

## INFLUENCE OF IMMUNOPREVENTABLE DISEASES AND AIDS ON THE DEMAND OF AN INFECTIOUS DISEASES DEPARTMENT IN RIO DE JANEIRO STATE, BRAZIL, IN THE COURSE OF THIRTY YEARS (1965-1994)

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### SUMMARY

Brazil's nosologic profile has been sustaining profound modifications. Some occurred because of massive immunization campaigns and socioeconomic and demographic trends. Some yet were pure nosologic transitions, such as the emergence of AIDS. In this demand study it is described how these changes reflected on the 8,630 admissions of an Infectious Diseases Department in Niterói, along a thirty year period. Brazilian rural endemic diseases were infrequent (3.45%). Men predominated (62%) all the time, in all age strata and in nearly all diseases. Children under fifteen predominated until 1983. There was, in the case of tetanus, a striking rise in age strata. Institutional mortality dropped from 31% in 1965 to 10% in 1984, but rose since then to 15% in 1994. However, if AIDS patients had not been computed, mortality would have kept descending till 8% at the end of the study period. The crescent unimportance of immunopreventable diseases paralleled with the growing prominence of AIDS. In less than a decade, AIDS ranked fifth among the most frequent diseases in the whole period of thirty years. As opposed to the immunopreventable diseases, neither meningitides nor pneumonia appear to be in decline. AIDS, by its exponential incidence, by its chronic character, and by the uncountable opportunistic infections it determines, imposes itself as a challenge for the coming years.

**KEYWORDS:** Health services needs and demands; Public health; Communicable diseases, Epidemiology; AIDS; Brazil.

### INTRODUCTION

The profile of infectious diseases in Brazil has been sustaining profound modifications in the last decades. Some of these changes occurred because of massive immunization campaigns, while others were due to demographic and socioeconomic transitions, such as declining birth rates and urbanization. Others yet were due to pure nosologic transitions, such as the emergence of AIDS.

Demand studies can help to detect nosologic trends, and may serve as a tool to guide health planning, including medical education and training, and allocation of financial resources. These goals are generally attained by methods such as epidemiological inquiries into population samples, domiciliary interviews in defined geographical areas, and, mainly, by analysis of the death causes reported in death certificates<sup>6,26</sup>. Indeed, mortality analyses are most often done, because death certificates are relatively easy to check. Nevertheless, it is important to study morbidity, as many health problems, despite not leading to death, dissipate financial resources and result in variable degrees of suffering and incapacity. Morbidity studies may be done assessing the population demand for health services<sup>21</sup>. Although data about ambulatory medical care are not biased by the severity of the patient problem (as even minor health problems are properly registered), hospital morbidity statistics have

more credibility than outpatient ones, because they generally describe data relating to an assistance done with more diagnostic resources, more accurate observation of the cases, and that includes also a follow-up. Nonetheless, data on outpatient morbidity are better and more reliable than mortality data obtained from death certificates (which are notoriously incorrect), or by domiciliary interviews<sup>26</sup>.

This is a hospital demand study. Its objective is to describe how the recent nosologic and demographic changes occurring in Brazil reflected on the demand of an Infectious Diseases Department along thirty years of its activity.

### MATERIAL AND METHODS

#### Background

The Antônio Pedro University Hospital (Hospital Universitário Antônio Pedro) is a big tertiary public hospital situated in Niterói, the former capital of Rio de Janeiro State, Brazil. Niterói has around 453,000 inhabitants and faces Rio de Janeiro City at the opposite side of Guanabara Bay. It is, by Brazilian standards, a medium-sized urban settlement. Bordering Niterói there is a greater municipality,

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São Gonçalo, with about 846,000 inhabitants. It is the second most populous municipality of Rio de Janeiro State, the first municipality in population being Rio de Janeiro City itself. Despite its two times greater population, São Gonçalo has worse health care facilities and no public tertiary hospital. Thus, Antônio Pedro usually gives assistance to both municipalities, not to mention a great number of people proceeding from the State interior where, with few exceptions, the health care facilities are even worse.

Since its creation in 1965, the Infectious Diseases Department has operated in the same 12-room ward, offering, depending on the occasion, between 18 and 24 beds for people of all ages and both sexes afflicted with infectious diseases. There is also an outpatient sector with two attending rooms operating in two daily shifts each. The Department's purpose is the instruction and training of medical and nursing students. Its activities were interrupted only in 1978, when it was closed for ten months for a lengthy reformation on its building.

### Study population

Since the beginning of its activities the Infectious Diseases Department has maintained a medical record file, made of manuscript medical history sheets, one for each admission. There is also an alphabetic ordered card file, in which the patients can be looked after by name, and a registration book, in which each admission has been registered, given a number, and assigned a final diagnosis. In 1993, we began to enter the contents of this logbook in a computer database. This work was completed one year after. Since then, the database has been appended with a new record for each new admission. This database made feasible a demand study of the Infectious Diseases Department, comprising 30 years of its activities. This work refers to the data as they were on December 31st, 1994, when the admissions summed up to 8,630. Besides these data, some demographic and epidemiological information was obtained at the Rio de Janeiro State Secretary of Health, for comparison between incidence and demand.

