Revista de Ciencias Médicas de Pinar del Río

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

**ORIGINAL ARTICLE**

# Determinants associated with community-acquired pneumonia in pediatric patients treated at Luis Gabriel Dávila Hospital

**Naomi Salome Flores-Santander**[1] ✉ , **Rosa María Montalvo-Pantoja**[2] , **José Orlando Flores-Alarcón**[1]

[1]Universidad Politécnica Estatal del Carchi, Tulcán, Ecuador.
[2]Luis Gabriel Dávila Hospital, Tulcán, Ecuador.

**Received:** January 14, 2026
**Accepted**: January 16, 2026
**Published**: January 17, 2026

**Citar como:** Flores-Santander NS, Montalvo-Pantoja RM, Flores-Alarcón JO. Determinantes asociados a la neumonía adquirida en la comunidad en pacientes pediátricos atendidos en el Hospital Luis Gabriel Dávila. Rev Ciencias Médicas [Internet]. 2026 [citado: fecha de acceso]; 30(2026): e7100. Disponible en: http://revcmpinar.sld.cu/index.php/publicaciones/article/view/7100

## ABSTRACT

**Introduction:** community-acquired pneumonia represents one of the main causes of childhood morbidity, with multiple factors influencing its incidence and severity.
**Objective:** to identify the biological, social, economic, and environmental determinants associated with the presence of community-acquired pneumonia in pediatric patients treated at Luis Gabriel Dávila Hospital.
**Methods:** an observational, descriptive, cross-sectional study was conducted in Tulcán, Ecuador, during 2025. The population included 55 pediatric patients up to seven years of age diagnosed with community-acquired pneumonia, selected through non-probabilistic convenience sampling. Information was obtained through documentary analysis of hospital records and structured questionnaires administered to the patients' guardians. Data were processed using descriptive statistics in SPSS, adhering to bioethical principles.
**Results:** a higher frequency of pneumonia was observed in children under two years of age, with a predominance of males (55 %). Among social determinants, household overcrowding (61,8 %), low parental educational level (52,7 %), and lack of regular medical check-ups (47,3 %) were highlighted. In the economic domain, low socioeconomic status (70,9 %) and difficulty in obtaining medications (56,4 %) predominated. The most frequent environmental determinants were indoor pollution (58,2 %) and poor household ventilation (52,7 %). Biologically, recurrent respiratory infections (60 %) and incomplete vaccination schedules (49,1 %) were most relevant.

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

**Conclusions:** the interaction of multiple socioeconomic, environmental, and biological determinants was identified, evidencing the need to implement comprehensive strategies for prevention, health education, and improvement of living conditions aimed at reducing the incidence and complications of this disease.

**Keywords:** Social Determinants of Health; Socioeconomic Factors; Respiratory Tract Infections; Community-Acquired Pneumonia; Child Health.

## INTRODUCTION

Respiratory pneumonias constitute one of the main infectious diseases affecting the respiratory system, characterized by inflammation of lung tissue caused by bacterial, viral, or fungal agents.[1] This condition represents a significant public health problem, especially in the pediatric population, due to its high incidence, rapid progression, and risk of severe complications if not diagnosed and treated promptly. Factors such as young age, nutritional status, environmental conditions, and limited access to health services significantly influence its occurrence and severity, making its study essential to strengthen prevention and medical care strategies.[2]

The relevance of this study lies in the need to generate local evidence to strengthen strategies for prevention, timely diagnosis, and clinical management of pneumonias in pediatric patients. Analyzing associated determinants—such as housing conditions, nutritional status, access to health services, and clinical history—will contribute to optimizing hospital care and guiding public policies aimed at reducing infant mortality.[3] Likewise, the results will serve as a starting point for designing health promotion and respiratory disease prevention programs for the pediatric population within the catchment area of Luis Gabriel Dávila Hospital.

