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Assessment of a strategy for the control of respiratory diseases in children

Avaliação de uma estratégia para o controle de doenças respiratórias em crianças

Julio Cesar Rodrigues Pereira*, Luís Antonio Stuginsky**, Theotonio Victor de Miranda Ribeiro**

PEREIRA, J.C.R. et al. Assessment of a strategy for the control of respiratory diseases in children. *Rev. Saúde públ.*, S. Paulo, 26: 414-23, 1992. A programme for the control of respiratory diseases in children was conceived for the State of S. Paulo, Brazil, in 1986. Its progress thereafter and the epidemiology of the diseases concerned are examined. Apart from an inquiry into the 64 existing State local health authorities, a sample of 18,255 cases of children assisted by the programme at different levels, including both in-patient and outpatient care, is analysed. Each case record included information about identification (child, doctor and health facility), reasons for calling, diagnoses made and outcome of treatment. Further data were also sought from hospitals and from State mortality records. The programme was found to be poorly implemented in the State but, where implemented, it showed itself capable of resolving problems (only 0.5% of the cases could not be handled) as also of changing ongoing trends (more than 50% reduction in hospital admission rates). Individual assessment of each item of the programme indicated its bottlenecks. Regarding the epidemiology of respiratory diseases, it is observed that the major burden to health services comes from children aged less than five, and that the most important diseases are wheezing illnesses and pneumonia. Morevoer, they were found to be significantly associated ($p = 0.000$) so that a child in the community presenting wheezing diseases is 5 times more likely to develop pneumonia than a child with any other respiratory diagnosis. Similarly, among the under five deaths it was found that the risk for pneumonia is 3 times greater for children who died presenting wheezing diseases than it is for children with any other sort of diagnosis. In conclusion, the programme is deemed to be efficient and effective but its efficacy is marred by administrative flaws. The successful control of respiratory problems in childhood is related to a proper appreciation of the importance of wheezing diseases.

Keywords: Respiratory tract diseases, prevention. Programme evaluation. Asthma, complications.

Introduction

A programme for the control of respiratory diseases in children was proposed in the State of S. Paulo, Brazil, in 1986[16]. The present paper is an effort to assess its progress.

The World Health Organization's[22] policies for controlling acute respiratory diseases (ARI) comprise three main strategies, namely immunization, health education, and case management[17]. In the State of S. Paulo, acceptance rates for vaccines are high (Fig. 1) and health education does not stand as a priority since patients do seek help and have easy access to medical care (90% of pneumonia deaths in children occur in hospital, according to official data). Hence, the S. Paulo programme focuses mainly on case management, and its mainstay is reinforcement of the local authority and organization of the health care into three levels of increasing complexity. Regarding the first, to guarantee independence from central authorities, the programme recommends that a local steering board be implemented to plan and coordinate activities locally.

The primary level is not specific to the programme; it comprises all health centres and casuality departaments, for they are the patient's first contact with the health system. Presently, this sort of facility runs the gamut of primary level activities to all health programmes. The secondary level is designed for short term follow-up and consists of both out and in-patient care. Outpatient clinics at this level are located preferably at the

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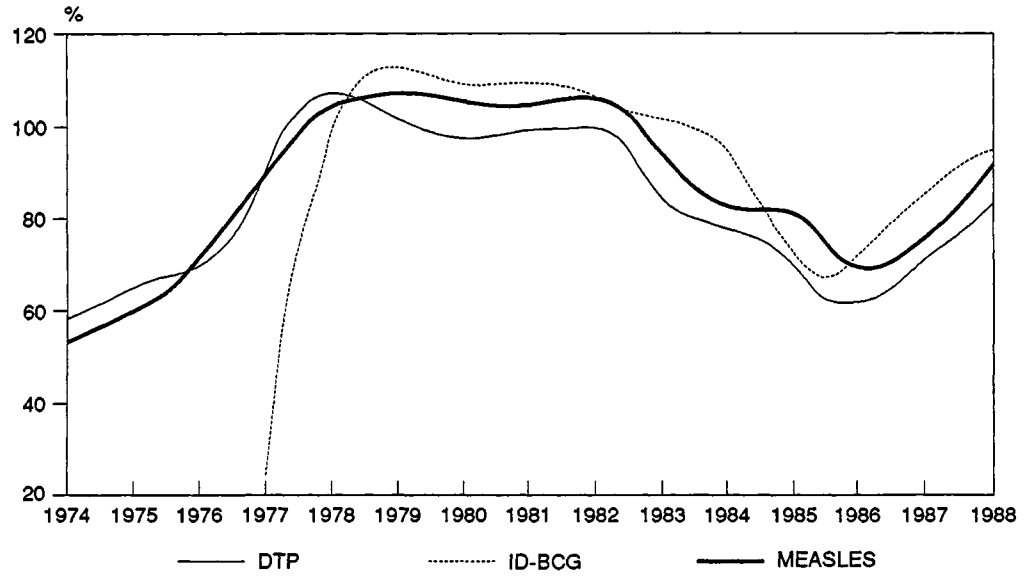


Source: The Health Information Centre of The State Health Secretariat

Figure 1. Acceptance rates for vaccines in the State of S. Paulo – Brazil.

same health facility where the patient is first seen. They follow-up selected children for 48 to 72 hours so as to identify those who deteriorate. Short-term inpatient treatment is aimed at improving the patient's condition before having him sent home, and is delivered in small hospital wards over a period not exceeding 48 hours, the mother being required to stay with the child.