### Study design

All the diagnoses in the manuscript logbook were standardized in 68 diagnostic categories, in order to permit computerized analysis. As many patients were readmitted, and even in a single admission many of them were given two or more diagnoses, we had different figures for the total number of admissions, the total number of patients, and the total amount of diagnoses or cases. Besides provisory and final diagnoses, sex, age, race, profession, address and outcome were entered in the database.

## RESULTS

Along these thirty years, we had exactly 8,000 patients. However, the number of admissions came up to 8,630 (of which 630 were readmissions). Patients with more than one diagnosis accounted for the 10,159 cases registered (Table 1). Most patients, admissions, and cases belonged to the male gender.

**TABLE 1**  
Distribution of patients, admissions and cases by sex (1965-1994).

	Males		Females		Total
	N	%	N	%	
Patients	4,936	61.7	3,064	38.3	8,000
Readmissions	438	69.5	192	30.5	630
Total admissions	5,374	62.3	3,256	37.7	8,630
Cases	6,290	61.9	3,869	38.1	10,159

**TABLE 2**  
Distribution of the most important diagnostic categories among 10,752 cases.

Categories	Cases	Total %
Meningoencephalitis	1694	15.76
Tetanus	966	8.98
Diphtheria	663	6.17
Pneumonia	547	5.09
Measles	507	4.72
AIDS	463	4.31
Hepatitis	412	3.83
Leptospirosis	400	3.72
Subtotal	5,682	52.58
Others	5,070	47.12
Total	10,752	100.00

Addresses were registered in up to 8,017 admissions. Most of these admissions were related to patients from other municipalities, and only 41% of them (3,272) originated from Niterói. Thirty-three percent (2,644) were from São Gonçalo, and 26% (2,101) from the remainder of the Rio de Janeiro State.

Table 2 shows only the most important categories into which diagnoses were standardized. The most frequent of them was meningoencephalitis (all forms, including meningococemia), followed by tetanus, which accounted for 966 admissions. Diphtheria, pneumonia (not related to measles), measles, AIDS, hepatitis and leptospirosis followed, in order of frequency. These categories comprise 52% of all diagnoses made, the remainder of them being pulverized in a great number of other small categories. Although

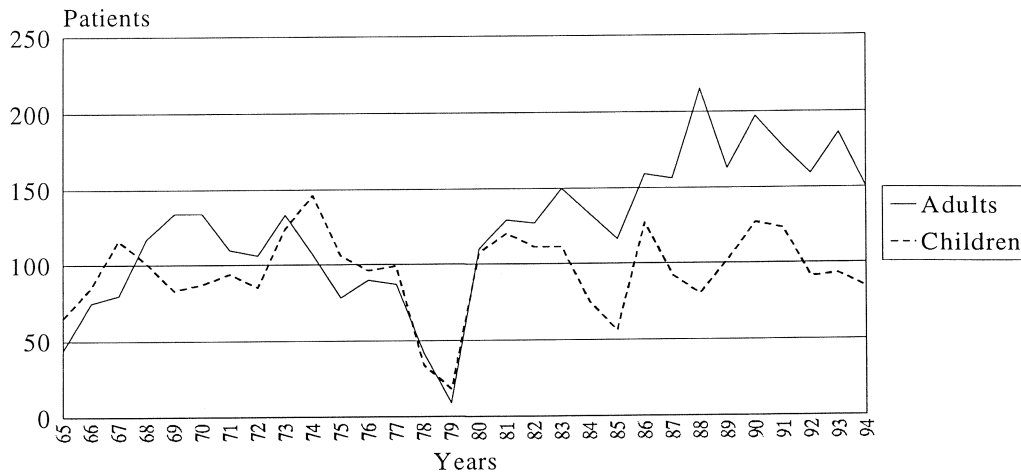


Fig. 1 - Changes in predominance of adults and children under 15 year old (1965-1994).

meningoencephalitis ranks first, if one sums up all immunopreventable diseases (tetanus, diphtheria and measles), the resultant category would be surpassed by no other. Our patients were predominantly of urban origin, and neither Brazilian rural endemic nor tropical diseases were very important in our past experience. Accordingly, cases of schistosomiasis (145), malaria (108), cutaneous leishmaniasis (97), visceral leishmaniasis (11), and Chagas disease (11), joined together, don't exceed 4% of total cases.

Children under fifteen years old predominated until 1983 (Figure 1). In the years that followed, the progressive changes in the number

of admissions due to immunopreventable diseases and AIDS led the adults to predominate.

Male gender predominated strongly in our registry, and this predominance was constant along the entire period studied, in all age groups. Sixty-two percent (4,936) of our 8,000 patients were men. Men also accounted for the majority of patients in almost every diagnostic category, particularly in leptospirosis and paracoccidiodomycosis. Women predominated in a few, more strongly in the urinary tract infection category. Figure 2 shows the participation of both genders in each category.

