

Respiratory Care of Bronchiolitis Patients: A Proving Ground for Process Improvement

This issue of *RESPIRATORY CARE* reports a study from Conway et al at Children's Hospital Cincinnati in which efforts were made to standardize the care of infants and children suffering viral bronchiolitis.¹ These respiratory therapists and their physician colleagues have been on the leading edge of using process-improvement methodology to change the way we administer respiratory care to bronchiolitis patients. Many departments are, to one degree or another, engaging in process-improvement efforts, but the Children's Hospital Cincinnati group has done all of us a service by publishing an honest description of their successes and the obstacles they faced.

Conway et al focused on making sure that key elements of the process of care were done appropriately, and they measured the effects of those processes on outcomes. Interventions tested included a combination of nasopharyngeal suctioning and a symptom score to determine whether aerosolized bronchodilators should be administered. Outcome measures included the mean number of bronchodilator treatments per patient.

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Viral bronchiolitis is a very interesting disease. Hospitals that do substantial amounts of in-patient pediatric care have an annual battle with bronchiolitis, it being consistently one of the top 3 causes for admission in pediatric hospitals nationwide. It is clear now from a growing body of evidence that, aside from ensuring that bronchiolitis patients are adequately hydrated, oxygenated, and have clear upper airways,²⁻⁷ most of the historical bronchiolitis interventions (aerosolized bronchodilators, chest physiotherapy, cool mist or bland aerosol therapy, antibiotics, and chest radiography) offer little if any benefit to the infant with uncomplicated bronchiolitis.⁸⁻¹²

Table 1 shows the wide range of utilization of bronchiolitis interventions at 10 pediatric hospitals, with over 600 bronchiolitis patients.¹³ Some of the hospitals gave chest physiotherapy to as few as 4% of the bronchiolitis patients, whereas one hospital did chest physiotherapy on 71%. And bronchodilators were used in nearly 80% of patients. Differences in severity of illness at those hospitals might explain the differences, but the investigators found a negative correlation between resource utilization and severity

of illness. In other words, it appeared that hospitals with lower severity scores were using more interventions. Thus we arrive at the heart of the problem with respiratory care of bronchiolitis patients. Clinicians feel a pressure to do something for these patients, and since we are, collectively, inveterate interventionists, therapies are administered, often on the premise that there is a slim chance it will help and at least it won't hurt.

Along with over-utilization of largely ineffective bronchiolitis interventions, the sheer number of bronchiolitis patients has grown tremendously. Between 1980 and 1996 admissions for bronchiolitis increased 239% among children < 6 months old.¹⁴ I estimate that when the diagnoses bronchiolitis and probably misdiagnosed pneumonia (caused by respiratory syncytial virus) are combined, there are at least 140,000 annual admissions in that age group. The average duration of hospital stay is approximately 3 days, and 90% of admissions are concentrated in a 10-12 week period. Figure 1 illustrates bronchiolitis patients per year at Primary Children's Medical Center in Salt Lake City, Utah, over the last 10 years. Hospitals have had to expand infrastructure to accommodate those additional patients, and it appears that the trend continues upward, unabated.

Respiratory therapy services have historically been taxed by the demands for bronchiolitis interventions. Historically, and I suspect in some places still, physician orders on bronchiolitis patients include aerosolized bronchodila-

Table 1. Utilization of Bronchiolitis Interventions at Pediatric Hospitals*

Intervention	Population Mean Utilization (%)	Range (%)
PICU admission	28	19-56
Intubation	12	0-26
Chest physiotherapy	27	4-71
Bronchodilators	92	82-100
Continuous bronchodilators	6	0-15
Antibiotics	64	0-15
Ribavirin	3	0-15
Steroids	27	8-81

*601 patients, < 12 mo old, with diagnosis of bronchiolitis, in 10 pediatric hospitals. PICU = pediatric intensive care unit (Adapted from Reference 13).

