

MSH + UHN

ASP

ANTIMICROBIAL
STEWARDSHIP
PROGRAM



Q3 REPORT

FISCAL YEAR 2012 | 2013

MOUNT SINAI HOSPITAL
Joseph and Wolf Lebovic Health Complex



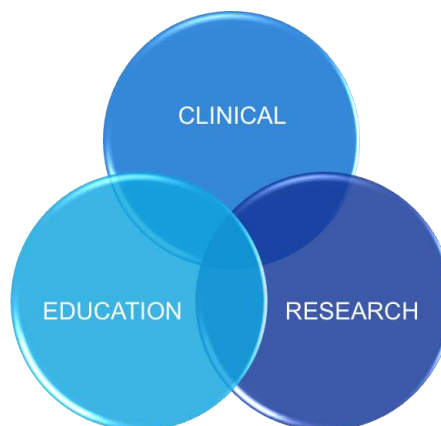
UHN

Toronto General
Toronto Western
Princess Margaret
Toronto Rehab

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

EXECUTIVE SUMMARY

The Mount Sinai Hospital-University Health Network Antimicrobial Stewardship Program (ASP) has been active since 2009. The MSH-UHN ASP uses a collaborative and evidence-based approach to improve the quality of antimicrobial use by getting patients the right antibiotics, when they need them. The ASP follows PDSA (Plan-Do-Study-Act) quality improvement methodology to pursue the best possible clinical outcomes for its patients, relying heavily on patient-centred data.



The MSH-UHN ASP uses research and education (facilitated by Pfizer Canada’s financial support), alongside clinical care, to take a leadership role in increasing antimicrobial stewardship capacity and improving the quality of health care.

THE MSH-UHN ANTIMICROBIAL STEWARDSHIP TEAM

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

PHYSICIAN TEAM

Andrew Morris, MD, SM, FRCPC

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

Chaim Bell, MD, PhD, FRCPC

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Clinical Fellow
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PHARMACIST TEAM

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 Assistant Professor (Status), Leslie Dan Faculty of Pharmacy
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Linda Dresser, PharmD, FCSHP

Pharmacotherapy Specialist – Antimicrobial Stewardship
 University Health Network
 Assistant Professor, Leslie Dan Faculty of Pharmacy
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Kevin Duplisea, PharmD

Pharmacotherapy Specialist – Antimicrobial Stewardship
 University Health Network

Monique Pitre, B.Sc. Pharm, R.Ph., FCSHP

Manager, Pharmacy Clinical Informatics
 Infectious Disease Pharmacist
 University Health Network

Sandra Nelson, PharmD

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

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/University Health Network

Marilyn Steinberg, RN

Research Coordinator, Antimicrobial Stewardship Program
 Mount Sinai Hospital

Melanie Thomson, BA, CHIM

Data Analyst, Antimicrobial Stewardship Program
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Yoshiko Nakamachi, RN, BScN, BA

Project Manager, CAHO Project
 Antimicrobial Stewardship Program
 Mount Sinai Hospital

Lopa Naik, BSc, MCA (On maternity leave)

Technical Analyst, Antimicrobial Stewardship Program
 University Health Network

Stephanie Olegario

Administrative Assistant, Antimicrobial Stewardship Program
 University Health Network

KEY HIGHLIGHTS

✦ ANTIMICROBIAL CONSUMPTION AND COSTS:

The ASP continues to work with clinical teams across all 4 hospitals. Further decreases in FY 12/13 year-to-date antimicrobial costs were seen in Toronto Western Hospital Intensive Care Unit (ICU), Toronto General Hospital ICU and Cardiovascular ICU compared to the previous year. Princess Margaret Cancer Centre Leukemia Service antimicrobial usage continues to decrease compared to the previous year. Mount Sinai Hospital ICU has sustained antimicrobial usage and costs lower than before implementing the ASP (pre-ASP), except for patients originating from Princess Margaret Cancer Centre which account for over 60% of the antimicrobial costs.

Antimicrobial consumption and costs by site are included below. Detailed tables and graphs are appended.

Of note, at UHN, generic costs of meropenem came into effective in Q3 of 12/13, whereas linezolid cost was increased by 2% in the same quarter.

MOUNT SINAI HOSPITAL ICU

The ASP has been working with the Mount Sinai Hospital (MSH) Intensive Care Unit (ICU) for 4 years now, starting February 9, 2009. FY 12/13 Q3 YTD highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased by 8.5% compared to the same period last year.
 - There has been 8 cases YTD of ICU-acquired *C.difficile*, which is an increase compared to last year
- Antimicrobial costs per patient day have increased by 13% compared to the same period last year. The ASP team is investigating this increase
- Princess Margaret patients accounted for 16% of patient visits and 63% of the antimicrobial costs

MSH ICU Total Antimicrobial Costs (Antimicrobial Costs per patient day)				
	FY 10/11	FY 11/12	Q1-3 11/12	Q1-3 12/13
Non-Princess Margaret Patients	\$78,737 (\$21.14)	\$87,931 (\$25.42)	\$46,514 (\$17.85)	\$86,982 (\$31.46)
Princess Margaret Patients	\$114,392 (\$179.02)	\$191,928 (\$181.58)	\$157,910 (\$187.99)	\$148,586 (\$269.67)
Total	\$193,129 (\$44.26)	\$279,859 (\$61.97)	\$204,424 (\$59.32)	\$235,568 (\$71.04)

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

PRINCESS MARGARET LEUKEMIA SERVICE

The ASP continues to work with the Princess Margaret Leukemia Service (14A, 15B, 15C). FY 12/13 Q3 YTD highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has decreased by 11% compared to the same period last year.
- Antimicrobial costs per patient day have increased by 26% compared to the same period last year, due to an increase in antifungal costs per patient day.
- Antibacterial costs per patient day have decreased by 1% compared to the same period last year.
- Overall, using FY 09/10 as the pre-ASP period, and post-ASP being FY10/11 onwards including Q3 of FY 12/13, reduction in costs has been sustained. Systemic antibacterial cost per patient day was reduced by 12.3% pre-ASP vs. post-ASP, and systemic antifungal cost has decreased by 24.2% pre-ASP vs. post-ASP.

TORONTO GENERAL HOSPITAL CVICU

The ASP continues to work with the Toronto General Hospital CVICU. FY 12/13 Q3 YTD highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased by 2% compared to the same period last year.

- Antimicrobial costs per patient day have decreased by 27% compared to the same period last year.

TORONTO GENERAL HOSPITAL MSICU

The ASP continues to work with the Toronto General Hospital MSICU. FY 12/13 Q3 YTD highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has increased by 6% compared to the same period last year.
- Antimicrobial costs per patient day have decreased by 27% compared to the same period last year.

TORONTO WESTERN HOSPITAL ICU

The ASP continues to work with the Toronto Western Hospital ICU. FY 12/13 Q3 YTD highlights include:

- Antimicrobial usage (using defined daily doses (DDDs) per 100 patient days) has decreased by 8% compared to the same period last year.
- Antimicrobial costs per patient day have decreased by 22% compared to the same period last year.

MOUNT SINAI HOSPITAL NICU

The ASP initiative in the Neonatal Intensive Care Unit (NICU) was started in October 2012 with strong support from the neonatology group, led by Dr. Yenge Diambomba, Medical Director of the NICU. The program consists of daily prospective audit and feedback on all the neonates with the 2 clinical teams in the 36-bed unit. We have collected days of therapy (DOT) as the metric for antimicrobial consumption, which is considered to be the standard for neonates. Initial results of October-December 2012 (Q3 12/13) show a decrease of antimicrobial days of therapy by 11.4% compared to FY 11/12. We are currently working with the NICU team on collecting patient outcome data.

