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**VIGILÂNCIA E PREVENÇÃO DE VETORES CULICÍDIOS - O CASO PORTUGUÊS**

**SURVEILLANCE AND PREVENTION CULICIDAE VECTORS - THE PORTUGUESE CASE**

**VIGILANCIA Y PREVENCIÓN DE VECTORES CULICIDAE - EL CASO PORTUGUÉS**

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## RESUMO

**Introdução:** Dengue e Zika são considerados uma doença do século XXI re-emergentes sendo um dos principais problemas de saúde pública no mundo, não só porque afecta milhares de pessoas, uma vez que o mosquito *Aedes aegypti* tende a reproduzir-se em casas, mas também porque é considerada uma das mais importantes doenças virais transmitidos pelos animais.

A vigilância da saúde pela Saúde Ambiental do meio ambiente, tem como missão analisar, prevenir e corrigir os riscos para a saúde, que são ambiental ou potencial. É neste sentido que a saúde ambiental é tão importante para erradicar a doença, e, entretanto, evitar que o vírus afete a saúde humana.

**Objetivos:** Rastreamento da presença de Vetores Culicídeos em Portugal.

**Métodos:** O estudo é baseado em dados do programa DGS e INSA, Revive, com chapeamento da presença de mosquitos e larvas que podem causar contaminação e doenças provenientes de mosquitos. A análise dos resultados permite avaliar a necessidade do cuidado profilático a ter no nosso país, especialmente na Madeira, que pela sua localização e clima pode favorecer a emergência destes.

**Resultados:** As amostras e os dados recolhidos pelo programa REVIVE não detectaram a presença dos mosquitos vírus em Portugal continental, no entanto as alterações climáticas que Portugal atravessa pode causar o aparecimento de mosquitos vetores de transportadores, sendo pertinente a educação pública para adoção de medidas preventivas da proliferação de mosquitos portadores.

**Conclusões:** Apesar de não existirem mosquitos, importa educar o público para medidas de prevenção da picada do mosquito. Assim, este estudo fornece uma série de soluções para minimizar a proliferação destes vectores epidemiológicos.

**Palavras-chave:** Culicídeos; Dengue; Zika; Saúde Ambiental

## ABSTRACT

**Introduction:** Dengue and Zika are considered a disease of the XXI re-emerging century are a major public health problems in the world, not only because it affects thousands of people, since the mosquito *Aedes aegypti* tends to reproduce in homes but also because it is considered one of the most important viral diseases transmitted by animals.

Health surveillance for Environmental Health of the environment, and its mission is to analyze, prevent and correct the health risks, which are environmental or potential. It is in this sense that environmental health is as important to end this disease, and in the meantime to prevent it does not affect human health.

**Objectives:** Tracking the presence of Culicidae Vectors in Portugal.

**Methods:** The study is based on data from DGS program and INSA, Revive, which plating the presence of mosquitoes and larvae that can cause contamination and diseases originating from mosquitoes, the analysis of these data and the other allows us to see the need for prophylactic care to have in our country, especially in Madeira, which, for its location and climate can foster the emergence of these.

**Results:** Samples and data collected by the REVIVE program did not detect the presence of the virus mosquitoes in continental Portugal, however climate change that Portugal crosses can cause the onset of mosquito vectors of carriers, so you want to public education for preventive measures can combat the proliferation of mosquitoes mosquito carriers.

**Conclusions:** Although there are no mosquitoes, as educate the public for mosquito prevention measures. Thus, this study provides a number of solutions to minimize the proliferation mosquito vectors.

**Keywords:** Culicids; Dengue; Zika; Environmental Health

## RESUMEN

**Introducción:** Dengue y Zika se consideran una enfermedad del siglo XXI reemergentes son uno de los principales problemas de salud pública en el mundo, no sólo porque afecta a miles de personas, ya que el mosquito *Aedes aegypti* tiende a reproducir en los hogares, sino también porque es considerada una de las enfermedades virales más importantes transmitidas por los animales.

