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Editorial on Panickar JR *et al*. Trends in deaths from respiratory illness in children in England and Wales from 1968 to 2000

Paediatric respiratory mortality – past triumphs, future challenges

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To invite me to comment on a paper that reports changes occurring during a period that coincided to within a year or two with my career as a consultant paediatrician presents me with an irresistible temptation to reminisce. At medical school in the late 1950's I learned that pneumonia, one-time captain of the men of death, had responded dramatically first to sulphonamides and then to penicillin, but that some deaths were still "inevitable" – a phrase much used at that time to excuse our inability to manage conditions that we did not fully understand. Asthma was common in children, but was considered to be an unusual cause of death, despite which it was responsible for the first death I encountered as a paediatric senior house officer. In the minds of my teachers asthma was readily distinguished from bronchitis, and to this day I can replicate a table listing the differences between asthma and wheezy bronchitis, most of which has to my surprise turned out to be accurate.[1] In those far off days most children with cystic fibrosis (CF) died in the pre-school years – pseudomonads were not the problem they are now, and most children died while still colonised with *Staph aureus* or *H influenzae*. Bronchiolitis was considered to be rather an esoteric diagnosis for which there was no diagnostic test – it would be a few years before its association with the respiratory syncytial virus (RSV) was appreciated.[2] It was thought safer to diagnose pneumonia if crackles were prominent, and to treat the child with antibiotics, whilst those with predominant wheeze were labelled "bronchitis" and given ephedrine.

In the mid-1960's I extracted data from the Registrar General's annual reports when as a junior I presented a fatal case of staphylococcal bronchopneumonia to a clinicopathological conference. I was surprised to find not only that was there still considerable childhood mortality from pneumonia, but also that following the rapid decline already mentioned, it had been more or less stable for the past decade. In my presentation I attributed this to the emergence of penicillin-resistant *Staph aureus*, an organism that had become ubiquitous despite the widespread presence of gimlet-eyed matrons who, some politicians would have us believe, have the power to stop the more recently emerged methicillin-resistant *Staph aureus* in its tracks.

By 1968, the first year of Panickar's study,[3] major changes were afoot. Coincident with but not necessarily due to the development of new antibiotics, pneumonia mortality had begun to fall, and when I prepared a figure to illustrate a textbook chapter,[4] it was clear that pneumonia mortality was back on its downward track, on which it has remained despite the emergence of respiratory pathogens of vastly greater virulence and antibiotic resistance than anything we had to deal with 40 years ago. Some children with CF were now entering secondary school, although their survival there was usually brief. Overnight incarceration in mist tents was part of the burden borne by CF patients – in 1968 I was trying to raise money to purchase tents, and was still doing so a few years later when Archie Norman demonstrated their inefficacy.[5]

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Antibiotic therapy had improved, but nutritional management was woefully inadequate – looking back, it is hard to believe that the era of the Allan diet[6] had not even arrived, far less departed. However, by 1968 we were becoming more secure in the diagnosis of bronchiolitis, although we had to rely on rising antibody titres to demonstrate the presence of RSV - the immunofluorescent technique for the rapid diagnosis of respiratory syncytial virus infection was described in 1968[7] but would not be in widespread use for several years. In the absence of an organised system of paediatric intensive care units, the availability of artificial ventilation depended on the interest and enthusiasm of local anaesthetists and paediatricians. Asthma was also a continuing problem; salbutamol was announced that year[8] but was not yet available for clinical use, and inhaled corticosteroids were a few years over the horizon.[9] Panickar's study therefore covers a period during which there were major developments in what we now regard as basic aspects of the management of respiratory tract diseases.