✦ BEST PRACTICE GUIDELINES & ALGORITHMS:

- *High Risk* Febrile Neutropenia Protocol: Thanks to support from Senior Leadership at Princess Margaret, the ASP team is currently consulting the expertise of UHN Healthcare Human Factors (HHF) to improve the usability and ergonomics of the protocol. Our goal is to ensure that these complex algorithms are interpreted with little ambiguity. We are at present in Phase I of the process, i.e. training the HHF consultants for field testing with end-users. A wide ranging group of prescribers across UHN and MSH are to be included in the field testing process (Phase II). We anticipate that this process will improve knowledge translation as the protocol is rolled out in the new fiscal year.
- VAP Algorithm: Implemented in the MSH ICU in November 2011, TGH ICU since June 2012, TWH ICU since July 2012, and the TGH CVICU since October 2012. Data will be captured in an ongoing research project that is an extension of the point prevalence study for Mount Sinai Hospital Intensive Care Unit (see below).

✦ RESEARCH:

Multiple research projects continue, with many important projects nearing completion and being prepared for submission to key medical journals.

Data collection has recently been completed on two large patient cohorts and is being prepared for analysis:

- Analysis of Investigations, Treatments and Outcomes associated with *Staphylococcus aureus* Bacteremia in the Greater Toronto Area. This cohort includes approximately 1,200 patients from 7 sites across the GTA over a 3-year period (sites: Mount Sinai Hospital, Toronto General Hospital, Toronto Western Hospital, North York General Hospital, Sunnybrook Health Sciences Centre, Trillium Healthcare and SickKids).
- Analysis of Investigations, Antifungal Treatments, and Outcomes Associated with Patients with Acute Myeloid Leukemia Undergoing First Remission-Induction Chemotherapy at Princess Margaret Hospital. This cohort includes approximately 260 patients over a 2-year period.

Our work will again be showcased in oral and poster presentations at the upcoming annual Association of Medical Microbiology and Infectious Diseases (AMMI) meeting in Quebec City.

Three abstracts were accepted for oral presentation at AMMI:

- A Point Prevalence Study to Evaluate Clinical Compliance with a Ventilator Associated Pneumonia Algorithm in the Intensive Care Unit. Q. Mohiuddin, S.Nelson, M.Steinberg, T.Jivraj, C.Harris, L.Burly, L.Varga, S.Lapinsky, A. Morris.
- A Survey to Evaluate Critical Care Trainees Perceptions of Antimicrobial Stewardship Programs in Intensive Care Units. L. Dresser, M. Steinberg, M.So, C.Bell, D. Scales, A.Morris.
- Impact of Antimicrobial Stewardship Program Prospective Audit and Feedback Program on Fungemia in the Intensive Care Unit. L.Dresser, T.Jivraj, M.Steinberg, K.Duplisea, S. Nelson, S.Poutanen, J.Singh, N.Lazar, S.Lapinsky, A.Morris.
- Two abstracts were accepted for poster presentation at AMMI:
 - Effect of Prospective Audit and Feedback as part of an ICU Antimicrobial Stewardship Program on Antimicrobial Sensitivity to Pseudomonas aeruginosa. K. Duplisea, T.Jivraj, S. Poutanen, S. Nelson, L.Dresser, M.Steinberg, N.Lazar, S.Lapinsky, J.Singh, C.Bell, A.Morris.
 - Evaluation of antimicrobial stewardship program on leukemia service through prospective audit and feedback. M.So, L.Pivnick, M.Steinberg, T.Jivraj, S.Lapinsky, A.Morris, S.Husain.

ASP in Leukemia:

- The research plan to evaluate the implementation, safety and efficacy of ASP in leukemia service as a multi-phase program is currently under review with various stakeholders.

+ EDUCATION:

The ASP continues to provide education in group and one-on-one sessions across all sites. Examples of education sessions with the Leukemia and TWH ICU teams are below:

- Education to the Leukemia Team during ASP rounds are well attended by staff physicians, medical trainees, clinical associates, nursing representative and pharmacists. The ASP also met with prescribers in the REACH and Transfusion Clinics to determine how to best collaborate with respect to antimicrobial use. Discussions included the potential for educational case-based discussions in the new fiscal year.
- At the TWH ICU, weekly stewardship rounds occur on an ongoing basis. Early each week, a selected ICU fellow chooses a stewardship topic for discussion for the upcoming Friday afternoon session. The intent of this clinical sharing is to provide practical stewardship debate/discussion regarding the management of a patient currently under the care of the ICU team.

+ PROVINCIAL ROLE:

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

- To date, nine of the thirteen ICUs participating have implemented an ASP. These ICUs are: UHN CVICU, Sick Kids PICU, TOH CIVIC, SJHC Hamilton, MSH NICU, CHEO PICU, HHSC ICU East, Health Sciences North, and LHS CCTC. The four remaining ICUs will be implementing their program within the next three months.
- The MSH-UHN ASP hosted an educational event on November 12, 2012 which was accredited by University of Toronto's CEPD. ASP physicians, ASP pharmacists, Intensivists, site leads, and senior leadership from each of the academic hospitals in Ontario attended.
- Over the last several months, the MSH-UHN ASP has been working with Critical Care Services Ontario (formerly known as the Critical Care Secretariat) and the Critical Care Information System (CCIS). This partnership has resulted in the addition of three new data fields in the CCIS Database. These three new antimicrobial indicators (days of antibiotic therapy, days of antifungal therapy, and ICU-onset *C.difficile*) went "live" in all ICUs province-wide in January, 2013.

+ STRATEGIC PLANNING:

The ASP team has been working hard through retreats and working groups on strategic planning for the upcoming year, with the aim of "Every patient on the right antimicrobial". The ASP has consulted with senior leadership and clinical directors at MSH and UHN to ensure alignment with corporate and clinical goals.

APPENDIX

MOUNT SINAI HOSPITAL: ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs										
Total Antimicrobial DDDs/100 Patient Days	177	171	144	162	155	180	178		170	157
Systemic Antibacterial DDDs/100 Patient Days	142	128	111	128	122	126	133		127	126
Systemic Antifungal DDDs/100 Patient Days	31	24	20	27	24	47	36		35	26
Total Antimicrobial Costs	\$332,724	\$285,975	\$193,129	\$279,847	\$66,483	\$89,645	\$79,439		\$235,568	\$204,424
Total Antimicrobial Costs/Patient Day	\$69.01	\$59.23	\$40.95	\$60.24	\$52.35	\$82.09	\$68.96		\$67.04	\$59.22
Systemic Antibacterial Costs	\$174,339	\$142,134	\$95,773	\$125,376	\$31,853	\$41,372	\$37,850		\$111,074	\$89,071
Systemic Antibacterial Costs/Patient Days	\$36.16	\$29.44	\$20.31	\$26.98	\$25.08	\$37.89	\$32.86		\$31.61	\$25.80
Systemic Antifungal Costs	\$143,100	\$132,519	\$88,998	\$141,865	\$30,446	\$44,706	\$39,798		\$114,950	\$108,253
Systemic Antifungal Costs/Patient Days	\$29.68	\$27.45	\$18.87	\$30.54	\$23.97	\$40.94	\$34.55		\$32.71	\$31.36
Patient Care Outcomes										
Hospital acquired C. difficile cases (rate per 1,000 pt days)	NA	NA	NA	5 (1.08)	3 (2.36)	3 (2.75)	2 (1.74)		8 (2.28)	3 (0.87)
ICU Average Length of Stay (days)	5.84	5.57	5.67	5.51	5.79	5.08	4.33		5.06	5.59
ICU Mortality Rate (as a %)	20.1	17.6	16.3	16.5	16.5	16.7	18.1		17.1	15.9
ICU Readmission Rate within 48 hrs (as a %)	3.2	2.9	2.7	2.7	0.8	2.4	0.9		1.4	2.9
ICU Ventilator Days	NA	3286	2934	2677	757	609	640		1366	1443
ICU Multiple Organ Dysfunction Score (MODS)	4	4.04	4.12	4.25	4.49	4.67	4.54		4.57	4.16

