Delivering beautiful and healthy babies, with a little help from digital health

Global Digital Health Forum
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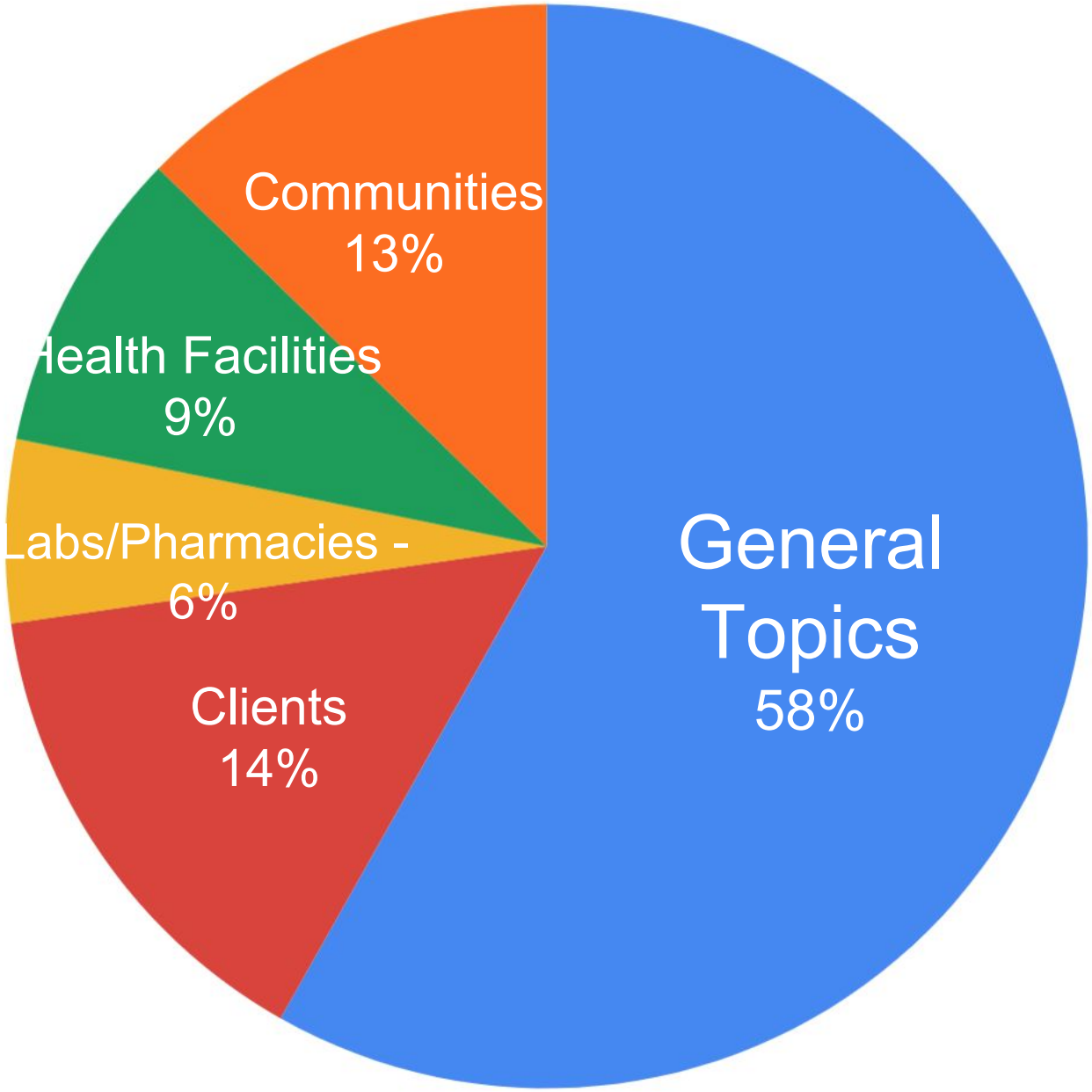
Communities
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9%
Labs/Pharmacies -
6%
Clients
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General
Topics
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A Crash Course in Intrapartum Care

Dr. Marc Mitchell

4
8
8

SO WHAT COULD GO WRONG?

HOW WOULD WE KNOW?

Fetal Monitoring

SAVING LIVES AT BIRTH: A GRAND CHALLENGE FOR DEVELOPMENT

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Evaluation of mLabour, an mHealth solution for improved quality of intrapartum care

