Overview

The Challenge

Post-partum hemorrhage (PPH) - or severe bleeding after childbirth - is the largest direct cause of maternal mortality worldwide, responsible for more than a quarter of the 300,000 estimated deaths each year.

These women are dying from preventable causes related to pregnancy and childbirth, with 94 per cent occurring in low- and middle-income countries, in areas where the nearest health facility with comprehensive obstetric care may be hours away.

Many of these deaths could be prevented with timely and effective maternal health care management and equipment.

The Response

The Non-pneumatic Anti-Shock Garment (NASG) is a low-cost first-aid device that limits persistent PPH. It’s a compression suit originally designed with technology from the United States National Aeronautics and Space Administration (NASA). At NASA, anti-gravity uniforms were developed to keep astronauts from blacking out during extreme acceleration by squeezing the arms and legs to push blood towards the head. This same technology was used to develop NASG where external pressure is applied to a woman’s lower body to drive blood upward.*

NASG is lightweight, washable and reusable, with eight segments to wrap over the legs and abdominal region. It reduces blood flow to the uterus and treats hypovolemic shock while allowing health staff to repair sites where bleeding occurred.

A large evidence base indicates that NASG is effective in reducing maternal mortality. The World Health Organization (WHO) recommends it as a temporary measure until appropriate care is available (2012). NASG is included in the WHO, UNICEF, and United Nation’s Population Fund (UNFPA) interagency list of medical devices for essential interventions for reproductive, maternal, newborn and child health (2015).

Although there are some countries that have successfully scaled NASG, UNICEF estimates that the global demand is much higher, given that five per cent of all women giving birth suffer from PPH. This is why UNICEF has added it to its portfolio of innovation projects - to use its know-how capacity in scaling proven technologies to ensure a fit-for-purpose and value-for-money product is available and accessible worldwide.

The Impact

NASG has been used by UNICEF, UNFPA, NGOs and governments over the past five years, saving thousands of mothers lives at an average cost of US$3 per use.**

UNICEF has added NASG to its Supply Catalogue*** and is providing technical guidance and support for its procurement, distribution, and implementation. With UNICEF’s expertise in scaling proven technologies, NASG can reach more mothers, ensuring future PHH deaths are prevented.

Key Figures

**Challenges**

5% of all women giving birth suffer from PPH

300,000 women die each year during pregnancy or childbirth (over 25% of which from PPH)

94% of maternal deaths occur in low- and middle-income countries in locations far from obstetric care

**Response**

US$3 average price to save a mother’s life with NASG**

9 countries are introducing NASG through UNICEF as of May 2020 (as compared to 3 countries one year earlier)

*Pressure Garments Save New Mothers’ Lives*, NASA Spinoff, 2016

**Based on UNICEF data on NASG pricing and the average number of uses from 2007-2018

***Supply Catalogue found here: https://supply.unicef.org/
**Non-pneumatic Anti-shock Garment**

**Timeline**

After WHO’s inclusion of NASG in the global PPH recommendations in 2012, its adoption and uptake has been limited due to a lack of knowledge about the product, a relatively high cost, and low support via global funding initiatives. NASG was added to UNICEF’s product innovation portfolio in 2019 to dedicate efforts to increasing access worldwide. The below chart illustrates the history of NASG, starting from the introduction of the technology in 1969 to where we are today.

- **1969**
  - NASA compression suits first modified to treat a patient suffering from severe PPH

- **1990s**
  - NASG is first commercially available (via ZOEK)

- **2004**
  - First clinical studies published, noting significant reduction in maternal mortality

- **2012**
  - WHO adds NASG to global PPH recommendations and guidelines

- **2018**
  - UNICEF adds NASG to its innovation portfolio to improve scaling activities

- **Late 2019**
  - NASG is available for purchase via UNICEF’s Supply Catalogue

- **2020**
  - UNICEF continues efforts to ensure its introduction in appropriate locations

**Impact**

Literature review on NASG notes a strong link to preventing maternal deaths. There have been over 36 publications on NASG since 2004. All clinical studies noted a significant impact that NASG has on reducing maternal mortality at a low cost for programming (on average, US$3 per use) as noted by the results in the chart to the right from six countries that participated in the clinical studies.

One key example of impact is found in Papua New Guinea (PNG). The risk of dying during childbirth in PNG is extremely high. According to UNICEF PNG, as much as one in every 120 women die during pregnancy or childbirth. However, many deaths may go undocumented, given that several women give birth outside of the formal health system. PPH is one of the leading causes of maternal mortality, in addition to resource-constrained health centers and hospitals that may not have the staff or supplies needed to save a woman’s life.

However, UNICEF and the Government are committed to improving the situation, by investing in obstetric care services and implementing new technologies, like NASG, to prevent the unnecessary deaths.

UNICEF first introduced NASG into the country in March 2019. Since then, the innovation has supported over 200 mothers who were suffering from PPH.

**Scaling NASG**

UNICEF has been analyzing the current barriers to scaling NASG to understand why it has not been introduced in appropriate settings, and in response, is implementing solutions.

**Barriers to scale:**

- Low awareness of NASG’s value
- Relatively high cost and low availability
- Lack of national policy on NASG
- Non-functional care & maintenance systems

**UNICEF response (in partnership w/ UNFPA):**

- Increase awareness by developing documentation on procurement and programming for NASG, including a package of technical resources for countries, while improving communications efforts by documenting local findings (i.e. story telling & sharing evidence through webinars).
- Improve institutional capacity by working with governments to advocate about the importance of NASG to reduce maternal deaths.
- Improve care and maintenance by developing and sharing appropriate guidance on how to use NASG.

**For more information contact:**

**UNICEF Product Innovation Website**
https://www.unicef.org/innovation/productinnovation

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