

# Pediatric and Congenital Cardiac Care in Low- and Middle-Income Countries

Frugal, Adaptable, and Scalable  
Training and Technology



# Congenital Heart Disease

## A Global Health Equity Gap



- CHD affects 1.8% of live births
- > 260,000 annual deaths globally
- Survival
  - > 90% if born in a HIC
  - << 50% if born in a LIC

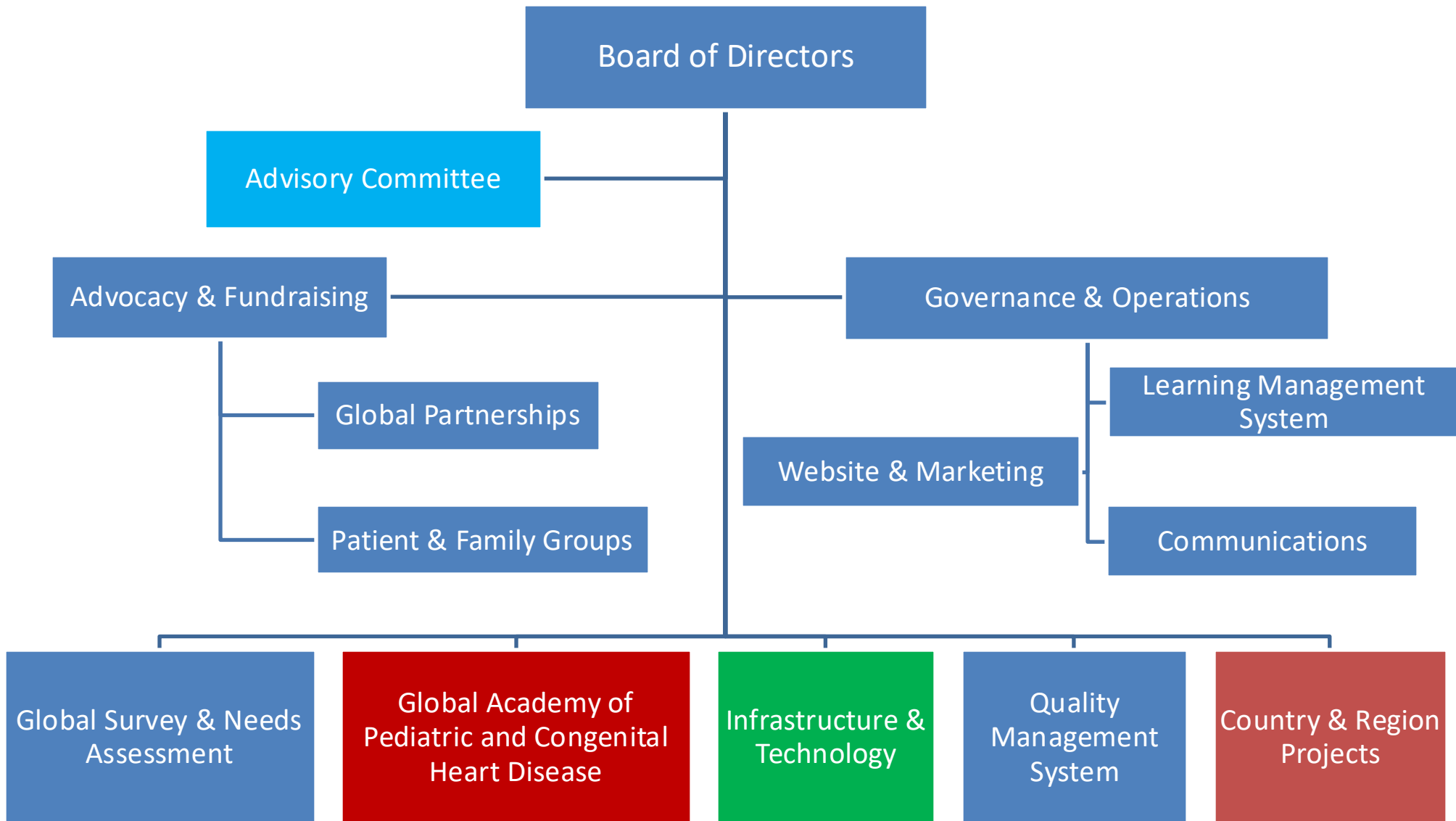
- Major limitations to current models of assistance
  - High cost, few children treated
  - Few sustainable programs
- 90% of children in LIC still lack access to cardiac surgery
- Major barriers to care include workforce shortage and delayed diagnosis

