

# Spatial Redesign for Kangaroo Mother Care Center in Malawi

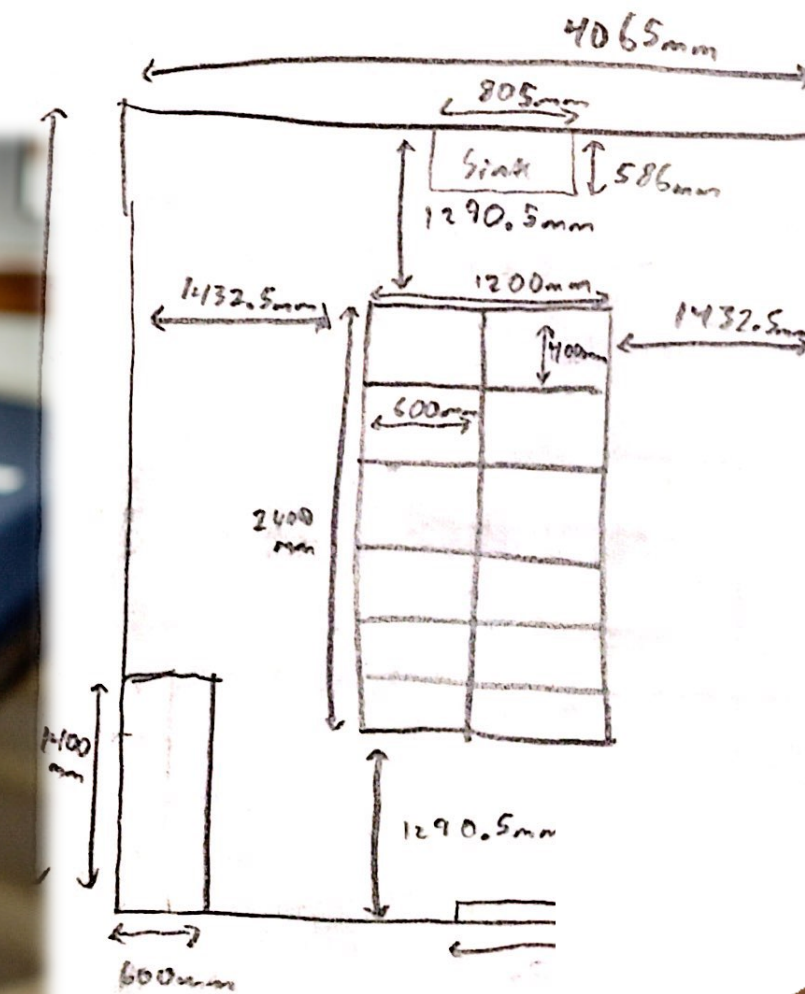
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## THE POWER OF KANGAROO MOTHER CARE

# Background

Over 80% of premature babies born worldwide are late-preterm, and do not require intensive care to survive and thrive (WHO, 2014).

Recent data shows **Kangaroo Mother Care (KMC)**:

- reduces neonatal mortality, infections, and sepsis
- increases maternal-infant bonding, weight gain, and improves long-term child development and health







