SIIM 2016 Scientific Session
Posters & Demonstrations
Thursday, June 30 I 5:30 pm – 7:30 pm

Paperless Workflow in Radiology: A Pilot Testing in Ultrasound Section

Beng E. Koay, London South Bank University (Presener); Choon H. Fooh; Rafidah B.A. Bakar; Sarat K. Sanamandra, MD

Background

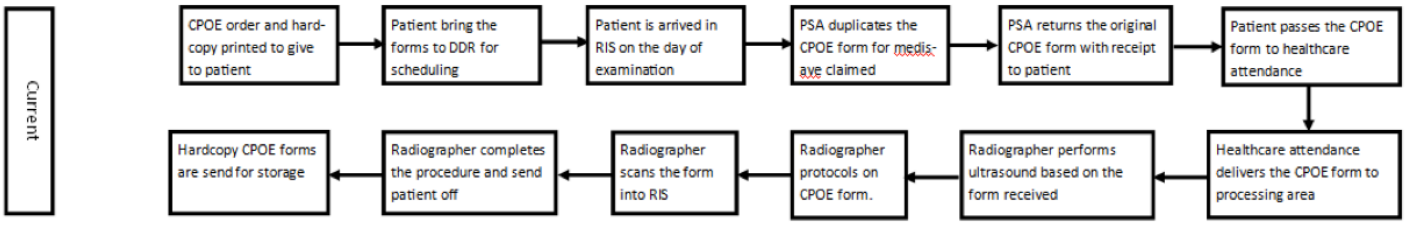
Paperless radiology is an aspiration Singapore General Hospital (SGH), Department of Diagnostic Radiology (DDR) wants to achieve for efficiency and productivity reasons. Although there are information system (IS) like Computerized Physician Order Entry (CPOE) and Radiological Information System (RIS) to facilitate but there still exist a dependency on paperwork to sustain the workflow. Notably, in the workflow, the healthcare attendants (HCAs) and the radiographers rely paperwork to fulfill their roles and duties. For the HCAs and radiographers, they relied on paperwork to identify the procedure and the patient.

The DDR had conducted a pilot testing of paperless workflow in the ultrasound section on May-June 2015. The pilot test aims to reduce the reliance on paperwork and simplify the work processes for the staffs in order to redirect the free-up resources to provide better patient experience in the ultrasound section. This paper presents the findings from the pilot testing in the two months period.

Evaluation

The LEAN thinking system was employed to evaluate the original papered workflow in Figure 1. The three elements were carried out in sequences, namely, value-stream mapping, stakeholder mapping, and waste process identification. The value-stream mapping broke down the papered workflow into task activities that were differentiated into valued and non-valued tasks. Stakeholder mapping listed out the roles in the project team that was formed based on the representative from wide range of knowledge bases to ensure well balance. Waste process was identified after discussing with the stakeholders on the various task activities in the workflow.

Figure 1



A team of imaging informatics professionals customized the RIS module from Carestream Vue RIS to facilitate the paperless workflow. Downtime workflow was planned as part of contingency plan prior to implementation and documented in the event of computer system failure.

Feedbacks from the staff involved and patient waiting time were obtained in the course of the test. Improvement was made to paperless workflow if the staff's feedback was deemed constructive.

The procedures excluded in this study were the contrast ultrasound procedures and orders from external general practitioner. The pilot testing was completed in 30 days period. The number of ultrasound procedures and timing data was extracted from Carestream Vue RIS system.

In the paperless workflow, the results had shown that there was a 33% improvement in the number of task activities by removing the waste processes. There was a total saving of mean time 71 seconds comparatively and an average saving of 60 pieces of paper per day. As for patient waiting time, there was improvement of 8-20% for different ultrasound procedures.

For the intangible aspects, both HCAs and radiographers found the task reduction commendable and for the HCAs, higher computer literacy was acquired in the course of study. However, they also feedback new constraints faced in the paperless workflow.

Discussion

The waste tasks contributed 33% to the total tasks. The waste tasks possess potential errors, for instances, scanning a patient's CPOE form into a wrong patient folder in RIS. With the removal of waste task, the standardization and simplification of the process resulted in fewer tasks where less error could occur. The process indirectly improves patient safety.

In time saving wise, the waste tasks reduction saves a mean time of 71 seconds for staff. Using the current hospital load of 100,000 ultrasound procedures annually, this is projected to be an annual administrative saving of 1972 man-hours for the ultrasound section.

It is observed that the saving of 71 seconds is not significant compared against the average duration of the procedure or waiting time of 30 minutes each. However, the time saving is considerable when projected to annual basis.

The reduction of patient waiting time for different ultrasound procedures ranges from 8% to 20%. The reduction in waiting time is because radiographers are able to gauge the patient queue from RIS rather than from the number of CPOE forms and be more responsive to the patient who's longer waiting time is reflected in the RIS. This effort managed to reduce the patient waiting time.

Paper saving in the new workflow is noteworthy. There is an average of 60 ultrasound procedures per day. With the elimination of duplicating another paper copy, the number of paper saved is equivalent to the number procedures on the day. The paperless workflow sets, potentially, a new direction to be eco-friendly.

DDR acknowledges that it must leverage on RIS to be paperless and personal computer is a requisite in each procedure room. This proves to be a logistic challenge. Furthermore, the HCAs has to undergo minimum IT training to be computer literate to use RIS.

Conclusion

Paperless workflow was able to reduce patient waiting time and was recommended to implement to the whole DDR. Although timesaving was not prominent if compared to procedure time but the removal of the waste tasks like scanning of CPOE form reduced administrative error and technical support. The paper saving effort was meaningful and potentially significant if this initiative was extended to other modalities.

In addition, positive feedback was reflected from the radiographers as their administrative works was reduced. Paperless workflow had improved the HCAs' computer literacy as fringe benefits.

However, SGH DDR also acknowledged the current challenges face by a fully paperless workflow and plans are in place to address and resolve them.

References

1. Bassignani, M. J., Dierolf, D. A., Roberts, D. L. and Lee, S. (2010) Paperless protocoling of CT and MRI Requests at an outpatient imaging center. Journal of Digital Imaging, 23 (2), pp. 203-210.
2. Poppendieck, M. (2011) Principles of lean thinking. IT Management Select, 18, pp. 1-7.
3. Ralston, M. D., Coleman, R. M. and Beaulieu, D. M. (2004) Progress toward paperless radiology in the digital environment: planning, implementation, and benefits. Journal of Digital Imaging, 17 (2), pp. 134-143.
4. Taylor-Philips, S., Grove, A., Hoffmeister, S., Wheaton, M., Coult, S., Essex, J., Hackney, J., Di Cioccio, S. and Clarke Aileen (2014) Going "paperless" in an English National Health Service (NHS) breast cancer screening service: the introduction of fully digital mammography. Health, 6 (5), pp. 468-474.
5. Vezyridis, P., Timmons, S. and Wharrad, H. (2011) Going paperless at the emergency department: a socio-technical study of an information system for patient tracking. International Journal of Medical Informatics, 80 (7), pp. 455-465.

Keywords

Paperless, Workflow, Ultrasound, Pilot Testing