

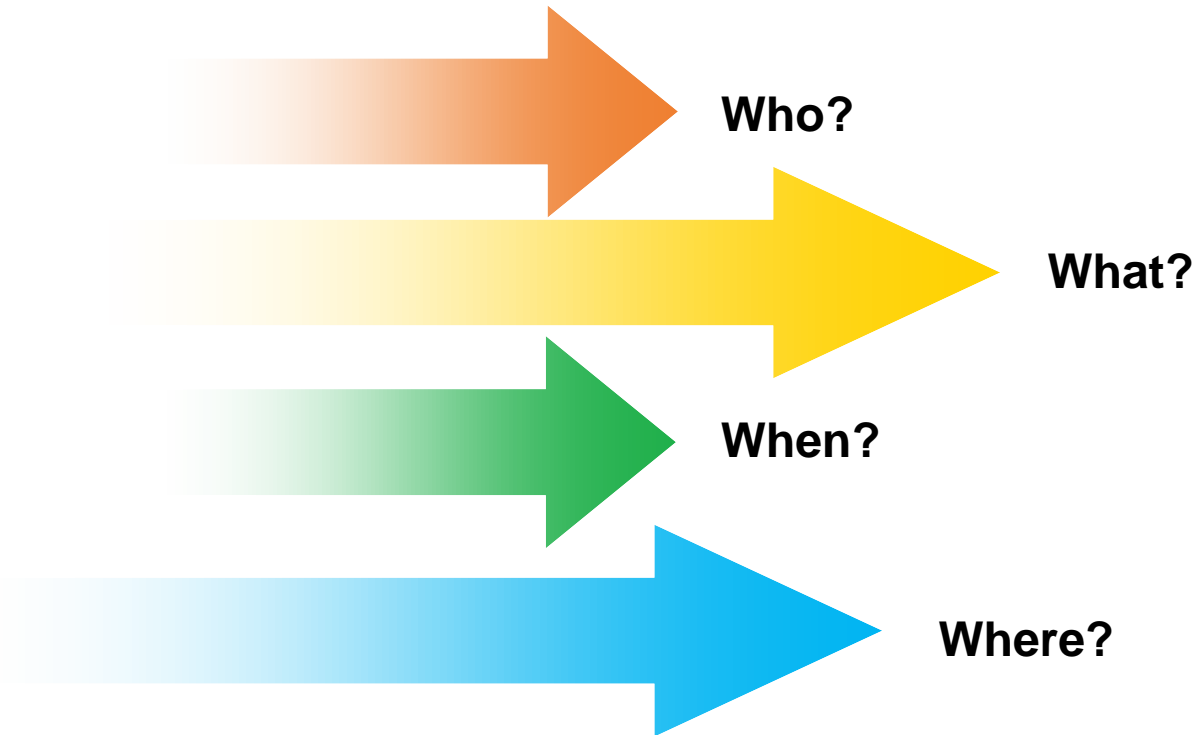


# Healthcare Analytics Success Story Using IBM's Clinical Analytics Solution

Basil Yunan, IBM  
Leader Business Analytics and Optimizations Quebec

Salon

**BUSINESS INTELLIGENCE**



**Disclaimer:** Information regarding potential future products is intended to outline our general product direction and it should not be relied on in making a purchasing decision. The information mentioned regarding potential future products is not a commitment, promise, or legal obligation to deliver any material, code or functionality. Information about potential future products may not be incorporated into any contract. The development, release, and timing of any future features or functionality described for our products remains at our sole discretion.



# IBM's Business Analytics & Optimization Services

## BAO Strategy



- Identify and prioritize opportunities for improvement
- Remodel business processes and change operations to exploit analytics
- Implement management systems to maintain control and achieve goals

## Business Intelligence & Performance Management



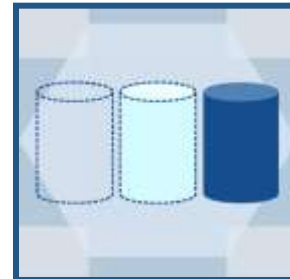
- Report outcomes of business processes and programs
- Automate management dashboards and scorecards
- Create planning, budgeting, & forecasting tools

## Advanced Analytics and Optimization



- Apply advanced statistical and regression analysis upon historical data for predictive decision-making
- Integrate optimization algorithms and technology into operations

## Enterprise Information Management



- Ensure robust and trusted data is available when needed and is easy to consume
- Provide a consolidated and efficient information platform to support optimization initiatives

