



ST. JOHN'S  
NATIONAL ACADEMY OF  
HEALTH SCIENCES



INDIAN INSTITUTE OF SCIENCE  
भारतीय विज्ञान संस्थान

# SecureUS

A Local Scanning Remote Screening  
Solution for Antenatal Care



8th Edition

CAHOTECH 2023

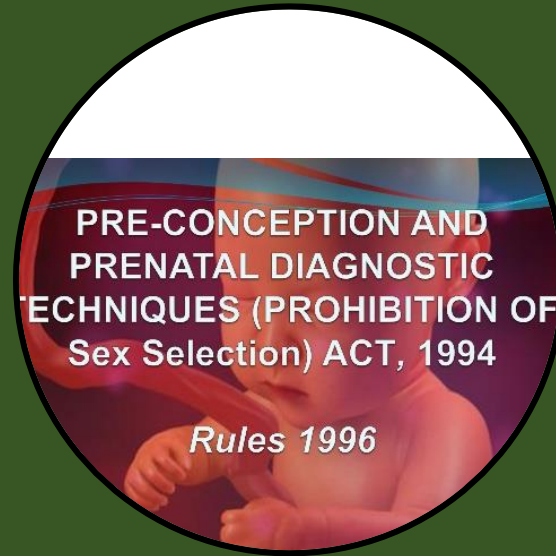
A collaboration between *Indian Institute of Science, and St. John's National Academy of Health Sciences, Bangalore*



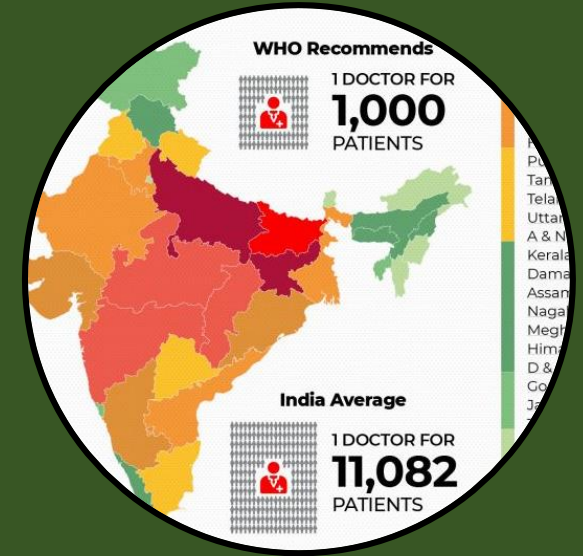
**Ultrasound** – the only safe and affordable, but **low access** imaging modality to monitor fetus



The PCPNDT Act of 1994 – renders **gender disclosure criminal offense**



The PCPNDT Act of 1994 – **limits access to Ultrasound, especially in Rural India**



Community Health Centers in India are **76% short of trained medical personnel**

## A Novel Solution

Development & deployment of a low cost, secure, point of care ultrasound imaging system with operator guidance and a remote diagnostic service for antenatal care in far to reach areas: **solution that ensures ZERO chance of disclosing Fetal Gender and improves ACCESSIBILITY.**