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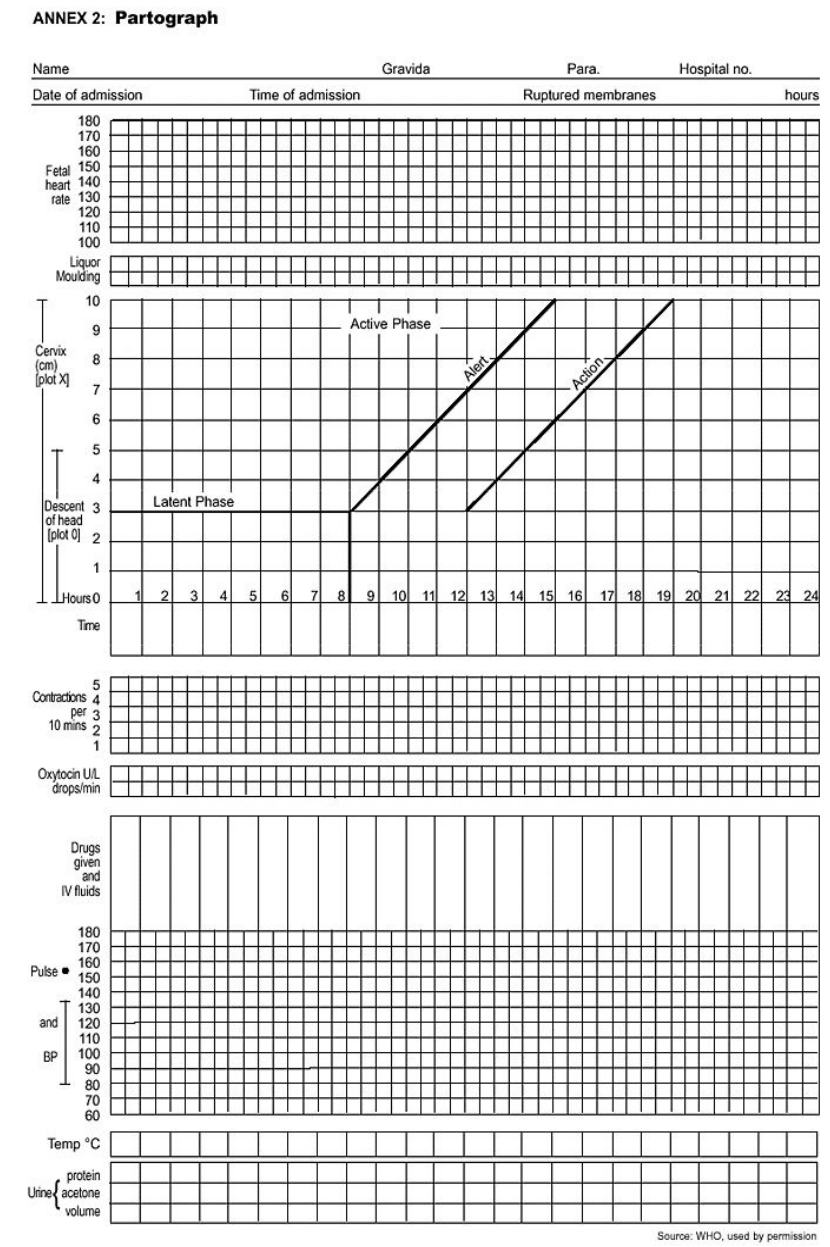
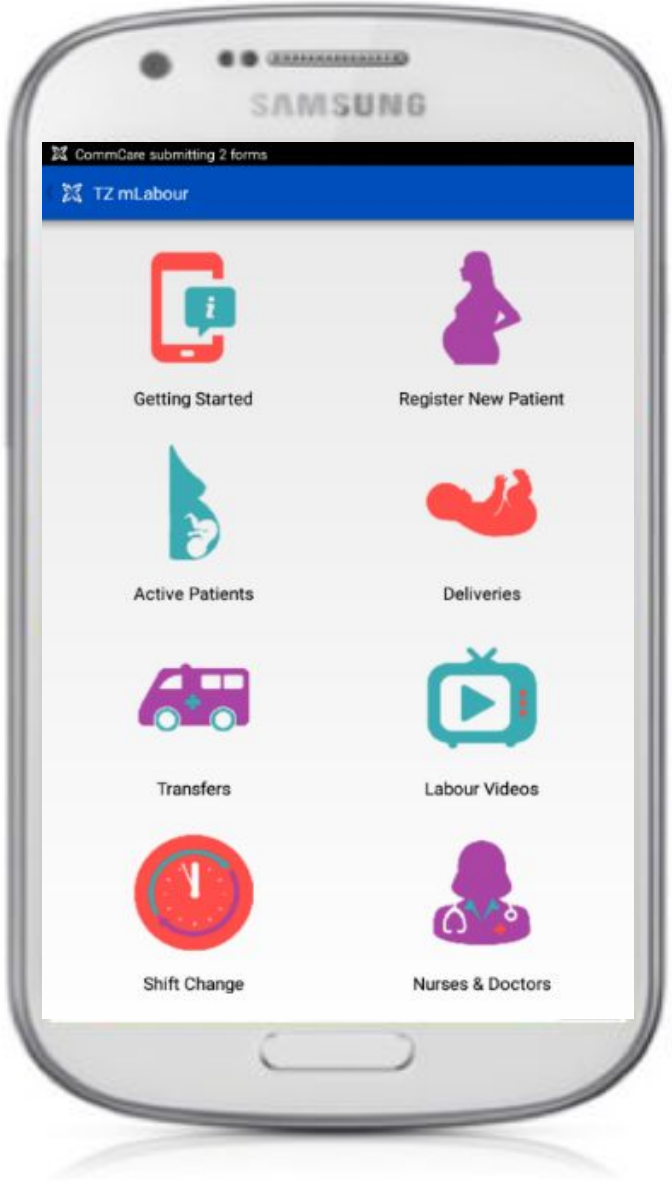
Background
The Paper Partograph

- The partograph monitors progress of labor

- A graph to track 21 parameters including
  - ➢ cervical dilation
  - ➢ contractions
  - ➢ maternal heart rate and blood pressure
  - ➢ position of head of fetus
  - ➢ fetal heart rate

- Evidence shows it is effective as an early risk detection tool.





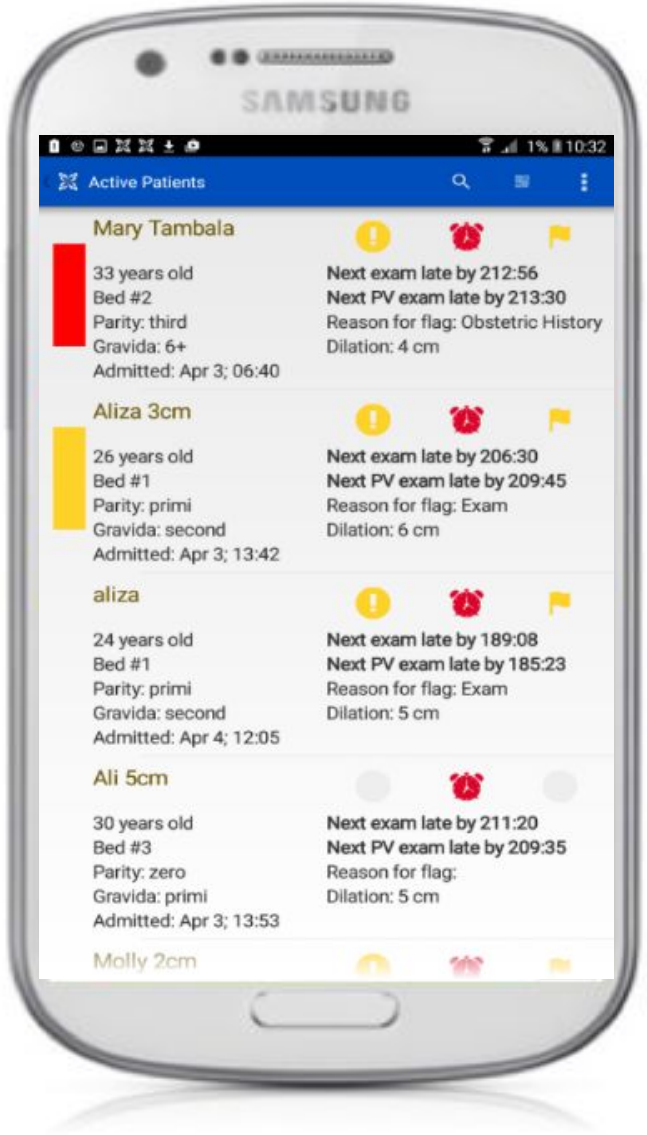
mLabour Overview

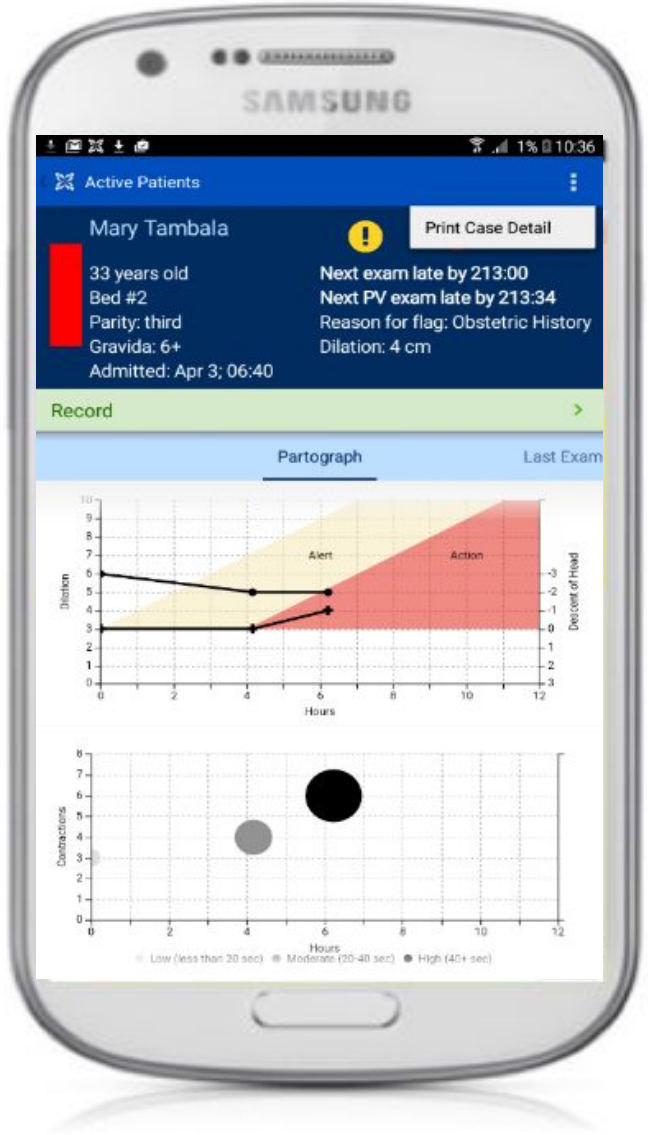
mLabour is a comprehensive labour management tool, built on CommCare