La vigilancia de la salud por la Salud Ambiental de carreras del medio ambiente, y su misión es analizar, prevenir y corregir los riesgos para la salud, que son el medio ambiente o potencial. Es en este sentido que la salud del medio ambiente es tan importante para poner fin a esta enfermedad, y al mismo tiempo para evitar que no afecta a la salud humana.

**Objetivos:** El seguimiento de la presencia de vectores culícidos en Portugal.

**Métodos:** El estudio se basa en datos del programa de DGS e INSA, Revive, que plateando la presencia de mosquitos y larvas que pueden causar la contaminación y las enfermedades provenientes de mosquitos. El análisis de estos datos y el otro nos permite avaliar la necesidad de profilaxis se preocupan de tener en nuestro país, especialmente en Madeira, que, por su ubicación y el clima puede favorecer la aparición de éstos.

**Resultados:** Las muestras y los datos recogidos por el programa REVIVE no detectaron la presencia de los mosquitos del virus en Portugal continental, sin embargo el cambio climático que Portugal cruza puede causar la aparición de mosquitos vectores de portadores, por lo que desea a la educación pública para las medidas preventivas pueden combatir la proliferación de los mosquitos portadores de mosquitos.

**Conclusiones:** Apesar de que no hay mosquitos, como educar al público para las medidas de prevención de mosquitos. Por lo tanto, este estudio proporciona una serie de soluciones para reducir al mínimo los vectores de la proliferación de mosquitos.

**Palabras clave:** Culicidae; Dengue; Zika; salud Ambiental

## INTRODUCTION

Dengue is considered one of the re-emerging diseases of the XXI century as major public health problems in the world, not only because it affects thousands of people, since the mosquito *Aedes aegypti* tends to reproduce in homes but also because it is considered one of the most important viral diseases transmitted by animals.

In health surveillance Environmental Health Race of the environment and its mission is to analyze, prevent and correct the health risks, which are environmental or potential. It is in this sense that environmental health is as important to end this disease, and in the meantime to prevent it does not affect human health.

### 1. THEORETICAL FRAME WORK

According to the National Adaptation Strategy to Climate Change published in May 2015, the Environmental Portuguese Agency *"With climate change are potentially social and environmental determinants affected that pose risks to health. Examples are related to the increase of diseases with air pollution and allergens, extreme events (floods and droughts), increased frequency and intensity of heat waves, changes in the distribution and incidence of vector-borne diseases and changes in the availability and quality of water and-infections toxic, among others. Climate change could lead to significant changes. geographical and seasonal distribution and spread of vector-borne diseases These diseases are of great importance and, in Portugal, the most worrying are associated with Aedes aegypti mosquitoes (especially dengue) species Aedes are present in nearby regions - ... Aedes aegypti in the Autonomous region of Madeira and in Spain Aedesalbopictus"* (Agência Portuguesa do Ambiente, 2015).

According to the (WHO, 1997) Dengue is the most important viral infection transmitted by mosquitoes. In recent decades, the incidence of dengue has grown dramatically around the world, it is estimated that over 2.5 billion people (40% of world population) are at risk of contracting dengue and occurs 50000000-100000000 of infections per year (World Health Organization, 1997).

With increasing temperature, as a consequence of climate change, it is expected favorable to increase the number of months for the development of such vectors and consequent increased risk of infectious diseases caused by them.

The expression vectors of bodies responsible for biological transmission (or mechanical) active pathogen among different vertebrate hosts. Currently, in Europe, they are known viral encephalitis transmitted by mosquitoes (Abrantes & Silveira, 2009). Factors such as population density of vectors and their hosts, the prevalence of pathogenic adapted to vectors and their hosts, the immune status of the human population and the local environmental conditions are crucial to the process of establishing place transmission of disease (Rodhain & Perez, 1997).

In all vector-borne diseases, the risk of transmission is not only dependent on the number of infected vectors in the region, but also the possible contact with humans, ie, the conditions that are provided for the dissemination of these (Câmara Municipal de Cascais, 2011).