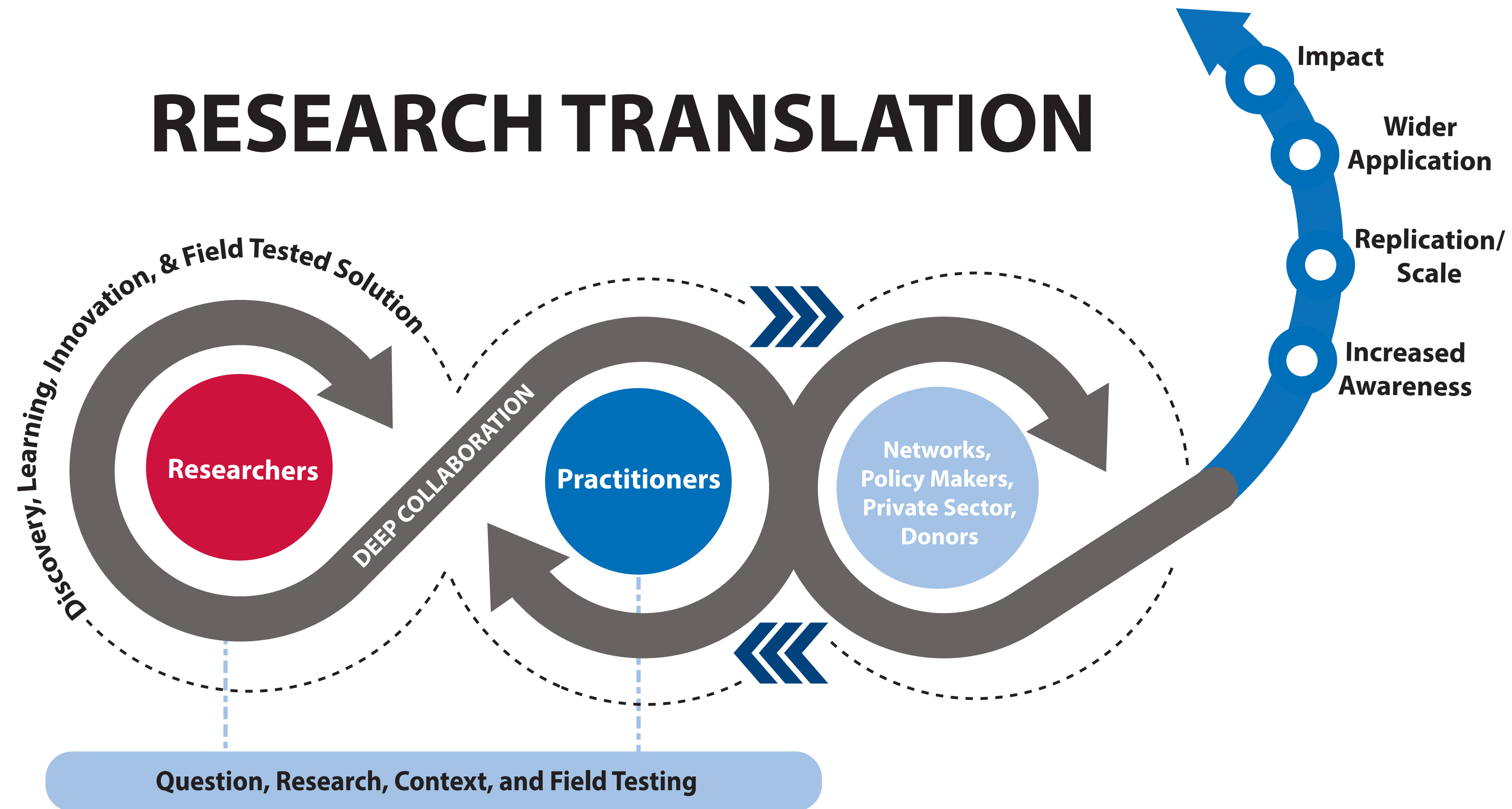
## THE CHALLENGE

# Background

Many neonatal care facilities are not conducive to KMC. At Ntcheu District Hospital the Neonatal Intensive Care Center (NICU):

- not enough space for KMC in NICU without disturbing nurses providing care to babies
- No working space for nurses for them to monitor and care for babies







## CATALYZING RESEARCH FOR DEVELOPMENT

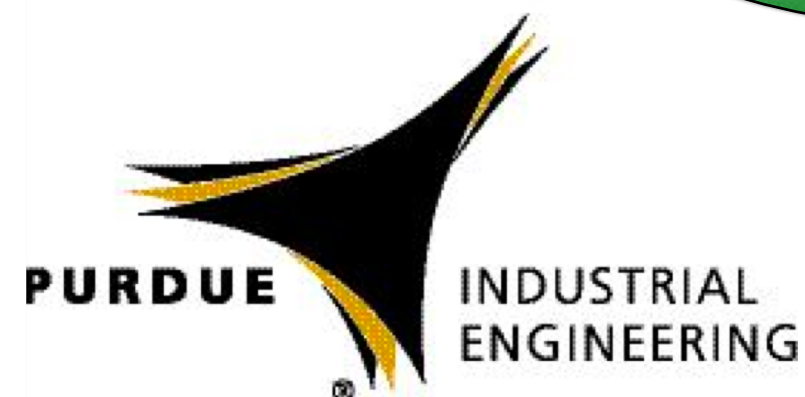
Queen Elizabeth  
Central Hospital

Dr. Queen Dube

PURDUE  
UNIVERSITY  
INDUSTRIAL DESIGN

Prof. Steve Visser

Practitioner  
Researcher  
Collaboration



Prof. Yuehwern Yih



Save the Children®

Dr. Bina Valsangkar



THE SOLUTION

# KMC Care Center

Spatial redesign of Ntcheu

District Hospital neonatal care

center and implementation of

modular furniture can

accommodate for and support

KMC.