This mHealth solution provides:

- Real-time decision support
- Automatic graphing
- Exam reminders
- Prioritized patient lists
- Printable partograph

The Adaption Process: mLabour features





Evaluation Objectives

Goal: Assess the ability of mLabour to improve the quality of care provided to women during the intrapartum and immediate postpartum periods.

Objectives

1. **Clinical adherence**: Assess impact on the clinical quality of care provided during the intrapartum period, as measured by adherence to labor management protocols;
2. **Client satisfaction**: Assess the impact on women's experience of care via changes in women's satisfaction with services;
3. **Appropriate use**: Assess providers' use and perceptions of usability.

Evaluation Partners

- Research: Dimagi, FHI 360, and CSK Research Solutions
- Funder: Human Development Innovation Fund (HDIF)
- Technical advisor: MOHCDGEC Safe Motherhood Initiative
- Implementation partners: PRINMAT and APHFTA

FACGBF Maternity and Nursing Home Bagomoyo

- 5-10 births per month.
- managed by a registered Nurse Midwife
- supported by two additional L&D registered Nurse Midwives.
- Refers high-risk women to the district hospital.

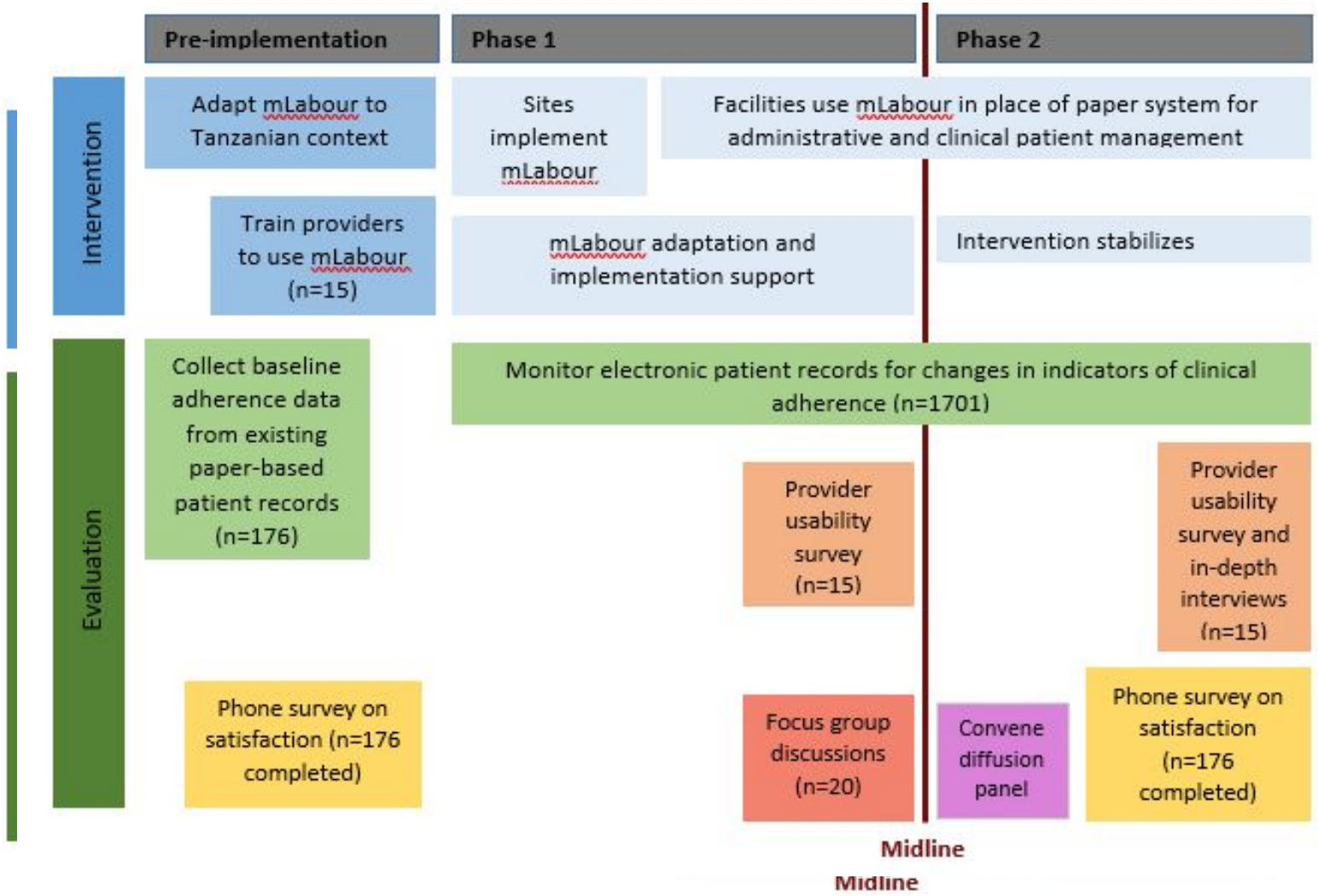
Kairuki Hospital
Dar es Salaam

- private, 17 obstetric-bed, full-service hospital with surgical capacity
- staffed by 10 midwives/nurses and 6 obstetricians/gynecologists.
- approximately 140 births per month, around 75 of these are elective CS.

Waebrania Maternity and Nursing Home Gongo la Mboto

- around 5-10 births per month.
- managed by registered Nurse/Midwife, supported by two other registered nurses.
- Refer to District Hospital

Evaluation Design



Objectives of the Diffusion Panel

- On average, 10 to 17 years from research results to practice uptake; high cost and time expense.
- Given the urgency, there is a need to rapidly diffuse promising technologies to make them widely available with a lower threshold of evidence, at a lower financial investment.

Diffusion Panel : To ensure safety and appropriateness, we planned to

- Share midline results with a consultative group of stakeholders
- Decide whether to diffuse based on combination of results
- Primary determinant was change in clinical adherence

Diffusion Panel Parameters

	Comparison of baseline and midline			
	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Clinical adherence	positive or stable	positive or stable	moderate or substantial negative change	positive or stable
Client Satisfaction	positive or stable	moderate negative change	any result	substantial negative change
Result/ Action	Continue implementation. Diffuse to four additional sites at midline	Continue implementation. Diffuse to four additional sites at midline. Use midline satisfaction results to inform adjustments to provider support/training.	Implementation continues with additional support. Diffusion delayed for 3 months. Convene focus group of providers to inform course correction. Convenes a focus group of women to inform improvements. Conduct analysis of clinical adherence at second midline.	Implementation continues with additional support. Diffusion delayed for 3 months. Convenes a focus group of women to inform improvements.