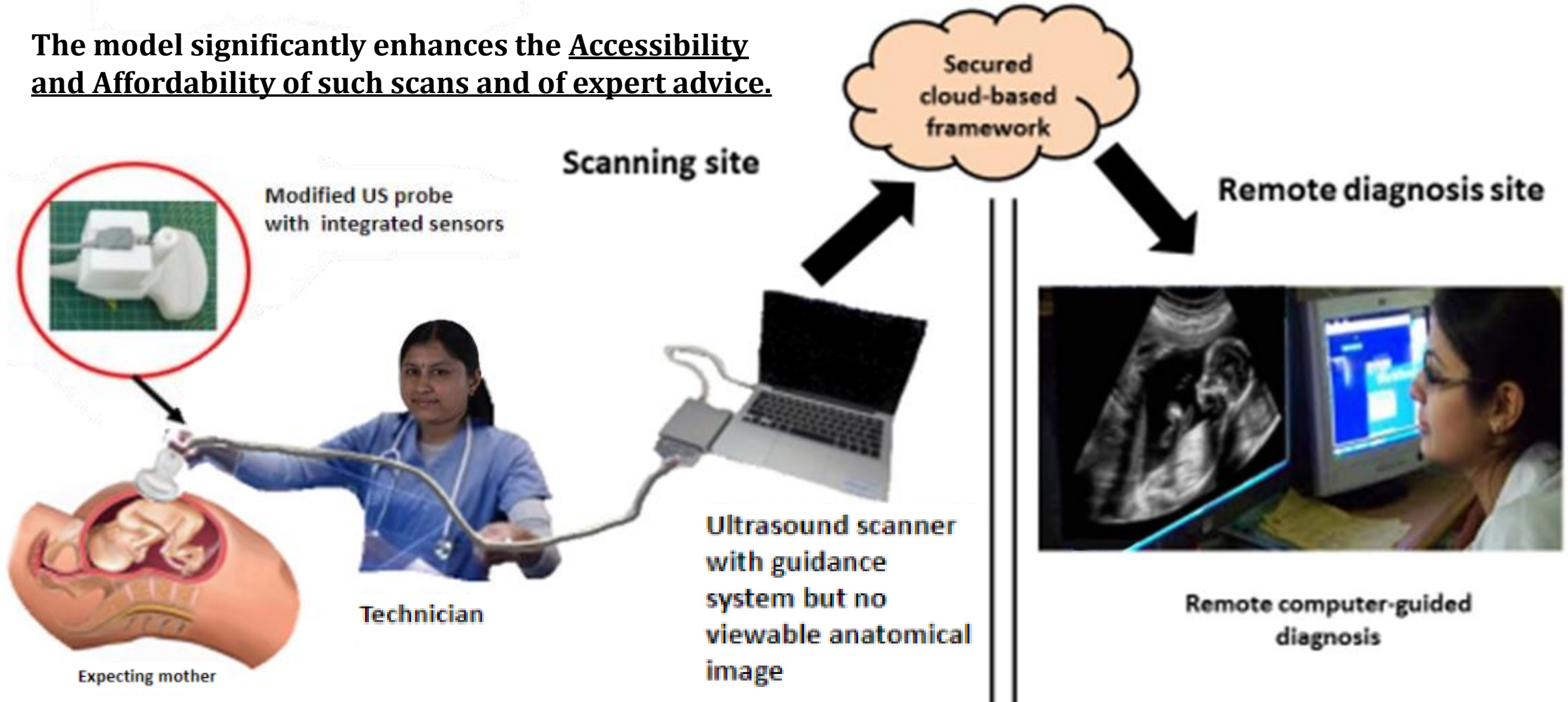
## Target Outcome

To reduce Maternal Mortality Rate (MMR) by providing **enhanced antenatal care to pregnant women (700,000 annual scans by year 5 after deployment)**, through ASHA workers & midwives trained for use of the Secure Ultrasound system.

# SecureUS: Workflow in Remote/Telemedicine Settings

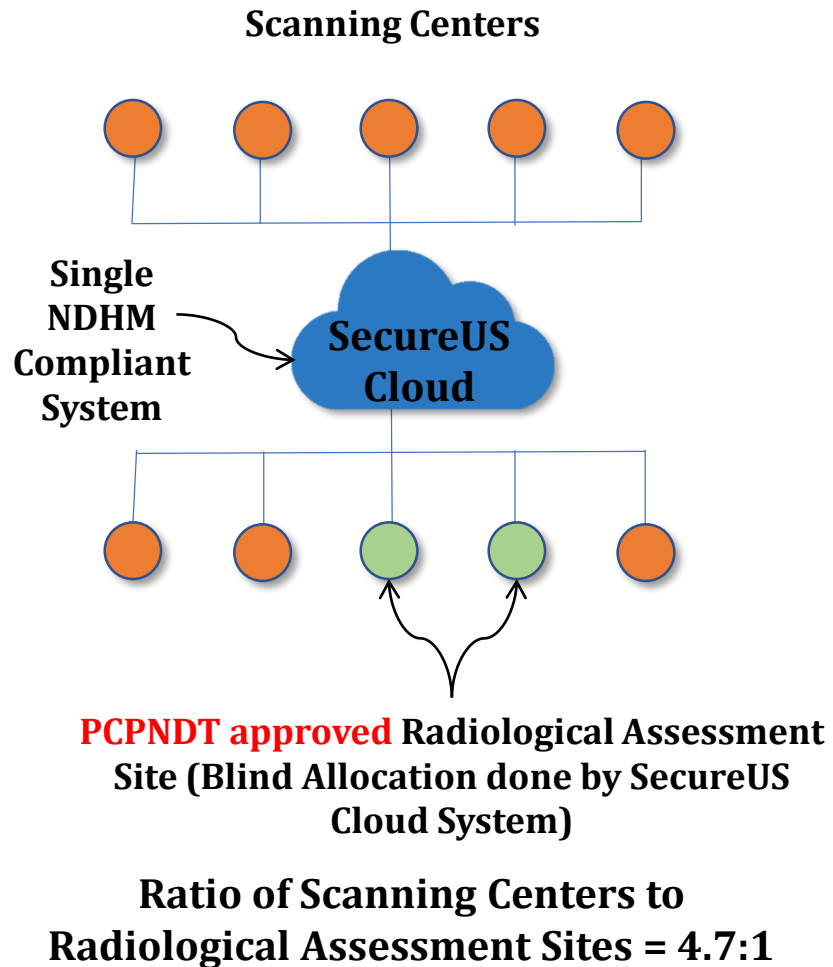
Our solution enables **LOCAL BLIND SCANNING** by a minimally trained **OPERATOR** and its transfer to a well-trained **RADIOLOGIST** who performs **REMOTE SCREENING** and sends back a **REPORT** to the local site.

