

## Pneumonia mortality among children in Brazil: a success story

Inge Axelsson,<sup>1</sup> Sven Arne Silfverdal<sup>2</sup>

The global number of deaths among children under 5 years of age was 8.8 million in 2008,<sup>1</sup> corresponding to 24,000 deaths per day. This figure is horrific, but fortunately decreasing. During the period 1990-2008, the under-5 mortality rate decreased 28% globally and 61% in Brazil.<sup>1</sup> In this issue of *Jornal de Pediatria*, Rodrigues et al. report that deaths from pneumonia during 1991-2007 decreased 74% for infants and 56% for children 1-4 years old in Brazil.<sup>2</sup> Thus, the total mortality and the mortality due to pneumonia have had roughly the same development in Brazil, pneumonia making up about 5% of the under-5 deaths.

Globally, pneumonia is the number 1 killer of children causing about 20% of under-5 deaths. It is the "forgotten killer of children" with more childhood deaths than HIV, malaria, and measles combined.<sup>3</sup> In Brazil, there are 4 million cases of childhood pneumonia each year.<sup>3</sup> However, Brazil is an upper middle income country<sup>4</sup> and infectious diseases are not so dominant causes of mortality compared to low income countries.

Table 1 shows that among the five most populated countries in the world, Brazil has improved the under-5 mortality faster than any of the other countries. Systematic improvement of prevention and treatment of pneumonia has been essential for this success. Gapminder World<sup>5</sup> is an interactive web-service displaying time series of development statistics for all countries, for some countries back to the early 1800s. By moving the time arrow, one

can see that Brazil now has about the same life expectancy and under-5 mortality as the United States had in 1975 and 1972, respectively.

The decline of the mortality rate of pneumonia among children in Brazil has been slower in northern Brazil where the mortality rate of pneumonia is now double that in the south. The authors suggest that Integrated Management of Childhood Illness (IMCI),<sup>6</sup> national clinical practice guidelines and vaccination against *Haemophilus influenzae* group b (Hib) and *Streptococcus pneumoniae* (pneumococci) have been important for the success and that different implementations of these tools may explain the differences between North and South.

What next? The member states of the United Nations are committed to achieve the Millennium Development Goal 4 (MDG4): to reduce the under-5 mortality rate by 2/3 by 2015, compared to 1990. The mortality rate has decreased (Table 1) but not fast enough to fulfill MDG4. Therefore, the Global Action Plan for Prevention and Control of Pneumonia (GAPP)<sup>7</sup> recommends urgent implementation of key strategies for treating, preventing and protecting children from pneumonia:

- case management at all levels: hospital, health facility and community levels;
- vaccination against measles, whooping-cough, Hib and pneumococci (conjugated vaccine);
- prevention and management of HIV infection;

---

**See related article  
on page 111**

---

1. MD, PhD. Department of Pediatrics, Research and Development Unit, Östersund County Hospital, Department of Health Sciences, Mid Sweden University, Östersund, Sweden.

2. MD, PhD, MPH. Department of Clinical Sciences, Pediatrics, Umeå University, Umeå, Sweden.

No conflicts of interest declared concerning the publication of this editorial.

Financial support: Department of Health Sciences, Mid Sweden University.

**Suggested citation:** Axelsson I, Silfverdal SA. Pneumonia mortality among children in Brazil: a success story. *J Pediatr* (Rio J). 2011;87(2):85-87.

doi:10.2223/JPED.2080

**Table 1** - Under-5 mortality in the five countries with largest populations<sup>1</sup>

Country	Population* 2008	Under-5 mortality rate		Annual no. of under-5 deaths† 2008
		1990	2008	
China	1,337	46	21	365
India	1,181	116	69	1,830
United States	312	11	8	35
Indonesia	227	86	41	173
Brazil	192	56	22	67
World	6,734	90	65 <sup>‡</sup>	8,772

\* Millions.

† Thousands.

‡ Millennium Development Goal number 4 (MDG4) is 30 (2/3 decrease from 90).

- improvement of nutrition and reduction of low birth weight, including promotion of exclusive breastfeeding during the first 6 months of life, and zinc supplementation;
- control of indoor air pollution;
- encouragement of hand washing.

GAPP claims that these interventions, if implemented, have the potential to reduce pneumonia mortality and morbidity by more than half. Primary health staff should use IMCI or related national guidelines for assessment and management of sick children. There are several good reports that could be used as scientific bases for national or regional clinical practice guidelines for doctors. Important findings in these papers may be summarized as follows:

- Most children with tachypnea do not have chest x-ray signs of pneumonia. Only 14% had it in a huge study in Pakistan (n = 1,932), and only 1.3% (26/1,932) had lobar consolidation.<sup>8</sup> Adding fever to WHO's criteria for pneumonia (which is based solely on tachypnea) greatly improves the specificity of the criteria with only marginally lowered sensitivity, according to a recent study from São Paulo.<sup>9</sup>
- Most cases of mild pneumonia in high-income countries do not need antibiotics.<sup>10</sup> This rule should probably not be used in middle or low income countries. Children with mild pneumonia have no serious symptoms or signs, are not septic (do not look "toxic") and do not have oxygen saturation below 95%.
- *Streptococcus pneumoniae* is the most common cause of pneumonia but other bacteria or virus or a combination of bacteria and virus are also common. There is no reliable method to differentiate between bacterial and viral pneumonia. Moderate or severe pneumonia should therefore be treated with antibiotics.<sup>10</sup>