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Clinical Adherence: Methodology

Among routine (non-complicated) deliveries, we developed a **composite indicator** that is a summary of:

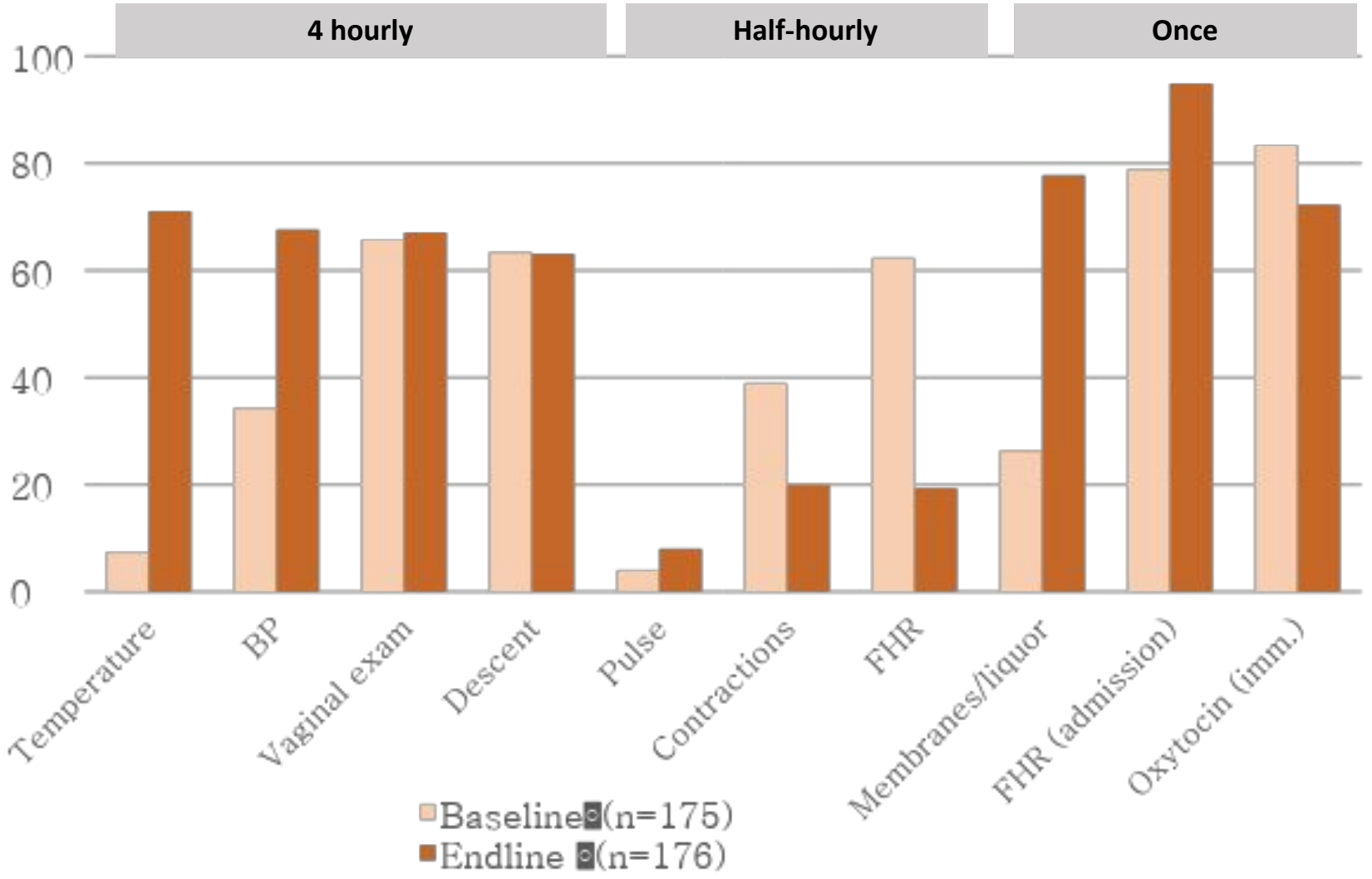
- fetal heart rate recorded on admission
- woman's temperature observed at least every 4 hours
- woman's blood pressure observed at least every 4 hours
- woman's pulse observed at least every 30 minutes
- fetal heart rate counted at least every 30 minutes
- contractions assessed every 30 minutes
- vaginal exams occurred every 4 hours
- descent of the head checked and recorded every 4 hours
- state of the membranes and color of liquor recorded
- immediate oxytocin delivered after expulsion for prevention of postpartum hemorrhage (PPH)

Clinical Adherence: Results

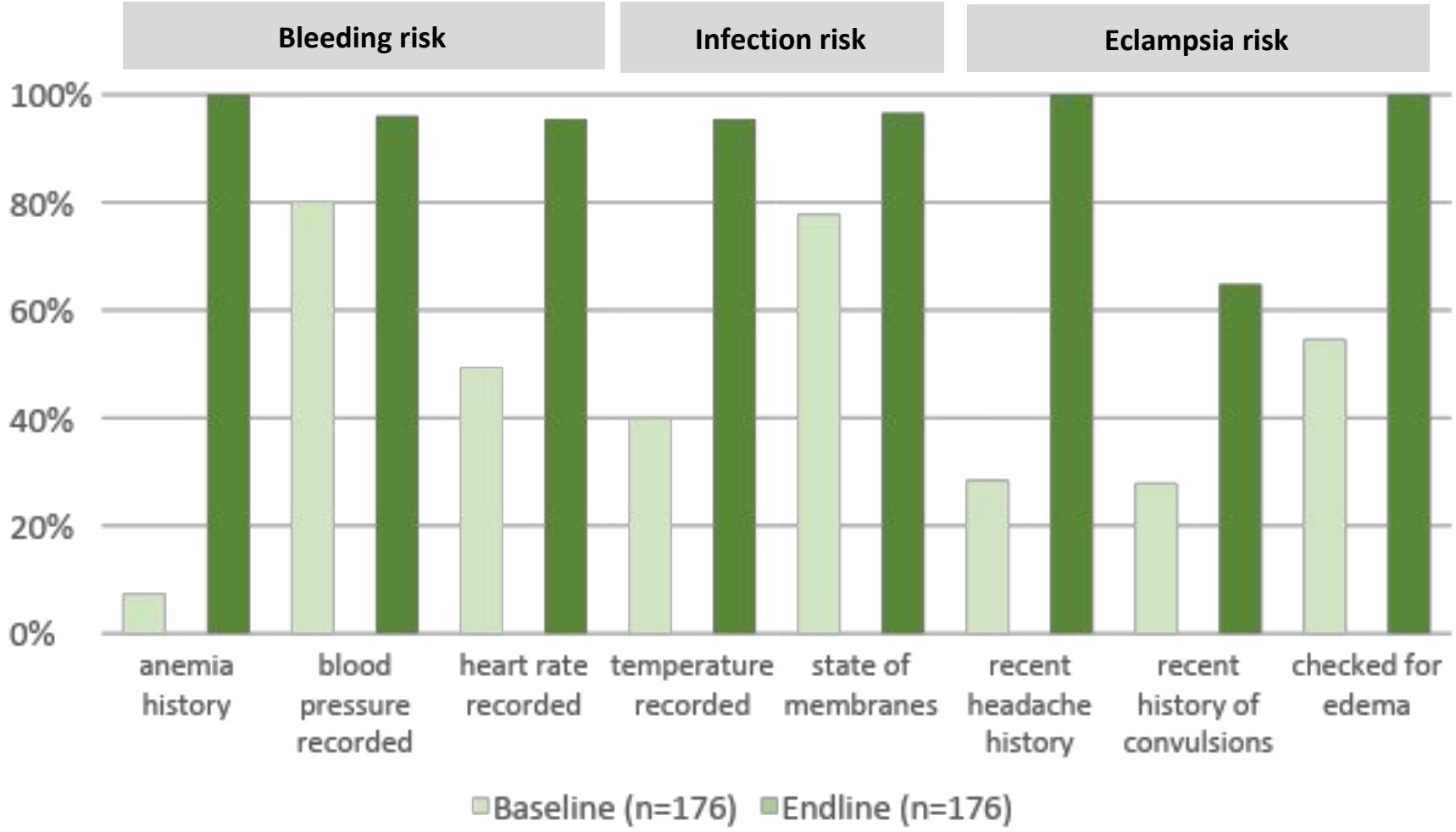
	Mean or % (n)		
	Baseline (n=175)	Midline (n=185)	Endine (n=176)
Mean adherence score (out of 10)	4.6	5.5	5.6*
Percent (number) scoring at least 6 out of 10	48.6 (85)	57.8 (107)	63.6 (112)

