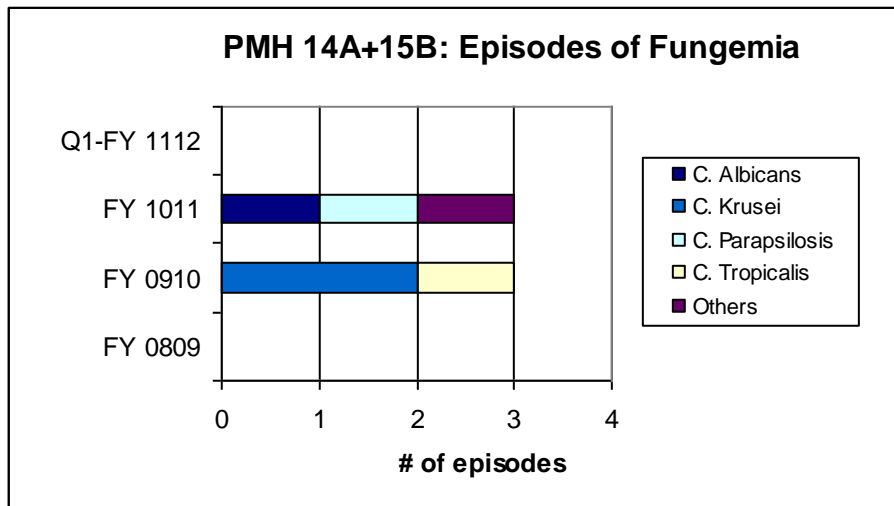


Antimicrobial Susceptibility and Pathogen Surveillance cont.

E.Coli isolates: Blood, Respiratory, Urine



Yeast Species Isolated in Blood - PMH 14A & 15B



TORONTO GENERAL HOSPITAL

TGH ICU Antimicrobial Usage and Costs

Key Performance Indicator	October 2009 to June 2010	October 2010 to June 2011	Difference	
			% Change	Numerical Change
Antimicrobial Usage and Costs				
Total Antimicrobial DDDs*/100 Patient Days	249.5	206.3	-17.3%	-43.2
Systemic Antibacterial DDDs/100 Patient Days	175.6	154.9	-11.8%	-20.7
Systemic Antifungal DDDs/100 Patient Days	73.9	51.3	-30.6%	-22.6
Total Antimicrobial Costs	\$507,771	\$473,211	-6.8%	-\$34,560
Total Antimicrobial Costs/Patient Day	\$98.25	\$82.71	-15.8%	-\$15.54
Systemic Antibacterial Costs	\$273,568	\$261,782	-4.3%	-\$11,786
Systemic Antibacterial Costs/Patient Day	\$52.93	\$45.76	-13.6%	-\$7.18
Systemic Antifungal Costs	\$234,203	\$211,429	-9.7%	-\$22,774
Systemic Antifungal Costs/Patient Day	\$45.32	\$36.96	-18.5%	-\$8.36
Patient Care Indicators				
TGH ICU Average Length of Stay (days)	8.75	8.00	-8.6%	-0.8
TGH ICU Mortality Rate	16.0%	15.9%	-0.9%	-0.2%
TGH ICU Apache II Score***	17.00	16.40	-3.5%	-0.60
TGH ICU Bed Occupancy	18.90	20.86	10.4%	2.0
TGH ICU Vent Days	4078	4629	13.5%	551

