Option 1: Address Problems in the Vaccine Supply Chain

1.5 million deaths could be prevented through childhood vaccinations costing around US $20 each, and though many vaccination programs are adequately funded, as many as half of the vaccines produced are currently wasted. Pilot a scalable tracking system both to identify cold chain and stocking problems as well as to implement solutions to the most serious known issues in a single vaccine supply chain.

The Problem: Many infectious diseases have theoretically been eradicated decades ago. Yet polio, measles, mumps, whooping cough, diphtheria, and others continue to cause severe global health burdens in many developing countries. The WHO estimates that 1.5 million childhood deaths, or 17% of all childhood deaths around the globe, could be averted with simple childhood vaccinations.1

The Proven Solution: Childhood vaccination remains one of the most cost-effective health interventions in the world.2 Based on 2011 data, there were an estimated 5.2 million deaths of children between 1 and 5 years old, of which 29% could be avoided with vaccinations.3

Nearly-adequate funding exists for widespread vaccination of large numbers of children. For roughly $20, a child can be immunized against a broad variety of deadly diseases for life. Distribution strategies include strengthening routine vaccination and one-time campaigns to vaccinate all children of a certain age range. Often, strategies will combine the two. Routine facility-based strategies cost $14 per fully immunized child (FIC), and campaigns are $27 per FIC.4

Unfortunately, childhood immunization rates are not yet universal. The WHO has found that up to 50% of vaccines produced for sub-Saharan Africa are wasted. Reasons include failures in the supply chain and inventory management. More effective systems have the potential to impact enormous numbers of children.5

Your Challenge: We will award up to $10,000 to a social entrepreneur who can create a simple management system that tracks vaccine supplies in central stocks and in primary-through-tertiary health facilities. The system should be piloted with one supply chain, and be highly scalable within two years.

1 http://www.who.int/immunization_monitoring/diseases/en/
2 http://www.gavialliance.org/about/value/cost-effective/
3 http://www.who.int/immunization/monitoring_surveillance/en/
4 Brenzel, Logan; Wolfsen, Lara; Fox-Rushby, Julia; Miller, Mark; Halsey, Neal A. Chapter 20: Vaccine Preventable Diseases. Disease Control Priorities in Developing Countries. Pp. 389.
5 http://whqlibdoc.who.int/hq/2005/WHO_V percentB_03.18.Rev.1_eng.pdf
The management system would identify cold chain problems and vaccine stock-outs, and then implement a broad variety of interventions (e.g. propane-powered refrigerator for a rural clinic, marketing campaign in dubious communities) to correct the most serious problems.

Additional Information:

- Geographically, more than 70% of children in need of DPT vaccinations, a standard vaccine, live in 10 countries: Afghanistan, Chad, DRC, Ethiopia, India, Indonesia, Nigeria, Pakistan, Philippines, South Africa. GAVI Alliance, a large and established NGO, publishes country level data and maps.
- Nearly every African country with data had higher DTP3 vaccine coverage in urban areas, with urban/rural disparities as high as 33%. However, gaps in urban areas are often masked, since capital cities are better covered than other urban areas. Coverage in the poorest slum and peri-urban areas within cities can be even worse than in rural areas.
- Past winners include Miti Health.

Option 2: Identify Patients Needing Simple Corrective Interventions

While cost-effective early interventions or surgeries can correct damaging health conditions like obstetric fistula, cervical cancer, club foot and cataracts, identifying individuals in need of treatment is challenging. In three months, identify and reach 100 patients with treatment for an easily correctable health condition as a pilot of a program to reach 3,000 patients over two years.

The Problem: There are many health conditions that are easily correctible with early intervention or surgery. Examples include:

1. Obstetric fistula (OF), which is a pregnancy complication that causes a woman to be incontinent for the rest of her life. Women who suffer from OF are highly stigmatized by society due to their humiliating circumstances.
2. Cervical cancer, which remains the second most common form of cancer for women in developing countries, even though effective screening interventions exist. Cervical cancer causes an estimated 230,000 deaths in the developing world each year.11
3. Club foot, a foot deformation that prevents a person from walking, is a condition that affects 200,000 babies each year.12
4. Cataracts, which is responsible for 51% of world blindness, is also easily correctable.13 A simple surgery could quickly change the lives of 20 million people.

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The Proven Solution: Early interventions and ultra-cheap surgeries for these conditions are well known:

1. In the case of fistula, a trained surgeon can administer a corrective surgery that costs less than $450, has a cost per disability-adjusted life year (DALY) of $40, and is successful over 90% of the time.\(^\text{14, 15}\)

2. Cervical cancer can be prevented using a visual inspection and cryotherapy technique (VIA).\(^\text{16}\) VIA can be administered by a trained nurse, requires only basic supplies – a speculum, cotton swabs, and vinegar – and offers a diagnosis on the spot.