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

Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs + systemic antivirals; non-systemic antimicrobials are excluded
Data Sources: Antimicrobial DDD and Costs (Pharmnet), C difficile (Infection Control Dashboards), Other ICU Patient Care Indicators (Critical Care Information System)

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

Indicators	FY 09/10	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs									
Total Antimicrobial DDDs/100 Patient Days	295	274	282	251	253	256		253	283
Systemic Antibacterial DDDs/100 Patient Days	191	167	164	139	148	158		148	173
Systemic Antifungal DDDs/100 Patient Days	104	107	105	112	105	98		105	109.6
Total Antimicrobial Costs	\$1,768,317	\$1,641,331	\$1,310,857	\$464,766	\$465,192	\$465,654		\$1,395,612	\$912,002
Total Antimicrobial Costs/Patient Day	\$167.12	\$154.32	\$115.13	\$141.74	\$141.44	\$140.94		\$141.37	\$112.63
Systemic Antibacterial Costs	\$659,034	\$609,747	\$663,175	\$178,406	\$180,794	\$138,395		\$497,596	\$411,343
Systemic Antibacterial Costs/Patient Days	\$62.28	\$57.33	\$58.24	\$54.41	\$54.97	\$41.89		\$50.40	\$50.80
Systemic Antifungal Costs	\$1,109,283	\$1,031,584	\$647,637	\$286,360	\$284,398	\$327,259		\$898,016	\$500,658
Systemic Antifungal Costs/Patient Days	\$104.84	\$96.99	\$56.88	\$87.33	\$86.47	\$99.05		\$90.97	\$61.83
Patient Care Outcomes									
Hospital acquired C. Difficile cases (rate per 1,000 patient days)	6 (0.56)	7 (0.65)	14 (1.17)	2 (0.61)	1(0.3)	1 (0.3)		4 (.41)	10 (1.16)

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).

TORONTO GENERAL HOSPITAL: CVICU

Indicators	FY 10/11 (Pre-ASP)	FY 11/12	FY12/13 Performance					YTD of Previous Year
			Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs								
Total Antimicrobial DDDs/100 Patient Days	115	98	100	110	109		106	104
Systemic Antibacterial DDDs/100 Patient Days	104	86	87	98	97		94	90
Systemic Antifungal DDDs/100 Patient Days	11	12	13	12	11		12	13
Total Antimicrobial Costs	\$117,356	\$107,795	\$21,718	\$21,066	\$20,497		\$63,281	\$92,009
Total Antimicrobial Costs/Patient Day	\$19.75	\$18.94	\$14.86	\$15.76	\$14.64		\$15.07	\$20.75
Systemic Antibacterial Costs	\$109,110	\$98,591	\$18,169	\$18,433	\$18,782		\$55,384	\$83,025
Systemic Antibacterial Costs/Patient Days	\$18.36	\$17.32	\$12.43	\$13.79	\$13.42		\$13.19	\$18.72
Systemic Antifungal Costs	\$8,246	\$9,204	\$3,550	\$2,633	\$1,714		\$7,897	\$8,984
Systemic Antifungal Costs/Patient Days	\$1.39	\$1.62	\$2.43	\$1.97	\$1.22		\$1.88	\$2.03
Patient Care Outcomes								
Hospital acquired C. difficile cases (rate per 1,000 pt days)	2 (0.34)	5 (0.88)	0 (0.0)	3(2.24)	1 (0.71)		4 (0.95)	3 (0.68)
ICU Average Length of Stay (days)	tbd	tbd	3.03	2.81	2.78		2.92	3.04
ICU Mortality Rate (as a %)	tbd	tbd	3.8	2.6	2.3		3.2	2.9
ICU Readmission Rate within 48 hrs (as a %)	tbd	tbd	1.6	3.3	1.7		2.4	2.6
ICU Ventilator Days	tbd	tbd	944	818	910		1762	2719

Notes:

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

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

Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, http://www.whooc.no/atc_ddd_index/). Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs; non-systemic antimicrobials are excluded. Data Sources: Antimicrobial DDD and Costs (Centricity)

TORONTO GENERAL HOSPITAL: MSICU

Indicators	FY 09/10 (Pre-ASP)	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
				Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs									
Total Antimicrobial DDDs/100 Patient Days	266	208	200	179	266	199		215	202
Systemic Antibacterial DDDs/100 Patient Days	184	153	141	137	196	158		164	146
Systemic Antifungal DDDs/100 Patient Days	82	55	55	41	70	41		51	55
Total Antimicrobial Costs	\$701,451	\$627,540	\$572,443	\$85,182	\$170,194	\$69,200		\$324,576	\$448,032
Total Antimicrobial Costs/Patient Day	\$102.52	\$83.81	\$77.60	\$50.28	\$93.36	\$35.51		\$59.38	\$81.25
Systemic Antibacterial Costs	\$390,209	\$373,504	\$288,775	\$50,733	\$82,839	\$51,312		\$184,884	\$228,514
Systemic Antibacterial Costs/Patient Days	\$57.03	\$49.88	\$39.15	\$29.95	\$45.44	\$26.33		\$33.82	\$41.44
Systemic Antifungal Costs	\$311,242	\$254,036	\$275,176	\$34,448	\$87,356	\$17,888		\$139,692	\$219,518
Systemic Antifungal Costs/Patient Days	\$45.49	\$33.93	\$37.30	\$20.34	\$47.92	\$9.18		\$25.56	\$39.81
Patient Care Outcomes									
Hospital acquired C. difficile cases (rate per 1,000 pt days)	10 (1.46)	10 (1.33)	11 (1.49)	4 (2.36)	3 (1.65)	1 (0.51)		8 (1.46)	9 (1.63)
ICU Average Length of Stay (days)	8.24	8.61	7.83	7.44	6.97	9.09		7.87	8.98
ICU Mortality Rate (as a %)	16.2	15.7	16.4	14.5	16.4	19.1		16.6	17.7
ICU Readmission Rate within 48 hrs (as a %)	3.8	4.4	4.0	2.6	3.9	2.4		2.9	3.5
ICU Ventilator Days	5399	6256	5975	1394	1567	1761		4722	4915
Apache II score	n/a	n/a	tbd	15.0	16.3	16.3		15.9	16.4

Notes:

* Due to an error in the Centricity Pharmacy data we are unable to provide accurate DDD data and utilization cost for the TGH ICU for the 1st quarter of fiscal 12/13. Use of Centricity data resumes effective 2nd quarter of fiscal 12/13. FY 12/13 Q1 Costs and DDD are taken from the estimated Centricity cost, which is 95% of the GL cost. Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, http://www.whocc.no/atc_ddd_index/). Total Antimicrobial DDDs is the sum of systemic antibacterial DDDs + systemic antifungal DDDs + systemic antivirals; non-systemic antimicrobials are excluded. Data Sources: Antimicrobial DDD and Costs (Centricity)

