

Opportunity Title: Mapping the Sociocultural Drivers of Infectious Disease Transmission

Opportunity Reference Code: ICPD-2020-24



Organization

Office of the Director of National Intelligence (ODNI)

Reference Code

ICPD-2020-24

How to Apply

Create and release your Profile on Zintellect – Postdoctoral applicants must create an account and complete a profile in the on-line application system. **Please note: your resume/CV may not exceed 2 pages.**

Complete your application – Enter the rest of the information required for the IC Postdoc Program Research Opportunity. The application itself contains detailed instructions for each one of these components: availability, citizenship, transcripts, dissertation abstract, publication and presentation plan, and information about your Research Advisor co-applicant.

Additional information about the IC Postdoctoral Research Fellowship Program is available on the program website located at: <https://orise.orau.gov/icpostdoc/index.html>.

If you have questions, send an email to ICPostdoc@orau.org. Please include the reference code for this opportunity in your email.

Application Deadline

2/28/2020 6:00:00 PM Eastern Time Zone

Description

Research Topic Description, including Problem Statement:

Sociocultural variation influences the epidemiology of a wide variety of infectious diseases. These behavioral and cultural factors impact transmission by influencing both exposure and susceptibility to infection. For example, exposure to Simian Immunodeficiency Virus via the consumption of non-human primate bush meat precipitated the emergence of HIV-1 in rural Cameroon around the turn of the twentieth century¹. During ensuing decades, behavioral factors (e.g., altered patterns of sexual contact and prostitution resulting from population expansion during the colonial period) facilitated the regional—and eventually global—propagation of this pandemic². More recently, idiosyncratic sociocultural burial practices contributed to the spread of Ebola in West Africa³, and anti-vaccine sentiment facilitated the re-emergence of measles and whooping cough in the West⁴. Despite the linkage between sociocultural variables and epidemiological outcomes, spatial and temporal heterogeneity in behaviors of public health relevance have proven difficult to quantify. Although physical surveys offer an important population engagement tool, these methods can be logistically cumbersome to implement and are often difficult to scale⁵. However, the digital revolution has ushered in a new era of health surveillance. Google Trends and Wikipedia have been co-opted for disease detection⁶⁻⁸, and variation in public health sentiment has been inferred from social media data⁹. The purpose of this research is to leverage these and other digital technologies to quantify spatial variation in a set of behaviors of relevance to infectious disease transmission.

Example Approaches:

The proposed research should seek to identify, map, and validate novel proxies for a set of sociocultural drivers of infectious disease transmission. Applicants are encouraged to explore diverse methodologies and draw upon a variety of data sources to derive candidate proxies (e.g., sentiment analysis of publicly available geo-tagged social media data; exploitation of market research datasets to identify susceptible subpopulations). Candidate proxies may address cultural affinities of public health relevance (e.g., anti-vaccine sentiment; affinity for western medical interventions) and/or infectious disease risk behaviors (e.g., substance abuse; adolescent risk behaviors; bush meat consumption). The approach should also allow for spatial representation of the proxy, and applicants should use empirical epidemiological data to evaluate whether spatial heterogeneity in the candidate proxy predicts variation in the incidence of a pathogen of interest.

Relevance to the Intelligence Community:

In our globally interconnected society, infectious diseases that were once geographically isolated now pose a tangible threat to the international community. During the last decade, emerging pathogens such as Ebola, MERS, H1N1, and Zika have strained healthcare systems and inflicted billions of dollars of economic damage. These and other biological agents have threatened the

Opportunity Title: Mapping the Sociocultural Drivers of Infectious Disease Transmission

Opportunity Reference Code: ICPD-2020-24

stability of nation states, undermined disaster relief efforts, and impacted the operational readiness of the warfighter. The capacity to combat emerging epidemics demands an intricate understanding of the underlying drivers of infectious disease propagation. By offering to quantify spatial variation in sociocultural behaviors of relevance to public health, this research topic will address a considerable gap in our understanding of the drivers of pathogen transmission. Although this research topic focuses upon the sociocultural drivers of infectious disease dynamics, the methodology developed could be co-opted to analyze sociocultural drivers of a wide variety of topics of interest (e.g., sociocultural impacts to the dissemination of aid; local market forces driving food and water insecurity).

References:

1. Sharp, P.M. and Hahn, B.H. (2011). Origins of HIV and the AIDS pandemic. *Cold Spring Harbor Perspectives in Medicine* 1(1), a006841.
2. Pepin, J. The Origins of AIDS. (2011). Cambridge University Press.
3. Abramowitz, S.A., Hipgrave, D.B., Witchard, A. & Heymann, D.L. (2018). Lessons from the West Africa Ebola Epidemic: A Systematic Review of Epidemiological and Social and Behavioral Science Research Priorities. *The Journal of infectious diseases*, 218(11), 1730-1738
4. Glasser, J.W., Feng, Z., Omer, S., Smith, P.J., & Rodewald, L.E. (2016). An assessment of the impact of heterogeneity in vaccine uptake due to religious and philosophical exemptions on the potential for outbreaks. *Lancet Infectious Disease*, 16(5), 599-605.
5. Barnett, T., Fournié, G., Gupta, S., & Seeley, J. (2015). Some considerations concerning the challenge of incorporating social variables into epidemiological models in infectious disease transmission. *Global Public Health*, 10(4), 438-448
6. Santilla, M., et al. (2014). What can digital disease detection learn from (an external revision to) Google Flu Trends? *American Journal of Preventative Medicine*, 47(3), 341-347.
7. Generous, N., et al. (2014). Global disease monitoring and forecasting with Wikipedia. *PLoS Computational Biology*, 10(11), e1003892.
8. Paul, M.J. and Dredze, M. (2011). You are what you tweet: Analyzing twitter data for public health. *Fifth International AAAI Conference on Weblogs and Social Media*.
9. Ji, X., et al. (2015). Twitter sentiment classification for measuring public health concerns. *Social Network Analysis and Mining*, 5(1), 13.

Key Words: Health, Culture, Behavior, Religion, Ethnic, Diseases, Infections, Epidemic, Pandemic

Qualifications







Postdoc Eligibility

- U.S. citizens only
- Ph.D. in a relevant field must be completed before beginning the appointment and within five years of the application deadline
- Proposal must be associated with an accredited U.S. university, college, or U.S. government laboratory
- Eligible candidates may only receive one award from the IC Postdoctoral Research Fellowship Program

Research Advisor Eligibility







- Must be an employee of an accredited U.S. university, college or U.S. government laboratory
- Are not required to be U.S. citizens

Eligibility Requirements

- **Citizenship:** U.S. Citizen Only
- **Degree:** Doctoral Degree.
- **Discipline(s):**
 - **Communications and Graphics Design** (2 )
 - **Computer, Information, and Data Sciences** (16 )
 - **Earth and Geosciences** (21 )
 - **Engineering** (27 )
 - **Environmental and Marine Sciences** (14 )
 - **Life Health and Medical Sciences** (46 )

Opportunity Title: Mapping the Sociocultural Drivers of Infectious Disease Transmission

Opportunity Reference Code: ICPD-2020-24

- **Mathematics and Statistics** (10 )
- **Other Non-S&E** (2 )
- **Other Physical Sciences** (12 )
- **Other S&E-Related** (1 )
- **Physics** (16 )
- **Social and Behavioral Sciences** (27 )