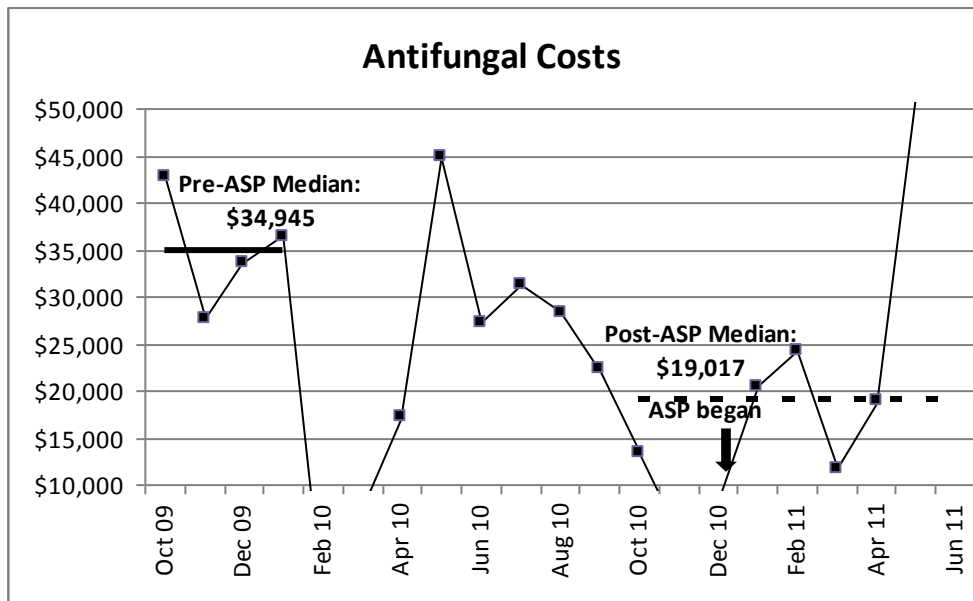
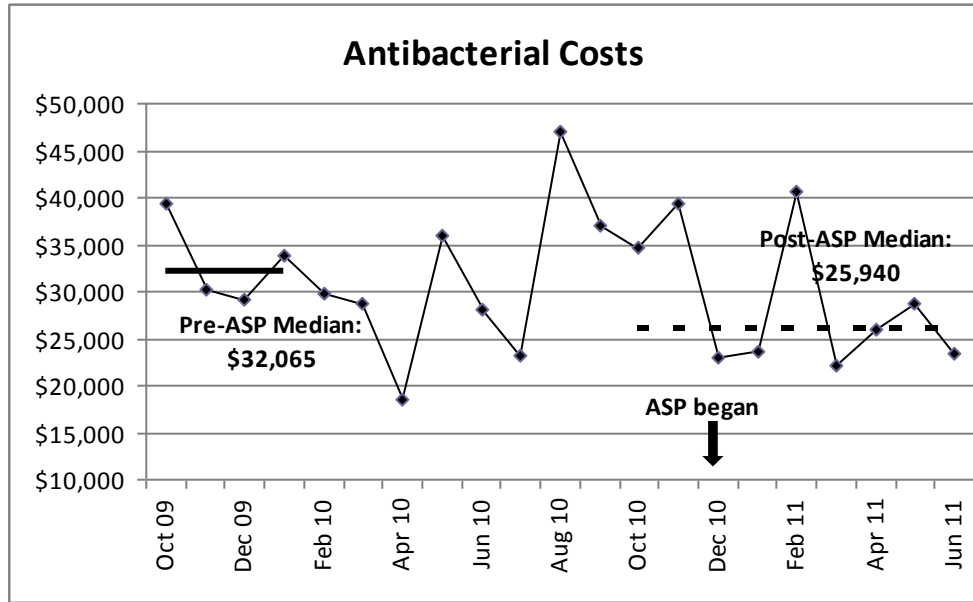
Note:

