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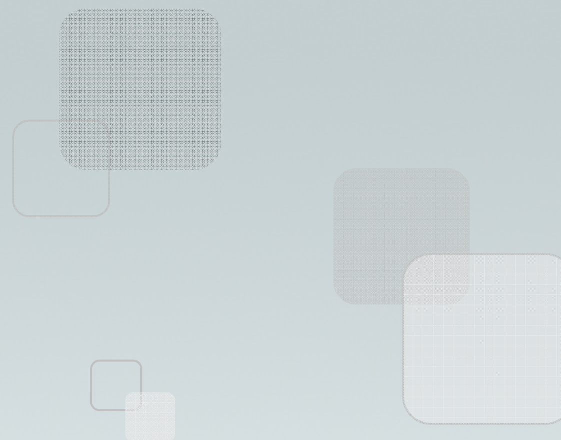

Getting Ahead with Analytics

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Is the Mortality Rate the Same??

SEVERITY OF TRAUMA	SURROUNDING HOSPITALS		REGIONAL TRAUMA CENTRE	
	NO. OF CASES	NO. OF DEATHS	NO. OF CASES	NO. OF DEATHS
MILD	3734	37	687	3
MODERATE	1887	94	1238	37
SEVERE	1645	327	1429	172
	7266	458	3354	212
Case Fatality Rate	458/7266 = 6.3%		212/3354 = 6.3%	

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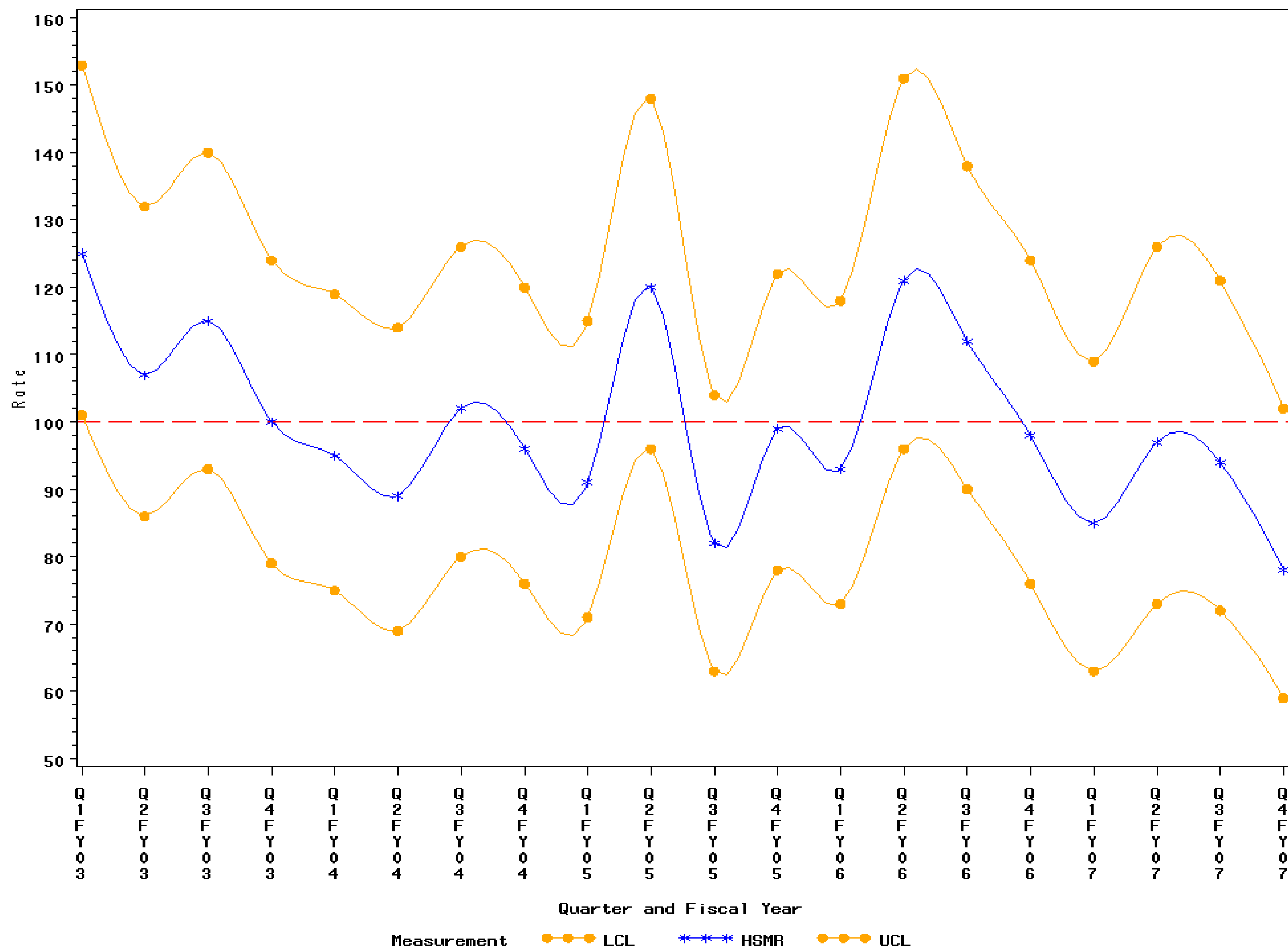
Hospital Standardized Mortality Rate



