Assessment of continuous acoustic respiratory rate monitoring as an addition to a pulse oximetry-based patient surveillance system.

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Technology advances make it possible to consider continuous acoustic respiratory rate monitoring as an integral component of physiologic surveillance systems. This study explores technical and logistical aspects of augmenting pulse oximetry-based patient surveillance systems with continuous respiratory rate monitoring and offers some insight into the impact on patient deterioration detection that may result. Acoustic respiratory rate sensors were introduced to a general care pulse oximetry-based surveillance system with respiratory rate alarms deactivated. Simulation was used after 4324 patient days to determine appropriate alarm thresholds for respiratory rate, which were then activated. Data were collected for an additional 4382 patient days. Physiologic parameters, alarm data, sensor utilization and patient/staff feedback were collected throughout the study and analyzed. No notable technical or workflow issues were observed. Sensor utilization was 57 %, with patient refusal leading reasons for nonuse (22.7 %). With respiratory rate alarm thresholds set to 6 and 40 breaths/min., the majority of nurse pager clinical notifications were triggered by low oxygen saturation values (43 %), followed by low respiratory rate values (21 %) and low pulse rate values (13 %). Mean respiratory rate collected was 16.6 ± 3.8 breaths/min. The vast majority (82 %) of low oxygen saturation states coincided with normal respiration rates of 12-20 breaths/min. Continuous respiratory rate monitoring can be successfully added to a pulse oximetry-based surveillance system without significant technical, logistical or workflow issues and is moderately well-tolerated by patients. Respiratory rate sensor alarms did not significantly impact overall system alarm burden. Respiratory rate and oxygen saturation distributions suggest adding continuous respiratory rate monitoring to a pulse oximetry-based surveillance system may not significantly improve patient deterioration detection.