



# A Case Study of the Implementation of an Oncology Information System in Two Hospitals in Sydney

Ping Yu, Senthilkumar Gandhidasan, Alexis Miller  
Health Informatics Research Lab  
School of Information Systems and technology  
University of Wollongong, Wollongong 2522 Australia



# Introduction

- Introducing information systems into hospital is challenged by technical, social and managerial impediments.
- A series of actions lead to a chain of responses, which attribute to success or failure.
- Few detailed, systematic studies of the introduction of oncology information systems (OIS) have been undertaken in Radiation Oncology; nor to say the effectiveness and outcomes of such OIS.



# The Aims of the Study

- To compare the introduction and use of the same OIS in two public hospitals
- Identify factors and actions that led to any difference in use, if it existed



# Research Methods

- The interview guide was developed based on the previous literature and three rounds of brain storming in the research team, followed by consultation with three radiation oncologists in a third hospital
- The issues to be investigated included
  - The clinician's computer experience
  - The implementation strategies and practices
  - The clinicians' current use and satisfaction with the OIS
  - Their perceived impact of the OIS on clinical practice
- The face value validity of the interview guide was assessed by two radiation oncologists in the third hospital.



# Research Methods

- The interview was conducted over a 3-week period in August 2007
- Twelve out of 15 radiation oncologists in both departments participated in the interview (80% of the population)
- Each interview lasted approximately 40 minutes, and was digitally recorded.
- The records were transcribed into text and imported into the NVIVO7 software (QSR International) for coding of concepts and issues.
- Two researchers independently conducted thematic categorization concurrently. Differences were reconciled by discussion.
- The codes were further assessed by the first author.



# Funding

- Initial project funding in both hospitals was provided by NSW Health.
- Hospital A successfully secured ongoing funding for the positions of a designated project manager and IT support person.
- In Hospital B, clinicians acknowledged the verbal management support and encouragement for the implementation.
- Ongoing financial resources were hard to acquire after completion of initial implementation in 2006.
- “The hospital originally refused to fund a position to supervise the software side ... It took a while convincing them to fund it. This slowed down the implementation.” Staff estimated the development delay to be one to two years.



# Implementation Strategy

- In Hospital A, the OIS was selected after a planning and procurement process taking several years.
- The initiative was started by the clinical leaders in the department, then incorporated into a state-wide NSW health project.
- The project committee developed their strategy of gradual roll out.
- The project was promoted for several months before any implementation activities.



# Implementation Strategy

- In Hospital B, the clinical leaders did not start with the planning process for the procurement of the software
- The system was pushed in by NSW Health
- The initial introduction was confronted by resistance from the clinical leaders, who rejected
  - Individual user name and password
  - The installation of a computer in the examination room



# Usage Policy

- In Hospital A a quality assurance system for entered data assesses who entered data, what was required and the due times.
- The individual clinician decided when and where to enter data.
- Some clinicians type when they see the patient, others later, supporting a variety of functionalities for people.
- In Hospital B, after the initial resistance from the clinicians, the departmental usage policy required specifically trained data entry staff enter data.
- Clinicians could look up data, but not enter data.



# Training and Support

- The training was provided for a specific group – the “super users”.
- Ongoing support was provided by the project manager in each hospital.
- Radiation physicist often offered informal support for end users.



**Table 1. A comparison of the functions of the OIS used in each hospital**

The functions of the OIS	Hospital A	Hospital B
Patient list and history	<b>Used</b>	<b>Used</b>
Patients queued on arrival	<b>Used</b>	No
Examination results	<b>Used</b>	No
Radiation prescription	<b>Used</b>	No
Approval of radiation prescription electronically	<b>Used</b>	No
Acute side effects recorded at weekly treatment review	<b>Used</b>	No
Disease outcome & late side effects recorded during follow up	<b>Used</b>	No



## Why was the same OIS used differently in these two hospitals

- The answers to this question was structured around three themes:
  - People
  - Process
  - Technology



# People

Table 2. Clinician demographics

	Hospital A	Hospital B
Age > 50	1	1
Age 40-49	2	1
Age 30-39	3	4
Previous OIS use	No	Yes (n=3)



# People

## The project manager's personal attributes

- In Hospital A, a radiation therapist undertook the role of Project Manager.
- All of the interviewees perceived that “the project manager was the key to it all”.
- Every modification was driven through the project manager.



