AEDES AEGYPTI: ECONOMIC IMPACT OF PREVENTION VERSUS PALLIATION OF DISEASES CAUSED BY THE MOSQUITO

INTRODUCTION

- Over one sixth of the illnesses and disabilities suffered worldwide are caused by vectorborne diseases, and more than half the world's population is estimated to be at risk for these diseases currently.
- Aedes aegypti is one of the main vectors responsible for transmitting four diseases that had major outbreaks recently in Brazil: dengue, Zika, chikungunya, and yellow fever.
- According to the World Health Organization (WHO), dengue fever is endemic in more than 100 countries, with about 3.9 billion people at risk. The largest outbreak in Brazil occurred in 2015, with approximately two million reported cases and over 900 deaths according to the Ministry of Health (MoH) data. 1, 2
- The main concern in cases of aedes is the infection of pregnant women, which can lead to microcephaly and other complications in infants. After the aedes outbreaks in 2015, there were 1,216 microcephaly cases confirmed by MoH between November 2015 and May/2017. 3 In addition, aedes is associated with Guillain-Barré syndrome, a rare disease in which the immune system attacks peripheral nerve cells, causing muscle weakness and loss of sensation, which can lead to total limb paralysis.
- Chikungunya presents high fever (>39°C), intense pain in joints, head, muscles and red patches on the skin. In 2016, MoH registered 271,824 probable cases of the disease and 143,702,444.04 in 2016 and R$150,019,037.98 in 2015 with the prevention and control of aedes aegypti (Figure 2).
- Brazil’s experiencing the largest outbreak of yellow fever seen in recent decades. From December 2015 to May/2017 there were 792 confirmed cases of the disease and 435 deaths. 4 Brazil is experiencing the largest outbreak of yellow fever seen in recent decades. From December 2015 to May/2017 there were 792 confirmed cases of the disease and 435 deaths. 4
- According to the Ministry of Health (MoH) data, 5 Brazil registered 211,824 probable cases of the dengue disease and 198 deaths. 6
- In addition to social burden, these diseases impose substantial economic burden on families and governments, both in medical costs and in working days lost due to illness. 7
- Our goal was to analyze the expenditures of the Brazilian government during these outbreaks (palliation), and compare them with the expenditures made during prevention campaigns.

METHODS

- We performed searches on MEDLINE using the following terms: aedes aegypti AND costs, dengue AND costs, chikungunya AND costs, also INR (yellow fever AND costs).
- Searches were completed with hand search on the reference list of included articles. Language was limited for English or Portuguese, and publication date to 2010-2017.
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- We retrieved 423 articles, 410 were excluded due to duplicity, because they did not address our topic or the Latin America area and due to design inadequacies. Thirteen studies were included for analysis.
- Data from the literature estimated the cost of treating dengue at around R$ 1 billion per year.
- Treatment of microcephaly and Guillain-Barré syndrome, the most severe consequences of aedes infection, was estimated at US $1,912. 8, 9
- The economic impact of chikungunya treatment was projected at US $73.6 million. 10
- For the current outbreak of yellow fever, the economic impact has not yet been estimated. 3
- Official data from the Brazilian Ministry of Health (MoH) and the World Health Organization (WHO) were also reviewed.
- We extracted data on government expenditures for the treatment of patients during the outbreaks (palliation).
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RESULTS

- We retrieved 423 articles, 410 were excluded due to duplicity, because they did not address our topic on the Latin America area and due to design inadequacies. Thirteen studies were included for analysis.
- Data from the literature estimated the cost of treating dengue at around R$ 1 billion per year.
- For chikungunya, number of probable cases was 36,254 in 2015, 230,410 in 2016 and 131,749 in 2017. 11
- Data from MoH showed that there was a total of 1,638,058 probable cases of dengue fever in Brazil in 2015, 1,409,907 in 2016 and 109,123 in 2017. 12
- For chikungunya, number of probable cases was 36,254 in 2015, 230,410 in 2016 and 131,749 in 2017.
- Zika cases started to be notified in 2015, and the number of probable cases for the year was 205,579 for 2016 and 15,023 for 2017.
- Cases of yellow fever started to be notified in 2015, and from December/2015 to May/2017, 792 cases were confirmed (Figure 5). 13

DISCUSSION

- Only in 2015, the year of the greatest outbreaks of the disease, the government spent over R$ 150 million on the prevention of the disease, but due to dengue treatment alone were estimated in over R$ 1 billion per year.
- The insufficient investment in control of the diseases caused by aedes aegypti leads to significant economic as well as social expenditures.
- As these diseases continue to spread, decisions regarding resource allocations to control and prevent them highlight the need to create policies according to their costs and the health burden they could prevent. 14
- Dengue, aedes, chikungunya and yellow fever are major public health problems throughout tropical and sub-tropical regions of the world. Epidemics of these diseases result in human suffering, strained health services and massive economic losses.
- For all of these diseases, vector control is a powerful preventive measure that is not used to its full potential. 15 Prevention of the disease can preclude high expenditures, as well as social burden of these diseases.

CONCLUSIONS

- There is a need for greater investment in prevention and control of the vector, which would now recede and avoid new outbreaks of these and other diseases transmitted by aedes aegypti.

REFERENCES