

Progress Toward a New Tool for the Toolbox: Supplemental Home Oxygen for Viral Bronchiolitis

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The outpatient and inpatient management of most children with viral bronchiolitis has remained essentially unchanged for decades. Clinicians continue to carefully assess a child's overall work of breathing, oxygen requirements, hydration status, risk of complications, and illness trajectory. They then provide supportive care as needed with supplemental oxygen, intravenous fluids, positive airway pressure, and assisted ventilation. Options for active or passive immunization to prevent or to attenuate infections are limited, whereas options for treatment (including bronchodilators, systemic and inhaled steroids, nebulized hypertonic saline, helium/oxygen mixtures, and antiviral agents) remain controversial and largely unsatisfactory. In short, clinicians have remarkably few "tools in their tool chests" to address this common disorder, and it remains a significant source of morbidity, mortality, and health care expense.

Of note, persistent hypoxia among inpatients with bronchiolitis remains a common cause of prolonged hospital admission.¹ The use of supplemental oxygen at home is an attractive, patient-centered supportive modality. With their retrospective analysis in a moderately sized cohort of infants and toddlers with mild to moderate bronchiolitis discharged from the hospital on home oxygen therapy from a single emergency department located at high altitude in Denver, Flett et al² provide the most comprehensive and rigorous assessment to date of short-term outcomes associated with the use of this still relatively new tool. Of the 234 unique patients from largely disadvantaged and minority families who were followed longitudinally after emergency department discharge, >90% remained outpatients until disease resolution and >90% were successfully weaned off oxygen by 2 weeks. No subsequently admitted patients required management in an ICU or assisted ventilation, and none died. Predictable associations with a prolonged home oxygen requirement included young age and a history of prematurity, whereas fever at the initial visit was the only variable associated with subsequent admission. Logistical problems with oxygen delivery to the home were rare, and adherence to recommended clinical follow-up was high. Unfortunately, no data on viral etiology were available for risk stratification despite growing evidence of an association between viral etiology and disease severity among hospitalized children.³

The study benefited from a multiyear experience and from the close integration of outpatient and inpatient services within Denver Health, a safety-net health care system insuring 40% of Denver's children. We can feel confident that most of the important end points (follow-up, hospital admissions, and complications) were captured. The work builds on previous reports of home oxygen therapy for bronchiolitis from Denver^{4,5} and Utah⁶ (high-altitude sites) and Perth⁷ (sea-level site), which together documented associations with reduced hospital admissions, lower overall costs, and high caregiver satisfaction and patient safety.

The immediate clinical implications of Flett et al's findings are unfortunately limited, however, by the highly selected nature of the population studied. The group of patients was relatively homogenous with mild to moderate disease managed by inconsistently applied criteria under unique high-altitude

physiologic circumstances where low oxygen saturations are more common. As noted above, multivariate analysis was not able to identify helpful variables predictive of the need for subsequent admission. Clinicians working at lower altitudes should therefore exercise caution before routinely embracing this

practice. Nonetheless, in the context of a disease with so few "tools in the toolbox," those managing these children should be encouraged by Flett et al's mostly reassuring findings. And they should clamor to have them replicated in larger trials among more diverse cohorts, including more at sea level!

REFERENCES

1. Unger S, Cunningham S. Effect of oxygen supplementation on length of stay for infants hospitalized with acute viral bronchiolitis. *Pediatrics*. 2008;121(3):470–475
2. Flett KB, Breslin K, Braun PL, Hambidge SJ. Outpatient course and complications associated with home oxygen therapy for mild bronchiolitis. *Pediatrics*. 2014;133(5):769–775
3. Mansbach JM, Piedra PA, Teach SJ, et al; MARC-30 Investigators. Prospective multicenter study of viral etiology and hospital length of stay in children with severe bronchiolitis. *Arch Pediatr Adolesc Med*. 2012;166(8):700–706
4. Bajaj L, Turner CG, Bothner J. A randomized trial of home oxygen therapy from the emergency department for acute bronchiolitis. *Pediatrics*. 2006;117(3):633–640
5. Halstead S, Roosevelt G, Deakynne S, Bajaj L. Discharged on supplemental oxygen from an emergency department in patients with bronchiolitis. *Pediatrics*. 2012;129(3). Available at: www.pediatrics.org/cgi/content/full/129/3/e605
6. Sandweiss DR, Mundorff MB, Hill T, et al. Decreasing hospital length of stay for 11 bronchiolitis by using an observation unit and home oxygen therapy. *JAMA Pediatr*. 2013;167(5):422–428
7. Tie SW, Hall GL, Peter S, et al. Home oxygen for children with acute bronchiolitis. *Arch Dis Child*. 2009;94(8):641–643

THE SALE PRICE OF COLLEGE EDUCATION: *I have three children in college, and conversation with our friends turns frequently to the high cost of college education. I have always been a bit surprised, however, by the volatility in pricing. Similar to national clothing chain stores and car showrooms, there is a recommended full price with plenty of room for negotiation. This past year, a friend of ours (who is a successful lawyer) negotiated a \$15,000 discount at a small liberal arts school in New York. Evidently, nowadays few students pay the full tuition price for college. As reported in The New York Times (Education: December 25, 2013), at least a few colleges are turning away from the discount model of pricing and actually reducing tuition. One rationale, explained a college President, was that almost nobody paid the full price anyway. Nationally, the discount rate for tuition at private, independent colleges is approximately 45%. Only about one quarter of students at these schools pay the full tuition. At colleges without much name recognition, fewer than 10% of students pay the full, published rate. Additionally, independent colleges are facing declining enrollments. No longer is a high sticker price seen by parents or students as a guarantee of a good education, and students (or their parents) are increasingly turning to public institutions with lower tuition. To lure students, most private schools have had to give steep discounts with the race to the bottom hurting everyone. In schools that decided to cut tuition, the discount rate is much smaller and targeted at talented students in need of financial aid. Schools that have cut tuition costs say that it allows them to compete against state schools and helps reframe the conversation about the costs of a college education with parents and students. As for me, I am a big fan of more transparent and appropriate pricing of education. I hate waiting for 50% off sales at clothing stores and feel the same way about colleges.*

Noted by WVR, MD

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