# The project management in Hospital B

- In Hospital B, the original project manager was technically highly competent, but was not interested in managing personal relationships and left the position after several months on job.
- A part-time appointment followed, but the person only devoted a small portion of time managing the project, so OIS integration into clinical practice progressed little.
- Role confusion existed in Hospital B in regard with who was the project manager at the time of interview.



# Project Management

- The implementation and change management was overseen by project committees and coordinated by project managers in each hospital.
- In Hospital A the project committee still met.
- It included a radiation therapist, two physicists, an IT person and the Department Head, who was a Radiation Oncologist.
- Specific deliverables were set up for each deadline.
- In Hospital B, the project management committee included a radiation therapist, two physicists and a clinician.
- There had been no director in Radiation Oncology in Hospital B for a long period of time



# Clinician attitudes

- In Hospital A, the clinicians interviewed were highly enthusiastic about their OIS.
- One stated: “We can continue to develop it and improve our work flow and data quality.”
- It was acknowledged that although now happy with the OIS, many clinicians were initially uncomfortable in adapting to its use.



## Clinician attitudes

One clinician in Hospital B reflected:

*“We were enthusiastic about it but wondering whether it is going to work. Some clinicians would have liked to do it, but not all clinicians. ... I am sure there were some adjustments there but everyone likes it now compared to the old system.”*



# User Satisfaction

- In Hospital A, the implementation was seen as

*“Success, strong success! Outstanding success! Why? Because it has achieved its aims. That is, we have centralized information that is accessible to all the people who need it. It is timely, and I think it enhances patient care. We have a much better way of communicating information about patients now. It is not the actual system; it is the actual benefits through the organization that has surpassed my initial expectations. The actual success of the way it has been used in the department has been very satisfying.”*

*“I think it is a success because first of all you can access it. So you are not tied to a paper file. I think that functionality is vastly superior than paper files.”*



# User Satisfaction

- In Hospital B, the implementation was seen as

*““a guarded success. It could be a lot better. It is a borderline pass because it enables us to do things much quicker and easier than what we have been able to do previously.”*

*“Perhaps underutilized, as I said we can’t input any information and we can’t change anything. So (it is) purely for us to view and check things out. Do I think it is a success? Compared to previous paper-based system I think it is much better. Because now we look up in advance clinic appointments, how old they (patients) are, we can look up previous letters, we can anticipate how many people coming from multi-disciplinary clinic. You can anticipate how long it will take things”.*



# Discussion

- At the initial introduction stage, the clinical leaders had different perceptions towards the introduction and use of the system, which may account for the different level of adoption and use of the OIS to date.
- In Hospital A, the Department Head oversaw a concerted effort to train clinicians and to change the culture of documentation.
- The project manager helped develop and implement training and support.
- The “super users” encouraged the participation of the others.
- The strategies of peer pressure (or subjective norm) and ‘carrot and stick’ effectively drove the evolution of the OIS.
- Hospital A showed sustained, continuous commitment from different levels of management and clinicians.



# Discussion

- The clinical leadership in Hospital B did not believe that every clinician should enter data into computer
- The reconciled implementation strategy, namely centralizing data entry by designated data entry staff, appeared to simplify the complexity of the OIS introduction; however, this removed the need for clinicians to enter data, thus disengaged them from any further development of the OIS. This appears to attribute to its static use and under-utilization.



# Conclusion

- This retrospective, qualitative evaluation of the implementation strategies and practices of the same software at two public hospitals in Sydney in the same time period provides evidence that the OIS can effectively support clinicians' work practices.
- The clinicians in both hospitals were satisfied that the OIS was easier and safer than paper-based systems.



# Conclusion

- The different level of use of the system between the two hospitals highlights the importance of clinical leadership and implementation strategies and policies for the success of the implementation.
- The integration of the system into clinical practice has no relation with the IT expertise of the clinical group, or the actions of the management outside the department.
- Long-term success of the system relies on the ongoing commitment, strategies and actions of the departmental management and engagement of clinicians.



# Contact

Dr Ping Yu

[ping@uow.edu.au](mailto:ping@uow.edu.au)

Tel: 0061 2 4221 5412

Web site: [www.uow.edu.au/~ping](http://www.uow.edu.au/~ping)