Study protocol: Cholera and pregnancy in Haiti: description of pregnant patients presenting to MSF OCA cholera treatment centers, September 2011-December 2013.

1 Background

Cholera is an acute diarrheal disease caused by the bacterium *Vibrio cholera* which is transmitted through fecally-contaminated water or food. It is estimated that 3–5 million people worldwide become ill and 100,000–120,000 die due to cholera each year. As cholera infections are often linked to insufficient access to safe water and proper sanitation, the impact can be particularly dramatic in areas such as Haiti where basic infrastructures are disrupted or destroyed. The association between cholera in pregnancy and negative fetal outcomes is well known, and although many pregnant women with cholera do not suffer from complications, in some cases this infection can lead to premature labor or obstetrical complications.

In Haiti, cholera remains a major health concern. Between October 2010 and September 2013; over 670,000 people were infected with over 8,250 deaths. Although annual case counts have decreased since 2010, cases continue to present. As the main actor in cholera treatment in the city of Port au Prince, Operational Centre Amsterdam (OCA) treated over 40,000 cases including over 800 pregnant women.

2 Context

MSF has been working in Haiti since the early 1990's and continues to fill major gaps in a country struggling with natural disasters, repeated bouts of violence, political instability and a mostly absent public health system. In 2010, OCA began providing treatment for cholera cases, in what would become the largest cholera outbreak in modern history. From the onset of the outbreak it became apparent that, due to the association between cholera in pregnancy and negative fetal outcomes, there was a need to provide specialized care for cases presenting during pregnancy. Initially, all pregnant cholera cases were treated in MSF-OCA's Cholera Treatment Centre (CTC) called Figaro located in close proximity to Centre de References des Urgences Obstericales (CRUO) with the notion that CRUO staff could provide assistance to pregnant cases as required. This was less than ideal, as many CRUO staff were unwilling to work in Figaro. Therefore, in April 2012, OCA established a specialized cholera treatment unit (CTU) for pregnant women located within CRUO. This CTU was established to provide intensive follow-up of cholera-associated dehydration in pregnant women, and to facilitate rapid access to obstetric and neonatal services in case of complications.

Throughout the outbreak OCA remained a key actor in treatment of cholera. By 2012 many cholera treatment centers had closed leaving OCA as one of the few functioning medical actors for cholera care in Port-au-Prince. With a 10 to 20 bed capacity, the CTU in CRUO remains functional today, continuing

to provide cholera treatment, obstetric and neonatal care in a clean and safe environment. In July 2013, OCA revised its treatment protocol to provide more aggressive rehydration treatment for pregnant women. Without this site, many pregnant women would be without any possibility of specialized medical treatment for cholera.

3 Study objectives

3.1 Principal objective

To understand the demographic, clinical and outcome profiles of pregnant patients that presented with cholera infection to Figaro CTC and CRUO CTU between September 2011 and December 2013**.**

3.2 Specific objectives

1. To determine the clinical presentation, treatment regimens and outcomes of pregnant patients with cholera seen at Figaro CTC and CRUO CTU between September 2011 and December 2014;

2. To identify factors related to age, clinical presentation or treatment that favour positive outcomes in pregnant patients with cholera presenting to Figaro CTC and CRUO CTU between September 2011 and December 2014;

3. To describe the evolution of patient profiles of pregnant cholera cases at Figaro CTC and CRUO CTU between September 2011 and December 2014 over time;

4. To describe the evolution of patient profiles of pregnant cholera cases at Figaro CTC and CRUO CTU between September 2011 and December 2014 in terms of spatial characteristics.

5. To identify differences in outcomes of patients presenting to a CTC (Figaro CTC) compared to a specialized maternal CTU (CRUO CTU).

6. To identify differences in outcomes after the implementation of new, more aggressive, maternal rehydration guidelines in June 2013.

4 Methods

4.1 Study population

The study population includes all pregnant women with suspected cholera infection attending an MSF-OCA CTC between 2010 and 2014.

4.2 Data sources

Comprehensive line lists of all patients (without identifiable information) have been kept at Figaro CTC and CRUO's CTU since September 2011. The complete data set contains records for the approximately 900 cases of cholera in pregnant women presenting to CRUO.

4.3 Data analysis

Data sets will be cleaned and checked for missing information and inconsistencies. Any information that can be completed from registry books or patient files will be identified.

Analysis of the data will look at frequencies and incidence rates by age as well as areas of the city in which cases reside. Frequencies for level of dehydration upon presentation, treatment plans administered and maternal and fetal outcomes will also be calculated. Proportions will be calculated with their respective 95% confidence intervals.

Depending on what are identified as outcomes of interest (fetal death, maternal death etc.) we will look at identifying risk factors for these outcomes in an unadjusted manner (bivariate analysis) by calculating relative risks and their respective confidence intervals. Risk factors identified in the unadjusted analysis to be significantly associated with the outcome will be included in a multivariate logistic regression model to calculate adjusted odds rations and their respective 95% confidence intervals.

Between group comparisons will be assessed using frequencies and logistic regression models using treatment location or protocol used as the exposure and maternal and neonatal outcomes as the outcome. We might also consider constructing multivariate models that include interaction terms to account for possible effect modification by any of the factors.

Data analysis will be done through Excel and STATA12.

5 Benefits

MSF OCA is the largest health care provider for cholera cases presenting during pregnancy, and to date has not compiled a description of cases treated. Therefore as this analysis would provide a documentation of all pregnant cholera cases seen by MSF OCA between 2011 and 2014, it would fill an information gap related to cholera during pregnancy.

No risks are identified from this work.

6 Ethical considerations

This protocol meets the MSF Ethical Review Board (ERB) exemption requirements as it pertained to retrospective routinely collected anonymous medical data. The Medical Director of OCA provided consent for the conducting of this analysis. Also, the National Bioethical Committee of the Ministry of Public Health and Population of Haiti approved this analysis.

7 Dissemination and implementation of research findings

7.1 Responsibility

- Mission Epidemiologist, OCA, Haiti – Erin Schillberg
- Medical Coordinator, OCA, Haiti – Lindsay Bryson
- Ministry of Health Haiti (MSPP) – Dr. Grand Pierre
- OCA Epidemiology Advisor – Annick Lenglet

7.2 Dissemination

Depending on the findings, several manuscripts many be prepared in order to cover all aspects. Manuscript(s) will be submitted to a peer reviewed journal.

Results will be shared within MSF and with stakeholders in Haiti.

7.3 Implementation

Results could result in an adaptation of control and treatment strategies for pregnant women with cholera.