TORONTO WESTERN HOSPITAL: ICU

Indicators	FY 08/09 (Pre-ASP)	FY 09/10	FY 10/11	FY 11/12	FY12/13 Performance					YTD of Previous Year
					Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs										
Total Antimicrobial DDDs/100 Patient Days	101	88	79	83	56	99	88		82	89
Systemic Antibacterial DDDs/100 Patient Days	94	78	73	77	54	95	83		78	82
Systemic Antifungal DDDs/100 Patient Days	6	10	6	6	2	4	6		4	7
Total Antimicrobial Costs	\$138,502	\$100,408	\$101,191	\$105,899	\$13,632	\$23,470	\$24,401		\$61,503	\$80,071
Total Antimicrobial Costs/Patient Day	\$18.39	\$13.24	\$13.17	\$13.60	\$7.49	\$12.65	\$12.15		\$10.82	\$13.80
Systemic Antibacterial Costs	\$123,278	\$87,445	\$79,280	\$89,784	\$12,337	\$22,434	\$19,093		\$53,863	\$66,303
Systemic Antibacterial Costs/Patient Days	\$16.37	\$11.53	\$10.32	\$11.53	\$6.78	\$12.09	\$9.50		\$9.48	\$11.43
Systemic Antifungal Costs	\$13,444	\$12,963	\$21,911	\$16,115	\$1,295	\$1,037	\$5,308		\$7,640	\$13,768
Systemic Antifungal Costs/Patient Days	\$1.79	\$1.71	\$2.85	\$2.07	\$0.71	\$0.56	\$2.64		\$1.34	\$2.37
Patient Care Outcomes										
Hospital acquired C. difficile cases (rate per 1,000 pt days)	6 (0.79)	9 (1.18)	4 (0.52)	13 (1.66)	2 (1.10)	1(0.54)	1 (0.50)		4 (0.70)	8 (1.38)
ICU Average Length of Stay (days)	8.39	7.44	10.68	9.77	7.76	7.91	8.34		8.00	10.32
ICU Mortality Rate (as a %)	19.6	19.9	18.1	19.3	18.5	13.7	18.6		16.9	16.5
ICU Readmission Rate within 48 hrs (as a %)	3.9	4.7	4.9	4.9	1.3	2.1	4.2		2.5	3
ICU Ventilator Days	4617	6305	5960	5621	1114	1171	1288		3573	4121
ICU Apache II Score	15.0	14.7	13.7	13.8	13.1	13.0	13.4		13.2	13.6

Notes:

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

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

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

Defined Daily Dose (DDD) is an internationally accepted method to measure and compare antimicrobial usage (World Health Organization, http://www.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)

MOUNT SINAI HOSPITAL: NICU

Indicators	FY 11/12	FY12/13 Performance					YTD of Previous Year
		Q1	Q2	Q3	Q4	YTD	
Antimicrobial Usage & Costs							
Total Antimicrobial DOTs/100 Patient Days	67.3	56.2	53.1	59.6		56.3	63.4
Systemic Antibacterial DOTs/100 Patient Days	65.1	53.4	52.5	58.6		54.8	61.8
Systemic Antifungal DOTs/100 Patient Days	2.2	2.8	0.7	0.9		1.5	1.6
Total Antimicrobial Costs	\$16,415	\$3,548	\$3,115	\$5,108		\$11,771	\$12,184
Total Antimicrobial Costs/Patient Day	\$1.31	\$1.18	\$1.02	\$1.72		\$1.30	\$1.28

Notes:

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

Top 5 ANTIBACTERIALS by Usage (DDDs per 100 patient-days)

MSH ICU		TGH ICU		TWH ICU	
Top 5 Antibacterials	DDDs/100 Patient Days	Top 5 Antibacterials	DDDs/100 Patient Days	Top 5 Antibacterials	DDDs/100 Patient Days
FY 12/13 Q1					
Meropenem	15.69	Cloxacillin	23.41	Ampicillin	7.83
Piperacillin-tazobactam	12.71	Piperacillin-tazobactam	17.45	Cloxacillin	7.26
Ampicillin	11.93	Meropenem	14.01	Vancomycin	5.57
Cloxacillin	10.43	Vancomycin	12.78	Ceftriaxone	4.62
Vancomycin	10.11	Cefazolin	8.17	Piperacillin-tazobactam	4.34
FY 12/13 Q2					
Meropenem	25.62	Cloxacillin	35.96	Vancomycin	17.94
Piperacillin-tazobactam	14.23	Meropenem	21.68	Cloxacillin	14.26
Vancomycin	11.94	Piperacillin-tazobactam	20.93	Ampicillin	13.75
Cloxacillin	9.66	Sulfamethoxazole-Trimethoprim	13.88	Piperacillin-tazobactam	9.56
Gentamicin	7.08	Dapsone	13.17	Ceftriaxone	8.09
FY 12/13 Q3					
Meropenem	22.68	Cloxacillin	25.96	Cloxacillin	14.81
Piperacillin-tazobactam	16.8	Piperacillin-tazobactam	23.86	Vancomycin	13.62
Vancomycin	15.12	Meropenem	21.24	Piperacillin-tazobactam	8.98
Colistimethate base	9.64	Vancomycin	11.36	Ceftriaxone	6.5
Ciprofloxacin	9.54	Dapsone	9.85	Meropenem	5.4

Top 5 ANTIBACTERIALS by Expenditures

MSH ICU		TGH ICU		TWH ICU	
Top 5 Antibacterials	Total Cost	Top 5 Antibacterials	Total Cost	Top 5 Antibacterials	Total Cost
FY 12/13 Q1					
Meropenem	\$19,149	Meropenem	\$23,109	Meropenem	\$5,274
Piperacillin-tazobactam	\$4,497	Piperacillin-tazobactam	\$10,771	Piperacillin-tazobactam	\$2,096
Vancomycin	\$2,284	Vancomycin	\$3,767	Vancomycin	\$1,622
Ertapenem	\$1,074	Cloxacillin	\$2,108	Cloxacillin	\$715
Cloxacillin	\$712	Linezolid	\$1,361	Cotrimoxazole	\$552
FY 12/13 Q2					
Meropenem	\$27,131	Meropenem	\$35,008	Meropenem	\$5,490
Piperacillin-tazobactam	\$4,345	Piperacillin-tazobactam	\$13,190	Vancomycin	\$5,353
Vancomycin	\$2,320	Linezolid	\$6,756	Piperacillin-tazobactam	\$3,574
Sulfamethoxazole-trimethoprim	\$1,717	Colistimethate	\$3,650	Ceftazidime	\$1,799
Ertapenem	\$1,099	Ceftazidime	\$3,564	Cloxacillin	\$1,347
FY 12/13 Q3					
Meropenem	\$19,636	Meropenem	\$14,639	Vancomycin	\$4,347
Piperacillin-tazobactam	\$5,388	Piperacillin-tazobactam	\$14,523	Meropenem	\$3,837
Vancomycin	\$3,077	Vancomycin	\$3,481	Piperacillin-tazobactam	\$2,658
Colistimethate base	\$2,601	Ceftazidime	\$3,366	Sulfamethoxazole-Trimethoprim	\$2,089
Ertapenem	\$1,324	Sulfamethoxazole-Trimethoprim	\$2,336	Ceftazidime	\$1,872

Top 5 ANTIFUNGALS by Usage (DDD's per 100 patient-days)

