

## PROFILE OF PATIENTS ADMITTED IN A PEDIATRIC INTENSIVE CARE UNIT OF A HOSPITAL SCHOOL IN THE COUNTRYSIDE OF SAO PAULO

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### ABSTRACT

The purpose of the study was to outline the profile of patients hospitalized at the Pediatric Intensive Care Unit of the *Hospital das Clínicas de Botucatu* - UNESP. This is a descriptive, cross-sectional and quantitative study. The data were extracted from the "Discharge, Admission and Death Register" of the unit of the patients hospitalized between January and December 2011. There was predominance of male children (54.4%) under one year of age (40.7%) were, with a mean length of stay of 5.46 days. Most of these children came from cities included in the DIR XI/SP in Botucatu (78.2%). The discharge contributed with 91.1% of the total discharges from the unit. Most admissions happened during the fall and winter, with the Immediate Post-Operative (IPO - 32.3%) and respiratory diseases (24.2%) as the most frequent causes. The profile of patients at the PICU makes it possible to elucidate individual aspects, family, social, demographic, seasonal, climatic, and, also, the clinical conditions, and, thus, comprehend the context of hospitalizations, in order to propose improvements on assistance, in an individualized and integral manner, for patients and their families.

**Keywords:** Health profile. Patients. Child. Hospitalization. Intensive Care Unit. Respiratory tract diseases.

### INTRODUCTION

Intensive Care Units (ICU) were created to accommodate critically ill patients postoperatively, to be observed carefully. From the decades of 40's and 50's, the purpose of the ICUs increased to save the lives of patients at risk of imminent death, and also promote the care of critically ill children. In the late 1970s, Canada and the United States, the first groups of specialized units that belonged to the Philadelphia Children's Hospital and Toronto were created<sup>(1)</sup>.

The ICU is characterized by the severity of the medical condition of the patient, and where they should be allocated professionals with high technical-scientific level, since these professionals perform important tasks daily, since the severity and complexity of patients impose the need for sockets immediate decisions, constant clinical evaluations,

complex procedures and deal with sophisticated equipment. There was a breakthrough in intensive care medicine in recent decades, with changes on the evolution and prognosis of patients in intensive care<sup>(1,2)</sup>.

Even with all the advances of science, unfortunately, the mortality rate in this unit is still very high, due to the severity of cases treated. However, in the Pediatric Intensive Care Unit (PICU), the mortality rate is usually high and this can be explained by the characteristics of patients seen, the fact that children have a faster recovery and also the high level of complexity and technologies that drive, and also by technological advance and human resources from the 90s<sup>(1,3)</sup>.

According to the literature, respiratory diseases are prevalent in PICU in different regions of Brazil. Other causes of hospitalization in this unit are the convulsive states, poisoning, trauma, infectious and parasitic processes<sup>(1,3-7)</sup>.

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Acute respiratory infections (ARIs) are the major causes of morbidity and mortality in pediatric patients. In developing countries, the IRAs are responsible for approximately 30% of infant deaths. The viruses responsible for this disease affect, mainly, the lower respiratory tract of children, ranging in age from 18 days to four years old. The most frequent respiratory infections are pneumonia and bronchiolitis, and its most common symptoms are cough, fever, wheezing and rhinitis<sup>(8-10)</sup>.

Trauma and postoperative (PO) also constitute another class of prevalent diseases. The traumas are undesirable events, producing some form of injury or functional alteration. In Brazil, Trauma is the leading cause of mortality in children, due to the incomplete neurological development, the curious behavior and the inability to assess risks<sup>(11)</sup>. Other diseases such as sepsis and shock, followed by seizures and heart disease are also present in the PICU<sup>(1,3,5,6)</sup>.

Due to the importance of the subject, the purpose of this study is characterizing the profile of patients admitted to a PICU.

## METHODOLOGY

This is a descriptive, cross-sectional, retrospective study with a quantitative approach, which was developed in the Pediatric Intensive Care Unit of the *Hospital das Clínicas* of Botucatu - UNESP.

