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PNG: Dietary Diseases

## **Papua New Guinea: Typhoid Fever**

### **Introduction:**

Papua New Guinea, or PNG, is one of the most resource-rich places in the world, containing nearly 7% of the world's biodiversity in its land, oceans, and rivers. It is also one of the greatest providers of seafood to the world (PNG). Despite the prevalence of aquatic resources, the country is struggling to develop these resources in a clean, safe environment, leading to high amounts of disease from aquaculture consumption (Guinea). The recent incline in production from the fishing industry has caused an increase in health problems related to the consumption of fish and other aquatic produce (User). In addition to the diseases this has caused, there is also a severe lack of vaccination for Typhoid fever, also known as enteric fever, a disease commonly transferred through water and seafood. Additionally, it can be spread through contact with contaminated urine or feces (Jerry). This has led to a spike in typhoid over the last twenty years. This disease is considered critical by the Mayo Clinic and is listed as a life-threatening disease if left untreated (Typhoid).

### **Background Information:**

Papua New Guinea's population largely relies on fish and other seafoods as a resource for food. Fish and other seafood are the main sources of protein for the people of PNG (Fishery). The production of fish for direct human consumption in 2007 was 228,458 tons. Many families are in the business of aquaculture, and 85% of them rely on subsistence agriculture (Economy). This means they rely on themselves and other people in their communities to provide and produce the food they eat. This is the primary reason fish is the main food source.

PNG is made up of over 600 islands and archipelagos. This makes it hard to get medical service to remote villages located on those islands. There is also a large mountain range bisecting the mainland of PNG which further increases the difficulty and disconnect of reaching the medical capabilities of many other countries. Currently the only way to cross these mountains is on foot or by plane. There are rivers that run down the mountain and over the mainland creating large swamps in some areas on the south end of the island. This is another obstacle that gets in the way of medical advances in many rural villages. This country is volcanically active, and earthquakes are not uncommon (Climate).

One of the largest issues residents of Papua New Guinea encounters is aquacultural dietary diseases. Since residents of PNG rely heavily on aquaculture for food, the diseases that can be transferred through these foods have become a problem in many communities (Papua). Typhoid fever is a disease that can be easily spread through contaminated water or food as well as person to person contact. It is a dietary disease that has been nearly wiped out in many industrialized countries through the use of vaccines and sanitary practices (Passey).

Typhoid fever in PNG was sporadic and sparse until the 1980s. Now, there are many more reported cases (Passey). This increase in cases directly coincides with the growing fishing industry. This is because it is very easy to acquire this disease by eating improperly prepared fish or even fish from contaminated water. The disease is caused by the bacterium *Salmonella enterica* serovar Typhi. The bacterium most commonly enters the body through contaminated food or water consumption. It then penetrates the intestinal wall, multiplies in the lymphoid tissue, and enters the bloodstream (Typhoid Fever | Definition). In a study near Goroka, a community in PNG, an annual incidence rate of typhoid fever of 1208 per 100,000 people was found. This is a very large number of people considering the status of this disease being critical and life-threatening, and the disease being practically wiped out in more advanced countries.

### The Solutions:

There is no simple fix to this problem. One of the most problematic factors is the spread of typhoid from person to person. This is an impossible thing to stop until the disease is nearly eradicated in PNG. The viable solution to these problems has to include vaccination followed by or integrated with education. The vaccines for Typhoid fever last for ten years, which makes it a relatively long term solution (dhs). This vaccine reacts with some medications, but there have been no reported cases of severe reactions. Many communities in PNG are more remote than most and have a harder time accessing the medical information that is necessary and even life-saving. This can make implementing vaccinations a challenge.

The lack of vaccination in many countries, PNG included, can be largely traced back to a lack of education. A solution to this problem would be implementing an interactive program to educate as well as vaccinate. This could be swiftly followed by vaccination. The program could then be monitored and cycled over a number of years to keep the knowledge in these communities up to date, motivate citizens to get vaccinated, and provide an opportunity to do so. The goal of this project is to keep people educated, so that they can move forward in their communities without being afflicted by preventable disease.

The first step, modeled after the “WASH” program from nonprofit organization H2O for Life, is a feasible solution that would implement programs in community schools to educate and execute sanitary practices (About). In this step, volunteers would model precautionary practices when around others who may have an infectious disease. This would be a very good step to take to keep disease down while vaccination cannot be accessed immediately.

