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Lab.our Ward Interim Report July 2016

Executive Summary

The Lab.our Ward Innovation Project brings together product, service and architectural design, in collaboration with maternal health experts, to rethink the birth experience in low resource settings. The resulting design proposals are rooted in clinical evidence combined with user insights gathered in India, Kenya, Uganda and Nigeria. These innovations could be applied to both new and existing health facilities to improve the quality of care for both women and care providers.

Mission | Enable a smoother and safer maternal and newborn care journey, by focusing on the experience of care.

Vision | By bringing together evidence-based care, best practices, humancentered design and creative problem solving we can re-frame the way we treat and care for women and newborns.

Objective | A cross-disciplinary exploration to co-create and ignite dialogue around innovations for better intrapartum care experiences in low resource settings.



Addressing care from **three pillars** – space, services and products – and recognizing a woman's journey through the facility from her arrival to postpartum, the initiative takes the notion of a safe and dignified childbirth experience beyond just statistics and survival.





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About Lab.our Ward

Nursing spec 13.0 m

Dector check-up 11.5 m²

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About Lab.our Ward

Lab.our Ward is an international development project rethinking the childbirth experience for maternity wards in low resource setting facilities.

It employes a cross-disciplinary approach with the project team consiting of product designers, service designers, architects and clinical advisors.

The project started in December 2015 and will run until the end of 2016, after which the outcomes will be published in the form of design proposals and a startegy.

Project Objectives

The objective of the project is to design a safer, more welcoming labour environment taking into account limited resources.

The key design principles

Be welcoming Relate to clinical evidence Ensure safety Embody respectful care Facilitate enjoyment, control and choice Support women's empowerment

The issue: Maternal and newborn health

While maternal and infant mortality rates have dropped significantly in the last twenty years, complications during pregnancy and childbirth claim the lives of thousands of mothers and newborns each year. Every two minutes, a woman dies from causes related to pregnancy or childbirth, and each year more than one million children die on the day they are born.

Overcrowding, uncleanliness and the lack of essential health infrastructure mean that for many women, the experience of birth is neither safe nor comfortable. As the number of births taking place in health facilities around the world continues to rise, maternity wards must be adequately prepared to deliver high quality care to women and newborns everywhere.

A woman's physical surroundings during childbirth can affect her perception of how easy or diffcult it is to give birth. Focusing on a woman's holistic experience of childbirth, including the infrastructure, products and services available to her at health facilities, can greatly improve her and her baby's health outcomes.

A number of cost-effective solutions – such as better designed delivery beds, lighting and airflow and clearer presentation of information – already exist and have been shown to vastly improve the quality of care in low-resource settings. The Lab.our ward project looks at both existing and new ways to deliver improved quality of care based on evidence and inspired through a human centred design process.



Maternity ward at Kolkata National College of Medicine, 2016. Photo: Amar Shaw



Patient health records. Nepal, 2014. Photo: Charlotta Liukas



Newborn weight scale, India 2016 Photo: France Donnay



Post-natal ward in Nepal, 2014 Photo: Charlotta Liukas

Cross-Disciplinary Design Process

Lab.Our Ward Timeline 2015 - 2016





March 2016 | Advisory group members weigh in on layouts Photo: Damaris Rodriquez



December 2015 | Design research, Zanzibar Photo: Helena Sandman



January 2016 | Co-Design in Nairobi Photo: Damaris Rodriquez

Approach: Cross-Disciplinary Design

The three design disciplines - Spatial, service and product design - look at quality maternal and newborn care from different viewpoints:

- Space: Architecture, interior, ambiance
- Products: Experience, interactions
- Services: Tools, accessories, clothing

In addition, the clinical team consists of an obstetrician-gynecologist with a global perspective on maternal health, a general practitioner for public health insight and a nurse-midwife and a midwife for Ugandan and Ghanaian contenxtual insight respectively.

The Lab.our Ward advisory group has offered their expert input at strategic points in time.

The resulting design proposals are rooted in clinical evidence combined with user insights gathered in India, Kenya, Uganda and Nigeria.

Product Design





Human-Centered Design

The design proposals that have come out of the Lab.our Ward project have been developed through a human-centered design process.

