Developing an Informatics Curriculum: Using Electronic Health Record (EHR) Simulations to Improve Pediatric Residents' Efficiency and Attention to Patient Safety

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Objective: Improve patient safety and flow by teaching residents via lesser known EHR tools to recognize status changes in admitted patients, efficiently mine the chart, and complete tasks faster.
Description: We created simulated patients in an EHR training environment with admission data. These patients have sparse notes describing hyperbilirubinemia, but data obtained via advanced methods shows the patient's presentation is concerning for sepsis. Participants review the chart and create a written handoff with the patient's problems and their plan. Each participant then gives verbal handoff to a moderator posing as the oncoming resident. The moderators then demo tools to find key data indicating risks to patient safety and review best practices in the admission workflow.
Lessons Learned: The sessions focused on a neonate with hyperbilirubinemia. Of 17 pediatric interns, 8 (47%) identified vital sign abnormalities concerning for sepsis. 3 (18%) identified that the patient's risk factors placed their bilirubin in the exchange transfusion range.
Interns felt the experience was beneficial (median 97 on 0-100 scale, range 76-100). Intern comments stressed that sessions should be started earlier in the year and that the debriefing should also review relevant order sets. Moderator comments suggested that early in the year, the assigned task should focus more on the verbal assessment and plan versus a clean written handoff.
Cost: The creation of the case required ~25 hours of work from senior pediatrics residents and ~8 hours from Information Services personnel. Administration of the curriculum requires at least 2 moderators available for 90 minutes and 8 computers with EHR access.
Barriers to Implementation: This curriculum requires a "training" build environment to create simulated patients as well as a realistic, refreshable "training sandbox" EHR environment capable of making copies of the same patient data. Each case must be built one encounter at a time due to constraints in the build environment.

CHOP NERD Squad

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Date/Time	Temp	Pulse	Resp	BP	SpO2	FiO2 (%)	O2 Flow Rate (Lpm)	Resp/O2 Device
03/14/16 1825	35.6 °C	↑ 195	54	--	92 %	--	--	--
03/14/16 1720	--	↑ 190	43	--	95 %	--	--	--
03/14/16 1606	--	↑ 181	60	--	96 %	--	--	--
03/14/16 1510	36 °C	↑ 184	44	--	94 %	--	--	--

Vitals(Min-Max)

			03/13 0700 03/14 0659	03/14 0700 03/14 2023	Most Recent
Temp (°C)	36 35.6			35.6–36	35.6 03/14 1825
Pulse	195 181			181–195	↑ 195 03/14 1825
Respiratory Rate	54 43			43–54	54 03/14 1825
BP					-- 03/14 1825
SpO2 (%)	96 92			92–96	92 03/14 1825

Key Information	Less efficient technique	More efficient technique
Vital Signs	Tabluar view Flowsheets VS & I/O Report	Graphical view Rounding report Synopsis view
Laboratory & Historical Data	Notes Chart Review	Chart Search Results Review Filters
Relevant Medical Knowledge	Manual lookup (Pubmed, UpToDate)	Clinical Decision Support Links