- Oral antibiotics (amoxicillin or cotrimoxazole) for 3 days are as good as intravenous antibiotics or a longer duration of medication for non-severe cases (except children who vomit).<sup>11</sup> This observation is based on trials in low income countries. Because of globally increased resistance, macrolides are not safe for pneumococcal pneumonia.<sup>12</sup>

Brazil has already fulfilled MDG4 but should continue the successful work, especially in the northern parts of the country where the pneumonia mortality rate among children is lagging about 8 years behind the South.<sup>2</sup>

## References

1. UNICEF. The State of the World's Children. Table 1: Basic Indicators. 2009. <http://www.unicef.org/rightsite/sowc/statistics.php>. Access: 9 Jan 2011.
2. Rodrigues FE, Tatto RB, Vauchinski L, Leães LM, Rodrigues MM, Rodrigues VB, et al. Pneumonia mortality in Brazilian children aged 4 years and younger. *J Pediatr (Rio J)*. 2011;86:111-114.
3. UNICEF. Pneumonia: the forgotten killer of children. New York: UNICEF / WHO Press; 2006. [http://www.unicef.org/publications/index\\_35626.html](http://www.unicef.org/publications/index_35626.html). Access: 9 Jan 2011.
4. The World Bank. Data: Brazil. <http://data.worldbank.org/country/brazil>. Access: 9 Jan 2011.
5. Gapminder World. <http://www.gapminder.org/>. Access: 9 Jan 2011.
6. World Health Organization (WHO), UNICEF. Integrated management of childhood illness. Geneva: WHO Press; 2008. [http://whqlibdoc.who.int/publications/2008/9789241597289\\_eng.pdf](http://whqlibdoc.who.int/publications/2008/9789241597289_eng.pdf). Access: 9 Jan 2011.
7. World Health Organization (WHO), UNICEF. Global Action Plan for Prevention and control of Pneumonia (GAPP). Geneva: WHO Press; 2009.
8. Hazir T, Nisar YB, A Qazi SA, Khan SF, Raza M, Zameer S, et al. Chest radiography in children aged 2-59 months diagnosed with non-severe pneumonia as defined by World Health Organization: descriptive multicentre study in Pakistan. *BMJ*. 2006;333:629.

9. Cardoso MR, Nascimento-Carvalho CM, Ferrero F, Alves FM, Cousens SN. Adding fever to WHO criteria for diagnosing pneumonia enhances the ability to identify pneumonia cases among wheezing children. *Arch Dis Child*. 2011;96:58-61.
10. British Thoracic Society Standards of Care Committee. *British Thoracic Society Guidelines for the Management of Community Acquired Pneumonia in Childhood*. *Thorax*. 2002;57 Suppl 1: i1-24.
11. Russell K, Robinson J, Yorke D, Axelsson I. The Cochrane Library and Treatment for Community Acquired Pneumonia in Children: An Overview of Reviews. *Evid-Based Child Health*. 2009;4:1149-64.
12. Don M, Canciani M, Korppi M. Community-acquired pneumonia in children: what's old? What's new? *Acta Paediatr*. 2010;99:1602-8.

Correspondence:  
Inge Axelsson  
Department of Health Sciences - Mid Sweden University  
SE-831 25, Östersund – Sweden  
Tel.: +46 (63) 165627, +46 (70) 3427981  
Fax: +46 (63) 165626  
E-mail: inge.axelsson@miun.se

## Next steps in the study of sudden infant death syndrome

Abraham B. Bergman\*

Several important lessons emerge from the paper by Pinho & Nunes<sup>1</sup> that appears elsewhere in this issue. First, by means of a careful case-control study, the authors convincingly show that the epidemiologic features of sudden infant death syndrome (SIDS) in Porto Alegre, Brazil, are similar to those found in other parts of the world, wherever infant deaths have been studied. These features include higher rates of prematurity, low birth weight, teenage pregnancy, dark-skin ethnicity, smoking, and poverty – along with the single most distinctive and puzzling feature of SIDS, a mean age at death of 3 months. The authors point out that because of the relative prosperity and diversity of Porto Alegre's population, the determined incidence of 0.55/1,000 live births may not be representative of other areas of Brazil. In less prosperous areas, the frequency is probably higher, as is infant mortality in general.

Second, the term SIDS is not generally recognized by certifying officials. Only two out of the 33 cases that fit the clinical and pathologic criteria, were classified as SIDS. That is not surprising. Though historical evidence points to "crib death" occurring throughout the ages, even in

ancient times, SIDS as a disease entity only began to be recognized in the last 40 years.<sup>2</sup> Many years usually pass from the time a disease entity is first recognized to when it becomes accepted within the medical community. This is especially true when the cause(s) remain(s) unknown. Some examples are Reye's syndrome, Kawasaki's disease, multiple sclerosis, sarcoidosis, and lupus.

Third, in looking for practical measures that have been shown to lower the incidence of SIDS, the authors identify the two most subject to modification: smoking both during and after pregnancy,<sup>3</sup> and placing the infant to sleep in the supine position.<sup>4</sup> That is not to say that changing long-standing habits is easy.

### Fate of the families

Not described in the paper from Porto Alegre, because it was not the subject of the investigation, is the fate of the families of infants who died suddenly and unexpectedly. I first became acquainted with the emotional devastation caused by SIDS while doing home visits as part of an epidemiological study, when I was invariably asked, "why

See related article  
on page 115

\* MD, Professor Emeritus of Pediatrics, Harborview Medical Center, University of Washington, Seattle, WA, USA.

No conflicts of interest declared concerning the publication of this editorial.

**Suggested citation:** Bergman AB. Next steps in the study of sudden infant death syndrome. *J Pediatr* (Rio J). 2011;87(2):87-88.

doi:10.2223/JPED.2076