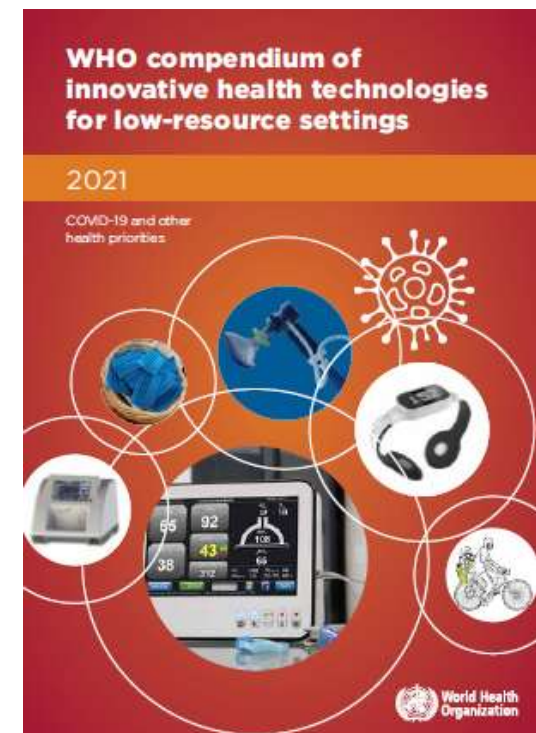


# Innovation Medical Devices

## Compendium of Innovative Health Technologies COVID-19 edition



# Agenda

31<sup>st</sup> August, 16:00 to 17:30 hrs CEST

Webinar 2021 Compendium of innovative technologies for low resource settings

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Welcome session

Mariangela Simao, ADG, WHO

2021 Compendium of innovative tech

Adriana Velazquez, WHO

Technology assessments

Gabriela Jimenez, Caroline Soyars, Cesar Burgi, Hans Peter Dauben, Inaki Gutierrez, Yadin David and Tom Judd and collaborators

Interdisciplinary work and innovation

Janet Diaz, Louise Agersnap, WHO

Case studies: Oxygen, Ventilator and PPE

Innovators, funders, regional colleagues, WHO staff

C-TAP and dissemination of compendium

Erika Duenas, WHO  
Mariela Machado, E4C

# Goal 3. Good health and well being

## Goal 9. Innovation



13<sup>th</sup> WHO Global Programme of Work:  
“Triple Billion” targets

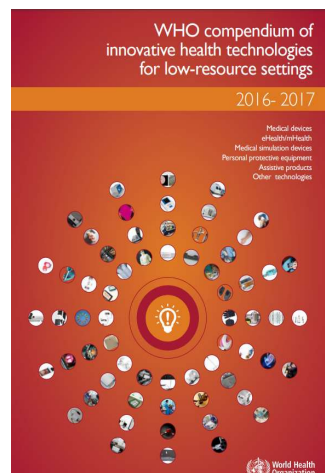
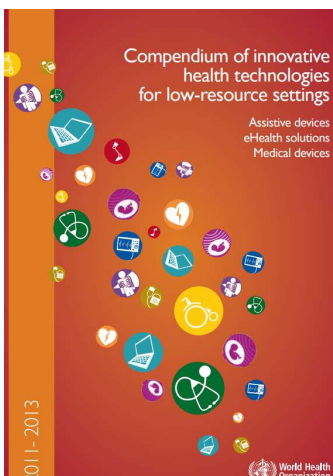




# WHO Assessing innovative technologies for use in low resource settings, since 2010



Formats and process is more stringent every year . Prototypes considered



### Self-powered pulse oximeter

Country of origin | United Kingdom

**Health problem addressed**  
10.8m children die every year. 99% of these deaths are in developing countries and 2.7m are due to congenital diseases that result in hypoxemia. Early detection of hypoxemia is essential in reducing mortality and morbidity.  $\text{SpO}_2$  monitoring facilitates this.  $\text{SpO}_2$  monitoring is also essential during anaesthesia. It is called the 5th vital sign.

**Product description**  
Our pulse oximeter is a portable, easy to use monitor that measures blood oxygen saturation levels and the pulse rate. It is designed for use in low resource settings and is rugged, reliable and has its own on board human powered energy source.

**Product functionality**  
The oximeter offers the highest quality pulse oximetry on the market. It analyses the entire graphic wave form, locking the onset of a pulse and resulting in extreme pulse detection. It has excellent low perfusion and motion -compensating performance, warning the user and preventing inaccurate readings.

**Developer's claims of product benefits**  
This monitor specifically designed for use in low resource settings or where electricity supply is a problem. The  $\text{SpO}_2$  monitor is rugged and reliable and has its own on-board power generator. Human energy is converted into electricity and saved in rechargeable batteries. The monitor gives 10-15 minutes of monitoring per minute of winding. The monitor may also be recharged using grid power when available. The pulse oximeter is designed to be compatible with a wide range of probes to take advantage of generic offerings when available. Unlike monitors designed for mainstream medical markets, it is very simple to use at low cost.

**Operating steps**  
The  $\text{SpO}_2$  monitor is a solution to the problem of measuring blood oxygen saturation in developing world health environments. By turning the crank human energy is efficiently converted into electricity and stored in rechargeable batteries. Generic probes ranging from pediatric to adult provide accurate pulse and saturation levels.

**Development stage**  
The pulse oximeter is currently available and in production. It is manufactured in India. Pilot field testing was carried out in South African secondary hospitals and its performance was congruent with "gold standard" high-end pulse oximeters.

**Regulatory approval is completed.**

**Future work and challenges**  
Product is commercialized.

**Use and maintenance**  
User: Nurse, midwife, physician, technician  
Training: none  
Maintenance: Nurse, physician, technician

**Environment of use**  
Setting: Rural, Ambulatory, primary and secondary health care facilities.  
Requirements: none.

**Product specifications**  
Dimensions (cm): 100 x 85 x 75  
Weight (kg): 0.7  
Consumables: none  
Life time: 5 years  
Shelf life: 5 years

**List price (USD): 600**  
Other features: Portable and reusable. Runs on batteries.  
Uses software.  
Year of commercialization: 2011  
Currently sold in: South Africa

See on following page



### Continuous Positive Airway Pressure, bubble

Country of origin | United States

**Primary function | Treatment**

**Health problem addressed**  
Preterm birth is the second leading cause of death in children under 5, with over 1 million babies dying directly from complications of preterm birth. In the developed world, Continuous Positive Airway Pressure (CPAP) is the gold standard treatment for respiratory distress syndrome (RDS). This device is based on CPAP technology and aims to treat neonates, particularly premature neonates, suffering from RDS in low-resource settings.

**Disease addressed**  
Diseases of the respiratory system; pregnancy, childbirth, and the puerperium; certain conditions originating from the perinatal period.

**Technical descriptions**  
The device consists of a flow source, pressure source, and patient tubing. The flow source, which is contained within a sheet metal enclosure, supplies a flow of room air and blends room air with supplemental oxygen. The pressure source is a column of water, and the user can adjust the pressure level by adjusting the level of water in the bottle. Infant-sized nasal prongs, connected to the patient tubing, provides the pressurised air flow to the patient.

