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NATIONAL PERINATAL EPIDEMIOLOGY CENTRE

Workflow impact of the redesign of a Neonate Summary Page: A before and after comparison of a neonatal electronic health record

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Background

The introduction of the Maternal and Newborn Clinical Management System (MN-CMS) was a seminal event in the digital maturity of the country in 2015 as it was the first national EHR implementation and aligned with the strategic goals of eHealth Ireland[1]. A key organisational factor for successful EHR implementation is workflows[2]. A clinical workflow e.g.. Admission or discharge process, is a series of steps enacted to perform a certain clinical activity[3]. Creating and adapting both the technology and work practices in workflow development, is a key factor in the implementation of an EHR[4].

Introduction and Objective

MN-CMS records 40% of Ireland's births and within the neonatal chart, the Neonate Summary page was upgraded and redesigned to optimise the software and the clinical information available to users. The design of the new summary page was based on the workflow concept[5] of review (charts opened, review times), communicate (orders, problems, diagnoses, procedures entry) and record (documentation). This study evaluates the upgrade and redesign of a neonate summary page by quantitatively measuring workflow compliance of neonatal EHR users (NICU Nurses and NICU NCHDs) in one tertiary neonatal unit. End users were provided with a training video on the use of the new page prior to implementation.

Method

Data were gathered by extracting log files from a background audit tool called Lights On Network (LON). LON reports an individual users' timings related to keystrokes and mouse movements within the EHR. Key workflow steps were identified for assessment such as documentation, chart review, problems and diagnoses entry. Data were gathered for the period of one month prior to the implemented change and one month post the change. Mean differences and their 95% CI were calculated, and their statistical significance was assessed based on p values derived from paired t tests for the NICU Nurse group (n=76) and independent t tests for the NCHD group (n=29).

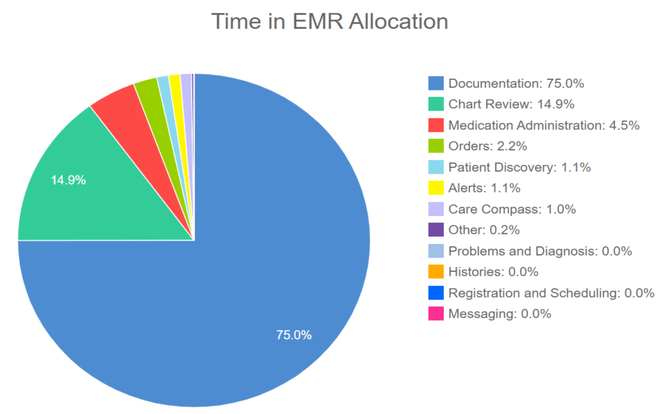


Figure 1: Example of the LON extract for one user for one month, displaying a breakdown of time distribution in the EHR described in percentages.

Results

NICU NCHDs

- Showed an increase in problems (+317%) and diagnoses (+47%) entry, albeit from low baseline levels, and a large increase in problems reviewed (+250%). There was some variation observed within this group and primarily it was registrars entering this structure data rather than Senior House Officers.
- Displayed a reduced order entry (patient care, diet, consults and referrals) which was not consistent with their workflow
- Displayed consistent laboratory result endorsement from message centre pools

NICU Nurses

- Displayed an increase in structured iView documentation (p=0.024) and a reduction in free text clinical notes (p=0.003)
- There was no change in nurses placing orders such as patient care/diet orders. This remained consistently low.
- Nursing time in the EHR was reduced following implementation by 1 minute and 14 seconds per patient (p= 0.037)
- Nurses chart review by summary page increased slightly (+0.4%) and their chart review by document viewer reduced (-2.3%)
- Nurses showed a reduction of 17 clicks per patient (p= 0.061)

During the post phase there was a reduced overall activity in the maternity hospital with birth rates reduced by 7.2% and neonatal unit occupancy reduced by 19.6%

Conclusions

This study has demonstrated some very positive changes and adoption to utilising the EHR optimally following the redesign of the summary page. Although this was a short-term assessment, there is a need for further improvement through training and optimisation. Increased structured entry of problems and diagnoses were identified from the NCHD group and significant time savings were demonstrated in the nursing group which can have positive impacts on patient care delivery.

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