

# Clinical leadership – an essential requirement for successful health information system implementation

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**HITC 2014 – 21<sup>st</sup> Oct 2014**

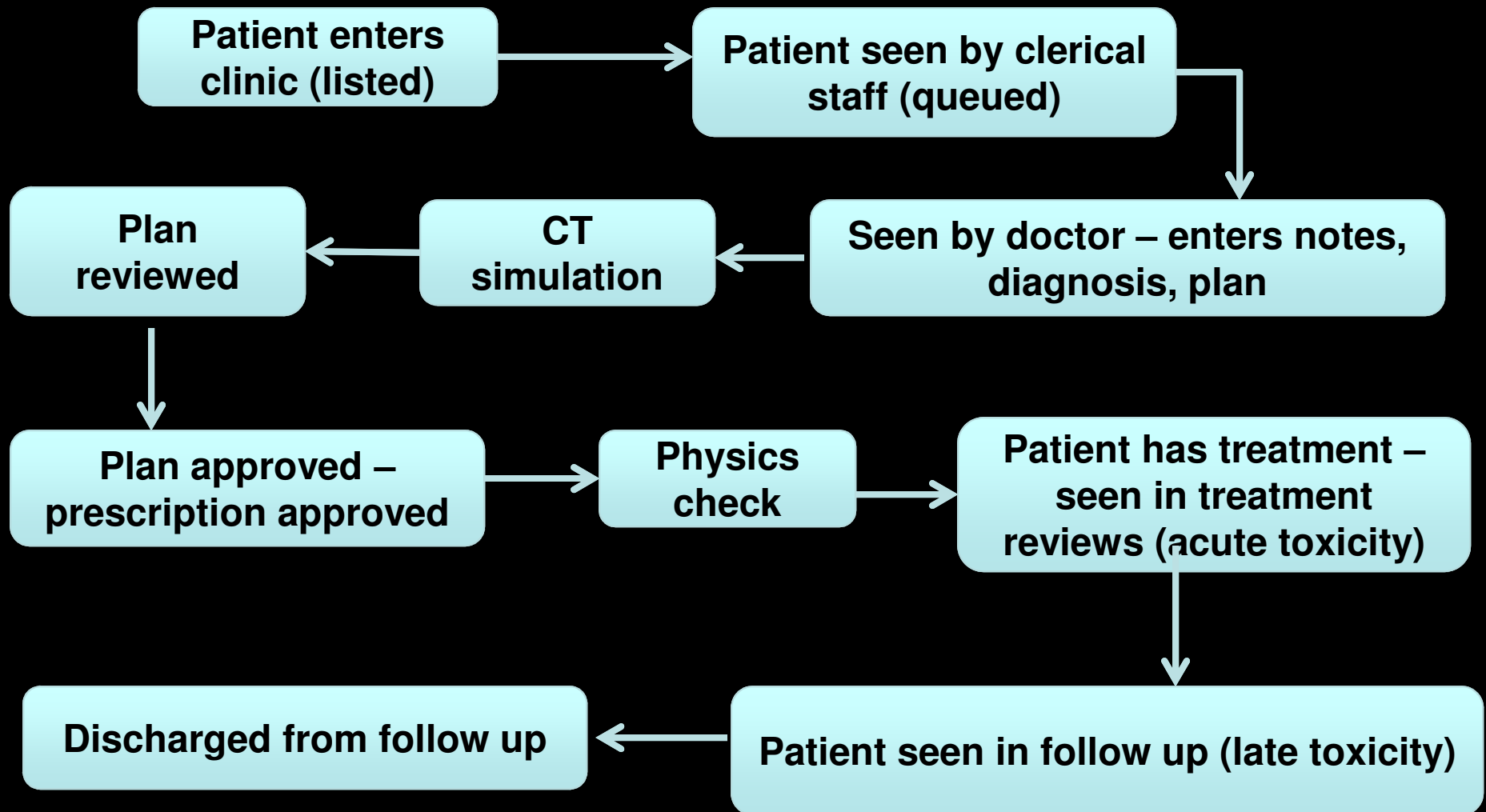
■ **Disclosure:**

**I have no conflicts of interest to disclose.**

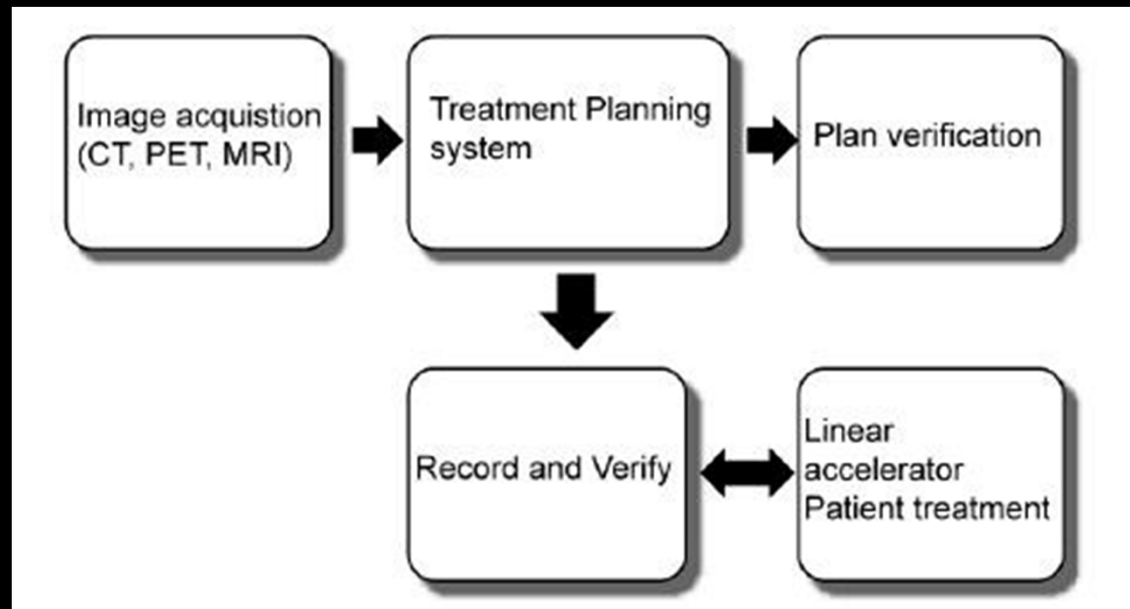
## ■ Background:

- Health information system (HIS) implementation
  - large challenge due to high cost and frequent failures
- HIS aims to eliminate and reduce human error and improve efficiency of health care.
- Factors influencing success – positive user attitudes, leadership, training/ user support, ill-defined project objectives
- Poorly studied in the oncology setting
- Sydney
  - 2 radiation oncology departments have implemented Oncology Information System (LANTIS®) 2002-2003 and preliminary discussion reveals “different levels of usage” 5 years post implementation

## ■ Clinical Workflow:



# ■ Schematic of a typical radiation therapy process flow



# ■ Linear Accelerator:



## ■ Objectives:

- To identify
  - differences in the implementation practices and usage of LANTIS®
  - critical factors and strategies for success
  - advantages or disadvantages in the health care delivery
- To understand
  - impact of different implementation practices on the clinical practice

## ■ Methods:

- Interview questions based on literature review
  - computer use
  - implementation
  - evaluation of current LANTIS® use
  - current clinical workflow
  
- Validity assessed by 2 radiation oncologists in a third hospital



## ■ Methods:

- Focussed, open-ended, semi-structured interviews (30-45 min) in Hospital A and B
  - 13 of 15 radiation oncologists
  - discussion was recorded and transcribed - analysis by coding concepts (NVIVO® software)
- Two researchers independently conducted the coding to ensure that the coding was accurate and comprehensive.
- The final interpretation was reached through discussion and consensus.

