

Global Health Challenges: Failure of  
Measles Vaccination Coverage in NigeriaStephanie K King<sup>1</sup>, Olivia G Mendel<sup>2</sup> and Juliet N Sekandi<sup>2\*</sup><sup>1</sup>College of Agriculture and Environmental Sciences, University of Georgia, Georgia<sup>2</sup>College of Public Health, Center for Global Health, University of Georgia, Georgia

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Vaccine-preventable diseases are the most common cause of childhood mortality, with an estimated three million deaths each year [1]. Over 20 million children across the globe are unvaccinated against measles, tetanus, rubella or polio [2]. Half of these children come from ten countries, five of which are in Africa. Nigeria, Ethiopia, the Democratic Republic of Congo, Uganda, and South Africa have the largest numbers of unvaccinated or under-vaccinated children on the continent [2]. In an era of a well-developed and cost-effective vaccine against measles, it is imperative that we address the continually high death rates from measles. A case in point is Nigeria, one of the worst performing countries in reaching universal vaccination for all vaccine-preventable diseases. Universal vaccination is defined as having at least over 90% of children less than one year vaccinated. Nigeria is the most populous country in Africa with a population of 173 million people; about 30 million are children under the age of 5 year. Nigeria is also the wealthiest in Sub-Saharan Africa. Still, one particular question remains unanswered: *why does Nigeria continue to report nearly 3.5 million unvaccinated babies against measles?*

Measles is a major concern for global health. It is the leading killer among vaccine-preventable diseases and causes an estimated 44% of the 1.7 million vaccine-preventable deaths among children under five each year [3]. The goal of this case study is to elucidate the reasons contributing to the failure of measles vaccination coverage in some parts of Nigeria. Many developing countries face common obstacles to achieving universal vaccination. These include the public's lack of understanding of the benefits of vaccination, a lack of trust in the health systems, limited access to health care services, a severe shortage of health workers to deliver timely vaccinations, political turbulence, and a deficient healthcare system that limits quality data collection [1].

In order to evaluate current status and barriers to success, one must know the history behind measles vaccinations efforts in Nigeria. In 1978, Nigeria initiated the Expanded Programme on Immunization (EPI); an international effort to immunize all children in the world against diphtheria, pertussis, tetanus, poliomyelitis, measles, and tuberculosis [3]. Nigeria hoped to provide routine immunization for children less than 2 years. In terms of measles, reaching all children with two doses of Measles Containing Vaccine (MCV) should be the standard for all national immunization programmes. The first dose of MCV is given at 9 months. The delivery of the second dose (MCV2) may occur either at a scheduled age through routine services or periodically through mass campaigns, depending on which strategy achieves the higher coverage. Administration of the second dose at age 15-18 months ensures early protection of the individual and slows accumulation of susceptible young children.

In most parts of Nigeria where coverage of the first dose of MCV is less than 80%, the World Health Organization recommends that improving MCV1 coverage should be prioritized and then conducting high-quality follow-up with supplementary immunization activities, rather than adding MCV2 to their routine schedule [4]. According to the routine vaccination schedule in Nigeria, the MCV2 should be given at 15-18 months but this second dose is often missed because of a lack of financial and human resources. Moreover, there is an increased cost of providing immunization services for hard-to-reach children who are refugees or homeless in politically unstable regions [5]. Failure to reach these groups of children with vaccines jeopardizes the massive efforts to reduce deaths from to measles.