MSH ICU		TGH ICU		TWH ICU	
Top 5 Antifungals	DDDs/100 Patient Days	Top 5 Antifungals	DDDs/100 Patient Days	Top 5 Antifungals	DDDs/100 Patient Days
FY 12/13 Q1					
Fluconazole	8.74	Nystatin	19.90	Fluconazole	1.33
Caspofungin	7.99	Fluconazole	10.09	Nystatin	0.40
Nystatin	3.18	Voriconazole	7.14	Caspofungin	0.33
Voriconazole	3.17	Caspofungin	1.86	Micafungin	0.10
Amphotericin B liposomal	0.86	Micafungin	1.85		
FY 12/13 Q2					
Fluconazole	18.15	Nystatin	27.98	Nystatin	27.98
Voriconazole	11.27	Fluconazole	17.99	Fluconazole	17.99
Caspofungin	7.19	Voriconazole	10.42	Micafungin	10.42
Amphotericin B liposomal	5.56	Caspofungin	4.76	Amphotericin B deoxycholate	4.76
Nystatin	4.49	Micafungin	3.43	Caspofungin	3.43
FY 12/13 Q3					
Fluconazole	16.32	Nystatin	22.53	Micafungin	2.44
Caspofungin	7.01	Fluconazole	14.26	Fluconazole	1.99
Voriconazole	7.20	Micafungin	3.13	Nystatin	1.14
Amphotericin B liposomal	2.78	Amphotericin B liposomal	0.48		
Nystatin	0.93	Caspofungin	0.37		

Top 5 ANTIFUNGALS by Expenditures

MSH ICU		TGH ICU		TWH ICU	
Top 5 Antifungals	Total Cost	Top 5 Antifungals	Total Cost	Top 5 Antifungals	Total Cost
FY 12/13 Q1					
Caspofungin	\$20,980	Voriconazole	\$21,941	Caspofungin	\$882
Voriconazole	\$7,886	Caspofungin	\$5,974	Fluconazole	\$218
Amphotericin B liposomal	\$806	Micafungin	\$3,135	Micafungin	\$190
Fluconazole	\$683	Fluconazole	\$1,852	Nystatin	\$6
Amphotericin B deoxycholate	\$61	Anidulafungin	\$1,342		
FY 12/13 Q2					
Voriconazole	\$22,997	Voriconazole	\$46,845	Micafungin	\$500
Caspofungin	\$16,317	Amphotericin B liposomal	\$13,209	Fluconazole	\$364
Amphotericin B liposomal	\$4,200	Caspofungin	\$12,654	Amphotericin B deoxycholate	\$133
Fluconazole	\$1,154	Micafungin	\$6,250	Nystatin	\$40
Nystatin	\$38	Fluconazole	\$3,788		
FY 12/13 Q3					
Voriconazole	\$17,799	Amphotericin B liposomal	\$6,825	Micafungin	\$4,900
Caspofungin	\$17,316	Micafungin	\$6,100	Fluconazole	\$390
Amphotericin B liposomal	\$2,355	Fluconazole	\$3,350	Nystatin	\$18
Amphotericin B deoxycholate	\$1,045	Caspofungin	\$1,045		
Fluconazole	\$1,041	Nystatin	\$389		

PRINCESS MARGARET LEUKEMIA SERVICE

Top 5 ANTIBACTERIALS and ANTIFUNGALS by DDD per 100 patient-day and expenditures

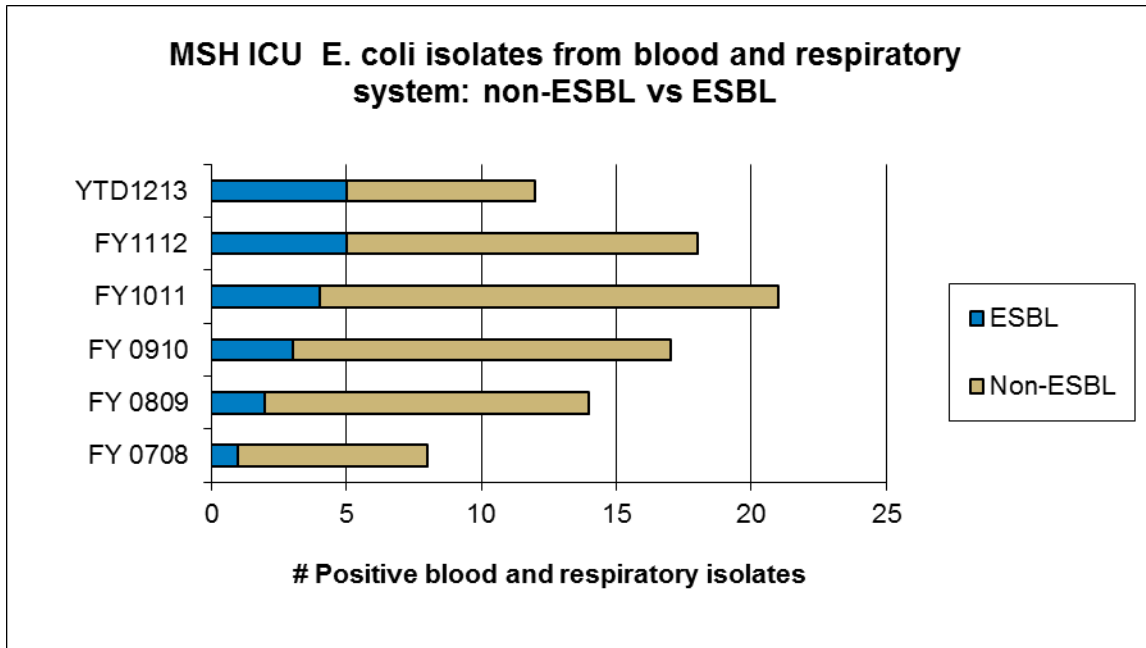
TOP 5 ANTIBACTERIALS				TOP 5 ANTIFUNGALS			
Top 5 Antibacterials	DDD by 100 patient days	Top 5 Antibacterials	Cost	Top 5 Antifungals	DDD by 100 patient days	Top 5 Antifungals	Cost
FY 12/13 Q1							
Meropenem	34.84	Meropenem	\$111,684	Fluconazole	63.57	Caspofungin	\$93,837
Piperacillin-tazobactam	32.26	Piperacillin-tazobactam	\$37,800	Voriconazole	19.60	Voriconazole	\$76,973
Ciprofloxacin	20.15	Vancomycin	\$12,604	Caspofungin	14.79	Amphotericin B liposomal	\$63,747
Vancomycin	16.74	Linezolid	\$6,894	Posaconazole	4.90	Posaconazole	\$30,223
Gentamicin	9.13	Colistimethate	\$2,341	Micafungin	4.71	Micafungin	\$15,438
FY 12/13 Q2							
Meropenem	43.08	Meropenem	\$120,169	Fluconazole	54.86	Voriconazole	\$92,547
Piperacillin-tazobactam	30.01	Piperacillin-tazobactam	\$33,808	Voriconazole	22.07	Amphotericin B liposomal	\$85,806
Ciprofloxacin	17.44	Vancomycin	\$12,029	Caspofungin	13.04	Caspofungin	\$62,736
Vancomycin	16.17	Linezolid	\$4,877	Micafungin	6.83	Micafungin	\$22,450
Gentamicin	10.55	Gentamicin	\$3,412	Amphotericin B liposomal	3.55	Posaconazole	\$12,844
FY 12/13 Q3							
Meropenem	49.21	Meropenem	\$57,487	Fluconazole	48.52	Amphotericin B liposomal	\$146,391
Piperacillin-tazobactam	31.78	Piperacillin-tazobactam	\$31,594	Voriconazole	17.88	Caspofungin	\$75,059
Vancomycin	20.62	Linezolid	\$19,793	Caspofungin	15.67	Voriconazole	\$64,306
Ciprofloxacin	14.22	Vancomycin	\$14,568	Micafungin	7.35	Micafungin	\$24,300
Gentamicin	8.08	Gentamicin	\$3,659	Amphotericin B liposomal	6.03	Posaconazole	\$12,103