Patient: [Redacted] Referring MD: [Redacted] Age - DOB: [Redacted]

<p><b>Add to Onc Hx</b></p> <p><b>Onc Hx</b>   Past Hx   Fam Hx   Soc Hx   Mx Plan</p> <p>On 19/06/2003                  will start treatment with chemotherapy and radiotherapy for carcinoma of the nasopharynx on 23/6/03. Treatment needed to be delayed for dental extractions. The sockets are not fully healed but I am not willing to delay any further because of the risk of tumor progression. He had a PEG feeding tube inserted this week in preparation and is recovering well from this.</p> <p>On 29/05/2003 wrote:                  History as per                  OPinion sought regarding suitability for Cisplatin based concurrent chemoradiation.                  Planning date for RT is next week.                  No serious medical problems - no HT, No IDDM, No IHD, no Asthma, no TB                  Family hisroy of Hep B so patient was tested and is HEP B SAg +                  Sx ganglion L wrist                  Works Data production in telcommunication industry.                  recent decreased hearing R ear no previous problem                  P/E BP 110/80 HS dual PVD NAD reflex brisk generally, no sensory abnormality. Chest abdo clear. 3 cm R level 2 node mobile.</p> <p>Discussed treatment with D1, 22 43 Cisplatin given written info about acute and late toxicity : emesis, nuerological renal fertility and myelosuppression. Indicated a tough regimen with considerable toxicity with good chance of local control.                  Booking form done, referred dieteian, clinical psychologist and socoal worker- ( No friends and limite dfamily support).                  29/5/03</p> <p>P/E</p> <p>On 28/05/2003 wrote:</p>	<p>Flowsheets   Assessments   Images   QCL   Schedule</p> <p><b>Diagnoses and Interventions</b></p> <p>03/04: IIB: 2 Right Lateral wall of nasopharynx</p>	<p><b>Labs and Vitals</b></p>																																
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## ■ Results:

Functionalities used by Radiation Oncologists	Hospital A
Patients listed	Yes
Patients queued	Yes
Patient history and examination results	Yes
Electronic Radiation prescription	Yes
Electronic Approval of prescription	Yes
Acute side effects recorded at weekly treatment review (electronic RTOG assessments or notes)	Yes
Disease outcome & late side effects recorded during follow up (electronic RTOG assessments or notes)	Yes

## ■ Results:

Functionalities used by Radiation Oncologists	Hospital A	Hospital B
Patients listed	Yes	Yes
Patients queued	Yes	No
Patient history and examination results	Yes	No
Electronic Radiation prescription	Yes	No
Electronic Approval of prescription	Yes	No
Acute side effects recorded at weekly treatment review (electronic RTOG assessments or notes)	Yes	No
Disease outcome & late side effects recorded during follow up (electronic RTOG assessments or notes)	Yes	No

## ■ Pre-implementation phase

### Hospital A

- Single radiation oncology department established satellite centre 25 km away
- Paper file transportation cumbersome > need for paperless system
- State Health Department - took ownership leading to bulk purchase of oncology information systems for entire state

## ■ Pre-implementation phase

Hospital A	Hospital B
<ul style="list-style-type: none"><li>▪ Single radiation oncology department established satellite centre 25 km away</li></ul>	<ul style="list-style-type: none"><li>▪ DORIS in 1980s containing 50,000 patients basic demographic data (home grown system)</li></ul>
<ul style="list-style-type: none"><li>▪ Paper file transportation cumbersome &gt; need for paperless system</li></ul>	
<ul style="list-style-type: none"><li>▪ State Health Department - took ownership leading to bulk purchase of oncology information systems for entire state</li></ul>	

## ■ Implementation process

	Hospital A	Hospital B
Aim	<ul style="list-style-type: none"><li>▪ <b>To become paperless</b></li><li>▪ To improve patient care through increased efficiency</li></ul>	<ul style="list-style-type: none"><li>▪ <b>To transfer DORIS data</b> into LANTIS</li></ul>

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	Hospital A	Hospital B
<b>Aim</b>	<ul style="list-style-type: none"><li>▪ <b>To become paperless</b></li><li>▪ To improve patient care through increased efficiency</li></ul>	<ul style="list-style-type: none"><li>▪ <b>To transfer DORIS data</b> into LANTIS</li></ul>
<b>Difficulties</b>	<ul style="list-style-type: none"><li>▪ Organizational, Size, getting everyone on board, finance</li></ul>	<ul style="list-style-type: none"><li>▪ <b>Loss of project manager- management made no replacement</b></li><li>▪ <b>Loss of director</b></li></ul>



## ■ Implementation process

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<b>Strategies</b>	<ul style="list-style-type: none"><li>▪ <b>Clear vision from leader, Support from General Manager and NSW Dept. of Health, Project Manager, supportive training</b></li></ul>	<ul style="list-style-type: none"><li>▪ Project Manager who understood the clinical workflow and technical knowledge for data transfer</li></ul>

- **Similarities between two departments**
  - Profile of radiation oncologist
    - Age, computing skills
  - Attitudes of the radiation oncologists
    - positive, not too enthusiastic, not negative
  - Evaluation by the radiation oncologists
    - “implementation is a success”
    - “implementation is still incomplete”
    - User support and training adequate
  - Perception of the Project manager
    - Competent
    - Achieved goals

## ■ Comparison of Project leaders of implementation

	Hospital A	Hospital B
Project leader for the IS introduction	<b>Radiation Oncologist</b>	<b>Radiation Oncologist</b>
• A computer expert?	No	No
• A senior staff member?	Yes	Yes
• In a position of authority?	Yes	Yes

