

The Tech for Global Good Vaccine Distribution Challenge



**CEBU CITY,
PHILIPPINES**



**The Tech
for Global Good**

Introduction

The Tech for Global Good

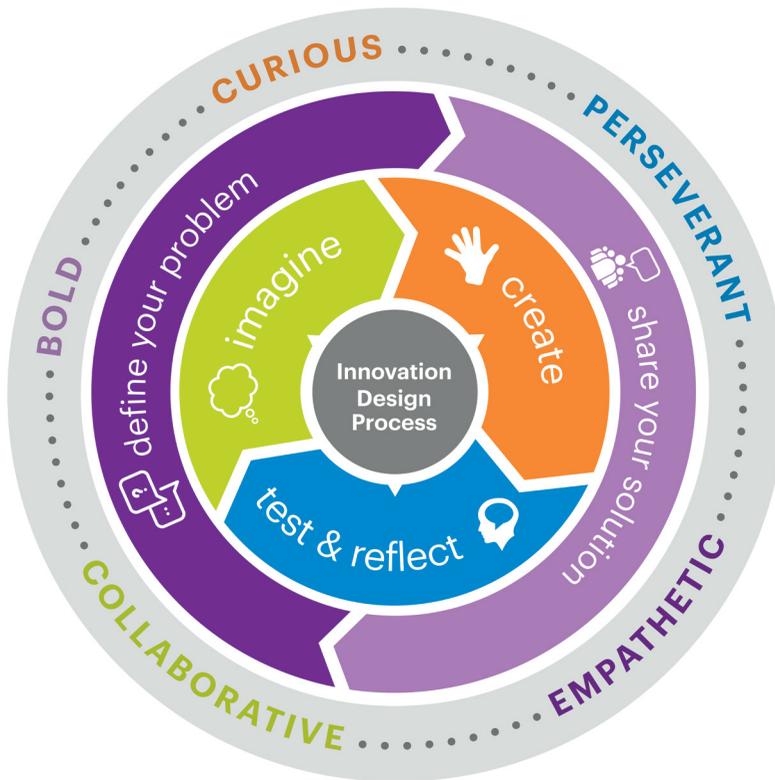
The Tech for Global Good is a new initiative that will create the next generation of innovators ready to tackle the toughest challenges facing our planet.

PATH

What is PATH?

PATH is the leader in global health innovation. An international nonprofit organization, they save lives and improve health, especially among women and children.

Innovation Design Process



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Design Challenge

You and your team run a pharmaceutical company in California that has developed, tested and produced a vaccine that can prevent measles. Your team will use your skills as communicators, researchers, collaborators and creative problem-solvers to assist the city governments in developing plans to help immunize their communities.

-  **1. Research the problem:**
 - Understand the design challenge.
 - Read the background material.
-  **2. Brainstorming:**
 - Write each idea (text/image/both) on a sticky note and put it on the board.
 - Be creative! Think of as many wild ideas as possible.
-  **3. Create a solution:**
 - Each member shares their sticky notes and posts them on the board.
 - Pick someone to group similar ideas.
 - Label the categories.
 - Work together to add more ideas.
 - Each team member ranks their favorite ideas (1-5).
 - As a team, choose a solution to focus on.
-  **4. Refine your solution:**
 - Get feedback from peers on your solution.
 - Edit your solution and improve how it addresses the problems.
-  **5. Design a project and presentation:**
 - Get feedback on your solution.
 - Please show:
 - The vaccination problem your team has addressed.
 - Your team's solution for this problem.
 - Story of how your solution will impact one person in the city (a child, a parent, a healthcare worker, etc.)

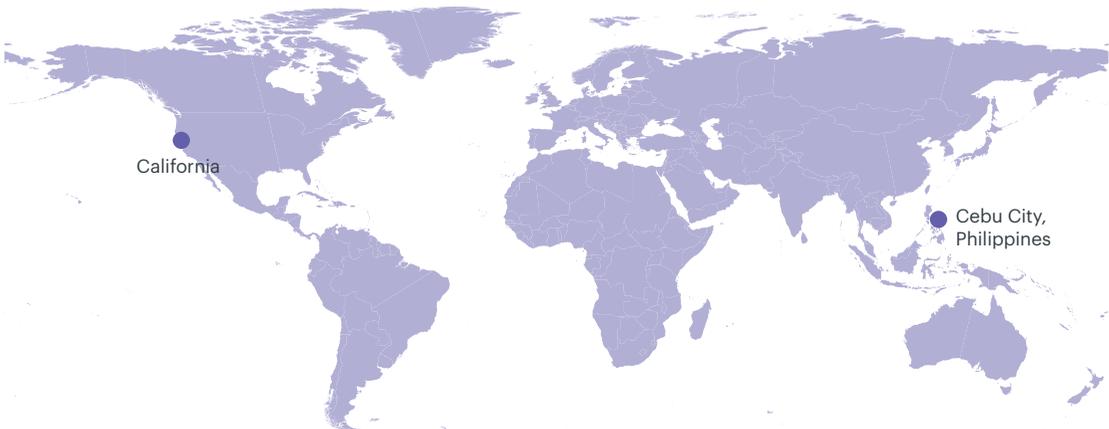
Designing a Solution with Cebu City, Philippines

The city of Cebu City has reached out to your pharmaceutical company in California for help with their current immunization crisis.