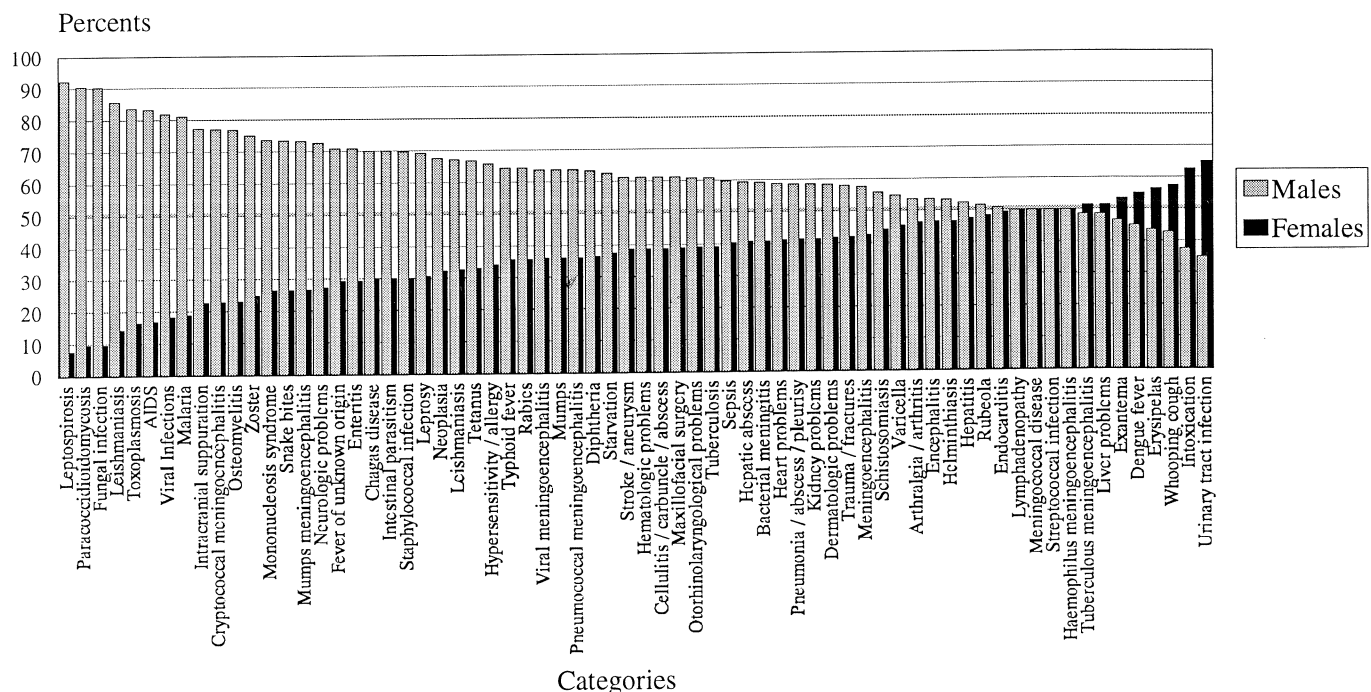


Fig. 2 - Distribution by sex and diagnostic category (1965-1994).

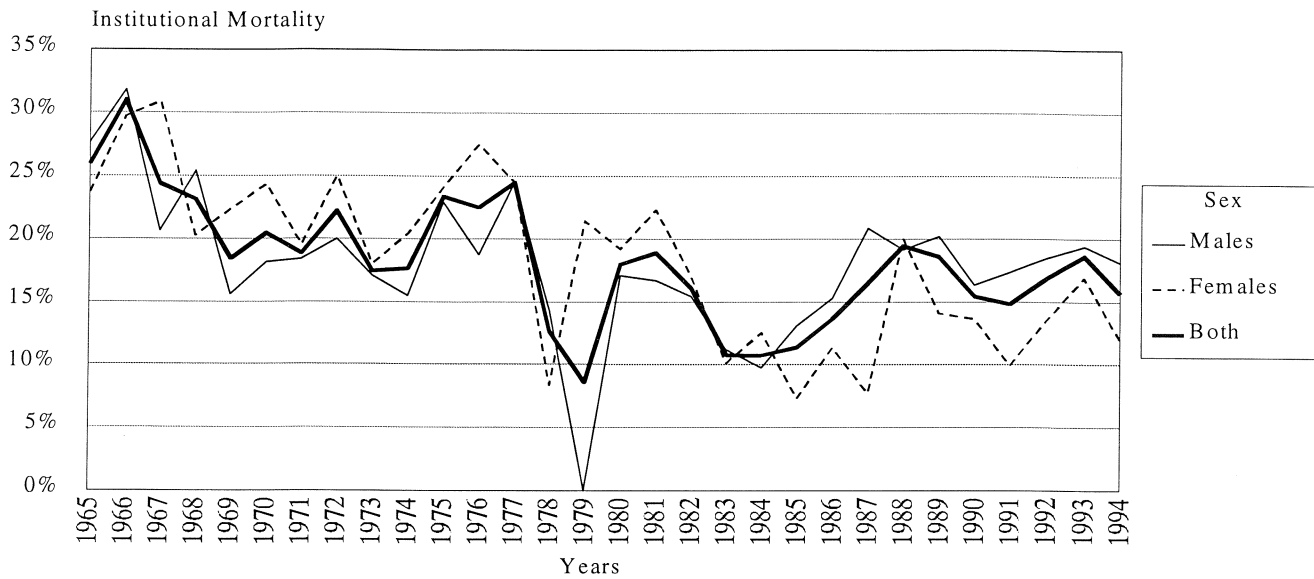


Fig. 3 - Variation of institutional mortality by year (1965-1994).