TORONTO GENERAL HOSPITAL CVICU

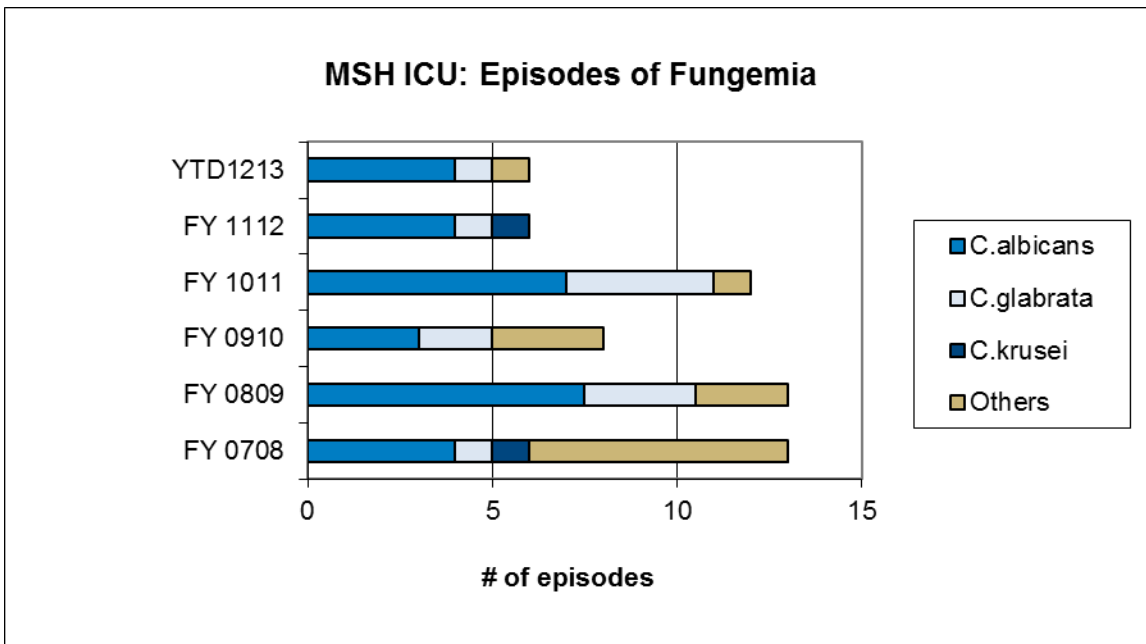
Top 5 ANTIBACTERIALS and ANTIFUNGALS by DDD per 100 patient-day and expenditures

Top 5 ANTIBACTERIALS				Top 5 ANTIFUNGALS			
Top 5 Antibacterials	DDD by 100 patient days	Top 5 Antibacterials	Cost	Top 5 Antifungals	DDD by 100 patient days	Top 5 Antifungals	Cost
FY 12/13 Q1							
Cefazolin	34.84	Cefazolin	\$5,892	Nystatin	7.73	Caspofungin	\$1,684
Cloxacillin	32.26	Piperacillin-tazobactam	\$4,514	Fluconazole	5.00	Fluconazole	\$823
Piperacillin-tazobactam	20.15	Meropenem	\$3,146	Caspofungin	0.61	Anidulafungin	\$767
Ciprofloxacin	16.74	Vancomycin	\$1,510	Anidulafungin	0.26	Micafungin	\$190
Vancomycin	9.13	Cloxacillin	\$863	Micafungin	0.13	Nystatin	\$86
FY 12/13 Q2							
Cefazolin	31.21	Cefazolin	\$4,957	Fluconazole	6.06	Micafungin	\$900
Cloxacillin	18.89	Meropenem	\$4,033	Nystatin	4.49	Caspofungin	\$890
Vancomycin	10.06	Piperacillin-tazobactam	\$2,854	Micafungin	0.67	Fluconazole	\$799
Ciprofloxacin	7.17	Vancomycin	\$2,046	Caspofungin	0.45	Nystatin	\$44
Piperacillin-tazobactam	6.29	Cloxacillin	\$1,258	Anidulafungin	0.00		
FY 12/13 Q3							
Cefazolin	30.5	Cefazolin	\$4,950	Nystatin	5.55	Posaconazole	\$988
Ampicillin	14.64	Piperacillin-tazobactam	\$2,896	Fluconazole	5.16	Fluconazole	\$552
Vancomycin	8.99	Meropenem	\$2,502	Posaconazole	0.38	Micafungin	\$100
Ceftriaxone	8.50	Vancomycin	\$1,990	Itraconazole	0.11	Nystatin	\$62
Piperacillin-tazobactam	6.45	Ampicillin	\$1,796	Micafungin	0.07	Itraconazole	\$12

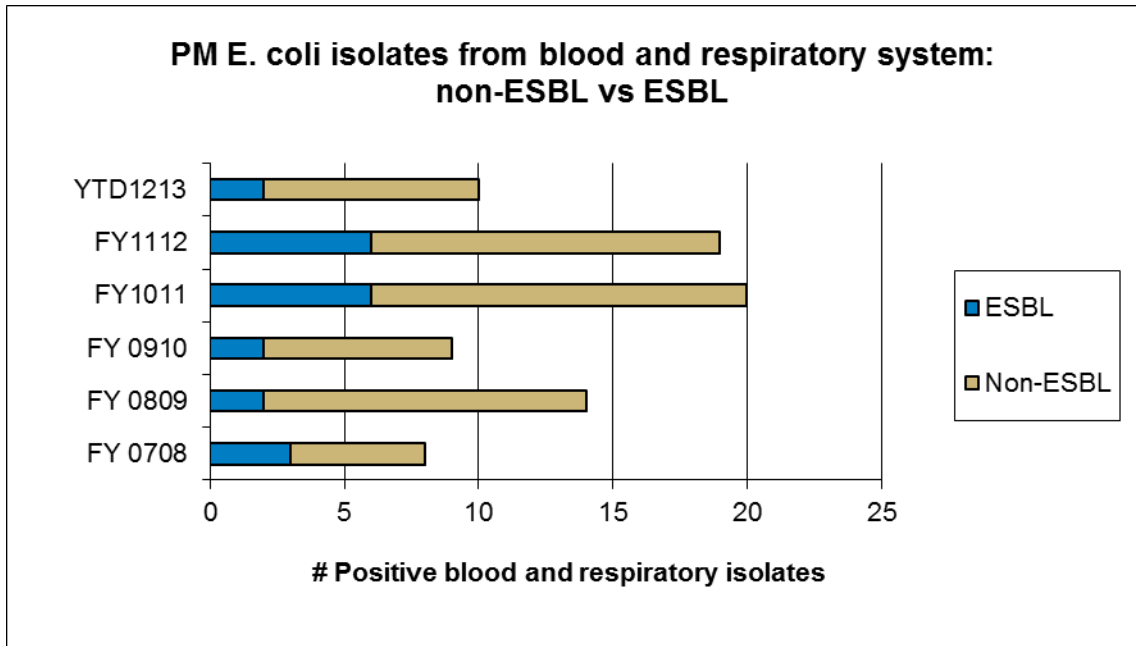
Antimicrobial Susceptibility and Pathogen Surveillance
E.Coli isolates: Blood and Respiratory