The improving mortality from pneumonia reflects many medical advances other than new antibiotics. Panickar *et al*[3] emphasise the importance of immunizations, to which I would add the developments in the organization and delivery of paediatric intensive care that have occurred in recent years. Nevertheless, there are no grounds for complacency. Children are still dying from pneumonia, and although we have useful guidelines for the management of community-acquired pneumonia,[10] albeit derived from a somewhat scanty evidence base, the management and perhaps more importantly the prevention of nosocomial pneumonia remains problematical.[11]

However, pneumonia is not the only important cause of respiratory mortality in children. Although fewer than 5% of asthma deaths occur in childhood,[12] asthma is an eminently treatable condition, and our objective should be to reduce this figure to zero. Most asthmatic children who reach hospital alive will survive, the majority of deaths occurring outside hospital.[13] Management in the community is therefore of prime importance. Although there is controversy about the role of written management plans in improving asthma care,[14] there is no doubt that comprehensive asthma management programmes are effective in reducing asthma morbidity and hospitalization.[15] The problem is not that we don't know what to do, but that the very patients who need to be included in such programmes, and in whom much of the childhood asthma morbidity and mortality occurs, are hard to reach because a combination of socio-economic deprivation,[16] family problems and psychological factors[17] leads to failure to recognise the severity of an attack and failure to seek medical help in time.[18]

It is already well known that the mortality from CF has fallen to the extent that it is no longer an important cause of childhood death.[19] This improvement has however been bought at a considerable price in terms of parental stress[20] and family disruption[21] – stress that was described at a recent meeting as "the daily grind."[22] Moreover, socio-economic deprivation has a substantial adverse impact on the outcome for patients with CF,[23] as evidenced for instance by the poorer clinical progress made by CF children of single parents.[24]

Panickar *et al* found that for most respiratory conditions, mortality is still higher in boys than in girls. However, the reverse is true in CF. Girls, who are so often model patients during childhood and comply conscientiously with the rigours of treatment, commonly deteriorate during adolescence, creating a gender gap in mortality that was demonstrated clearly in data from the UK CF Survey.[25] An examination of the large database maintained by the US CF Foundation showed that after adjustment for other risk factors, female sex was a significant risk factor for death in patients <21 years of age, with a relative risk compared to males of

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1.6.[26] Although the added disadvantage suffered by adolescent girls with CF is widely recognised, it has never been adequately explained. Studies have demonstrated differences between the sexes in energy intake [27] and resting energy expenditure,[28] in everyday activity levels [29] and in some psychological traits,[30,31] but none of these offers a convincing explanation for the large excess in female mortality.

In addition to applying the medical advances that must sooner or later flow from our increased understanding of the molecular biology of CF, future challenges include narrowing the gender gap in mortality, improved delivery of care to economically disadvantaged families and reduction of the psychosocial impact of the CF child on other family members.

The last major cause of paediatric respiratory death discussed by Panickar *et al* is acute viral bronchiolitis. The antiviral drug ribavirin, given as a small particle aerosol, has failed to live up to early expectations,[32] and is unlikely to have had much influence on mortality. The use of palivizumab, an effective monoclonal antibody directed against the respiratory syncytial virus, is reserved for high risk cases, and the extent of its use varies widely. Its introduction was too recent to have affected mortality in all but the most recent years of the study, and the dramatic falls in mortality must therefore be attributed to improvements in general paediatric care together with improved access to paediatric intensive care.

So what are the lessons to be learned from this report on childhood mortality? Clearly, paediatric respirologists are getting results at least as satisfactory as those of their colleagues in other paediatric specialties. Deaths are at an all-time low, and for this we can allow ourselves a moment's satisfaction. However, much remains to be done. One obvious need is for well designed clinical trials in almost every aspect of paediatric respirology, to allow us to fine-hone our management and to discard useless treatments. In particular, although the excellent results obtained in CF in the absence of a satisfactory evidence base testify to the value of clinical experience and common sense in directing patient care, our use of ever more expensive and complex treatments must in future be more rationally based.

