

Seroprevalence of measles and rubella antibodies in pregnant women Haiti, 2012



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ABSTRACT

Background: Haiti had set a national goal to eliminate measles and rubella, as well as congenital rubella syndrome (CRS) by 2010. A 2007–2008 nationwide measles and rubella vaccination campaign targeting 1–19 years, however, reached only 79% of the target population. To assess whether population immunity was adequate to support elimination, we conducted a national serosurvey.

Methods: We systematically selected 740 serum specimens collected from pregnant women in a 2012 national antenatal HIV sentinel serosurvey across four age strata: 15–19, 20–24, 25–29 and 30–39 years. Sera were tested for measles and rubella specific immunoglobulin G antibodies (IgG) using commercial immunoassays. We classified sera as seropositive, seronegative or indeterminate per manufacturer's instructions, and analyzed seroprevalence according to age strata, and rural or urban residence. We assessed immunity by estimating antibody concentrations in international units per milliliter (IU/mL) for seropositive and indeterminate sera. Measles IgG concentrations >0.12 IU/mL and rubella IgG concentrations >10 IU/mL were considered clinically protective.

Results: Of 740 sera, 696 (94.1%) were seropositive and 20 (2.7%) were indeterminate for measles IgG; overall 716 (96.8%) sera had IgG concentrations >0.12 IU/mL. For rubella IgG, 691 (93.4%) sera were seropositive and 1 (0.1%) was indeterminate; a total of 687 (92.8%) had IgG concentrations >10 IU/mL. Measles seropositivity varied across age strata ($p=0.003$); seropositivity increased from 88.6% among 15–19 year olds to 98.4% among 30–39 year olds (Cochran–Armitage trend test ≤ 0.0001). Rubella seropositivity did not differ across age strata. There were no statistically significant differences in measles or rubella seropositivity by urban versus rural residence.

Conclusion: Despite previous low vaccination coverage for measles, results from this serosurvey indicate high levels of measles and rubella seropositivity in pregnant women, and contribute to the evidence for measles, rubella and CRS elimination from Haiti by the target date.

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1. Introduction

In 1994, at the 24th Pan American Sanitary Conference, Pan-American Health Organization (PAHO) member states set a regional

goal for the elimination of measles by 2000 [1]. This goal was achieved in 2002 [2]. In 2003, PAHO, endorsed by Haiti and other member states, set a regional goal for the elimination of rubella and congenital rubella syndrome (CRS) in the Americas by 2010 [3]. In 2007, because of the progress made toward the elimination of rubella/CRS a resolution was passed to begin the documentation and verification of the interruption of endemic measles and rubella virus transmission in the region [4]. The strategy for measles, rubella and CRS elimination included introducing rubella-containing vaccines in routine vaccination campaigns with $\geq 95\%$

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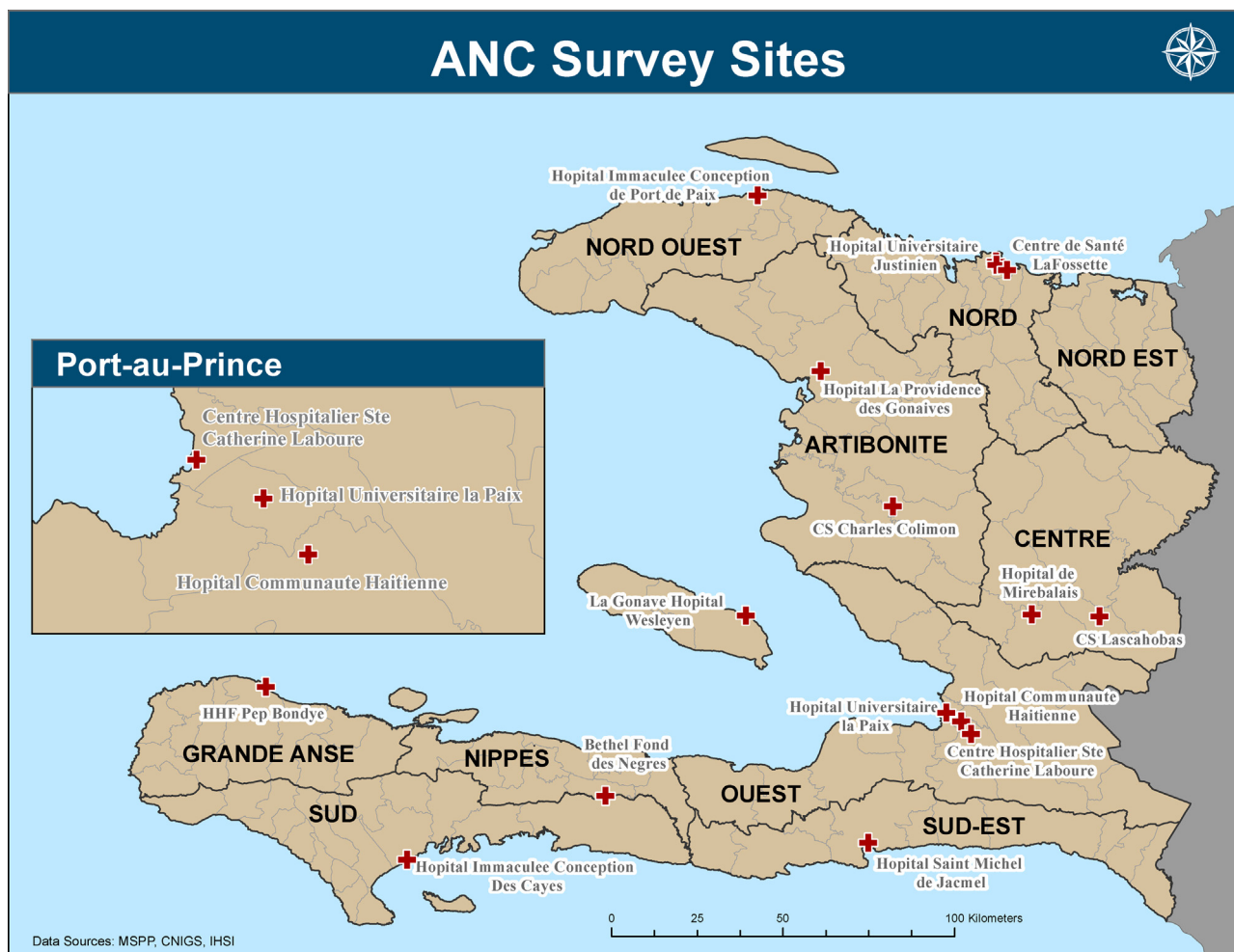