* DDD = Defined Daily Dose

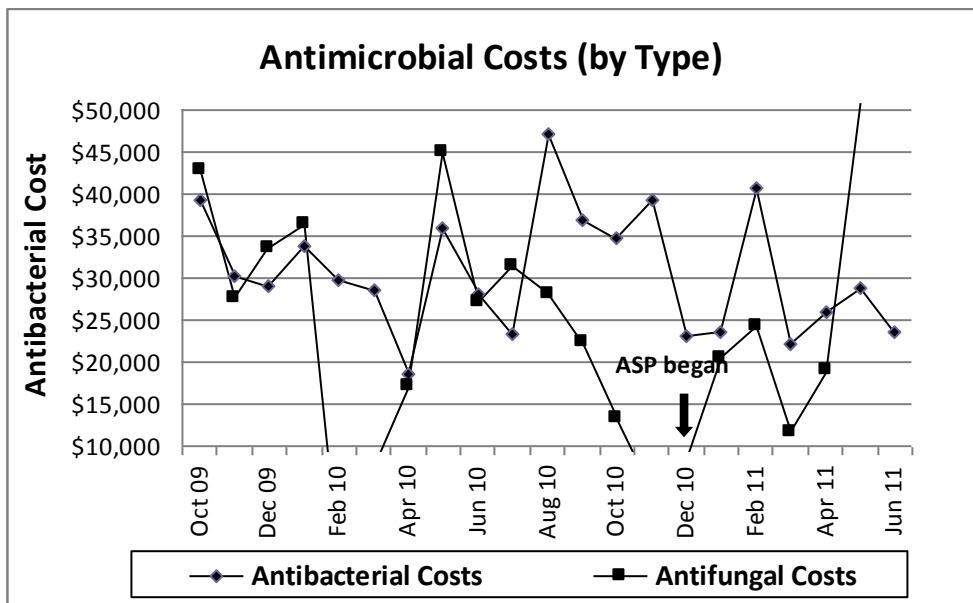
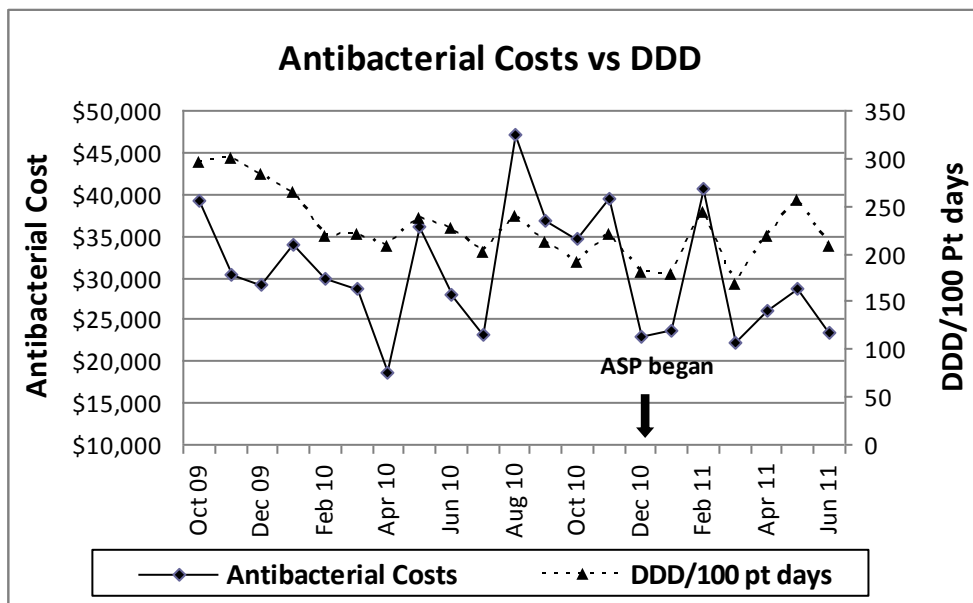
** ASP started at TGH ICU in October 2010