Bacusoy Ramírez,[4] reported a prevalence of community-acquired pneumonia in children under six years of age attending Martín Icaza Hospital. A quantitative, analytical, and descriptive methodology was used, employing direct observation and review of clinical records of 125 children diagnosed with pneumonia. Results showed a prevalence of 58 %, with one-year-old children being the most susceptible and a male predominance. Regarding socioeconomic and environmental determinants, most children belonged to a low economic level, and 70 % came from rural areas. The main risk factors identified were exposure to dust and chemicals (39 %), hereditary respiratory infections (31 %), tobacco smoke (23 %), air pollution (12 %), and wood smoke (10 %).

Criollo Armijos,[5] focused on identifying the influence of environmental determinants on community-acquired pneumonia in children aged 1 to 5 years in Colonche parish during 2021, considering factors such as environmental pollution, overcrowding, and exposure to tobacco smoke. This study used a quantitative, descriptive, cross-sectional, and non-experimental approach with a sample of 55 children, using a structured form to collect sociodemographic data, housing conditions, and environmental factors. Results showed a higher prevalence of pneumonia in three-year-old children, with a male predominance, and confirmed the association between environmental determinants and disease complications, with pleural effusion and pneumothorax being the most frequent. The study concluded that overcrowding, pollution, and exposure to tobacco smoke are the main causal factors of community-acquired pneumonia in the pediatric population.

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

Fuentes Fuentes y Hurtado,[6] examined the environmental health determinants influencing respiratory diseases in childhood at the Ayapal Family and Community Health Center, San José de Bocay municipality, during the first semester of 2021, using a descriptive, observational, retrospective, and cross-sectional design applied to 52 children under five years of age. Results showed that most affected children were over two years old and male, with recurrent episodes of respiratory illness. Parents or guardians were characterized as young, with low educational and socioeconomic levels, and large families. The main environmental determinants identified were overcrowding, rural origin, educational level, access to water, low economic status, and incomplete vaccination schedules. Additionally, caregivers demonstrated limited knowledge of risk factors and prevention of respiratory diseases, inadequate hygiene practices, and frequent use of alternative treatments, with pneumonia being one of the main diagnosed conditions, confirming the significant influence of social and environmental determinants on pediatric respiratory health.

Respiratory pneumonias remain one of the leading causes of morbidity and hospitalization in the pediatric population, representing a significant challenge for health services.[7] Despite advances in diagnosis and treatment, Luis Gabriel Dávila Hospital records a high incidence of pneumonias in children, suggesting the presence of various determinants influencing their occurrence and severity. However, there is no systematic information specifically identifying and analyzing the biological, socioeconomic, and environmental determinants associated with this pathology in the treated pediatric population. In this context, the following research objective arises: To identify the biological, socioeconomic, and environmental determinants associated with the presence of respiratory pneumonias in pediatric patients treated at Luis Gabriel Dávila Hospital.



## METHODOLOGY

An observational, descriptive, cross-sectional study was conducted at Luis Gabriel Dávila Hospital, located in Tulcán, Ecuador, during the period from January to December 2025. The study population consisted of pediatric patients up to seven years of age diagnosed with respiratory pneumonia.

Children treated at the hospital with a confirmed diagnosis of respiratory pneumonia were included, while those with chronic respiratory diseases not related to pneumonia or with incomplete clinical records were excluded. The final sample consisted of 55 patients, selected through non-probabilistic convenience sampling, considering the availability of cases during the study period.



### Procedures and Techniques

Data collection was carried out through documentary analysis of medical records and hospital registries, complemented by the administration of a structured questionnaire to the patients' legal guardians. The questionnaire included sociodemographic, economic, environmental, and health history sections, and was developed based on a prior literature review.

The diagnosis of pneumonia was based on clinical and radiological criteria established by the hospital, including respiratory symptoms, physical findings, and radiographic confirmation. The main variables were the presence of pneumonia and the associated social, economic, environmental, and biological determinants. Secondary variables included age, sex, and relevant clinical history. The questionnaire demonstrated acceptable reliability (Cronbach's $\alpha = 0,8$). Data were recorded in a digital database and subsequently processed for analysis.