*difference between baseline and endline statistically significant ($p<0.001$)

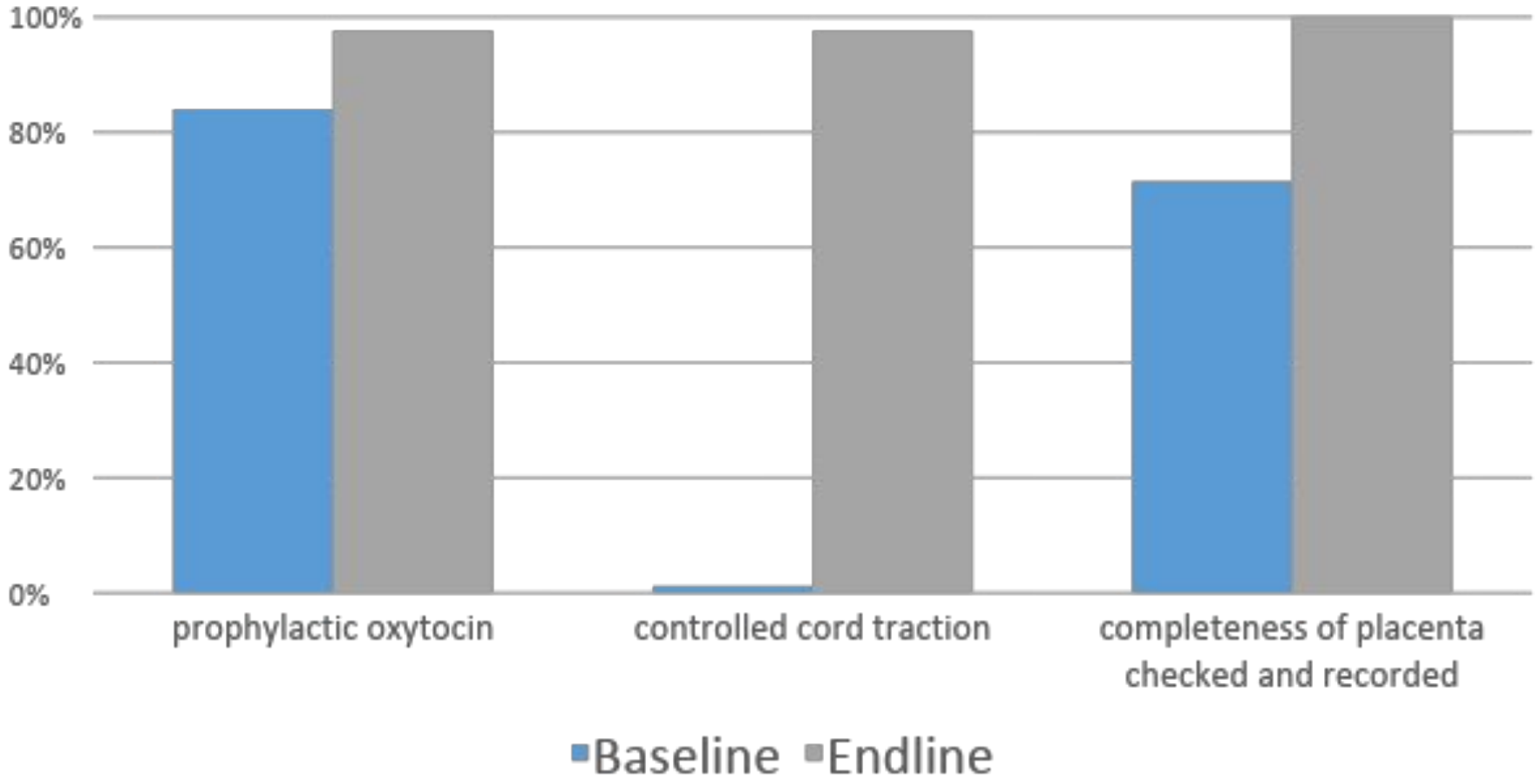
Clinical Adherence: Item Results



Danger Sign Screenings at Admission



Performance of AMTSL Functions



Clinical Adherence: Note

Calculated through review of patient medical records

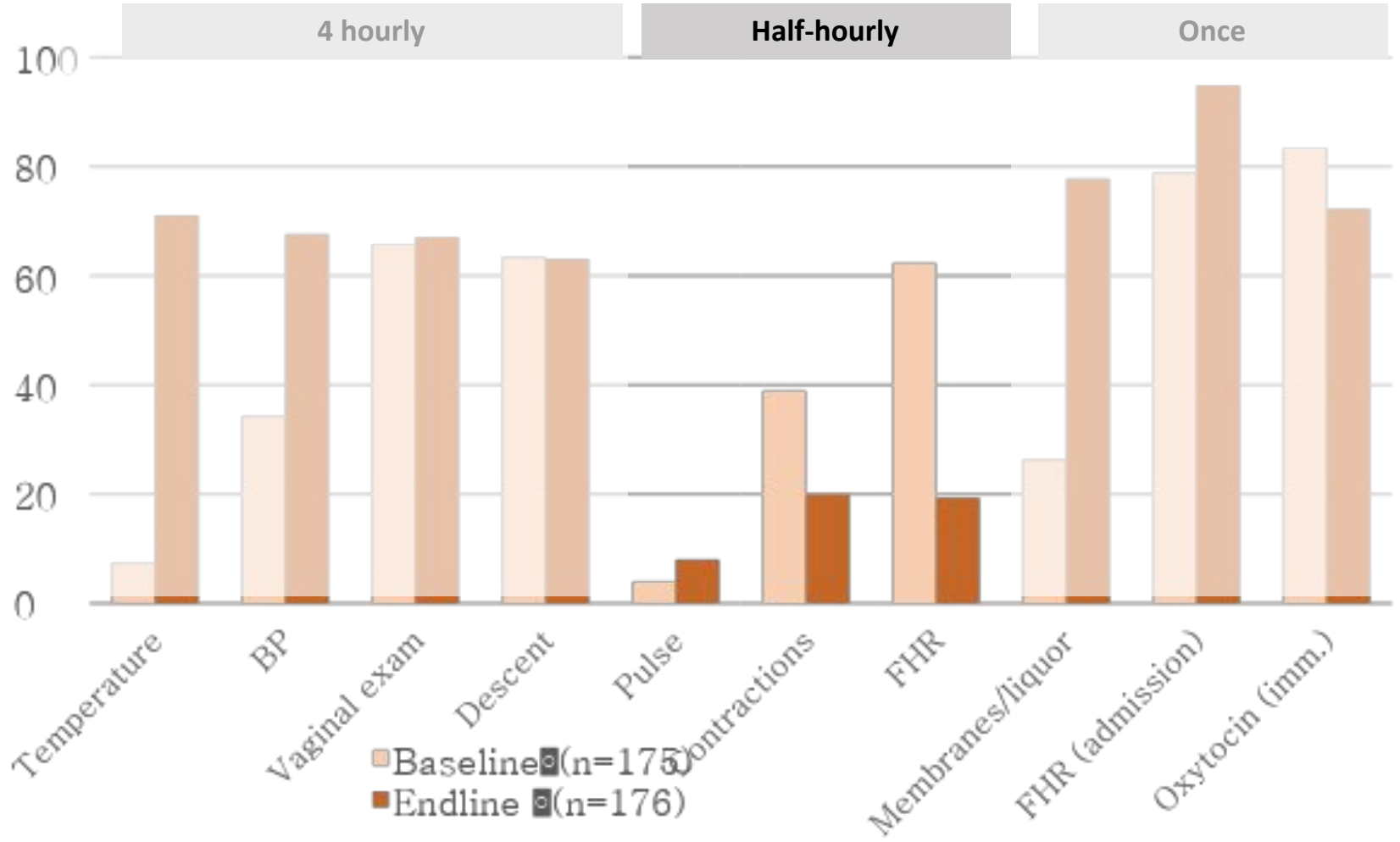
- paper (at baseline)
- electronic (during implementation period)

The switch in data type means that observed changes could be the result of:

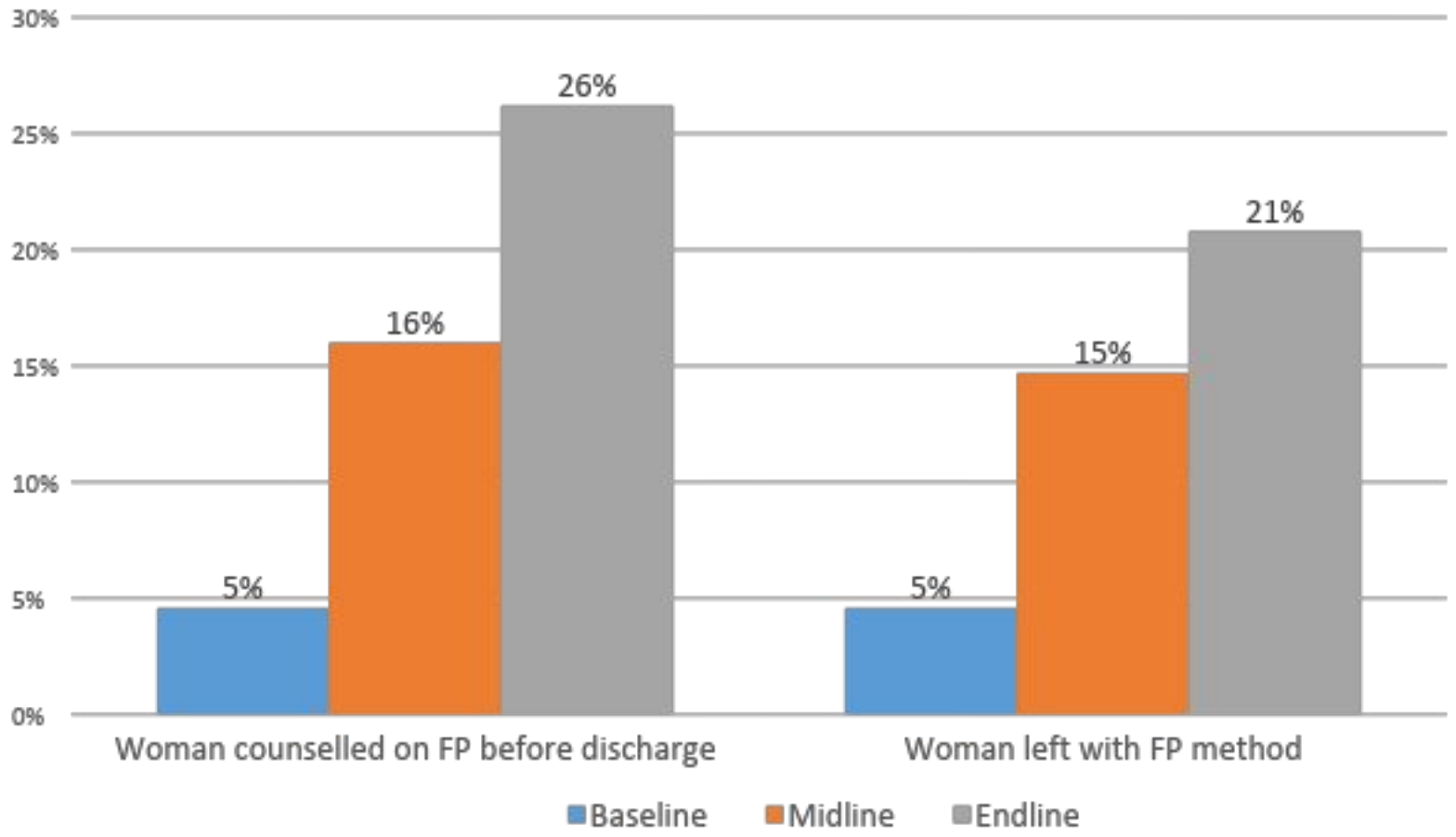
- changes in record-keeping and/or
- changes in adherence

The changes we see are likely due to both.

Clinical Adherence: Item Results



Postpartum Family Planning



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Client Satisfaction: Methodology

Phone interviews with patients after discharge to assess whether the implementation of mLabour impacted key aspects of patient satisfaction.

Quantitative client satisfaction survey at baseline and endline

- **satisfaction score based on responses to 8 questions.**
  Perception of competence of health workers, respect providers showed, provider communication skills, feeling neglected, ever asked if she had any questions, providers came quickly when called

Qualitative in-depth interviews at midline

- **in-depth question investigating perceptions around:**
  satisfaction, respect, quality, tablet use

Client In-depth Interviews: Highlights

On interaction between provider, patient and tablet

"It was good because they welcomed me very well, also they were filling their information in the electronic device (tablet). Therefore, in general I can say it was good"

-FACGBF patient, 30-34 yrs, 4+ births

"It was good, they asked questions I answered them and wrote the information in the computer and gave me some papers"

-Waebrania patient, 18-24 years, first birth

On whether providers were attentive

"Their attention was good every half an hour the nurses were doing ward round and ask if we are doing ok"

-Kairuki patient, 25-29 years, 2-3 births

On perceptions about tablet use

"The uses of computer tablet its good it's a modern way of recording information."

