



**The beginning of cancer patient journey:
Automated cancer result Notification
for better patient care**

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Clinical Result Notification

- *“When test results are not acted on in a timely and appropriate manner, patients’ safety and satisfaction are jeopardized.”*

Eric G Poon et al. Journal of Biochemical Informatics 2003

- *“Information technologies that facilitate the transmission of important patient data can potentially improve the quality of care.”*

Kuperman et al. JAMIA 1999



Cancer Result Notification

- *Cancer refers to a group of diseases with uncontrolled tissue growth.*
- *It may progress to cause local invasion and distant metastasis, leading to morbidity and mortality.*
- *Early diagnosis and treatment is one of the crucial factors affecting prognosis.*
- ***Timely notification of histopathology result*** is hence essential in cancer patient management.

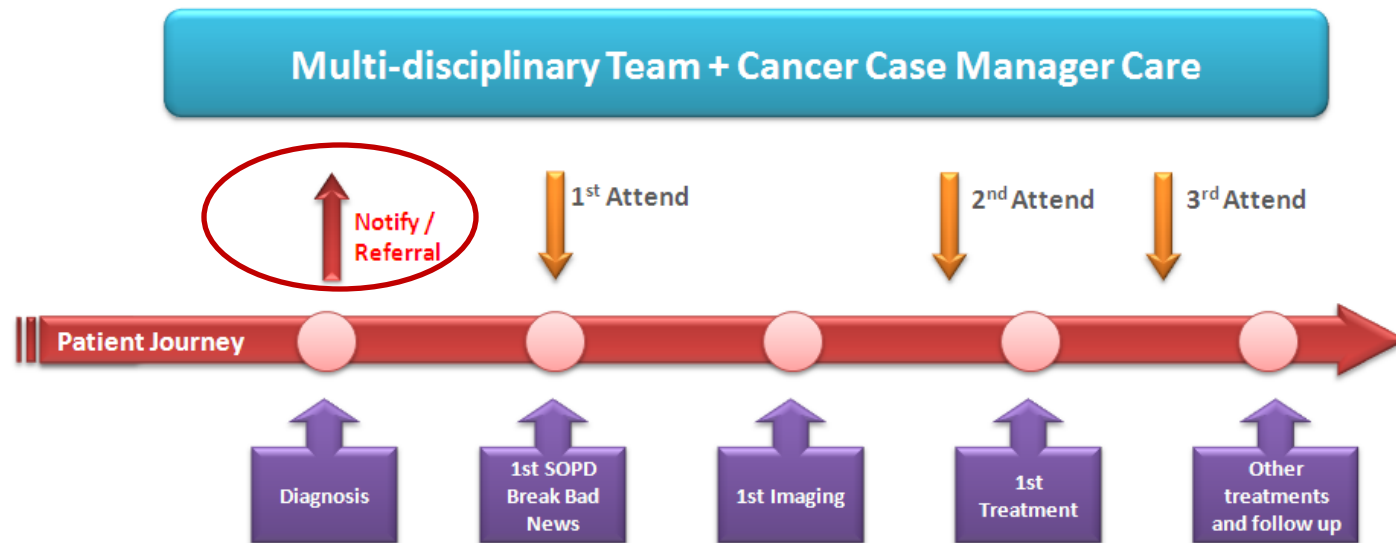


Breast Cancer

- *Breast cancer is the major lady killer worldwide*
- *From the 2008 Hong Kong Cancer Registry data,*
 - *Breast cancer is the top female cancer*
 - *It affects one every 21 females*
 - *It ranks the third highest cancer death cause*