At the lower levels, activities can be managed by either general practitioners or paediatricians. On the tertiary level, it is recommended that a respiratory paediatrician be in charge. This level is composed of respiratory outpatient clinics and respiratory wards.

According to the latest available information[7], the S. Paulo State has an estimated 33 million inhabitants living in an area of 247,346 Km^2. Eighty-eight percent of the population live in urban areas, on average there is a basic health facility for every 24,000 people, and there are 4.2 hospital beds for each 1,000 persons, 30% of which are for specialized care. With an average of US$ 3.000 as annual per capita income, the State accounts for approximately 20% of Brazil's population and 41% of its gross national product.

For the present paper, data gathered from local health authorities and medical records were processed and analysed so as to provide assessment on how the programme is progressing in the field, what the bottlenecks are, and what epidemiological information can be deduced to better assist health authorities in local planning and management.

Material and Method

The existing 64 local health authorities (for which the Portuguese acronym, *ERSA*, will be used from this point on) were questioned as to the status of the programme. Of those which confirmed the implementation of the programme, 7 agreed to collect prospective data concerning patients' attendance at health facilities. There was a participation of 130 health units in the period from June 1989 to May 1990: 104 basic health practices short term follow-up outpatient clinics, 10 respiratory outpatient clinics, 4 short-term inpatient care wards, and 12 respiratory wards. Overall, 262 doctors contributed with information on 18,255 cases.

As the recording of visits at primary level would represent an impossible burden for medical personnel, data collection was restricted to the upper levels of the programme. Accordingly, for each child with respiratory disease referred to the secondary or tertiary level of the programme, the assisting physician was required to fill in a form. Besides date, identification items concerning the health unit, doctor and patient, also recorded were: 1) reasons for calling (either spontaneous or requested for follow-up); 2) diagnoses (main diagnosis and up to 2 aggravating disorders or associated

diseases); 3) outcome of the visit (such as whether the patient was discharged, scheduled for follow-up, or referred elsewhere).

Data cards were punched locally with the help of a data entry programme prepared in BASIC (Beginner's All-purpose Symbolic Instructions Code) and were sent monthly for central processing. Data consistency was checked by this programme by comparing each variable value typed with a previously defined acceptable range. Cases with out-of-range values for any variable were not recorded unless the error were corrected. With the help of a statistical package (SPSS-PC/+- Statistical Package for Social Sciences, version for personal computers) a monthly report was issued to each participating health authority. After the one-year period, the data were analysed together and, when necessary, further information was sought from other sources.

In the assessment of the programme, four items were considered:

1. *Coverage and efficacy:* Refers to the programme's outreach within the State and the degree to which each sort of health facility envisaged by the programme is actually implemented by local health authorities. Efficacy is defined as the ratio between the number of ERSAs with a given health facility and the total number of ERSAs studied in the sample;
2. *Efficiency:* Within each type of health facility, efficiency is defined as the ratio between the number of cases independently resolved and the total number of cases seen. Cases are considered not resolved if they require care at a higher levels of the programme, if they are referred to facilities outside the programme, or further, if the patient dies;
3) *Effectiveness:* Should ultimately ascertain the programme's ability to reduce respiratory mortality in children. Nevertheless, as the breakdown of mortality data differs as between the various health regions and, moreover, as there is normally a time lag of 5 years for this sort of data to become available, the ability of the programme to reduce admission to hospital was chosen as an alternative indicator of effectiveness. Accordingly, data collected from two hospitals participating in the programme for time intervals before and after the introduction of the programme, as well as pooled data from 15 other hospitals in the same region, were analised so as to provide a measurement of the reduction in the respiratory in-patient rate. Effectiveness is then expressed as the percentage reduction of this rate in the series after implementation of the programme as compared with the general trend, represented by the 15 hospitals;
4) *Epidemiological profile:* A description of the morbimortality pattern found in the sample studied, by age group, sex, diseases and their severity. Further analysis was carried out as required or suggested by the descriptive approach.

All ratios are expressed as percentages and have been computed over the number of valid cases. In other words, computing procedures disregarded missing values. Wherever applicable, the number of valid cases is given.

Regarding efficacy, efficiency and effectiveness, very often "the various definitions available are contradictory" (Muller[13]). Thus, the reader is invited to read the present paper in the light of the distinctions made above.

