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	**HIT Contributing Factors**

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)