*** Apache II Score: FY 09-10 vs. FY 10-11

TGH ICU Antimicrobial Usage and Costs

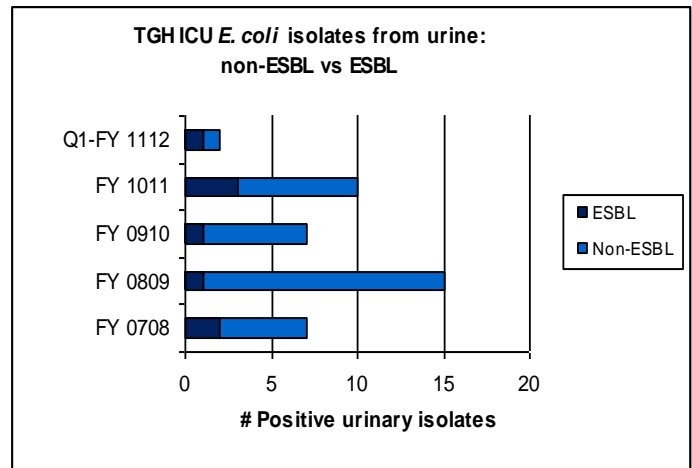
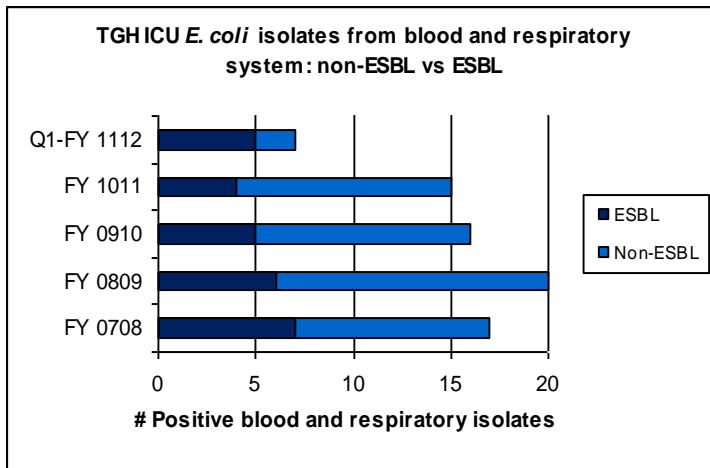


TGH ICU Antimicrobial Usage and Costs

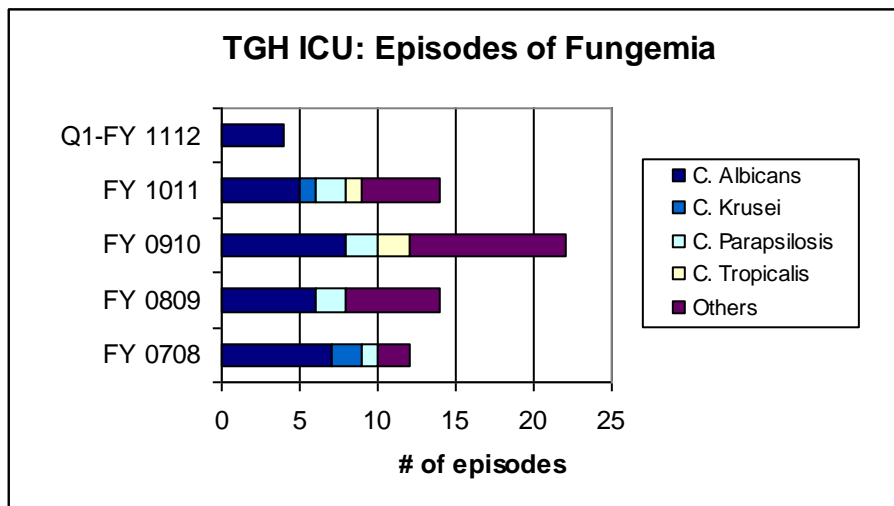


Antimicrobial Susceptibility and Pathogen Surveillance cont.