## Enterprise Content Management



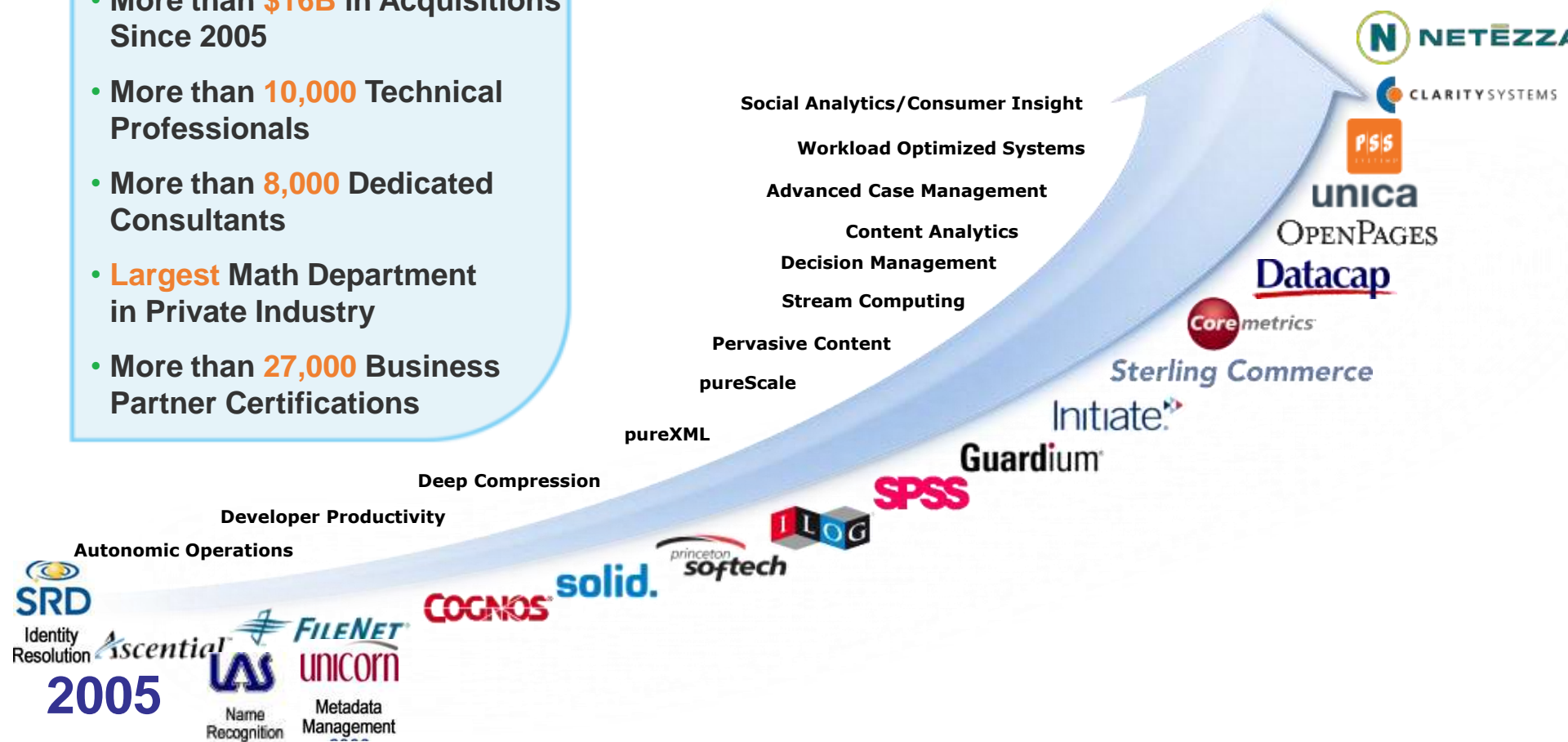
- Manage document & records, including archives
- Manage structured and unstructured content
- Manage digital assets & rights
- Provide efficiency and transparency to complicated workflows



# IBM's Complete and Growing Portfolio of Information Management and Analytics Technology

- More than **\$16B** in Acquisitions Since 2005
- More than **10,000** Technical Professionals
- More than **8,000** Dedicated Consultants
- **Largest** Math Department in Private Industry
- More than **27,000** Business Partner Certifications

2011



# About North York General Hospital

- 3 sites in Toronto, Canada
  - General, Branson, Senior Centre
- 400 inpatient beds
- 192 long term care beds
- 111,000 emergency/urgent care visits
- 27,700 inpatient cases
- 228,000 outpatient visits
- 32,500 day surgery cases
- 3,200 total employees
- 962 medical staff
- 887 volunteers



# North York General Hospital Strategy Map

**Our Mission**  
*A community teaching hospital in a continuum of health care, providing compassionate and quality care to diverse communities in North Toronto and beyond*

**NYGH Evolving Vision: Community of Success: Serving with Kindness**

- Each role is essential
- A well designed, safe workplace makes it easy to do the right things right
- System relationships achieve improved care for populations, patients and their families
- Everyone is a leader achieving quality outcomes and in leveraging resources
- People celebrate with others the joy and success of their work

**Operational & Clinical Excellence**      **Knowledge Generation & Translation**      **Community Integration & System Priorities**

Outcomes	<b>Patient &amp; Community Perspective</b>	Provide outstanding patient and family experience  Recognized for outstanding and responsive care and service by NYGH staff, volunteers and physicians	Access to the highest quality and safest care for patients  Recognized as an ultra safe organization	Translate knowledge into practice to improve outcomes  Provide the 'ultimate' educational experience for all learners	Enhance access to support system priorities  Improve quality and efficiency through integration or services	That meet our patients needs
	<b>Core Processes Perspective</b>	Implement evidence based leadership practices related to patient and family experience	Leverage actions that will create a highly reliable or ultra safe organization	Develop partnerships and relationships to advance the Academic Mission  Acquire and develop methods for knowledge translation	Align our clinical programs and physical facilities to be responsive to community and stakeholder needs	

**Organizational Capital / Human Capital / Information Capital**

Enablers	<b>Learning &amp; Growth Perspective</b>	Enable competencies to support organizational objectives  Cultivate engaged, aligned and dedicated employees, volunteers and physicians	Continue to foster a culture of a learning organization  Nurture and develop leadership talent	Support existing processes through information technology, tools and systems  Provide business intelligence capabilities to support processes and outcomes	We will enable our people
	<b>Resource Management Perspective</b>	Remain financially strong to sustain our Mission, Vision, Values and Strategy	Manage performance and productivity, and resources effectively and efficiently: be a cost efficient hospital and use assets, including facilities efficiently	Leverage revenue opportunities from non-traditional and special areas	

**Our Values**

*Listening to appreciate diversity      Learning through dialogue and reflection*  
*Leading with courage, transparency and forgiveness      Serving patients, families and others with kindness*

# NYGH's Vision for Business Intelligence

- Business Drivers
  - Long term vision is to instil the principles and processes inherent in performance management throughout the organization
  - BI is seen as a key component of performance management
  - BI provide tools and information to allow the leaders to make better decisions at the operational, strategic and governance levels
- Technical Drivers
  - Drill to Patient Detail: Dashboard says how we did but it is very important to have the supporting detail to say why.
  - Ability to Grow: What happens when users ask for the next report?