This means focusing on listening to the people who use the products and services which are being designed, and involving these end users in the development of ideas and testing of prototypes.



One of the methods applied in Lab.our Ward was immersive co-design, where medical fellows and context experts were placed in the design team for months at a time.

Here nurse-midwife Nazalius Ndinayo is designing a non-touch data collecting tool together interaction designer Promila Roychudhury. (The prototype didn't advance beyond an idea stage, but some of the functionalities of this idea are present in the APGAR score solution presented later in this report).

Photo: Damaris Rodriguez



The Design Proposals

Woman's Journey: A model

Throughout this report, we use the term 'design proposal' to discuss the different outcomes of the design work. This highlights that the designs are not yet final, but works-in-progress.

The design proposals are structured around a Journey Model, which illustrates the woman's journey in the facility through the Arrival, Admission, Labour, Delivery and Postpartum stages. Some of the design proposals are focused on a particular stage in the process, and some are more overarching and interconnected.



Service Design

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Service Design

The service design team is focused on improving the communication between women and healthcare providers and developing tools to facilitate women-centred quality care.

Key Service Design Principles

Provide clear information to the woman and her family

Improve orientation within the facility

Ensure clear and continuous communication to the woman about the progress of her labour and birth

Support prioritization and urgency assessment

Provide reminders and alerts of key moments during the birth process

Service Design Proposals

Pregnancy Assistant M **Digital Check-In** Woman's Journey 🚯 🚷 😍 🙆 **Family Pass** Ä Photography * **APGAR & Timestamping** 😍 🙆 Call for Help **(i)** Care Mediator



Easy self-service check-in to make the arrival smooth and safe

A digital design proposal to facilitate the identification, registration and urgency assessment of women arriving at a high volume facility



When using the paper based Family pass upon arrival at the facility, the woman can register by holding the pass against the screen. A friendly arrival message welcomes the woman to the facility and makes her feel accepted and expected.

A key insight that led to the design of this concept was the observation that in many high volume facilities, women arrive and wait long hours before they are seen by a healthcare worker. Health care providers on the other hand face the challenge of prioritizing and identifying the most urgent cases from the mass of clients coming in.

This design proposal uses NFC (Near Field Communication) technology stickers placed on a pregnancy care pass ("Family Pass") that women receive during their antenatal visit. When they arrive at the facility for childbirth, they use this paper pass to register themselves in the Check-in service on a tablet device.

The Check-in service asks the woman a set of key questions and can alert a healthcare provider immediately when an urgent case has been identified. Most importantly, every woman's arrival to the facility will be time stamped and therefore allows healthcare providers to access a complete list of clients waiting to be seen based on their time of arrival.

The **design objectives** guiding the design:

- Improve the way data is collected to keep documentation updated
- Create a digital tool that assists healthcare providers in making decisions based on collected data and Quality of Care guidelines
- Support better communication between healthcare providers and women with information visualization and language that the women can understand
 - Make the woman feel accepted and expected



Instructive photography to show active positions and ways to involve the companion

A set of photographs showing women during labour assisted by their supporters through labour progression.

The pictures aim to inspire and help the woman and her companion to learn how to ease labour pain and support labour progression. The photos are intended to hang in a labour room in the maternity ward as decorative and informative imagery.

This concept bases on design insight to help the companion to support the woman in an optimal way. Additionally, the healthcare provider can use photos as a tool to communicate which position could be best to ease labour pain and facilitate labour progression.

The **design objectives** guiding the design:

- Encouraging and positive communication
- Inspiring
- Inclusive

"We want to help but sometimes we don't know how." Husband in Bududa



The photo visualizes how to support the woman during labour progress



Hands-free tool to record APGAR score and delivery time

Recording the APGAR score and key labour progression and delivery times can be a challenge in high volume facilities where healthcare professionals attend several deliveries simultaneously.

Healthcare providers in high volume facilities often face challenges with reliably recording key data during the labour and delivery, when peak delivery times compromise the time they can spend with the women and the newborn.

This concept is an electronic device that is operated with an elbow. The elbow interaction of the tool was designed to offer healthcare providers a way to keep their gloves on and focus on the delivery and the woman yet allowing key data to be recorded.

The data recorded in an electronic form can be easily processed and allow alerts and reminders to be provided to the healthcare provider in case of emergencies or deviations from the normal.

