

# *Automated UICC-TNM Staging*

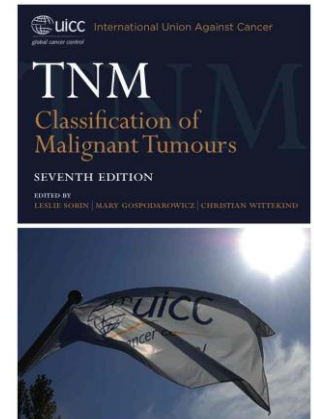


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# Outline

- The *problem* with current case ascertainment
- The rationale for automating UICC-TNM staging for the Princess Margaret Cancer Centre (PM)
- Illustrate how the data elements are automatically populated from two data sources
- Demonstrate how the process has helped with the data quality in the Cancer Registry



# The *Problem*

PAST

**PRESENT**

FUTURE

- Delay in identifying all new primary cases seen at Princess Margaret Cancer Centre
- Difficulty in identifying subsequent primaries and recurrences



# Case Ascertainment

PAST

**PRESENT**

FUTURE

- Scheduling system for new patients
  - ✓ Affiliated hospitals see patient for 1<sup>st</sup> time, not booked as new patients when they arrive at PM
  - ✓ Last minute bookings
  - ✓ Patients on follow up, if new primary diagnosed, no way to book new cancer or record recurrences other than in dictated clinical notes
- Surgical bookings
  - ✓ Clerical process to flag for cancer related surgery
- In-Patient admissions

# A Possible SOLUTION!

PAST

**PRESENT**

FUTURE

Look at pre-existing UHN systems with TNM data

- Is the *data timely*?
- Is the *data accurate*?
- Is the *data complete*?

If not *yes* to above can we still use the data

Can the data be transferred between platforms

# Radiation Treatment-Mosaiq (MQ)

PAST

**PRESENT**

FUTURE

- One source of accurate staging information that already existed at PM was in the radiation prescription & treatment database, “Mosaiq”
- The Radiation Oncologists are encouraged to enter staging into the prescription section
- An interface was designed to transfer the required data elements into the staging tool on a daily basis

# MQ With Staging Data

Diagnosis and Staging - MRN#: 4194706 MAJOR, JOSEPH EMERICH

Affirm Diagnosis This diagnosis has been affirmed. Wait Code:

Diagnosis: C20.9 Rectum, NOS Category: LGI C20 C21 C26 Initial Diagnosis:

Laterality:  Type: Primary Consultation: 5/ 6/2014

Morphology: 8140/3 00 Adenocarcinoma, NOS Primary:  Inactive Diagnosis:

Notes:  Discriminator:  Tumor Marker:

Staging Tumor Details Additional Classifiers Collaborative Staging

Clinical

T: T3 - Tumor invades through the muscularis propria into pericolorectal tiss Stage: IIIB Confirm:

N: N1b - Metastasis in 2-3 regional lymph nodes Staged By: BRIERLEY, JIM D. P Grade:

M: M0 - No distant metastasis Edition: AJCC 7th Edition Age at Dx:

N/A:   Manually Stage

5/6/2014 12:29:09 PM: Clinical stage IIIB for T3 N1b M0

Diagnosis Specific Values

Date	Lab	Value	Units
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Pathologic

T:  Stage:

N:  Staged By: BRIERLEY, JIM D.

M:  Edition: AJCC 7th Edition

N/A:   Manually Stage

Close Display Folder

# Radiation Treatment-MQ- Set Up

PAST

**PRESENT**

FUTURE

- Working with informatics personnel in both departments mapping was developed for the transfer of:
  - ✓ Primary site
  - ✓ Morphology
  - ✓ Reason for referral
  - ✓ Clinical and Path T, N, M values and stage group
- This process went live in November 2011



# Radiation Treatment-MQ- Process

PAST

**PRESENT**

FUTURE

- Daily import reviewed on a daily basis
- Data that is downloaded into staging is reviewed and verified
  - ✓ Date of diagnosis added
  - ✓ Pathology staging for patients with surgery done elsewhere, if applicable is added
  - ✓ Staging is cross checked using dictated clinical notes, diagnostic imaging and outside reports stored in scanned documents

# Radiation Treatment-MQ- Challenges

PAST

**PRESENT**

FUTURE

- **Initially**
  - ✓ Not all TNM values are always entered
  - ✓ Primary staging may be inaccurately used for a recurrence
  - ✓ Inaccurate primary site
  - ✓ Metastatic site used rather than primary
- **Improvements**
  - ✓ Registry feedback to Radiation Oncologists resulted in dramatic improvements in correct primary site and complete TNM values being entered

