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Alarms in the ICU and operating room (OR) sound frequently and 85-99% of cases do not require clinical intervention. As alarm frequency increases, clinicians develop 'alarm fatigue' resulting in desensitization, missed alarms, and delayed responses. This is dangerous for the patient when an alarm-provoking event requires clinical intervention but is inadvertently missed. Alarm fatigue can also cause clinicians to: set alarm parameters outside effective ranges to decrease alarm occurrence, decrease alarm volumes to an inaudible level; silence frequently insignificant alarms; and be unable to distinguish alarm urgency. Since false alarm and clinically insignificant alarm rates reach 80-99%, practitioners distrust alarms, lose confidence in their significance, and manifest alarm fatigue. Yet, failure to respond to the infrequent clinically significant alarm may lead to poor patient outcomes. Fatigue from alarm amplitude and nonspecific alarms from uniform uninformative alarms is the post-monitor problem that can be addressed by understanding the psychoacoustic properties of alarms and the aural perception of clinicians.

Research will be presented from the field of music perception and cognition and how it fits with medical literature to inform alarm development, encompassing the principles of:

- History of alarms (Patterson alarms)
- Pitch ability from novices to absolute pitch perception
- How jazz improvisation principles can be used in alarm development
- The application of opera to the emotional responses of the healthcare environment
- Emerging psychoacoustic principles in alarm design