The **design objectives** guiding the design:

- Facilitate real-time data collection
- Operated without fingers / Hands-free to ensure hygiene and safety
- Reduce paperwork
- Accuracy of data enables better care



The healthcare provider can use elbow interaction with the tool to record the APGAR score, the time of birth and other key moments of the delivery.

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Infographics to help orient and communicate

Presented in an infographic form, the journey of the woman is the unifying element to blend product, service and architecture into a holistic experience

The journey of the woman has been guiding the design of many of the design proposals.

The key moments or touch points in the experience of care were mapped into five key areas: Arrival, Admission, Labour, Delivery and Postnatal. The journey serves as an orientation map for the arriving woman. The color coding in the map is repeated in the physical space of the maternity ward as well as the signage of the icons to support wayfinding.

Color creates a bridge between architecture, and people, and has symbolic importance - white is a pratical for environments which must be kept sterile, like health clinics, but has come to indicate a medical profession even outside a clinical context.

The color used in interiors might appear to be of modest importance, but it has a strong impact on the human psyche. The selected hues are beneficial for women who are giving birth, in accordance to best practices in colour psychology.

In addition to using the colors for signage, decoration and orientation in the facility, they have also been used in the design of digital and paper based tools.



Woman and companion arriving to the healthcare facility; a visualisation.



Infographic outlining the five key areas of the labour and delivery journey.



Call for help button for women and healthcare providers

Connected and simple technology objects like smart buttons enable better communication within a healthcare team and between a healthcare professional

Many women and their companions may not be well aware of how to identify danger signs after delivery and during the postnatal period. The call for help concept is both a tool to communicate possible danger signs to the woman and her companion as well as give her a way to alert for someone to check up.

The tool operates using two sets of buttons. One can be placed next to each postnatal bed with instructions for the woman on when to call for help. When pressed, a notification is shown on a tablet or phone displaying the room and bed number.

In addition this functionality can be used within staff teams to assist each other by calling for help. The call button can be attached to the staff uniform and when pressed, a notification is shown on the other healthcare professional's phone or tablet showing the source of the call.

The **design objectives** guiding the design:

- Create a non-intrusive call for assistance system
- Easy to customize, so that the system can be implemented in any facility
- Create an easy way to understand who needs assistance
- Design a tool aligned with the WHO Safe Childbirth Checklist



When pressed a notification is shown on the tablet or phone used by the healthcare provider

Family tool to promote understanding of labour and delivery

Tapping into existing channels for information distribution and involving men in the preparation for labour and delivery

The Pregnancy Assistant aims to improve the understanding of pregnancy and delivery among women and their families and enable better communication between the expecting mother and father to prepare for delivery.

The design research and several co-design sessions in Nigeria and Uganda with women and their families have resulted in the design of a folder containing several tools to facilitate preparation for delivery.

The folder contains the following tools:

- National Mother's book
- Set of cards with question and answers
- Preparation timeline with key decision points
- Visualization of pregnancy journey

The **design objectives** guiding the design:

- Introduce the role of the companion from the beginning of the pregnancy
- Focus on a family unit rather than individuals
- Introduce what the family needs to do before they go to delivery
- Help the expectant woman to visualize where they are in their pregnancy terms



The Folder contains all necessary information and tools to get prepared and make key decisions for reaching care



Communication of labour progression and next steps

This concept supports the healthcare professional to communicate labour progression and risk factors to the woman and her companion

The paper based tool is introduced during pregnancy to inform the women about the overall process of labour and childbirth and introduce labour progress and the different conditions during the process.

At the time of delivery the tool will help the healthcare professional to repeat some of the information introduced during pregnancy.

The **key insights** that this concept is based on:

- Current tools do not support current workloads
- Poorly designed communication does not lead to action
- Passive learning drives poor information retention
- Reduced perception of feeling in control
- No clear outcomes communicated when women are waiting

The **design objectives** guiding the design:

- Facilitate the communication between women and healthcare professional
- Create an increased feeling of control by making the progress of labour and related instructions visible
- Help healthcare providers adjust the care based on women's different needs



The care mediator is a paper based tool that facilitates understand the process of childbirth already during pregnancy and supports communication during labour progress.