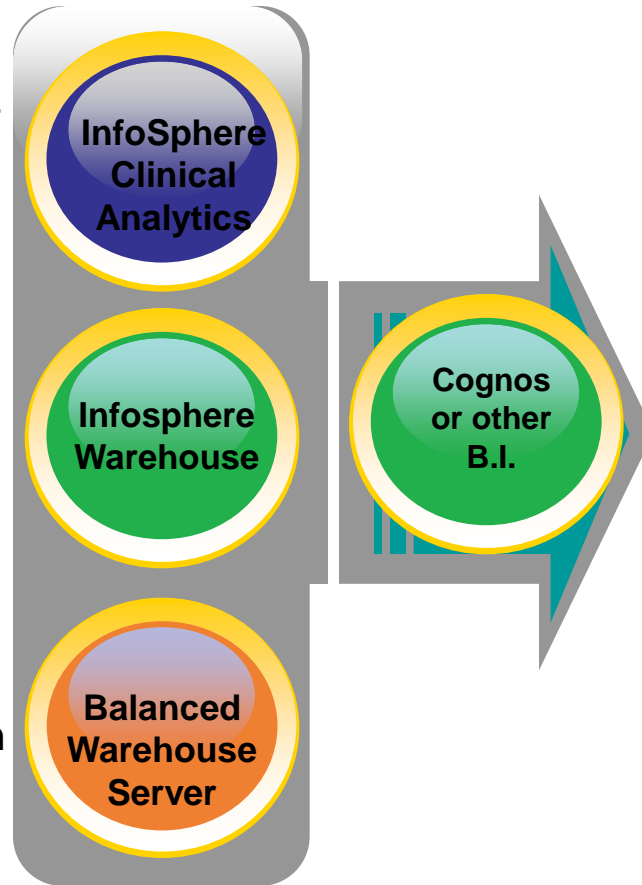
**Selected IBM InfoSphere Clinical Analytics with Cognos as the solution that best fit NYGH vision**



# InfoSphere Clinical Analytics – what is it?

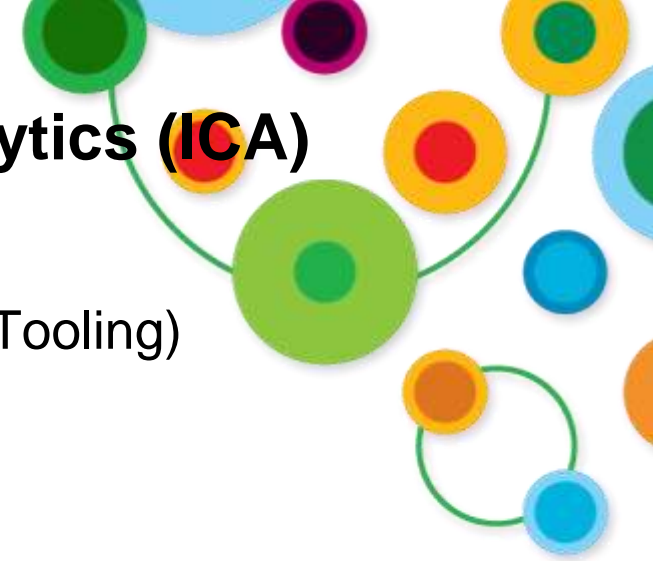
Clinical Analytics:  
A Complete Solution = Hardware + Software + Services

- A fully integrated solution
  - Clinical Analytics + BI Applications + Healthcare Intelligence Dashboard Server + Data Warehouse + Server
- Solution's unique features:
  - ✓ Creates longitudinal record from inpatient, outpatient, specialty and ambulatory care setting
  - ✓ Patient record De-Id and Re-Id
  - ✓ 900+ procedures for data cleansing and validation
  - ✓ Medical vocabulary mapping
  - ✓ Cohort record or encounter search
  - ✓ Analysis of whole organization down to physician and patients



# Solution – IBM InfoSphere Clinical Analytics (ICA)

- IBM Smart Analytics System
  - InfoSphere Warehouse (DB2 + Warehouse Tooling)
  - Cognos (Dashboard, Metrics)
- Data Model
- Hardware Configured in Building Block Increments
  - Pre-Configured X-Series Servers (App Server + Data Server)
  - Pre-Configured Storage (DS3400)



# Canadian customizations

- ICA is an accelerator -- it comes with a lot of pre-built value, but is designed to be extended
- At NYGH, IBM extended the model for the Canadian market
  - Data model Canadianized
    - i.e. billing portion of model modified to account for single payer system
  - New measures specific to North York General score card added
  - Minor modifications also made to model to add in extra attributes
    - e.g. extra information on nurse note, patient surveys



# Phase 1 (go-live November)



- 50 measures (analytical & operational)
- 20 different data sources

# Data Sources

## *Vendor packages*

- Cerner (ADT – admission/discharge/transfer)
- Infinium (Finance)
- Kronos (employee time tracking)
- Med2020 (Coded data – admissions, emergency)
- Orsos (operating room)
- TeleTracking (bed tracking)
- Wellsoft (emergency dept)

## *Custom Applications*

- CCIS (Critical Care Information System)
- IPAC (Infection Prevention & Control)
- MRI Hours
- Quality (hand hygiene)

## *Ministry of Health Systems*

- HIMSS
- NRC Picker (patient surveys)
- OHA Survey (hospital-level surveys)
- WTIS (wait time)
- Spreadsheets (various sources)