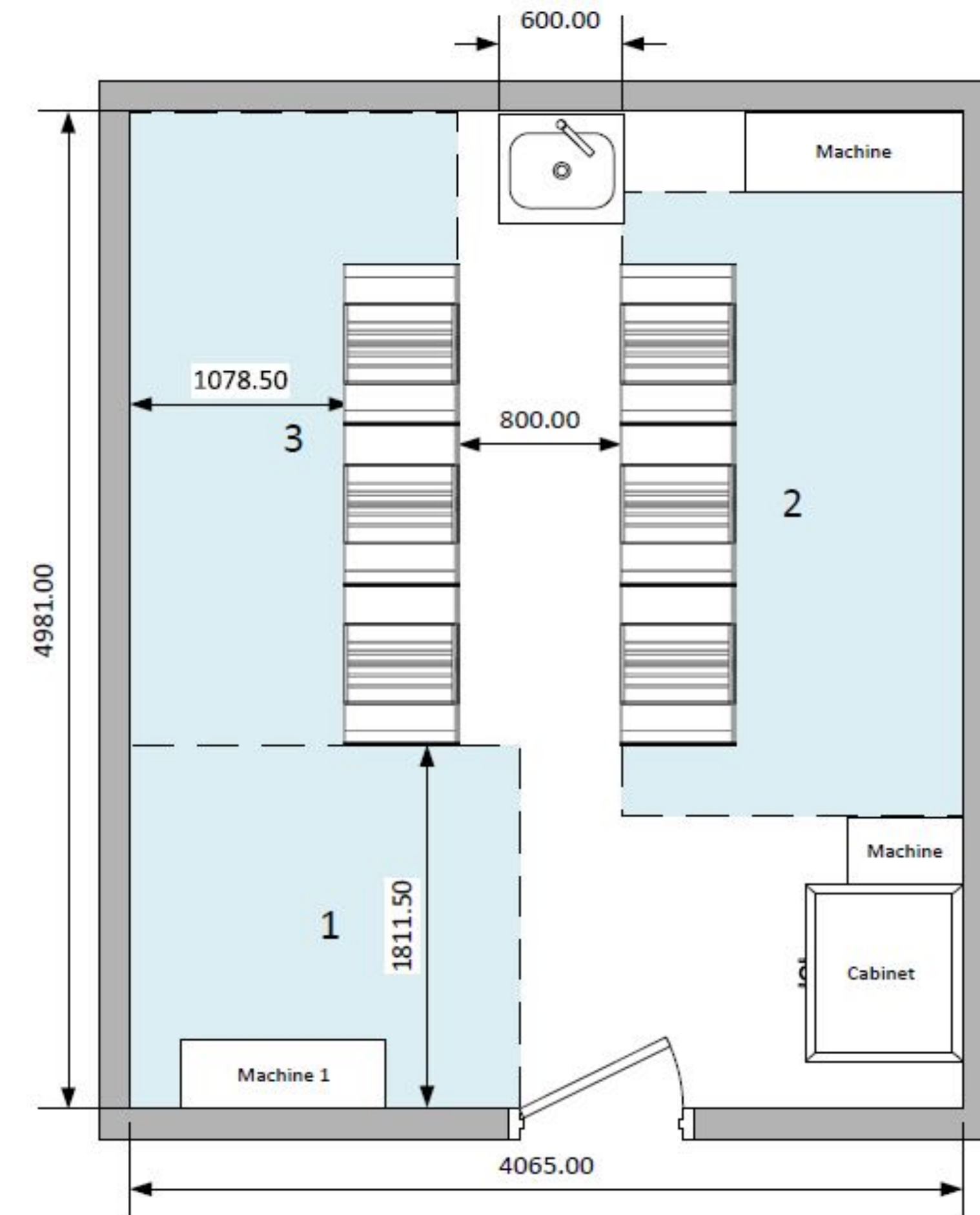
PATIENT FLOW AND VISIBILITY SIMULATION

# Academic Research

## INDUSTRIAL ENGINEERING

Flow analysis (mothers, providers) → space utility → # cribs → Capacity of NICU vs space of KMC

Visibility analyses → # babies can be monitored from different location of the room → care quality and safety





RESULTS

# Academic Research

## INDUSTRIAL ENGINEERING

### Visibility Simulation

Average visibility index increased from 3.69 to 4.61 with spatial redesign of NICU.

↑ 25%

### Flow Simulation

Longest care completion time from old spatial layout to new layout reduced from 193 min to 145 min.

↓ 48 min





**Two-level Crib Design**



## BABY CRIB AND NURSE'S STATION

# Industrial Design

**Modular furniture**  
**Small footprints/Space saving**  
**Mobility/Reconfigurable**  
**Visibility**  
**Ergonomic**  
**Low cost**  
**Local materials and production**





**Nurse's Station**



KMC CHAIR

# Industrial Design

Design considerations for furniture pieces include:

- Small footprint to maximize use of space
- Wheels on nurse's station and baby crib to allow reconfiguration of space
- KMC chair that converts to bed for comfortable rest for mothers sleeping with babies



**KMC Chair**



Thank You!!