Results

The reliability of the analysis herein presented can be indirectly assessed by the frequency of missing values for each variable. Child identification was missing in 3,238 cases (17.73%), date was missing in 1,001 cases (5.48%), sex in 101 (0.55%), and age in 256 (1.40%). Reason for calling was not recorded in 1,238 cases (6.78%), diagnosis in 971 (5.31%), and outcome in 6,923 (37.92%). Cross-tabulation of variables can end up with a greater number of missing cases as variables are deleted pairwise from analysis under such procedures.

Coverage and Efficacy

Of the 64 ERSAs, 28 (44%) acknowledged use of the programme, 20 of then in the interior of the State and 8 in the Greater S. Paulo, the metropolitan area that comprises about half the population of the State.

Of the 7 ERSAs entering the prospective study, 3 were located in the interior of the State and 4 belonged to Greater S. Paulo City. None had a steering committee formally established, and only 2 had a defined system for the reference of patients, one of these being in Greater S. Paulo (ERSA Centro) and the other in the interior of the State (ERSA Lins). All of them had implemented short term follow-up outpatient clinics (100%); 4 had respiratory outpatient clinics (57%); 4 had short term follow-up wards (57%) and 6 had respiratory wards (86%). Assuming that the sample is representative, the efficacy of the programme can be estimated as shown in Fig. 2.

The distribution of the 18,255 cases among the ERSAs in the sample studied is shown in Table 1. Most of these cases were dealt with at the secondary level: 84.3% at the short term follow-up out-

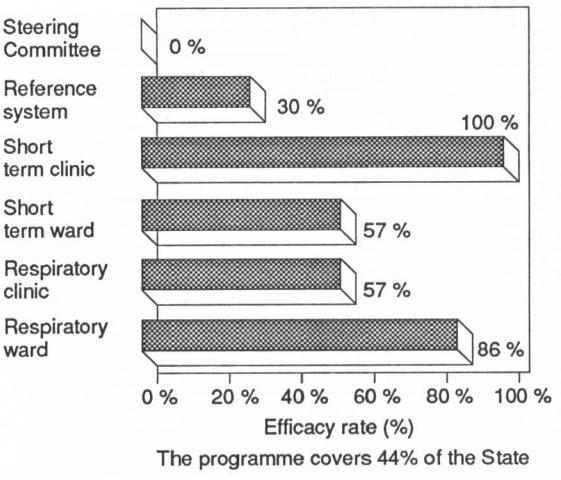


Figure 2. Efficacy of the programme.

Table 1. Distribution of cases studied by ERSA (Local Health Authority).

ERSA (Local Health Authority)	Number of cases	Total percentage
Greater S. Paulo:	10,339	56.6
Center	3,371	18.5
"Penha"	2,293	12.6
"Mandaqui"	3,048	16.7
"N. Senhora do Ó"	1,627	8.9
Interior of S. Paulo (State Cities)	7,916	43.4
"Assis"	4,660	25.5
"Lins"	2,348	12.9
"S. José dos Campos"	908	5.0
Total	18,255	100.0

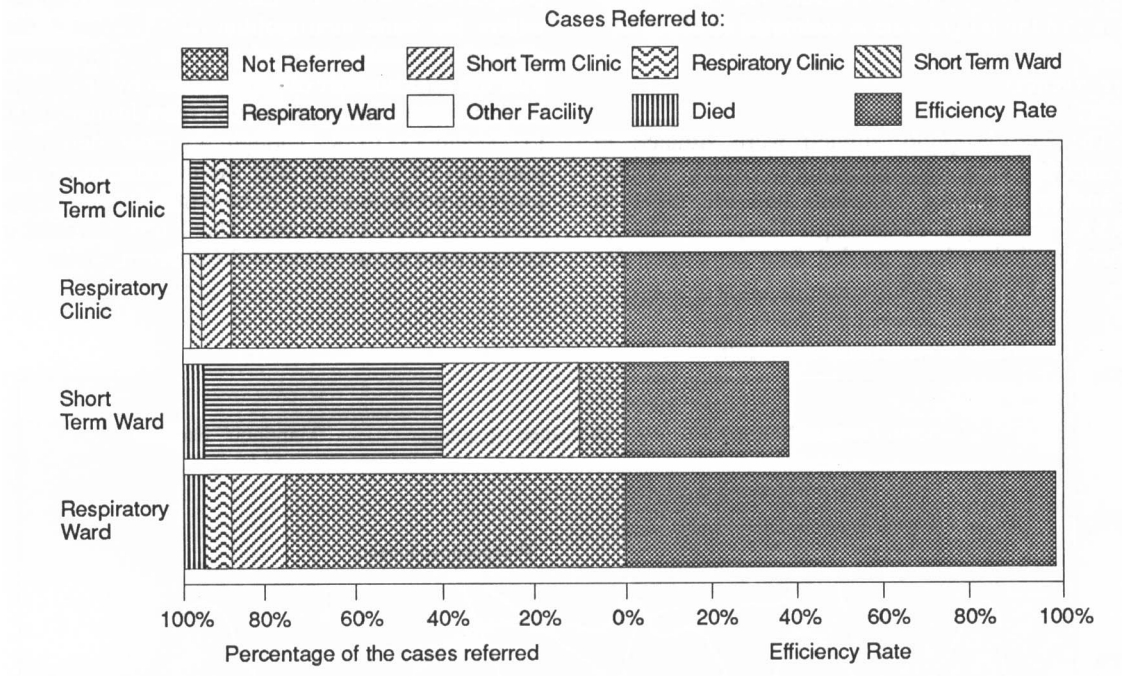


Figure 3. Outcome of medical care and efficiency of each programme facility.