Seventy-five percent (6,418) of our patients were discharged, either definitively, or for outpatient follow-up. Only 7% (611) were transferred to another health care facility or hospital. Eighteen percent (1,509) died. These figures were not constant along the thirty-year period of our study, however. In 1966, our institutional mortality was near 31%. These figures presented a steady decline until 1984, when the institutional mortality was only 10%, but went higher after that, reaching 15% in 1994. Similarly, women mortality was also generally higher than men mortality until 1984. At this point, however, men mortality grew higher and so remained (Figure 3).

Our first case of AIDS dates from 1985. Institutional mortality irregularly descended until 1984, but kept rising steadily since then. However, when AIDS patients are not computed, institutional mortality keeps descending till the end of the study period, without any rising.

Figure 4 reflects the impact of AIDS in institutional mortality.

Figure 5 shows our three main immunopreventable diseases (tetanus, diphtheria and measles), meningoencephalitis, and AIDS, in the context of overall admissions. The crescent unimportance of immunopreventable diseases parallels with the growing prominence of AIDS in the Department's demand, despite the small decline in the number of admissions due to this latter disease, registered since 1991 (Figure 5). As opposed to the

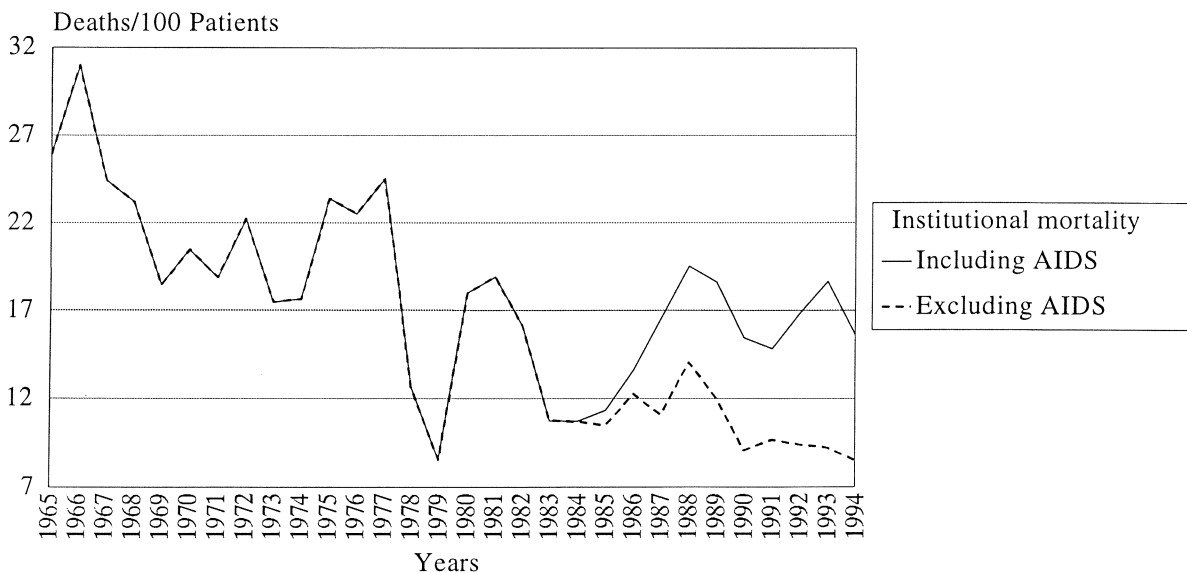


Fig. 4 - Impact of AIDS in overall institutional mortality (1965-1994).