# Empowering Hearts Globally

The Problem: Too many children with congenital heart disease are dying due to lack of access to care

The Mission: Transform access to quality pediatric and congenital cardiac care in low- and middle-income countries

Our Goal: To develop an innovative approach to graduate medical training and early diagnosis by using emerging technologies



**Empowering Hearts Globally**

# Global Academy of Pediatric and Congenital Heart Disease (GAPCHD)

Global Initiative in  
PCHD Training

Global Initiative in  
PCHD Credentialing

Global Initiative in  
PCHD Nursing

Global Initiative in  
PCHD Administration

Basic

Core

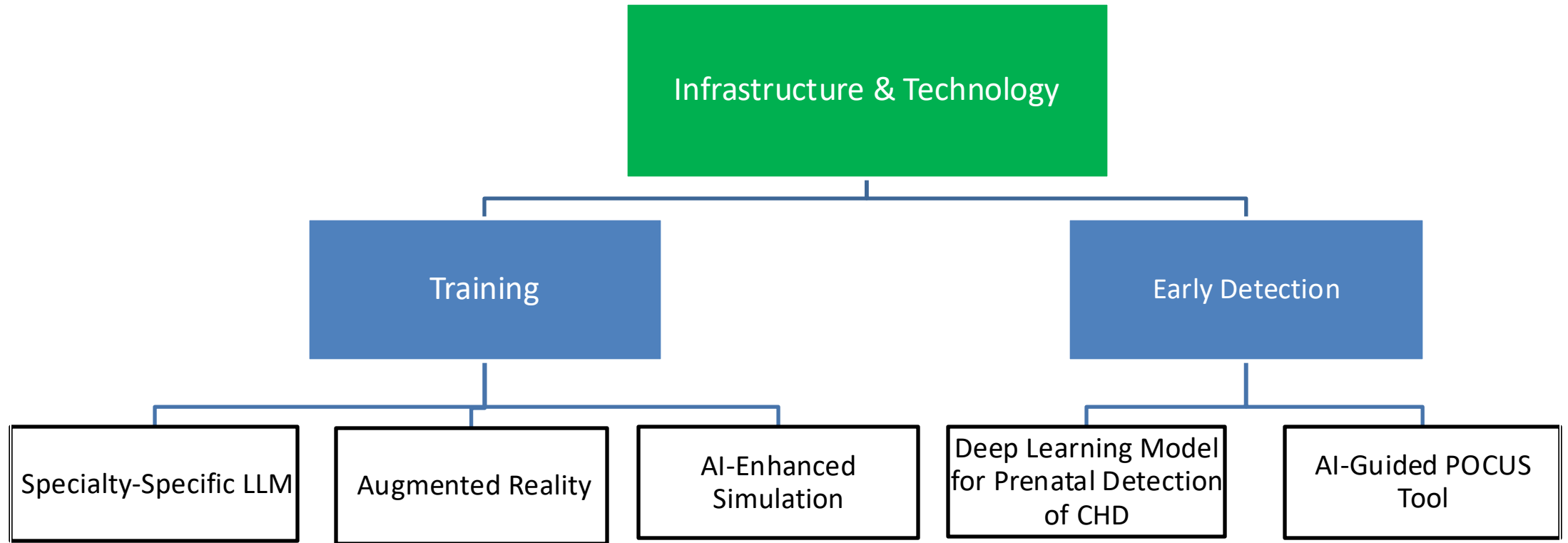
Advanced

## Pillars of Training:

Pediatric Cardiology  
Pediatric Critical Care  
Pediatric Cardiac Anesthesia  
Pediatric Cardiac Perfusion  
Pediatric Cardiac Surgery

