Measles Cases and Outbreaks  
Dorothy

[Institutional Affiliation(s)]

Author Note

Measles Cases and Outbreaks

Measles is a highly infectious and transmittable virus-borne disease that remains a significant cause of child mortality and morbidity despite the availability of effective and safe vaccines. The WHO initiated a ‘Global Vaccine Action Plan' in which a complete elimination of diseases such as rubella, mumps, and measles was planned until 2020 in five regions. The surveillance activities and coordination of immunization are overseen by the WHO that is extending prevention efforts in most UN-member countries. By 2016, the overall global incidence of measles had reduced by 84% compared to the figures from 2000, yet the disease is still prevalent in many parts of the developing world. In 1990, nearly 630,000 deaths were known to have been caused by measles which reduced to 158,000 deaths in 2011. In the developed world the mortality rate is 2 out of 1000 (0.2%) cases, with the U.S. reporting the same rate (WHO, 2018). Over 7 million people were reported to have been affected by the disease in 2016, yet the number of measles-related deaths dropped by 78%, however, the incidence rates, especially among younger children in developing countries, is nearly 15% with about 25% fatality rates (CDC, 2015). Sustained global efforts to enhance vaccine coverage brought about significant positive results preventing nearly 21.1 million deaths within the African region alone, as parts of the measles prevention program (WHO, 2018).

According to the Health People 2020 initiative, the target is to provide culturally appropriate preventive healthcare to eliminate preventable infectious diseases by 2020. To achieve this, the healthcare systems have to expand their capacities to meet the expanding needs of an aging and diverse population. In the U.S., there were nearly 140 reported cases of measles in 2008, which was thrice as high as the previous year, which indicates that newer or replacement strains of measles have to be dealt with to prevent outbreaks (Healthy People, 2014). Furthermore, due to increasing migration, international trade and travel, global exchange of agricultural practices and food, infectious diseases such as measles have to be seen from a global perspective in order to be able to eradicate the disease by the year 2020, as aimed by the WHO and the Healthy People 2020 initiative.

# Populations at risk

Measles outbreak have frequently resulted in epidemics that have provoked severe outcomes in the form of the demise of malnourished children and young people. In countries where the disease was domestically eliminated, there are cases imported from other countries which contribute to the infection. Being unvaccinated is one of the major risks involved in this infection. If the infected doesn’t receive the vaccine for measles, they are most likely to get affected by this disease. Another risk factor is traveling internationally, especially top the underdeveloped countries where this disease is more prevalent, there is a high risk of developing this infection. The deficiency of Vitamin A also contributes to the vulnerability of infection. Not having enough vitamin A results in more complications and severe symptoms. Severe measles is most prevalent among young children not having good nourishment, especially those suffering from the deficiency of vitamin A, and those having infected immune system owing to AIDS or any other disease. Blindness, dehydration, diarrhea, pneumonia, encephalitis and other related respiratory infections are among serious complications (WHO, 2018). Countries with weak health infrastructures and low per capita incomes are more likely to develop measles and also suffer from the majority of deaths due to measles. Unvaccinated young children mostly develop a complication of this infection which results in death most of the times. Any non-immune person (who has not been medicated) and unvaccinated pregnant women are also at a high risk of measles. Measles is a common disease in some parts of developing countries, such as Asia and Africa. According to the WHO (2018), more than 95% of these deaths occur in underdeveloped countries with low per capita income. Nations who are in the recovery phase of some conflict or natural disaster are also vulnerable to measles outbreaks. Routine immunization gets interrupted by healthcare infrastructure damage, and residential camps congestion also increase the risk of this infection.

# Recommendations

Measles is a highly contagious and easily transmittable disease that can spread through close contact, sneezing, coughing, or contact with throat and nasal secretions. Moreover, no specific medication based antiviral treatment is currently known to treat the infection. Therefore, primary prevention methods that seek to prevent injury or disease before its onset have to be adopted, which in the case of measles involves increasing resistance to the disease before a victim is exposed to the virus. In this regard, active immunization serves as the primary prevention method for measles. The approach has been widely successful in developed countries, yet there are still reports of cases attributed to international travelers. Therefore, it is important to maintain the target population’s immunity in order to prevent a re-introduction of the virus and prevent outbreaks. An MMR vaccine is known to be 93% effective while a double dose over a period of time is found to be 97% effective (CDC, 2015). Those who do not respond to the first dosage will usually respond to the second dosage, thus addressing any chance of primary vaccine failure. The intervention is recommended for adolescents, infants as well as adults that fall within high-risk populations.