**Developer's claims of product benefits**  
Oxygen is the standard treatment for neonates with RDS in low-resource settings, although oxygen does not provide the pressure necessary to keep lungs inflated, and can be an ineffective treatment for many neonates. This technology is a low-cost, easy to use device that is designed to keep the patients lungs inflated. The only additional components required are a power supply and source of oxygen. The device is designed to be very easy to assemble and use.

**Operating steps**  
Fill the bottle to the specified pressure level. Attach the bottle tubing and the patient tubing to the device and attach the nasal prongs to the end of the patient tubing. Plug the power cord into an outlet and turn on the device. Set the oxygen flow and the total flow on the device. Attach the nasal prongs to the patient. Check for bubbling in the water bottle to confirm that the patient is receiving the pressurised air.

**Regulatory status and standards compliance**  
European Community (CE-mark). The device is compliant with: ISO 14971, ISO 980, ISO 1041, ASTM D4169-09, ISO 10993, EC 60601.

**Use and maintenance**  
User: Nurse, general physician, specialised physician  
Training: A one-day training of the assembly, use, maintenance, and repair of the device is required in order for clinicians to be comfortable with and capable of providing CPAP therapy. Users are provided with a printed user manual and repair manual, as well as online training videos and documents.  
Maintenance/Calibration required: No

**Environment of use**  
Setting: Rural settings, urban settings, indoors, secondary level (general hospital), tertiary level (specialists hospital).  
Facility requirements: Gas supply.  
Energy requirements: Continuous power supply.

**Product specifications**  
Weight (kg): 12  
Dimensions: 480mm x 380mm x 30mm  
Accessories: A "starter kit" of accessories, includes hats, hat clips, nasal prongs, connectors, bottle tubing, and patient tubing. Additional accessories are available separately.  
Consumables: A hat, a set of hat clips, nasal prongs, patient tubing, a bottle, and bottle tubing.  
General product: The device should be used with a pulse oximeter, respiratory rate monitor, suction machine, and oxygen source (either a concentrator, cylinder, or piped).  
Lifetime: 5-10 years  
In UN catalog: Yes

**Commercial information**  
Reference price (USD): \$800.00  
Year of commercialization: 2015  
Number of units distributed: 101-1,000  
Other features: Portable, reusable (assuming appropriate decontamination and/or other processing between uses)

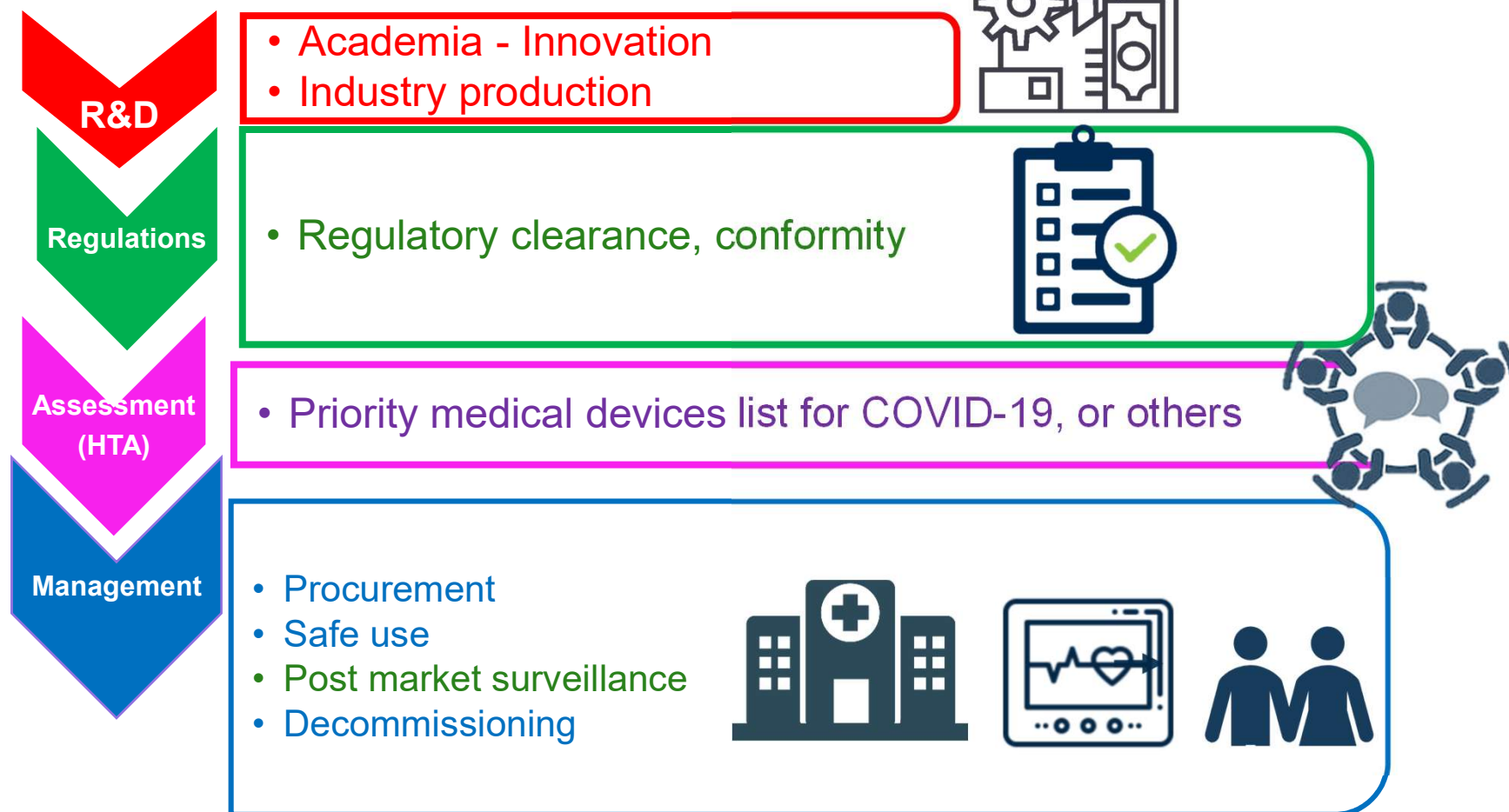
Contact: Robert Mros | Telephone: +1 415 454 3005 | Web: <http://btl2l3qcc0>

[www.who.int/medical\\_devices](http://www.who.int/medical_devices)

# List of compendia and downloads

Name of the publication	Year of publication	Number of Technologies per book	Number of Downloads per book (accessed 25.08.2021)
<a href="#">Compendium of new and emerging health technologies</a>	2011	44	10,310
<a href="#">Compendium of innovative health technologies for low-resource settings</a>	2014	86	11,235
<a href="#">WHO compendium of innovative health technologies for low resource settings, 2011-2014</a>	2015	119	22,312
<a href="#">WHO compendium of innovative health technologies for low-resource settings, 2016- 2017</a>	2018	71	12,913
WHO compendium of innovative health technologies for low-resource settings, 2021. COVID-19 and other health priorities.	2021	24	
	TOTAL	344	56,770