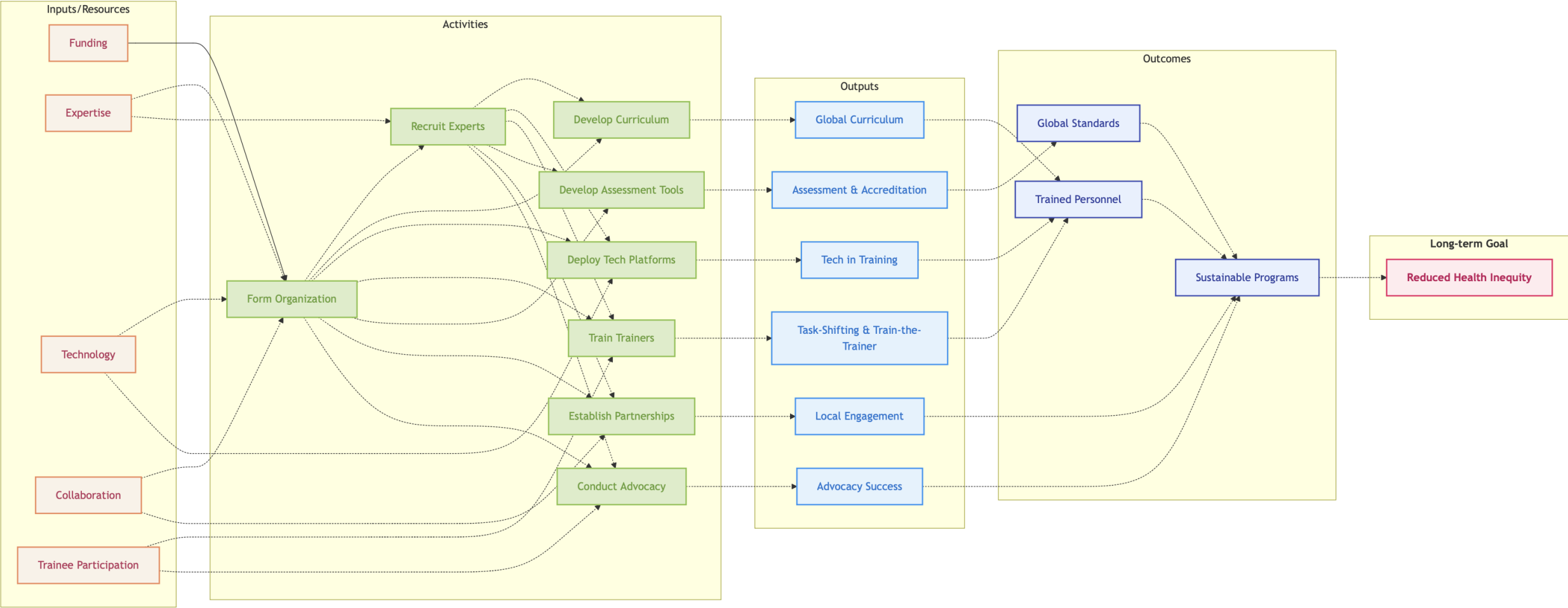
Cardiac Nursing  
Cardiac Administration

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# Theory of Change Flow Chart



# Advisory Committee - Page 1



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# Advisory Committee - Page 2



