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Title: Impact of electronic data monitoring on the incidence of hyperoxia in premature neonates

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Body: Background: Episodes of hyperoxia, a known risk factor for bronchopulmonary dysplasia in premature neonates, most often are identified manually by care providers. Objective: We sought to determine whether an automated electronic data surveillance tool (DST) would reduce the rate of hyperoxic episodes in premature neonates. Methods: We studied all neonates born at <29 weeks gestation who were admitted to our NICU between August 2008 - June 2010. Because a standardized respiratory treatment protocol (RTP) for this same population had been introduced in early 2009, the study period was divided into three epochs (E) of equal duration as follows: E1 - no RTP, no DS; E2 - with RTP, no DS; E3 - with RTP, with DS. Because our standard clinical data systems collect data at 15 minute intervals, we prospectively defined a hyperoxic episode as three consecutive measurements (at 0, 15 and 30 minutes) of O₂ sat >92%, the upper limit of the RTP. During E1 and E2, O₂ sats >92% were detected manually by the bedside nurses. During E3, the DST analyzed clinical data and automatically notified the charge nurse of a patient's hyperoxic episode. We retrospectively compared the rate of hyperoxic episodes of each epoch, using the Chi-squared test to determine statistical significance. Results: Neonates treated during E3 experienced fewer hyperoxic episodes than those treated during E2 (17 v. 24 episodes per 1000 O₂ sat measurements; p < 0.0001). These rates both were lower than that of E1 (41 episodes per 1000 O₂ sat measurements; p < 0.0001). Conclusion: Use of a DST was associated with less frequent episodes of hyperoxia among premature neonates and seemed to enhance the efficacy of a respiratory treatment protocol.