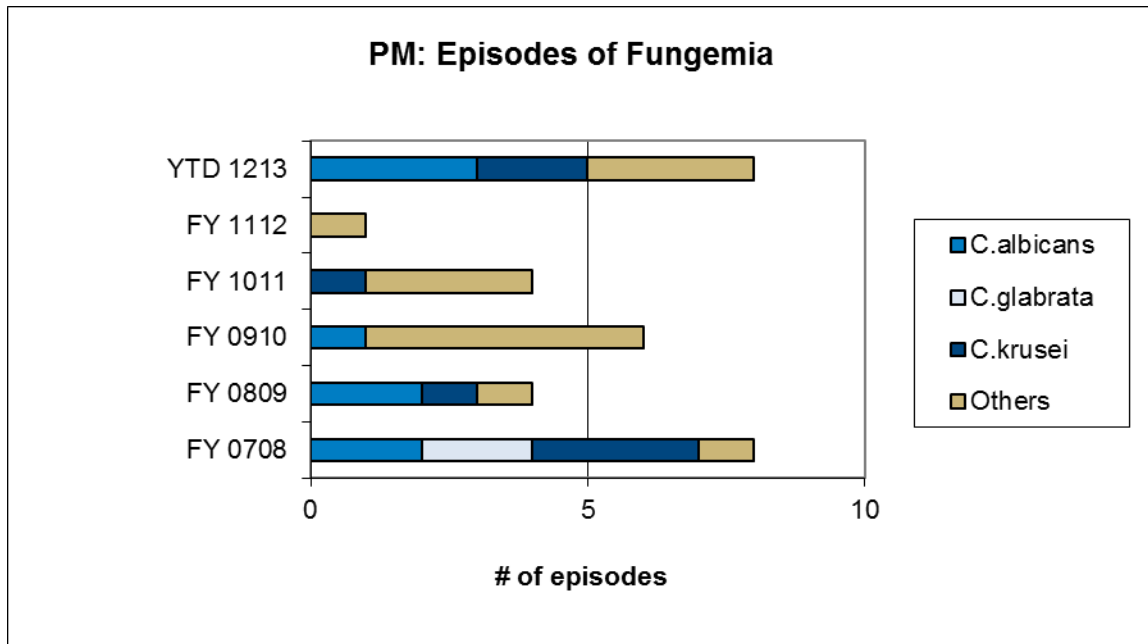
Yeast Species Isolated in Blood – MSH ICU



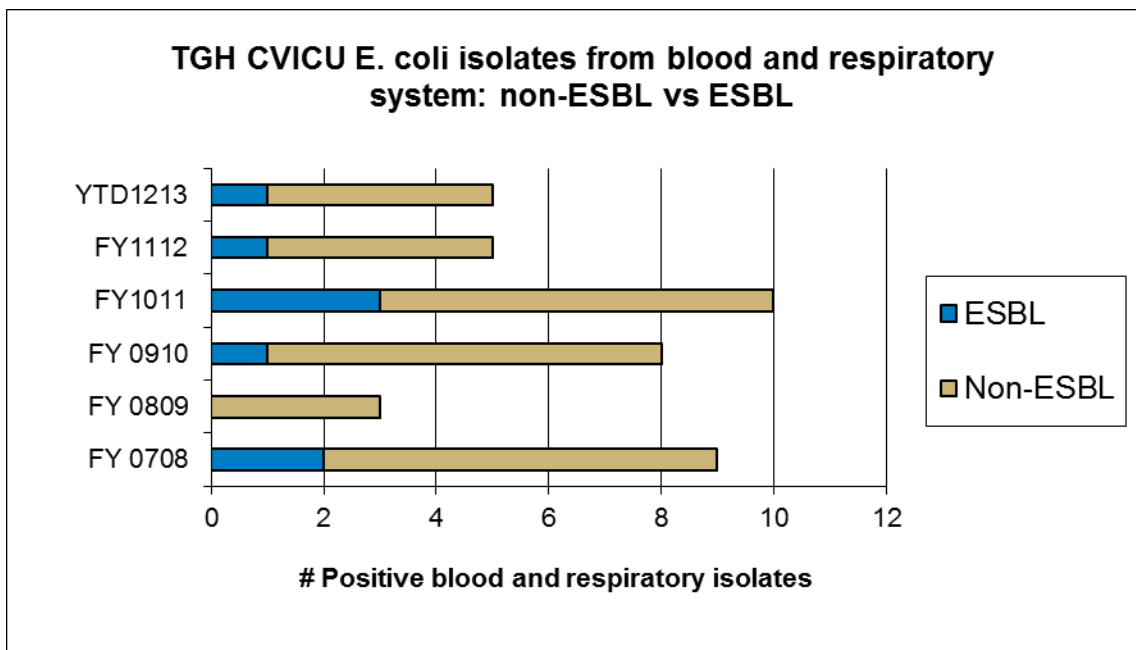
Antimicrobial Susceptibility and Pathogen Surveillance
E.Coli isolates: Blood and Respiratory



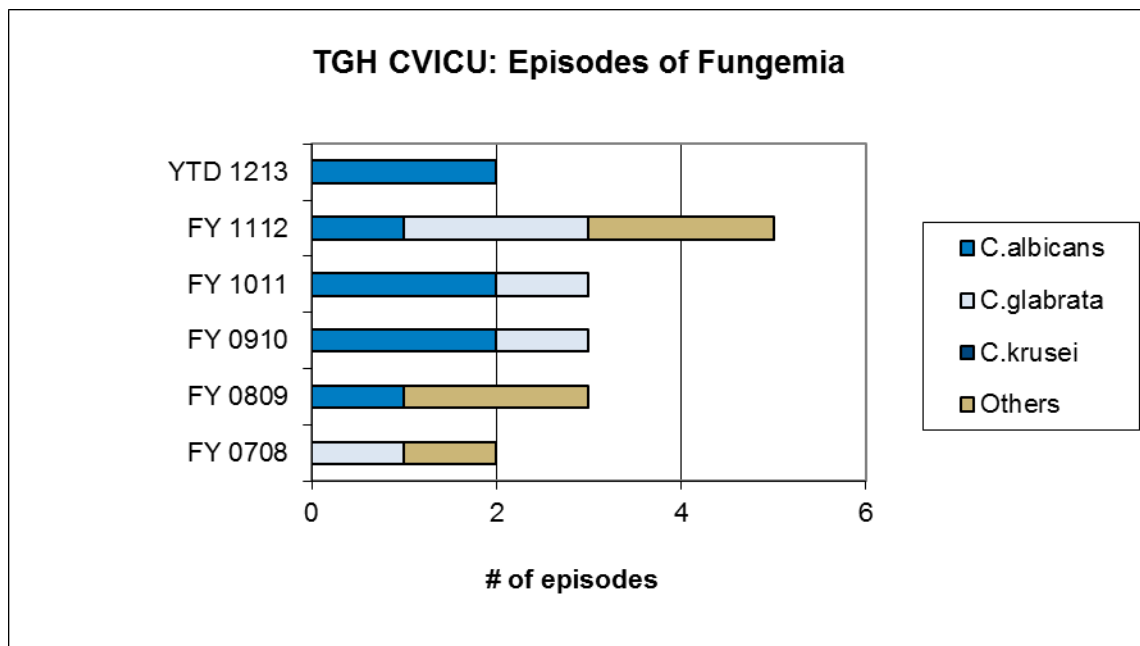
Yeast Species Isolated in Blood – Princess Margaret



