



## ORIGINAL ARTICLE

# Incidence of community-acquired infections of lower airways among infants



Ana Luisa Oenning Martins<sup>a</sup>, Deisy da Silva Fernandes Nascimento<sup>a</sup>,  
Ione Jayce Ceola Schneider<sup>b</sup>, Fabiana Schuelter-Trevisol<sup>a,c,\*</sup>

<sup>a</sup> Universidade do Sul de Santa Catarina (Unisul), Tubarão, SC, Brazil

<sup>b</sup> Universidade Federal de Santa Catarina (UFSC), Florianópolis, SC, Brazil

<sup>c</sup> Centro de Pesquisas Clínicas do Hospital Nossa Senhora da Conceição, Tubarão, SC, Brazil

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### KEYWORDS

Pneumonia;  
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Risk factors

### PALAVRAS-CHAVE

Pneumonia;  
Bronquiolite;  
Criança;

### Abstract

**Objective:** To estimate the incidence of community-acquired infections of the lower respiratory tract and the risk factors associated with its occurrence in infants, in their first year of life.

**Methods:** A prospective cohort study of infants who were followed up during the first 12 months of life. Interviews were conducted with their mothers, and children were clinically monitored bimonthly to investigate the occurrence of the incidence density of community-acquired infections of the lower respiratory tract. Cox regression analysis was used to estimate the crude and adjusted relative risk of the variables associated with the outcome.

**Results:** The mean age of the mothers was 26 years, 62% of them had more than 11 years of schooling, and 23.5 were at risk of social exclusion regarding economic income. The incidence density of pneumonia and bronchiolitis were, respectively, 0.51 and 3.10 episodes per 100 children-months. Children who had low birth weight (<2500g) were 5.96 (95%CI 1.75–20.40) times more likely to have pneumonia than infants weighing 2500g or over.

**Conclusions:** The incidence of acute lower respiratory tract infection in children was similar to that found in other studies. Only low birth weight was an independent risk factor for the occurrence of pneumonia.

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### Incidência de infecções comunitárias de vias aéreas inferiores em crianças

### Resumo

**Objetivo:** Estimar a incidência de infecções comunitárias de vias aéreas inferiores e os fatores de risco associados à sua ocorrência em lactentes em seu primeiro ano de vida.

\* Corresponding author.

E-mail: [fastrevisol@gmail.com](mailto:fastrevisol@gmail.com) (F. Schuelter-Trevisol).

Epidemiologia;  
Fatores de risco

**Métodos:** Estudo prospectivo de coorte com lactentes que foram acompanhados durante os primeiros 12 meses de vida. Foram realizadas entrevistas com as mães e as crianças foram clinicamente monitoradas bimestralmente para investigar a ocorrência da densidade de incidência de infecções comunitárias das vias aéreas inferiores. A análise de regressão de Cox foi utilizada para estimar o risco relativo bruto e ajustado das variáveis associadas com o desfecho.

**Resultados:** A idade média das mães foi de 26 anos, 62% tinham mais de 11 anos de escolaridade, e 23,5 estavam em risco de exclusão social em relação à renda. A densidade de incidência de pneumonia e bronquiolite foram, respectivamente, 0,51 e 3,10 episódios por 100 crianças-mês. Crianças com baixo peso ao nascer (2.500gramas) foram 5,96 vezes (IC95% 1,75–20,40) mais propensas a ter pneumonia do que crianças com peso de 2.500 gramas ou mais.

**Conclusões:** A incidência da infecção aguda das vias aéreas inferiores em crianças foi semelhante à encontrada em outros estudos. Apenas baixo peso ao nascer foi um fator de risco independente para a ocorrência de pneumonia.

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## Introduction

Acute respiratory tract infections (ARIs) are a leading cause of morbidity and mortality among children. In 2010, infectious diseases caused 58% of deaths globally among children younger than 5 years. Pneumonia, diarrhea and malaria accounted for one-third of deaths in this age group.<sup>1</sup> In Latin America, respiratory infections were responsible for over 80,000 deaths of children per year, 40% of which occurred in Brazil.<sup>2</sup> The World Health Organization (WHO) considers that bronchiolitis and pneumonia are the most important epidemiological components of ARIs in early childhood.<sup>3</sup>

Bronchiolitis is an acute infection of the small airways that primarily affects young infants, often those aged between 2 and 24 months. The disease follows a seasonal pattern, with peaks during the winter in temperate climates, and during the rainy season in tropical climates.<sup>4</sup> Pneumonia is a leading cause of morbidity and mortality among children younger than five years, with 95% of cases occurring in developing countries.<sup>3</sup> Previous studies have listed the risk factors for acquiring respiratory infections, among which are socioeconomic factors (low household income, poor parental education, and high number of persons per household), early cessation of breastfeeding, low birth weight, malnutrition, passive smoking, and daycare attendance.<sup>5,6</sup>

In this context, the aim of this study was to estimate the incidence of community-acquired lower respiratory tract infections, and the risk factors associated with its occurrence in infants up to one year old in Tubarão, southern Brazil.

## Method

This study was approved by the Research Ethics Committee of the University of Southern Santa Catarina (code number 12.035.4.01 III) on April 27, 2012.

This is a prospective cohort study. The municipality of Tubarão is home to 96,284 residents. According to the Information Technology Department of the National Health System (DATASUS), around 2000 children are born in Tubarão yearly (average for the last 10 years), above 80% per year,

on average, in the maternity of *Hospital Nossa Senhora da Conceição* (HNSC). The HNSC is reference center and it is the only hospital that provides neonatal intensive care in the region. It is a "Baby-friendly hospital" since 2001.

It is estimated that one-third of infants have at least one episode of lower respiratory tract infection in their first year of life.<sup>7</sup> The sample size calculation considered the following: exclusive breastfeeding is the main protective factor for reducing lower respiratory tract infections (LRTIs); reduction of LRTI provided by exclusive breastfeeding in about 65%<sup>8</sup>; power of 80%; alpha error of 5%; and 95% significance level. A 20% addition was made to cover possible losses to follow-up, totaling a minimum sample size of 106 subjects.

Data were collected between June 2012 and September 2013 from mothers of newborn babies at the *Hospital Nossa Senhora da Conceição*. After getting a written consent form, the participants were interviewed to collect data regarding prenatal care, delivery details, and demographic and socioeconomic characteristics of the family. Mothers who agreed to participate were given a health diary to make weekly notes about their child's clinical data. The health diaries were collected at each medical appointment, and new ones were handed out. Childcare was provided to all children included in the study, with bimonthly scheduled medical appointments for a one-year period. During these visits, clinical follow-up data were collected, and confirmation of data provided by mothers in the health diaries was made. Six medical appointments were provided to each child over a one-year period. The children were seen by physicians who were pediatricians and professors at the medical school at two outpatient clinics run by the University of Southern Santa Catarina.

In this study, pneumonia and bronchiolitis were diagnosed by a physician when the baby's mother sought health care. Symptoms associated with pneumonia were cough, fever, and radiographic changes to confirm the diagnosis, whereas symptoms associated with bronchiolitis were tachypnea, cough and wheezing with presence or absence of fever and coryza. The data were collected during the pediatric visits and reported by the mothers.

The Open Source Epidemiologic Statistics for Public Health (OpenEpi), version 2.3.1 was used to calculate the sample size. The collected data were entered into

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