> "It would nice to have something to show to women, now we are using our hands." Doctor in Akure

Setting care priorities and communicating preferences

A concept for women to communicate their preferences as well as understanding key important information about their delivery process

The Family Pass is a set of wearable paper cards for the woman, the companion and the newborn to visualize key information. This information could be about the woman, her personal information and preferences. The aim is to allow skilled birth attendants to better prioritize and provide individualized care and allow the woman and companion to understand her progress of labour.

The **design objectives** guiding the design:

- Create a supportive relationship between healthcare workers and women
- · Create empathy and an appreciation for each other
- Increase communication efficiency for better medical care
- Utilize the capabilities of the companion

"This pass will make women understand what are we doing, so they will get less stress" Midwife in Akure



The pass for the woman shows important details about her care needs and preferences and visualizes clearly when she will be checked up for the next time.



The product design proposals shown here are focused on supporting

the woman's journey through the facility with product prototypes that increase comfort and safety while ensuring improved care provision from the healthcare provider.

Product Design Proposals

Reception Desk

Bed Add-ons

Delivery Stool

Delivery Bed

Multi-Purpose Trolley

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QUOTES AND INSIGHTS

"Once you get the right people in you can make things happen even when the resources are low."

Improving the quality of care with better products - we still need good people to use them.

"It is difficult to estimate the loss of blood."

Solutions which expand on the capacity when needed.

"There is room for technological improvements and solutions."

Solutions which can be upgraded while the infrastructure is improving.

"With small improvements you can make a big difference which could help with basic maintenance and cleaning."

Emphasize the form, materials and details to improve the up-keep of usage.

"Skin to skin doesn't happen everywhere. Better in Uganda than in Nigeria. It is important to expose the baby to mothers and fathers bacteria. Skin to skin contact enables a healthy, good start for the baby."

Improvement of practices through better designed as soon as possible. Start for the baby products.



A reception desk that helps women feel expected and accepted

The reception desk is the starting point for the woman and her companion into their facility experience.

The arrival desk concept is the first interaction with the facility. The furniture is multipurpose, creating a comfortable waiting space and providing personal access to the healthcare professional.

The furniture is designed in a modular way so depending the space requirements it will be adaptable and customizable by each facility.

The desk provides a clearly signaled higher reception zone, an integrated seating space for comfortable waiting and a low desk at which the pregnant woman and her companion can speak with the healthcare professional.

The reception desks will be relatively low and narrow in depth so as to not create too much distance between clients and staff. The low sections will also provide a clear view of the woman's abdomen, to better convey her stage of pregnancy and enhance a sense of familiarity.

Design principles

- Modular elements for flexibility
- Various heights for information communication
- Built-in waiting area, working desk and information desk



Reception desk prototype at Women Deliver 2016.

"It took us more than an hour to find Admission" Mother in Kampala



Low cost extensions for better care and comfort

Bed add-ons as low cost extensions aim to increase comfort, hygiene, storage space and safety of the facility's existing beds.

The bed add-on concepts aim to make existing beds more user friendly, focusing on increasing safety and comfort of already existing resources rather than investing in full replacement of bed structures.

With simple solutions such as a mosquito net holder, a baby bay, a privacy tent and storage add-ons, an existing bed becomes more flexible and adjustable to enable high quality of care.





The tent offers a simple solution for private space especially in crowded facilities to support privacy, bonding and rest after the delivery.

Baby cot attached to the mother's bed fosters better bonding and increases breastfeeding possibilities especially among C-Section patients.

This design proposal introduces bed add-ons like a baby cot next to the mother's bed, mosquito net and storage space next to existing bed frames, which will provide a better experience for the mother.


Mobile delivery stool with improved ergonomics and a cleaner environment

The stool concept combines a traditional squatting birth position with low cost furniture to increase capacity and preparedness for ad hoc deliveries.

The mobile delivery stool is a portable delivery pack that can be used for normal deliveries in the delivery room and emergency situations across and outside the facility.

The stool supports different positions that allow women to sit, kneel or squat, providing space for the companion to help. The box is light and made of plastic. Inside the box there is space for a clean delivery kit and a Mama Kit.