-Waebrania patient, 18-24 years, first birth

On whether tablet affected patient perceptions

"It was good because sometimes I was calling the provider to come and see me, but she was telling me to wait for the devices to return the feedback. Therefore, [the provider] told me to wait a little bit so that [the provider] can come to see me while having the feedback which [the provider] got from the devices."

-FACGBF patient, 30-34 yrs, 4+ births

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Provider Perceptions: Methodology

Quantitative usability survey pushed out on mLabour at midline and endline

usability score adapted from validated, customizable health IT usability scale

Health ITUES tool [Yen et al (2010); Yen, et al., (2014)].

25 yes/no question investigating impact of mLabour on quality of work/life; perceived usefulness of mLabour; perceived ease of use; user control.

Qualitative in-depth interviews at endline

in-depth questions investigating perceptions around:

Operational management of the tablets; administration and training; patient interactions; utility of electronic data collection; impact on provider time and efficiency

Provider In-depth Interviews
Respondent Demographics

- Average age: 35.6 years (range 24-67)
- Professional classification: 15/15 were registered nurses/midwives
- Sex: 14 of 15 providers were female
- Average births attended in last week: 4.0 (range 0-11)
- Average years working at current facility: 4.2 (range <1 - 28)

Provider In-depth Interviews
Trainings

9 out of 15 participants attended training with Dimagi staff

- Six others trained by colleagues at their respective facilities

All providers indicated knowledge exchange between providers regarding the mLabour was common at their facilities

- Seven providers reported training new colleagues on how to use mLabour

Providers' suggestions for future trainings:

- Regular retraining sessions at facility
- Longer initial training
- Add focus on using mLabour while managing multiple patients

Provider In-depth Interviews
Perception of Client Outcomes

Many providers reported mLabour making a difference in their interactions with patients

- Stronger rapport with patients due to more frequent interactions
- Patients feel happy and better attended to

All providers believed it was helpful to explain their use of mLabour to patients

- Many explained that patients think providers are on their phones when they see them using tablets
- Some indicated that women would be uneasy/uncomfortable about tablet use unless providers explained its purpose

“Yes, the difference is that we have seen the ***patient is happier with the device.***

This is because once you have already told her that you are using this device to record her information, which is kept confidential, ***she knows that it is confidential. She sees that you are more careful and closer to her because after every half an hour you come and examine her to record the information.*** *They saw that we were caring for them more compared to the beginning. In the beginning, once you have examined her, you can be late to come back on time as required. But now,* ***you cannot be late because the tablet reminds you.***

”

-Provider

Provider In-depth Interviews
Advantages and Disadvantages

Advantages

- Helps detect problems early/gives guidance
- Simplifies work
- Improves provider-patient relationship

Disadvantages

- None
- Difficult to manage multiple patients at once
- Others: cost/need to buy credit; fewer breaks for providers due to constant app reminders

*“It [mLabour] has **helped me to remember** the required things to manage a pregnant woman.*

*Also, the action and alert lines has made me to stay updated that whenever you see a certain thing, it easily and timely reminds you to do something. When you see that you are required to take action, you see that it has already reminded you. In case there is a patient with a problem such as HIV, you are **reminded by the tablet that now you are required to give the child Nevirapine**. It is not easy to forget and leave in the ward the patient that is HIV positive as the tablet constantly reminds you of what you are supposed to do. Or **maybe the patient has high blood pressure, what is needed is close follow up** to see how her condition progresses.*

-Provider

”

Unexpected Outcomes

Team-building and skills enhancement

- Several clinics conducted informal training among new staff; used as an opportunity to refresh clinical skills and for the team to work together
- Clinic managers felt more in touch with their staff
- Possible solution to issue of staff turnover

Empowerment

- Midwives at one hospital noted that through mLabour they felt better equipped to make decisions and suggestions to their superiors regarding appropriate care for their patients

Benefits and Challenges

Benefits of mLabour

- Clear increase in clinical adherence and screening for danger signs
- Improved data quality
- Patients perceived improved communication
- Clinic staff have noted it empowers their decision making and improves how the staff work together

Challenges and Limitations

- Staff turnover and training
    - With staff turnover, some on-the-job training has worked effectively, while others have requested more formal training & refreshers
- Hardware and technical challenges
    - Airtime, printing, electricity

Acknowledgements

Partners

PRINMAT

APHFTA

ITIDO

HDIF

CSK

FHI 360

Dimagi

Health Fa[illegible]ies

FACGBF Maternity

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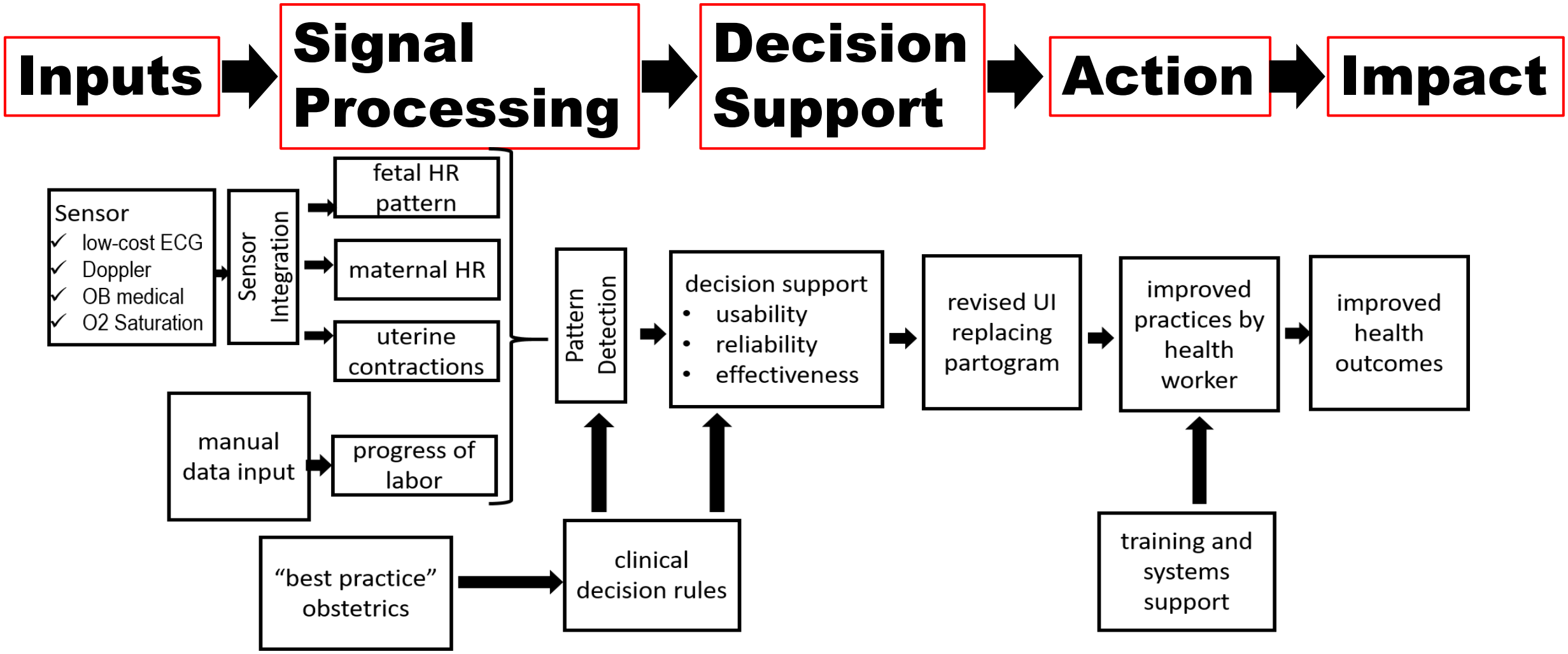