This unit has nine inpatient beds, two exclusively for isolation. Visits can be done in three times daily, lasting up to two hours each, and each time the entry is allowed only two visitors. A parent or chaperone responsible have free access and can remain indefinitely with the patient, since no procedure is being performed. Children are admitted from 29 days to 15 years of age, if there is no bed available in the Neonatal Intensive Care Unit (NICU) or the Adult Intensive Care Unit, exceptions for infants of 29 days and over 15 years old, can happen in the unit.

On the drive there is the "Book of Discharge, Admission and Death", which register all hospitalizations in the PICU. These annotations are included data: patient record, age, sex, origin, date of admission and departure, type of

output, and diagnostics. Annotations are carried out by nurses from the PICU.

The data used in this research were taken from this book, the notes relating to children hospitalized in the period from January 1<sup>st</sup> to December 31<sup>th</sup>, 2011. By using only the data recorded in the book of the unit was not required Statement of Informed Consent.

The data collected were distributed in items: name, sex, origin, age, date of admission and date of departure, type of outlet (discharge, death or transfer) and pathology. These data were recorded and sorted in a Microsoft Office Excel worksheet; the variables were analyzed and calculated the absolute and relative frequencies, presented in forms of tables and figures.

The inclusion criterion was the completeness of the records contained in the "Book of Discharge, Admission and Death", referring to notes of inpatients. The lack of registration data characterized as an exclusion criterion.

This study was approved by the Research Ethics Committee of the Faculty of Medicine of Botucatu - UNESP, under the Legal 136/2012.

## RESULTS AND DISCUSSION

In 2011, the ICU of the *Hospital das Clínicas de Botucatu* had the hospitalization of 297 patients. Because of the lack of data in the "Book of Discharge, Admission and Death", 12 patients were excluded, totaling 285 patients.

Of the total admissions analyzed, contacted a predominance of males (54.4%), and this fact also observed in several studies<sup>(1,4,6,12)</sup>. The ages ranged from 1 month old to 17 years old, incomplete. The distribution of gender and age is shown in Table 1.

There was a predominance of age group 0-1 year old, which corresponded to 40.7% of admissions, in agreement with other findings in the literature<sup>(1,6)</sup>. Study conducted in an ICU of Paraná had mean age of patients of 25 months old, with a median of seven months old<sup>(13)</sup>. This predominance of age may be due to immaturity of the immune system during the first 12 months of life, which makes these children more susceptible to acute infections. This can cause systemic

complications, and in cases of respiratory diseases, such as airway caliber of children is reduced, it can develop into severe forms, significantly compromising respiratory function<sup>(12)</sup>.

The average length of stay in this study was of 5.46 days. The average length of stay in PICU found in the literature ranged from 4 to 11 days of hospitalization<sup>(1,5,13)</sup>. This unit has

a high turnover of patients, it receives many cases of POI (immediate postoperative), which would explain the average length of stay found. As the merits of the patients admitted to the PICU, it showed the prevalence of children of the Regional Directorate of Health (DIR XI / SP) of Botucatu.

**Table 1** - Distribution by age and gender of patients hospitalized in the Pediatric Intensive Care Unit of the *Hospital das Clínicas de Botucatu* during the year of 2011.

AGE	GENDER				TOTAL	
	Male		Female			
	N	(%)	N	(%)	N	(%)
0 - 1 year old	66	23,2	50	17,5	116	40,7
1 - 5	51	17,9	34	11,9	85	29,8
5 - 10	16	5,6	33	11,6	49	17,2
10 - 17 years old	22	7,7	13	4,6	35	12,3
TOTAL	155	54,4	130	45,6	285	100

This regional operates in 31 municipalities, divided into two microregions: Botucatu, with 13 municipalities and Avaré, with 17 municipalities. Approximately 52,2% of admissions relating to DIR XI were children from municipalities near Botucatu; from Botucatu were 26% and 21,8% of other cities.

Currently the *Hospital das Clínicas de Botucatu* is a tertiary referral for 31 municipalities in the State of São Paulo. Due to the increased coverage area, also occur admissions for children living in other municipalities<sup>(14)</sup>.

Regarding the type of children's discharge from the unit, it was checked for high prevalence of pediatric ward. The data are shown in Figure 1.