The stool could be stored in the entrance of the facility or easily accessible in the facility for emergency situations when women need to be attended to suddenly. The stool can also be used in remote or rural areas in smaller health centres. The stool is wrapped in a mat that unfolds as the stool is opened and offers a clean delivery surface.

The **design objectives** guiding the design:

- Simple
- Durable
- Comfortable
- Light and portable
- Easy to clean



The delivery stool offers an alternative delivery method and is a solution for accidental deliveries when a delivery bed is not available. Inside the stool is a set of basic equipment to perform a delivery.



Different positions that the woman can adopt using the Mobile Delivery Stool.

Delivery Bed



Delivery bed with improved comfort and security

Enabling alternative birth positions.

The delivery bed design proposal provides alternative birthing positions for women during delivery. It's a shift from the healthcare provider's perspective towards a woman centred ergonomy.

The design of the bed is lower and wider than normal delivery beds, enabling the woman to rest comfortably after the delivery and enjoy skin-to-skin contact with the new born baby. Additional elements in the bed concept include easy measurement of blood and other liquids loss. The bed can also be flattened for ease of transition to another bed or emergency surgeries.

The **key insights** that this concept is based on:

- Delivery beds can be uncomfortable
- They look hostile and don't feel safe in use
- Many current models don't allow alternative delivery positions

The **design objectives** guiding the design:

- Comfortable
- Safe and welcoming
- Provides alternatives
- Functional



The delivery bed offers a variety of birth positions and better comfort and saftey





Flexible and modular trolley structure

A flexible and modular multipurpose trolley eases a woman's journey through the facility

In many low resource setting facilities, space for women to adopt comfortable positions during labour or find a place to rest may be a challenge. The trolley was envisioned to offer the woman a physical support tool along the journey through the facility by addressing several challenges at the same time: resting or leaning over during labour, walking aid, newborn transportation and luggage storage.

Equipped with wheels, the trolley is easy to clean, requires low maintenance and has a simple assembly structure. The trolleys can double as a work aid for facility staff carrying cleaning equipment of medical supplies.

The trolley idea was inspired by a facility manager in Uganda recognizing "there is nothing here for the woman". Apart from offering functional support for the woman during labour, delivery and the postnatal period, the trolley aims to give the woman the feeling that there is something just for her.



The exible structure of the trolley allows for a variety of usage possibilities:

The trolley idea was inspired by a facility manager in Uganda recognizing "there is nothing here for the woman". Apart from 0 ering functional support for the woman during labour, delivery and the postnatal period, the trolley aims to give the woman the feeling that there is something just for her.

The structure can be used as a moving station for healthcare workers to carry instruments and other medical equipment.

After delivery, the baby can be transported to the postnatal ward accompanied by the woman, who can use the trolley as a walking aid.



May 2016 | A birth simulation using the Mobile Delivery Stool prototype





May 2015 | Women Deliver attendees testing the product prototypes

Architecture

11

Architecture

The architectural designs present a modular facility structure that can be adapted and expanded according to the setting and needs of each unique facility.

The key architechtural design principles include:

- Rooting the architectural concept in its environment and embracing local cultural trends
- Supporting local construction knowledge and low- cost exible solutions to provide a robust yet localized structure
- Involving local residents in the design of the ward by gathering their insights and encouraging their participation

Identified challenges:

- Hygiene routines
- Administration and maintenance
- Privacy during delivery but also antenatal and post-natal
- Presence for companion during labor and delivery
- Security for mothers and newborn
- Possibility to move around during early labor
- Comfortable and warm atmosphere combined with sterility and safety
- Low resource setting limiting use of technological equipment

Mothers and newborns inside of the Kivunge Hospital, Zanzibar, Tanzania. Photo: Helena Sandman

Approaching the Architecture

Maternity ward architecture would ideally make it easier for women to understand the stage of labour in which they are, to understand where they will go to next and for staff to more readily manage situations as they arise. The spaces on display here are organized to achieve a balance between safety and privacy.

In the next section we present a **modular design** which can be constructed for different needs and in different sizes. This includes a model of a ward designed for approximately 300 births/month that includes a cesarean theatre and a ward for approximately 100 births/month. Should this not be enough, there is a ward which can be used as an addition to an existing facility, which is designed for approximately 500 births/month.