# To ensure improved access of safe, quality medical devices for COVID-19



# Sequence of process to ensure access to appropriate and safe health technologies



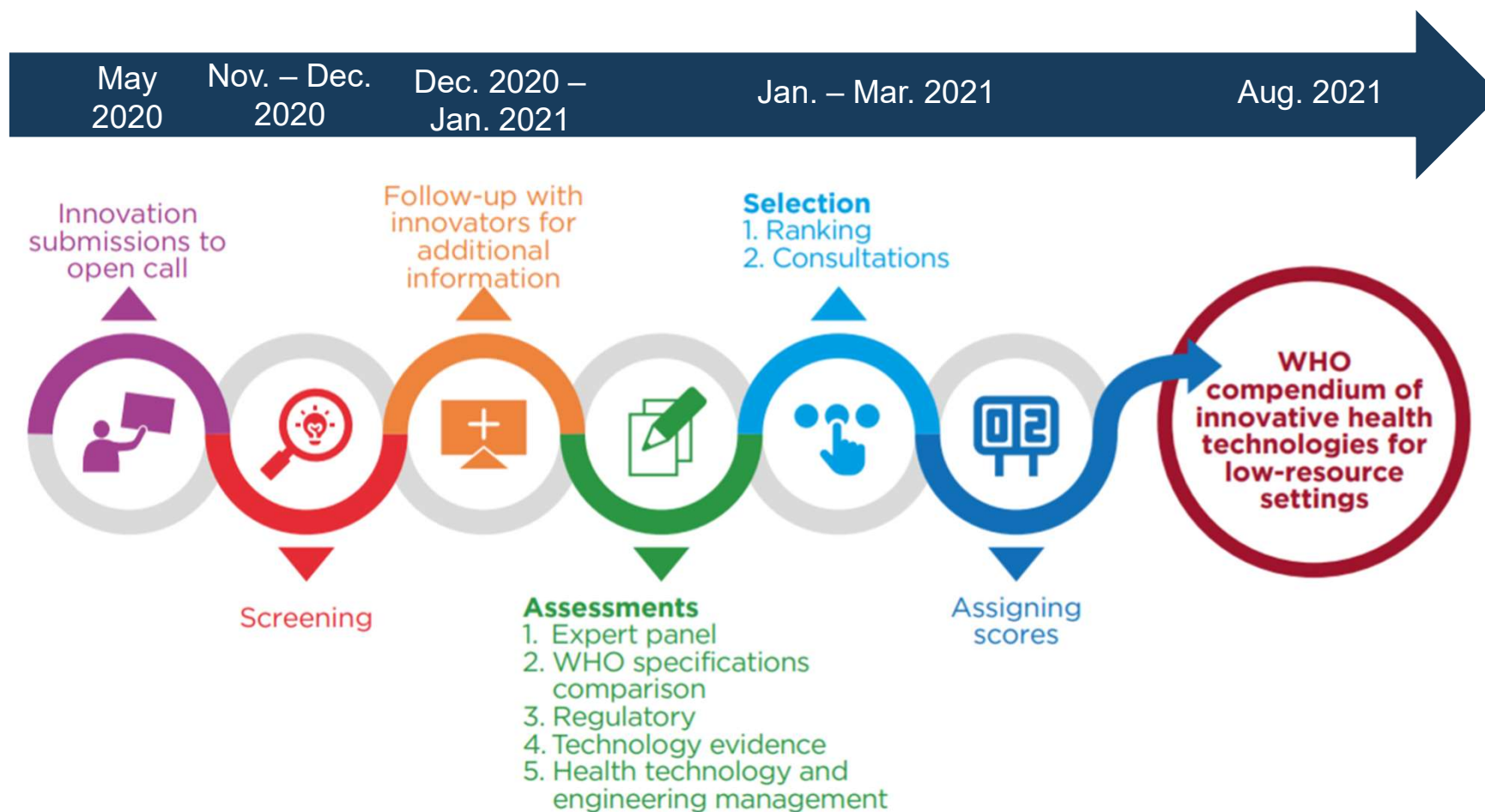


# 2020 On line submission format for assessment includes: 5 sections:



Documents need to be submitted for review

# Evaluation Process and Timeline



# Submissions to the call

**42 submissions out of  $\approx 280$**  that were considered to have relevant details after screening and were contacted for additional information

**33 complete submissions** after innovator follow-up that underwent full assessment

**24 products selected to be in the compendium**

**9** prototypes

**15** commercially available

# Innovator information per submission

## Newborn heart rate meter

Country of origin | Norway

Primary function | Monitoring

### Commercial information

List price (USD)<sup>1</sup>: \$150

Year of commercialization<sup>1</sup>: 2018

Number of units distributed<sup>1</sup>: 101-1,000

Currently marketed in<sup>2</sup>: Europe, Australia, New Zealand, and Tanzania

Brand<sup>1</sup>: Laerdal Medical AS

Model<sup>1</sup>: NeoBeat Newborn Heart Rate Meter



### Health problem addressed<sup>3</sup>

An estimated 10 million newborns are born every year that are not breathing and require resuscitation. Due to insufficient oxygenation of the newborn, 0.7 million newborns died and 1.15 million newborns suffered permanent brain injury. To address this issue, there is a need for immediate provision of newborn's heart rate to support health care workers in performing effective ventilations, by application of a reusable ECG heart rate meter onto the wet newborn's chest and quick continuous display of the newborn's ECG heartrate.

### Product description<sup>3</sup>

ECG signals from newborn's wet chest are picked up by dry stainless-steel electrodes that are embedded in one spring-elastic plastic buckle. A housing includes a rechargeable battery, signals processor, and a bright-LED display.

### Product details<sup>3</sup>

Accessories<sup>1</sup>: USB 5V power supply (charger), AC plug kit to fit various global electrical systems

Warranty Duration<sup>1</sup>: 1 year

Lifetime<sup>1</sup>: 2-5 years

Energy requirements<sup>4</sup>: Continuous power supply (AC powered, 110V/220V, 5W)

Facility requirements<sup>4</sup>: Disinfection with 70% ethanols

Contact: Frode Liland | Email [frode.liland@laerdal.com](mailto:frode.liland@laerdal.com) | Telephone +47 91 106093 | Web <https://bit.ly/3hzpDFh>

<sup>1</sup> Reported by manufacturer on 5 May 2020 | <sup>2</sup> Reported by manufacturer on 7 Jan 2020 | <sup>3</sup> Reported by manufacturer on 18 Jan 2020. | <sup>4</sup> Reported by manufacturer on 20 Jan 2020.



# Disclaimer and Regulatory Assessment



## WHO specification comparison

At the time of report creation, WHO technical specifications are not available to compare against for this type of technology.

## Regulatory assessment

 Pre-market assessment	 Proceed with caution
 Post-market assessment	 Proceed with caution
 Quality system assessment	 Proceed with caution

Some WHO requested information and documentation for all three Regulatory and Quality Assessment categories is absent. Therefore, a thorough review of this product was not possible at this time. Laerdal has obtained an EU MDD CE Mark for the AS NeoBeat Newborn Heart Rate Meter. The regulatory status for the various accessories is currently unclear. Laerdal has obtained an ISO 13485:2016 certificate. Laerdal must also ensure they comply with local country import and pre-market regulations.

Inclusion in the Compendium does not constitute a warranty by WHO of the fitness of any technology or product for a particular purpose, as no rigorous review for safety, efficacy, quality, applicability or cost acceptability was conducted by WHO. WHO will not be held to endorse nor to recommend any technology or product included in the Compendium. WHO disclaims any and all liability whatsoever for any damage of any kind that may arise in connection with the procurement, distribution and/or use of any such technology or product.