patient clinics and 0.8% on the short term in-patient care wards. The remaining cases were seen at the tertiary level, 11.8% at respiratory outpatient clinics and 3.1% on respiratory wards. As for each activity of the programme there is a corresponding sort of medical technology involved, this information can be put in other words: for each 25 children referred from the primary level, 21 (about 84.3%) could be managed at basic health practices; 3 (about 11.8%) needed specialized outpatient care and 1 needed in-patient care, were it for short (0.8%) or long (3.1%) term.

Efficiency

To compute efficiency, the outcome of medical care, were it a visit or in-patient treatment, was analysed. Results are graphically displayed in Fig. 3 and detailed information is provided by Table 2.

The overall efficiency of the programme can be ascertained by the rate between the total number of cases successfully managed and the total number of cases seen. Of the 11,332 valid cases, 11,271 were managed by the programme, 51 were referred to facilities not belonging to the pro-

Table 2. The outcome of medical care and efficiency of each type of health facility in the programme.

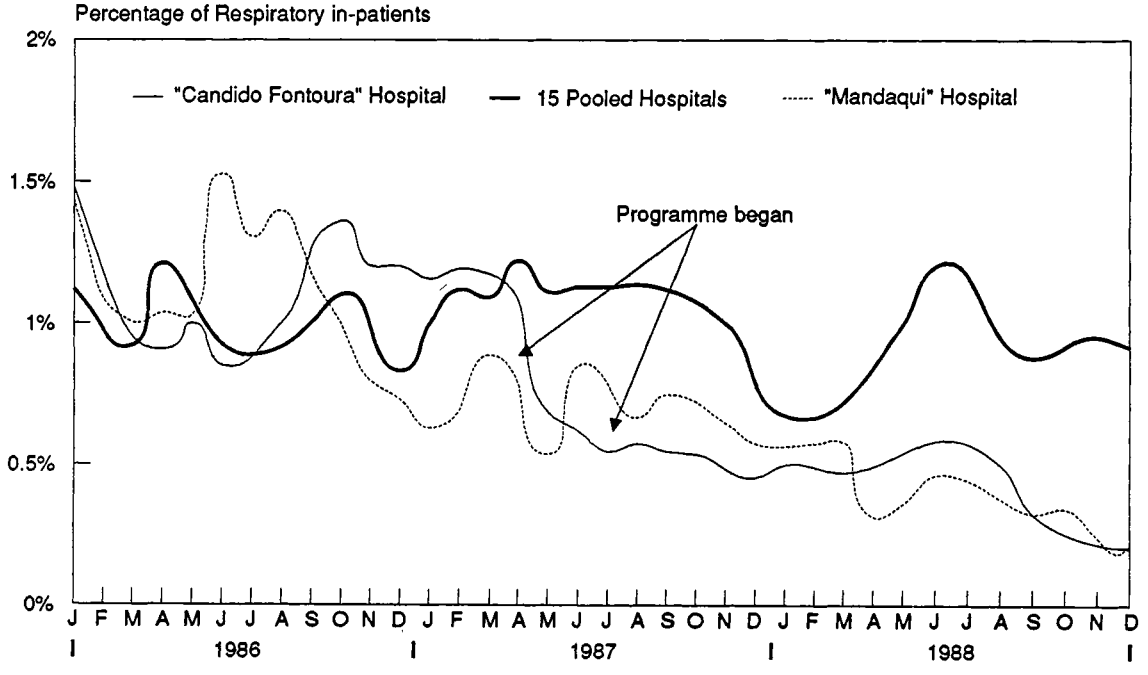
Facility type → Cases referred to:	Short term clinic (n = 8913)	Respiratory clinic (n = 1850)	Short term ward (n = 138)	Respiratory ward (n = 431)
Not referred	92.95%	91.78%	8.70%	77.49%
Short term clinic	—	6.43%	29.71%	13.22%
Respiratory clinic	3.72%	—	—	7.42%
Short term ward	0.72%	1.18%	—	0.23%
Respiratory ward	2.09%	0.32%	59.42%	—
Facility out side the programme	0.52%	0.27%	—	—
Died	—	—	2.17%	1.62%
Total	100.00%	99.98%	100.00%	99.98%
Efficiency rate	92.95%	98.21%	38.41%	98.36%

n = Number of valid cases

gramme and 10 resulted in death. The overall efficiency of the programme is estimated as 99.46%.