E.Coli isolates: Blood, Respiratory, Urine



Yeast Species Isolated in Blood - TGH ICU



TORONTO WESTERN HOSPITAL
TWH ICU Antimicrobial Usage and Costs

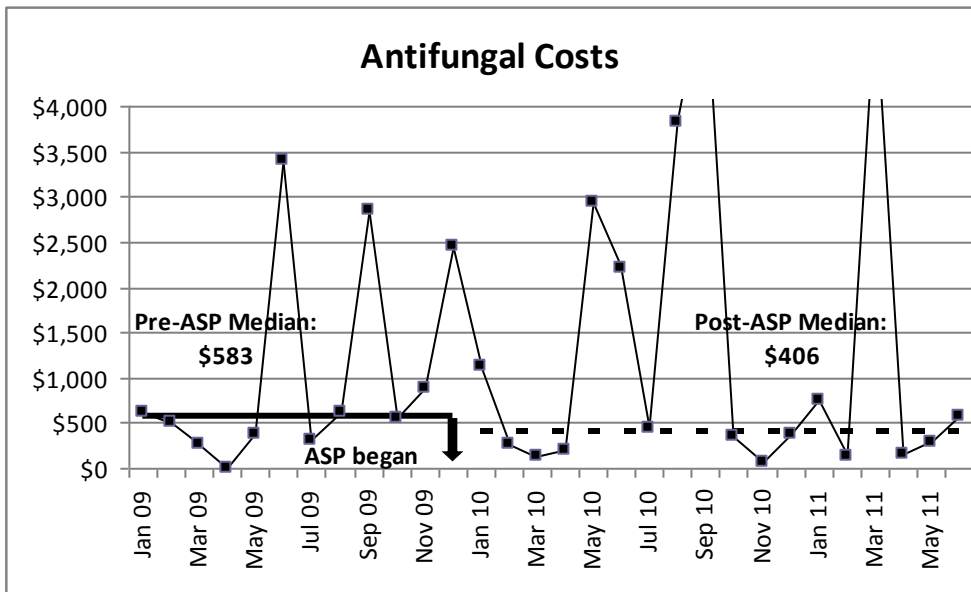
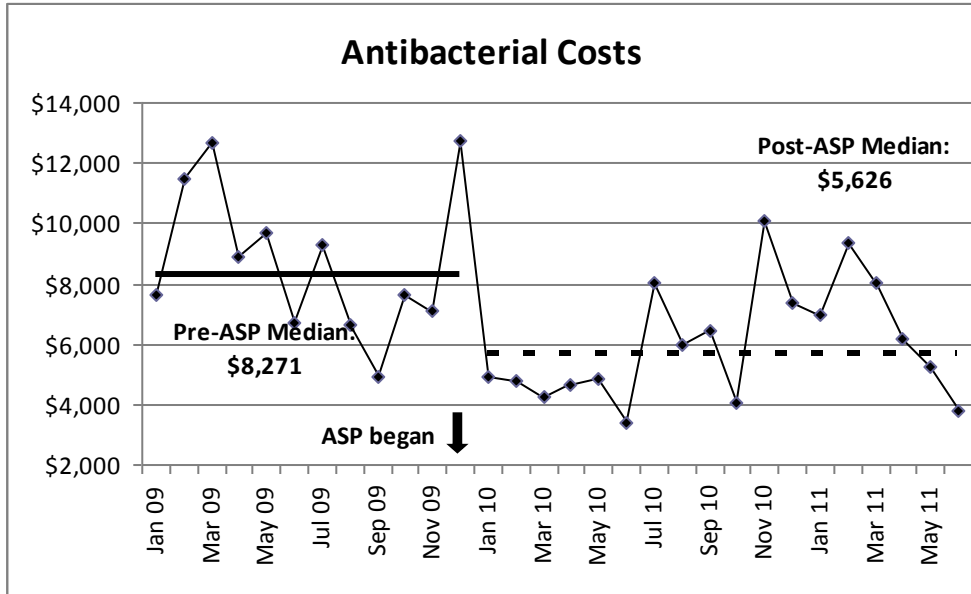
Key Performance Indicator	FY 09/10	FY 10/11	FY 11/12 Q1 (Apr - Jun)	Difference (FY 11/12 Q1 vs. FY 10/11 Q1)	
				% Change	Numerical Change
Antimicrobial Usage and Costs					
Total Antimicrobial DDDs*/100 Patient Days	87.6	79.2	78.1	12.7%	8.8
Systemic Antibacterial DDDs/100 Patient Days	77.8	73.5	73.9	15.3%	9.8
Systemic Antifungal DDDs/100 Patient Days	9.8	5.7	4.2	-18.8%	-1.0
Total Antimicrobial Costs	\$100,408	\$101,191	\$16,251	-11.0%	-\$2,004
Total Antimicrobial Costs/Patient Day	\$13.24	\$13.17	\$9.17	-1.5%	-\$0.14
Systemic Antibacterial Costs	\$87,445	\$79,280	\$15,226	18.1%	\$2,331
Systemic Antibacterial Costs/Patient Day	\$11.53	\$10.32	\$8.59	30.6%	\$2.01
Systemic Antifungal Costs	\$12,963	\$21,911	\$1,025	-80.9%	-\$4,336
Systemic Antifungal Costs/Patient Day	\$1.71	\$2.85	\$0.58	-78.8%	-\$2.16
Patient Care Indicators					
TWH ICU Average Length of Stay (days)	7.44	10.68	6.59	-14.7%	-1.14
TWH ICU Mortality Rate	19.9%	18.1%	15.1%	-1.7%	-0.3%
TWH ICU Apache II Score	14.65	13.73	12.90	-4.4%	-0.60
TWH ICU Readmissions within 48 hours	4.7%	4.9%	3.4%	-48.0%	-3.2%
TWH ICU Ventilation Days	6305	5960	1254	-21.2%	-338

