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A joint statement on eliminating cholera transmission in Haiti

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Striking on 4 October 2016, Hurricane Matthew left 1.4 million people in southern Haiti in need of urgent humanitarian assistance - destroying homes and health facilities, flooding water sources with run-off, ruining crops and livestock, and displacing hundreds of thousands of people. Looming as the next act in the disaster is a resurgence in endemic cholera. Cholera had never been reported in Haiti until it was introduced in 2010.^{1,2} The introduction of *Vibrio cholerae* into a cholera-naïve population, with extremely limited access to safe water and sanitation, had a predictable effect, an explosive epidemic of cholera that has killed at least 10,000 people, and caused almost 800,000 reported cases across the country.³ Three weeks after Hurricane Matthew, cholera cases are already on the rise, and we are concerned about the impact on human life.⁴ Now in its seventh year, the cost of the epidemic on individuals, communities, and the health system in Haiti has been immeasurable, and the resources to control it have been too few. In 2015, Haiti reported more cases of cholera per population than any other country.⁵ In 2016 there were 29,000 cases of cholera in the first 9 months of the year⁶ - already a disaster before the hurricane. As often is the case, the poor suffer the most.⁷ New approaches are needed to address the ongoing problem and mitigate suffering from cholera in Haiti. The hurricane's aftermath adds urgency to this problem.

In response to Hurricane Matthew, first, and foremost, is the need for humanitarian relief to the victims -- the provision of food, shelter and clean water to those that are without these

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life-saving essentials. Rallying emergency clean water activities around the known risk of cholera in the immediate phase is an important strategy. We should assume, at least initially, that there has been further contamination of fresh water sources in Haiti's southern peninsula. Ensuring that people have access to and use effectively chlorinated water with safe water storage at home (or in shelters) is a critical life-saving objective.

In parallel is the need to ensure that cholera treatment centers and oral rehydration posts are functional. After the hurricane many will have to be rebuilt, resupplied with rehydration fluids, antibiotics, and zinc for children, and supported with staff for effective case-finding in the community, and rapid treatment of the sick. These strategies have not changed since the beginning of the cholera epidemic in 2010, although in recent years, resources to implement them have dwindled.^{8,9}

When the cholera epidemic began in Haiti, and for some years later, there was a lack of consensus on the role that oral cholera vaccine (OCV) could play as part of the epidemic response. One clear issue however, was that the supply of vaccine was very limited, and there was limited experience in using OCVs in response to outbreaks. Furthermore, the fact that the vaccine had not yet met pre-qualification requirements of the World Health Organization (WHO) meant that UNICEF and other UN agencies could not purchase the vaccine.

Since then a number of developments have enhanced our ability to control the epidemic in Haiti. Two safe, effective OCVs are now pre-qualified by WHO and available at affordable cost (\$1.7-\$1.85 per dose), with availability over the next months to years expected to increase. Shanchol[®] (Sanofi-Pasteur, India), was pre-qualified in 2011. A two million dose OCV stockpile was established in 2013 to manage the vaccine as a public good.¹⁰ Euvichol[®] (Eubiologics, South Korea) was prequalified by WHO in 2015 and the manufacturer recently announced that they could produce 25 million single dose vials per year that remain stable at 37°C for 30 days, avoiding wastage, and enabling it to be delivered to remote areas without a requirement of a stringent cold chain for delivery. Finally, a series of studies with OCVs in Haiti have demonstrated the efficacy of the Shanchol vaccine in both urban and rural settings, the feasibility of achieving high coverage, and the low cost of delivering this vaccine to the population¹¹⁻¹⁵. In one of the poorest urban slums of Haiti, not a single case of culture-confirmed cholera occurred between September 2013 and August 2016 in individuals who had received a combined intervention ensuring household chlorination and cholera vaccination.^{12,16} This research complements other such studies from Guinea, and South Sudan.¹⁷⁻¹⁹

This information fundamentally changes the way health authorities should now consider the use of OCV in controlling cholera. Mass vaccination in Haiti would save lives, and modeling suggests that such an intervention, coupled with targeted, effective water, sanitation and hygiene interventions, could substantially control, if not eliminate, the disease within a few years of the program's introduction, and at an affordable cost.^{20,21} This medium-term plan must happen in concert with a long-term vision to realize the human right of access to clean water, a goal that will require a huge budget, and years if not decades to accomplish.²² Control of cholera in Haiti was a problem for the six years before Hurricane Matthew – and

this is due not only to insufficient resources, but also to the enormity of the challenge of redressing the population's severely constrained access to clean water and sanitation.

One million doses of OCV have already been requested by the Haitian Ministry of Public Health and Population (MSPP), and authorized as part of the emergency response to Hurricane Mathew.²³ Two shipments of 500,000 doses are scheduled to arrive in Haiti on October 24 and 25th, 2016. This Consultation commends this mass vaccination approach in the hurricane-affected areas of the south of Haiti, as one part of a comprehensive emergency response. In light of recent data on vaccine efficacy, feasibility and the increased availability of safe, effective and low cost vaccines, the consultation urges that their delivery be also connected to an intense and re-invigorated support to The Government's National Plan for the Elimination of Cholera in Haiti through a nationwide two-dose oral cholera vaccination campaign.^{24,25} This will require additional vaccine doses to become available not only for Haiti but also for other similar cholera-affected countries and crisis situations.

Over the past six decades, several public health programs in Haiti have provided models for the world.^{26–28} The increased availability of OCVs, and their roll out in a national program could be the next opportunity for the government of Haiti and the international community to demonstrate that comprehensive national OCV coverage, combined with sustained WASH interventions could eliminate cholera in Haiti over the next 3–5 years at an affordable cost (some estimates suggest approximately \$66 million). This is surely an aspirational goal considering the human cost of maintaining the status quo.

Eliminating cholera transmission in Haiti with a combined integrated approach at the population level would be a major achievement for the government and people of Haiti, and would also have broad implications for the control of cholera in other affected populations around the world. The time for ambitious action on cholera control and elimination in Haiti is now.

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