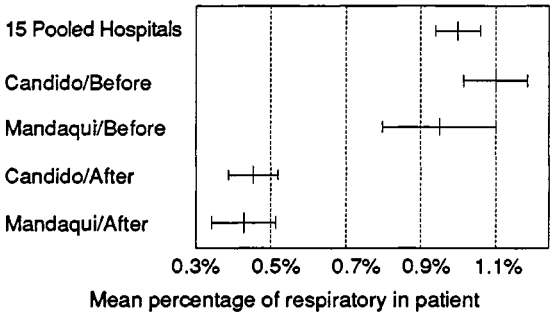
Effectiveness

The two hospitals studied were situated in Greater S. Paulo, one belonging to ERSA "Penha" ('Cândido Fontoura' Hospital) and the other to ERSA "Mandaqui" ('Mandaqui' Hospital). The 15 other hospitals whose pooled data were used for comparison, were all state paediatric hospitals within the same metropolitan area. Figure 4 displays the monthly rate of respiratory in-patients over the total number of patients seen by any hospital department during the period from January 1986 to December 1988. Though no clear deflection point can be detected, after the introduction of the programme there seems to be a trend towards progressively decreasing rates. The T-test was used to compare the mean values of the different series.



Source: The State Commission for the Control of Respiratory Diseases in Children

Figure 4. Respiratory in-patient rate for two hospitals in the programme and a pool of 15 other hospitals.



Source: The State Commission for the Control of Respiratory Diseases in Children

Figure 5. Mean respiratory in-patient rate: 15 pooled hospitals belonging to of the programme and 2 hospitals before & after programme.

Series before and after introduction of the programme are significantly different (p = 0.000) in both hospitals. Comparing these hospitals with the 15 others, it was found that their series before introduction of the programme did not differ from the general trend (p = 0.16 for the 'Cândido Fontoura' Hospital and p = 0.37 for the 'Mandaqui' Hospital), while their series after the introduction of the programme are significantly different (p = 0.000 in both cases). Figure 5 displays the mean values and corresponding 95th confidence intervals for all series.

The two series 'post-introduction of the programme' pooled have, together, a mean respiratory in-patient rate of 0.47 (SE = 0.027) and the mean of the pooled data of the 15 hospitals is 0.99 (SE = 0.023). Therefore, the reduction attributable to the programme, or in other words the effectiveness as here conceived, is of 52.41%, with a 95th confidence interval of between 44.57% and 59.57%.

Epidemiological Profile

The patient was identified in 15,017 of the 18,255 cases studied. Computing techniques revealed that these cases corresponded to 10,857 children seen, which gives an average of 1.38 visits per child during the 12-month study period. The children's sex and age are displayed in Table 3.

A greater number of cases were recorded in the first months of the study period which corresponded to winter time, as shown in Figure 6. The five most frequent diagnoses were: common cold (16.69%), wheezing bronchitis (15.68%), asthma (11.19%), tonsilitis (10.99%) and pneumonia (10.67%). In Figure 7, diagnoses are grouped and shown by age group. Pneumonia stands apart from other lower tract acute respiratory infections (ARI) in recognition of its severity and significance for children's mortality. The other lower ARI together presented a frequency (11.29%) close to that of pneumonia alone, and comprised tracheobronchitis (9.20%), bronchiolitis (1.71%), tuberculosis (0.22%), pertussis (0.14%) and measles (0.02%).

Table 3. Breakdown according to of sex by age group for the children seen among the cases studied.

Age group → sex	1 Year and less	From 2 to 5	5 Years and more	Total
Male	2,538	1,575	1,623	5,736
Row percentage	44.24%	27.45%	28.29%	
Column Pct	54.31%	52.92%	54.04%	53.84%
Female	2,135	1,401	1,380	4,916
Row percentage	43.42%	28.49%	28.07%	
Column Pct	45.68%	47.07%	45.95%	46.15%
Total	4,673	2,976	3,003	10,652
Row percentage	43.86%	27.93%	28.19%	100 %

Number of missing observations = 205

Severity of outpatient cases was assessed by the frequency of aggravating disorders or associated diseases. In the short term follow-up clinic 4.14% of the cases had one associated diagnosis and 0.37% had two or more. In the respiratory clinic, these frequencies were of 9.51% and 1.39%, respectively. All cases receiving in-patient care should be regarded as severe, and according to Table 2 they represented 5.02% of the overall sample (138 from the short term follow-up wards and 431 from the respiratory wards, over the total number of valid cases, 11,332).

Among the cases under in-patient care 10 deaths were recorded: 7 due to pneumonia, 1 due to bronchiolitis, 1 due to bronchitis and one was recorded as due to 'other respiratory diseases'. One of the pneumonia cases had asthma as an associated diagnosis, and the bronchitis case had also other respiratory diseases. All deaths occurred among children aged 1 year or less and none had had any previous visit recorded at the programme's lower levels.

As in both morbidity and mortality profiles wheezing diseases and pneumonia were found to be frequent diagnoses, contingency tables were built to study a possible relationship between these two groups of diseases. Computing the odds ratio, it was found that cases with wheezing diseases as the main diagnosis when compared to cases with other diagnoses are 4.98 (95th confidence interval from 3.49 to 7.10) times more likely to present pneumonia as an associated illness (Table 4).