# Example of MQ Download

## Cancer Staging Test

### Patient Information

Medical Record Number: **850**

Patient's Name:

Birth Date: **04/01/80** Gender: **M** [Edit](#)

Source **Mosaiq**

Record Creation Date: **04/01/14**

Last Appt. Date: **04/01/14**

### Case: 99 - -April 01, 2014 [New](#)

Disease is: **Malignant**

Reason for referral: **New Diagnosis of Primary** [?](#)

Site Group: **Digestive System**

Malignant Disease: **Rectum**

Morphology ICD-O-3: **81403 - Adenocarcinoma, NOS**

Appt Date: **Apr** / **1** / **2014**

Date of Diagnosis: **Select** / **Select** / **Select**

[Search](#) [Clear Morphology](#)

Clinical T: **T3** [?](#)

N: **N0**

M: **M0** [Copy to Path](#)

Post Neo-Adjuvant

Pathological T: **Select**

N: **Select**

M: **Select**

OVERALL Clinical Stage: [?](#)

**IIA**

[Calculate Stages](#)

OVERALL Path Stage:

Responsible Oncologist: **Dr. C Yellow**

Staged By: **Mr. Gregory W. Zufelt**

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# Radiation Treatment-MQ-Results

*PAST*

***PRESENT***

*FUTURE*

This process has allowed for the identification of

- ✓ additional cases
- ✓ subsequent primaries
- ✓ recurrences

With the daily process of review and verification, the time required to complete the staging record has been reduced in half compared to manual collection of staging

# Pathology Reports-Co-Path

PAST

**PRESENT**

FUTURE

- A second major source of staging data was identified through the pathology reporting system, Co-Path
- At UHN all surgical resections have *synoptic reports*:
  - an electronic report with discreet, table driven data fields
- Co-Path allows the pathologist to select from standardized options (checklists) to complete the pathology report

# Pathology Reports-Co-Path-Set-Up

PAST

**PRESENT**

FUTURE

- Mapping of the synoptic reports was completed disease site by disease site. Starting with *thyroid*
- Each CAP checklist was reviewed and data to be captured identified, not all synoptic data was used
- A program was developed to search each path report identifying
  - Primary site
  - Morphology, mapped from SNOMED to ICDO-3-M
  - TNM staging

# Pathology Reports-Co-Path-Process

PAST

**PRESENT**

FUTURE

- Cases downloaded as soon as the pathologist signs off the case
- Reviewed on a daily basis
- Data that is downloaded into staging is reviewed and verified
  - ✓ Date of diagnosis added
  - ✓ Clinical staging for patients is added, Clinical M0 used for Path if not M1
  - ✓ Staging is cross checked using dictated clinical notes, diagnostics imaging and outside reports stored in scanned documents

# Pathology Reports-Co-Path- Challenges

PAST

**PRESENT**

FUTURE

- If the M is blank than the diagnostic imaging and dictated clinical notes need to be reviewed
- Primary staging maybe inaccurately used for a recurrence
- For certain cancer sites, the T value may be greater than the synoptic T value. Based on OR findings
- If tumour overlaps multiple sites i.e. head & neck, it may be difficult to determine the true primary site



# Example of Co-Path Download

### Cancer Staging Test

**Patient Information**

Medical Record Number: **750**  
Patient's Name: **SEVEN, Fifty**  
Birth Date: **04/01/80** Gender: F

Source: **Co-Path**  
Record Creation Date: **06/18/14**  
Last Appt. Date: **06/18/14**

**Case: -Malignant-June 18, 2014** 

Disease is:  Appt Date:  /  /   
Reason for referral:   Date of Diagnosis:  /  /   
Site Group:   
Malignant Disease:   
Morphology ICD-O-3: **83803 - Endometrioid adenocarcinoma, NOS**

Post Neo-Adjuvant

Clinical T:   Pathological T:   
N:  N:   
M:   M:

Responsible Oncologist:  Staged By:

# Example of Co-Path Download

### Cancer Staging Test

**Patient Information**

Medical Record Number: **750**  
Patient's Name: **SEVEN, Fifty**  
Birth Date: **04/01/80** Gender: **F** [Edit](#)

Source: **Co-Path**  
Record Creation Date: **06/18/14**  
Last Appt. Date: **06/18/14**

**Case: -Malignant-June 18, 2014** [New](#)

Disease is: **Malignant** Appt Date: **Jun / 18 / 2014**  
Reason for referral: **New Diagnosis of Primary** [?](#) Date of Diagnosis: **Select / Select / Select**  
Site Group: **Gynecologic**  
Malignant Disease: **Corpus Uteri**  
Morphology ICD-O-3: **83803 - Endometrioid adenocarcinoma, NOS**  
[Search](#) [Clear Morphology](#)