# Measures (first phase)

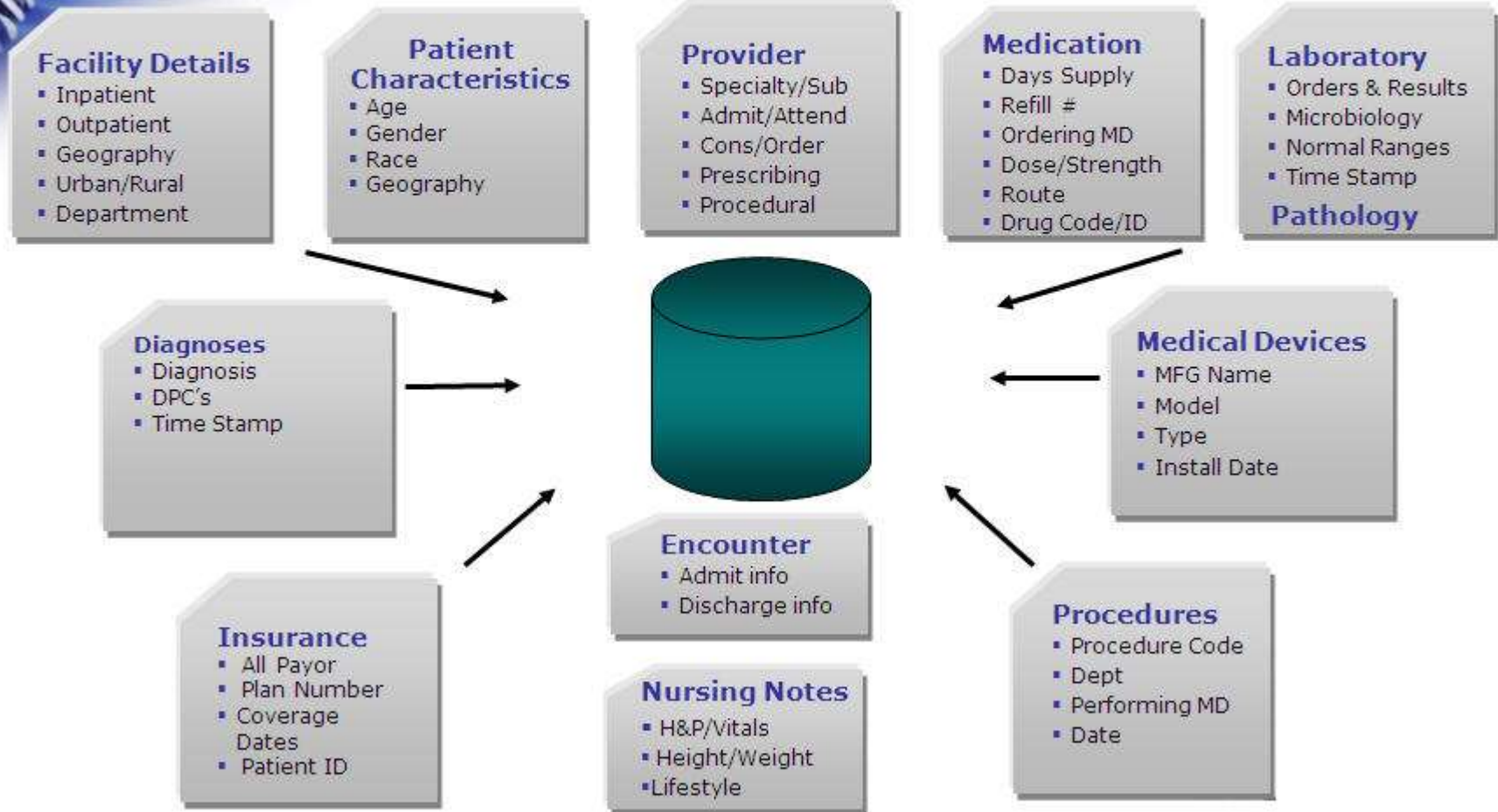
## *Qualitative*

- Patient Satisfaction Surveys (inpatient, emergency, maternal)
- Wait Time (overall surgical cases, digital imaging)
- Wait Time (cataract, cancer, hip, knee)
- Hospital Acquired Infections (CDAD, MRSA, VRE, VAP, CLI)
- Hospital Standardized Mortality Rate
- Average wait time for inpatient bed
- Wait time in Emergency Dept (high & low acuity)
- People leaving Emergency without being seen, or against medical advice
- Absenteeism
- Readmission Rates
- Skin Ulcers (bed sores)