Of the children, 91,1 % were discharged to the pediatric ward. The occurrence of deaths was 7,7%. Study in Maringa observed PICU mortality of 6,94%, similar to our study. In other studies, mortality rates varied in the PICU, and in Porto Alegre rate ranged from 6,4% to 14,3%, in Greece the mortality rate was 12,1% and in California was identified a rate of 22%<sup>(1,15)</sup>. The mortality rate in a PICU is lower than that found in other ICUs, because there was a change in the profile of patients who died within these units. From the 80s and 90s, technological progress has

enabled improvements in the care provided to critically ill children, especially with regard to the evolution of primary care, also the creation of programs and actions as the "Program of Comprehensive Health Care Women" (PAISM), "National Immunization Program" (PNI), the Child Health Program", "Integrated Management of Childhood Illness", as well as increasing access to water supply and drainage and reducing illiteracy provided the reduction of the mortality, which were between 15% and 20% to 3% to 10% in Pediatric ICUs. The vast majority of children who die in PICU present comorbidity similar to that found in units those serve adult patients<sup>(7,16)</sup>. The purpose of neonatal and pediatric ICUs is saving the lives of children who, for some reason, are at risk of death, and that goal has been achieved due to high-tech, invasive procedures and qualified personnel. However, the cold and hostile environment brings distressing feelings, especially for the family. But, through the actions of rulers, the presence of the mother and/or the responsible unit eases that feeling and unity of study; mothers are present whenever they can, provided it is not being done procedure in patients<sup>(17,18)</sup>.

Of deaths in the pediatric ICU of Botucatu (22 – 7,7%) there was no prevalence of any

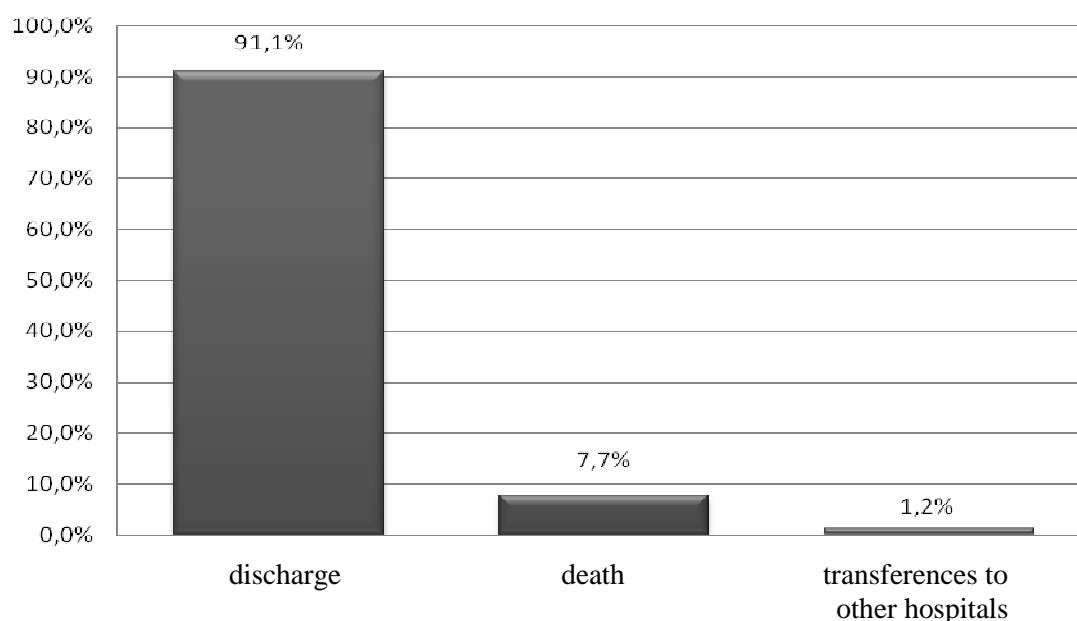
gender. The causes of death were respiratory problems (27.3%), post-operative complications and heart problems (18,3% each), renal failure and cardiopulmonary arrest (9% each), other causes such as seizures and septicemia (13,6%) and cancer (4,5%). A study conducted in southern Brazil showed that respiratory problems appeared first with approximately 31% of cases of death in the PICU<sup>(1)</sup>.