The Space

The spatial design of the maternity ward facilitates the journey of the woman in labour, and her companion, through admission to discharge.

In many contemporary labour wards there is limited privacy and little space for a companion to accompany the woman and support her through her labour. Our research shows that the organization of the maternity ward is frequently disjointed and there is often no clear route to move through the facility.



300 births/month



45

The exterior of the Kivunge Hospital, Zanzibar, Tanzania. Photo: Helena Sandman





The building is designed for women from the time that they arrive in active labour until two days after they have given birth.

All the spaces are designed to have natural light and ventilation as many countries with low resources have hot climates, meaning that the sun is a primary source of light. Natural air flow also reduces the risk of bacteria staying within the facility.

Everything being built today should be sustainable. Our building designs can all be built with local materials and skills. The process of giving birth is an individual one and there should also be space for local traditions and habits in the space. The buildings should be adapted to local culture, so that women feel welcome and at home.

The design goal is to appeal to women and, by encouraging admission and entry to the facility, to save the lives of women and their babies.

Natural Ventilation

The building consists of closed blocks, corridors, which combine the indoors and outdoors and open-air courtyards. The facility is **designed for cross-ventilation throughout**, which means the air can be continuously renewed. The building is cooled down by natural ventilation, to save costs and be environmentally friendly.

Ventilation bricks and inner courtyards make the cross-ventilation possible. Hot air is lighter than cool air and so the ventilation openings in the spaces are designed to let cool air in and the hot air to rise and find it's way out of the building. The ventilation bricks are used along the corridors and walls to the inner courtyards.





PASSIVE DESIGN STRATEGIES



Natural Light

To save resources, **all spaces use natural light** to minimize the need for artificial light. Reflective light flows through overlapping roofs adding to the ceiling lights which illuminate the spaces. Each bed also has an outside view. The building can easily be built without window panes depending on the resources available and climate. If there are no window panels then the windows can have mosquito nets and a safety grill on the outside.

Artificial Light

In the spaces on display here, artificial lights give high visibility during procedures in which precision is a necessity. They also allow facility managers to create different moods depending on the stage of labour.

Most hospital lights only provide visibility and the women's comfort is not taken into account. In these designs we have addressed this by including a variety of artificial light sources: spot lights, floor dimmers, ceiling and hanging lamps.



Rainwater Harvesting & Green Walls

The roofs are designed to collect rainwater in the inner courtyards and from around the outer edges of the roof.

The sunlight in equatorial areas comes from the east in the morning and the west in the afternoon. This means that the best position for windows in these regions is facing south and north to shelter the occupants from the afternoon sun. However, this is not always possible. If a space needs to have windows facing west, a cooling green wall can be planted in front of those windows.

Photo: Jon Candy

PASSIVE DESIGN STRATEGIES

4. RAINWATER HARVESTING + GREEN WALL Secondary resources and systems

1



Companion Flow

The important role of the companion in the labour process has been emphasized in the architectural designs displayed here. The delivery rooms are designed to be private, which will enable the companion to take part in the process. The diagram shows the flow of the companion's journey. The companion could be a traditional birth attendant, relative, friend or partner.



Flexibility

Maternity wards in low resource settings can experience seasonal peaks and troughs of attendance, as illustrated by this chart showing season fluctuation in Zanzibar, Tanzania. This seasonality varies according to place and culture. Birth rates in maternity wards can double during high season.

Currently many labour wards and their staff do not have the resources to support the enormous increase in delivery rates during high season. Facilities are understaffed and this leaves midwives overworked and mothers cramped into small spaces with too few beds.

The chart gives a clear indication of the extent of the increase of births in facilities in potential high season. This change in birth rates must be accommodated in the facility architecture. *Compromise proposal: average delivery rooms necessary as indication for year, with surplus accommodated in the Active Labour Room in High season