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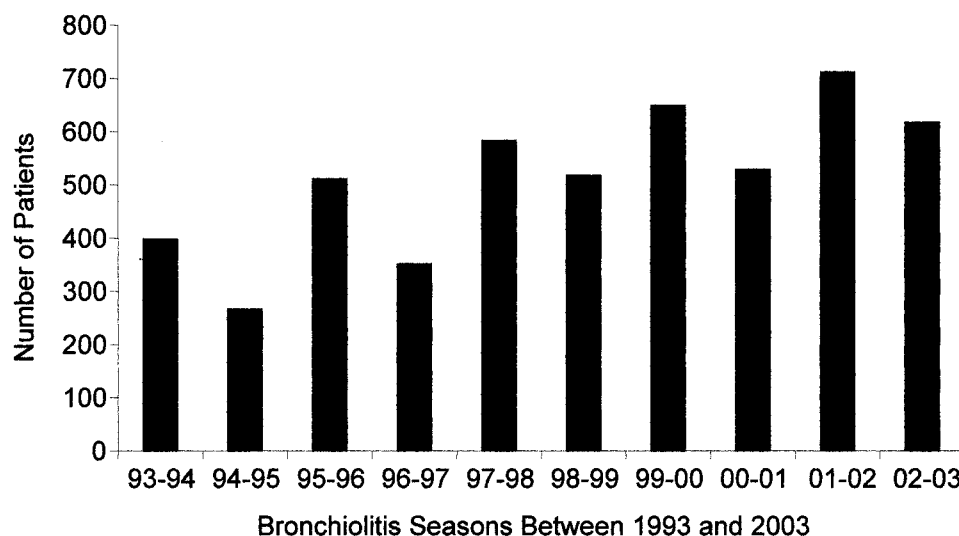


Fig. 1. Annual numbers of bronchiolitis patients, < 24 months old, who had discharge diagnoses of bronchiolitis (all International Classification of Disease diagnostic codes beginning with 466), 1993–2003, at Primary Children’s Medical Center, in Salt Lake City, Utah.

tors as frequently as every hour, chest physiotherapy every 2 hours, and continuous cool mist therapy.

If respiratory departments increase their staffing infrastructure in anticipation of meeting that demand during the bronchiolitis season, they are often sending staff home from their scheduled shifts during the summer because of over-staffing.

During the 1990s bronchiolitis was a target for process-improvement efforts. Attempts to reduce in-patient cost structure and the emerging evidence-based medicine movement led some respiratory care departments to begin studying ways of streamlining bronchiolitis care. Some departments realized they could continue to struggle with trying to meet the demand for services or they could begin efforts to reduce the demand. Thus, the care of bronchiolitis patients became a proving ground for the study of techniques for improving care processes.

The approach used by Conway et al attempted to ensure that patients received what they called “perfect” respiratory therapy, which meant that any bronchodilator administration was preceded by nasopharyngeal suctioning and a post-suctioning respiratory symptom score that was high enough to warrant bronchodilators.¹ Their efforts resulted in substantial process improvements and modest reductions in bronchodilator use, but still only 19% of patients got “perfect” respiratory care, and the proportion of patients who got bronchodilators despite low respiratory symptom score increased from 44% to 59%.

Conway et al are to be commended for their continuing efforts in process improvement, but apparently it can be very difficult to get clinicians to comply with care protocols, even if the protocols are based on impressive evidence. Conway et al took on the difficult task of implementing practice protocols and measuring

compliance; it would have been very interesting to study the reasons their clinical staff gave for not following the clinical protocol. I have thought for some time that clinical inconsistency is an important issue in respiratory practice, but it has not been discussed much in our literature. The experience of Conway et al at Children’s Hospital Cincinnati is surely not very different than in most departments—in fact probably better—and clinical inconsistency is not a phenomenon unique to respiratory care. What factors cause clinicians to sometimes ignore practice protocols? Are the protocols inadequate? Are clinicians insufficiently trained? Is there a general lack of leadership and oversight? These questions need to be addressed broadly in the respiratory care community and could be a rich area for future research into the use of clinical process-improvements methods.

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