- A regulatory & quality system requirements checklist was created for each device type
- EU & US device regulatory & quality system requirements were used as benchmarks for all devices, to ensure consistency & objectivity for each device assessment

## COMMERCIALLY AVAILABLE

### Technology evidence assessment

Domains	Evidence assessment
Medical	! !
Safety	! !
Economy	✗ ✗ ✗
Organizational	→ → →
Legal/ regulation	✗
Social	! ! !
Ethical	→ → →
Green environment	! ! !

Three level of confidence:

**Green** → ok

**Orange** → with caution

**Red** → higher risk, based on the provided information

### Descriptive and overall statement

#### Conclusions

Transferability



Status of development,  
technology readiness  
level



8

Evidence (according to  
GRADE)



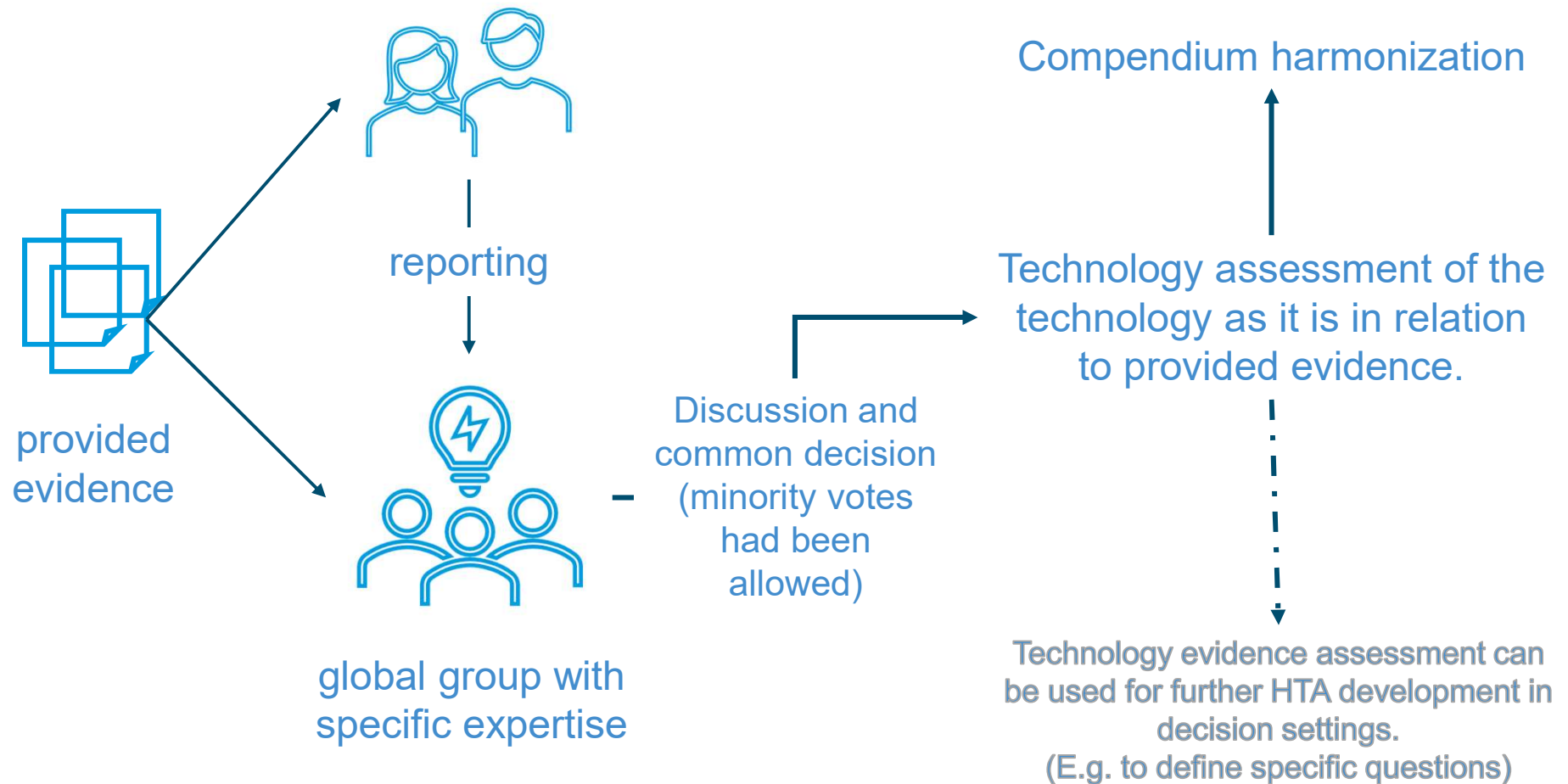
Technology evidence  
assessment



Recommendation  
with caution

Rate meter

## Technology evidence assessment



# Health technology and engineering management

	Appropriateness for low-resource settings		Appropriateness for low-resource settings		Target setting: Neonatal ICU 
Durability	→		Ease of maintenance	→	
Ease of Use	→		Infrastructure requirements	→	
Positive impact on clinical outcomes	→		Local access to sales support	→	
Affordability	→		Local access to technical support	→	
Engineering resources minimization	→		Local access to training	→	
Cultural and social acceptability	→		Local access to spare parts	→	
Environmental conditions	→		Local production	✗	
Aesthetics	→		Locations of use within target setting	✗	
Ease of cleaning	→				

This product is a heart monitor for newborns. It is applied to the newborn's chest with an elastic spring and buckle and dry stainless-steel electrodes make contact with the skin. A housing with a rechargeable battery, signal processor, and LED display is on the center of the buckle. The device includes a charging stand. The device must be attached to the newborn skin up to two minutes in order for the pulse oximetry readings to appear. Although the product is easy to apply, there are concerns about pressure and skin irritation on the fragile newborn chest due to the long duration of use. The manufacturer suggests that the product can assist during emergencies, however, it would obstruct a chest x-ray or cardiac resuscitation if urgently needed. The product requires minimal maintenance, is easy to cleaning, and seems to be well supported by sales and technical staff.



# Health technology & engineering management



## Field-Based Evaluation

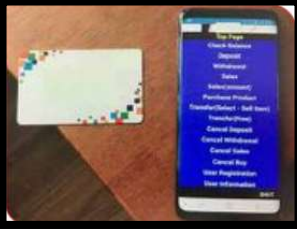
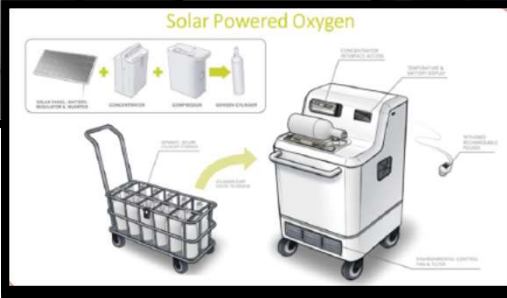
- Purpose: To review and assess technological attributes and engineering management of Health Technologies submitted to WHO to address needs of low resource settings (LRS).
- Methodology: Through collaboration between the IFMBE Clinical Engineering Division (CED) and the Global Clinical Engineering Alliance (GCEA), we engaged our international network of field-based practitioners, mostly from LRS. The group validated the Survey tool and participated in grading the attributes shown on the previous slide.
- Results: Data collection evidence included multiple responses for each of the submissions and validation through senior Clinical Engineering experts. The data included 102 inputs from 50 practitioners in 37 countries. This is the first WHO Innovation Compendium with the benefits from Engineering field-based Evaluation.