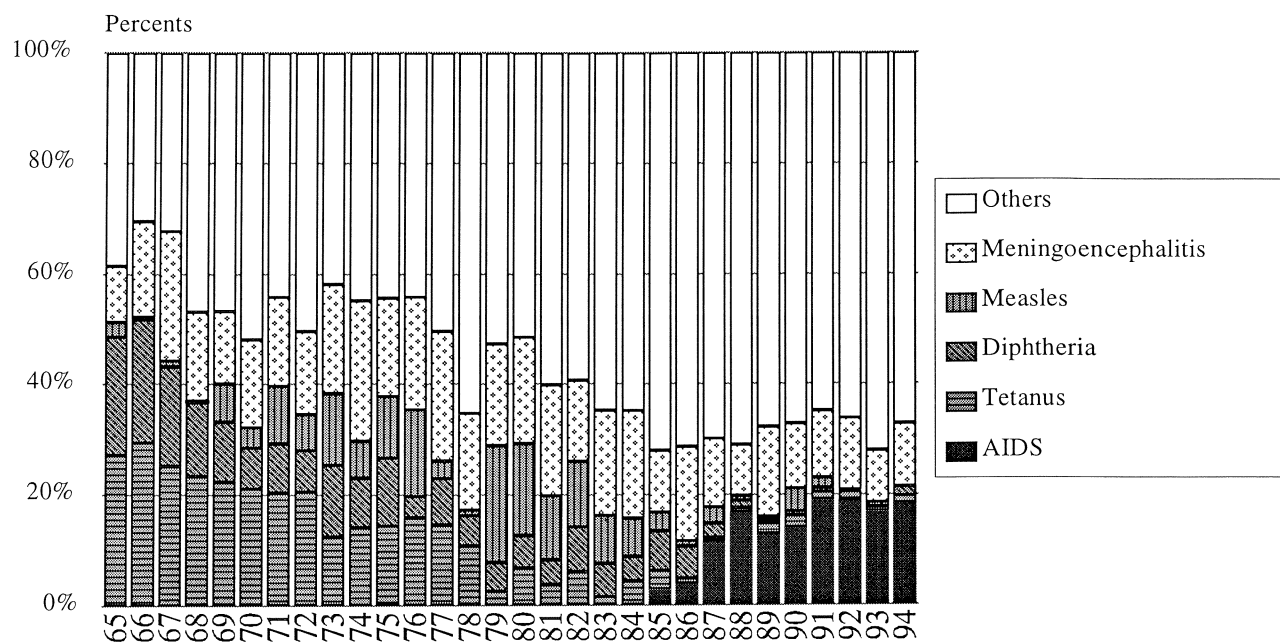


Fig. 5 - Demand due to measles, diphtheria, tetanus, meningoencephalitis and AIDS, in 8630 admissions (1965-1994).

immunopreventable diseases, meningoencephalitis appears not to be in decline. We can see the progressive collapsing of the segments corresponding to the immunopreventable diseases along the years, as if they had been crushed by ascending AIDS and sustained meningoencephalitis. There was also some diversification of our other diagnoses, as the progressive enlargement of the white superior segment suggests. This segment, however, has no important categories, being atomized in numerous unimportant ones, with a few admissions each.

Along with the gradual decrease in the number of admissions by immunopreventable diseases, there was, in the case of tetanus, a striking shift in the age strata of patients admitted. Figure 6 shows how the relative contribution for the admissions due to tetanus made by each different age strata changed along time. There were 5 patients over 60 years old in each one of first and last triennia. However, the five patients in the first triennium comprised only 2% of the 239 patients admitted in that triennium, and the five patients in the last comprised almost half the 12 patients admitted in that period.

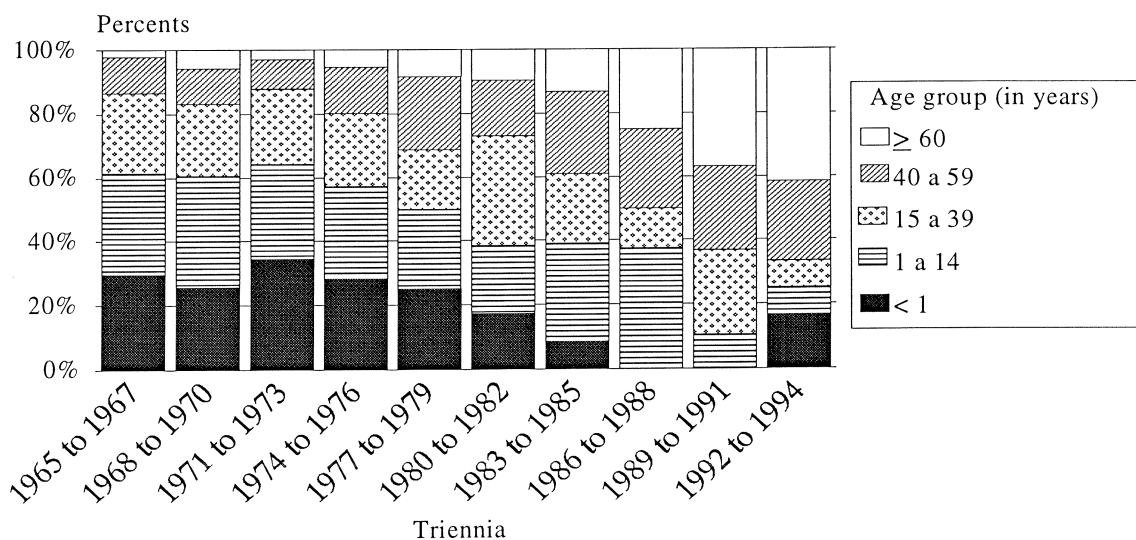


Fig. 6 - Tetanus. Relative participation of different age groups according to triennium (1965-1994)

## DISCUSSION

More than half of our patients came from outside Niterói. The bad health care facilities in São Gonçalo and the remainder of the state may explain why did it occur. The Infectious Diseases Department, along the study period, has assisted patients with acute diseases and of strict urban origin, with the exception perhaps of those with tetanus and snake bites, who, in great part, came from farms in the State inland. This urban origin is the reason why the demand exerted by the classic Brazilian rural endemic diseases, as, for instance, Chagas disease and schistosomiasis, was so small. The Department is therefore more prone to the assistance of infectious diseases (due to virus, bacteria and fungi) and less inclined to the assistance of parasitic diseases (due to protozoa and helminthes), if this kind of distinction, as posed sometimes by some<sup>1,25</sup>, is justifiable. In other words, it is a Department more affected to the Infectology, in particular, than to Tropical Medicine as a whole<sup>25</sup>. Among our main causes for admission were meningoencephalitides and pneumonia, which remained major causes of admission notwithstanding the decrease in the immunopreventable diseases and the ascension of AIDS. On the other hand, there were only few admissions due to malaria, visceral leishmaniasis and Chagas disease. Cases of schistosomiasis summed up 145 (1.35%), and those due to paracoccidioidomycosis to 193 (1.79%).