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Outline

- Setting the Stage
- Example Analytics
  - HSMR
  - Infection Control
  - Pharmacy Utilization

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Hospital Standardized Mortality Rate

Patient Flow

CCC Rug Weighted Patient Days

Repatriation Rates

Cancer Care Ontario

Risk Adjusted Analyses

Demand for Analysis & Reporting

Nosocomial Infection Rates

Safer Healthcare Now!

New HBAM funding formula

Alan Hudson

Referral Patterns

Adalsteinn Brown

Market Share

Stage 2 Ulcer Rates

Ambulance Offload Times

Patient Care in Community

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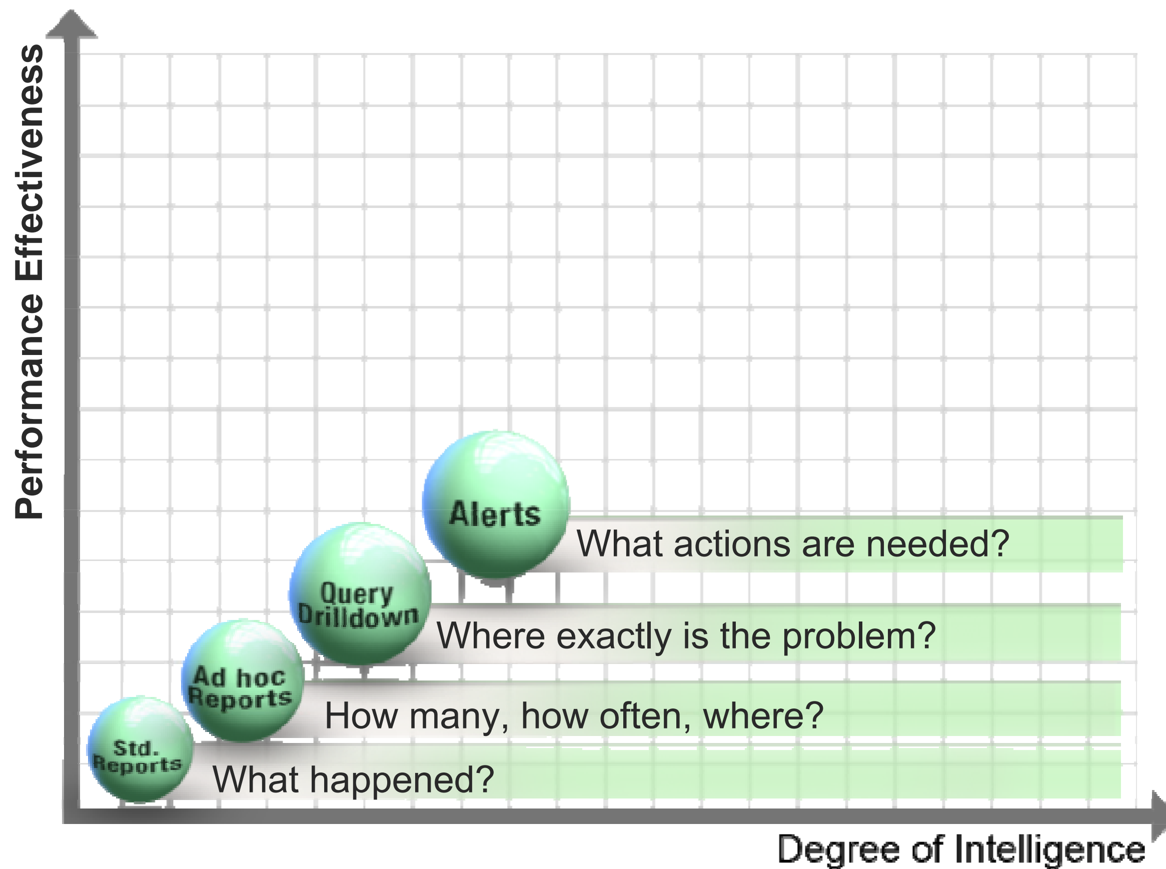
Traditional Business Intelligence



