Outline

• The *problem* with current case ascertainment
• The rational 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*

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

- **Scheduling system for new patients**
  - Affiliated hospitals see patient for 1st 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!

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)

- 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
Radiation Treatment-MQ- Set Up

- 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

- 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

- **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: Edit
Birth Date: 04/01/80 Gender: M

Record Creation Date: 04/01/14
Last Appt. Date: 04/01/14
Source: Mosaiq

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

Clinical T: T3
N: N0
M: M0

OVERALL Clinical Stage: IIA

Pathological T: Select
N: Select
M: Select

OVERALL Path Stage:

Responsible Oncologist: Dr. C Yellow
Staged By: Mr. Gregory W. Zufelt

Hide Patient Info Record History Delete Case Delete Patient In Progress No Show Cancel Save Signoff...
Radiation Treatment-MQ-Results

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.
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

• 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

- 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

• 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
Example of Co-Path Download
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

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

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Records Reviewed</th>
<th>Additional Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 14</td>
<td>370</td>
<td>25</td>
</tr>
<tr>
<td>February 14</td>
<td>315</td>
<td>26</td>
</tr>
<tr>
<td>March 14</td>
<td>366</td>
<td>27</td>
</tr>
<tr>
<td>April 14</td>
<td>343</td>
<td>33</td>
</tr>
</tbody>
</table>

### Pathology System Co-Path

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Records Reviewed</th>
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</tr>
</thead>
<tbody>
<tr>
<td>January 14</td>
<td>331</td>
<td>68</td>
</tr>
<tr>
<td>February 14</td>
<td>343</td>
<td>56</td>
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<tr>
<td>March 14</td>
<td>389</td>
<td>59</td>
</tr>
<tr>
<td>April 14</td>
<td>342</td>
<td>53</td>
</tr>
</tbody>
</table>
Impact of Co-Path and Mosaiq

- 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

Clinical Desktop
UHN’s EPR

Transactional Systems

Research Databases

PRESENT

UHN Data Warehouse

FUTURE

Pathology Co-Path

Radiation Mosaiq

Oncology Cancer Staging

Cancer Registry
ISIS Registrar
ISIS-Registrar- Data Collected

- The patient
- Disease and staging
- First course of treatment
- Follow-up
The Registry’s database ISIS-Registrar allows for the capture of three stage groupings using UICC TNM 7th 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**

<table>
<thead>
<tr>
<th>Abstract</th>
<th>Patient</th>
<th>Tumor/EOD</th>
<th>Treatment</th>
<th>Admission/Follow-up</th>
<th>Notes/Over-rides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

- **Primary Site:** C501 Central portion of breast
- **Primary Site Text:** 2 Left: origin of primary
- **Morphology/Behavior:**
  - **ICD-O-3:** 85003 Infiltrating duct carcinoma (C50_)
  - **ICD-O-2:**

**Morphology Text:**

- **Grade:** 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: IA 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 D N0 M: C D M0 Group: IA IA COC Desc. 

**Other Staging Basis:** Combined Stage

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

- **Estrogen:** Positive
- **Progesterone:** Positive
- **HER2:** Negative
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
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