

Clinical Quality Improvement Project: Utilization of Modified Early Warning Systems in an Ambulatory Care Oncology Clinic



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1 Background

The objective of this Quality and Safety Project was twofold: to implement an Early Warning Scoring System (also known as EWS or MEWS for "modified" EWS) to better identify outpatient oncology patients at risk for deterioration; and to simultaneously evaluate the effectiveness Johns Hopkins Hospital Sidney Kimmel Comprehensive Cancer Center's (SKCCC) EWS in preventing "code events" by more effectively triaging deteriorating patients. This project was an expansion of a completed Quality Improvement (QI) project that project sponsor MiKaela Olsen spearheaded in 2013 across inpatient oncology; we worked across Fall 2014 and Winter 2015 to adapt the EWS for effective use in the outpatient oncology, hematology, and phlebotomy departments. The MEWS project – which closely embodies the "Plan-Do-Check-Act" methodology for continuous quality improvement (Seidl & Newhouse, 2012) – is not specifically designated as a Comprehensive Unit-based Safety Program (CUSP) project, but the progress and results of EWS are reported to a CUSP point-person, once-a-month.

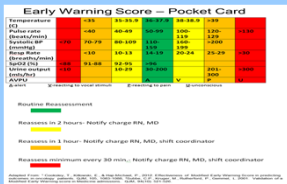
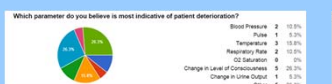
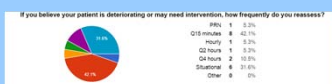


Table 1. JHH SKCCC EWS. Nurses and Clin Techs carry this laminated card on their badges at all times

2 Methods

- Comprehensive literature search/article appraisal to assess the existence and quality of literature/evidence to support outpatient early warning systems
- Survey ambulatory care oncology/phlebotomy clinic clinical technicians ("Clin Techs") to understand how patients are currently monitored for impending deterioration or possible adverse outcomes and procedures for addressing warning signs (See Table 3)
- Train Clinical Techs in outpatient oncology and phlebotomy on the use of EWS and the laminated badge-cards (see Table 1)
- Comprehensive analysis of all outpatient oncology code events between October 2012 and April 2014 via in-depth chart review:
 - Focused on the 17 code events that took place in various locations in the Weinberg Building.
 - Analyzed patient demographics, code locations, response times, event resolution (i.e., patient treated and released, patient admitted, etc.) and examined whether activation of EWS may have prevented the code.
- Refined analysis to drill-down on 10 patients who were existing oncology clinic patients (i.e., not JHH employees, visitors or relatives of patients who happened to suffer a code event on hospital grounds).



3 Results

- Our literature search determined that little is being done across the US to tailor EWS to the outpatient arena.
- Our literature search did, however, support the importance of frontline personnel, such as the Clin Techs, in determining whether a patient is deteriorating, therefore supporting our supposition that Clin Techs must be trained on EWS for it to be effective (James, J. et al, 2010).
- Though Clin Techs did identify barriers to full optimization of EWS – and this feedback will be used as EWS is continuously refined – they see the value of EWS and take ownership of how important their role is in making EWS a success.
- Our comprehensive audit of all oncology-related code events uncovered the following results:
 - Out of the 10 code patients who were existing clinic patients, 3 were female and 7 were male;
 - Average age 61.7;
 - 6 African American and 4 Caucasian;
 - Codes were evenly distributed across the three years studied and there was no reliable trend regarding months which may be more likely to see codes (due to small sample size);
 - Of the 8 patients who had vital signs recorded at the time of the code event, 7 had at least 1 vital sign (VS) in the "yellow zone" or worse. Four patients had at least 2 VS in the red or orange, indicating that EWS would have flagged these patients as being in need of special attention (See Table 2);
 - After the patient was transferred, only 1 had any VS in the red; and the others had largely stabilized (See Table 2).

Table 2

Patient	Vitals during code*				
	HR	BP	RR	SPO2	Temp
1	114	127/75	22	94	36.1
2	102	119/70	20	94	36.1
3	94	109/63	20	94	36.1
Vital signs were taken three times after transfer for this patient					
4	97	100/74	20	94	36.1
5	94	105/68	18	100	35.8
6	106	105/68	22	96	36.1
7	105	107/74	18	92	35.8
8	124	122/86	18	92	36.1
9					
10					
Patient	Vitals after transfer*				
	HR	BP	RR	SPO2	Temp
1	106	103/74	18	94	36.1
2	103	103/68	20	94	36.1
3	92	104/54	18	94	35.8
4	98	105/63	18	94	35.8
5	45	104/61	18	97	35.2
6	99	103/65	20	94	35.8
7	94	105/68	20	95	35.8
8	120	109/74	20	93	36.1
9	94	103/68	18	94	36.1
10					

*vitals not recorded for all codes, as indicated by white space

Table 3
 Sample Questions and Results from Clin Tech Survey



4 Conclusions

- JHH SKCCC is on the cutting-edge with its implementation of EWS in the outpatient setting; the 1-year outcomes will inform other outpatient centers as to the merits of implementing a similar system.
- It is too early to draw meaningful conclusions on the effectiveness of EWS in the outpatient setting, given both the short amount of time that it has been operational, and that the acuity level is much different from inpatient. In the outpatient setting, far fewer patients are likely to show deterioration that would be flagged by EWS, which is what we proved by doing the comprehensive chart review.
- Regardless, all outpatient personnel feel strongly that having the concrete tools to flag decompensating patients and a process by which to triage will have a profound effect on patient safety in the long term.
- Our chart review of code events showed that not only might the code have been prevented if EWS had been in place, but showed that for patients who coded many could have been effectively managed in the proposed Oncology Ambulatory Urgent Care Center.

5 Future Directions

- As EWS implementation in the outpatient arena takes hold at JHH, we are beginning to see the potential for profound implications with respect to planning and resource utilization.
- Our chart exercise supported the need for an Oncology Ambulatory Urgent Care center for JHH SKCCC – an initiative the Project Sponsor is working on.
- Now that EWS has been operational for close to two years in inpatient and over 6 months in outpatient, the next step will be to hardcode the EWS into EPIC, as well as continuously refine the process so that outpatient Clin Techs (and inpatient RNs) will have a better process of elevating the concern for a deteriorating patient to the appropriate clinician for a timely intervention.

6 References

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