New hospital tech disrupts doctors' and nurses' jobs, forces improvisation to ensure patient safety

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Doctors and nurses must adapt their routines and improvise their actions to ensure continued patient safety, and for their roles to be effective and to matter as new technology disrupts their working practices.

Research from Lancaster University Management School, published in the *Journal of Information Technology*, found electronic patient records brought in to streamline and improve work caused changes in the division of labour and the expected roles of both physicians and nursing staff.

These changes saw disrupted working practices, professional boundaries and professional identities, often requiring complex renegotiations to re-establish these, in order to deliver safe patient care. Managers implementing these systems are often quite unaware of the unintended consequences in their drive for efficiency.

The researchers worked in one of Saudi Arabia's biggest hospitals, in Riyadh, over the course of a nine-month period. The hospital has 2,000 beds and serves around 2,000 outpatients a day, with a staff of 1,000. They conducted interviews and observations on the wards and timed their research to coincide with the introduction of a new Computerised Physician Order Entry system (CPOE) which provide the facility to update patient records electronically.

The CPOE system is designed to be a safer, more streamlined and efficient way to provide care to patients. However, implicit in its design is a hierarchy of medical expertise, which assumes physicians rather than nurses will enter orders.

The researchers found this was at odds with ongoing work practices, where doctors considered themselves the thinkers, and nurses the doers, carrying out such work. As a result, staff found their roles and established practices undermined, and employed methods better suited to

their routines to ensure fewer mistakes and that their roles still mattered, even if the new system was not built with such decisions in mind.

The CPOE also introduced added complications in the form of yellow stickers to indicate when medication for a patient is set to be discontinued. Aimed at physicians, who must give orders to renew medication, they tended to ignore them, because they felt the alerts were meant for nurses, who instead kept track and issued reminders to act on them.

Co-author Professor Lucas Introna said: "Introducing the CPOE system disrupted medical work practices, especially around the division of labour between 'headwork' and 'paperwork', and staff had to renegotiate new practices, with non-human actors such as the CPOE and paper-based medical records playing a role in such renegotiations.

"The new system affected the professional identities of doctors and nurses, as they became fundamentally different actors when operating within that system as opposed to using previous methods. Boundaries were contested when trying to deal with the changes introduced.

"Under the paper system, the nurse held the role of an expert administrator of the patient record, but the new CPOE system handed that responsibility to doctors with no experience of such responsibilities. The new system did not take account of the established hierarchy and division of labour, which places physicians as authorisers rather than administrators.

"Because physicians were not used to using such systems, they were more error-prone—on occasion entering details for the wrong patient, or failing to even log on," added Professor Introna. "As a result, some claimed it was confusing and could cause serious errors, concluding it was neither safe nor useful.

"Nurses would have to correct errors and it was not uncommon for them to stand next to doctors and guide them through the system, with one nurse saying the doctor working with them was 'clueless as far as the system is concerned'.

"Doctors became novice administrators and nurses became chasers—their roles and long-established professional identities and boundaries changed by the introduction of the new system which has the potential to remove their legitimacy."

Doctors and nurses related to medical records in different ways, with nurses staying on top of medical record requirements and seeing caring for the records as caring for the patient, and vice-versa. Doctors, contrarily, saw themselves as being responsible for diagnosis and prescription, with nurses carrying out their instructions. The medical record is what tied them together and served as the centre of interaction.

Entering orders into the CPOE on an individual basis reduces the opportunities for discussion and joint decision-making when it comes to patients, while use of the system can take up to twice as long as the previous paper-based system.

Co-author Professor Niall Hayes said: "The changes in the division of labour seemed innocent on the surface, but were much more significant. The previous recording practices, using paper and notes, were not only records, but also functioned as ways of communicating and sharing knowledge, which defined roles of those involved and more besides. The recording and reviewing of records were practices at the heart of clinical care and decision-making, and this all changed.

"There was a reluctance by the physicians to engage with the CPOE's functionality. They were now expected to enter orders, previously the domain of the nurses—they were no longer just the authorisers, they

now had to take direct action through the system.

"Instead, doctors would often still ask nurses to enter orders and would simply check and submit. One nurse manager suggested doctors had been spoiled in the past, and it appeared the doctors did not see the work they were expected to carry out as work they should be doing.

"As an ICU consultant explained to us, they saw 'use' of the system as getting benefit from it, not operating it."

More information: Lucas D Introna et al, The negotiated order and electronic patient records: A sociomaterial perspective, *Journal of Information Technology* (2019). DOI: 10.1177/0268396219870548

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