3. The most effective treatment for club foot in the developing world is through early treatment using the non-surgical Ponseti method. In this case, early identification (within 1-2 years of life) is crucial before the condition becomes neglected club foot, which requires surgical intervention.

4. Cataracts can be corrected with a surgery that is over 90% effective.\(^\text{17}\)

Your Challenge: We will award up to $10,000 to a social entrepreneur who can reach 100 patients in a three-month pilot and identify at least 3,000 patients who are in need of a proven treatment within two years.

Additional Information:

- One major problem with addressing these conditions is identifying the few people who need treatment among vast populations. For instance, the incidence of congenital clubfoot globally is 1/1000, with a male to female ratio of 2:1.\(^\text{18}\) According to Ponseti International, the leading NGO in this sector, approximately 80% of the 200,000 children born with clubfoot annually will be in low and middle income countries and are difficult to monitor.\(^\text{19}\)

Fistula patients are also difficult to identify, as they are often shunned by their families and community. The WHO estimates 50,000 to 100,000 new cases of obstetric fistula each year. According to UNFPA, fistula is most common in rural areas - as women with obstructed labor can spend 2.5 days walking to health clinic. Prevalence is highest in impoverished communities in Africa and Asia and particularly areas where women give birth at home.\(^\text{20}\) Direct causes of fistula include child-bearing at to early an age, malnutrition and limited access to emergency obstetric care.\(^\text{21}\)

Option 3: Train Birthing Attendants & Reduce Postpartum Hemorrhage

*The drug misoprostol reduces postpartum hemorrhage, the world’s leading cause of maternal death, by 38%, costs under US $3 and can be administered by traditional birth attendants. In three months, train 100 birth attendants to administer misoprostol as a pilot to train 5,000 birth attendants over two years.*

\(^\text{14}\) http://www.fistulafoundation.org/
\(^\text{15}\) http://www.givewell.org/files/DWDA%202009/Fistula%20Foundation/Fistula%20Foundation%20Letter%202009-09-12.pdf
\(^\text{16}\) http://apps.who.int/iris/bitstream/10665/75250/1/9789241503860_eng.pdf
\(^\text{21}\) Ibid.
The Problem: Postpartum hemorrhage (PPH) is the excessive loss of blood following childbirth. PPH is the leading cause of maternal death. The WHO estimates that 25% of the 400,000 maternal deaths a year are due to PPH, and risk is 100 times larger in developing countries.\textsuperscript{22, 23}

The Proven Solution: Misoprostol is a drug that prevents and treats PPH. The drug costs less than $3, and does not require refrigeration.\textsuperscript{24} Randomized controlled trials show that misoprostol can reduce PPH-caused deaths by 38%.\textsuperscript{25}

The drug does not require a doctor to administer treatment. Instead, misoprostol is generally administered by traditional birth attendants (TBAs) during at-home births. Total cost per disability-adjusted life year (DALY), including the cost of training TBAs and distributing misoprostol, is estimated at $6.\textsuperscript{26}

Your Challenge: We will award up to $10,000 to a social entrepreneur who can train 5,000 traditional birth attendants (TBAs) to correctly administer misoprostol as a PPH treatment within two years. A three-month pilot program should reach at least 100 TBAs, proving a significant increase in treatment with misoprostol after six months.

Additional Information:

- Judging by the number and probability of maternal deaths, the greatest need for misoprostol and TBA training is in sub-Saharan Africa. An estimated 247,000 maternal deaths occurred in this region in 2000, with a lifetime risk of maternal death being 1 in 16.\textsuperscript{27}
- Hurdles facing misoprostol distribution and TBA training include supply chain issues. Monopoly pricing in areas with limited drug supply can be a burden. Working with misoprostol manufacturers with strong in-country manufacturing facilities and presence will help to avoid this bottleneck. At the last mile of the supply, TBAs must have the drug on hand in the home at the time of birth.
- Misoprostol has recently gained attention as a potential drug for abortion inducement, leading to political motivations to curb its use in some areas.\textsuperscript{28} In many sub-Saharan African countries, misoprostol is not approved for distribution at all.\textsuperscript{29}
- Although the drug is less effective than oxytocin (an alternative drug), it does not require refrigeration and is consequently recommended by the WHO in settings where health facilities do not have reliable cold storage.\textsuperscript{30}

\textsuperscript{23} http://emedicine.medscape.com/article/275038-overview
\textsuperscript{24} http://vsinnovations.org/assets/files/Bradley et al 2007.pdf
\textsuperscript{25} http://www.ncbi.nlm.nih.gov/pubmed/17027730
\textsuperscript{26} http://www.ncbi.nlm.nih.gov/pubmed/20079493
\textsuperscript{29} http://medicationabortion.com/misoprostol/
\textsuperscript{30} http://www.who.int/bulletin/volumes/87/9/08-055715/en/
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