Average Births /month	Low season/ High season		Average Births /day LS/HS	Average births /year	Active Labour req. /day	Deliv. Rooms /day	Average Deliv. /day	Postnatal Beds /day	Special Care Units/ day	Nurses & MW/shift
100	L.S.	82	3	1200	4	1	2	4	1	2
	H.S.	137	5			2				
200	L.S.	164	6	2400	8	2	3	8	2	4
	H.S.	273	10			3				
300	L.S.	245	8	3600	12	3	<u></u> ц	12	3	6
	H.S.	410	14			5				
400	L.S.	327	11	4800	16	4	5	16	4	8
	H.S.	546	18			6				
500	L.S.	409	14	6000	20	5	7	20	5	10
	H.S.	683	23			8				
600	L.S.	491	16	7200	24	6	. 8	24	6	12
	H.S.	819	27			9				
700	L.S.	573	19	8400	28	7	9	28	7	14
	H.S.	956	32			11				

*45.45% - 4 months a year (March/April/May/June) = High Season *54.55% - 8 months a year (July-February) = Low Season

• average of 3 births/day in 1 delivery room ·3 shifts/day

Hygiene

Places for hand hygiene are distributed evenly around the facility. Water taps are operated by foot pedals, not hands.

The smooth movement of staff and a clear division of the separate phases of labour has been designed into the spaces shown here.

The floor of the facility is shiny and has rounded corners to facilitate cleaning. The walls are white, so that any uncleanliness can be seen and taken care of easily.





Low Walls

In many maternity wards in low resource settings, beds are placed against the walls, facing into the centre of the room. This leaves no privacy for women and their babies. New designs must balance the necessity for midwives to be able to monitor many woman at the same time, while simultaneously providing privacy for women during and after labour.

In this new design there will be **low walls dividing the pre-natal and post-natal wards**. We have chosen to position the beds facing out towards the windows from the centre of the room, with the heads of the beds against a low central wall. This facilitates more privacy, but still provides enough visibility for the midwives to have an overview of the ward and the women. Partitioning between the beds is made of natural, local materials, such as wood or woven leaves which add a homely touch to an otherwise clinical environment.

The dividing walls between each bed allow the women to sit up and talk with each other or to lay down in privacy.

Mirror View

Private delivery rooms accommodate a woman from the time that they are 5-7 cm dilated until two hours after delivery. The private rooms allow the woman to be accompanied by a companion.

In the many labour wards in low resource settings there is no privacy for the woman. Our designs facilitate both privacy and supervision. The nurses station is placed centrally between all the delivery rooms. Each delivery room has an angled mirror on the ceiling, which means that the nurses have a view to all rooms from their station. This enables male companions to move around in the facility with supervision and privacy and so be part of the birth process.



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Materials

The building is made using as many local materials as possible both in the exterior walls and in the interior. This integrates the building into the culture and surroundings. This approach makes it more sustainable and creates a feeling of community ownership.

The construction of new facilities should be both sustainable and meet the need for fast construction in tough terrain and climate conditions. One solution is to use **Earth House** modular metal frames and natural, locally available, building materials. These modular metal frames can be installed with limited skills, using natural materials like clay and reed as insulation. It is a fast, durable, reusable and affordable system for mass construction.

Clay is an ideal surface and construction material for hospitals and facilities. As a natural material it regulates room air moisture and stores heat. Clay plaster is reusable and it can be recycled without producing waste. Clay is a safe material to work with, it is easy to process and learning how to plaster with clay is simple. Clay has good acoustic qualities and is a fire safe material. It is durable, breathable and keeps structural moisture at bay. Clay is antibacterial – and may help to purify the air in enclosed spaces. It is visually pleasing and has a modern look and feel. Mould eventually finds its way into every structure. However, as clay is a natural material, the toxins produced by the mould are less harmful than those in synthetic materials.



Photos: Helena Sandman

Photo: Helena Sandman

Colours

Colours

Colour creates **a bridge between architecture and people**, and has symbolic importance - white is a pratical for environments which must be kept sterile, like health clinics, but has come to indicate a medical profession even outside a clinical context. The colour used in interiors might appear to be of modest importance, but it has a strong impact on the human psyche. We have opted for hues which are beneficial for women who are giving birth, in accordance to colour psychology best practice.

In many maternity wards in low resource settings sterile colours are the norm, which emphasizes the hospital-like atmosphere. In response, we have chosen yellow in the reception area, to communicate a warm and positive facility. Blue is used in the admission zone to communicate clarity and transparency. In the active labour ward orange communicates energy and optimism, while purple in the delivery room enhances perseverance, motivation and courage. The postnatal space will be green for relaxation and harmony, where the mother and her newborn baby can bond in a rejuvenating atmosphere.