However, one challenge that will tax our ingenuity and for which no obvious solution is in sight is the delivery of health education and medical care to families from socially disadvantaged backgrounds. Many governments have pledged to reduce social inequalities in health, but the gap persists obstinately.[33] These differences are seen throughout the world, between as well as within nations,[34] and a solution to the problem has so far proved elusive. As we have seen, paediatric respirology is by no means immune to these problems; there will be little benefit from screening for CF or improving asthma management plans if our attempts to deliver appropriate care are frustrated by socio-economic and psychological barriers. Paediatricians are accustomed to working in multidisciplinary teams, but perhaps it is time to reconsider the composition of such teams, which in the past have tended to be disease-specific. Should we be making better use of the more generic facilities of the school health service,[35] the social work department,[36] or the clinical psychology department? Whatever the ultimate solution, it is clear that current practice is inadequate and that radical new ideas are needed.

R**eferences**

1. **Wassall HJ**, Devenny AM, Daud Khan S, Ninan TK, Russell G. A comparison of virus-associated and multi-trigger wheeze in school children. *J Asthma* 2005; (in press - accepted April 2005).

Thorax: first published as 10.1136/thx.2005.050773 on 2 September 2005. Downloaded from http://thorax.bmj.com/ on April 19, 2024 by guest. Protected by copyright.

2. **Chanock RM**, Kim HW, Vargosko AJ, Cumming C, Deleva A, Parrot RH, Johnson KM. Respiratory syncytial virus. I. Virus recovery and other observations during 1960 outbreak of bronchiolitis, pneumonia, and minor respiratory diseases in children. *JAMA* 1961;**176:**647-653.
3. **Panickar JR**, Dodd SR, Smyth RL, Couriel J. Trends in deaths from respiratory illness in children in England and wales from 1968 to 2000. *Thorax* 2005;*****:*****-***.
4. **Forfar JO**, Arneil GC. *Textbook of Paediatrics, 2nd ed.* Edinburgh: Churchill Livingstone, 1978:p16.
5. **Norman AP**. Nocturnal mist therapy in cystic fibrosis. *Practitioner* 1971;**206:**786-790.
6. **Allan JD**, Milner J, Moss D. Therapeutic use of an artificial diet. *Lancet* 1970;**1:**785-786.
7. **McQuillin J**, Gardner PS. Rapid diagnosis of respiratory syncytial virus infection by immunofluorescent antibody techniques. *Br Med J* 1968;**1:**602-605.
8. **Hartley D**, Jack D, Lunts LHC, Ritchie AC. New class of selective stimulators of β-adrenergic receptor. *Nature* 1968;**219:**861-862.
9. **Brown HM**, Storey G, George WH. Beclomethasone dipropionate: a new steroid aerosol for the treatment of allergic asthma. *BMJ* 1972;**1:**585-590.
10. **Anon**. British Thoracic Society Guidelines for the Management of Community Acquired Pneumonia in Childhood. *Thorax* 2002;**57 Suppl 1:**i1-24.
11. **Zar HJ**, Cotton MF. Nosocomial pneumonia in pediatric patients: practical problems and rational solutions. *Paediatr Drugs* 2002;**4:**73-83.
12. **Sturdy PM**, Victor CR, Anderson HR, Bland JM, Butland BK, Harrison BD, Peckitt C, Taylor JC. Psychological, social and health behaviour risk factors for deaths certified as asthma: a national case-control study. *Thorax* 2002;**57:**1034-1039.
13. F**letcher HJ**, Ibrahim SA, Speight N. Survey of asthma deaths in the northern region: 1970-1985. *Arch Dis Child* 1990;**65:**163-167.
14. **Toelle BG**, Ram FS. Written individualised management plans for asthma in children and adults. *Cochrane Database Syst Rev* 2004;CD002171.
15. **Mitchell EA,** Didsbury PB, Kruithof N, Robinson E, Milmine M, Barry M, Newman J. A randomized controlled trial of an asthma clinical pathway for children in general practice. *Acta Paediatr* 2005;**94:**226-233.
16. **Castro M**, Schechtman KB, Halstead J, Bloomberg G. Risk factors for asthma morbidity and mortality in a large metropolitan city. *J Asthma* 2001;**38:**625-635.
17. **Bloomberg GR**, Chen E. The relationship of psychologic stress with childhood asthma. *Immunol Allergy Clin North Am* 2005;**25:**83-105.
18. **Fletcher HJ**, Ibrahim SA, Speight N. Survey of asthma deaths in the northern region: 1970-1985. *Arch Dis Child* 1990;**65:**163-167.
19. **Dodge JA**, Lewis PA. Cystic fibrosis is no longer an important cause of childhood death in the UK. *Arch Dis Child* 2005;**90:**547.
20. **Burton L**. Cystic fibrosis - a challenge to family strength. *Health Visit* 1973;**46:**186-189.
21. **Begleiter ML**, Burry VF, Harris DJ. Prevalence of divorce among parents of children with cystic fibrosis and other chronic diseases. *Soc Biol* 1976;**23:**260-264.