Post Neo-Adjuvant

Clinical T: **Select** [?](#) Pathological T: **T2**  
N: **Select** N: **N0**  
M: **Select** [Copy to Path](#) M: **M0**

**OVERALL Clinical Stage:** [?](#) [Calculate Stages](#) **OVERALL Path Stage:**  
**II**

Responsible Oncologist: **Dr. C Yellow** Staged By: **Ms. Darlene Dale**

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# Pathology Reports-Co-Path- Results

*PAST*

***PRESENT***

*FUTURE*

- Once again the automatic download of the staging information helped with case ascertainment by identifying:
  - ✓ additional cases
  - ✓ subsequent primaries
  - ✓ recurrences

As with the MQ data, the daily process of review and verification, the time required to complete the staging record has been reduced in half compared to manual collection of staging

# Co-Path and Mosaiq-Impact

PAST

**PRESENT**

FUTURE

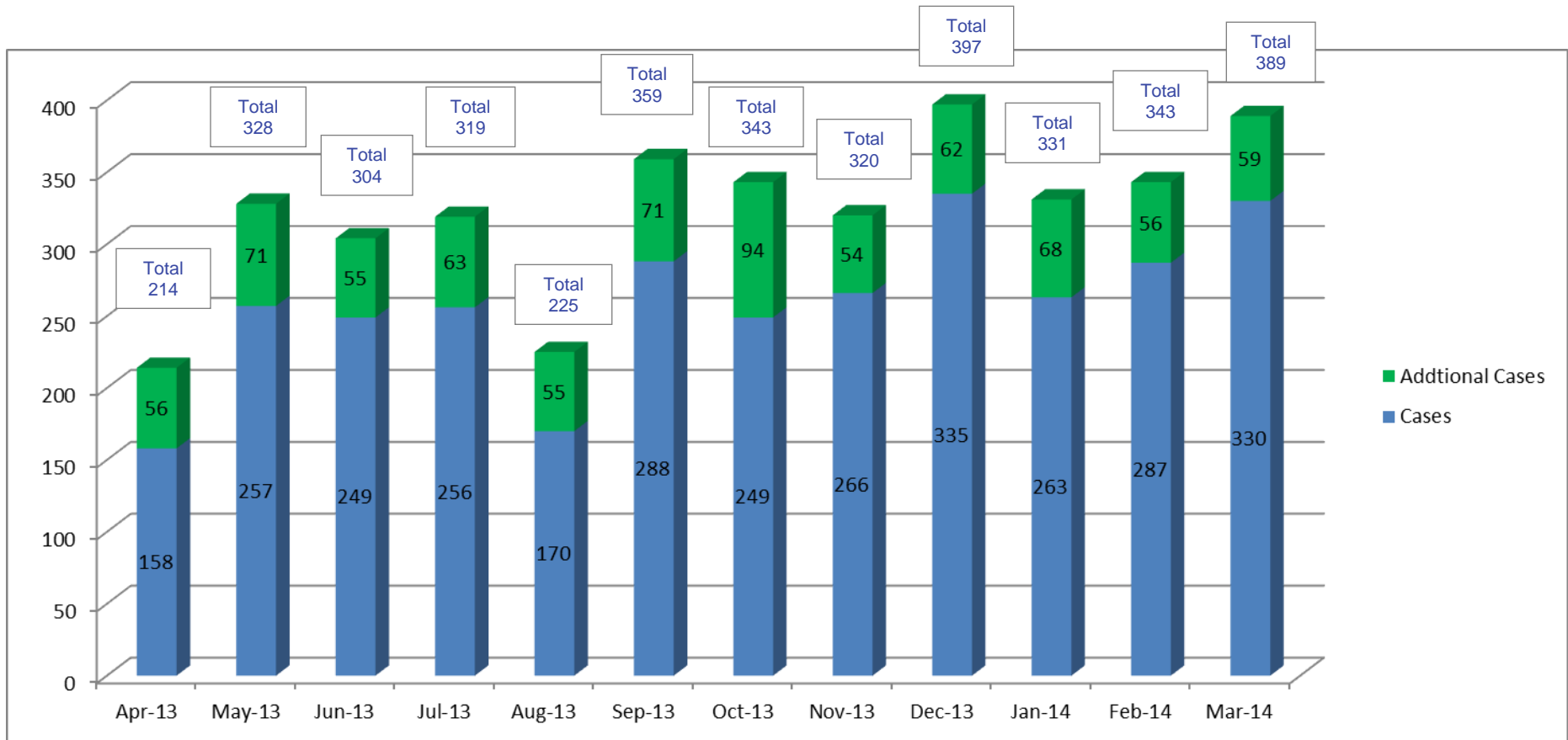
In an average month, **781** malignant cases are processed of which **46.2%** have the staging information automatically downloaded from the two electronic data sources of Co-Path and Mosaiq