## ■ Comparison of Project leaders of implementation

	Hospital A	Hospital B
Project leader for the IS introduction	<b>Radiation Oncologist</b>	<b>Radiation Oncologist</b>
• A computer expert?	No	No
• A senior staff member?	Yes	Yes
• In a position of authority?	Yes	Yes
• Was there a <b>absence of leadership</b> either at or immediately after the implementation?	<b>No</b>	<b>Yes</b>
• Able to articulate a <b>'paperless' vision</b> at start of project?	<b>Yes</b>	<b>No</b>

## ■ Comparison of Project Manager of implementation

	Hospital A
Project Manager (day to day running of IS introduction)	<b>Senior Radiation Therapist</b>
• A computer expert?	No
• A senior staff member?	Yes
• <b>Supported by higher authority to change clinical practice?</b>	<b>Yes</b>
• Was there a vacancy or gap in the project manager role at or immediately after the implementation?	Yes
• Understand the clinical workflow?	Yes
• Perceived to be competent in their role of implementation?	<b>Yes</b>
• Achieve the aim of the implementation?	<b>Yes</b>

## ■ Comparison of Project Manager of implementation

	Hospital A	Hospital B
Project Manager (day to day running of IS introduction)	<b>Senior Radiation Therapist</b>	<b>Radiation Physicist</b>
• A computer expert?	No	Yes
• A senior staff member?	Yes	No
• <b>Supported by higher authority to change clinical practice?</b>	<b>Yes</b>	<b>No</b>
• Was there a vacancy or gap in the project manager role at or immediately after the implementation?	Yes	Yes
• Understand the clinical workflow?	Yes	Yes
• Perceived to be competent in their role of implementation?	<b>Yes</b>	<b>Yes</b>
• Achieve the aim of the implementation?	<b>Yes</b>	<b>Yes</b>

## ■ Advantages in Hospital A over Hospital B in health care delivery

- Efficient - Data
  - Never 'missing", Real time, entire multidisciplinary team adds data (med onc, pall care, etc), wide accessibility
- Quality assurance of data
  - Improved quality of data and reduced error
  - standard prescription, now legible
- Research Database
- Statistics on workflow – process reports
- Changed clinical workflow
  - Checklist functionality

## ■ Disadvantage – disaster when the system crashes

## ■ Results:

Functionalities used by Radiation Oncologists	Hospital A 2007	Hospital B 2007
Patients listed	Yes	Yes
Patients queued	Yes	No
Patient history and examination results	Yes	No
Electronic Radiation prescription	Yes	No
Electronic Approval of prescription	Yes	No
Acute side effects recorded at weekly treatment review (electronic RTOG assessments or notes)	Yes	No
Disease outcome & late side effects recorded during follow up (electronic RTOG assessments or notes)	Yes	No



## ■ Results updated:

Functionalities used by Radiation Oncologists	Hospital A 2007	Hospital B 2007	Hospital B 2014
Patients listed	Yes	Yes	Yes
Patients queued	Yes	No	Yes
Patient history and examination results	Yes	No	Yes
Electronic Radiation prescription	Yes	No	No
Electronic Approval of prescription	Yes	No	No
Acute side effects recorded at weekly treatment review (electronic RTOG assessments or notes)	Yes	No	No
Disease outcome & late side effects recorded during follow up (electronic RTOG assessments or notes)	Yes	No	No

## ■ Results updated:

- Hospital B acquires a new head of department
  - Leadership and aim of implementation to be paperless
  - Training
  - User support
  - Increased usage by multidisciplinary team
  - Obstacles more easily overcome

## ■ Conclusion:

- OIS has changed work practice
  - easier to use and safer than the paper-based system
- Supports previous literature - positive user attitudes, leadership, training/ user support
- Critical factors for success in this case study
  - Strong clinical leadership within the department
  - Clear vision prior to implementation
- Advantages in health care delivery
  - Timeliness of data and benefits through the organization of data most appreciated

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## ■ Key points:

- OIS implementation is a culture change in the workplace
- Don't need IT expertise to implement the information systems side, project management skills are desirable
- Clinical leadership essential
- Implement slow and steady seems to more effective
- Obstacles to implementation are common (resistance to change, getting everyone on board)
- Advantages of having an oncology information system outnumber the disadvantages

## ■ Acknowledgements:

- Project supervisors
- Radiation oncologists in both departments
- Informatics department of University of Wollongong for providing NVIVO software
- Yiyu Qiu – independently conducted coding
- Rashmi Nigam, Swapna Nair, Gowri Lachmana – transcription
- Dr. Tony Sara

# Questions ?