Cancer Patient Journey

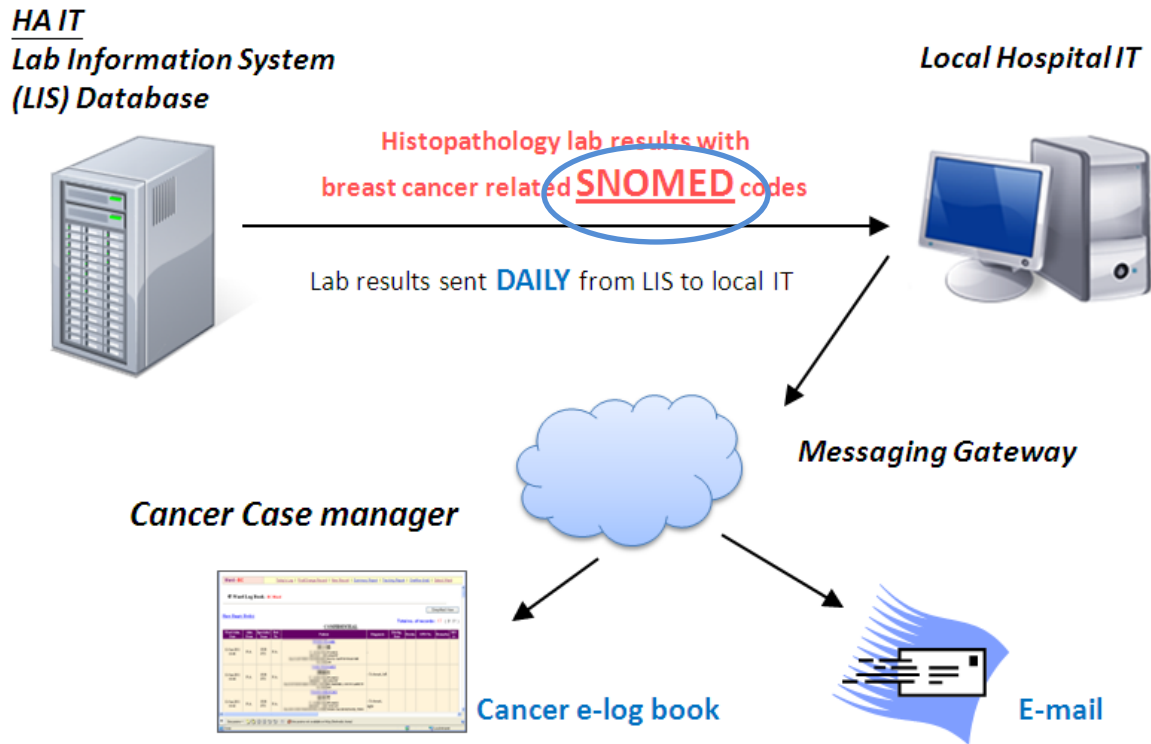


Automated Breast Cancer Result Notification Proof of Concept (POC) Project

- *A proof of concept (POC) project has been planned to conduct in one local Hospital for automating the breast cancer result notification mechanism instead of traditional time consuming manual screening*
- *It aimed at early result notification to facilitate case manager workflow and follow up of patient journey*



Schematic diagram of Cancer Result Notification Project design



SNOMED

- ***Systematized Nomenclature of Medicine (SNOMED)***
 - *It is a multiaxial, hierarchical classification system , for the purpose of accurately storing and/or retrieval of records in clinical care*
- *In Hospital Authority Pathology Laboratory, SNOMED codes are used in result reporting*
 - *T (Topography): Anatomical terms, and*
 - *M (Morphology): Changes found in cells, tissues and organs*



Retrospective Review

- ***A retrospective review** was performed in June 2011*
- *To evaluate the accuracy of using the selected **SNOMED** codes as pathology report retrieval criteria for breast cancer result notification*



Methodology

- *Breast cancer related pathology reports from 1 Jan **2010** to 31 Dec 2010 were retrieved from LIS according to the selected SNOMED codes*
- *List of patients with newly diagnosed breast cancer of the same period provided by the local hospital (Kwong Wah Hospital, KWH) was used as reference test*
- *The two lists were compared for potential discrepancy*



Results

- *HA LIS:*
 - **1660** transactions were retrieved
 - Belonged to **533** reports
 - Breast: **500** reports
 - Lymph nodes: **33** reports (**22**: LN only, **11**: Breast and LN)
 - Belonged to **308** patients (1-4 reports/patient)
- *KWH:*
 - **263** patients were recorded (with pathological Dx in KWH)
- Mapping was performed, **243** patients were appeared on both KWH and LIS list
- **“Sensitivity”** = $243/263 \times 100\% = 92\%$



Results

21 cases (8%) were appeared in KWH list but not included in LIS list

- **2 cases with no SNOMED codes** input by pathologists
 - 1 was DCIS after definitive surgery
 - 1 was Adenocarcinoma
- **15 cases with histopathology report confirmed malignancy**, but not retrieved by LIS due to involved SNOMED codes were not included in the previously provided list as retrieval criteria
- **4 cases showed either suspicious of malignancy or atypia** only on histopathology report, in which these SNOMED codes were not included in the previously provided list
 - 2 were subsequently confirmed CA in private OT
 - 1 was DCIS after definitive surgery
 - 1 was treated as recurrence with radiological evidence



Results

65 cases were appeared on the LIS retrieved list but not on KWH list

- **19** cases were **papilloma**
- **3** cases were fibroepithelial lesions, with SNOMED code of **Phyllodes tumour** (M90201) used
- **9** cases were **slides reviews** of private OT specimens (assuming KWH manual captured list provided did not involved private histopathology confirmed cases)
- **1** was **male** CA breast case
- **20** cases were those with FNA done in Nov or Dec **2009**, and OT in Jan/Feb 2010. Perhaps headcount will be included in KWH 2009 list
- **7** cases were 1st diagnosed in **private**
- **6** cases were 1st diagnosed in **other HA hospitals**



Discussion

- *Causes of discrepancies*
 1. *Not all histopathology reports with **SNOMED coding***
 2. *Inclusion of SNOMED codes of **benign** breast lesions*
 3. *Incomplete inclusion of SNOMED codes of certain histological types of **breast malignancy***
 4. *Incomplete inclusion of SNOMED codes of certain histological types of **pre-malignant breast lesions** which required case manager attention*
 5. *Incomplete inclusion of SNOMED **T-codes (Anatomical site)***



conclusion

- *Modification of the pre-selected SNOMED code list is needed before live run of POC project*
 - *Definite Malignancy*
 - *Suspicious of Malignancy*
- *Engagement of pathologist is also essential to ensure complete SNOMED coding upon issuing pathology report*



Second review after revision on SNOMED code list

- LIS:
 - **1774** transactions were retrieved
 - Belonged to **545** reports
 - Definite malignancy: **527** reports
 - Suspicious of malignancy: **18** reports
 - Belonged to **316** patients
 - Definite malignancy: **299** patients
 - Suspicious malignancy: **17** patients
- KWH:
 - **263** patients were recorded (with pathological Dx in KWH)
- Mapping was performed again, **258** patients were appeared on both KWH and LIS list
- **“Sensitivity”** = $258/263 \times 100\% = 98\%$



Progress

- *POC Project live run since 25 July 2011*
- *Parallel system with manual result screening and recording*
- *Prospective study on accuracy and reliability of refined SNOMED codes in POC project would be performed after implementation*



Way Forward

- *With the timely and automated result notification mechanism, facilitation on clinical frontline workflow and cancer patient management could be achieved*
- *Further extension of model by using generic HA Clinical Management System (CMS) platform in all HA hospitals will be the way forward*



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Questions and Comments



Thank You