The main risk factors for mortality in these units are children under 2 months of age, the use of mechanical ventilation, the association of pneumonia diagnosis, the use of two or more antibiotics, and also children who already have comorbidity<sup>(4,6)</sup>. Infant mortality due to respiratory problems in children under 1 year is associated with low birth weight,

early weaning and unfavorable socio-economic conditions<sup>(1)</sup>.

The months of August, May and September were found to be more prevalent for hospitalizations, due to climatic changes. The climate of the city of Botucatu is classified as humid mesothermal, ie warm temperate climate. The coldest months are Botucatu June, July and August, with the lowest temperature of the month being July with an average of 17,1° C. The driest month is August, with a water deficit of 3,9 mm, compared to other months of the year. In relation to the seasons, the predominance of admissions to the PICU was during autumn and winter<sup>(19)</sup>. The data are shown in Figure 32.

### Discharge type from PICU



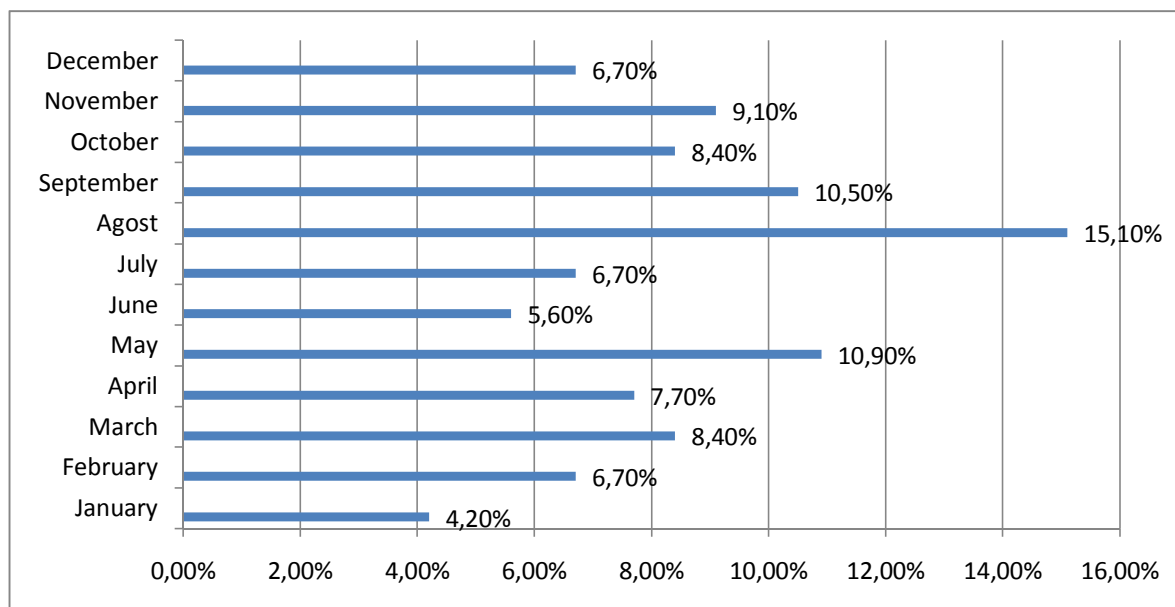
**Figure 1.** Distribution of discharge of children's type in the Pediatric Intensive Care Unit of the *Hospital das Clinicas of Botucatu*, in 2011.

The classification of admissions or reason for hospitalization of children in the PICU was mainly due to surgical procedures, followed by diseases of the respiratory system. This PICU has the feature to receive children for care with the immediate postoperative period, by offering specialized care 24 hours a day. To verify the conditions of the children, it was found that the problems in the respiratory tract are responsible for much of the admissions to the PICU. The data are shown in Figure 3.

Respiratory diseases are responsible for major causes of hospitalization in PICU throughout Brazil, mainly due to climate change, temperature inversions and inappropriate actions of the population as fires and pollution<sup>(1,3,20)</sup>. A study in Londrina (Paraná) was the leading cause of hospitalization in the PICU respiratory failure (41%), circulatory failure (32%) and neurological (16%)<sup>(13)</sup>. Factors associated with hospitalization of children under 5 years indicate that respiratory

diseases are major causes of illness and also in health care services <sup>(1)</sup>.

