Vaccine xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Attitudes about vaccines to prevent Ebola virus disease in Guinea at the end of a large Ebola epidemic: Results of a national household survey

Kathleen L. Irwin [a,*], Mohamed F. Jalloh [b,2], Jamaica Corker [c,4], Barry Alpha Mahmoud [d], Susan J. Robinson [a], Wenshu Li [a], Nyuma E. James [b,3], Musa Sellu [b], Mohammad B. Jalloh [b], Alpha Ahmadou Diallo [e], LaRee Tracy [f], Rana Hajjeh [a,1], Amanda VanSteelandt [a], Rebecca Bunnell [a], Lise Martel [a], Pratima L. Raghunathan [a], Barbara Marston [a], The 2015 Guinean Household Survey of Ebola Virus Disease Project Group

[a] Centers for Disease Control and Prevention, 1600 Clifton Road, Atlanta, GA 30329, USA
[b] Focus 1000, 15 Main Motor Road, Brookfields, Freetown, Sierra Leone
[c] Consultant to the Centers for Disease Control and Prevention, Atlanta, 1600 Clifton Road NE, Atlanta, GA 30329, USA
[d] Santé Plus, Koloma Plateau, Ratoma, Conakry, Guinea
[e] Ministry of Health, BP 585, Conakry, Guinea
[f] Food and Drug Administration, Center for Drug Evaluation and Research, 10903 New Hampshire Avenue, Silver Spring, MD 20993, USA

ARTICLE INFO

Article history:
Received 7 April 2017
Received in revised form 22 May 2017
Accepted 9 June 2017
Available online xxxx

Keywords:
Ebola
Vaccine
Survey
Acceptability
Attitudes
Epidemic

ABSTRACT

Introduction: In 2014–2016, an Ebola epidemic devastated Guinea; more than 3800 cases and 2500 deaths were reported to the World Health Organization. In August 2015, as the epidemic waned and clinical trials of an experimental, Ebola vaccine continued in Guinea and neighboring Sierra Leone, we conducted a national household survey about Ebola-related knowledge, attitudes, and practices (KAP) and opinions about "hypothetical" Ebola vaccines.

Methods: Using cluster-randomized sampling, we selected participants aged 15+ years old in Guinea's 8 administrative regions, which had varied cumulative case counts. The questionnaire assessed sociodemographic characteristics, experiences during the epidemic, Ebola-related KAP, and Ebola vaccine attitudes. To assess the potential for Ebola vaccine introduction in Guinea, we examined the association between vaccine attitudes and participants' characteristics using categorical and multivariable analyses.

Results: Of 6699 persons invited to participate, 94% responded to at least 1 Ebola vaccine question. Most agreed that vaccines were needed to fight the epidemic (85.8%) and that their family would accept safe, effective Ebola vaccines if they became available in Guinea (84.2%). These measures of interest and acceptability were significantly more common among participants who were male, wealthier, more educated, and lived with young children who had received routine vaccines. Interest and acceptability were also significantly higher among participants who understood Ebola transmission modes, had witnessed Ebola response teams, knew Ebola-affected persons, believed Ebola was not always fatal, and would access Ebola treatment centers. In multivariable analyses of the majority of participants living with young children, interest and acceptability were significantly higher among those living with vaccinated children than among those living with unvaccinated children.

Discussion: The high acceptability of hypothetical vaccines indicates strong potential for introducing Ebola vaccines across Guinea. Strategies to build public confidence in use of Ebola vaccines should highlight any similarities with safe, effective vaccines routinely used in Guinea.