Note:

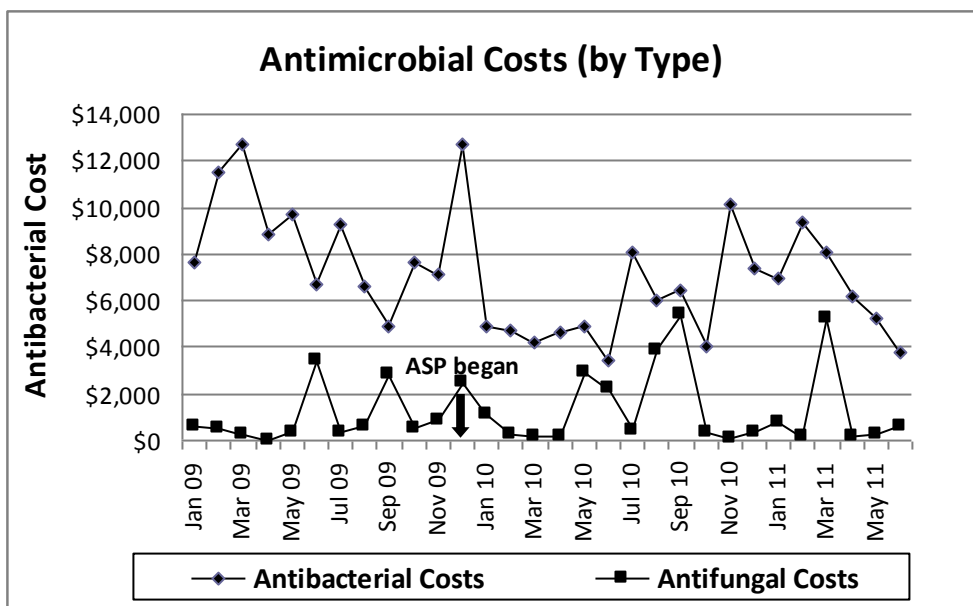
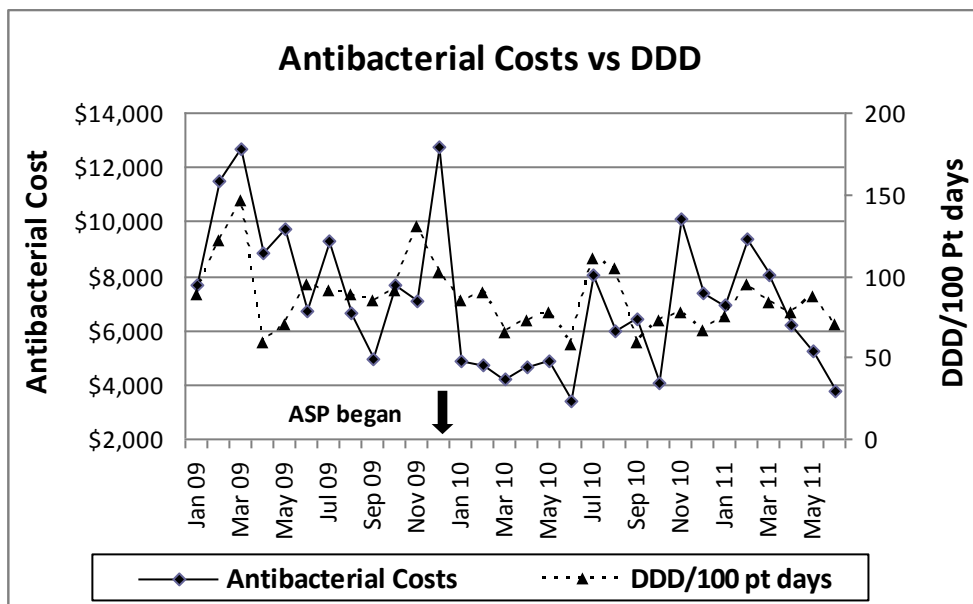
* DDD = Defined Daily Dose