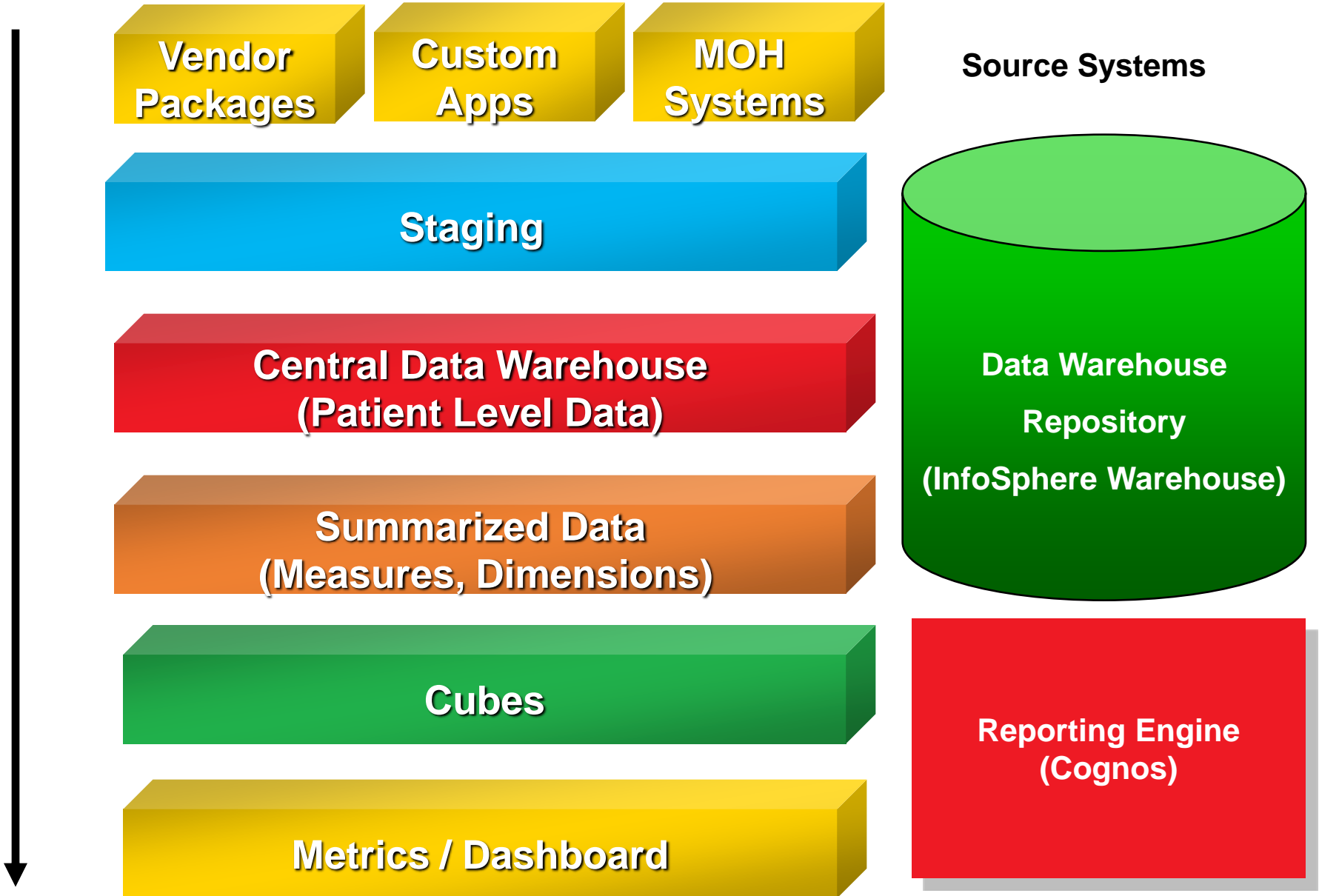
## *Operational*

- MRI hours
- Finance
  - Increase in funding for research activities
  - Increase in Non-Ministry of Health Net Revenues
  - Margin, Current Ratio, Budget variances
- # Surgeries
  - Hip and Knee Joint Replacements
  - Cataract, Pediatric, General, Cancer
- Antibiotics administered in time for hip/knee surgery
- Alternate Level of Care (ALC) Days
- Mental Health Inpatient Days
- Ambulatory Care Visits
- Visits to Emergency/Urgent Care
- # Colonoscopies
- # Systematic Therapy Visits
- Occupancy Rates

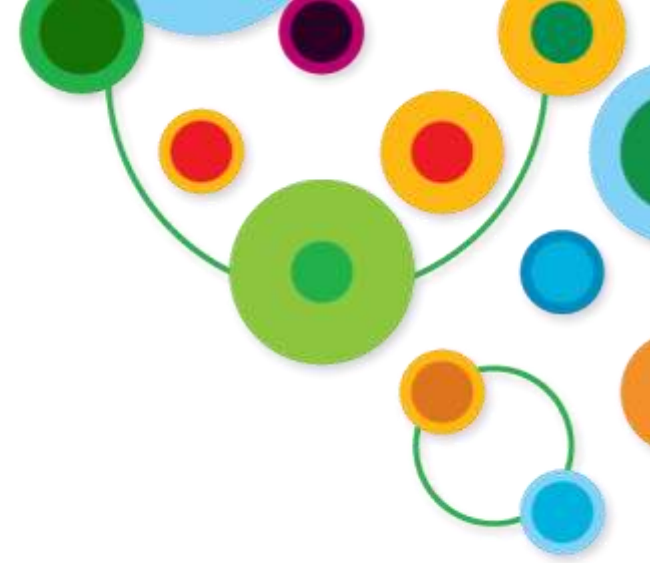
# Key Data Captured



# High Level Data Architecture



## Demo Screen Captures



**An illustration of the dashboards and on the capabilities to drill down and understand the data behind the metrics.**



# Main Dashboard Page – NYGH Strategy Map



NYGH ICA Scorecards

Public Folders

My Folders

Organizational Strategy Map

Corporate Dashboard

Accountability Agreements

Program / VP View

My Watch List

Cube Analysis

## Organizational Strategy Map

[Patient And Family Experience](#)

[Quality And Safety](#)

[Learning And Innovation](#)

[Community And Systems](#)

