(27.6 vs 5.7 h, $P = .002$) in the modified oxygen saturation group.[22] This was all accomplished without any differences in adverse events and safety outcomes.

In hospitalized pediatric patients with bronchiolitis, evidence supports an oxygenation target of $\geq 90\%$ (Evidence level C, median appropriateness score 7). However, in hospitalized pediatric patients with respiratory diseases other than bronchiolitis, establishing a patient/disease oxygen therapy target upon admission is best practice, but a specific target cannot be recommended (Evidence level C, median appropriateness score 7).

Summary

The results of this systematic review are summarized in Table 1. Disappointingly, the evidence available to answer the PICO questions is minimal. The recommendations in Table 2 are based on low levels of evidence and strongly reflect committee experience. The PICO questions were developed from the aspects of oxygen use that were perceived to have the highest variability in clinical practice and the greatest chance of reducing the efficiencies in care of pediatric patients. The result of this evidence-based review have identified more needs for future research than evidence-based recommendations for clinical practice. The lack of evidence to support the consistency of oxygen delivery via oxygen tents and hoods over the use of low-flow oxygen devices is overwhelmed by the potential risks.

The use of HFNC (≤ 2 L/kg/min) appears to be safe and more effective than low-flow oxygen (< 2 L/min) to treat infants with moderate to severe bronchiolitis in the pediatric ward and pediatric ICU settings. Practitioners need to use appropriately sized cannulas that block around 50% of naris openings. Larger sizes increase the risk of inadvertently creating PEEP and pressure ulcers. Also, the cannulas should not exceed the manufacturers' recommended maximum flow. Exceeding these flows results in the build-up of back pressure. It is important to understand the role of HFNC in pediatric oxygenation and to be mindful of its limitations. Protocols that include indications, contraindications, escalation, and de-escalation of care, scheduled monitoring of occurrence of pressure ulcers, recommendations for obtaining a blood gas, and transfer to pediatric ICU if used in the ward should be used. Monitoring adverse events that occur during the use of HFNC should be included in the protocols. In addition, when HFNC is used in pediatric wards, patients should be monitored with continuous pulse oximetry, and staff need to be appropriately trained to use the devices and to recognize complications. Although studies done in conditions other than bronchiolitis are lacking, these systems are used in clinical practice. This is an area that needs further study. In the meantime, if used, careful monitoring is of the utmost importance.

There are few investigations into the benefit of adding humidification (heated or unheated) for low-flow oxygen delivery. None of the studies identified showed a difference in the defined outcomes. From these results, the committee cannot recommend the routine use of humidification for low-flow oxygen delivery. There is a need for research into the short- and long-term outcomes for each type of humidification.

Titration of oxygen to a therapeutic goal in the treatment of hypoxemia would appear to be a best practice within many of the disease-specific clinical practice guidelines today, but, apart from bronchiolitis, this practice has not been evaluated scientifically. In hospitalized patients with bronchiolitis, targeting a lower-than-normal oxygen saturation results in less time receiving oxygen therapy and earlier discharge. In hospitalized pediatric patients with bronchiolitis, evidence supports an oxygenation saturation target of 90–98%. While expert clinicians recommend therapeutic oxygenation targets for respiratory diseases, we could find little evidence that these targets are correct. In hospitalized pediatric patients with respiratory diseases other than bronchiolitis, establishing a patient/disease oxygen therapy target upon admission is best practice, but a specific target cannot be recommended.

ACKNOWLEDGMENTS

We thank Ms Melissa Brown for her contribution to the development of the research questions, literature review, and data extraction.

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