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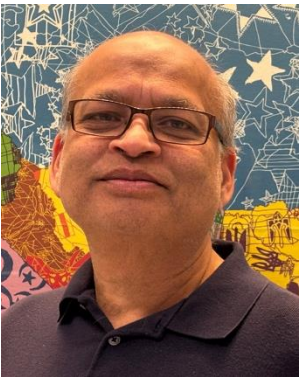
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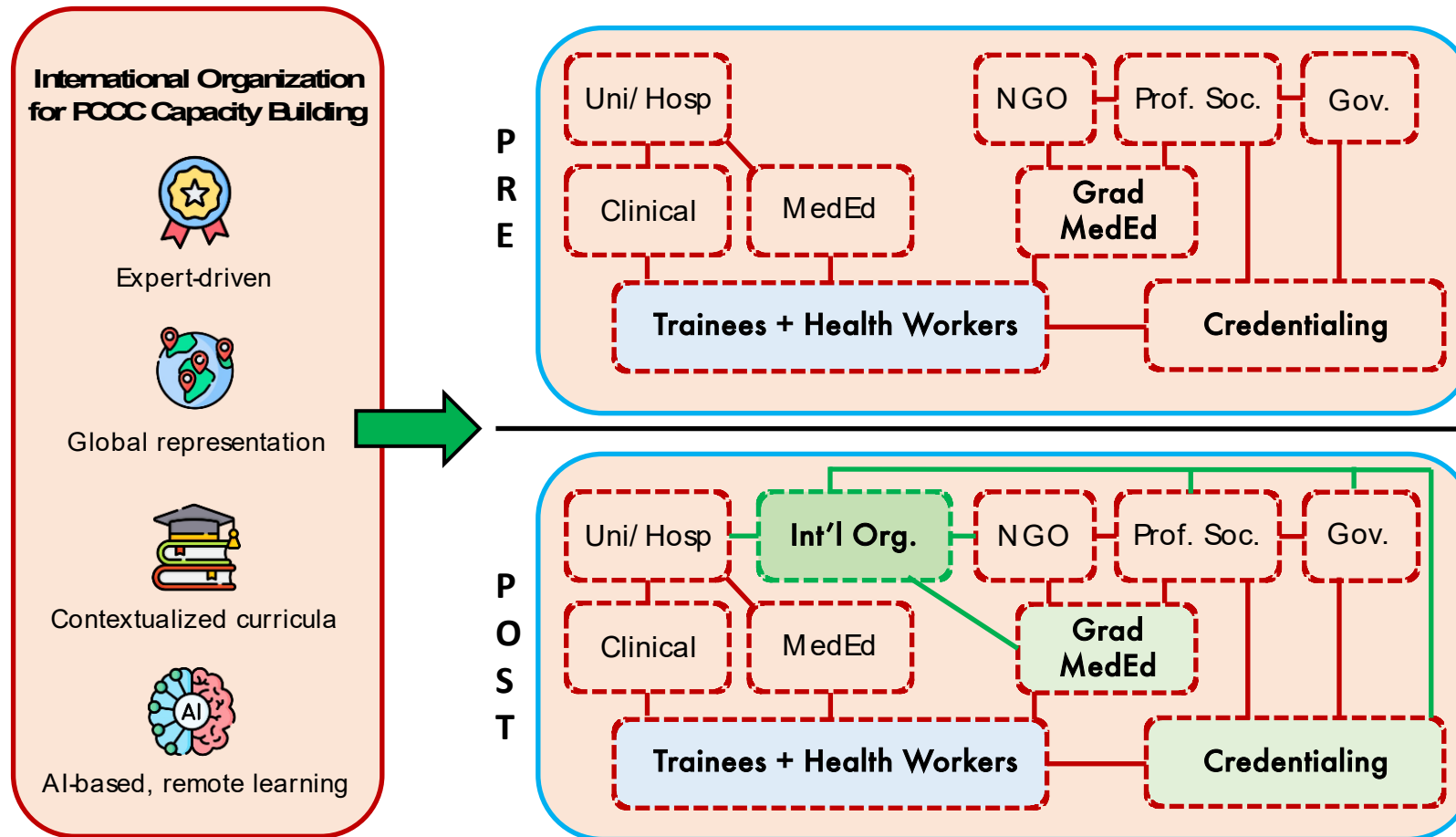


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Empowering Hearts Globally














# Role of an International Organization in Improving Graduate Medical Education and Credentialing



## **CONTEMPORARY REVIEW**

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# Pediatric and Congenital Cardiac Services: An Innovative and Empowering Approach to Global Training and Equitable Care