Problem

Your pharmaceutical company has helped develop and ship 200,000 vaccines for measles to Cebu City, Philippines. Now your team needs a plan that keeps these vaccines the right temperature and gets them distributed and stored in the rural communities outside of Cebu City.

Your pharmaceutical team will need to create a presentation to show your solution and how it will impact one person (a child, a parent, a healthcare worker, etc.) in a community near Cebu City. The following provides some information that might be useful to your team while you work on your solution and story of how a person in this community is affected by your solution.



About Cebu City



Cebu City is a busy port town with a long history. Today there are 922,611 people living within the city limits. This is between the population of San Jose (1 million) and San Francisco (800,000). Cebu City is the main domestic port in the Philippines with over 2 miles of the coast available for docking ships. This city is very busy with international and local boats dropping off and picking up goods. However, this is not the only way to get in and out of Cebu City. There is an international airport 9.5 miles away. Getting around the area can be achieved with buses, ferries and jeepneys.

In November 2013, Typhoon Haiyan hit the Philippines. It was one of the deadliest ever recorded in this region and took out electricity throughout the Philippines. In 2017, there are still electrical issues related to the damage from this storm. This includes rolling brownouts, which are times when part or all of the electricity in an area goes out for periods of time from a few minutes to a few hours.

There are challenges to getting immunizations for people who do not live near the city. Many of the clinics and supplies are located in major cities, like Cebu City, and communication is provided locally or electronically about where to get immunizations. However, for people in rural communities medications and immunizations are difficult to access. Travel to the city can be costly in fare and lost wages. Waiting for vaccinations to come to one's rural community can take time, since the delivery pattern is unpredictable and it is difficult to keep the vaccines at the correct temperature during transport.



When there are storms like Typhoon Haiyan that destroy buildings, ships and the electrical grid the need for vaccines and medicines increases. The damage to infrastructure like storage, transportation and clinics makes getting vaccinations in rural communities even harder. City and country governments often work with nonprofit and international agencies to develop plans to help these areas in case of an emergency.

Cold Storage Challenges in Cebu City and the Philippines



Immunizations need to be kept very specific temperatures to preserve their effectiveness. One immunization that helps protect against measles is called the MMR. MMR is shipped in two different sets of vials; one has the undiluted vaccine and the other has the diluent. The diluent can be stored at room temperature, but it cannot be frozen. The undiluted vaccine can be stored between -58°F and 46°F. Any colder or warmer will damage the vaccine and make it less effective. Also, the vaccine must be protected from light at all times, since such exposure may make the vaccine not work at all.

To use the vaccine the undiluted vaccine vial and the diluent need to be combined. The temperature of the vaccine must be between 36°F to 46°F to do this. It is recommended that the vaccine be used as soon as possible after combining the vials. The combined vaccine vial should be stored in a dark place at 36°F to 46°F and discarded if not used within 8 hours.

The challenge in Cebu City is that there needs to be ways to store and transport the vaccines while keeping both vials at the correct temperatures. Given that the area has earthquakes, typhoons and some brownouts there needs to be a plan for storing and delivering vaccines where they are needed. To achieve this there can be a combination of approaches in protecting vaccines using:

- Temperature monitoring vaccine carriers that can run 8 to 65 hours between electrical charges, but they can only hold a few boxes (100 vaccines).
- Backup generators at hospitals can be expensive to maintain, but can supply electricity during a power outage as long as there is enough fuel to keep them running.
- Ice-lined refrigerators can maintain their temperatures for up to 31 hours without electricity.
- Solar-powered refrigerators need 3.5 kWh/m²/day of sunlight to power the freezer for 85 to 135 hours.



From Your Reading

What information is important to share?

What additional questions do you have based on this reading?



Brainstorm Notes

Problem

- How will you share your vaccine with different communities within your city?
- How will you let people know about your vaccine?
- How will you distribute your vaccine to people who do not regularly see a doctor?



Solution

- What are some really wild, unusual ideas that you might try?
- If you had unlimited resources, what would you do to solve this problem?
- What are other ways to solve this problem? What are the pros and cons of these solutions?

Impact

- How does this solution impact the vaccine user (patient)?
- How does this solution impact healthcare workers?
- How does this solution impact the family of the patient?



Listen and Help

	Team Presenting	Audience
3 min	Present their design solution.	Silently listen. Take notes.
3 min	Respond to clarifying questions.	Ask clarifying questions.
2 min	Silently listen. Take notes.	Provide feedback.

Listen and Help Notes



Presentation Ideas and Sketches



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