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ORIGINAL

Distribution of Dengue Serotypes in Argentina in the Last 2 Years

Distribución de los Serotipos de Dengue en la Argentina en los 2 últimos años

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ABSTRACT

Introduction: dengue virus is transmitted mainly by the Aedes aegypti mosquito, and represents a public health problem worldwide, especially in tropical and subtropical regions.
Objective: to determine the dengue serotypes circulating in Argentina.
Method: epidemiological reports were evaluated retrospectively. Dengue surveillance data from the National Ministry of Health of the Argentine Republic during the period 2022 to 2024 were used for this purpose.
Results: the serotypes circulating in Argentina during 2022-2023 were DenV-1 and DenV-2; during the 2024 outbreak, the DenV-3 serotype was introduced, with DenV-2 accounting for 57,41 %, DenV-1 for 42,40 % and DenV-3 for 0,19 %.
Conclusion: the predominance of serotypes DENV-1 and DENV-2, and the introduction of serotype DENV-3 in 2024, increase the risk of sequential infections and severe forms of the disease, which emphasizes the need to implement effective strategies, between endemic and epidemic years, for vector control and to promote community awareness.

Keywords: Dengue; Dengue Virus; Aedes; Argentina; Disease Vector Control.

RESUMEN

Introducción: el virus del dengue se transmite principalmente a través del mosquito Aedes aegypti, y representa un problema para la salud pública en todo el mundo; especialmente en regiones tropicales y subtropicales.
Objetivo: determinar los serotipos de dengue circulantes en Argentina.
Método: se evaluaron los informes epidemiológicos en forma retrospectiva. Para ello, se utilizaron los datos de vigilancia del dengue por el Ministerio de Salud de la Nación de la República Argentina durante el periodo de 2022 al 2024.
Resultados: los serotipos circulantes en Argentina durante el 2022-2023 fueron DenV-1 y DenV-2, durante el brote del 2024 se introduce el serotipo DenV-3; siendo un 57,41 % el DenV-2, un 42,40 % el DenV-1 y 0,19 % el DenV-3.
Conclusión: la predominancia de los serotipos DENV-1 y DENV-2, y la introducción del serotipo DENV-3 en 2024, aumentan el riesgo de infecciones secuenciales y formas graves de la enfermedad, lo que enfatiza la necesidad de implementar estrategias efectivas, entre los años endémicos y años epidémicos, de control vectorial y promover la concientización de la comunidad.

Palabras clave: Dengue; Virus del Dengue; Aedes; Argentina; Control de Vectores de las Enfermedades.

INTRODUCTION

Dengue virus is transmitted mainly by the Aedes aegypti mosquito and represents a public health problem worldwide, especially in tropical and subtropical regions.(1) How the different types of dengue virus are distributed plays a crucial role in how the disease spreads and how many people are affected.(1,2) There has been a significant increase in dengue cases in different parts of the country in recent years. To effectively address this problem, it is critical to understand how the different types of the virus are distributed and the risk and prevention factors.(3)

Dengue has been a recurrent problem in Argentina, especially during the summer, when climatic conditions favor the reproduction of the mosquitoes that transmit the disease.(5) Population mobility and the rapid growth of urban areas have contributed to the spread of the virus in different parts of the country, which has caused a significant burden on the health system.(6)

Four known dengue virus serotypes are DE: NV-1, DENV-2, DENV-3, and d DENV-4.(7) the most common types in Argentina are DENV-1 and DENV-4, identified as having multiple outbreaks in different provinces.(8) These types have shown the ability to circulate sustainably and have been associated with mild and more severe forms of dengue cases. It is of utmost importance to carry out epidemiological surveillance of dengue to detect the presence of the different types of the virus in different parts of the country.(1,7) This allows us to monitor how outbreaks evolve, identify the most significant risk areas, and target control and prevention measures.(8,9) In Argentina, surveillance systems have been established that allow early case detection and rapid outbreak response.(10) Several factors may influence how dengue viruses are distributed. These include population mobility, the number of mosquitoes transmitting the disease, environmental conditions, and population immunity to the different virus types.(11)

