

5- DOVE (Delivering Oral Cholera Vaccine Effectively)

PN 05 : Summary report of the Cameroon Chapter of the DOVE project: Sustainable cholera surveillance for Cameroon.

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Sub-Saharan Africa has the highest cholera mortality burden, yet there have been few prospective studies of the disease epidemiology, seasonality, and evaluation of effective interventions in this region. Most frequently, cholera outbreaks in Africa are viewed as unanticipated events, and health officials could only deal with these outbreaks in a reactive manner. Better surveillance methods and analytical tools, preventive measures, improved case management, and vaccine interventions could be introduced to reduce transmission and mortality.

The following hypotheses were to be tested: 1) Cholera is seasonal with most outbreaks starting in the months of March to May; 2) Outbreaks are preceded by individual cholera cases occurring prior to the outbreak, thus providing an early warning signal to the impending outbreak; 3) Cholera outbreaks correlate with, and/or precede by the identification of V cholerae in surface water samples, and the molecular markers of the environmental isolates is are similar to clinical isolates; 5) identification of cholera risks factors helps in targeting oral cholera vaccine in the future.

The study was conducted from August 2013 to September 2015 in eleven (11) sentinel sites including seven (7) in Far North Cameroon and four (4) in Douala. These were regions that recently recorded the highest attack rate and/or the highest case fatality rates during recent cholera outbreaks that occurred in Cameroon. At each of these "sentinel sites" the study was conducted in two phases: The routine phase covering 12 out of 15 consecutive days in which nurses continuously identified all patients > 5 years of age who come for treatment of severe watery diarrhea and dehydration (This corresponds to the WHO cholera case definition). From those of these patients who consented, a questionnaire was administered to collect data on patient exposure to risk factors and stool sample were collected and tested for cholera with improved dip stick. In addition, there was a three-day intensive surveillance period every 15 days (20% sample) during which time all patients (of all ages) who come for treatment of diarrhea (including those with milder symptoms) were included in the surveillance and the same data and sample collected. In each of up mentioned phases, a matched (age) control case with no diarrhea symptom was recruited. Forty eight (48) sites of surface water in Douala and 36 in Far North Cameroon were collected every two weeks to be tested with improved dipsticks.

A total of 2362 cases of diarrhea were included identified, with including 1270 in routine surveillance and 1092 in intensive phase. Among these, 299 were from Douala and 2063 from the Far North Region. One fourth of cases (593) were Children under five. In Far North, the frequency of cases of dehydration was 77% (457/593) among children with 48% moderately or severely dehydrated and was 83% (1467/1769) among adults with 53% (50/1769) moderately or severely dehydrated. From these cases a stool sample was collected and tested with improved dipsticks and some with culture and PCR. This allowed characterizing different Vibrio cholerae strains from stools samples before, during and after the cholera outbreak that occurred in Far North in 2014. Nine hundred and ninety five samples of surface water were collected and tested. All of these samples were tested with improved dipstick and some with culture and PCR. This allowed characterizing different Vibrio cholerae strains from water surface before, during and after the cholera outbreak that occurred in Far North in 2014.

Main lessons learned from this project include: Simplified laboratory and epidemiological methodologies can improve the feasibility of cholera surveillance in rural and resource-constrained areas, facilitating early case detection and rapid response implementation; Collecting V. cholerae using simplified laboratory methods in remote and low-resource settings allows for subsequent advanced molecular characterization of V. cholerae O1.