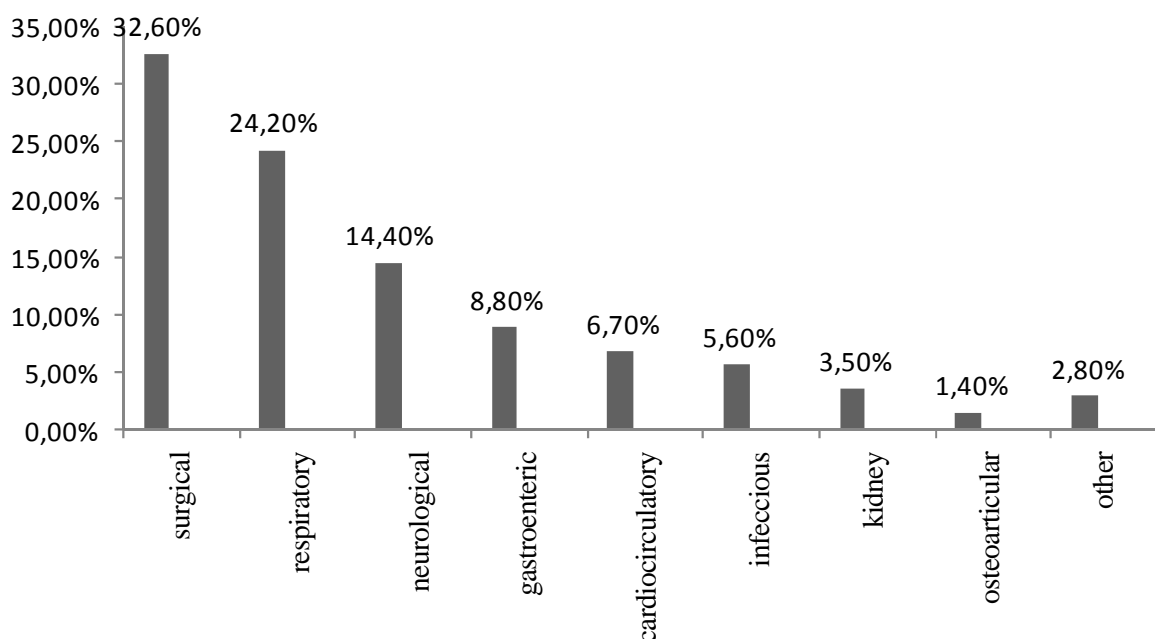
### Percentage of Admissions During year 2011



**Figure 2.** Distribution of hospitalizations compared with the months of the year of 2011 in the Pediatric Intensive Care Unit of the *Hospital das Clinicas of Botucatu*.

Other factors are also at risk of hospitalization for respiratory diseases, such as maternal smoking, pacifier use, early weaning, history of respiratory diseases, socioeconomic factors and exposure to

pollution. Studies have reported that maternal smoking is a potent risk factor, but is related to the amount of cigarettes smoked during pregnancy.



**Figure 3.** Diagnostics and causes of admissions of patients of the Pediatric Intensive Care Unit of the *Hospital das Clinicas of Botucatu*, in 2011.

Smoking seems to affect lung development of children, decreasing the diameter of the intrapulmonary airways<sup>(4,12)</sup>.

The use of pacifiers or spout facilitates mouth breathing causing the child does not breathe through the nasal region and thus preventing the nostrils perform the functions of filtration and humidification of air. It can also happen to exchange dummies among children, which would allow cross-infection<sup>(12)</sup>.

A history of chronic respiratory diseases such as asthma and bronchiolitis facilitates the onset of acute respiratory problems and rapid evolution<sup>(12)</sup>.

Regarding socioeconomic factors, the level of education of the mother is more associated with the presence of respiratory diseases, than to the family income. Improving the educational level of the mother's actions would provide more appropriate care, preventive measures for children's health and greater adherence to health services<sup>(4,12)</sup>.

The age group most affected by respiratory diseases found in this study was infants under one year of age, as in other studies cited in the literature<sup>(1,12)</sup>.