Understanding these factors is crucial to predict how dengue will spread and to design effective prevention and control strategies. Despite efforts, dengue remains a significant public health problem in Argentina. Identifying the most common types and their geographic distribution in the last two years will provide valuable information to guide future interventions and improve the health system's response capacity to dengue outbreaks.(10,12)

METHOD

The present study is a retrospective systematic review of epidemiological reports from the Argentine Ministry of Health covering the last two years, from January 2022 to the week ten bulletin of the year 2024. The samples selected were autochthonous cases confirmed by molecular or antibody testing. Subsequently, they underwent genotypic testing to determine the specific dengue serotype and its distribution in the region in which it lives.

The following inclusion criteria were used:

- Confirmed cases of dengue virus infection in Argentina during the last two years.
- Patients with confirmed diagnosis of dengue by serological or molecular tests.
- Official reports with epidemiological and surveillance data including information on the geographical distribution of dengue virus serotypes.

Exclusion criteria used were:

- NON-confirmed cases of dengue virus infection in Argentina during the last two years.
- Patients with indeterminate or inconclusive results in dengue diagnostic tests.
- Incomplete or insufficient epidemiological data to determine the distribution of dengue virus serotypes.
- Non-updated or unverified information on the presence of specific dengue virus serotypes in Argentina.

Data was obtained from the epidemiological bulletins of Argentina's epidemiology page and the Ministry of Health. Each data obtained from the state pages was annotated and processed in the database. The variables to be analyzed will be quantitative; each will be extracted from the epidemiological bulletins of Argentina. From the data obtained, a database was assembled to work on each of the data obtained.

RESULTS

General Overview

To establish a general overview of the distribution of dengue serotypes in Argentina during the last two years, as shown in figure 1, which clarifies the distribution of serotypes that circulated and are currently circulating in the Republic of Argentina.

Number of cases per period and year

Taking into account that each year is different from the next in terms of the number of cases, which leads to a different distribution of serotypes if it is an outbreak year, if it is an endemic year whose serotypes remain unchanged, or if a serotype other than the circulating one is added. Figure 2 below shows the number of cases in the last two years during weeks 52 of the previous year up to week 10.

Figure 1. Distribution of dengue serotypes in Argentina, 2022 - 2024

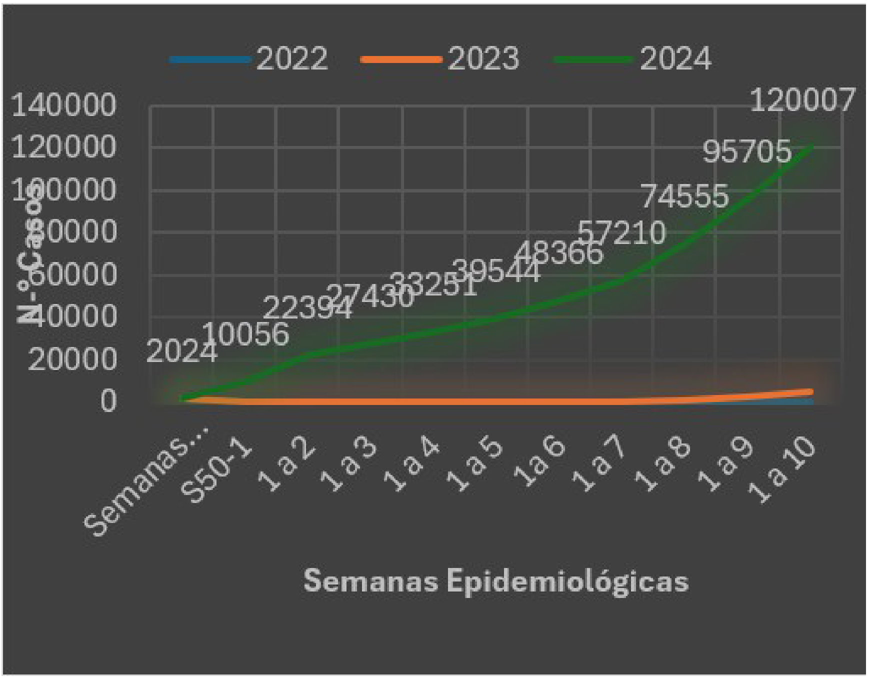

Figure 2. Number of cases since epidemiological week 52-10, 2022-2024

Current situation: Dengue epidemic (2024)

During the year 2024, 8985 genetic tests were performed, of which 3810 yielded the Den-1 serotype, representing 42,40 %, 5158 tests yielded the Den-2 serotype, representing 57,41 %, and only 17 tests yielded the Den-3 serotype, representing 0,19 % of the total number of cases studied with genetic tests, as shown in figure 3.