The model significantly enhances the Accessibility and Affordability of such scans and of expert advice.



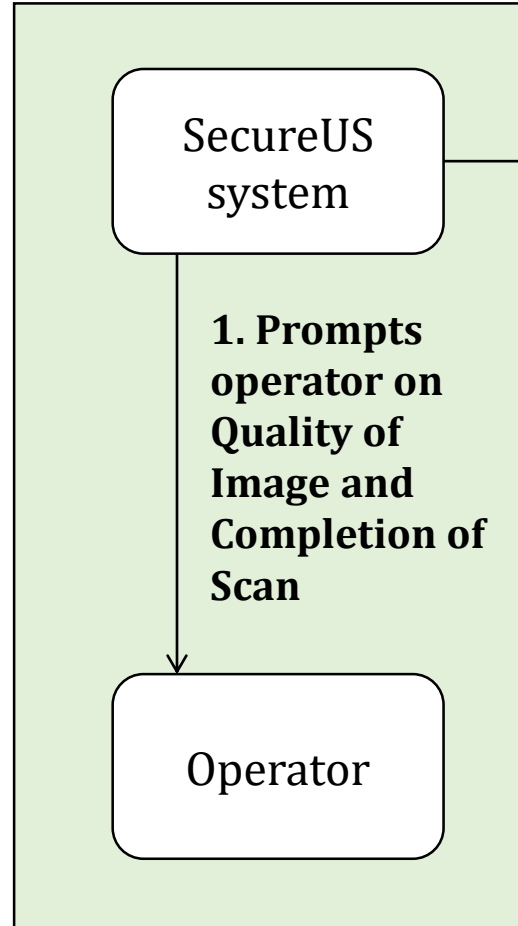
# Encrypted Cloud-based Architecture to support PCPNDT Approval\*