In two other studies made to evaluate demands in infectious diseases, one from Salvador, Bahia<sup>23</sup>, and other from Londrina, Paraná<sup>2</sup>, the small contribution of parasitic diseases was also verified. In the study from Paraná, which evaluated 11,486 admissions in a period of 20 years since 1970, 4.5% of the patients had malaria, 3.2% had schistosomiasis, and 0.9% cutaneous leishmaniasis. No other parasitic disease was mentioned. In the study from Bahia, an evaluation of 300 patients admitted between 1988 and 1990 in a private infectious disease hospital, no parasitic disease was ever mentioned among the more frequent causes of admission. Meningoencephalitis was the most frequent reason for admission in both studies.

The reason why men outnumbered women in our registry is not clear. The study from Bahia<sup>23</sup>, already mentioned, verified the same. In the studies of outpatient demand, however, women often predominate<sup>5, 16, 21</sup>. It is supposed that job responsibilities preclude or retard men in searching for medical attention as outpatients. Such would not occur in hospital demand, in which diseases are more serious and more urgent the need for admission<sup>21</sup>. There is in Niterói and São Gonçalo, as in Brazil as a whole<sup>3</sup>, a predominance of women in the population, which gets stronger as the age strata grows higher. The population of these two municipalities, joined together, comprised (in the last census in 1991) 584,291 men and 631,969 women<sup>4</sup>. The past distribution by sex and age strata for this restrict population is not available. The historical information concerning Brazilian population shows that women have outnumbered men since 1940, and it is assumed that this predominance has been growing higher as standards of living got better, allowing women to survive men, as they are in general less susceptible to external violent harm and degenerative diseases. In

Niterói and São Gonçalo, the female predominance occurred, in 1991, in all age strata above 15 years old. Even taking in account the age structure of the population assisted in the Infectious Diseases Department, which is much younger, a female preponderance would be expected. What occurred was, in fact, a strong predominance of men, visible even without statistical analysis, as males responded for 62.3% of all 8.630 admissions ( $P < 0.0001$ ). This predominance of men was maintained along all the thirty years, growing stronger in the last six years. It is thus in complete disagreement with the sex distribution by age groups in our population.

The variations that occurred in the demand along time were surely under the influence of modifications that took place in the Brazilian nosologic and demographic profile during the study period. Brazilian population has been sustaining a demographic transition, with progressive decline in birth rates, and, consequently, with the contraction of the age strata below 15 years old<sup>20</sup>. So, the changing in age structure that occurred in the demand after 1983 (when adult patients above 15 years old outnumbered children below 15 years old) may have been influenced by alterations in the Brazilian population age strata. Even so, 60% of our patients were less than 15 years old in 1980 (while, by contrast, 38% of Brazilians were in this age stratum at this time); this percentage fell down to 42% in 1990 (year in which 35% of Brazilians had ages below 15)<sup>20</sup>. One can assume, admitting these figures (and supposing there are proportionally fewer children in Rio de Janeiro than in Brazil as a whole)<sup>22</sup>, that children were always over represented in the Department. However, this over representation got lower and lower as years went by.

Parallel to the demographic transition just described, another, nosologic or epidemiologic, is occurring. This is characterized by a constant decrease in the values of certain classic health indicators, such as infantile mortality and infectious diseases incidence, along with the ascension of degenerative diseases, violence and accidents. In the developed world, this transition has occurred step-by-step, as a result of gradually improved socioeconomic standards. In Brazil, notwithstanding the great inequalities in income and other standards of living, this transition is also taking place, albeit in a rather fast and unstable way, under the influence of some technical measures of medical and sanitary order. Among these measures are the widespread use of oral hydration and alimentary supplement, the incentive to breast-feeding and, mainly, immunization. This latter is being done either as a routine procedure or by means of periodic vaccination campaigns<sup>20</sup>.

In the beginnings of the seventies, it finally became clear that immunization, one of the best cost-effective health actions known, was being tragically underutilized, and that this underutilization was killing, in the whole world, by means of immunopreventable diseases, more than 6 million children each year. This means six children every minute, or, in the words<sup>18</sup> of a WHO technician, *each time one takes a breath, a child dies from a vaccine-preventable disease*. The National Immunization Program (PNI)<sup>19</sup>, was created in 1973, antedating so the Expanded Program of Immunization (EPI), which was officially approved by the World

Health Organization only in 1977<sup>24</sup> with the objective of providing basic immunization to all children on the planet. The activities of PNI, initially very inconstant and modest, were restricted initially to the urban areas of the country. Eventually they were extended to the rural inland<sup>19</sup>, assimilating strategies that brought worthy effects in their performance, namely, the optimization of routine immunization schedules and the adoption of mass campaigns of vaccination. The vaccines employed were the Sabin, BCG, diphtheria-tetanus-pertussis and measles<sup>24</sup>. A question for long time discussed was if the immunization would work only if integrated to others measures (of sociopolitical and/or medical sanitary order) aiming to improve the socioeconomic and citizenship standards, or if it would bring effects even in the absence or failure of such forms of intervention<sup>17</sup>. One can guess the profound efficacy of immunization alone taking in account the complete vanishing of measles, diphtheria, *neonatorum* and infantile tetanus from the records of a Department like ours, despite the persistence of known socioeconomic inequities.