# List from table of contents

<b>COMMERCIALLY AVAILABLE PRODUCTS . . . . .</b>	<b>1</b>
Bleach additive, colourized . . . . .	2
Deployable facility, for emergencies, shipping container based . . . . .	4
e-voucher, vaccination management . . . . .	6
Heart rate meter, for newborn . . . . .	8
Infrared thermography camera . . . . .	10
MP3 radio, solar, wind-up powered . . . . .	12
Oxygen generation plant, deployable . . . . .	14
Oxygen, portable rebreathing . . . . .	16
Respiratory monitoring system, portable . . . . .	18
Solar-powered oxygen concentrator . . . . .	20
Tele-education, for COVID-19 . . . . .	22
Ventilator, for low oxygen inlet pressure . . . . .	24
Ventilator, mechanical, pressure control . . . . .	26
Ventilator, with extended battery time . . . . .	26
<b>PROTOTYPE PRODUCTS . . . . .</b>	<b>33</b>
X-ray detector, dual energy, portable . . . . .	33
Face mask, reusable, polypropylene based . . . . .	34
Microfluidic based, COVID-19 test . . . . .	36
Optical screening jaundice device, neonatal . . . . .	38
Pediatric automated ultrasound . . . . .	40
Personal protective equipment, biodegradable, jute cellulose based . . . . .	42
Personal protective equipment suit reusable, ventilated . . . . .	44
Solar Powered Oxygen Concentrator & Compressor (SPOCC) . . . . .	46
Ventilator, resuscitator bag based . . . . .	48
Ventilator, ICU with waveform display . . . . .	50

# Key for Icons

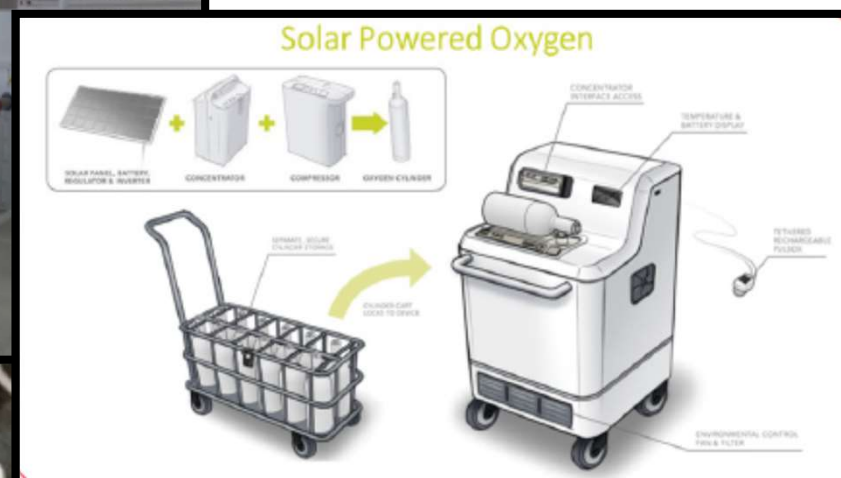
							
<b>Regulatory assessment</b>	Proceed	Proceed with caution	Not acceptable	Hospitals		Health care systems	
<b>Technology evidence assessment - risk/benefit ratio</b>	High	Medium	Low	Clinic		Health care providers	
<b>Technology evidence assessment - Impact</b>	High	Medium	Low	Health care facilities		Neonatal care	
<b>Innovation</b>		Innovation aspect in the domain		Public and home settings		Neonatal ICU	
<b>Summary:</b>				Patient transport		Screening tool at public and clinical sites	
Transferability	Fully transferable	Partly transferable	Not transferable				
Evidence (according to GRADE)	High	Medium	Low				
Technology evidence assessment	Recommended	Recommend with caution	Not recommended				
<b>Health technology and engineering management</b>	High appropriateness for low-resource settings	Moderate appropriateness for low-resource settings	Low appropriateness for low-resource setting	Not Applicable			





## **Panel 1: Oxygen innovations**

# OXYGEN INNOVATIONS



## Innovation in health begins and ends with a life saved...



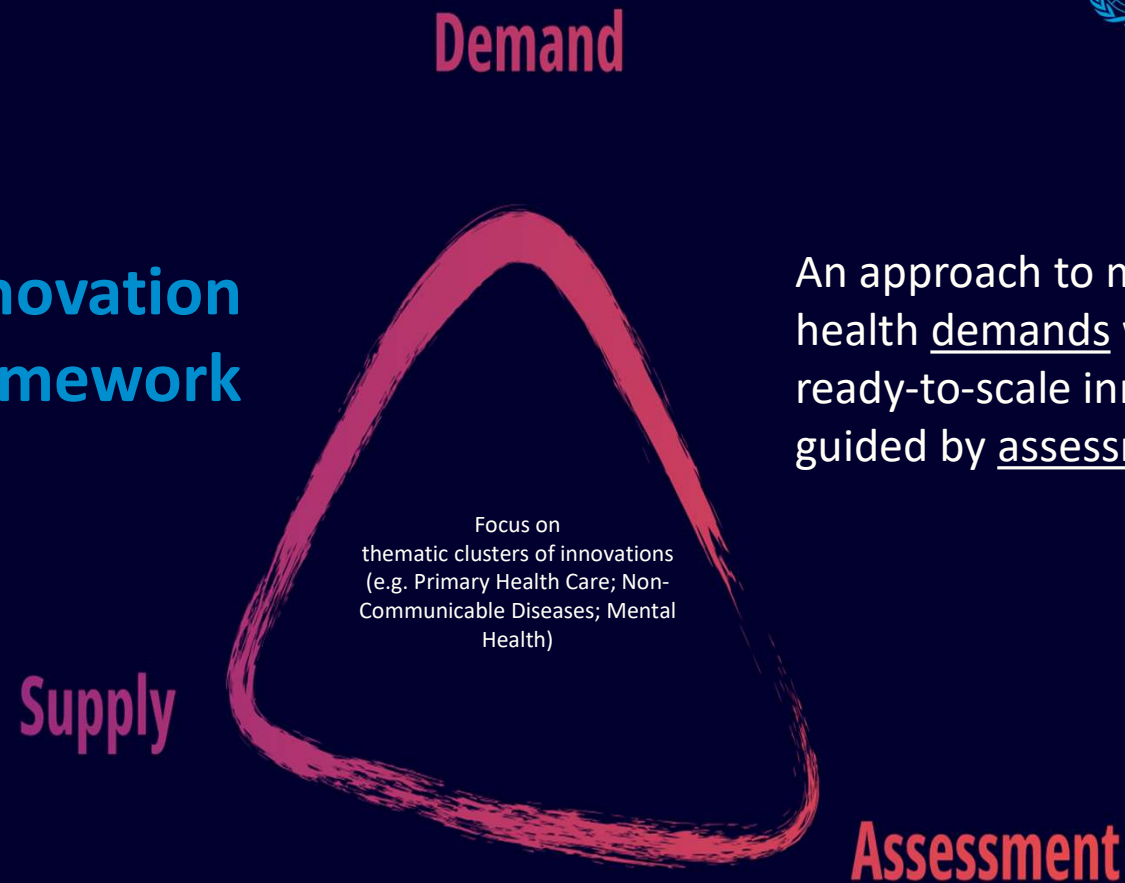
This child is receiving oxygen through a **solar-powered oxygen concentrator** – an innovative solution that can save lives in places with frequent power cuts, such as this hospital in Somalia