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Where do we Go from OLAP?

- Analytics
  - Derive insights
  - Forecasting trends into the future,
  - Predicting what will happen, and ultimately
  - Optimizing what is the best that can happen.
- Analytics build upon one another.

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Intelligence Through Analytics

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What to Measure?

- Who are the Drivers? – Use them as Guides
  - Consumer (demanding behaviour, performance expectations, public score cards etc.)
  - Regional & Provincial Governments
- Corporate Strategy
  - Does your org have one?
  - Does it translate into measures?
  - What do you do if you do not have one?
- Performance Measurement Framework

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Performance Framework

- Evidenced based
- Board Direction e.g. Quality Indicators
- Policy based
  - Does the MOH want to see it?
  - Related to funding or Performance Contracts?
- Adjust for case mix where possible
- Less is More

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Examples

Pause for Questions?

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HSMR Background

- International trends
- 1999 Jarman in the UK
- 2000 “Move your Dot” campaign in the US
- 2004 CIHI Hospital Standardized Mortality Ratio

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What is a Standardized Rate

- Crude mortality rate
  - Without regard to population characteristics
- Attribute specific
  - Calculated separately within categories of population variables (e.g. age)
- Adjusted or Standardized
  - Summary measure – weighted average across categories of population variables (e.g. age)
  - Direct and indirect standardization methods
  - Can be used to compare facilities when used properly

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Is the Mortality Rate the Same??

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Is the Mortality Rate the Same??

- Standardize by calculating specific rates for each hospital and apply to total population of two sites.

Severity of Trauma	Standard Population	Surrounding Hospitals		Regional Centre	
		Mortality Rate	No. of Deaths	Mortality Rate	No. of Deaths
Mild	4,421	0.0099	44	0.0044	19
Moderate	3,125	0.0498	156	0.0299	93
Severe	3,074	0.1988	611	0.1204	370
	10,620		811		482
Mortality Rate Per 100 Patients		811/ 10,620	**7.64**	482/10,620	**4.54**

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Why Measure Mortality?

- Death is an effective measure
  - recorded by law
  - accuracy is high
  - easy outcome to understand
  - statistical methods have become robust
- Mortality is a “Big Dot” measure of quality
  - As much as 98,000 U.S.(2003) 16,000 (2004)Canadian preventable deaths
  - Hence reduce deaths means increased quality of care

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HSMR

- Hospital Standardized Mortality Ratio
  - = Observed Deaths/Expected Deaths
- Observed Deaths from Hospital Data
  - Source data systems CIHI data
- Expected Deaths
  - using logistic regression models
  - standardized for
    - age,
    - sex,
    - type of admission, transfer
    - length of stay, diagnosis
    - Co-morbid diagnoses (Charlson Index)