Fig. 1. Map of Haiti showing the 15 ANC sites participating in the measles and rubella serosurvey as well as the departments in which they are located.

coverage, conducting a one-time mass campaign with measles-rubella (MR) vaccine, periodic follow-up campaigns, maintaining surveillance, and strengthening laboratory capacity [5].

Measles vaccination was first introduced in Haiti in 1982 and offered to children 6 months to 5 years of age; measles vaccination campaigns took place in 1994, 1999 and 2001. During 2007–2008, an MR campaign targeted children and adolescents between 1 and 19 years old. Following this campaign, a national survey estimated coverage of 79% in the target groups [5]. Haiti was the last country in the Americas to introduce rubella-containing vaccine. In 2008, following the 2007–2008 MR campaign, MR vaccine replaced measles in routine immunization. Current practice is one scheduled dose of MR vaccine with an opportunity for a second immunization during campaigns. However, estimated vaccination coverage with measles-containing vaccine continued to remain low, ranging from 55% to 59% between 2000 and 2011 [6].

Although the last confirmed cases of measles and rubella in Haiti were in 2001 and 2006, respectively, Haiti is in the process of verifying elimination for measles, rubella and CRS [7,8]. Documenting immunity is important for evaluating immunization strategies to eliminate measles, rubella and CRS and to provide population immunity data that can help to support the verification process of elimination of measles and rubella [9–11]. Serosurveys may be used to identify susceptible populations for measles and rubella vaccination and are also important to determine whether populations targeted for vaccination have been successfully immunized. This is especially important for rubella, as low vaccination coverage in

childhood can result in lower immunity during reproductive years than that seen in populations regularly exposed to natural rubella infection at early ages. Low vaccination coverage may decrease circulation of the rubella virus such that many of those who would be naturally infected during childhood will remain susceptible until adolescence or adulthood, which can potentially increase CRS incidence as predicted from mathematical models [12]. Verification and documentation of measles and rubella elimination in Haiti has been hindered by weak surveillance and low routine immunization coverage [13].

To document elimination of measles, rubella and CRS from Haiti, additional data are needed concerning vaccine coverage and prevalence of measles and rubella immunity. Haiti has regularly conducted HIV and syphilis prevalence surveys among women attending sentinel antenatal care (ANC) sites. The 2012 ANC serosurvey provided an opportunity to examine the measles and rubella seroprevalence in pregnant woman aged 15–39 years old (Fig. 1).

2. Methods

Measles and rubella serologic testing was conducted on sera collected from 740 pregnant women aged 15–39 years old. The sera were selected from the first 3546 samples collected for the nationwide ANC serosurvey. The 2012 ANC serosurvey collected basic demographic information from pregnant women attending 18 sites throughout Haiti from February 2012 through August 2012 (Map/ Fig. 1). The sites participating in this sentinel surveillance

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