### Key facts:

- Installed thanks to a new WHO Innovation Scaling framework – a WHO facilitated multi-partner approach to innovation scaling
- Since then many more lives have been saved (and counting)
- Pneumonia kills 800,000 people each year. 20-40% could be saved with medical oxygen
- COVID19 has accelerated global demand for oxygen
- Barriers exist for conventional oxygen systems



# WHO Innovation Scaling Framework



An approach to matching country health demands with supply of ready-to-scale innovations, guided by assessment

# Lessons learned from Innovation Matchmaking & Scaling

- Demand drives scaling
- WHO can add value by 'unlocking demand'
- WHO and UN Country Reps → the 'salesforce'
- Assessment – a double edged sword
- Heavy process – need match-making platform
- Supply pipeline: Wholesale approach
- Understand and engage audiences
- Horizontal scaling through peer-to-peer learning

Scaling



## **Panel 2: Innovative ventilators**

# INNOVATIVE VENTILATORS



# Gradian Health Systems

At Gradian, we believe medical equipment is a catalyst — not a sole solution — for overcoming inequitable access to healthcare service. The impact of medical equipment on patient outcomes can only be realized with robust, comprehensive, and sustained technical support and training.

## WHO WE ARE

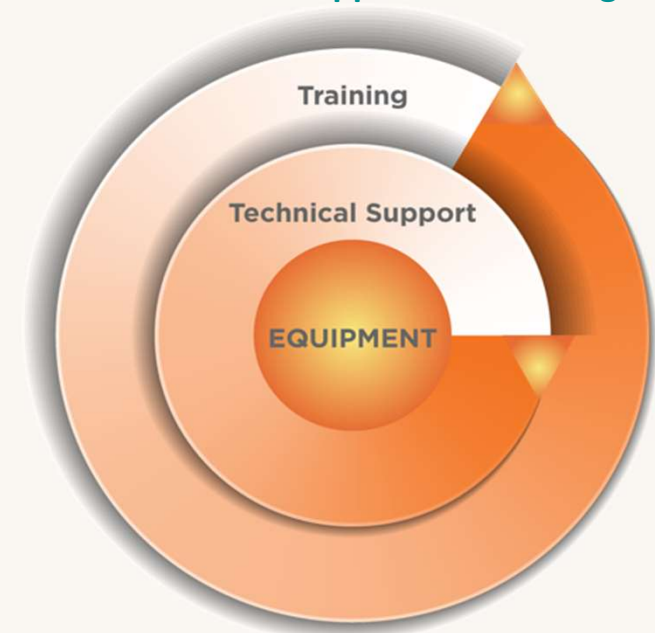
Nonprofit medical technology company  
focused on  
resource-constrained settings

## WHAT DO WE

Develop, distribute & sustain world-class medical technology with local customer service & user-centered training

## WHY WE DO IT

Every patient deserves access to high-quality healthcare, which means every provider needs access to high-quality medical technology and training



## Equipment | Gradian CCV

The Gradian CCV offers management options for post-op, intensive, critical care, and facilitates ventilation during transport within and between hospitals



### **Portability Features**

Bed hooks, handle, and shoulder strap for convenient use and transportation in any setting

### **Fully-Automatic Ventilator**

Pneumatically-driven mechanical ventilator with 7 hours of rechargeable internal battery

### **Internal Compressor**

Built-in air compressor that uses room air to supplement existing oxygen sources or ventilate patients when medical oxygen is unavailable

### **Oxygen Reservoir**

Reservoir enabling use with low-flow oxygen sources like a concentrator or flowmeter

### **External Battery**

Hot-swappable, rugged battery providing additional 14 hours of operating time (up to 21 hours in total)

## Technical Support | Proactive & In-person

Gradian has extensive service operations infrastructure — managed from our service and operations hub in Nairobi, Kenya — to best better serve our customers where they are

- ✓ 3-year service and spare parts warranty with every purchase carried out by Gradian certified engineers and technicians
- ✓ On-site preventive maintenance annually and corrective maintenance, as needed
- ✓ Spare parts stored locally for rapid deployment
- ✓ 24/7 customer service for remote troubleshooting via WhatsApp, phone, email





## Training | Building Capacity for the Long-Term

Trainings are designed and led by teams of certified local clinical trainers with deep experience in the specialties of anesthesia and critical care medicine and are:

- ✓ User centric
- ✓ Rapid-cycle, deliberate practice
- ✓ Modular
- ✓ Accessible
- ✓ Locally contextualized

*Since the start of COVID-19, Gradian has supported COVID-19 responses in Kenya, Uganda, Nepal, Sierra Leone, Tanzania, Zambia, and Benin among other countries with Gradian CCVs as well as the training of more than 2,000 healthcare providers.*



## Training | Uganda Spotlight

The Government of Uganda has taken on an ambitious effort to increase critical care capacity by fully equipping ICUs at all regional referral hospitals across the nation – as such, Gradian is working with the Association of Anesthesiologists of Uganda and Joint Medical Store to support nationwide scale up of ventilation capabilities



- ✓ 109 CCVS installed at 17 hospitals representing all regional referral hospitals in the country
- ✓ 698 clinical providers trained, amounting to 850+ hours of training

*“In every hospital that we’ve trained, we’ve covered the basics of critical care or the fundamentals of critical care. Things to do with definition of what a critical care bed is, what a critical patient needs, and different interventions and therapies that can be provided in a critical care unit. We’ve also trained on therapies like oxygen therapy, fluid therapy.”*

- Dr. Fred Bulamba

## **Panel 3: personal protective equipment (PPE)**

# INNOVATIVE PPE



# Personal Protective Equipment Innovations in the context of COVID-19

**Madison Moon**  
**WHO Health Emergencies Programme**  
**Infection Prevention and Control**

WHO Compendium of Innovative Technologies for Low-Resource Settings Launch  
31 August 2021

[www.HelixAnimation.com](http://www.HelixAnimation.com)

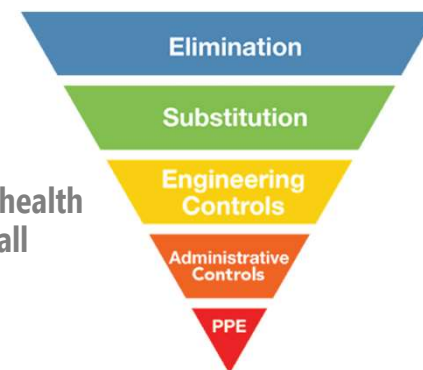
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An Animated HD PowerPoint 7



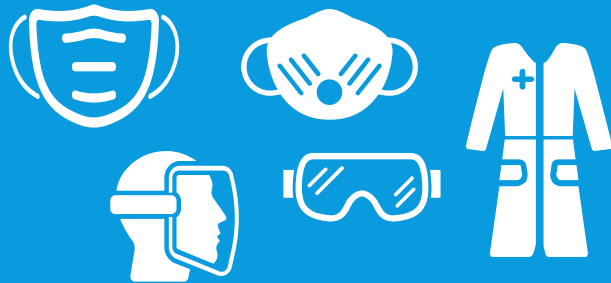


- In the context of COVID-19 the use of PPE (and masks in particular) has increased substantially, leading to global shortages in availability of PPE
- In most instances, the use of masks has been elevated to be a primary control strategy in both health care and community settings, as an inability to identify and isolate all suspected cases renders all persons as potential cases
- Environmental and engineering controls remain extremely important, particularly in instances where there is a need to ration personal protective equipment (including extended use, alternatives, reprocessing). PPE conservation carries risk, as deviations from standard and transmission-based precautions can result in widespread surface contamination and self-contamination
- In health care settings, any strategy to maintain hygienic care conditions must contend with the wide variety of possible organisms that transmit in health care. Although it is relatively easy to kill SARS-CoV-2 with standard cleaning and disinfection practices; difficult to ensure full decontamination of items (including PPE) potentially contaminated with *C. difficile*, norovirus, *C. auris*, etc.