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22. **Hunter V**. The daily grind and how to stay sane as a mother of two children with cystic fibrosis. *J R Soc Med* 2003;**96 Suppl 43:**51-56.
23. **O'Connor GT**, Quinton HB, Kneeland T, Kahn R, Lever T, Maddock J, Robichaud P, Detzer M, Swartz DR. Median household income and mortality rate in cystic fibrosis. *Pediatrics* 2003;**111:**e333-e339.
24. **Macpherson C**, Redmond AO, Leavy A, McMullan M. A review of cystic fibrosis children born to single mothers. *Acta Paediatr* 1998;**87:**397-400.
25. **Dodge JA**, Morison S, Lewis PA, Coles EC, Geddes D, Russell G, Littlewood JM, Scott MT. Incidence, population, and survival of cystic fibrosis in the UK, 1968-95. UK Cystic Fibrosis Survey Management Committee. *Arch Dis Child* 1997;**77:**493-496.
26. **Rosenfeld M**, Davis R, FitzSimmons S, Pepe M, Ramsey B. Gender gap in cystic fibrosis mortality. *Am J Epidemiol* 1997;**145:**794-803.
27. **Collins CE**, O'Loughlin EV, Henry R. Discrepancies between males and females with cystic fibrosis in dietary intake and pancreatic enzyme use. *J Pediatr Gastroenterol Nutr* 1998;**26:**258-262.
28. **Allen JR**, McCauley JC, Selby AM, Waters DL, Gruca MA, Baur LA, Van Asperen P, Gaskin KJ. Differences in resting energy expenditure between male and female children with cystic fibrosis. *J Pediatr* 2003;**142:**15-19.
29. **Selvadurai HC**, Blimkie CJ, Cooper PJ, Mellis CM, Van Asperen PP. Gender differences in habitual activity in children with cystic fibrosis. *Arch Dis Child* 2004;**89:**928-933.
30. **Willis E**, Miller R, Wyn J. Gendered embodiment and survival for young people with cystic fibrosis. *Soc Sci Med* 2001;**53:**1163-1174.
31. **Gee L**, Abbott J, Conway SP, Etherington C, Webb AK. Quality of life in cystic fibrosis: the impact of gender, general health perceptions and disease severity. *J Cyst Fibros* 2003;**2:**206-213.
32. **Kimpen JL**. Management of respiratory syncytial virus infection. *Curr Opin Infect Dis* 2001;**14:**323-328.
33. **Corbin T**. Mortality in children aged under 8. *Health Stat Q* 2004;30-37.
34. **Anon**. The WHO European report confirms links between socioeconomic development and health. *Euro Surveill* 2002;**7:**143-144.
35. **Tinkelman D**, Schwartz A. School-based asthma disease management. *J Asthma* 2004;**41:**455-462.
36. **Anon**. New inner-city asthma interventions put social workers in the driver's seat. *Dis Manag Advis* 2003;**9:**111-115.

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