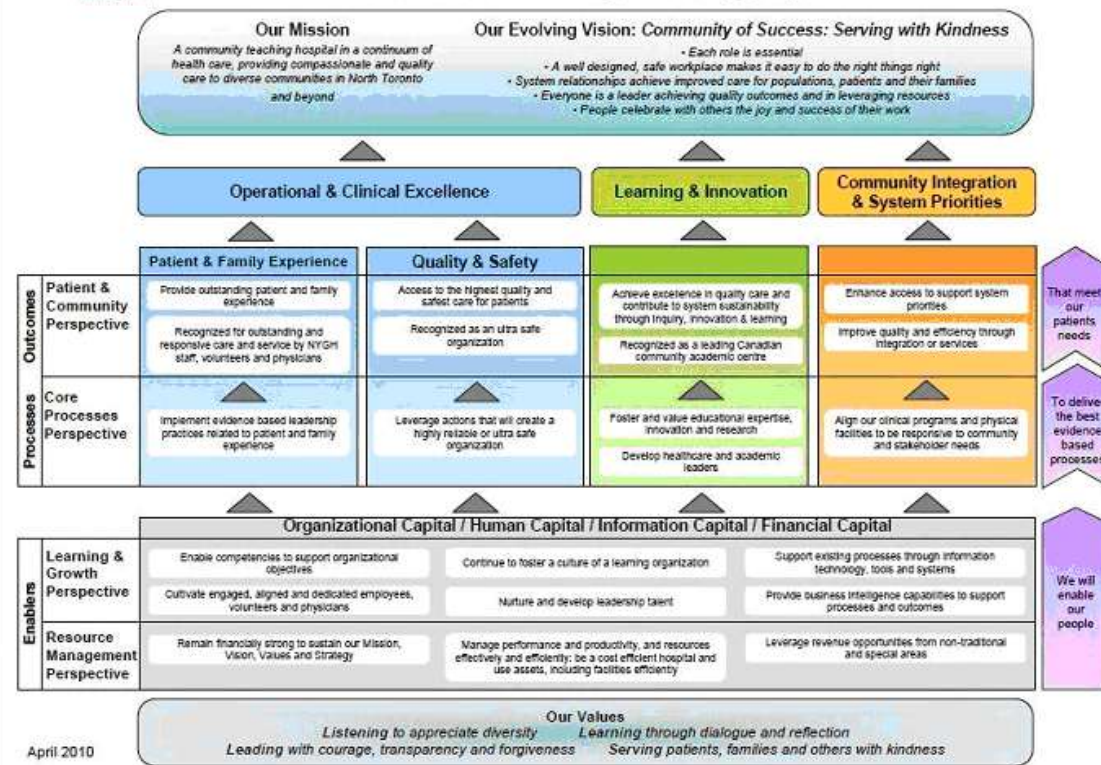
[Organizational And Human Capital](#)

[Information Capital](#)

[Financial Capital](#)



## North York General Hospital Strategy Map





# Patient And Family Experience Dashboard Tab

NYGH ICA Scorecards | Public Folders | My Folders

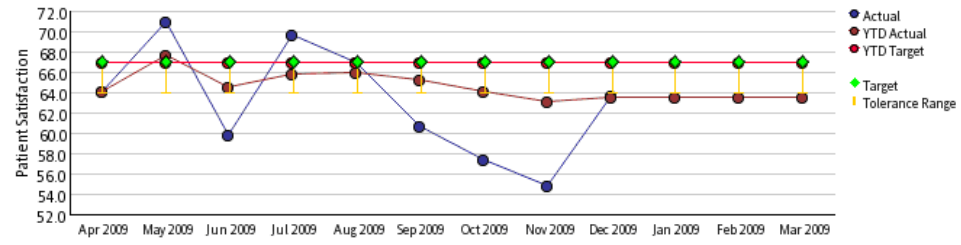
Organizational Strategy Map | Corporate Dashboard | Accountability Agreements | Program / VP View | My Watch List | Cube Analysis

- [Organizational Strategy Map](#)
- [Patient And Family Experience](#)**
  - [Quality And Safety](#)
  - [Learning And Innovation](#)
  - [Community And Systems](#)
  - [Organizational And Human Capital](#)
  - [Information Capital](#)
  - [Financial Capital](#)

Metric List

No filter

Patients / Community		Actual	Target	Variance	Variance %	YTD Actual	YTD Target	Time Period
	<a href="#">Patient Satisfaction - Emergency Dept</a>	63.8	67.0	-3.2	4.8%	63.5	67.0	Dec 2009
	<a href="#">Patient Satisfaction - Inpatient</a>	79.0	83.0	-4.0	4.8%	79.0	83.0	Dec 2009
	<a href="#">Patient Satisfaction - Maternal Newborn</a>	83.7	87.0	-3.3	3.8%	84.2	87.0	Dec 2009