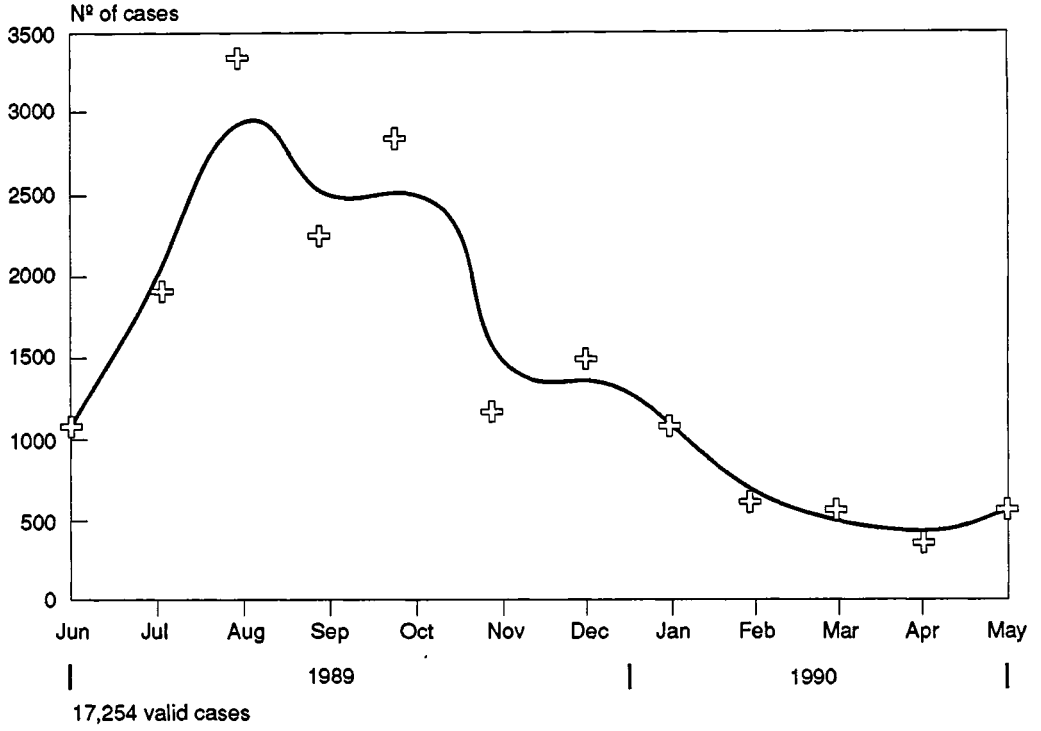
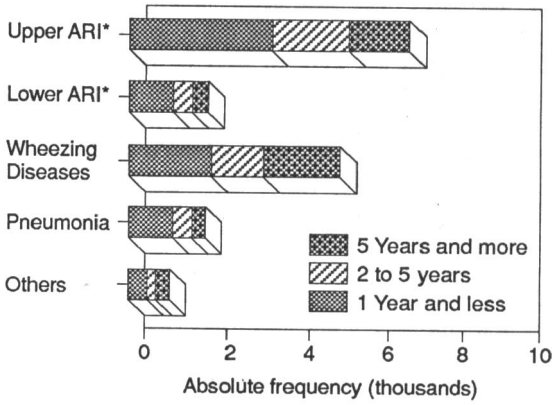


Figure 6. Distribution of cases studied by month of occurrence.



Number of valid cases = 17,018
* ARI = Acute Respiratory Infection

Figure 7. Distribution of diagnoses by age group.

Likewise, cases with pneumonia as the main diagnosis have a probability of presenting wheezing diseases which is 17.6 (95% C.I. = 12.97 - 23.87) times greater than cases with any other diagnosis (Table 5).

Considering the importance of these findings, confirmation was sought by analysing data from other sources. It was found from official mortality records that data for all deaths of children under 5 years of age during the period from 1985 to 1987 were available for the whole State of S. Paulo, adding up to 84,143 cases. As the rationales for ordering causes and aggravating factors were different in these mortality records from those of the morbidity data herein discussed, the analysis only took into consideration the presence or absence of disease irrespective of their order (Table

Table 4. Cross-tabulation of wheezing diseases and pneumonia as main and secondary diagnoses, respectively.

Main Diagnosis → Secondary Diag.	Wheezing diseases	Others	Total
Pneumonia	85	47	132
Others	330	909	1,239
Total	415	956	1,371

$X^2 = 78.8015$

Table 5. Cross-tabulation of pneumonia and wheezing diseases as main and secondary diagnoses, respectively.

Main Diagnosis → Secondary Diag.	Pneumonia	Others	Total
Wheezing diseases	166	201	367
Others	45	959	1,004
Total	211	1,160	1,371

$X^2 = 339.5998$

Table 6. Presence of wheezing diseases and pneumonia in of children who died with less than five years of age, State of S. Paulo, 1985 to 1987*.