Secondary prevention methods include isolating the measles’ patient and attempting to strengthen the immunization of people in areas where the outbreak is reported. Susceptible populations should be provided immune globulin within a week of exposure to modify the infection, along with vitamin A treatment which is also known to reduce illness (Sudfeld, Navar, & Halsey, 2010). Furthermore, supportive care that involves providing adequate fluid intake, good nutrition and use of rehydration solutions can replace body fluids and nutrients that may be lost through vomiting and diarrhea. Comorbidities involving ear or eye infections, or pneumonia may be treated through antibiotics. In case, the immunized population still contracts measles, the symptoms would be milder and would last for a shorter time period. For pregnant women and infants with weaker immune systems, an injection of proteins and antibodies should be administered within 6 days of exposure to reduce the symptoms (CDC, 2017).

Tertiary efforts would involve interventions that would reduce the discomfort, disability, or severity associated with the illness by reducing chronic and acute complications of the disease. Even if an individual is exposed to the virus, the vaccine may prevent or reduce the symptoms of the disease even if administered within 3 days of exposure. Moreover, even if the time since the exposure has spanned beyond 3 days, administering MMR vaccine will still be helpful to prevent exacerbation of symptoms of the infected individual (Thomas, 2014).

# Literature Review

Globally, measles still kills millions of children annually without there being a specific therapy to treat it. A number of studies have pointed to the efficacy of Vitamin A intervention to benefit the treatment. Hussey and Klein (1990) aimed to test the efficacy of Vitamin by conducting a double-blind, randomized trial of 189 hospitalized children with measles infection along with diarrhea, pneumonia or croup comorbidities. Vitamin A was introduced after 5 days of the onset of rashes, measuring the outcomes in terms of the illness’ severity and death, indicated by the incidence of herpes stomatitis, post-measles croup, pneumonia, or diarrhea. The findings suggested that the introduction of Vitamin A reduced mortality and morbidity in all cases of measles, and strongly recommending making use of vitamin A supplements to treat children with severe measles, regardless of having nutritional deficiencies or not. Moreover, there were no side-effects of the treatment which could be deemed clinically apparent.

In another study, LeBaron, Beeler, and Sullivan (2007) evaluated whether two doses of measles vaccine will allow measles antibodies to persist in settings where exposure was less likely to occur. The study thus aimed to evaluate long-term and short-term antibody response after the second MMR dosage has been administered, by comparing two groups of children to whom MMR2 was administered at middle school vs those in kindergarten. The age of the two groups was between 10-12 years and the other between 4-6 years. The researchers collected serum samples regularly for a period of 5 years in the older group while collecting it regularly for a period of 10 years for the younger group. During the study period, no instance of measles was reported while assessing the persistence of measles’ antibodies revealed that they persisted after the second MMR2 vaccine dosage even after 10 years without any seronegative results. However, declining titers were observed which suggested that complete disease protection still required vigilance and higher rates of 2-dose vaccination for elimination. Furthermore, no adverse effects of the treatment were observed.

# Current Initiatives

In 2002, a major initiative was taken for the elimination of measles by 5 leading public health organizations operating at the global level. The initiative aimed to save 1.2 million potential lives in the subsequent five years in the African continent. Termed as the Measles Initiative, the program was a long-term commitment to prevent measles-related deaths by enhancing support to immunization services through mass vaccination and follow-up vaccination campaigns in 36 countries in Sub-Saharan Africa, aiming to vaccinate at least 200 million children. The initiative included the UN Foundation, the American Red Cross, UNICEF, CDC, the WHO and the Pan American Health Organization. Furthermore, the initiative was supported by many different non-governmental organizations operating within Africa along with the respective national Ministries of Health of the participating countries (Christie & Gay, 2011). The vaccination campaign aimed to reduce mortality and specifically aimed at children below the age of 15, with the initial mass campaign followed by a second campaign targeting children born after the first campaign and another at a three to four years gap. The strategy adopted by the initiative proved to be effective and significantly reduced measles-related deaths. Before the program, 18 African countries received less than 50% of the total vaccination coverage. A similar strategy implemented earlier in 50 Latin America countries completely eradicated the disease in the 1990s, through enhanced surveillance, high routine coverage and a series of public vaccination programs conducted within a decade (Christie & Gay, 2011). Moreover, the campaign was cost-effective and showed that each child in 15 African countries could be vaccinated for lesser than $1 for a child.