# Corporate Dashboard

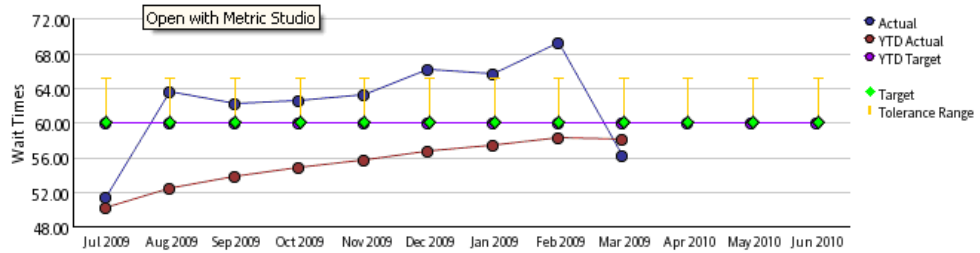
## “Community And Systems” Tab



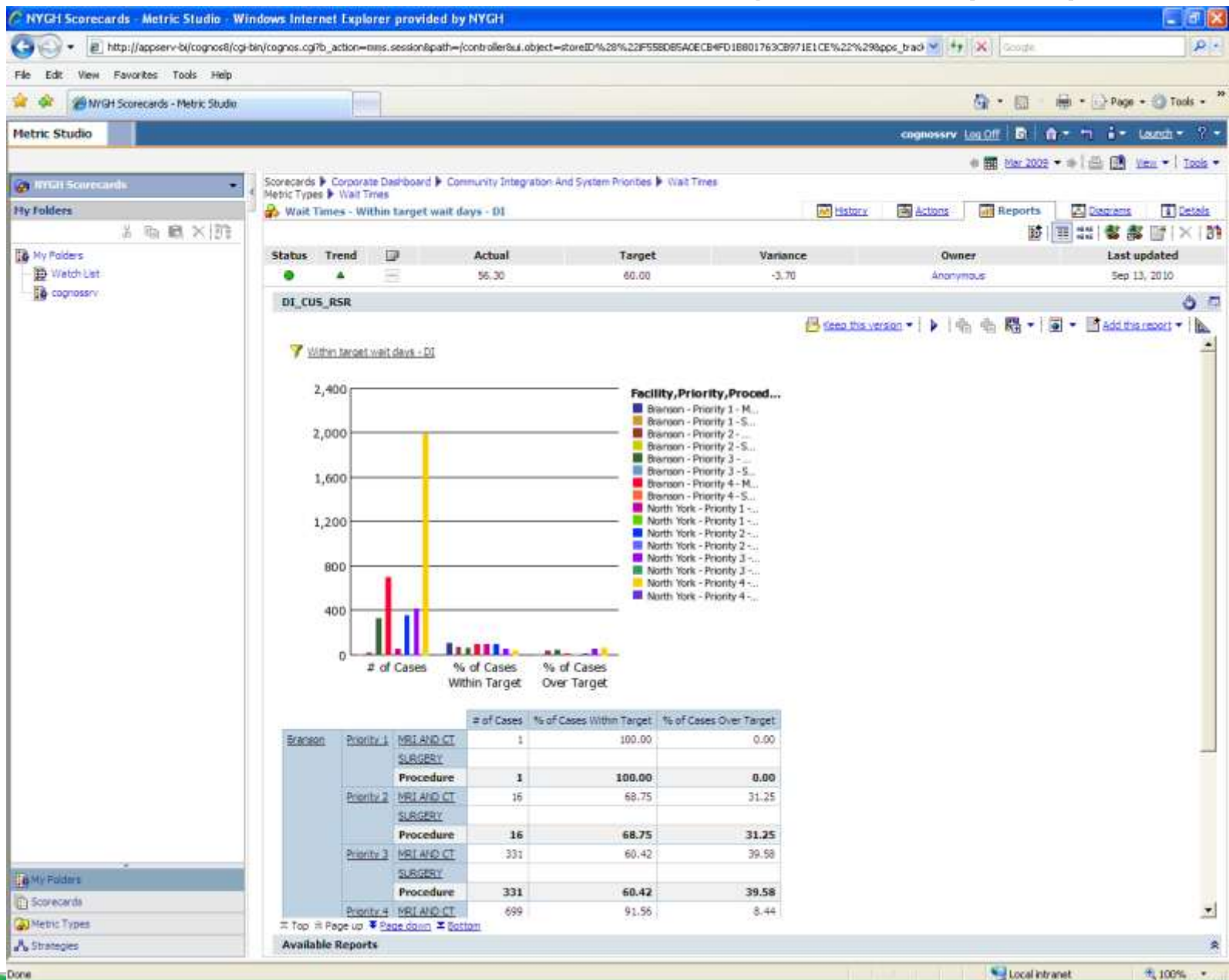
No filter

Community Integration And System Priorities    0 1 5

Wait Times		0	1	5			
Name	Actual	Target	Variance	Variance %	YTD Actual	YTD Target	Time Period
Wait Times - Cancer > 84 days	0.00	0.00	0.00		0.00	0.00	Mar 2009
Wait Times - Cataract > 182 days	0.00	0.00	0.00		0.00	0.00	Mar 2009
Wait Times - Hip > 182 days	0.00	0.00	0.00		0.00	0.00	Mar 2009
Wait Times - Knee > 182 days	0.00	0.00	0.00		0.00	0.00	Mar 2009
Wait Times - MRI > 28 days	62.87	60.00	2.87	4.78%	65.96	60.00	Mar 2009
Wait Times - Within target wait days - DI	56.30	60.00	-3.70	6.16%	58.11	60.00	Mar 2009



# Details of “Wait Times Within Target – DI” (Top)



# Details of "Wait Times Within Target – DI" (Bottom)



NYGH Scorecards - Metric Studio - Windows Internet Explorer provided by NYGH

http://appserv-bj/cognos8/cgi-bin/cognos.cgi?b\_action=mnv.session&path={controller&ui.object=storeID%26%22F55BD8540ECB4FD1B801763CB971E1CE%22%29&pps\_track=...

Metric Studio

Scorecards > Corporate Dashboard > Community Integration And System Priorities > Wait Times  
Metric Types > Wait Times

Wait Times - Within target wait days - DI

Status: ● Trend: ▲ Actual: 56.30 Target: 60.00 Variance: -3.70 Owner: Anonymous Last updated: Sep 13, 2010

DI\_CUS\_RSR

Within target wait days - DI

Month-Year	Priority	SURGERY	# of Cases	% of Cases Within Target	% of Cases Over Target
Health-Work	Priority 4	Procedure	1,991	36.56	63.44
		HIRLAND CT	2,809	46.96	53.04
Facility	Priority 1	SURGERY	2,809	46.96	53.04
		Procedure	52	98.08	1.92
	Priority 2	HIRLAND CT	52	98.08	1.92
		SURGERY	369	91.60	8.40
	Priority 3	Procedure	369	91.60	8.40
		HIRLAND CT	745	55.57	44.43
	Priority 4	SURGERY	745	55.57	44.43
		Procedure	2,690	50.86	49.14
	Priority	HIRLAND CT	2,690	50.86	49.14
		SURGERY	3,856	56.30	43.70
		Procedure	3,856	56.30	43.70

