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Ebola modeling: behavior, asymptomatic infection, and contacts

Project Number 1R01GM130900-01A1 **Contact PI/Project Leader PORCO, TRAVIS CHRISTIAN** **Awardee Organization** UNIVERSITY OF CALIFORNIA. **SAN FRANCISCO**



(≡) Description

Abstract Text

Project Summary! The impact of unrecognized Ebola virus (EBOV) infection (asymptomatic and symptomatic) on transmission dynamics during the 2013–2016 West Africa Ebola outbreak is poorly understood. Individuals who had asymptomatic EBOV infection or unrecognized symptomatic Ebola virus disease (EVD) represent two groups who may have had different levels of exposure and rates of EBOV transmission. Increasingly protective behaviors to avoid contact with EVD cases may have resulted in lower levels of exposure, and these exposures may be associated with asymptomatic EBOV infection. On the other hand, individuals who had symptomatic EVD but were never diagnosed may be disproportionately important to transmission dynamics because some of these individuals were part of transmission chains leading to Ebola outbreaks in previously unaffected communities. Our research question focuses on understanding the drivers of EBOV transmission leading to epidemic decline. Competing hypotheses were centered around issues of preventive behaviors, health- seeking behaviors, saturation of transmission among contacts, and asymptomatic EBOV infection. Newly available, detailed serologic, social network, behavioral, ethnographic, and vaccination data from research collaborations in Liberia, Sierra Leone, and Democratic Republic of Congo will allow us to test competing hypotheses in the following aims: 1) Dynamical effects of unrecognized EBOV infection in social network structure, 2) Unrecognized symptomatic EVD cases, barriers to care, and preventive behaviors, and 3) Causes of asymptomatic EBOV infection. These findings have the potential to quantify what ended the Ebola pandemic and improve mathematical models. Mathematical modeling applications will improve forecasting during new outbreaks and inform ways to deliver vaccines to contacts, by ring vaccination or novel social network algorithms. As Ebola outbreaks continue to occur, two in 2018, this R01 proposal will provide lessons learned that are immediately applicable to future outbreaks of EBOV, other viral hemorrhagic fevers, and emerging infectious diseases.!

Public Health Relevance Statement

Project Narrative New data are available regarding the causes and contributions of asymptomatic and unrecognized, symptomatic Ebola virus infection to epidemic transmission. We propose statistical and mathematical modeling studies of such Ebola virus infections and the associated social networks to improve forecasting and optimize vaccination strategies.

NIH Spending Category

Behavioral and Social Science Emerging Infectious Diseases Biodefense Immunization Infectious Diseases Vaccine Related Prevention **Rare Diseases**

Project Terms

Algorithms Africa Behavior Behavioral Collaborations Communities Data Biology Democratic Republic of the Congo Diagnosis Diagnostic tests Disease Outbreaks Dose **Ebola Hemorrhagic Fever Ebola virus Emerging Communicable Diseases Epidemic Ethnography Exhibits First Degree Relative Future Health Care Seeking Behavior Event Exposure to** Intervention **Health Personnel Immunity** Individual Infection International Human lce Liberia Liquid substance Modeling **Play** Reporting **Paint Pattern Preventive** Seroepidemiologic Studies Research Seminal fluid Role Serological Sierra Leone Statistical Models Study models **Testing Social Network Structure Survivors Time**

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State Code **CA**

Congressional District

12

Other Information

FOA **PAR-17-267**

Study Section

Infectious Diseases, Reproductive Health, Asthma and Pulmonary Conditions Study Section[IRAP]

Fiscal Year Award Notice Date 2019 23-August-2019

Administering Institutes or Centers

NATIONAL INSTITUTE OF GENERAL

MEDICAL SCIENCES

DUNS Number CFDA Code **094878337 859**

Project Start Date 01-September-

te **2019**

Project End Date 31-August-2023

Budget Start **01-September-**Date **2019**

Budget End Date 31-August-2020

Project Funding Information for 2019

Total Funding Direct Costs Indirect Costs \$362,585 \$228,693 \$133,892

Year	Funding IC	FY Total Cost by IC
2019	NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES \$	362,585

NIH Categorical Spending

Click here for more information on NIH Categorical Spending

Funding IC	FY Total Cost by IC	NIH Spending Category
NATIONAL INSTITUTE OF GENERAL MEDICAL SCIENCES	\$362,585	Behavioral and Social Science; Biodefense; Emerging Infectious Diseases; Immunization; Infectious Diseases; Prevention; Rare Diseases; Vaccine Related;

品 Sub Projects

No Sub Projects information available for 1R01GM130900-01A1

Publications

No Publications available for 1R01GM130900-01A1

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No Patents information available for 1R01GM130900-01A1

Outcomes

The Project Outcomes shown here are displayed verbatim as submitted by the Principal Investigator (PI) for this award. Any opinions, findings, and conclusions or recommendations expressed are those of the PI and do not necessarily reflect the views of the National Institutes of Health. NIH has not endorsed the content below.

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† Clinical Studies

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History

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