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Innovation in intensive care nursing work practices with PACS

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Background to the project

- Part of a large project examining work practice innovations supported by the use of information and communication technology across multiple sites (ICT)\(^1\)
- Contributes to a new program of work evaluating medical imaging systems
- Contributes to work evaluating ICU information systems

\(^1\)Westbrook et al (2010) BMC Health Serv Res 9:201
Background to this study

- Picture archiving and communication systems (PACS) store and provide access to electronic medical images such as x-rays, CTs and MRIs.
- Accessing images is an integral part of the work of ICU nurses.
- Previous studies examining PACS use in ICUs have not focused on nurses.
Study aims

To understand whether and how intensive care nurses access and use medical images in their work

To examine the impact of PACS on nursing work practice innovation
Sociotechnical approach

- Nurses are part of an interrelated network of users situated within a complex department and organisation.
- Nurses are attempting to fit information technology into their work routines and communication.

Method

- Study design: Qualitative
- Setting: Three Australian metropolitan teaching hospital intensive care units
- Data collection: Interviews (n= 49) and direct observation (35.5 hours) (n=23)
- Participants: Intensive care nurses
- Analysis: Thematic analysis
ICU 1

- PACS for 9 years (AGFA IMPAX 6.3.1)
- CCIS – electronic flow sheets, progress notes, medication charts, some pathology results
- Cerner Powerchart
- All available at the bedside
ICU 2

- PACS for 8 months (GE Centricity Web v3.0)
- Cerner Powerchart for ordering and viewing pathology tests
- All available at computers at central workstations in the ICU
- Paper-based patient flow sheets, progress notes, observation charting, medication charts – located at the end of each bed
ICU 3

- No PACS - Images viewed on lightbox
- Cerner Powerchart for ordering and viewing pathology tests - available at computers at central workstations in the ICU
- Paper-based patient flow sheets, progress notes, observation charting, medication charts – located at the end of each bed
Results

- Independent image viewing practices
- Collaborative image viewing practices
- Patient safety and work practices
Nurses working in ICUs with PACS (ICUs 1 & 2) more frequently viewed x-rays separately from doctors (eg. to check position of tubes before commencing nasogastric feeding)

In ICU 3, nurses reported viewing images independently infrequently – they mainly viewed images at the multidisciplinary handover round
Results

Collaborative image viewing practices

ICU 2 had multidisciplinary ward rounds, but when doctors moved to central workstation to view images, nurses usually stayed at the bedside.

In ICU 3, nurses viewed images at the multidisciplinary handover rounds.

In ICU 1, nurses had few opportunities to view images in collaboration with doctors.
Results
Work practices and patient safety

Nurses in ICU 1 believed that by looking at x-rays themselves and not just relying on the doctors they could assess the x-ray, and raise an alarm if they saw an abnormality.

“... well I think having the PACS that handy it just allows ... a double check quickly... doctors are always checking but for you to check as well it just feels better you know just being able to look at it yourself.” (RN, ICU 1)
In ICU 2, nurses believed there was improved infection control and fewer lost images

“...they don’t get lost and it’s a lot easier, so that saves time instead of searching you know, to and fro. You know if you open up your PACS ... you’re going to have your chest x-ray there no matter what, ...it’s not going to be erased, it’s not going to be missing.” (RN, ICU 2)

In ICU 3, nurses anticipated that when PACS is introduced there will be less need to “chase up films” with “treatment initiated quicker” (CNC, ICU 3)
Discussion

- In ICU 3 (without PACS) nurses had more opportunities to view images collaboratively with doctors.
- In ICU 1, nurses accessed images autonomously, raising the alarm when abnormalities detected.
- In ICU 2 (PACS at central workstations) nurses had opportunities to view images alongside doctors and discuss with them.
Conclusions

- PACS in ICU settings promotes change in nursing work practices by providing nurses with the ability to act more autonomously.
- This has potential to enhance patient care.
- Further work should examine the impact on doctor-nurse communication and patient care.
- Context influences whether and how ICT innovates work practices.
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