The demand in many categories showed, along time, considerable analogy with incidence in Niterói e São Gonçalo, as inferred by the number of reported cases<sup>8,9,10,11,12,13,14</sup>. In some cases, as occurred with measles and diphtheria, there was some discrepancy in the orders of magnitude between reported cases and admissions, as, of course, not all the measles cases reported presented the severity or complications that usually lead to hospital admission. For diphtheria, some cases were referred to others hospitals in Rio de Janeiro City. In tetanus, however, figures for reported cases and admissions were in the same order of magnitude, as we were a very specialized and very important referral center for this disease, as long as it existed. In all cases the shape of both curves (admissions and reported cases along time) were quite similar.

The decrease of diseases like tetanus, diphtheria, whooping cough, and measles in our registries can be ascribed largely to immunization. The recession in the incidence of these diseases is one of the characteristics of the epidemiologic transition taking place in Brazil. Unfortunately, they are being substituted by others. An infectious diseases ward cannot, of course, reflect the rising of degenerative diseases, violence and accidents, but the nosologic transition is taking place also in the boundaries of infectious diseases themselves. In less than a decade, AIDS reached the fifth position among the more frequent diseases admitted in the whole period of thirty years, with 463 admissions. The admissions due to AIDS more or less followed the reported cases in Niterói and São Gonçalo, until 1991<sup>8</sup>. After that, as a result of saturation of all few available AIDS beds, the admissions were left behind reported cases. This notwithstanding, more than 60% of our deceases occur presently among AIDS patients. It also can be ascribed to AIDS the reversal in mortality descending trends, witnessed since 1984. AIDS, by the exponential rising of its incidence, by its chronic character, by the uncountable opportunistic infections it determines, each with its own expensive and prolonged treatment (not mentioning the resurgence of tuberculosis<sup>20</sup>), imposes itself as a challenge for the coming years<sup>7</sup>.

## RESUMO

### **Influência das doenças imunopreveníveis e da SIDA na demanda de um serviço de Doenças Infecciosas no Estado do Rio de Janeiro, Brasil, ao longo de trinta anos. (1965-1994)**

O perfil nosológico brasileiro tem passado por profundas modificações. Algumas devem-se às grandes campanhas de imunização e a tendências demográficas e socioeconômicas. Outras são puramente nosológicas, tal como o surgimento da Síndrome de Imunodeficiência Adquirida (SIDA). Este estudo de demanda descreve como estas alterações refletiram-se nas 8.630 admissões de uma Enfermaria de Doenças Infecciosas em Niterói, Brasil, durante trinta anos. As endemias rurais brasileiras foram infreqüentes (3,45%). Os homens predominaram (62%) todo o tempo, em todas as faixas etárias e em todas as doenças. Crianças menores de quinze anos predominaram até 1983. Houve, no caso do tétano, importante elevação das faixas etárias acometidas. A mortalidade institucional caiu de 31% em 1965 para 10% em 1984, voltando a subir para 15% em 1994. Entretanto, se os pacientes com SIDA não forem computados, a mortalidade mantém-se em declínio até o final do período de estudo (8%). A progressiva desimportância das doenças imunopreveníveis esteve em paralelo com a crescente proeminência da SIDA. Em menos de uma década, a SIDA atingiu o quinto lugar entre as doenças mais freqüentes durante todos os trinta anos do período estudado. Ao contrário das doenças imunopreveníveis, as meningoencefalites e as pneumonias mantiveram-se estáveis. A SIDA, pela sua incidência exponencial, pelo seu caráter crônico, e pelas incontáveis infecções oportunistas que determina, impõe-se como um desafio para os próximos anos.

## REFERENCES

1. BALDY, J.L.S. - Conceitos básicos. In: AMATO NETO, V. & BALDY, J.L.S. *Doenças transmissíveis*. 3.ed. São Paulo, Sarvier, 1989. p. 1-11.
2. BALDY, J.L.S.; PETRUS, A.C.; KUSOMOTO, E.A. et al. - Diagnósticos relativos aos pacientes internados na enfermaria de doenças transmissíveis do Hospital Universitário de Londrina durante os primeiros 21 anos de funcionamento (1970-1990). In: CONGRESSO DA SOCIEDADE BRASILEIRA DE MEDICINA TROPICAL, 28., Belém, 1992. *Anais*. p. 147.
3. BRASIL. Instituto Brasileiro de Geografia e Estatística - *Anuário estatístico do Brasil*, 1994 (disquetes).
4. BRASIL. Secretaria de Planejamento, Orçamento e Coordenação. Fundação Instituto Brasileiro de Geografia e Estatística. - *Censo demográfico de 1991*, v. 20.
5. CARVALHO, M.S.; D'ORSI, E.; PRATES, E.C. et al. - Demanda ambulatorial em três serviços da rede pública do município do Rio de Janeiro, Brasil. *Cadern. Saúde públ. (Rio de J.)*, 10: 17-29, 1994.
6. CARVALHO, M.S.; D'ORSI, E.; MELO, E.C.P. & CAMPOS, T.P. - *Estudo de demanda ambulatorial: do planejamento à divulgação dos resultados*. Rio de Janeiro, ENSP, 1993.
7. COURA, J.R. - Desafios das doenças infecciosas e parasitárias e da medicina tropical no último decênio do século XX. *Rev. Soc. bras. Med. trop.*, 24: 119, 1991.