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Calculating the HSMR

- Align with CIHI methods with SAS
  - All HSMR programming is done using SAS

- Work with CIHI
  - HSMR department very helpful
  - Get SAS code
  - Ensure ability to calculate
  - Validation exercise
  - Check with CIHI Quarterly to ensure accuracy

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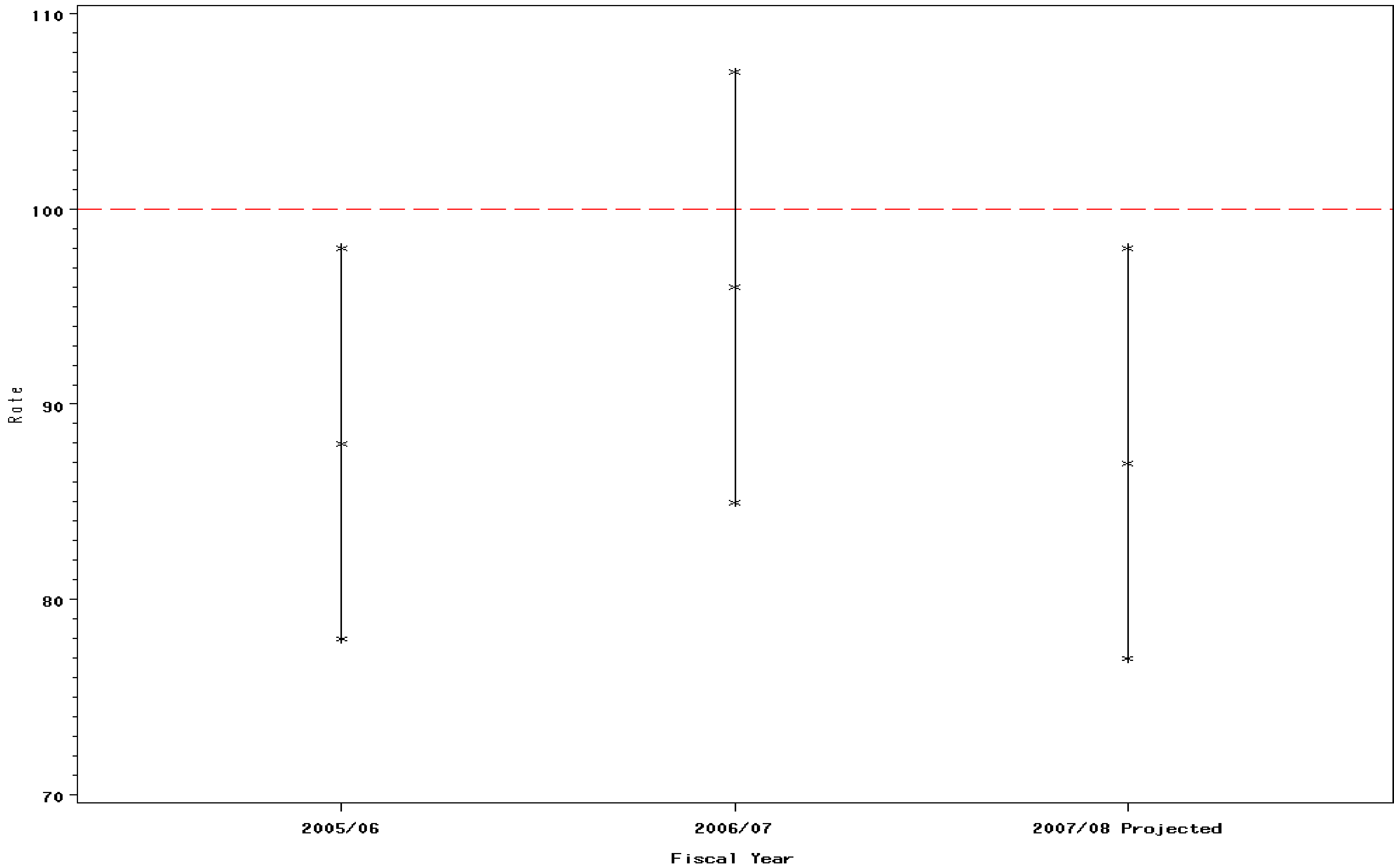
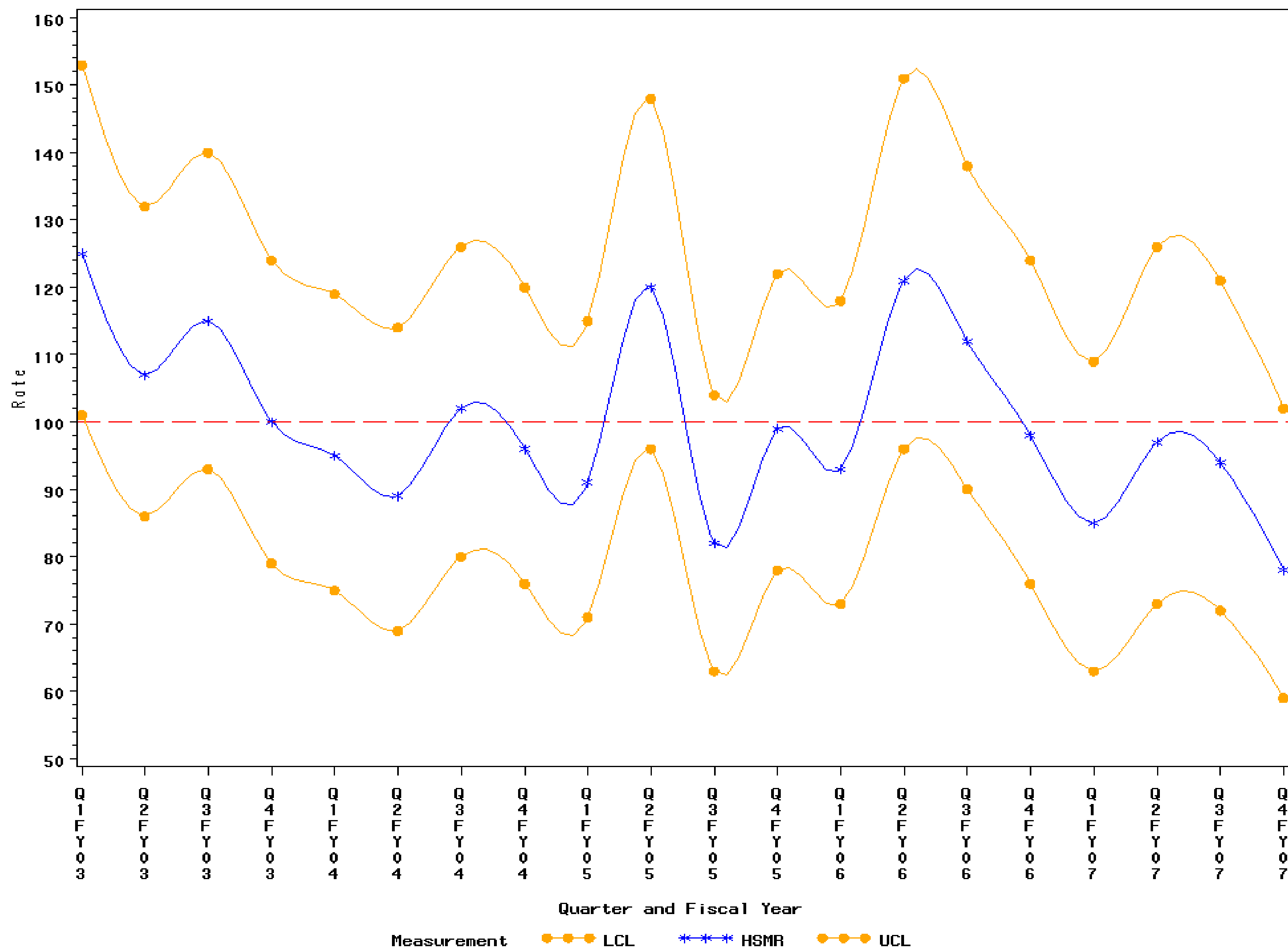
Hospital Standardized Mortality Rate