The origin of the mosquito *Aedes aegypti* is African but are known various regions of the world affected by this disease. While the first outbreak of the disease on European soil has been registered in 1920, the mosquito was first sighted on the island of Madeira in 2005, the city of Funchal, more precisely in the parish of Santa Luzia, following reports and some reactions skin population were subsequently linked to a mosquito bite.

This type of mosquito takes less to the common mosquito and has black body with white-silver stripes. The distinguished male female, among other features, feathers contain more antennas.

The female mosquito lays eggs individually in places able to accumulate water - breeding. It is the woman who bites because it has no blood to the maturation of the eggs and the male feeds on sugary liquids. This species can survive for a year in tropical and subtropical climates. (IASaúde, 2012) The life cycle to complete ranges from 7 to 15 days and consists of four stages: egg, larva, pupa and finally adult mosquitoes.

The archipelago is located in the subtropical region, with a mild climate both in winter and summer, however, and due to pressure systems during the summer months, gives an abundant rainfall (Santos & Aguiar, 2006).

The cases of the disease on the island began to emerge in October of 2012 and since then, several efforts have been gathered by the city of Funchal, such as the creation of a Municipal Plan Against Mosquito and various activities carried out by IASAUDE technicians, IP- RAM (composed of environmental health technicians). These activities have focused on monitoring; to control; prevention; and placement and collection of traps for eggs, larvae and adult mosquitoes and performance REVIVE - National Surveillance Culicidae vectors Program, etc. This is because it is known that it is difficult to eliminate the mosquito, so it is necessary to use awareness and prevention, starting with the elimination or reduction of reproduction. (IASaúde, 2012) (Câmara Municipal do Funchal, 2012). It should be noted that, dat, which were not identified in mainland Portugal, alien / invasive. All species identified are part of the Culicidae fauna.

The National Programme for Culicidae Vectors Surveillance, approved in 2007, is a collaboration between institutions of the Ministry of Health and aims to implement a vector network surveillance system (REVIVE), education / information across cultures, periodic or sporadic, vector culicids, surveillance of activity mosquito vectors, characterization of the species and seasonal occurrence in selected locations, as well as the timely detection of the introduction of exotic mosquitoes, particularly *Aedes albopictus* and *Aedes aegypti*, and send alerts to appropriate control measures (Chivian, 2008).

Crops under REVIVE program are conducted using CDC traps with bait CO<sub>2</sub> and vacuum cleaners to catch live mosquitoes. When performing cultures the minimum and maximum temperatures, relative humidity and geo-reference are recorded. The frequency of these ranges from May to October in Portugal; April to November, on the island of Madeira; and throughout the year in harbors and airports.

To perform the capture of adult mosquitoes, the emphasis is the twilight period or evening to make the crop, since it is the day time they reach the perfect conditions for food, the place to be on the periphery of urban centers, preferably in places with natural or artificial lakes. So to make this capture are used CDC light traps, which are composed of a flashlight that attracts mosquitoes, a fan that sucks and a bag where they are pushed by the fan.

This trap has a photo sensor that allows the electric system only works when it starts to get dark until dawn. Throughout this trap can be placed bait or not. Typically, the bait inside the STIR program is a bag with dry ice, since the release of CO<sub>2</sub> simulates respiration of an animal, thereby increasing the probability of success and capture efficiency.

Usually in Public Health Units in Portugal, these traps are placed at the end of the day and meet in the morning. For the harvest of larvae and pupae, you should choose a location near populations and shrimp pots are used for this collection, and these are placed in collection jars.

The frequency of collection should be defined by the Public Health Unit. After capturing the samples are sent to the National Institute of Health Dr. Ricardo Jorge (INSA), packed in refrigerated system, up to 3 days after the start of field work. All samples arrive accompanied by their adult harvest newsletters and immature stages mosquitoes.

According to the Centers for Disease Control and Prevention, the United States, focusing on health promotion and disease prevention created that will healthy homes, workplaces, schools and communities so that people can live long and productive lives and further reduce health care costs. Better health improves population and economy.

It is also important the role of Environmental Health, in the sense that develops identification activities and characterization of risk factors for health originating in the environment, such as the Environmental Health aims to Prevention and Health Promotion, and its intervention in case risk.