# The PPE ecosystem needs to change

- Single use PPE contributes to enormous generation of waste (both infectious and normative waste streams)
- Lack of focused research attention on comfort, harms, effectiveness, and self-contamination risks despite being relied upon daily by millions of health workers worldwide
- There are now more untrained users of PPE and masks than ever before, often well-intended but inconsistently or incorrectly implemented
- Reliance on global market rather than local production and testing capacities creates disparities in cost and availability
- Beyond COVID-19, antimicrobial resistance is increasing, additional respiratory infection variants are being identified, occasional concerning cases of viral hemorrhagic fever occurring with smaller intervals between cases. PPE must meet the challenges of today and tomorrow.



## RESOURCES ON PERSONAL PROTECTIVE EQUIPMENT IN THE CONTEXT OF COVID-19



- Rational use of personal protective equipment for coronavirus disease (COVID-19) and considerations during severe shortages:  
[https://www.who.int/publications/i/item/rational-use-of-personal-protective-equipment-for-coronavirus-disease-\(covid-19\)-and-considerations-during-severe-shortages](https://www.who.int/publications/i/item/rational-use-of-personal-protective-equipment-for-coronavirus-disease-(covid-19)-and-considerations-during-severe-shortages)
- Mask use in the context of COVID-19:  
[https://www.who.int/publications/i/item/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications/i/item/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak)
- Technical specifications of personal protective equipment for COVID-19:  
[https://www.who.int/publications/i/item/WHO-2019-nCoV-PPE\\_specifications-2020.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-PPE_specifications-2020.1)
- Infection prevention and control during health care when coronavirus disease (COVID-19) is suspected or confirmed:  
<https://www.who.int/publications/i/item/WHO-2019-nCoV-IPC-2021.1>
- COVID-19 Essential Supplies Forecasting Tool:  
[https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential\\_forecasting-Overview-2020.1](https://www.who.int/publications/i/item/WHO-2019-nCoV-Tools-Essential_forecasting-Overview-2020.1)
- COVID-19 Supply Chain System:  
<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/covid-19-operations>
- OpenWHO Training: Standard precautions: The role of personal protective equipment (PPE): <https://openwho.org/courses/IPC-SP-PPE-EN>
- WHO Academy: Augmented reality personal protective equipment training (AR PPE): <https://www.who.int/about/who-academy/the-who-academy-s-covid-19-mobile-learning-app#:~:text=New!,while%20they%20care%20for%20patients>

## C-TAP (Technology Access Pool)



Health Topics ▾

Countries ▾

Newsroom ▾

Emergencies ▾

Data ▾

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[Home](#) / [Initiatives](#) / [COVID-19 technology access pool](#) / [What is C-TAP?](#)



## What is C-TAP?

< [COVID-19 technology access pool](#)

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[Solidarity Call to Action](#)

### Commitments to share knowledge, intellectual property and data

The COVID-19 Technology Access Pool (C-TAP) will compile, in one place, pledges of commitment made under the Solidarity Call to Action to voluntarily share COVID-19 health technology related knowledge, intellectual property and data. Shared knowledge, intellectual property and data will leverage our collective efforts to advance science, technology development and broad sharing of the benefits of scientific advancement and its applications based on the right to health. C-TAP works through its implementing partners: the Medicines

### Related documents

27 October 2020

[The Geneva Call: A Joint Appeal for Open Science](#)

27 October 2020

[C-TAP: A Concept Paper](#)

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov>





# **Engineering Global Development Engineering for change “4FC” disseminates technical information from WHO compendia August 2021**

engineering FOR  
CHANGE





**E4C** is on a mission to prepare, educate and activate the international engineering workforce to improve the quality of life of underserved communities around the world.

We do this by providing resources, programs and platforms that accelerate the development of impactful solutions and cultivate change agents.

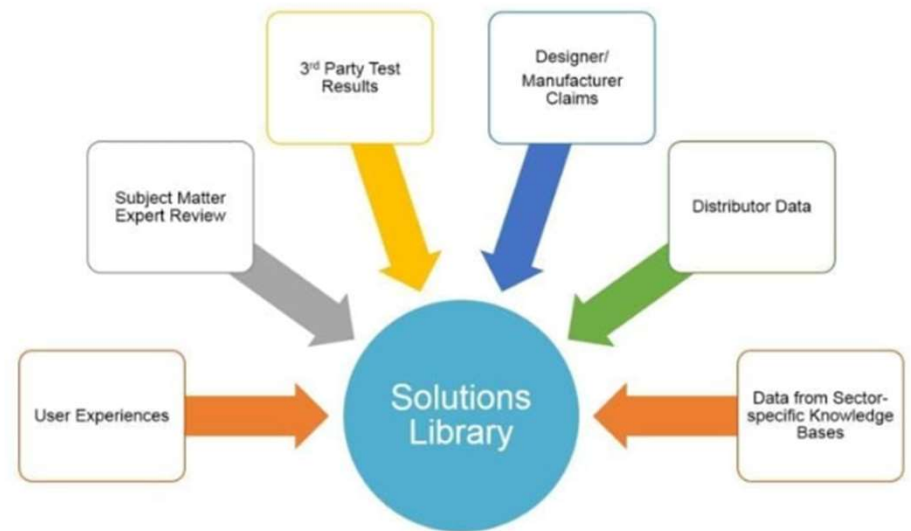
[www.engineeringforchange.org](http://www.engineeringforchange.org)

# E4C Solutions Library

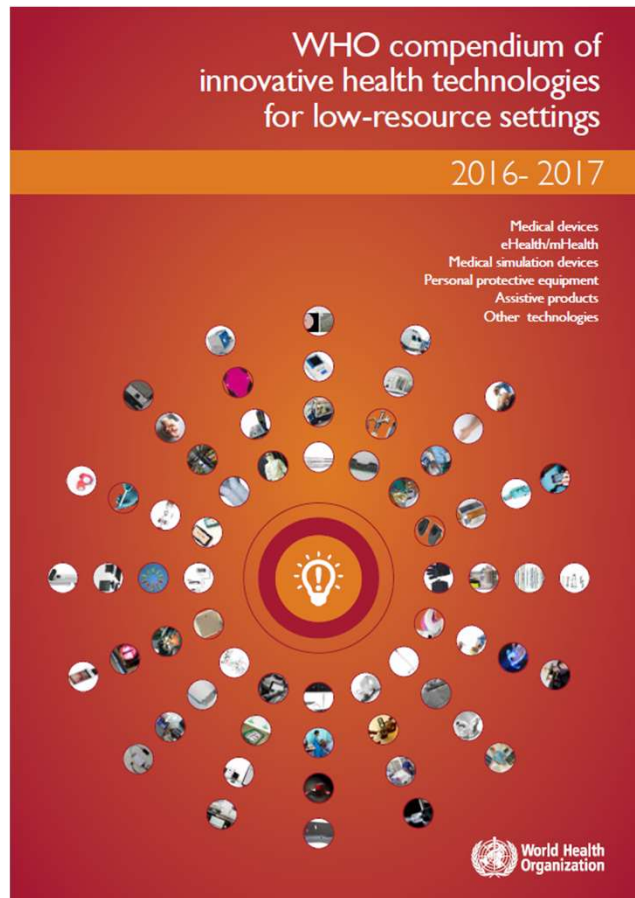
**Living database** of products and services (1,000+) intended to be accessible and appropriate for those living in resource-constrained environments.