		Wheezing Disease		
		Nb	Yes	Total
Pneumonia	Nb	65,094	233	65,327
	Yes	18,616	200	18,816
Total		83,710	433	84,143

$X^2 = 140.9547$

* Source: "Fundação SEADE" (Foundation for Analysis of Data from S. Paulo State).

6). The computed odds ratio was 3.0 (95th C.I. = 2.50 - 3.59), reinforcing the finding that there is an association between the diseases.

Discussion and Conclusions

According to the results, the S. Paulo programme for controlling respiratory diseases in children is satisfactorily efficient and effective, but conversely it presents disappointing levels of efficacy. As this latter is related to the implementation of the programme it seems that, if made to work, the programme can perform well. Thus, the main hindrance to the full development of the programme is apparently of an administrative or political nature.

Indeed, the poor coverage of the programme (44%) and the non-adoption of artless measures, like the establishment of steering boards and the definition of reference systems, indicate a very low level of commitment on the part of the health authorities. Neither at central nor at local level are there any policies established to meet the unequivocal problem of respiratory diseases in childhood. In 1986, when the programme was first proposed, the State Health Departament set up a Commission for the Control of Respiratory Diseases in Children, but it has always been restricted to an advisory role. Discussions on the possible causes of this indifference of health authorities exceed the scope of the present study.

The short term follow-up wards stand revealed as the vulnerable part of the programme. To serve the programme's goal of reducing admissions to hospital, they were conceived as a strategy to afford in-patient care without exposing the child to the stress of being kept alone in a ward. Nevertheless, they have shown a rather poor performance. Not only were most of the cases seen eventually referred to respiratory wards (Fig. 3), but also deaths were observed and, worse, at a rate even greater than that registered on the respiratory wards (Table 2). One could perhaps argue that the same administrative deterrents that influenced its low efficacy rate could negatively influence its performance. However, the respiratory clinics, despite an equally low level of efficacy (Fig. 2), achieved a very high rate of efficiency (Fig. 3). Undoubtedly, these are different facilities aimed at different patients, but the information provided by this study clearly suggests that the short term follow-up wards should either be improved or dropped from the programme, for they are not contributing to the reduction of admissions to hospital and, worse, they are keeping the fatality rate high.

When Figure 4 is examined, it is to be seen that the proportion of respiratory in-patients in the series "15 pooled hospitals" is quite stable around its mean value (0.99%) over the 3-year observation period and that the hospitals studied tended to follow this trend up to the time when the programme was implemented. The very high statistical significance of the differences between the series after the implementation of the programme and the others (see Fig. 5) leaves no room for doubt as to how effective the programme can be in reducing admission to hospital.

Regarding the epidemiological profile of the respiratory diseases, the high frequency of children under 5 years of age (more than 70% of the cases according to Table 3) confirms previous reports both from Brazil and elsewhere. In Pará, in North Brazil, this age group was found to represent 74.4% of cases[2] and Leowsky[10], in an international review, also stressed the importance of the under-fives. Likewise, it is not surprising that the number of respiratory patients is higher in the winter months (Fig. 6) for this is a common pattern for respiratory diseases, supported even by countrywide studies like that conducted by Mohs[12] in Costa Rica. Nevertheless, even though the consistency of the data collected was checked, nothing can be said about un-reported data and there is no assurance that the distribution of cases over the 12-month period was not biased by the ERSAs willingness to report cases. Accordingly, this distribution of cases might not properly portray the incidence of the respiratory diseases.

By the same token, the lack of randomness in the sampling frame could challenge the morbidity profile displayed in Figure 7, though in this instance the large number of cases studied is tantamount to confirmation of accuracy. Indeed, regardless of their origin, the diagnoses made for 17,018 cases by 262 different doctors over the period of a whole year are quite unlikely to be distorted by systematic error. Thus, wheezing diseas-

es and pneumonia seem to be the two major items of morbidity, the former for its high frequency, being second only to upper respiratory tract infections, and the latter because of its potential severity since it is well known to be the leading cause of respiratory deaths.

The significance of wheezing diseases has long been overlooked by public health programmes, with the exception of a few examples[3,4]. The World Health Organization itself has only recently included guidelines for treatment of wheezing symptoms in its programme[22]. The S. Paulo programme, with its proposal for organizing different levels of assistance, has a most suitable approach to deal with wheezing diseases, for they, differently from single ARI episodes, very often need long term and specialized care.

Undisputable and of the utmost importance are the striking findings that point to wheezing diseases and pneumonia as related diseases. Indeed, not only are the strength and significance of the association found in the analysis of the sample data to be seen as sound indicators that the presence of one disease predisposes to the development of the other, but also the confirmation of this is to be seen in a large set of publicly available data. Children presenting with a wheezing disease at a health facility are almost 5 times more likely to have pneumonia when compared to children with other respiratory problems and children who die with wheezing symptoms are 3 times more likely to present pneumonia than are children who die from any other diagnosis. This places the wheezing diseases in a special position with regard to other respiratory diseases, for the evidence is that they are highly prevalent and that they are, further, a risk factor for the most deadly respiratory disease.