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

### Statistical Analysis

Data were analyzed using descriptive statistics, employing absolute frequencies, percentages, and measures of central tendency to characterize the variables. SPSS software version 25 was used for statistical processing. The level of significance was set at $p<0,05$. Association tests (Pearson's $\chi^2$) were applied to explore relationships between categorical variables. Missing data were handled by excluding incomplete cases, and bias control strategies were implemented, such as cross-verification of hospital records and questionnaires.

### Ethical Considerations

The study was approved by the Ethics Committee of the Universidad Politécnica Estatal del Carchi and Luis Gabriel Dávila Hospital. Written informed consent was obtained from the parents or legal guardians of the patients prior to participation in the research. Confidentiality of information and anonymity of participants were guaranteed. The research complied with the ethical principles of the Declaration of Helsinki and with current national regulations on biomedical research.



## RESULTS

The highest proportion of pediatric patients with respiratory pneumonia is concentrated among infants under one year of age and children aged one year, who together account for 40 % of the total cases, highlighting greater vulnerability at the earliest ages. Likewise, a predominance of the male sex is observed, with 55 % of cases compared to 45 % in females, suggesting a greater biological susceptibility of boys to respiratory pneumonia. As age increases, the frequency of cases progressively decreases, being lower from five years onward, which may be related to the strengthening of the immune system and greater resistance to respiratory infections.

Table 1 shows that household overcrowding is the most frequent social determinant, present in 61,8 % of cases, which increases the risk of respiratory infection transmission. Similarly, more than half of the patients (52,7 %) come from families with a low educational level, a factor that may influence inadequate practices of prevention and early detection of the disease. Nearly half of the parents (47,3 %) do not carry out regular medical check-ups, which delays the timely diagnosis of pneumonia. These findings demonstrate that social determinants play a significant role in the occurrence of respiratory pneumonia in the pediatric population studied.

**Table 1.** Social determinants associated with respiratory pneumonia in pediatric patients.

| Social determinant | No. | % |
|---|---|---|
| Household overcrowding | 34 | 61,8 |
| Attendance at daycare/preschool | 21 | 38,2 |
| Low parental educational level | 29 | 52,7 |
| Lack of regular medical check-ups | 26 | 47,3 |
| Primary care provided by third parties | 18 | 32,7 |



Regarding economic determinants (Table 2), it was observed that 70,9 % of patients belonged to households with a low socioeconomic level, making this the most relevant economic factor. Likewise, 65,5 % of families reported insufficient income to cover basic needs, while more than half (56,4 %) indicated difficulties in acquiring medications. These conditions limit timely access to adequate treatments and favor the progression of respiratory infections into pneumonia, highlighting a strong association between poverty and childhood respiratory disease.

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

**Table 2**. Economic determinants associated with respiratory pneumonia in pediatric patients.

| Economic determinants | No. | % |
|---|---|---|
| Low socioeconomic level | 39 | 70,9 |
| Insufficient family income | 36 | 65,5 |
| Lack of access to complete basic services | 28 | 50,9 |
| Difficulty in acquiring medications | 31 | 56,4 |

The results show that household overcrowding is the most frequent social determinant, present in 61,8 % of cases, increasing the risk of respiratory infection transmission. Likewise, more than half of the patients (52,7 %) come from families with low educational levels, a factor that may influence inadequate prevention and early detection practices. Nearly half of the parents (47,3 %) do not undergo periodic medical check-ups, delaying the timely diagnosis of pneumonia. These findings demonstrate that social determinants play a significant role in the occurrence of respiratory pneumonias in the studied pediatric population.

