Sammy Mehtar 1 April 2018

**Concept Note**

I. **Title of the Proposed Project:** *Infectious Disease Surveillance in the Context of Conflict in Syria*

II. **Name of the Organization:** Assistance Coordination Unit (ACU) & School of Public Health, UC Berkeley

III. **Context:**

Syria has been engulfed in a civil conflict since 2011 that has claimed hundreds of thousands of lives, both from violent conflict and the indirect impacts of war on civilians. Healthcare providers and infrastructure have been routinely targeted, compounding issues of access to care and potentially contributing to reemergent diseases in the region. This project will study different risk factors associated with the conflict and how these factors may contribute to the burden of infectious diseases in Syria, including the reemergence of previously controlled diseases, using a large surveillance dataset collected by our partner organization, the ACU.

IV. **Objective**

To examine temporal and geographic trends in surveyed infectious diseases over the course of the Syrian conflict and assess for potential risk factors to help inform clinical advice, resource allocation, and policy in conflict settings.

Potential questions to address:

- How have the case fatality rates (CFR) of surveyed infectious diseases changed over the course of the conflict Syria?
- Has conflict influenced the incidence and prevalence of these diseases? How?
- In what way has conflict contributed to the emergence or exacerbation of vaccine treatable diseases such as polio and measles?
- How effective have vaccine campaigns been in the context of the conflict?

V. **Rationale for the Proposed Project:**

The effects of conflict on population health has been well-documented via United Nations agencies, governments and their militaries, non-governmental organizations (NGOs) and other aid-based agencies, academic institutions, and news-based agencies, as well as a growing body of grassroots documentation through social

media and online advocacy.[1] Despite extensive documentation of the Syrian conflict, there is a very limited body of literature available analyzing the data and concrete consequences on population health. We hope to contribute to this body of research in a novel way, by studying risk factors associated with conflict and their effects on infectious disease morbidity and mortality.

Some of the benefits of studying the effects of conflict on disease trends have been outlined by Levy and Sidel: "Informing the public and policy makers about the consequences of armed conflict, identifying immediate needs of affected populations so that appropriate services can be provided, reducing the likelihood of future armed conflict, [and] identifying violations of international humanitarian law protecting human rights."[2]

Our partner organization, the Assistance Coordination Unit (ACU), established an infectious disease surveillance system (EWARN) inside Syria in 2013 and has been collecting data since. This data has been dispersed in the form of weekly and annual reports, and has been used by the WHO, UN agencies, and other NGOs. The data is thorough, with 522 reporting sentinel sites across 11 governates, with 9 governates reporting at rates consistently between 95%-100%. Two sites have had a few weeks that fell below this reporting range, the embattled Deir Az-Zour and Al-Raqqa, and even then, never below 80%. The data is based on syndromic surveillance of 14 infectious diseases, including measles, TB, and polio, to name a few.

However, this data has yet to be analyzed and interpreted, and could help us further our understanding of the role conflict and displacement plays in health and the spread of infectious diseases. The level of detail available in the collected data over a relatively long period of time in such a context of conflict is unique and may yield some novel insights, and in doing so we hope to further the relationship between the academic establishment and locally based organizations serving complex crises, in this case starting with the ACU and UC Berkeley.

We hope to use this data and contextualize it within the broader context of the conflict, and potentially conflicts more generally, though analyses of the potential

[1] Barry S. Levy and Victor W. Sidel, Documenting the Effects of Armed Conflict on Population Health, Annual Review of Public Health 2016 37:1, 205-218

[2] Barry S. Levy and Victor W. Sidel, Documenting the Effects of Armed Conflict on Population Health, Annual Review of Public Health 2016 37:1, 205-218

trends and associations. Two points of interest are identifying and studying the effects of risk factors associated with conflict, and the relation between reemergence of vaccine preventable disease and disruption of services or access to those services, namely vaccination programs.

The ACU reached out to Dr. Haar for support in epidemiological logistics and statistical analysis as well as getting their data into academic publishing. This would help them in ways outlined by Levy and Sidel above, such as giving weight to their advocacy and policy work, and to better manage and prioritize resources and projects. Reports are often viewed as less credible than peer-reviewed findings, and usually do not make claims about possible associations or the degree of confidence thereof. We would thus contribute to both cleaning and organizing the data in more visual and accessible ways and analyzing and publishing of the data in collaboration with the ACU.