In the present study, hospitalizations for respiratory problems were concentrated in the month of April, which is characterized as the driest month of the year in the city of Botucatu; it is worth mentioning the high number of hospital admissions for

respiratory disease in August, which also has the same characteristic climate. According to the literature, long-term climate change may exert effects on health in urban areas, exposure to air pollutants are enhanced with climate change and temperature inversions, causing diseases such as asthma, upper airway infections, allergies, and bronchial infections pulmonary-to lead in number of occurrences. Changes in temperature, humidity, fire and rainfall may increase the severity and effects of respiratory diseases<sup>(20)</sup>.

## FINAL CONSIDERATIONS

The profile of patients admitted to the PICU allows elucidating individual, family, social, and welfare aspects, and thus understand the context of admissions, if they are avoidable or not and whether they could be addressed in primary care.

It is necessary to intensify the child care in primary care preventing hospitalizations, and also providing clarification to parents and guardians of the children about taking care of their health.

And always carry and encourage continuing education and training for health professionals working in this unit, providing conditions to achieve quality care.

## PERFIL DOS PACIENTES INTERNADOS EM UMA UNIDADE DE TERAPIA INTENSIVA PEDIÁTRICA DE UM HOSPITAL ESCOLA DO INTERIOR DE SÃO PAULO

### RESUMO

O objetivo do estudo foi traçar o perfil dos pacientes internados na Unidade de Terapia Intensiva Pediátrica do Hospital das Clínicas de Botucatu - UNESP. Trata-se de um estudo descritivo, transversal e quantitativo. Os dados utilizados foram extraídos do "Livro de Alta, Admissão e Óbito" pertencente à unidade dos pacientes internados de janeiro a dezembro de 2011. Houve predomínio do sexo masculino (54,4%), faixa etária inferior a 1 ano (40,7%) e com uma média de permanência de 5,46 dias. A maioria dessas crianças era procedente de cidades que fazem parte da DIR XI/SP de Botucatu (78,2%). A alta contribuiu com 91,1% do total de saídas da unidade. A maioria das admissões foi durante o outono e inverno, tendo como causas mais frequentes o Pós-Operatório Imediato (POI - 32,3%) e doenças respiratórias (24,2%). O perfil dos pacientes internados na UTIP possibilita elucidar aspectos individuais, familiares, sociais, demográficos, sazonais, climáticos e, também, das condições clínicas e, assim, compreender o contexto das internações, no sentido de propor melhorias na assistência prestada, de maneira individualizada e integral, para os pacientes e familiares.

**Palavras-chave:** Perfil de saúde. Pacientes. Criança. Hospitalização. Unidade de Terapia Intensiva. Doenças Respiratórias.

## PERFIL DE LOS PACIENTES ADMITIDOS EN UNA UNIDAD DE CUIDADOS INTENSIVOS PEDIÁTRICOS DE UN HOSPITAL ESCUELA DEL INTERIOR DE SAO PAULO

### RESUMEN

El objetivo del estudio fue definir el perfil de los pacientes ingresados en la Unidad de Cuidados Intensivos Pediátricos del Hospital de las Clínicas de Botucatu - UNESP. Se trata de un estudio descriptivo, transversal y cuantitativo. Los datos utilizados fueron extraídos del "Libro de Alta, Admisión y Óbito" que pertenece a la unidad de los pacientes ingresados de enero a diciembre 2011. Hubo un predominio del sexo masculino (54,4%), franja de edad inferior a 1 año (40,7%) y con un promedio de permanencia de 5,46 días. La mayoría de estos niños era procedente de ciudades que hacen parte de la DIR XI/SP Botucatu (78,2%). El alta contribuyó con 91,1% del total de salidas de la unidad. La mayoría de las admisiones fue durante el otoño e invierno, teniendo como causas más frecuentes el Postoperatorio Inmediato (POI - 32,3%) y enfermedades respiratorias (24,2%). El perfil de los pacientes ingresados en la UCIP permite dilucidar aspectos individuales, familiares, sociales, demográficos, estacionales, climáticos y, también, de las condiciones clínicas y, así, entender el contexto de los ingresados, con el fin de proponer mejoras en la atención prestada, de manera individualizada e integral, para los pacientes y familiares.

**Palabras clave:** Perfil de salud. Pacientes. Niño. Hospitalización. Unidad de Cuidados Intensivos. Enfermedades Respiratorias.

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