Hypothesis

Clinical context integration between PACS and the electronic medical record (EMR) increases radiologist usage of the EMR to obtain additional history.

Introduction

The advent of electronic medical records has made clinical information beyond that included in the imaging request more readily available to radiologists. Recent study has demonstrated that this additional information may affect interpretation and treatment in over 20% of cases [1]. However, most EMRs exist in a separate computer system from the PACS, which may present a barrier to use of the EMR by radiologists. We implemented clinical context integration between our PACS and EMR: the patient displayed in PACS is automatically opened and displayed in the EMR. To determine whether this integration facilitates radiologist usage of the EMR, we calculated the number of patients accessed by diagnostic radiologists in the EMR each day during a period from 6 months before to 6 months after implementation.

Methods

We analyzed EMR security audit logs collected during the study period to determine the number of patients accessed in the EMR by each radiologist each day. For the period after implementation of integration, accesses generated purely by the integration system without evidence of radiologist involvement were not counted. Daily access counts were normalized to daily CT, MR and US volume. Fourteen-day running averages of number of patients accessed in the EMR by radiologists were plotted, mean number of patients accessed each day were calculated for the pre- and post-implementation periods and t-test was used to determine significance.

We also measured average user time to open the EMR to a patient displayed in PACS with and without context integration.

Results

The average time to open the EMR to the record of a patient displayed in PACS was 53 +/- 2 s without context integration. With context integration, the patient EMR record was opened concurrently with the study in PACS and the effective time was 0s.

The average number of patients accessed in the EMR each day (normalized to study volume) increased by 36% from 107 before context integration to 146 after context integration (p < 0.001). Plot of the daily running average demonstrated an abrupt change in number of patients accessed concurrent with the date of context integration implementation [Figure 1].
Discussion

Clinical history is generally accepted to be useful and important in interpretation of radiological studies; it has recently been shown that history available in the record but not present in the imaging request may change interpretation in over 20% of cases [1]. Despite it taking less than a minute to open the EMR without integration, the disruption in workflow and thought process that this represents is sufficient to significantly impede radiologist use of the EMR. Technology projects that reduce barriers to accessing information should be viewed as not only improving workflow and efficiency, but also improving quality, as they increase the probability that the information will be accessed.

Conclusion

Reducing the time and inconvenience barriers to radiologist usage of the electronic medical record by eliminating the extra login and manual transcription of medical record number inherent in using a non-integrated EMR yielded a clinically and statistically significant increase of 36% in radiologist usage of the EMR. Integration of PACS with the EMR should be considered a necessary feature to facilitate radiologist access to clinically important data.

References


Keywords

Clinical Context Integration, Clinical History