** ASP started at TWH ICU in December 2009

TWH ICU Antimicrobial Usage and Costs

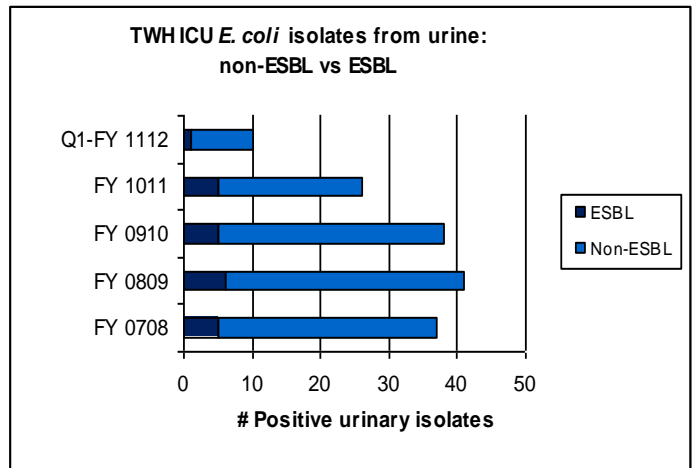
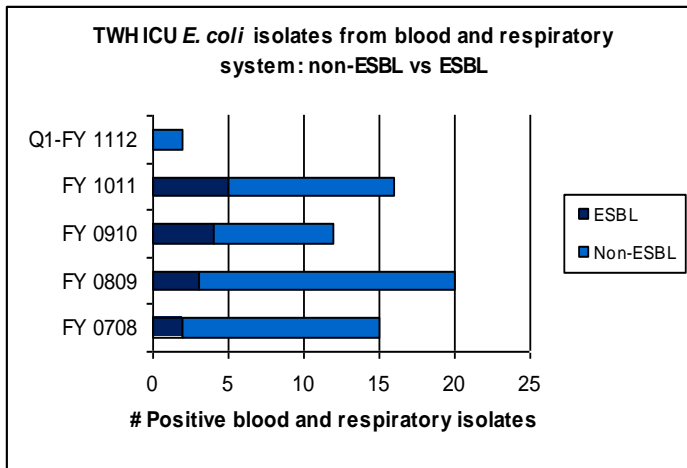


TWH ICU Antimicrobial Usage and Costs



Antimicrobial Susceptibility and Pathogen Surveillance cont.

E.Coli isolates: Blood, Respiratory, Urine



Yeast Species Isolated in Blood - TWH ICU