## 2. METHODS

The study is based on data from DGS and INSAprogram, Revive, which plating the presence of mosquitoes and larvae that can cause contamination and diseases originating from mosquitoes, the analysis of these data and the other allows us to see the need for prophylactic care to have in our country, especially in Madeira, which, for its location and climate can foster the emergence of these.

### 3. RESULTS

Samples and data collected by the REVIVE program did not detect the presence of the virus mosquitoes in continental Portugal, however climate change that Portugal crosses can cause the onset of mosquito vectors of carriers, so you want to public education for preventive measures can combat the proliferation of mosquitoes mosquito carriers.

### CONCLUSIONS

Although there are no mosquitoes, as educate the public for mosquito prevention measures. Thus, this study provides a number of solutions to minimize the proliferation mosquito vectors. Prevention is the best measure to be applied to the elimination of all disease. However, for this it requires efforts of all people to combat the problem at source, ie in this case, eliminate potential mosquito breeding sites. Awareness and education to this problem is an essential and necessary weapon for effective prevention (Instituto de Medicina Molecular da Faculdade de Medicina da Universidade de Lisboa & Universidade Federal do Rio de Janeiro, 2007).

Climate change and the expected effects on the distribution and prevalence of the disease in Portugal can lead to the emergence of new demands on health systems, requiring an adaptation work to be done as soon as possible to prevent and reduce the extent of the effects on the population.

### REFERENCES

- Abrantes, P., & Silveira, H. (2009). Alterações climáticas na Europa: Efeito nas doenças parasitárias humanas. *Revista Portuguesa de Saúde Pública*, 27(2), 98-102.
- Agência Portuguesa do Ambiente. (2015). *Estratégia Nacional de Adaptação às Alterações Climáticas (ENAAC 2020)*. Disponível em: [www.apambiente.pt](http://www.apambiente.pt)
- Câmara Municipal de Cascais (2011). *Plano estratégico de Cascais face às alterações climáticas*. Disponível em: <http://www.cm-cascais.pt/projeto/plano-estrategico-de-cascais-face-alteracoes-climaticas>
- Câmara Municipal do Funchal. (2012). *Plano municipal de combate ao mosquito: Vetor de transmissão da dengue*. Disponível em: <http://www1.cm-funchal.pt/cmfi/images/stories/destaques/2012/11/planoMunicipalCombateMosquito/PlanoCombateMosquito.pdf>
- Chivian, E. (2008). *Biodiversity: Its importance to human health*. Disponível em: [http://chge.med.harvard.edu/publications/documents/Biodiversity\\_v2\\_screen.pdf](http://chge.med.harvard.edu/publications/documents/Biodiversity_v2_screen.pdf).
- Instituto de Medicina Molecular da Faculdade de Medicina da Universidade de Lisboa & Universidade Federal do Rio de Janeiro. (2007). *Dengue*. Disponível em: <http://dengue.biochemistry-imm.org/cat.php?catid=10>
- IASaúde. (2012). *Mosquitos*. Disponível em: <http://iasaude.sras.gov-madeira.pt/mosquitos/>
- Departamento de Doenças Infeciosas - Centro de Estudos de Vetores e Doenças Infeciosas Doutor Francisco Cambourna (2014). *Relatório Revive: Culicídeos e Ixodídeos*. Lisboa: Instituto Nacional de Saúde Doutor Ricardo Jorge, IP. ISBN: 978-972-8643-92-8.
- Rodhain, F., & Perez, C. (1997). *Précis d'entomologie médicale et vétérinaire: Notions d'épidémiologie des maladies à vecteurs*. Paris: Maloin.
- World Health Organization (1997). *Dengue hemorrhagic fever: Diagnosis, treatment, prevention and control*. Geneva: WHO.
- Santos, D., & Aguiar, R. (2006). *Impactos e medidas de adaptação às alterações climáticas no arquipélago da Madeira: Projecto CLIMAAT II, 110*. Funchal: Direcção Regional do Ambiente da Madeira.