* Corresponding author.
E-mail addresses: kli1@cdc.gov (K.L. Irwin), yum8@cdc.gov (M.F. Jalloh), Jamaica.Corker@gatesfoundation.org (J. Corker), alphaguinea@gmail.com (B. Alpha Mahmoud), sjr2@cdc.gov (S.J. Robinson), kuq5@cdc.gov (W. Li), nyumaejames@gmail.com (N.E. James), sellusellu2@gmail.com (M. Sellu), mbjalloh@focus1000.org (M.B. Jalloh), dalphahm@yahoo.fr (A.A. Diallo), laree.tracy@fda.hhs.gov (L. Tracy), hajjehr@who.int (R. Hajjeh), kqj6@cdc.gov (A. VanSteelandt), rrb7@cdc.gov (R. Bunnell), diz0@cdc.gov (L. Martel), pgr4@cdc.gov (P.L. Raghunathan), bxm5@cdc.gov (B. Marston).
[1] Present address: The Eastern Mediterranean Regional Office, World Health Organization, Cairo, Egypt.
[2] Present address: The Centers for Disease Control and Prevention, Atlanta, GA 30329, USA
[3] Present address: The Ministry of Health and Sanitation, Freetown, Sierra Leone.
[4] Present address: The Bill & Melinda Gates Foundation, 500 5th Ave, N, Seattle, WA 98109, USA.

http://dx.doi.org/10.1016/j.vaccine.2017.06.026
0264-410X/Published by Elsevier Ltd.

1. Introduction

From March 2014 to May 2016, Guinea suffered a large, national Ebola virus disease (Ebola) epidemic in which 3814 confirmed, probable, or suspected cases and 2544 deaths were reported [1]. Most cases resulted from touching infectious persons or corpses during home care, healthcare, or traditional burial preparations [2–4]. The government of Guinea's National Coordination for the Fight against Ebola collaborated with partner organizations to increase the public's knowledge about Ebola and to promote life-saving prevention practices. These activities included surveillance for cases and deaths, identifying and monitoring persons who had had contact with persons with Ebola, safe medical transport, treatment and specialized Ebola treatment centers, safe management of corpses and burials, and services for Ebola survivors. Mass media, community events, and door-to-door campaigns spread information about Ebola causes and transmission and advised prompt symptom reporting and avoiding contact with sick people and corpses [5,6]. Response activities were most intensive in areas with high case counts (Fig. 1).

As the epidemic waned in August 2015, several organizations collaborated to conduct a national household survey that evaluated the knowledge, attitudes, and practices (KAP) related to the epidemic response and attitudes about "hypothetical" Ebola vaccines that might inform future use of experimental or licensed Ebola vaccines. At this time, phase 3 clinical trials of an experimental Ebola vaccine (recombinant vesicular stomatitis virus vaccine [rVSV-ZEBOV]) were underway in Guinea and neighboring Sierra Leone [7,8]. The Guinean investigators spread information about the trial in the Maritime region to recruit participants. By August 3, 2015, Guinean and international mass and scientific media had announced the interim trial results: the ring-vaccination strategy was highly efficacious in preventing Ebola among vaccinated contacts of persons with laboratory-confirmed Ebola infection and vaccinated contacts of these contacts (i.e., no cases of Ebola occurred 10 or more days after clusters were randomized to receive immediate vaccination) [7,9,10]. The timing of these announcements provided a unique opportunity to assess attitudes about Ebola vaccines when some Guineans were aware of a promising experimental vaccine being used to fight the epidemic.

2. Materials and methods

The Guinean Ministry of Health, the U.S. Centers for Disease Control and Prevention (CDC), and the U.S. Office of Management and Budget approved this cross-sectional survey. Survey participants in 150 clusters in Guinea's 8 administrative regions were recruited using multistage, cluster-randomized sampling using a sampling frame from the 2014 Guinea Census [11]. Within each region, prefectures or urban communes were randomly sampled among 2 strata defined by high (95+) or low (<95) cumulative counts of confirmed cases reported to the national Ebola surveillance system by May 2015 [12, unpublished WHO data]. Within the sampled prefectures, sub-prefectures were sampled among 2 strata defined by rural and urban status. This partial randomization

