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Letter to the Editor

Crimean–Congo Hemorrhagic Fever: A bibliometric assessment of the literature

Dear Editor,

Crimean–Congo Hemorrhagic Fever (CCHF) is caused by Nairovirus — the most genetically diverse virus among the Arboviruses, and a widespread tick-borne infection affecting EU, Africa and Asia [1]. The asymptomatic hosts of the CCHF virus include wild and domesticated animals that are infected by carrier ticks and act as reservoirs for re-infection [2]. Ticks of the genus *Hyalomma* are the principal vector but others can be reservoirs too [3].

Human infection is the highest in individuals working in close contact with livestock [4]. The symptoms are mild at first, but with time a serious hemorrhagic syndrome is observed with elevated mortality rates of 30–40% [2]. Universal supportive and preventative strategies are used to control the spread of the infection as there is no specific antiviral treatment for CCHF. Although there is an inactivated vaccine, it is not widely used [5].

To evaluate the effect of CCHF on scientific publications globally, most preeminent biomedical and multidisciplinary journal-indexing databases including Medline (using GoPubMed®), Science Direct, Scopus, SciFinder and SciVal were used. Information was gathered with the following keywords; Crimean Congo; Crimean Congo hemorrhagic fever; Crimean Congo hemorrhagic fever virus; and Crimean Congo hemorrhagic fever vaccine. Previously; similar studies were conducted for Zika, chikungunya and Mayaro virus [6,7]; however this study is the first to reveal the global research pattern on CCHF.

SciFinder search identified 1701 publications since 1963, but Medline search resulted a total of 1145 articles since 1973 as of September 2016. The Science Direct search revealed 1534 articles since 1886 and Scopus search delivered 1480 articles since 1969. Based on the Scopus search, 26% of the articles were from Turkey, 17% from the USA and 8% from Iran (Table 1). These results demonstrate that countries where many tick-borne diseases are detected are the ones primarily conducting scientific research concerning CCHF. The abundance of research from Turkey is not surprising as between January and August 2006, 242 laboratory-confirmed cases, including 20 deaths, have been reported [8] although unreported cases would be much higher. According to Scopus search, Pasteur Institute in Iran provided the most abundant source of CCHF worldwide with 56 articles (3.8% of the 1480 published research papers) followed by Cumhuriyet University in Turkey with 54 articles (3.6% of the 1480 published research papers) (Table 1). The next most abundant source was Ankara Numune Hospital, Turkey which contributed 49 articles (3.3%) (Table 1). Fig. 1A & B demonstrate that there is no cooperation in between these countries, rather, the authors cooperated individually with other researchers in their own countries.

There was an increase in publications on CCHF after 2013 which corresponds to the report of an increased number of cases in Mauritania (Fig. 1C) [9]. 22.5% of the articles available in Medline, 50.6% of articles provided by SciFinder, 48.6% of articles indexed at Scopus and 44.7% of articles revealed in Science Direct were published between 2011 and 2016 (Fig. 1C). These findings are in line with the increased incidence of CCHF in Turkey in 2006 and Pakistan in 2010 [10].

In conclusion, this study provides a brief summary of the global patterns in scientific research output, trend and academic collaboration in CCHF, enabling to identify the new research strategies to control CCHF.

Table 1
The top 10 countries with their major institutes and authors concerning scientific publication on CCHF research (as of November 16, 2016) from Scopus.

Rank	Number of articles	Country	Major institutes (major authors)
1	388	Turkey	Cumhuriyet University (Bakir M, Elaldi N, Engin A, Kaya A, Guven A) Ankara Numune Education and Research Hospital (Bodur H, Dokuzoguz B) Karadeniz Technical University (Koksal I) Bozok University (Erbay A)
2	249	USA	Centers for Disease Control and Prevention (Nichol S, Rollin P) University of Texas Medical Branch (Ksiazek T, Watts D)
3	120	Iran	Pasteur Institute (Chinikar S, Jalali T) Zahedan University of Medical Sciences (Matenat M)
4	118	UK	University of Glasgow
5	81	France	Institute Pasteur (Bouloy MB) Université de Montpellier (Camicas JL)
6	78	Germany	Freie Universität Berlin (Schwarz T)
7	59	South Africa	National Institute for Communicable Diseases (Leman P, Paweska JT)
8	55	Greece	Aristotle University of Thessaloniki (Papa A)
9	53	Sweden	Swedish Institute for Infectious Disease Control Karolinska Institutet (Mirazimi A)
10	41	Russia	State Research Centre for Virology and Biotechnology (Seregin S, Petrov V, Petrova I, L'Vov D, Netesov S)

