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## Original article

# Brazilian infectious diseases specialists: who and where are they?



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## ABSTRACT

**Background:** The infectious diseases specialist is a medical doctor dedicated to the management of infectious diseases in their individual and collective dimensions.

**Objectives:** The aim of this paper was to evaluate the current profile and distribution of infectious diseases specialists in Brazil.

**Methods:** This is a cross-sectional study using secondary data obtained from institutions that register medical specialists in Brazil. Variables of interest included gender, age, type of medical school (public or private) the specialist graduated from, time since finishing residency training in infectious diseases, and the interval between M.D. graduation and residency completion. Maps are used to study the geographical distribution of infectious diseases specialists.

**Results:** A total of 3229 infectious diseases specialist registries were counted, with 94.3% (3045) of individual counts (heads) represented by primary registries. The mean age was 43.3 years (SD 10.5), and a higher proportion of females was observed (57%; 95% CI 55.3–58.8). Most Brazilian infectious diseases specialists (58.5%) practice in the Southeastern region. However, when distribution rates were calculated, several states exhibited high concentration of infectious diseases specialists, when compared to the national rate (16.06). Interestingly, among specialists working in the Northeastern region, those trained locally had completed their residency programs more recently (8.7 yrs; 95% CI 7.9–9.5) than physicians trained elsewhere in the country (13.6 yrs; 95% CI 11.8–15.5).

**Conclusion:** Our study shows that Brazilian infectious diseases specialists are predominantly young and female doctors. Most have concluded a medical residency training program.

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The absolute majority practice in the Southeastern region. However, some states from the Northern, Northeastern and Southeastern regions exhibit specialist rates above the national average. In these areas, nonetheless, there is a strong concentration of infectious diseases specialists in state capitals and in metropolitan areas.

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## Introduction

The infectious diseases specialty is a medical professional field dedicated to the management of disease in both individual and collective dimensions. The infectious diseases specialist (ID) must thus have comprehensive medical knowledge and skills to be able to integrate individual clinical data with concepts that emerge from other biomedical areas that include epidemiology, microbiology, immunology, and public health. To provide comprehensive care to patients suffering with bacterial, viral, fungal, or parasitic infections, an ID should not only be able to diagnose and treat the patient properly, but also to participate in the surveillance and prevention of communicable diseases spread. Moreover, IDs may also play an expert role in assessing the ecological and economic impact of infectious diseases on health systems and the community. Currently, Brazilian IDs require versatile attributes in order to face patient care related to endemic neglected tropical diseases, HIV/AIDS, and viral hepatitis, as well as novel health challenges, such as emerging and reemerging diseases (H<sub>1</sub>N<sub>1</sub> influenza, chikungunya, and Zika viral infections), multi-resistant bacterial infections and hospital infection control, infections in migrants, travelers and in immunocompromised patients.<sup>1-3</sup>

Brazilian ID training started with the implementation of a specialized medical residency program in 1952 at Hospital das Clínicas, affiliated to the University of São Paulo Faculty of Medicine.<sup>4,5</sup> Since then, new programs were launched in other regions, before national regulations were established in 1977 under the Federal Decree number 80,281,<sup>6</sup> which created the Comissão Nacional de Residência Médica – CNMR (National Medical Residency Committee), affiliated to the Ministry of Education. In 1981, Federal Law number 6,932<sup>7,8</sup> was passed and conceptualized residency training as the recommended “post-graduation program for medical doctors, based on in-service training under the supervision of ethical and highly skilled medical professionals”. Finally, minimum curricula requirements for these training programs were approved and implemented nationwide in 1983.<sup>9</sup>

Currently, certification of ID in Brazil is obtained after completing a 3-year infectious disease residency training (IDRT) at a CNRM-accredited institution.<sup>10,11</sup> MR programs include learning activities in several practice scenarios, such as outpatient clinics, hospital inpatient wards, intensive care units and field work, covering aspects related to internal medicine and infectious diseases. Each program may place special emphasis on diseases that are more prevalent in its location.<sup>12</sup> Alternatively, ID may be certified after approval in a board

examination, prepared by the Sociedade Brasileira de Infecologia – SBI (Brazilian Society of Infectious Diseases) and accredited by the Associação Médica Brasileira – AMB (Brazilian Medical Association).<sup>10,11,13</sup>

Infectious disease specialists have an important role to play in medical care provision in Brazil. It is broadly recognized that the country has experienced an irregular epidemiological transition.<sup>14,15</sup> Although infectious diseases-related deaths have been remarkably reduced over the past six decades, these illnesses still remain relevant public health issues. Despite having successfully controlled vaccine-preventable diseases, cholera, and vector-borne Chagas’ disease, some illnesses remain for which control has failed (i.e., dengue and visceral leishmaniasis) or been partially effective (i.e., HIV/AIDS, viral hepatitis, leprosy, tuberculosis, and schistosomiasis), due to complex transmission patterns associated with adverse environmental, social, economic, or unknown determinants. Moreover, some of these diseases are chronic, exhibit long infective periods and require prolonged treatment, or sometimes are transmitted by insect vectors that are difficult to control.<sup>16</sup>

When planning healthcare strategies for the Brazilian population, a clear understanding of how specialized healthcare personnel is prepared to face these challenges and to what extent these professionals are available throughout the country is certainly useful. The aim of this paper is thus to evaluate the current profile and distribution of IDs in Brazil.

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## Material and methods

This is a cross-sectional study using secondary data. Evaluated datasets included administrative registry and notary data obtained after linkage of three primary sources: Conselho Federal de Medicina – CFM (Federal Medical Council) database that integrated information from 27 Conselhos Regionais de Medicina – CRMs (Regional Medical Councils), including one database from each Brazilian state; the database of the Comissão Nacional de Residência Médica – CNMR (National Medical Residency Committee), affiliated to the Ministry of Education; and the Associação Médica Brasileira – AMB (Brazilian Medical Association) dataset that integrated databases from medical specialty societies (BSID, in this case). All databases were accessed in May 2014.

An ID was defined as a physician who completed IDRT in a CNRM-accredited program or who had passed the BSID board examination.<sup>10,11</sup>

Qualitative variables of interest for our study included gender, age, type of medical school the ID graduated from (public or private), time since completion of IDRT, interval between

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