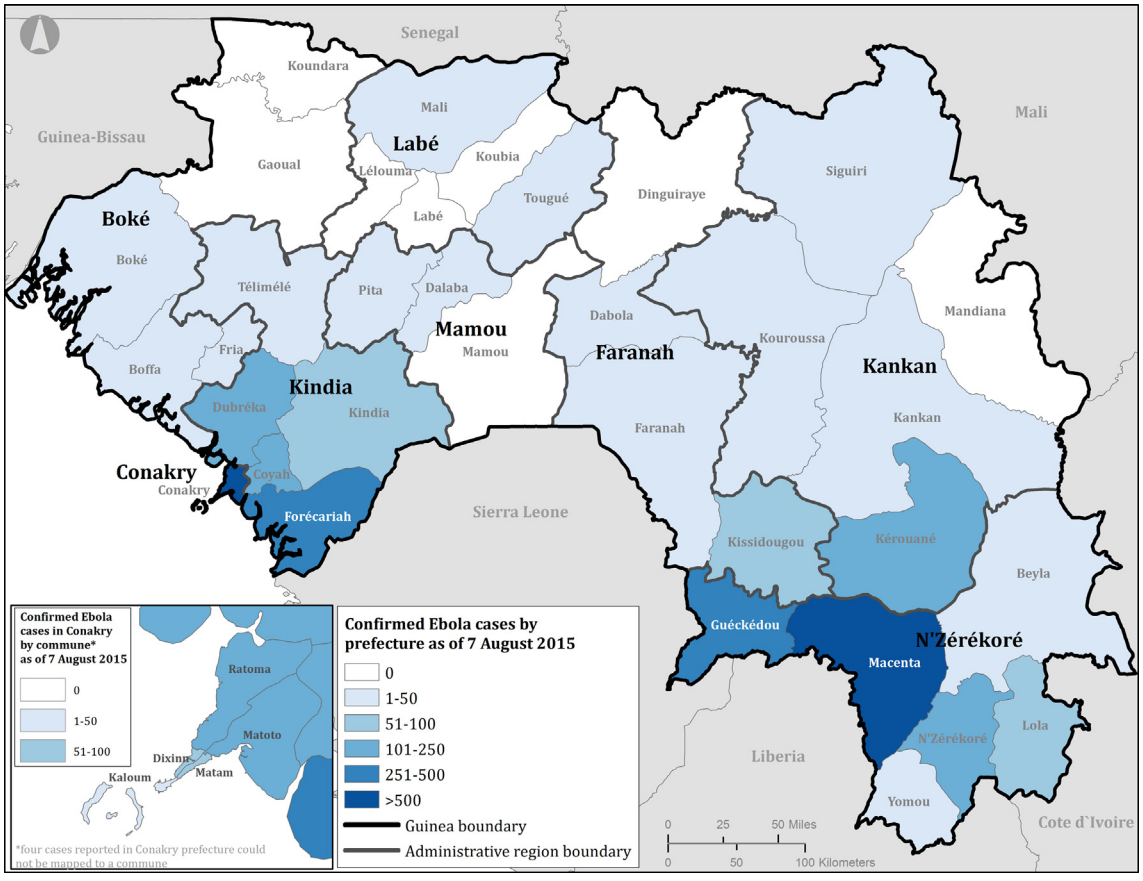

Fig. 1. Cumulative number of confirmed cases of Ebola virus disease reported by Guinea's prefectures and Conakry's urban communes as of August 7, 2015. Of the 22 sampled prefectures and urban communes, 12 reported 0–50 cumulative cases (Boffa, Boké, Dalaba, Dinguiraye, Fria, Kaloum, Kouroussa, Labé, Mamou, Tougué, Siguiri, Yomou) and 10 reported 51 or more cumulative cases (Dixinn, Forécariah, Kindia, Kissidougou, Macenta, Matam, Matoto, N'zérékoré, Ratoma).

Please cite this article in press as: Irwin KL et al. Attitudes about vaccines to prevent Ebola virus disease in Guinea at the end of a large Ebola epidemic: Results of a national household survey. Vaccine (2017), http://dx.doi.org/10.1016/j.vaccine.2017.06.026