## Model for Blinding between Scanning Centers and Assessment Sites

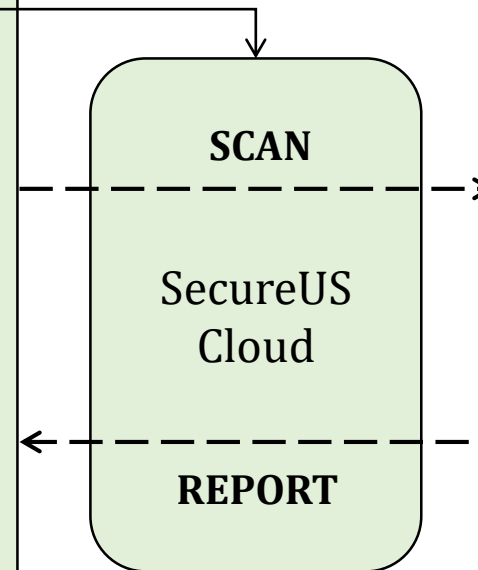


## How it Works?

### PERIPHERAL SCANNING CENTRE

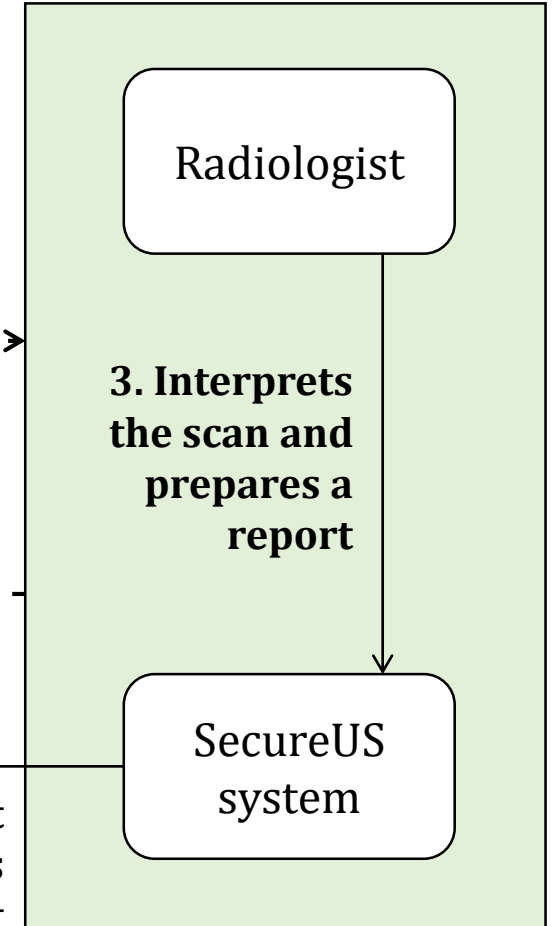


2. Anonymized ultrasound images *(unseen by operator)* are uploaded



4. Uploads Report without US images or radiologist information

### PCPNDT APPROVED RADIOLOGICAL ASSESSMENT SITE



\*In discussions with Health Dept., Govt. of Karnataka



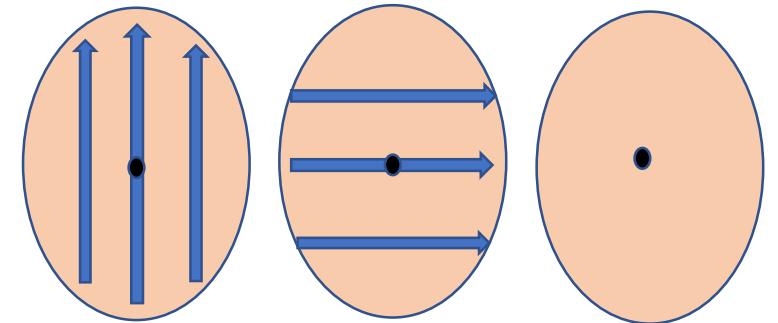
# SecureUS: Tested on 21 patients at St. John's Hospital

AS PER APPROVAL FROM THE ETHICS COMMITTEE ( IEC No. 177/2020 dt. 28th Aug 2020)



Doctor performing a SecureUS scan on a third trimester patient (left); on-screen guidance module (right).

1. On-Screen Guidance Module and pre-defined Obstetric Scanning Protocol developed for assisting a **minimally trained user**.
2. Evaluation conducted as per the **ISUOG six step approach** for basic ultrasound examination.
3. **Good agreement** seen between examination of data captured from the SecureUS system and that from the gold standard system.



Depiction of Obstetric Scanning Protocol (OSP) followed

DR ARUN  
GEORGE  
*Radiologist, St. John's  
Medical College Hospital*

## REDUCTION IN MATERNAL MORTALITY RATIO

MMR in India for the period 2016-18 was 113 deaths/100,000 live births; **total estimated maternal deaths was 26,437 in 2018.**

## REDUCTION IN NUMBER OF "MISSING" GIRLS

About **4,60,000 girls in India are missing at birth** each year. Non-disclosure of fetal sex will address the skewed sex ratio.

# Number of Lives To Touch



### EXTENDED APPLICATION

A larger population will be benefitted with ultrasound technology (for other applications such as kidneys, carotids, liver, knee etc.) without legal implications.

### UPSKILLING OF THE CLINICAL WORKFORCE & CONNECT FOR MULTIPLE EXPERTS

Health workers or technicians can be trained to use the device in 6 hours.

## Overview of the 5-year Plan: Reach and Finances *(Break-even in year 3)*

|                                      | Fee/Scan | Year-2 | Year-3 | Year-4 | Year-5 |
|--------------------------------------|----------|--------|--------|--------|--------|
| <b>Center Count</b>                  |          | 7      | 42     | 147    | 462    |
| <b>Radiological Assessment Sites</b> |          | 2      | 9      | 32     | 99     |
| <b>Expenditure#</b>                  |          | 1,77   | 9,28   | 3089   | 9,383  |
| <b>Revenue#</b>                      | 1500     | 1,61   | 10,12  | 3542   | 12,274 |
| <b>PnL#</b>                          |          | -16.6  | +84    | +453   | +2890  |

# in 100,000 INR

Districts to be chosen based on severity of Maternal Mortality Rate (MMR) and Government support.

### TOTAL AVAILABLE MARKET

Total Number of Subcenters + PHCs + CHCs + Hospitals in India = **3.9 lakh centers**

### SERVED AVAILABLE MARKET

Considering ~70% of the Total Available market where there is a shortage of clinicians = **2.7 lakh centers**

### TARGET MARKET

Considering that about 5% of the SAM actually invests in our solution = **13,000 centers**

**FIVE-YEAR TARGET: 460 centers in India**

**Low one-time setup fee, 5L – 10L per site**

**INR 1500 per scan incl. fee for doctor**

Revenue Model: Pay per Scan



## PRIMARY COMPETITIVE ADVANTAGE:

**Novel Technology for Display-less  
Ultrasound Antenatal Screening** and other  
applications

## KEY DIFFERENTIATORS:

- portable and affordable,
- does not allow sex determination
- allows operation without any prior training
- stores data for retrospective analysis of the whole volume of the fetus
- allows multiple clinicians to connect and comment

## Funding support:

**EPSRC**

Engineering and Physical Sciences  
Research Council

EPSRC Reference:  
EP/R013950/1  
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**Thank you for your kind attention**

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**Our team with 120+ years of collective practice**

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