- Codified framework and taxonomy
- Technical performance, market and compliance information, evaluation methods and standards
- Neutral information that is normalized across all products
- Side-by-side comparison and analysis of market influences

**Relevant resource** for engineers, designers, manufacturers and implementers of tech4good



## E4C >< WHO



**2016** - Data disclosure framework, taxonomy harmonization and integration of ~10 products from the Compendium, promotion to network

**2018** - Harmonization of eHealth/mHealth product classification

**2021** - Integration of 24 new products in three technology categories (invasive ventilators, non-invasive ventilators, and oxygen systems) +

Targeted promotion to E4C's network via research briefs and signal boosts

# Solutions Library > WHO Compendium

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Solutions Library

RETURN TO THE PRODUCTS PAGE

ABOUT

The E4C Solutions Library is a living database of products and services that are intended to be accessible and appropriate for those living in resource-constrained environments. The data in the Solutions Library is curated technical and market performance information that is normalized across all products, enabling side-by-side comparison and analysis of market influences. [Find out more.](#)

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AGRICULTUREENERGYHABITATHEALTHICTSANITATIONTRANSPORTWATER


NeoBeat Newborn Heart Rate Meter

Laerdal Medical AS

A reusable neonatal ECG heart rate meter.

Courtesy of WHO Compendium 2021





SNAPSHOT

MANUFACTURING & DELIVERY

PERFORMANCE & USE

RESEARCH & STANDARDS

FEEDBACK

Product description

NeoBeat is a reusable, consumable-free heart rate meter that provides an accurate and continuous display of newborn heart rate. The device takes seconds to put on a newborn's abdomen, and the instantaneous heart rate can help guide neonatal resuscitation.

This product was selected for inclusion in WHO's 2021 [Compendium of Innovative Health Technologies for Low-Resource Settings](#).






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ASME  
SETTING THE STANDARD

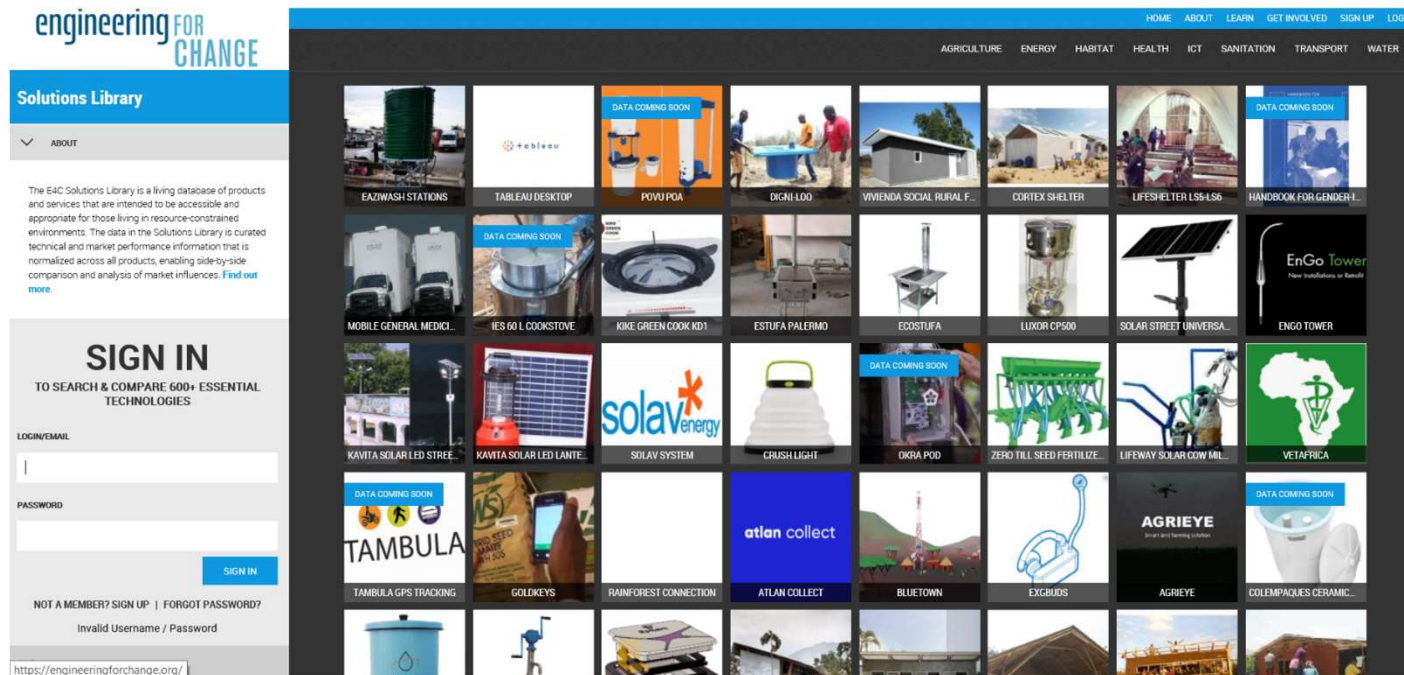
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# Solutions Library > WHO Compendium

<div> <div>              SNAPSHOT         </div> <div>              MANUFACTURING &amp; DELIVERY         </div> <div>              PERFORMANCE &amp; USE         </div> <div>              RESEARCH &amp; STANDARDS         </div> <div>              FEEDBACK         </div> </div>	
Fields marked ✓ are sourced values that have been evaluated by the manufacturer or a third party, all others are design specifications.	
Consumables	None
Indispensable equipment for function	No
Power Supply Type	Rechargeable battery
Maintenance or calibration required by user at time of use?	No
Alert mechanism	No
Clinical measurements monitored	Heart rate
Patient population	Newborns
Maximum duration of consecutive usage	Unknown

# Elevating the WHO Compendium



THANK YOU!

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[www.engineeringforchange.org/solutions/products](http://www.engineeringforchange.org/solutions/products)

# Next call open during September, to be published early 2022



**To review previous submissions with more evidence and to add new ones.**

Submission for Compendium of innovative health technologies for low-resource settings 2021 vol 2 (ID 396376)

<https://extranet.who.int/dataformv3/index.php/396376?lang=en>

**Gracias  
Thank you  
Merci  
Shokran  
Xie xie  
Spasiva**



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