**Table 3.** Economic determinants associated with respiratory pneumonias in pediatric patients.

| Environmental determinants | No. | % |
|---|---|---|
| Exposure to tobacco smoke | 24 | 43,6 |
| Use of wood or coal for cooking | 17 | 30,9 |
| Indoor pollution | 32 | 58,2 |
| Poorly ventilated housing | 29 | 52,7 |
| Exposure to dust and chemicals | 21 | 38,2 |

The results show that 60 % of patients had a history of recurrent respiratory infections, which increases the risk of developing pneumonia. In addition, nearly half (49,1 %) had an incomplete vaccination schedule, a factor that limits protection against respiratory infectious agents. The presence of malnutrition and low birth weight also constitutes a relevant biological determinant, as it compromises the child's immune response (Table 4).

**Table 4.** Health conditions and medical history associated with respiratory pneumonia.

| Health condition | No. | % |
|---|---|---|
| Incomplete vaccination schedule | 27 | 49,1 |
| History of recurrent respiratory infections | 33 | 60,0 |
| Mild or moderate malnutrition | 19 | 34,5 |
| Low birth weight | 14 | 25,5 |

## DISCUSSION

In theoretical terms, respiratory pneumonia constitutes one of the leading causes of childhood morbidity and mortality worldwide, particularly in children under five years of age. It is defined as an acute infection of the pulmonary parenchyma caused by bacterial, viral, or fungal agents, which generate inflammation of the alveoli and compromise respiratory function.[4] In pediatrics, the immaturity of the immune system, combined with unfavorable social and environmental

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

conditions, increases susceptibility to this disease, making it a major public health problem in developing countries and in areas with limited access to timely health services.[8]

From the perspective of the social determinants of health, as proposed by the World Health Organization, the occurrence of pneumonia in the pediatric population does not depend solely on biological factors, but also on the conditions in which children are born, grow, and develop.[9] Social factors such as parental educational level, childcare practices, attendance at health check-ups, and knowledge about the prevention of respiratory infections directly influence the frequency and severity of pneumonia.[10] Lack of information and delays in seeking timely medical care increase the risk of complications and hospitalization.

Economic determinants also play a relevant role in the incidence of respiratory pneumonia in children. Low socioeconomic status limits access to adequate nutrition, health services, medications, and optimal housing conditions.[11] Situations such as unemployment, informal labor, and lack of social security can generate family instability, hindering compliance with vaccination schedules and continuous medical follow-up, thereby favoring the recurrence of respiratory infections in the pediatric population.[4]

Regarding environmental determinants, multiple studies show that domestic and community conditions significantly influence respiratory health in children. Household overcrowding, poor ventilation, exposure to tobacco smoke, use of firewood and other solid fuels for cooking, humidity, and environmental pollution increase the likelihood of acute respiratory infections, including pneumonia.[5] These factors generate greater exposure to pathogens and contaminant particles that directly affect children's airways.

Biological determinants constitute an essential component in the development of respiratory pneumonia. Early age, malnutrition, low birth weight, prematurity, and the presence of chronic diseases or a history of recurrent respiratory infections increase the child's vulnerability.[6] The lack of a complete vaccination schedule, particularly against preventable respiratory diseases, represents an important risk factor that can worsen the clinical course of pneumonia.[2]

The results of the present study confirm that respiratory pneumonia in pediatric patients at Luis Gabriel Dávila Hospital constitutes a significant health problem, especially in children under five years of age, with greater impact in males. These findings are consistent with those reported by Bacusoy Ramírez,[4] who identified a high prevalence of community-acquired pneumonia in children under six years, with one-year-old boys being the most susceptible. Similarly, in the present research, the most affected age groups were infants under one year and children aged one to two years, which may be attributed to immune system immaturity and greater exposure to household risk factors.

With respect to social determinants, the results showed that overcrowding, low parental educational level, and lack of regular medical check-ups were frequent factors in the studied population. These findings are consistent with the social determinants of health approach proposed by the World Health Organization, which states that the conditions in which children are born and develop directly influence their health status.[9] Likewise, Trujillo-Calderón and Sánchez,[10] highlight that caregivers' educational level shapes childcare practices and timely medical care-seeking, a point reflected in this study in the significant percentage of parents who do not carry out regular medical check-ups.