8. RIO DE JANEIRO (ESTADO). Secretaria de Estado de Saúde. Superintendência de Saúde Coletiva. Coordenadoria de epidemiologia - **Distribuição dos casos e óbitos por SIDA, segundo o município de ocorrência, 1982-1995**. Tabela, 1995.
9. RIO DE JANEIRO (ESTADO). Secretaria de Estado de Saúde. Superintendência de Saúde Coletiva. Coordenadoria de epidemiologia - **Distribuição dos casos e óbitos por difteria, segundo o município de ocorrência, 1982-1994**. Tabela, 1995.
10. RIO DE JANEIRO (ESTADO). Secretaria de Estado de Saúde. Superintendência de Saúde Coletiva. Coordenadoria de epidemiologia - **Distribuição dos casos e óbitos por doença meningocócica, segundo o município de ocorrência, 1975-1995**. Tabela, 1995.
11. RIO DE JANEIRO (ESTADO). Secretaria de Estado de Saúde. Superintendência de Saúde Coletiva. Coordenadoria de epidemiologia - **Distribuição dos casos e óbitos por leptospirose, segundo o município de ocorrência, 1990-1994**. Tabela, 1995.
12. RIO DE JANEIRO (ESTADO). Secretaria de Estado de Saúde. Superintendência de Saúde Coletiva. Coordenadoria de epidemiologia - **Distribuição dos casos e óbitos por sarampo, segundo o município de ocorrência, 1982-1994**. Tabela, 1995.
13. RIO DE JANEIRO (ESTADO). Secretaria de Estado de Saúde. Superintendência de Saúde Coletiva. Coordenadoria de epidemiologia - **Distribuição dos casos e óbitos por tétano, segundo o município de ocorrência, 1982-1994**. Tabela, 1995.
14. RIO DE JANEIRO (ESTADO). Secretaria de Estado de Saúde. Superintendência de Saúde Coletiva. Coordenadoria de epidemiologia - **Boletim epidemiológico sobre meningites. Primeira parte**. Março de 1995 (mimeografado).
15. RIO DE JANEIRO (ESTADO). Secretaria de Planejamento e Coordenação Geral. Secretaria de Estado de Saúde. Fundação Instituto de Desenvolvimento Econômico e Social do Rio de Janeiro - **Estatísticas do sistema de saúde**. Rio de Janeiro, 1977.
16. FÁVERO, N.; FÁVERO, M.; NAKAO, J.R.S. & EVORA, Y.D.M. - Motivo da demanda dos pacientes que buscam a assistência a um hospital universitário. *Rev. paul. Hosp.*, 37: 64-68, 1989.
17. HALSEY, N.A. - Strategies for achieving high vaccination coverage: introduction. *Rev. infect. Dis.*, 11: S503-S504, 1989.
18. HENDERSON, R.H. & KEJA, J. - Global control of vaccine-preventable diseases: how progress can be evaluated. *Rev. infect. Dis.*, 11: S649-S654, 1989.
19. OLIVEIRA, S.A. - **Contribuição ao estudo da imunidade contra o sarampo em pessoas vacinadas e não vacinadas nos municípios de Niterói e São Gonçalo, Estado do Rio de Janeiro**. Rio de Janeiro, 1989. (Tese de Doutorado - Universidade Federal do Rio de Janeiro).
20. PEREIRA, M.G. - **Epidemiologia, teoria e prática**. Rio de Janeiro, Guanabara-Koogan, 1995. p. 157-184.
21. RADAELLI, S.M.; TAKEDA, S.M.P.; GIMENO, L.I.D. et al. - Demanda de serviço de saúde comunitária na periferia de área metropolitana. *Rev. Saúde públ. (S. Paulo)*, 24: 232-240, 1990.
22. REICHENHEIM, M.E. & WERNECK, G.L. - Adoecer e morrer no Brasil dos anos 80: perspectivas de novas abordagens. In: GUIMARÃES, R. & TAVARES, R. **Saúde e sociedade no Brasil. Anos 80**. Rio de Janeiro, Abrasco-IMS-UERJ; Relume-Dumará, 1994. p. 113-130.
23. SAMPAIO, M.; ALVES, C.B.; DUARTE, E. et al. - Análise de 300 pacientes internados em um serviço privado de infectologia. *Rev. Soc. bras. Med. trop.*, 24: 170, 1995.
24. UGÁ, M.A.D. - Economic analysis of the vaccination strategies adopted in Brazil in 1982. *Bull. Pan Amer. Hlth. Org.*, 22: 250-263, 1988.
25. WARREN, K.S. - Tropical medicine or tropical health: the health Clark lectures, 1988. *Rev. infect. Dis.*, 12: 142-156, 1990.
26. YAZLLE ROCHA, J.S. & NOGUEIRA, J.L. - Padrões de morbidade em assistência primária na região de Ribeirão Preto, SP (Brasil). *Rev. Saúde públ. (S. Paulo)*, 19: 215-224, 1985.

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