# Results of Automated Data

Radiation System MQ		
Month	Total Records Reviewed	Additional Cases
January 14	370	25
February 14	315	26
March 14	366	27
April 14	343	33

Pathology System Co-Path		
Month	Total Records Reviewed	Additional Cases
January 14	331	68
February 14	343	56
March 14	389	59
April 14	342	53

# Co-Path Reports at PM 2013-2014



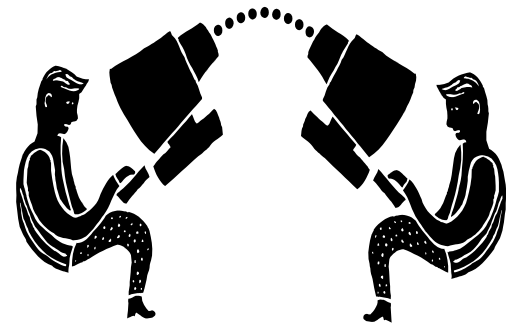
# Impact of Co-Path and Mosaiq

PAST

**PRESENT**

FUTURE

- Prior to these automated downloads of data from MQ and Co-Path, on average a single case would be staged in 10 minutes
- Now 5 cases can be staged in 10 minutes



# Cancer Staging System: Data Flow

PAST

PRESENT

FUTURE

**Clinical Desktop**  
UHN's EPR



**Transactional Systems**



**Research Databases**



**Pathology**  
Co-Path



**Radiation**  
Mosaiq



**Oncology**  
Cancer Staging



**Cancer Registry**  
ISIS Registrar



# ISIS-Registrar- Data Collected

*PAST*

*PRESENT*

*FUTURE*

- The patient
- Disease and staging
- First course of treatment
- Follow-up

# Harmonized Stage in ISIS-Registrar

PAST

**PRESENT**

FUTURE

The Registry's database ISIS-Registrar allows for the capture of three stage groupings using UICC TNM 7<sup>th</sup> edition

- ✓ **Clinical** staging with all the TNM data elements and stage group
- ✓ **Pathological** staging with all the TNM data elements and stage group
- ✓ **Harmonized** (combined) staging using a combination of clinical and pathological TNM to arrive at a best or combined stage

# ISIS Registrar Harmonized Stage

STAGED, Example 00000001

Abstract | Patient | **Tumor/EOD** | Treatment | Admission/Follow-up | Notes/Over-rides

Primary Site: **C501** Central portion of breast  
 Primary Site Text:   
 Laterality: **2** Left: origin of primary

Morphology/Behavior:  
 ICD-O-3: **85003** Infiltrating duct carcinoma (C50\_)  
 ICD-O-2:   
 Morphology Text:

Grade: **9** Not Available  
 Confirmation: **1** Positive Histology

TNM Edition No: **7** Seventh Edition (2010)

**Staging**

Clinical T: **1B** T1b N: **0** N0 M: **0** M0 Group: **1A** IA COC Desc.   
 Pathological T: **1C** T1c N: **X** NX M: **0** M0 Group: **99** 99 COC Desc.   
 Other Staging T: P  **1C** T1c N: C  **0** N0 M: C  **0** M0 Group: **1A** IA  
 COC Desc.  Staged By:   
 Other Staging Basis: Combined Stage

Tumor Markers 1: **9** N/A; unknown; no information 2: **9** N/A; unknown; no information 3: **9**  
 Distant Mets 1: **0** None 2: **0** None 3: **0**

Estrogen:  Positive  
 Progesterone:  Positive  
 HER2:  Negative

# The Future....

PAST

PRESENT

**FUTURE**

Where to look for more staging data?

- Some sources of pre-existing staging that could be used include
  - ✓ synoptic OR reports
  - ✓ synoptic diagnostic imaging
  - ✓ chemotherapy order entry
  - ✓ site specific research databases

The format of pre-existing data may require transformation to allow for integration into the Registry system. A system of quality control and verification would be required

# Summary

- The UICC TNM staging application at PM has changed dramatically throughout the years
  - ✓ It started out as a manual paper process
  - ✓ Evolved into a manual electronic staging tool
  - ✓ Progressed into an automated transfer of UICC TNM data elements from pre-existing databases
- The time required to complete a staging record has been reduced,
- Additional cases, subsequent primaries and recurrences are identified
- Allowed for fast and efficient processing of staging
- As with all processes this continues to evolve and change with new needs and access to additional resources to streamline the staging process

# Acknowledgements

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