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CORRESPONDENCE

A bibliometric analysis of global Zika research

Zika virus (ZIKV) is an arbovirus belonging to the Flaviviridae family, originally isolated in Uganda (1940s) [1], known to cause mild clinical symptoms similar to those of dengue and chikungunya [2]. The virus is known to be transmitted by several *Aedes* species, although sexual intercourse, perinatal spread and blood transfusions have also been described as additional ways of transmission [1–3]. The first human cases were reported in Africa and Asia, but recent outbreaks in several regions of the world including Egypt, Easter Island, the insular pacific region and more recently (2015) Brazil have highlight the needs for the scientific community and public health community to consider it as an emerging global threat.

In order to assess its current impact on global scientific production, a bibliometric analysis was conducted using available information deposited at major journals-indexing databases, such as Science Citation Index (SCI), Scopus and Medline (using GoPubMed®). As our search strategy, data on indexed articles was retrieved from those databases using the term "Zika" as a main operator.

A total of 325 Zika-associated items were retrieved in our search. From Scopus, 169 articles were recovered (20.1% from Uganda, 10.1% French Polynesia and 5.9% Nigeria), followed by SCI with 92 articles (26.1% USA, 18.5%

Table 1 Top twenty countries with scientific production on Zika research at SCI, Scopus and/or Medline (up to June 1, 2015).

Rank	Country	Number of articles	Database with highest number of articles
1	Uganda	34	Scopus
2	United States	24	SCI
3	French Polynesia	17	Scopus
3	Germany	17	SCI
4	France	13	SCI
5	Nigeria	10	Scopus
6	Senegal	9	SCI
7	Malaysia	6	Scopus
7	New Zealand	6	Scopus
8	Australia	5	Scopus
8	Indonesia	5	Scopus
8	South Africa	5	Scopus
8	New Caledonia	5	SCI
9	Congo	4	Scopus
9	Cote d'Ivoire	4	Scopus
9	Thailand	4	Scopus
9	Czech Republic	4	SCI
10	Cameroon	3	Scopus
10	Canada	3	Scopus
10	Gabon	3	Scopus
10	India	3	Scopus
10	Singapore	3	Scopus
10	Cambodia	3	Medline
10	Switzerland	3	SCI
10	Federated States of Micronesia	3	SCI

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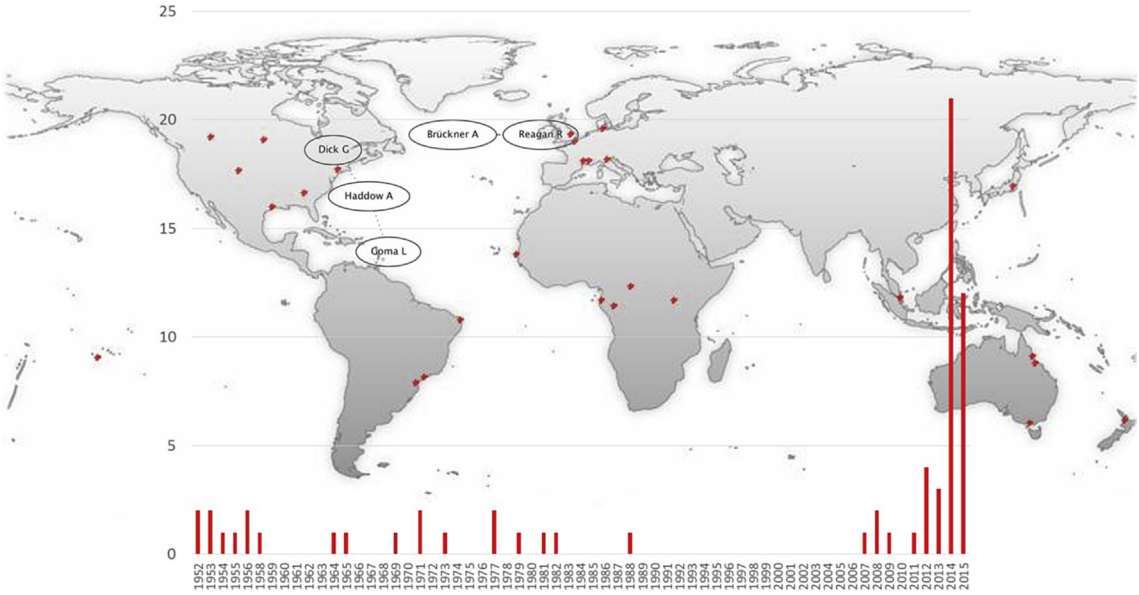

Figure 1 Major international research cooperation networks on Zika (from GoPubMed®), including also trends in time for scientific production (1952—2015).

Germany and 14.1% Canada) and Medline with 64 articles (21.9% French Polynesia, 20.3% Uganda and 9.4% Senegal) (Table 1). In addition, 5.9%, 13.0% and 12.5% of the articles respectively were published in 2015 (up to June 1°).

For Medline, the annual mean number of articles up to 2014 was 0.9, contrasting Scopus and SCI which were 2.45 and 3.08 respectively. Yet, for 2014, Medline included a total of 22 articles, followed by 24 in SCI and 37 at Scopus. Although in a general context the number of articles published about Zika virus is relatively low, the H index for this topic is 20, with 10 of these articles proceeding primarily from Uganda (Scopus). Cardinally, the most cited article specifically addressing Zika in the literature has received 60 citations in Scopus and 54 at SCI, which along with our findings through network analysis (Fig. 1), clearly reveal the imperative need to increase international cooperation in order to overcome the current weakness prevailing in Zika research networks.

Through our study, Uganda leadership in Zika global research (14.4% of the total) clearly stands up, most probably due to the fact that it was in this country where the virus originally isolated. Other countries as those located in the Southern Pacific insular basin have also increased their scientific output in recent years owing their new outbreaks. United States with a 10.1% of the scientific contribution has begun to increase its production efforts in this area due to the potential risk that this represents globally.

Between 2010 and 2015, 46.7% of the articles retrieved were published, which is consistent with the recent and increasing outbreaks. The scientific production on this specific field is far below what is expected when compared to other similar viral diseases such as chikungunya virus (scientific production: 6331 items) [4]. The global map of scientific collaboration networks and production clearly demonstrates the lack of information on global Zika research. This is worrisome, since there is very scarce information on the recent resurgence and expansion of this arbovirus, which clearly deserves more research incentives, especially in a highly vulnerable area such as the Americas [5].

In conclusion, as mentioned previously, it is time to translate those research findings generated over the past decade into plausible and effective diagnostic and therapeutic approaches aimed at controlling tropical viruses with epidemic potential [4] and to prioritize major interventions directed to reduce and control the negative impacts of infectious diseases such as those caused by Zika virus.

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Conflict of interest

The authors have no conflict of interest to disclose.

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