19-Oct-10 -> 2:56:11 PM

Available Reports

# Prepare To Drill Through To Detail On Tallest Yellow Bar



NYGH Scorecards - Metric Studio - Windows Internet Explorer provided by NYGH

http://appserv-bj(cognos8)/cg-bin/cognos.cgi?b\_action=mms.session&path=/controller&ui.object=storeID%26%22P958D65A0EC94FD1B801763CB971E1CE%22%29&pps\_track

NYGH Scorecards - Metric Studio

Scorecards > Corporate Dashboard > Community Integration And System Priorities > Wait Times  
Metric Types > Wait Times

Wait Times - Within target wait days - DI

Status	Trend	Actual	Target	Variance	Owner	Last updated
<span style="color: green;">●</span>	<span style="color: green;">▲</span>	56.30	60.00	-3.70	Anonymous	Sep 13, 2010

DI\_CUS\_RSR

Within target wait days - DI

Facility, Priority, Proced...

- Branson - Priority 1 - M...
- Branson - Priority 1 - S...
- Branson - Priority 2 - ...
- Branson - Priority 2 - S...
- Branson - Priority 3 - ...
- Branson - Priority 3 - S...
- Branson - Priority 4 - M...
- Branson - Priority 4 - S...
- North York - Priority 1 ...
- North York - Priority 1 ...
- North York - Priority 2 ...
- North York - Priority 2 ...
- North York - Priority 3 ...
- North York - Priority 3 ...
- North York - Priority 4 ...
- North York - Priority 4 ...

	# of Cases	% of Cases Within Target	% of Cases Over Target
Branson			
Priority 1			
MRI AND CT	1	100.00	0.00
SURGERY			
Procedure	1	100.00	0.00
Priority 2			
MRI AND CT	16	68.75	31.25
SURGERY			
Procedure	16	68.75	31.25
Priority 3			
MRI AND CT	331	60.42	39.58
SURGERY			
Procedure	331	60.42	39.58
Priority 4			
MRI AND CT	699	91.56	8.44

Available Reports

# Drill Through To Detail



DT Target - Cognos Viewer - Windows Internet Explorer provided by NYGH

http://appserv-bj/cognos8/cgi-bin/cognos.cgi

Cognos Viewer - DT Target

Keep this version | Add this report

# of Cases	# of Cases Within Target	WTIS_DT_ID	SITE_ID	PARTICIPANT_ID	PATIENT_ID	ACCESS_TARGET_DAYS	ACTUAL_SERVICE_DT	CREATION_DT	DATES_AFFECT_READINESS_TO_TREAT	ENTRY_EXCLUDED_FROM_REPORTS	FACILITY	HEALTHCARE_PRC
3	2	58	0	0	3,563,643	84	18-Mar-10	22-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	90	0	0	4,134,813	84	21-Mar-10	24-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	107	0	0	1,666,038	84	31-Mar-10	8-Apr-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	122	0	0	2,186,532	84	13-Mar-10	18-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	196	0	0	785,484	84	2-Mar-10	2-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	358	0	0	2,068,338	84	1-Mar-10	4-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	532	0	0	5,039,787	84	9-Mar-10	17-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	561	0	0	2,044,164	84	14-Mar-10	17-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	586	0	0	4,407,951	84	2-Mar-10	3-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	
3	2	654	0	0	2,259,432	84	22-Mar-10	25-Mar-10	0	N	NORTH YORK GENERAL HOSPITAL (632)	

Top | Page up | Page down | Bottom

Local intranet | 100%

# For Additional Analysis, Launch The OLAP Cube



New \* - IBM Cognos 8 BI Analysis Studio - Windows Internet Explorer provided by NYGH

File Edit View Settings Run Help

Insertable Objects

- WTTIS\_DI
  - Date
  - KPI
    - Within target wait days - DI
    - MRI > 28 days
  - Facility
    - Branson
    - North York
  - Priority
    - Priority 1
    - Priority 2
    - Priority 3
    - Priority 4
  - Procedure
    - MRI AND CT
      - CT SCAN
      - MRI
    - SURGERY
  - Scorecard
  - Measures
    - # of Cases
    - # of Cases Within Target
    - # of Cases Over Target
    - % of Cases Within Target
    - % of Cases Over Target
    - # of Cases Within Target (YTD)
    - # of Cases Over Target (YTD)
    - # of Cases (YTD)
    - % of Cases Within Target (YTD)
    - % of Cases Over Target (YTD)
    - Access Target Days
    - Actual Wait Days
    - Records

Rows: Date Columns: Priority Measures (list) Context filters

Suppression is applied: Rows, Columns. Remove All Suppression

	# of Cases	# of Cases Within Target	# of Cases Over Target	% of Cases Within Target	% of Cases Over
FY 08/09	Priority 1	621	582	39	93.72
	Priority 2	4,395	3,479	936	79.16
	Priority 3	9,684	3,982	5,702	41.12
	Priority 4	42,460	23,779	18,681	56.00
	<b>Priority</b>	<b>57,160</b>	<b>31,822</b>	<b>25,338</b>	<b>55.67</b>
FY 09/10	Priority 1	658	633	25	96.20
	Priority 2	4,620	3,777	843	81.75
	Priority 3	9,158	4,445	4,713	48.54
	Priority 4	38,434	23,005	15,429	59.86
	<b>Priority</b>	<b>52,870</b>	<b>31,860</b>	<b>21,010</b>	<b>60.26</b>
Date	Priority 1	1,279	1,215	64	95.00
	Priority 2	9,015	7,256	1,759	80.49
	Priority 3	18,842	8,427	10,415	44.72
	Priority 4	80,894	46,784	34,110	57.83
	<b>Priority</b>	<b>110,030</b>	<b>63,682</b>	<b>46,348</b>	<b>57.88</b>

Information - Priority

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