Hospital Standardized Mortality Rate



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Using the HSMR

- HSMR triggers action & requests
  - More detailed analyses
  - “Why is our HSMR so high”
  - “The Board, The chiefs…..”
- Solution
  - Integrate the HSMR with your CIHI data
  - Create program specific reports
  - Help prioritize patients for review

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HSMR Mortality Review Tool

HSMR Probability	Chart no	Discharge Date	Encounter Number	CMG	SCU description	SCU LOS	LOS Days	ALC LOS	Patient Service	Age	Gender	DNR	Inst From
0.02				221 Colostomy/Enterostomy	Combined Medical/Surgical Intensive Care Nursing Unit	6	14	0	30				

Diagnosis:	Dx. type
Malignant neoplasm of caecum	M
Acidosis	1
Atrial fibrillation	1
Postoperative intestinal obstruction	2
Other postprocedural disorders of digestive system, not elsewhere classified	2
Acute posthaemorrhagic anaemia	2
Transient alteration of awareness	2
Haemorrhage and haematoma complicating a procedure, not elsewhere classified	2
Infection following a procedure, not elsewhere classified	2
Acute peritonitis	3
Benign hypertension	3
Removal of other organ (partial) (total) as the cause of abnormal reaction or later complication, without mention of	9

Interventions:	Interv. Date
1.NM.87.RE Excision partial, large intestine open approach Enterocolostomy anastomosis technique	
1.KV.53.HA-CH Implantation of internal device, artery NEC of intra-arterial needle (e.g. with lead or line) using percutaneous approach	
1.IS.53.GR-LF Implantation of internal device, vena cava (superior and inferior) vascular access device with external lumen using percutaneous transluminal venous approach (e.g. peripherally inserted central	
1.LZ.35.HH-C6 Pharmacotherapy (local), circulatory system NEC percutaneous infusion approach of parenteral nutrition	
1.OT.52.HA Drainage, abdominal cavity using percutaneous (needle) approach	
3.OT.20.WE Computerized tomography [CT], abdominal cavity with and without enhancement (contrast)	
1.NK.77.RR Bypass with exteriorization, small intestine open approach end enterostomy (e.g. terminal, end or loop ileostomy)	

Physicians:

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Infection Control Monitoring

- Most Hospitals still use forms
  - Time – staff as well as data entry
  - Significant data error problems
  - Takes away from education, rounds, staff development
- No data integration
  - Admissions info
  - Laboratory info
  - Pharmacy modules
- All done by hand