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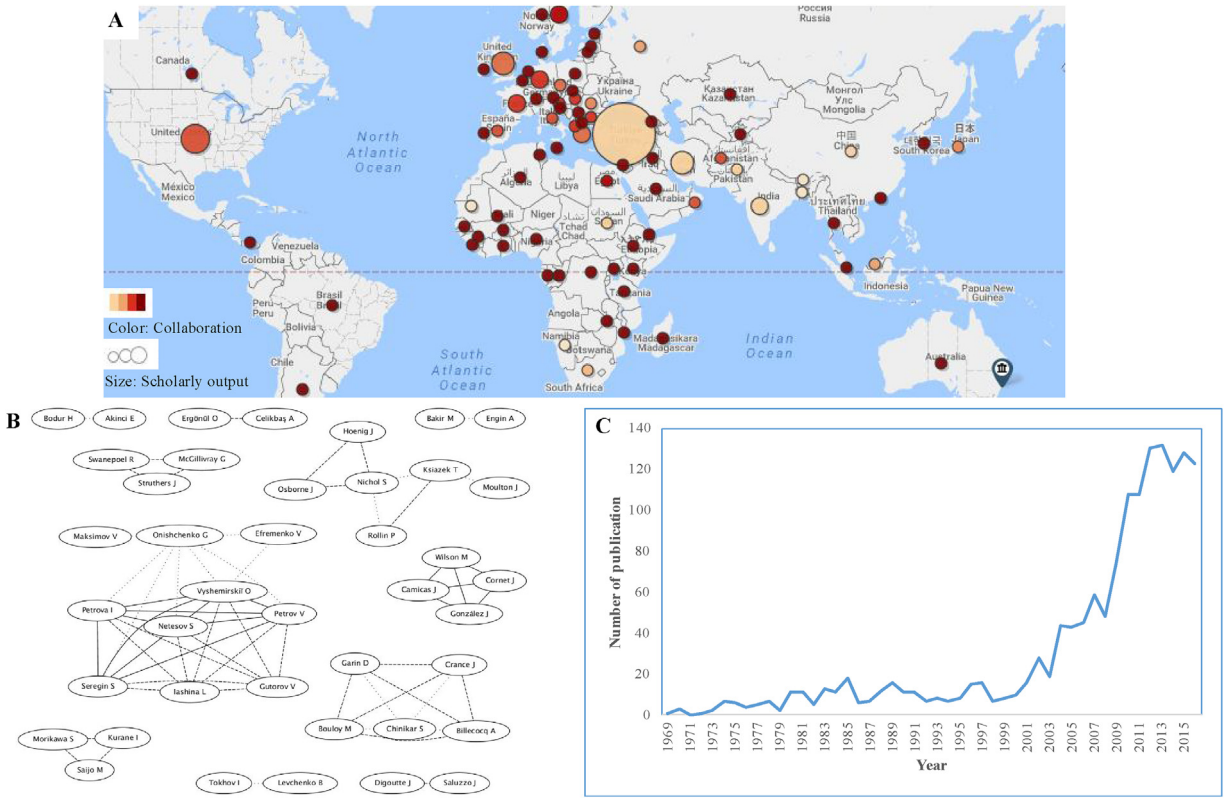

Fig. 1. (A) Geographic distribution of publications on CCHF around the world from 2011 to 2016 (from SciVal). (B) Major international research cooperation networks on CCHF (from GoPubmed®). (C) Timeline for the number of publications from 1969 to 2016 (from Scopus).

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Conflict of interest

No conflict of interest to declare.

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