Angola weekly cholera incidence at the province level collected from 2016-02-13 to 2016-05-29 (Cholera_Disease_Dyn project)

Website: https://www.bco-dmo.org/dataset/719960
Data Type: Other Field Results
Version:
Version Date: 2017-11-28

Project
» Modeling the Effects of Heterogeneity in Water Quality on Cholera Disease Dynamics (Cholera_Disease_Dyn)

Contributors	Affiliation	Role
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Table of Contents

Coverage

Spatial Extent: **N**:-4.3726 **E**:24.0821 **S**:-18.0421 **W**:11.6792
Temporal Extent: 2016-02-13 - 2016-05-29

Dataset Description

This dataset includes weekly cholera incidence data collected by the Angola Ministry of Health and compiled by the World Health Organization Cholera Task Force collected at the province level from Feb. 13th to May 29th, 2016.

These data were published in:
Eisenberg M, Robertson SL, Tien JH (2013). Identifiability and estimation of multiple transmission pathways in cholera and waterborne disease. J. Theoretical Biology 324: 84-102. doi: 10.1016/j.jtbi.2012.12.021

Other relevant publication:
Lee EC et al (2017), Model distinguishability and inference robustness in mechanisms of cholera transmission and loss of immunity. J. Theoretical Biology 420: 68-81. doi: 10.1016/j.jtbi.2017.01.032

Methods & Sampling

Cholera incidence reported by the Angola Ministry of Health.

Data Processing Description

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date
* modified parameter names to conform with BCO-DMO naming conventions (spaces and periods changed to underscores)

[table of contents | back to top]

Data Files

File
angola_cholera.csv (Comma Separated Values (.csv), 1.19 KB) MD5:9d2b938d09a52f09937b272bc731235a Primary data file for dataset ID 719960

[table of contents | back to top]

Related Publications

Eisenberg, M. C., Robertson, S. L., & Tien, J. H. (2013). Identifiability and estimation of multiple transmission pathways in cholera and waterborne disease. Journal of Theoretical Biology, 324, 84–102. doi:10.1016/j.jtbi.2012.12.021
Results

Lee, E. C., Kelly, M. R., Ochocki, B. M., Akinwumi, S. M., Hamre, K. E. S., Tien, J. H., & Eisenberg, M. C. (2017). Model distinguishability and inference robustness in mechanisms of cholera transmission and loss of immunity. Journal of Theoretical Biology, 420, 68–81. doi:10.1016/j.jtbi.2017.01.032
Related Research

[table of contents | back to top]

Parameters

Parameter	Description	Units
year_from	Starting year of weekly cholera incidence count in format yyyy	unitless
month_from	Starting month of weekly cholera incidence count in format mm	unitless
day_from	Starting day of weekly cholera incidence count in format dd	unitless
year_to	Ending year of weekly cholera incidence count in format yyyy	unitless
month_to	Ending month of weekly cholera incidence count in format mm	unitless
day_to	Ending day of weekly cholera incidence count in format dd	unitless
year_frac	Fractional year for stop date of the weekly incidence data in format yyyy + fraction of year (example: week ending on Jan 7, 2006 (the first week of the year) 1/52 = .019. So value would be 2006.019.	unitless

Bengo	Weekly cholera incidence count in Bengo province	count per incidence
Benguela	Weekly cholera incidence count in Benguela province	count per incidence
Bie	Weekly cholera incidence count in Bie province	count per incidence
K_Norte	Weekly cholera incidence count in Kuanza Norte province	count per incidence
K_Sul	Weekly cholera incidence count in Kuanza Sul province	count per incidence
Luanda	Weekly cholera incidence count in Luanda province	count per incidence
Huambo	Weekly cholera incidence count in Huambo province	count per incidence
Malange	Weekly cholera incidence count in Malange province	count per incidence
Namibe	Weekly cholera incidence count in Namibe province	count per incidence
Zaire	Weekly cholera incidence count in Zaire province	count per incidence
Huila	Weekly cholera incidence count in Huila province	count per incidence
Uige	Weekly cholera incidence count in Uige province	count per incidence
Cabinda	Weekly cholera incidence count in Cabinda province	count per incidence
TOTAL	Total weekly cholera incidence for all 13 provinces	count per incidence

[table of contents | back to top]

Project Information

Modeling the Effects of Heterogeneity in Water Quality on Cholera Disease Dynamics (Cholera_Disease_Dyn)

Coverage: Haiti, Angola and London

Funding was requested to analyze and model cholera epidemics. In order to accomplish this task, the team will

analyze spatio-temporal data from cholera outbreaks in Haiti (2010), Angola (2006) and London (1832); develop mathematical theory for coupled patch models of waterborne disease; and develop models to predict disease spread under different scenarios. The study will explore the contribution of humans (direct) and of environmental (delayed) pathways to disease transmission and investigate how heterogeneity in water quality, which is ubiquitous in developing countries, affects cholera disease dynamics. This project will advance understanding of the factors governing the spatial spread of cholera, examine how the arrangement and connectivity between cholera risk hot spots influence disease spread and develop a modeling framework for rapid response to a cholera crisis.

The proposed study has clear practical and theoretical significance for understanding and predicting not only cholera transmission, but other waterborne diseases as well, reaching beyond the specific study system. The team will develop mathematical theory for coupled patch models of waterborne diseases and advance understanding of the effects of movement of individuals and of water to cholera transmission. The team will also explore inclusion of data from early stages of an outbreak on parameter estimates and whether information on water quality and availability and on types of sanitation facilities available can be used to improve knowledge of model parameters before the disease has reached a given area.

This study will result in the training of undergraduates and graduate students, and include outreach to the Columbus Science Pub (public), Cornell's Summer Math Institute (undergraduates) and the UCLA Math Circle (grades K-12). This project will strengthen international scientific collaboration through interaction with scientists and students from the University of Toronto.

The research from this study will provide society benefits through improved understanding of the factors influencing the ability of cholera to invade, spread and persist in a region. The proposed study will provide a tool to predict disease spread under different scenarios for rapid response to a cholera crisis and evaluate the efficacy of different intervention strategies on containing cholera spatial spread. The team will interact and communicate their research findings to the Centers for Disease Control and the National Biosurveillance Integration Center within the Department of Homeland Security. They will collaborate with the United Nations University Institute for Water, Environment and Health to compile a database of time series data from cholera outbreaks worldwide, in association with data on water quality, water availability, and sanitation facilities from several outbreak locales.

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1115881

[table of contents | back to top]