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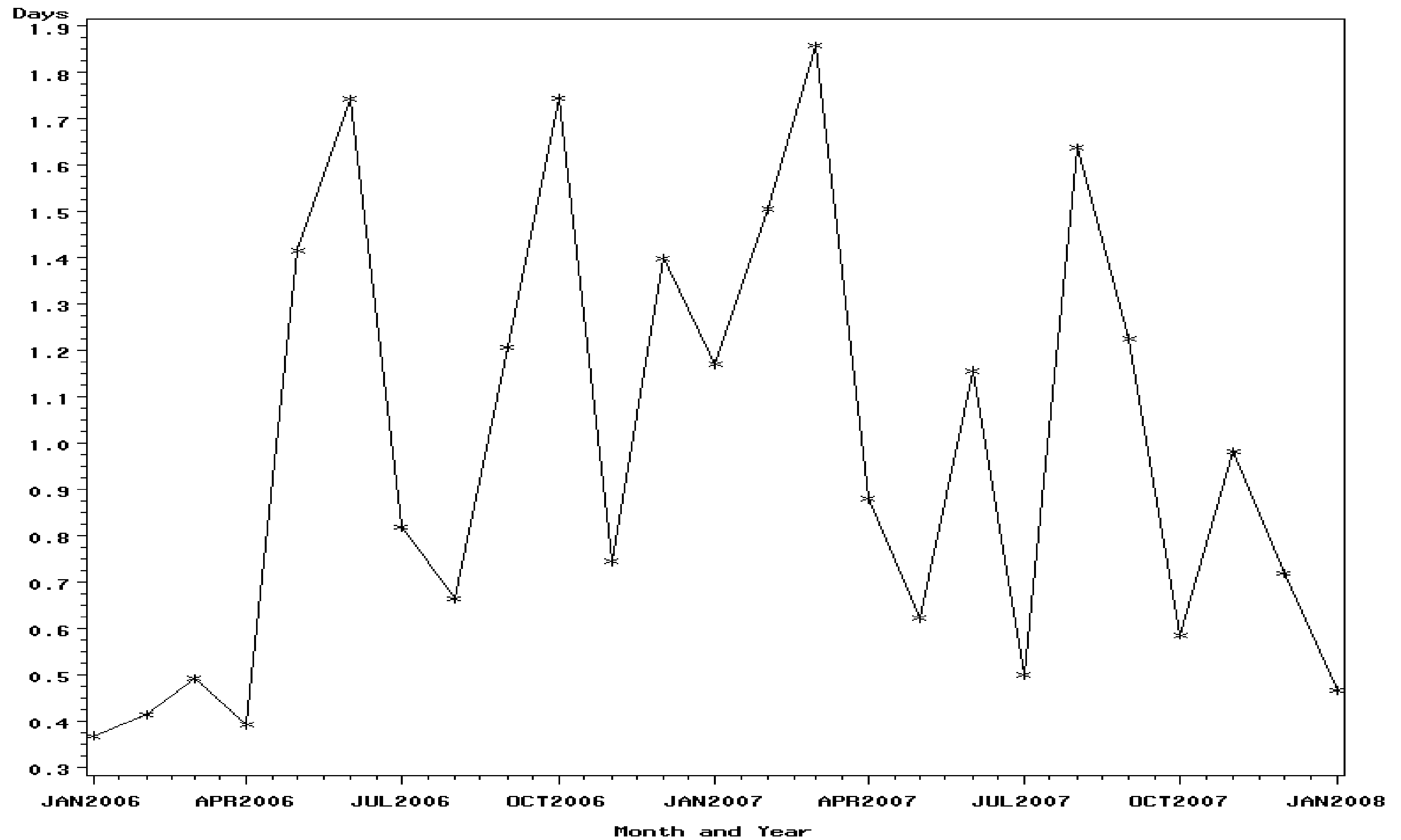
Nosocomial Clostridium Difficile Rate
Cases Per 1,000 Hospital Bed Days



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Pharmacy Utilization

- Most Hospitals have Rx Systems
- Good data
- Very rich
- Easy to integrate
- No excuses
  - Rx is doctor ordered via CPOE etc.
  - Evidence based guidelines
- Good discipline
  - Pharmacists are very analytical

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Pharmacy Utilization

- Prophylaxis
  - Surgical Site infections – 2 days or less
  - Anti-coagulant usage for all medicine patients
- Cost Reduction
  - High cost Antibiotics
    - Are docs complying with regulations signing forms etc
- Quality of Care
  - High risk Antibiotics
    - Are guidelines being followed

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			day																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
			N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
month	Admit_Service	agent																								
JUL2008	SUR	others	2	2	1	1	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
AUG2008	SUR	cefazolin	29	7	2	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		gentamicin	7	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		others	33	32	31	31	28	18	13	10	8	5	4	2	2	2	1	1	1	1	1	1	1	1	1	1
		vancomycin	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SEP2008	ICU	cefazolin	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		clindamycin	1	1	1	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		gentamicin	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		others	2	2	2	2	2	1	1	1	1	1	1	1	1	1	.	.	.	.	.	.	.	.	.	.
	SUR	cefazolin	32	12	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		clindamycin	5	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		gentamicin	14	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
		others	39	39	38	38	34	18	8	4	3	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.
		vancomycin	3	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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Take Home Messages

- Using analytics is an approach you can use now!
  - Integrate and use the data you have now
  - No EHR needed
- Analytics empower you to look ahead
  - Less reaction to external sources
- Use Analytics within a framework
  - Understand your performance
  - Be more accountable
  - Less is more

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Questions?

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