The global atlas of podoconiosis

Article (Published Version)


This version is available from Sussex Research Online: http://sro.sussex.ac.uk/id/eprint/67394/

This document is made available in accordance with publisher policies and may differ from the published version or from the version of record. If you wish to cite this item you are advised to consult the publisher's version. Please see the URL above for details on accessing the published version.

Copyright and reuse:
Sussex Research Online is a digital repository of the research output of the University.

Copyright and all moral rights to the version of the paper presented here belong to the individual author(s) and/or other copyright owners. To the extent reasonable and practicable, the material made available in SRO has been checked for eligibility before being made available.

Copies of full text items generally can be reproduced, displayed or performed and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided that the authors, title and full bibliographic details are credited, a hyperlink and/or URL is given for the original metadata page and the content is not changed in any way.

http://sro.sussex.ac.uk
The global atlas of podoconiosis

We have received funding from the Wellcome Trust to develop a global atlas of podoconiosis. We aim to advance new knowledge on the geographical distribution and spatial epidemiology of the disease. A first step in this work will be to establish the geographical absence of disease by applying an evidence consensus approach (thorough literature searches and contacting ministries of health). The project will also use environmental predictors to determine environmental suitability for the occurrence of podoconiosis. In our previous work in Ethiopia we have identified important covariates that drive the spatial distribution of podoconiosis. Using boosted regression tree modelling, we mapped the environmental limits of podoconiosis, with high accuracy for determining the presence or absence of podoconiosis. Once validated in other countries this model will have the potential to define the environmental limits of podoconiosis globally, thus targeting survey efforts to high-priority countries.

Population-based surveys are important sources of data for mapping of podoconiosis. Surveys informed by podoconiosis risk stratification will also be important. Such surveys will provide statistically powered and spatially representative sampling, which will capture environmental risk drivers of podoconiosis within a

Panel: Standard podoconiosis survey

Podoconiosis surveys are done in individuals aged 15 years or older who have lived in the implementation unit (administrative units used as the basis for making decisions about morbidity management) for more than 10 years.

Podoconiosis is a clinical diagnosis based on exclusion of other potential causes of lymphoedema and disease-specific tests, such as the Alere Filariasis Test Strip and Wb123 test, to exclude lymphoedema due to lymphatic filariasis. For the surveyed cluster or districts, the following data are required:

- The name of the site (district or village names)
- Region and district where the survey was done
- Coordinates (longitude and latitude) of community or cluster (if available)
- Survey methods and population sampling
- Year of survey
- Age range
- Number of individuals examined
- Number of people with lymphoedema
- Number of people diagnosed with podoconiosis
- Disease stage for podoconiosis
country. A recommended survey of podoconiosis is done among individuals aged 15 years or older (podoconiosis commonly occurs after the age of 15 years), with a clear diagnostic algorithm using history, physical diagnosis, and disease-specific tests (panel). The usefulness of the data can be enhanced by Bayesian modelling to identify risk factors at different scales and to predict the prevalence and burden of podoconiosis in unsampled locations. Such a Bayesian framework has been used to effectively map the global distribution of several infectious diseases, including malaria, dengue virus infection, and soil-transmitted helminth infection.

Data collected through dedicated epidemiological surveys can be expensive and inefficient, however, especially for countries with low disease prevalence. To reduce reporting costs, suspected endemic countries can also collect information about podoconiosis through routine surveillance systems. For example, since Ethiopia included podoconiosis into the national health information system in 2013, an increased number of cases have been reported. The use of community health workers to identify cases of podoconiosis, which are subsequently validated by experienced health workers, has been piloted with good success. There is also opportunity for the integrated reporting of morbidities cases due to other neglected tropical diseases, such as leprosy, Buruli ulcer, and trichiasis, and subsequent management through the primary health-care system. Clinical diagnosis of podoconiosis based on pathognomonic signs and symptoms has been found to be workable in the regular health system. Case definitions for podoconiosis have been developed and can be used for case identification through routine surveillance.

Over the span of 5 years, the global atlas of podoconiosis will define the epidemiology and distribution of podoconiosis globally. Through collection and collation of the available evidence, generation of new epidemiological data, and the currently available state of the art geostatistical and machine learning approaches, the global limits of podoconiosis will be defined and the population at risk and burden of the disease estimated for the first time. Further collaborations from endemic countries, partners, and WHO country offices are crucial to advance the project goals. Additionally, we are exploring strategies to integrate podoconiosis mapping with ongoing mapping of other neglected tropical diseases. The atlas will provide vital evidence of the geographical distribution and burden of podoconiosis globally, and provide an important basis for expanding prevention and treatment services on the path towards a world without podoconiosis.

*Kebede Deribe, Jorge Cano, Melanie J Newport, Rachel L Pullan, Abdisalan M Noor, FKire Enquelslassie, Christopher J L Murray, Simon I Hay, Simon J Brooker, Gail Davey*

Wellcome Trust Brighton and Sussex Centre for Global Health Research, Brighton and Sussex Medical School, Brighton, BN1 9PX, UK (KD, MJN, GD); School of Public Health, Addis Ababa University, Addis Ababa, Ethiopia (KD, FE); Faculty of Infectious and Tropical Diseases, London School of Hygiene & Tropical Medicine, London, UK (JC, RLP); Kenya Medical Research Institute–Wellcome Trust Research Programme, Nairobi, Kenya (AMN); Institute for Health Metrics and Evaluation, University of Washington, Seattle, WA, USA (CJLM, SIH); Oxford Big Data Institute, Li Ka Shing Centre for Health Information and Discovery, University of Oxford, Oxford, UK (SIH); and Bill and Melinda Gates Foundation, Seattle, WA, USA (SJB)

kebededeka@yahoo.com

KD is funded by a Wellcome Trust Intermediate Fellowship in Public Health and Tropical Medicine (201900). SIH is funded by a Senior Research Fellowship from the Wellcome Trust (095066), and grants from the Bill and Melinda Gates Foundation (OPP1119467, OPP1110311, OPP11066023, and OPP1112415). We declare no competing interests.

Copyright © The Author(s). Published by Elsevier Ltd. This is an Open Access article under the CC BY license.