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

Regarding economic determinants, the study results showed that most patients belonged to households with low socioeconomic status and insufficient income to cover basic needs, limiting access to health services, medications, and adequate housing conditions. These results are similar to those reported by Bacusoy Ramírez,[4] and Ramírez Palma et al.,[11] who point out that poverty and economic instability increase children's vulnerability to respiratory infections by hindering compliance with vaccination schedules, adequate nutrition, and continuous medical follow-up.

As for environmental determinants, the present study revealed a high frequency of indoor pollution, poor housing ventilation, and exposure to tobacco smoke, factors that increase the risk of respiratory pneumonia. These results are consistent with the findings of Criollo Armijos,[5] who identified overcrowding, environmental pollution, and exposure to tobacco smoke as the main causal factors of community-acquired pneumonia in children aged one to five years.

Similarly, Bacusoy Ramírez,[4] reported that exposure to dust and chemicals, as well as to tobacco and firewood smoke, represent significant risk factors, findings that coincide with those observed at Luis Gabriel Dávila Hospital. Likewise, the biological determinants identified in this study, such as a history of recurrent respiratory infections, incomplete vaccination schedules, and the presence of malnutrition, reinforce the observations of Fuentes Fuentes and Hurtado,[6] who note that early age, low birth weight, and malnutrition increase susceptibility to respiratory diseases in childhood. In this regard, Garrido-Galindo,[2] emphasizes that incomplete vaccination constitutes a key risk factor that can worsen the clinical course of pneumonia, a point reflected in nearly half of the patients evaluated in this study.

Finally, the results obtained demonstrate that respiratory pneumonia in pediatric patients at Luis Gabriel Dávila Hospital does not respond to a single cause, but rather to the interaction of multiple social, economic, environmental, and biological determinants. This reality coincides with the observations of Pardo Santana et al.,[7] who argue that, despite advances in diagnosis and treatment, the persistence of unfavorable structural conditions keeps pneumonia as one of the leading causes of childhood morbidity and hospitalization. Consequently, the need to strengthen prevention strategies, health education, and improvement of living conditions is highlighted, aimed at reducing the incidence and severity of respiratory pneumonia in the pediatric population.

## CONCLUSION

The study identified that respiratory pneumonias primarily affect pediatric patients under five years of age treated at Luis Gabriel Dávila Hospital, with higher prevalence among males. This situation highlights that young age is a key biological determinant, as immune system immaturity increases vulnerability to respiratory infectious agents. It is concluded that social and economic determinants significantly influence the occurrence of respiratory pneumonias in the pediatric population, particularly low parental educational level, low socioeconomic status, and limited attendance at periodic medical check-ups. These conditions restrict timely access to health services, hinder the adoption of preventive practices, and promote the recurrence of respiratory infections in children. Environmental determinants are also key factors in the development of respiratory pneumonias, with high exposure to indoor air pollution, overcrowding, and tobacco smoke being evident. The interaction of these factors with biological and social determinants confirms that pediatric pneumonia is a multifactorial health problem, underscoring the need to implement comprehensive prevention strategies, health education programs, and improvements in family living conditions.

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

## BIBLIOGRAPHIC REFERENCES

1. Miguéns Blanco I, Micheloud Giménez D, Berian LA, Morales Pérez J. Infecciones respiratorias con compromiso respiratorio. Neumonías y COVID-19. Medicine (Baltimore) [Internet]. 2023 [citado 23/11/2025]; 13(88): 5185-95. Disponible en: https://www.sciencedirect.com/science/article/abs/pii/S0304541223002548

2. Garrido-Galindo C. Neumonía en niños: un desafío histórico y vigente en pediatría. NCT Neumol Cir Torax [Internet]. 2024 [citado 23/11/2025]; 83(S1):97-9. Disponible en: https://www.medigraphic.com/cgi-bin/new/resumen.cgi?IDARTICULO=114819