The colours are used on floors and accents in doorways, on signage and feature furniture, such as the reception desk or delivery props.

We have chosen to adjust the shades of colour according to the tints found in the environment, in order to add context as well as familiarity to every birthing facility. It is important not to design a universal tonality, as culture and surroundings need to be taken into account in order to give relevance to the design and the women's experience of it.







Photo: Episcopal Relief



Photo: Jeremy Wilburn



Birth in Progress: Showcasing Lab.our Ward at Women Deliver 2016

Birth in Progress: Co-Creation Exhibition

'Birth in Progress', the exhibition showcasing Lab.our Ward design proposals took place at the global women's health and rights conference, Women Deliver in Copenhagen, Denmark, May 2016.



"How about tweaking it for a community health care worker?"

Design critiques at Women Deliver 2016

The exhibition's central theme was co-creating better experiences for mothers and newborns, and exhibition visitors were invited to take part in the co-creation the design proposals and concepts.

By and large, we received positive feedback and interest for the design proposals, and were delighted at how the discussions were enriched by the visitors being able to see, touch and try out the concepts.

The setup provided for many inspiring interactions for the project team and we are thankful for the time each visitor took to evaluate and provide critical feedback on our proposals.

Below, we look at specific mechanisms of capturing design critique at Women Deliver.

Feedback cards

Note cards with questions like:

What would require more focus? Which design proposal sparked your interest? What area should be further explored?

We used these cards to collect feedback and document the main points of the conversations. With the cards, visitors could make an individual reflection and explain their thoughts in their own words.





Stickers

Three type of stickers that visitors could attach to the design proposals: great (in pink), has potential (in yellow) and it is complicated (in blue).

With the stickers we gather initial reactions that allow us to ask why does the visitor think so and open up the discussion on a certain proposal.

Emergent themes in the feedback

Training

The visitors pointed the possibility of using the design solutions for training midwives and wanted to see them in the countries where they were working.

Inclusion and accessibility

Both in terms of demographic inclusion of e.g. the visually impaired, illiterate or minority groups, as well as the visibility of the woman

Locality, local materials and sustainability

Including appraisal for the use of local material, concerns for quality of local manufacturing as well as modifiability for very low resource environments and e.g. tertiary care providers.

In service design proposals, a main theme for feedback centered around **interoperability of the concepts**.

The tangibility of product design proposals prompted visitors to share insights, e.g. with **structural feedback** on the delivery bed's hinge mechanism, as well as new ideas to complement the displayed design proposals, such as ropes on the ceiling, near the delivery stool.

Spatial design proposals sparked many **small modification ideas** as well as **new additions**, such as building a pop-up version of emergency contexts, an ANC unit for pregnant women, a waiting home, staff housing and a children's parking area.
"In Malawi this would not work. Midwives take equipment home and leave it there." "How about tweaking it for community health care worker?"

"I liked the fact that the material is locally sourced. Not only is it a place for women but it also promotes local economies" "Photos and decorations on the wall to make them feel welcomed and safe. Nothing too fancy."

"Move this work into practice ASAP! It is brilliant..."

"Apgar panel is a really good idea. All the others I have seen then before. The delivery bed is good: Functional, simple, not easy to break & easy to clean."



Advisory Group

The Project Advisory Group, a team of leading professionals with expertise in MNCH, architecture and technology in low resource settings, provide guidance to the process.



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Next steps

Next Steps in the project

- Partnership discussions
- Innovation revision based on feedback
- Design of the pop-up / suitcase model of the Lab.our Ward ideation and design
- Design research documentation and website content development
- · Open sourcing and dissemination of the design proposals
- Design presentation and dissemination strategy development



We would love to hear from you:

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M4ID is a globally recognised leader in providing creative communication and service design solutions for development and health initiatives. Together with its partners, M4ID delivers social change projects across Asia, Africa, the Americas and Europe. M4ID works with civil society, foundations, UN agencies, academia and public sector actors. The agency also independently researches and develops new service and communication concepts, filling innovation gaps in the area of reproductive, maternal and newborn child health.



Please visit **www.labourward.org** for more information.

Please visit **www.m4id.fi** to learn more about us.

Thank you