The next step to the solution would be providing access to vaccines in remote villages. This could be done by recruiting volunteers, including community members, to set up a sanitary location for medical examinations and follow up by sending in medical personnel to administer vaccines. Including community members would give the people of the communities more opportunity to learn about sanitary spaces and their importance to their health. These locations can be set up in a “pop-up-shop” fashion, meaning that they can be set up and taken down quickly and stay in one place for a limited time, or they can be set up in buildings and become semi-permanent and integrated into the community. These would be kept sanitary by using disinfectants and stainless steel for examination tools and equipment.

After these steps have been executed, information and directions should be given about nearby places to get vaccinated, ways to contact the project if there are questions or concerns, and information on signs and symptoms of possible disease in unvaccinated community members. This solution will have to be implemented over a large span of time and needs to be repeated to keep it relevant and in the community's consciousness. It will largely rely on time and effort of good samaritans. Ideally, the involvement from the communities that are benefiting from this process will largely decrease the funding necessary for this project. The final outcome of this project would be to decrease the numbers of typhoid fever cases in villages and communities without medical access, and educate and increase the number of vaccinated citizens in PNG until typhoid fever becomes a disease that is once again only seen in sporadic and sparse cases.

### Funding the Solutions:

Finding a solution is not the end of the problem. Another important part of solving the typhoid fever problem in Papua New Guinea is funding the programs that can be set up to fix the lack of vaccination against typhoid fever. Funding the vaccination of PNG citizens is important, but the need for education on vaccines is also very necessary. Many rural PNG citizens do not have access to healthcare, so the need for education is important in making sure that vaccination continues in future years. This education would increase the likelihood that citizens of PNG would continue vaccinations when they are not brought to their communities. In a Stanford Social Innovation Review article, they mentioned a few ways to fund non-profits (Ten). Some ways that would best apply to the project include:

**1. Heartfelt Connector-** The Heartfelt Connector funding method is made up of donations given by large numbers of people with many different income levels. This is also likely to be a worldwide donation group as opposed to many other methods where projects are very localized in funding. This method provides the opportunity for people to donate from their personal income when they feel this cause is worthy of financial backing. The funding can be executed by charity events to raise awareness of the issue and gain momentum in the public eye. This method is most successful when the project involves a meaningful topic that can appeal to people on a more emotional level. It is also crucial that donors experience a sense of worth and nobility when this method is executed. The PNG Typhoid Prevention Project could provide this sense of need through the spreading of awareness of this problem and education on the issues at hand.

**2. Big Bettor-** The Big Bettor project model is great place to start before the project is on its feet. It is common for a founder or major donor to do this type of funding. When using this model, a project can be successfully launched and run for a short time on this financial backing, but will likely need other methods of funding to continue to produce results. This method is often used in large projects or environmental issues. With the PNG Typhoid Prevention Project this money could go towards the cost of vaccines and sanitation supplies needed to support and launch an effective vaccination education program.

**3. Resource Recycler-** The Resource Recycler method relies on businesses that support the cause to donate large quantities of unused items. Usually these businesses are relative to the project in some way. With the PNG Typhoid Prevention Project the most likely donors would be businesses

in the medical field. The most likely donations would be things like new syringes, gloves, or other sanitary items needed for vaccinations.

**4. Beneficiary Building-** The Beneficiary Building method is a funding model that would be best used once the project is on its feet and has stories of success to spread. Through this type of funding, people that have benefited from the project are able to give back to the project. With the PNG Typhoid Prevention Project, communities that have been vaccinated and educated can give back to the project financially. This is a great method of funding, because it would be from people who know the benefit of the project. Many of these people would also be able to help by giving up time and working on the project alongside volunteers from many different places, giving further opportunity for the community to be involved. These beneficiaries would also be good candidates to represent and promote this cause, further helping the project financially. This means they will have ties to the project and have better ideas of the benefits that will be provided with their assistance.

#### Conclusion:

While this problem may sound overwhelming, the most effective way to stop Typhoid Fever in Papua New Guinea would be to integrate vaccination into their lifestyle. The best way to begin funding this would be using Heartfelt Connector, because this method could easily lead into some of the other funding methods. Larger organizations and wealthier individuals would also be able to help out, which could result in a higher amount of impact on the situation. Typhoid Fever is not an insurmountable problem, and when working together it can be overcome.

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