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# Characteristics of a Scalable Global Training Program

Executing a global strategy for training while prioritizing local solutions

- Standardized curriculum with a modular design
- Contextualized, interactive case-based lessons
- Training-the-trainer approach
- Sharing of trainers and mentors
- Standardized assessment tools

# Emerging Technologies in Medical Education

- Pediatric cardiology large language model with RAG
- Augmented or extended reality for remote hands-on training
- AI-enhanced simulation training and assessment



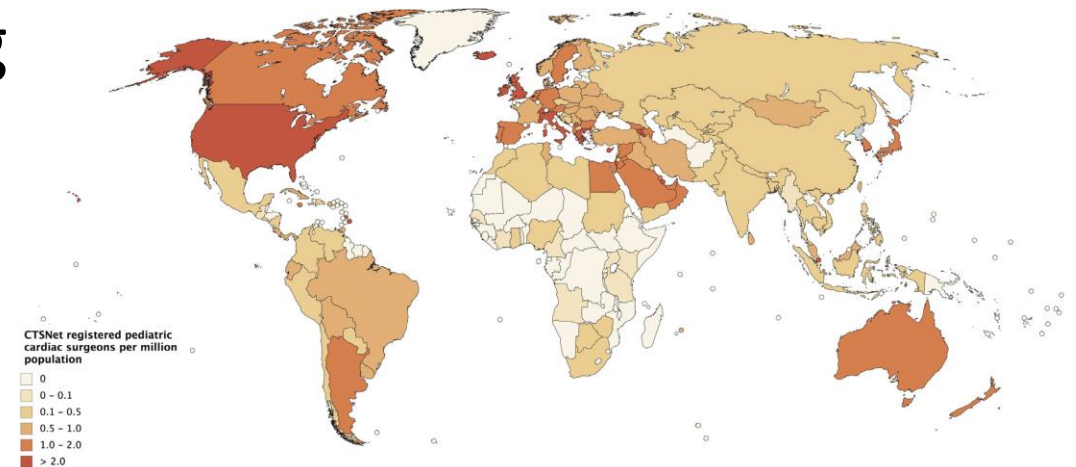
# Emerging Technologies in Early Diagnosis

- AI-enhanced fetal screening for congenital heart disease
- Point-of-Care Ultrasound (POCUS) for congenital and rheumatic heart disease



# Strategic Goals

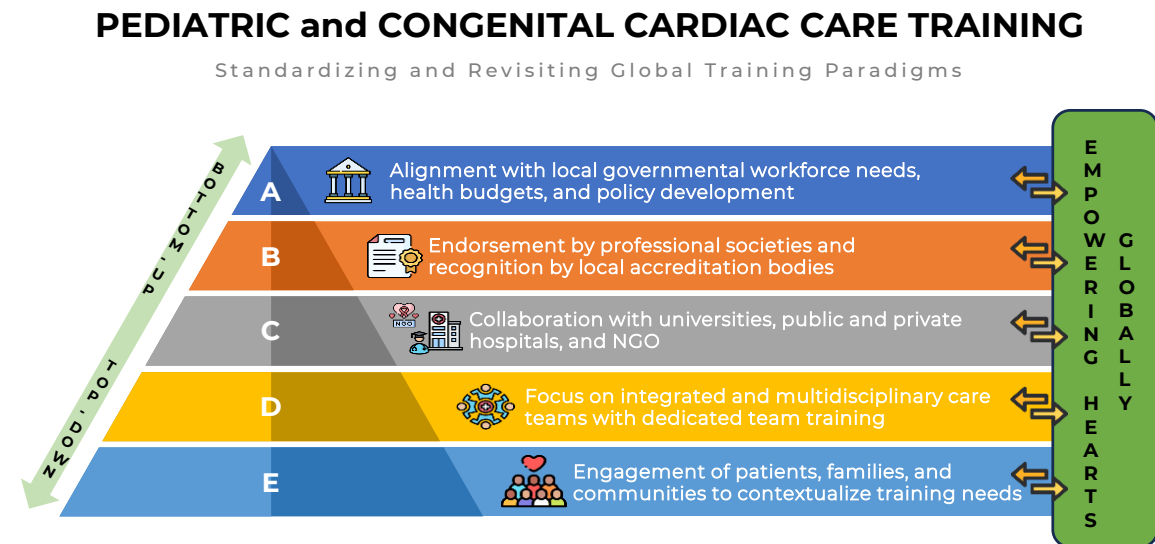
- Innovative Global Medical Education
- Innovative Technology for Early Diagnosis
- Capacity Building and Quality Improvement
- Knowledge Sharing and Networking
- Advocacy and Policy
- Funding and Fundraising
- Sustainable Programs