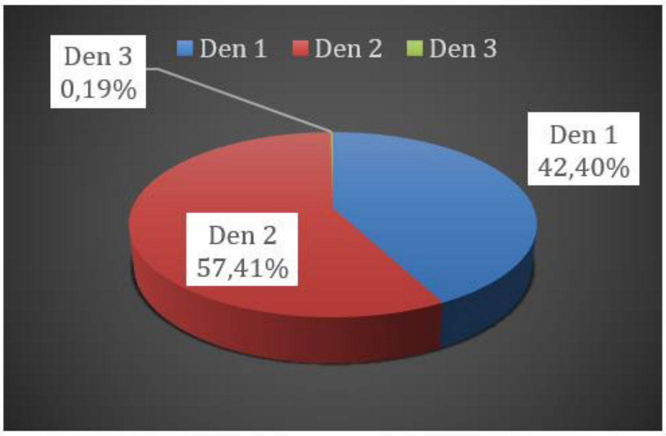

Figure 3. Distribution of dengue serotypes 2024

Distribution during outbreak-free years (2022-2023)

In 2022, during epidemiological weeks 1 to 52, 750 cases of dengue were documented, with only three autochthonous cases registered in CABA and the rest distributed throughout the Noe and Nea regions, making a total of 26 autochthonous cases in the whole country at the end of epidemiological week 50. During the year 2023, the documented cases of dengue fever increased concerning the previous year, with a total of 3992 autochthonous cases at the end of week 52, with circulation of serotypes Den-1 and Den-2 throughout the country, as shown in figure 4.

Figure 4. Autochthonous Cases in Argentina (2022-2023)

DISCUSSION

The results provide an overview of the distribution of dengue virus serotypes in Argentina during the last two years. It was observed that serotypes DENV-1 and DENV-2 were the predominant ones, while serotype DENV-3 had a minimal presence.

It is important to note that the number of cases varies considerably from year to year, as shown in figure 2. This is because some years present epidemic outbreaks while others are considered endemic, influencing the distribution of circulating serotypes.

In the current situation, corresponding to 2024, there is evidence of a dengue epidemic with a high circulation of serotypes DENV-1 (42,40 %) and DENV-2 (57,41 %). This finding is consistent with previous studies showing that these two serotypes are the most frequent in the region and can coexist during the same epidemic outbreak. On the other hand, 2022 and 2023 were characterized as years without significant outbreaks, with endemic circulation of serotypes DENV-1 and DENV-2 in different regions of the country.

This pattern is typical in areas where dengue is endemic, and serotypes may remain unchanged, or new serotypes may be introduced in subsequent seasons. It is essential to mention that the presence of serotype DENV-3, although minimal in the period analyzed, should not be underestimated since its introduction in a susceptible population could trigger future outbreaks. In addition, the co-circulation of multiple serotypes increases the risk of sequential infections, which may lead to more severe forms of the disease. The patterns observed in the distribution of dengue serotypes in Argentina reflect the epidemiological dynamics of this disease and highlight the importance of maintaining continuous surveillance and strengthening prevention and control strategies, especially in the most affected regions.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

Conceptualization: Mercedes Pablo Araujo, Susana Carnovale.
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Methodology: Mercedes Pablo Araujo, Susana Carnovale.
Project administration: Mercedes Pablo Araujo, Susana Carnovale.
Writing - original draft: Mercedes Pablo Araujo, Susana Carnovale.
Writing - revision and editing: Mercedes Pablo Araujo, Susana Carnovale.