3. Alvear G, Santibáñez L, Sepúlveda R, Ramírez V, Martínez B. Prescripción de antibióticos en las infecciones respiratorias agudas no neumonías en atención ambulatoria en la práctica privada. Rev Med Chil [Internet]. 2022 [citado 23/11/2025]; 150(8):1000-9. Disponible en: https://www.scielo.cl/scielo.php?pid=S0034-98872022000801000&script=sci_arttext

4. Bacusoy Ramírez JP. Factores determinantes que influyen en la neumonía adquirida en la comunidad en infantes menores de 6 años, Hospital Martin Icaza, Babahoyo, diciembre 2022-abril 2023 [Tesis]. Babahoyo: Universidad Técnica de Babahoyo; 2023 [citado 23/11/2025]. Disponible en: https://dspace.utb.edu.ec/items/e24299e2-15dc-4ba9-93b3-01528cfa7a07

5. Criollo Armijos LJ. Determinantes ambientales y su influencia en la neumonía adquirida en la comunidad en niños de 1 a 5 años de edad en la parroquia Colonche 2021 [Tesis]. Santa Elena: Universidad Estatal Península de Santa Elena; 2021 [citado 23/11/2025]. Disponible en: https://repositorio.upse.edu.ec/server/api/core/bitstreams/2c23dfd0-1864-4f6f-867d-1d69028d4319/content

6. Fuentes Fuentes LO, Hurtado MJ. Determinantes ambientales de salud que influyen en las enfermedades respiratorias en la infancia en Bocay, Jinotega 2021. Rev Torreón Univ [Internet]. 2024 [citado 23/11/2025]; 13(38): 185-201. Disponible en: https://revistas.unan.edu.ni/index.php/Torreon/es/article/view/4728

7. Pardo Santana S, Soares FM, Plutín Gómez M. Caracterización clínica y epidemiológica de pacientes con infecciones respiratorias agudas en Timor Leste. Rev Cubana Hig Epidemiol [Internet]. 2022 [citado 23/11/2025]; 59(1): 1-16. Disponible en: http://scielo.sld.cu/scielo.php?pid=S1561-30032022000100002&script=sci_arttext&tlng=en

8. Ríos Albán EE. Neumonía en pacientes pediátricos a nivel de Latinoamérica. Revisión bibliográfica [Tesis]. Cuenca: Universidad Católica de Cuenca; 2022 [citado 23/11/2025]. Disponible en: https://dspace.ucacue.edu.ec/server/api/core/bitstreams/09fbcce2-bc82-45f4-80fe-b7047c263100/content

9. López Contreras DJ. Revisión sistemática sobre las características fisiopatológicas y el manejo de la neumonía infantil adquirida en la comunidad [Tesis]. Cuenca: Universidad Católica de Cuenca; 2023 [citado 23/11/2025]. Disponible en: https://dspace.ucacue.edu.ec/server/api/core/bitstreams/d0ced6e4-a9bd-4ae6-9b91-e8e9b17c2316/content

**ISSN:** 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2026; 30(2026): e7100

10. Trujillo-Calderón JN, Sánchez IP. Neumonía atípica en niños: detección serológica y molecular de Mycoplasma pneumoniae. Revisión sistemática. Kasmera [Internet]. 2020 [citado 23/11/2025]; 48(2): 1-13. Disponible en: https://zenodo.org/records/3911152

11. Ramírez Palma A, Calderón Vega E, Vidal Ortega J. Sistemas de aspiración: incidencia en neumonía asociada a ventilación mecánica y efectos hemodinámicos. Revista Ene De Enfermería [Internet]. 2021 [citado 23/11/2025]; 15(3):1-16. Disponible en: https://scielo.isciii.es/pdf/ene/v15n3/1988-348X-ene-15-03-1211.pdf