**FIGURE 5.** Pediatric cardiac surgeons per million population registered with the CTSNet in August 2017 (n = 3858). Map created at [www.mapchart.net](http://www.mapchart.net). CTSNet, Cardiothoracic Surgery Network.

# Start-Up Tasks

- Recruitment of Experts in Education and Technology
- Global Physician and Nurse Needs Assessment
- Curriculum Development
  - Pediatric Cardiology **\*FIRST\***
  - Team Approach
- Credentialing and Accreditation



# Next Steps

- Partnership Agreements
- Refinement of Technology
- Funding and Fundraising
- Networking
- Pilot Programs



# Impact

- Transformative Impact: *improve the lives of children with CHD*
- Sustainable Solutions: *prioritizing care in LMIC*
- Empowered Workforce
- Reduced Disparities: *bridge the global gap in access to quality pediatric and congenital cardiac services*
- Educational Reform: *quality with access*
- Pioneering Innovation

The Project Canvas: Developing An Innovative Approach to Global Training and Early Diagnosis in Pediatric and Congenital Cardiac Services

Foundation	People		Creation	
<b>Purpose</b> <i>To transform access to quality pediatric and congenital cardiac care in low- and middle-income countries (LMIC)</i>	<b>Sponsorship</b> <i>A new international organization of visionary clinician educators and collaborative healthcare advocates</i>	<b>Stakeholders</b> <i>Governmental, non-governmental, local, and global agencies committed to the care of children and young adults with heart disease in LMIC</i>	<b>Deliverables</b> <i>Training programs in pediatric and congenital heart disease (PCHD) tailored to the needs and resources in LMIC; development of pediatric cardiology large language model and early diagnostic tools for pediatric and congenital heart disease</i>	<b>Plan</b> <i>Development of curricula and technologies in 2025-26; Testing of core curricula in pilot countries in 2026</i>
	<b>Resources</b> <i>Educators, technology innovators, individuals familiar with challenges due to resource limitations, and individuals skilled in finance and advocacy</i>			<b>Change</b> <i>Teaming with local partners to define appropriate short- and long-term goals; provide continuous learning opportunities and quality improvement tools</i>
<b>Investment</b> <i>Start-up expenses of \$1.28 M over 1.5 years and estimated expenses of \$16 M over 10 years, decreasing years 7 to 10</i>			<b>Benefits</b> <i>Improved access to personnel pediatric and congenital cardiac care and earlier diagnosis of PCHD leading to better outcomes</i>	

# Wildly Important Goals

- Top Clinical Priorities
  - To develop a pediatric cardiology core curriculum by December 7, 2025 (for presentation at the World Congress of Pediatric Cardiology & Cardiac Surgery 2025)
  - To offer an online pediatric cardiac nursing course, in partnership with other organizations, by February 1, 2026
- Top Technological Priority
  - To develop a pediatric cardiology large language model with retrieval-augmented generation (LLM with RAG) by June 30, 2026

“...the envisioned results fully justify the effort.”

- Sir Magdi Yacoub, *Circulation* 2007

Establishing Pediatric Cardiovascular Services in the  
Developing World: A Wake-up Call