Appendix B – Revised Hazard Manager Ontology

Hazard Manager	Common Formats

Usability
• Information hard to find
• Difficult data entry
• Excessive demands on human memory
• Sub-optimal support of teamwork (situation awareness)
• Confusing information display
• Inadequate feedback to the user
• Mismatch between real workflows and HIT
• Mismatch between user mental models/expectations and HIT
• Other
Data Quality
• IT contributed to entry of data in the wrong patient's record
• Organizational policy contributed to entry of data in the wrong patient's record
• Patient information/results routed to the wrong recipient
• Discrepancy between database and displayed, printed or exported data
• Faulty reference information
• Unpredictable elements of the patient's record available only on paper/scanned documents
• Lost data
• Inaccurate natural language processing
• Virus or other malware
• Other
Decision Support
• Excessive non-specific recommendations/alerts
• Faulty recommendation
• Missing recommendation or safeguard
• Inadequate clinical content
• Inappropriate level of automation
• Other
	Contributing Factors (not HIT-specific)
	• Environment
	  ○ culture of safety
	  ○ management
	  ○ physical surroundings
	• Staff qualifications
	  ○ competence
	  ○ training
	  ○ experience
	• Supervision/Support
	  ○ clinical supervision
	  ○ managerial supervision
	• Policies and Procedures, including clinical protocols
	  ○ presence or policies
	  ○ clarity of policies
	• Equipment/device
	  ○ function
	  ○ design
	  ○ availability
	  ○ maintenance
	• Data
	  ○ availability
	  ○ accuracy
	  ○ legibility
	• Communication
	  ○ supervisor to staff
	  ○ among team members
	  ○ staff to patient or family
	• Human Factors
	  ○ Fatigue
	  ○ stress
	  ○ inattention
	  ○ cognitive factors
	  ○ health issues

Hazard Manager	Common Formats

Vendor Factors
• Sub-optimal interfaces between applications and devices
• Faulty vendor configuration recommendation
• Unusable software implementation tools
• Non-configurable software
• Inadequate vendor Testing
• Inadequate vendor software change control
• Inadequate control of user access
• Faulty software design (specification)
• Other
Local Implementation
• Faulty local configuration or programming
• Inadequate local testing
• Inadequate project management
• Inadequate software change control
• Inadequate control of user access
• Suboptimal interface management
• Other
Other factors
• Inadequate training
• Excessive workload (including cognitive)
• Inadequate organizational change management
• Inadequate management of system downtime or slowdown
• Unclear policies
• Compromised communication among clinicians (i.e., during hand-offs)
• Interactions with other (non-HIT) care systems
• Physical environment (e.g., hardware location, lighting, engineering)
• Inadequately secured data
• Hardware Failure
• Use error in the absence of other factors
• Other
	HIT Contributing Factors
	• Security, virus or other malware
	• Incompatibility between devices
	• Equipment/Device function
	  ○ Error in charting, communication or display
	  ○ Loss of clinical data
	  ○ Medication error—software related
	  ○ System returns or stores wrong data for a patient
	• Equipment/device maintenance
	• Hardware failure
	• Failure of wired or wireless network
	• Ergonomics
	  ○ Alert fatigue/alarm fatigue
	  ○ Data entry (wrong patient or provider selected)
	  ○ Hardware location
	  ○ Information display
	• Output from device during use
	  ○ Discrepancy between system data and printed, stored or exported data
	  ○ Image measurement/ corruption issue
	  ○ Image orientation incorrect
	  ○ Incorrect or inadequate test results
	  ○ Incorrect software programming calculations
	• Security, virus or other malware
	• Unforeseen software issue (e.g. safety issue caused by unexpected aspect of the software design)