In the United States, despite a very low incidence of the disease, a number of measles breakout occurred in the recent decades which brought the illness back to national attention. A number of factors associated with immigration, traveling, and related elements led to outbreaks, which required public vaccination at the local and state level. However, a hesitancy towards vaccination complicated controlling the outbreak which resulted in cases occurring in a number of states from New York to Texas. As a result, there have been increased efforts to bring in stricter exemption laws with regards to immunization in a number of states such as Vermont, New Jersey, New York, Oregon, and Washington (Mohanty & Reiss, 2019). Personal belief exemptions from MMR vaccination are now being removed through legislation in order to reduce unvaccinated or under-vaccinated children. States with stricter immunization rules and exemption laws report significantly fewer disease rates compared to those where exemption for various reasons is tolerated (Mohanty & Reiss, 2019).

# Area of Focus

The number of cases of measles reported by the CDC in the beginning months of the year 2019 was about 206. This reduction in the number of cases is attributed to the effective vaccine, which eradicated measles nationally starting from the year 2000. During the months of January and February of 2019, the number of cases reported outperforms the yearly number of cases in all but 3 years since the year 2000. However, some parents decided not to vaccinate their kids against infectious diseases, due to the anti-vaccine propaganda (Rudy, 2019). Different hotspots have report major continuous outbreak of measles due to the parents skipping vaccines, and refusal or hesitation to vaccinate their children. In 1992, the concern over MMR initiated when a British study found the possibility of links between autism and the presence of measles virus in the guts. The inaccurate media coverage of the study along with other anti-vaccine propaganda led many to make use of exemptions in state laws or exploit loopholes to prevent their children from being vaccinated, thereby making the whole exercise controversial. However, the CDC along with a number of credible institutions found no evidence of autism or MMR vaccine being linked, even after extensive tests (Rudy, 2019). Thus, no causal link between bowel disease, autism or MMR could be established. Thus, putting an end to the basis of the controversy. However, the anti-vaccine movement continues to create hurdles for immunization and may pose a challenge in preventing outbreaks in the future.

# References

CDC. (2015, April). *Measles*. Retrieved April 20, 2019, from Center for Disease Control and Prevention: https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/meas.pdf

CDC. (2017). Infectious Diseases Related to Travel. In *CDC Yello Book: Health Information for International Travel.* New York, NY: Oxford University Press.

Christie, A. S., & Gay, A. (2011). The Measles Initiative: Moving Toward Measles Eradication. *The Journal of Infectious Diseases, 204*(1), 14-17. doi:10.1093/infdis/jir075

Healthy People. (2014). *Immunization and Infectious Diseases*. Retrieved from Office of Disease Prevention and Health Promotion: U.S. Department of Health and Human Services: https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases

Hussey, G. D., & Klein, M. (1990). A Randomized, Controlled Trial of Vitamin A in Children with Severe Measles. *the New England Journal of Medicine, 323*, 160-164. doi:10.1056/NEJM199007193230304

LeBaron, C. W., Beeler, J., & Sullivan, B. J. (2007). Persistence of Measles Antibodies After 2 Doses of Measles Vaccine in a Postelimination Environment. *Measles and Measles Vaccination, 161*(3), 294-301. doi:10.1001/archpedi.161.3.294

Mohanty, S., & Reiss, D. R. (2019, February 13). *Measles Outbreak Prompts States to Consider Stricter Immunization Laws*. Retrieved April 20, 2019, from Penn LDI: https://ldi.upenn.edu/healthpolicysense/measles-outbreak-prompts-states-consider-stricter-immunization-laws

Rudy, L. J. (2019, February 8). *Why Do People Think the MMR Vaccine Causes Autism?* Retrieved April 20, 2019, from Very Well Health: https://www.verywellhealth.com/the-mmr-vaccination-autism-controversy-260556

Sudfeld, C. R., Navar, A. M., & Halsey, N. A. (2010). Effectiveness of measles vaccination and vitamin A treatment. *International Journal of Epidemiology, 39*(1), 48-55. doi:10.1093/ije/dyq021

Thomas, J. (2014). Secondary and Tertiary Prevention in the Control of Communicable Diseases. In *Handbook of Infectious Diseases* (pp. 230-246). Cape Town: Department of Paediatrics & Child Health. Retrieved from http://www.paediatrics.uct.ac.za/sites/default/files/image\_tool/images/38/Secondary%20%2B%20tertiary%20prevention%20of%20selected%20communicable%20diseases%20MIMS%20Handbook%202014.pdf

WHO. (2018, April 2). *Immunization, Vaccines, and Biologicals: Measles*. Retrieved April 20, 2019, from World Health Organization: https://www.who.int/immunization/diseases/measles/en/

WHO. (2018, November 29). *Measles*. Retrieved April 20, 2019, from World Health Organization: https://www.who.int/news-room/fact-sheets/detail/measles