

Stemming the tide of hospital admissions for bronchiolitis

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Bronchiolitis is a source of unique fascination for health services researchers. Partly this is due to its ubiquity, as the single most common cause of children being admitted to hospital and to paediatric intensive care units in the UK and USA. Partly it is the fact that, for the overwhelming majority of affected infants, treatment is supportive, despite the historical procession of postulated treatments and vaccines which so far have had no impact on prevention or outcome. Thus, health professionals and health services researchers have concentrated their efforts on reducing unnecessary medical interventions such as use of antibiotics, bronchodilators or chest X-rays.

Green *et al* contribute to the literature on healthcare utilisation in bronchiolitis

with their retrospective analysis of hospital admissions in England over five decades.¹ The triangulation of several data sets adds robustness to their finding that hospital admission rates for bronchiolitis have risen nearly sevenfold in 32 years. This correlates broadly with similar literature on trends in hospitalisation for bronchiolitis in other countries.²

The first question that arises is whether this reflects a true increase in hospital utilisation. Coding of administrative hospital data in England is variable but improving over time, which may represent a potential source of bias. However, the degree of increase makes this less plausible. Furthermore, if clinicians were getting better at coding bronchiolitis admissions over time, one would expect to see an associated inverse trend for lower admissions for other lower respiratory tract infections (LRTIs) in that period. In fact, absolute admissions, including for other LRTIs, have also been rising among infants and children over the past decade.³

Possible biological explanations for rising admission rate include increasing incidence of bronchiolitis, or greater pathogenicity of causative organisms. In short, is bronchiolitis getting more

common and/or severe? Green *et al* show that intensive care admission rates have remained unchanged in this period, and there is evidence that mortality has declined over a similar period, both of which make increasing disease severity unlikely. There is also little evidence for rising disease incidence. While some known risk factors (notably premature births) have become more common over the past decades, most (including young maternal age, household smoking and breastfeeding) are unchanged or improving. In any case, the majority of hospital admissions for bronchiolitis are for low-risk infants born at full term.⁴

In the absence of rising disease incidence or severity, a more likely explanation relates to the organisation, delivery and practice of healthcare for infants with bronchiolitis. This theory is supported by the degree of geographical variation observed, which is only weakly attributable to sociodemographic factors—particularly for a condition in which supportive care is the only proven effective therapy.^{1 5}

The nature of what constitutes an admission may have changed over time. Hospital admission rate is one measure of hospital utilisation, but cannot be interpreted in isolation. One reason for the observed increase may lie in the changing nature of how clinicians use inpatient stays in the management of bronchiolitis. Green *et al*'s paper does not consider how related indicators of hospital utilisation, namely length of hospital stay (LoS) and hospital

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readmissions, have changed over time, and how they might be related to admission rates. Hospital admissions of shorter than 1 day have increased in the past decade, with the advent of short stay units—might this alone account for the rising number of admissions? Rising hospital admissions, which may be symptomatic of lower clinical thresholds for admission, have been shown to have a negative correlation with LoS. There is recent evidence that LoS for bronchiolitis is low, with median LoS for bronchiolitis in the UK in 2007/2008 being only 1 day long.^{4,5}

Simply put, perhaps we are admitting a greater number of less unwell infants who are therefore staying less long in hospital. Another possibility is that we are discharging infants home earlier and accepting a higher risk of readmission, thus inflating the total number of admission episodes disproportionately to the number of affected infants. Recent data show 21% of infants hospitalised with bronchiolitis have more than one admission,⁴ but unfortunately historical administrative data is not suitable for comparison through similar linkage studies.

In addition to biological or health service factors which are specific to bronchiolitis, the rise in hospital admissions may simply reflect the broader pattern of health service utilisation in the past decades. Hospital admissions for infants show the highest rate of rise among children in the past decade. Admissions for LRTIs have also risen disproportionately. It may be that the trend for bronchiolitis may simply reflect a 'rising tide which floats all boats'.

Theories abound on the reasons behind the overall rise.³ More children are being brought to medical attention, via National Health Service (NHS) Direct, primary care or emergency departments (ED). Thresholds for admission may be falling for all children, which may reflect societal changes that mean parents and carers, not to mention clinicians, are becoming more risk-averse. Poorer access to primary care has also been postulated to be a factor. As a disease where supportive care is

paramount, the reassurance provided by a trusted usual family general practitioner (GP) that conservative care is all that is required is key—access to which may have been eroded by the rationalisation of primary healthcare and out-of-hours services. It is interesting to note, too, Green *et al*'s data which show a second rise in bronchiolitis admissions from 2000 onwards, following a decade-long plateau.¹ This mirrors the overall rise in all-cause admissions and is temporally related to the instigation of acute and primary care policies (such as the maximum 4-h ED wait, and changes to the GP contract resulting in changes to out-of-hours healthcare access), and is in direct contrast to the USA where rates have actually fallen since 2000.²

We agree with Green *et al*'s conclusion that rising admissions for bronchiolitis are unlikely to be related to changes in the disease, and likely to be driven by healthcare factors. Tackling overuse of medical interventions, including hospital admission, can be difficult, however. The recent publication of National Institute for Health and Care Excellence (NICE) guidance aims to establish some uniformity of practice, but the interpretation of admission and discharge criteria are still predominantly based on local established practice and custom alongside clinical findings, and therefore some intrinsic subjectivity remains. Furthermore, while the degree of geographical variation in hospital admission rate suggests unwarranted variation in clinical practice, there is no empirical evidence to suggest what the most appropriate rate might be. Quality improvement methodologies such as clinical care pathways or Achievable Benchmarks of Care (in which adjusted comparative outcome data are presented together to motivate improvement) have shown some success in reducing variation in outcomes.

Green *et al* correctly conclude that the rising rate of bronchiolitis admissions provides a strong case for the significant ongoing investment and interest in the

development of vaccinations against respiratory syncytial virus. However, while we await that silver bullet, the focus for health systems' efforts should be on tackling the inconsistency in clinical practice through quality improvement interventions and benchmarking of quality and service data. More broadly, robust planning, implementation and evaluation of changes in the delivery of care for all acutely unwell children are needed to stem the rising tide of unnecessary hospital admissions of children.

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