It is well established that viral respiratory infections can lead to bronchial hyper-reactivity and clinical asthma[5,20] as well as possibly being responsible for chronic diseases in adult life[19]. Bronchiolitis is widely acknowledged as a provocative factor for wheezing illnesses[9,11,18]. Empey et al.[6] showed, in 1976, that even in normal subjects these infections can cause transient bronchial hyper-reactivity. Norn et al.[14], in 1987, having found that different bacteria, the *Streptococcus pneumoniae* included, could induce a release of histamine from human basophil leukocytes, speculated that bacterial infections themselves could provoke asthma.

Whereas there is this general agreement that ARI can predispose to wheezing diseases it seems that the present results are the first evidence that the contrary might also be true, or in other words, that wheezing diseases might be a predisposing factor to respiratory infections. Indeed, Peat[14], after studying schoolchildren in Australia reported no difference between the frequencies of upper respiratory tract infections in children who had and those who did not have bronchial hyperresponsiveness. Similarly, Trigg et al.[21], in a community study conducted in London found that hyper-reactive patients did not present more respiratory complaints that the non-hyper-reactives.

The histopathology of bronchi in asthmatic patients[1] reveals an inflamatory process with the presence of different leukocytes, loss of integrity of the epithelial lining and a dense exudate in the bronchial lumen. Metaplasia of epithelial cells, thickening of the basement membrane and other signs of chronic inflamation are also often present. Such damaged tissue recalls the grounds which help to explain bacterial superinfection in virus diseases of the lung[8]: impaired defence mechanisms along with a nutrient medium for bacterial multiplication. Therefore, the epidemiological evidences found in the present study are consistent with the current knowledge of lung disease pathophysiology and could certainly benefit from investigations at that level.

PEREIRA, J.C.R. et al. Avaliação de uma estratégia para o controle de doenças respiratórias em crianças. *Rev. Saúde públ.*, S.Paulo, **26:** 414-23, 1992. Foi proposto programa para o controle de doenças respiratórias na infância (Programa DRI) para o Estado de São Paulo, Brasil, em 1986. Sua evolução desde então e a epidemiologia dessas doenças são examinadas. Além de inquérito nos 64 Escritórios Regionais de Saúde (ERSAs) existentes, é analisada uma amostra de 18.255 casos de crianças atendidas pelo Programa, em seus diferentes níveis, incluindo hospitais. Cada registro incluiu informação sobre identificação (da criança, do médico, da unidade de saúde), diagnósticos realizados, e resultado do tratamento. Outros dados foram também buscados em hospitais e registros estaduais de mortalidade. O Programa apresentou baixos níveis de implantação, mas onde foi implantado mostrou boa resolubilidade (apenas 0,5% dos casos não puderam ser tratados pelo Programa) e bom impacto (mais de 50% de redução em internações). Do total de 64 ERSAs existentes à época, 28 tinham o Programa implantado (44%), sendo 20 do interior do Estado e 8 da região metropolitana de São Paulo. A amostra estudada era composta de atendimentos realizados em 7 ERSAs, 3 do interior e 4 da Grande São Paulo. A eficácia do Programa foi calculada pela medida de cobertura de metas do Programa nesses 7 ERSAs estudados, tendo-se encontrado as seguintes medidas: implantação de comissão executiva local - 0%; implantação de sistema de referência - 30%; implantação de ambulatório 1 - 100%; implantação de unidade de retaguarda - 57%; implantação de ambulatório 2 - 57%; implantação de enfermarias para pacientes DRI - 86%. A eficiência de cada nível do Programa foi avaliada pela proporção de casos resolvidos autonomamente, tendo-se

encontrado os seguintes resultados: ambulatório 1 - 92,95%; ambulatório 2 - 98,21%; unidade de retaguarda - 38,41% e unidade de internação - 98,36%. Em relação à epidemiologia das doenças respiratórias, encontrou-se que a faixa etária mais importante é a de menores de 5 anos e que as principais doenças são as que apresentam com chiado e a pneumonia. Encontrou-se uma associação significativa (p = 0.000) entre ambas, de forma que uma criança na comunidade que tenha uma doença com chiado tem chances 5 vezes maiores de apresentar pneumonia do que uma criança que tenha outro diagnóstico respiratório. Da mesma forma, encontrou-se que crianças que tenham ido a óbito apresentando doenças chiadoras apresentam um risco de ter pneumonia que é 3 vezes maior do que crianças com quaisquer outros diagnósticos. Concluindo, o Programa é avaliado como eficiente e efetivo mas sua eficácia é prejudicada por deficiências administrativas. O controle efetivo dos problemas respiratórios deve considerar adequadamente a importância das doenças chiadoras.

Descritores: Doenças respiratórias, prevenção. Avaliação de problemas. Asma, complicações.

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