Although the Nigerian immunization program has had some successes they did not reach the goal of over 90% national vaccination coverage; children under the age of one year should be immunized. In the early 1990s, Nigeria reached 81.5% vaccination coverage for all [1]. However, in 1996, data showed only 30% coverage for vaccines. This decline continued over the subsequent years, however, Nigeria's coverage for all vaccines hit an all-time record low of 12.9% in 2003. This was the second worst coverage in West Africa [1]. Only Sierra Leone reported lower coverage in 2003 [1]. Specifically looking at measles, the immunization data reveals similar patterns of growth and decline. In 1990, the coverage was 54% falling to 44% in 1995, and by 2004/2005, it had plummeted to 32%. However, by 2010, measles vaccination coverage rose again to 63.6% perhaps due to concerted efforts in massive vaccination campaigns. . Of all WHO member countries, Nigeria

ranks among the highest in measles incidence. In 2014, this incidence rate was of 3.95 cases per 100,000 total populations compared to less than 2 cases per 100,000 in the rest of the West African countries [6]. Compared to all 47 WHO member states in Africa, Nigeria ranked ahead of only seven: Namibia, Ethiopia, Angola, Benin, Burkina Faso and Botswana in terms of measles incidence.

It is important to note that vaccination coverage varies widely even across districts in Nigeria. The variations could be explained by the unique demographic, sociological, and political factors that affect vaccination coverage. For example, political violence due to the presence of Boko Haram, a militant Islamist group, has negatively affected measles vaccination coverage in the northern region of Nigeria. The measles coverage in northeast region was reported to be about 47.2% in 2006 while in the southeast region coverage was 82.5%. The ongoing violence in the northeast region interferes with the timely delivery of vaccines [1].

Globally, displaced populations often struggle to receive basic health and social services. In the northern state of Kano, measles coverage is 16.5%. In contrast, the state of Enugu has 97.8% measles coverage. Although Kano and Enugu have similar demographics, they vary in their terms of social and ethnic conflicts. Enugu is historically a peaceful state, with few cases of conflict and violence. In contrast, Kano has experienced a multitude of violent conflicts since 1953 [7]. Considering that social violence is the most obvious difference between these two regions, we can infer that the poor vaccine coverage is partially related to political stability.

Additionally, socio cultural beliefs may also explain the low vaccination coverage. In the state of Kano, 9.7% of mothers expressed that they had “no faith in immunization” and 6.7% expressed “fear of side effects.” Suspicion and apprehension about vaccination is fairly common, particularly among several specific disenfranchised communities including those in the United States. For these communities, the suspicion is best understood in a social and historical context of inequality and mistrust.

On the other hand, certain religious belief systems promote alternative perspectives toward vaccination. Religious objections to vaccines are based generally on (1) the ethical dilemmas associated with using human tissue cells to create vaccines, and (2) beliefs that the body is sacred, should not receive certain chemicals, blood, or tissues from animals, and should be healed by God or natural means. In Nigeria, religious beliefs seem to have some influence on immunization acceptance, for example, the Muslim communities in northern and southwest states have a lower immunization coverage compared to more Christian states [1].

Although the prevailing political conflicts and sociocultural beliefs affect all vaccinations, the measles vaccination arguably stands to be at greatest risk of being missed because of its timing in the schedule. According to the standard schedule, measles vaccination is given to children at the age of 9 months. Children are much more likely to be near a medical facility at the time of birth than 9 months after birth. Therefore, it is more likely to be missed than the newborn vaccinations in the context of violent conflict and displacement.

We conclude that geographic variations, armed political conflict, and socio-cultural beliefs coupled with the timing of the measles vaccine as well as the fragile health service infrastructure all affect measles immunization coverage. This observation is supported by the available evidence showing the disparities in vaccination coverage between different regions of Nigeria. Among the vaccine preventable illnesses, measles causes the greatest mortality in children. Addressing the region-specific barriers to measles vaccine coverage and improving the overall function of the health system should lead to a significant reduction in incidence and mortality in Nigeria. If the combination of factors is properly addressed, Nigeria should be able to reach the goal of a 90% reduction in measles mortality compared with the year 2000 estimates like most of the African region [2]. Additionally, sustaining the decline in measles deaths will call for all districts in Nigeria to be vaccinating at least 90% of children before their first birthday, as well as conducting follow-up supplementary immunization activities every two to four years. Currently, there is no global consensus on global elimination or eradication of measles, but reducing global measles mortality remains the overriding unfinished agenda for global health.

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