This project has two overarching goals in mind: to publish our findings from the surveillance data collected by ACU, and establish a relationship between the organization and UC Berkeley.

## VI. Project Goals and Objectives:

a. Consolidate data collected by ACU and WHO through the EWARN and EWARS systems, respectively
b. Focus on syndromic surveillance findings of: AFP/polio, measles, influenza-like illnesses, acute jaundice syndrome, severe acute respiratory illness, acute diarrhea, and typhoid fever.
c. Collect data from ACU and WHO on reported attacks on healthcare facilities
d. Analyze individual governates through an ecological study design, comparing trends before, during, and after periods of conflict.
e. Establish relationship with organization to build capacity for epidemiologic studies and statistical analysis
f. Publish the findings in partnership with ACU to improve efficacy of advocacy

## VII. Ethical considerations

a. *Safety*: The data has already been collected there will be no ethical or safety concerns regarding collection of data.
b. *Identifiable health information*: the data is will already be de-identified.

c. *Storage of Data*: Data will be encrypted and stored on researchers' secure hard drives. Only researcher and research mentors will have access to the data.

d. *Power dynamics*: There is a concern for imbalance in power dynamics; coming from a top-tier research university could create the impression of a power dynamic between researchers and the ACU team. Intention and goal is to establish a partnership on equal footing. This must be, and has been, explicitly stated from the beginning. Care and awareness of the impact of our words, requests, and actions must remain throughout.

e. *Publication*: The partner organization will be fully involved in the paper and its publication.

**VIII. Research methods:**

This will be a quantitative study conducting statistical and epidemiologic analyses on datasets already collected by the partner organization. We will rely on an ecological study design, an observational study with at least one variable measured at the group level. Since we will not be studying individual outcomes or exposures, all our variables will be measured at the group level. The program R will be used for statistical analyses.

We will start by comparing disease trends between governates. Exposure to conflict will be defined categorically as none, low, medium, and high, and will be defined after further studying the available data and previous research with similar designs. Cases will be defined as a report of one of the seven syndromic categories, not-cases will be determined by the number of people served by each site. Each cohort can then be stratified into governate and bivariable age, younger than five years or five years and older, as well as specific disease states. The goal is to identify risk factors of war and instability associated with increased infectious disease morbidity and mortality.

**IX. Limitations:**

Despite the rigorous surveillance efforts of the ACU and WHO, there are inevitable limitations in the process of collecting and analyzing data from a conflict setting. The populations accessible to surveillance may not be representative of the entire population. Many sentinel sites are focused primarily in areas outside of government and Russian control, causing the distribution of sites to concentrate predominantly in northern Syria. The populations they serve can, in certain regions, be volatile due to population flux in response to the progression of the conflict. There is also issues of

barriers to access to reporting sites due to physical, security, travel, or political limitations. We do not know the specifics of how these sites differ from non-reporting sites overall. And it will be difficult, potentially impossible, to distinguish the effects of specific attacks and the overall war. There are multiple actors involved in the process of data collection, some of which may be uncoordinated or overlap. We must be aware of these and other limitations we come across, hopefully diminishing their effects where possible and being transparent about them when not.

**X. Proposed Timeline:**

*Spring 2018*: Preliminary literature review, IRB approval, statistical and epidemiologic training

*Summer 2018*: Data collection, building relationship with partner organization

*Fall 2018*: Data analysis, formal literature review

*Spring 2019*: Preliminary paper draft, work on continuity of capacity training

*Summer 2019*: Follow up on current project, potentially establish future research projects

*Fall 2019*: Submit final paper for publication

XI. **Proposed Budget:**

Summer timeline: 8 weeks (minimum)

| **Item** | **Unit price/description** | **Total Price** |
|---|---|---|
| Flights | Roundtrip to Gaziantep | $1,800 |
| Lodging | ~$750 / month | $1,500 |
| Commute | Car rental, ~$27/day | $1,400 |
| Food | $18/day estimate | $1,100 |
| Software | RStudio | $0 |
| Hardware | Hard drive | $70 |
| **TOTAL:** | | **$5,970** |