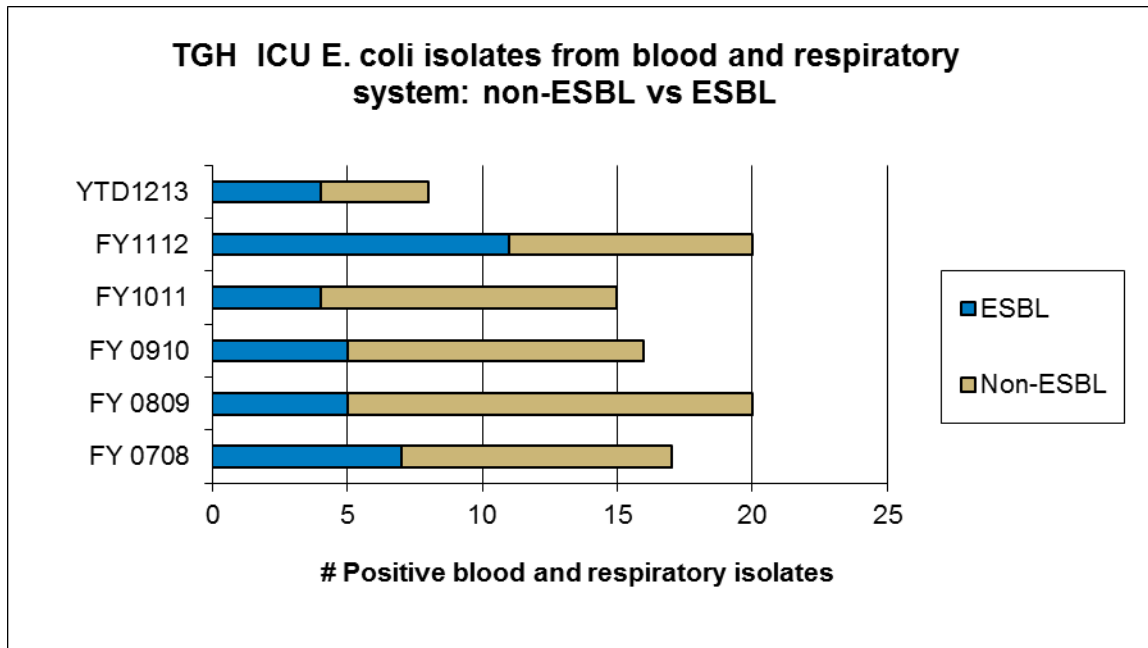
Antimicrobial Susceptibility and Pathogen Surveillance
E.Coli isolates: Blood and Respiratory



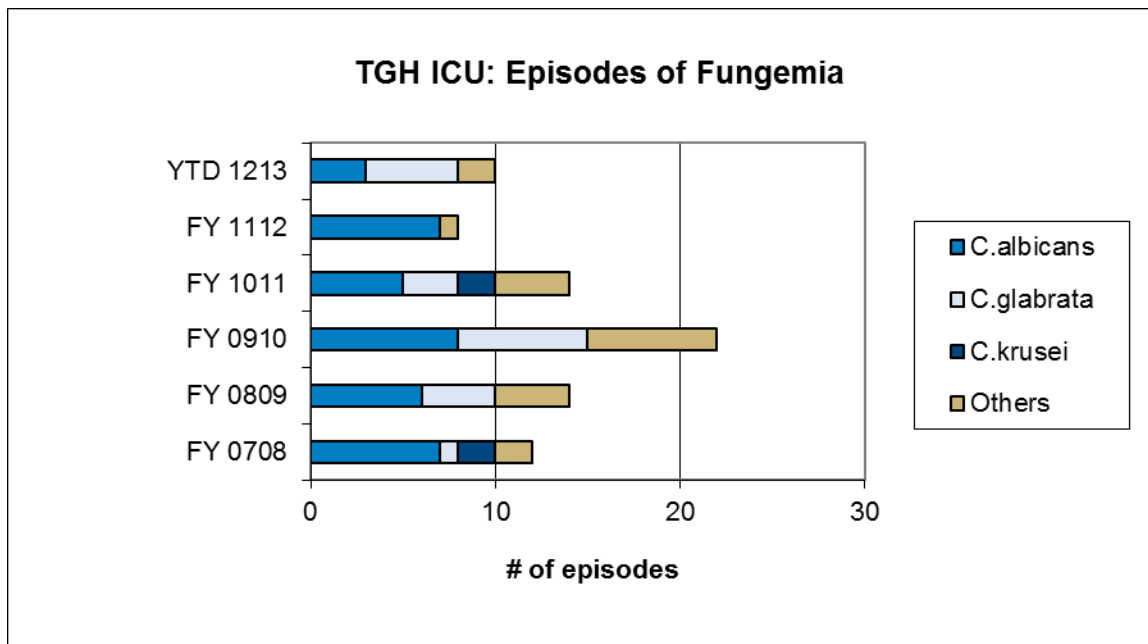
Yeast Species Isolated in Blood – CVICU



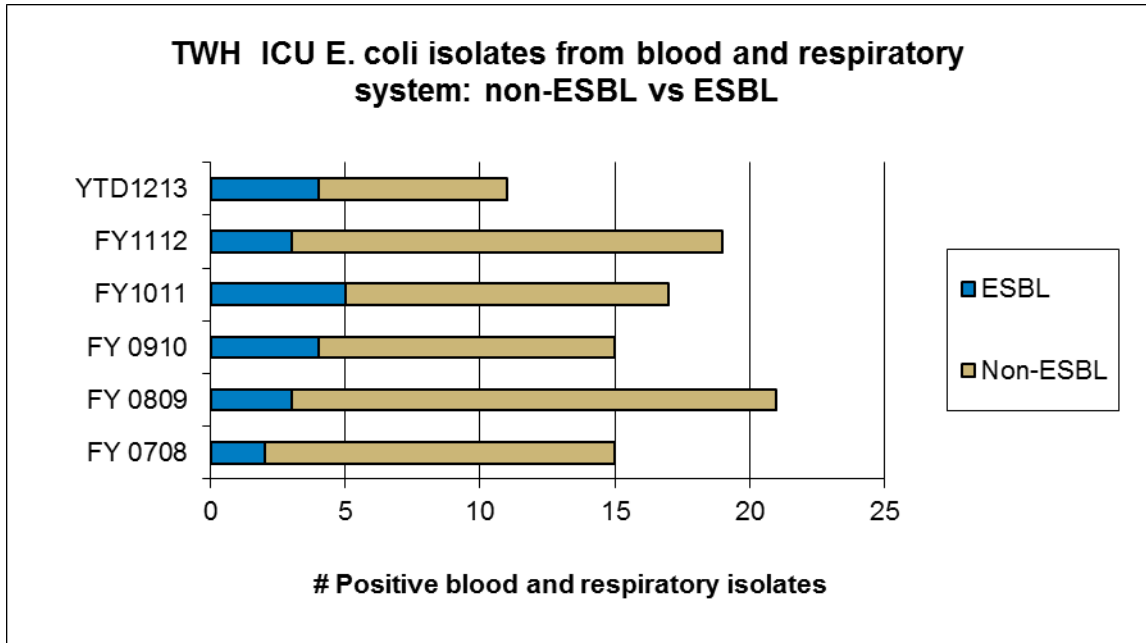
Antimicrobial Susceptibility and Pathogen Surveillance
E.Coli isolates: Blood and Respiratory



Yeast Species Isolated in Blood – TGH ICU



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



Yeast Species Isolated in Blood – TWH ICU