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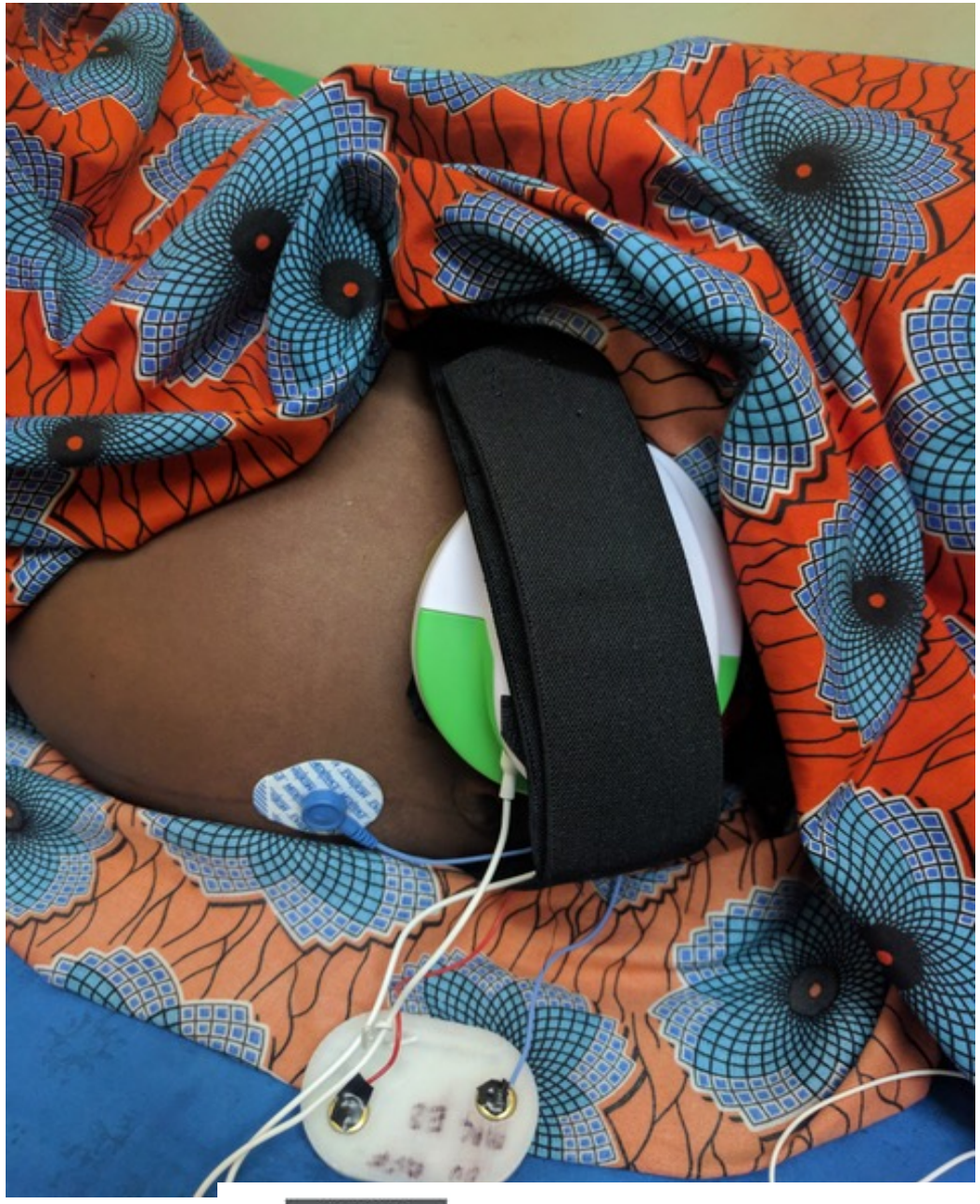
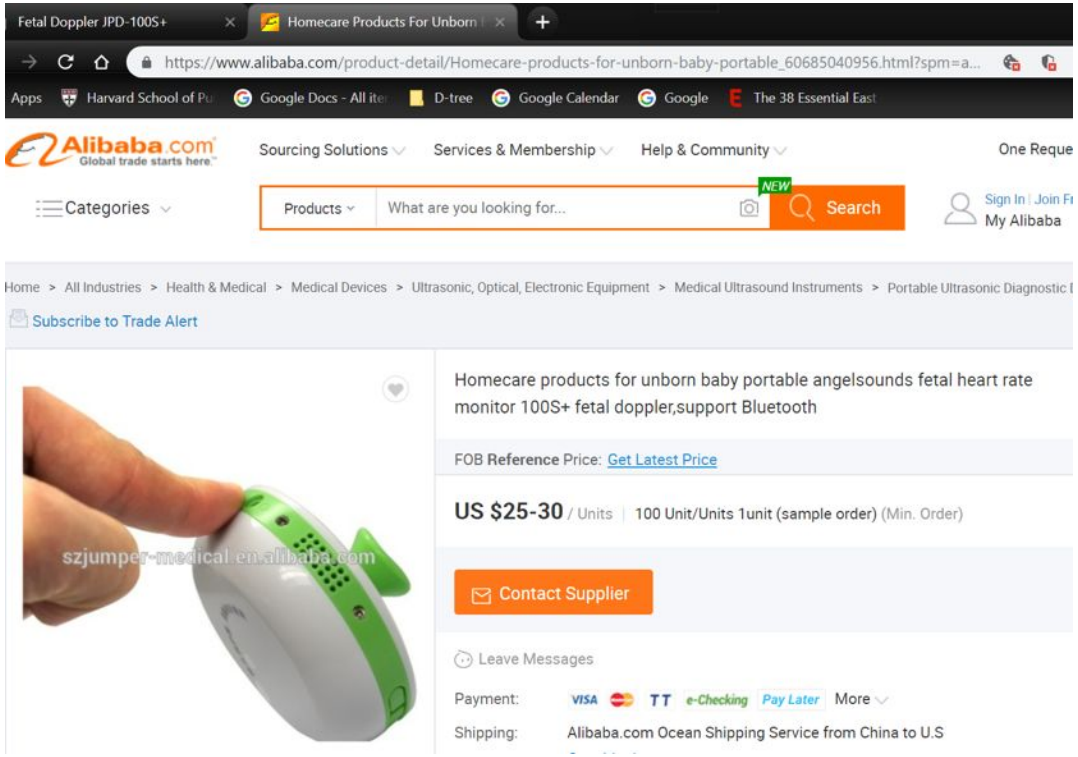


Inputs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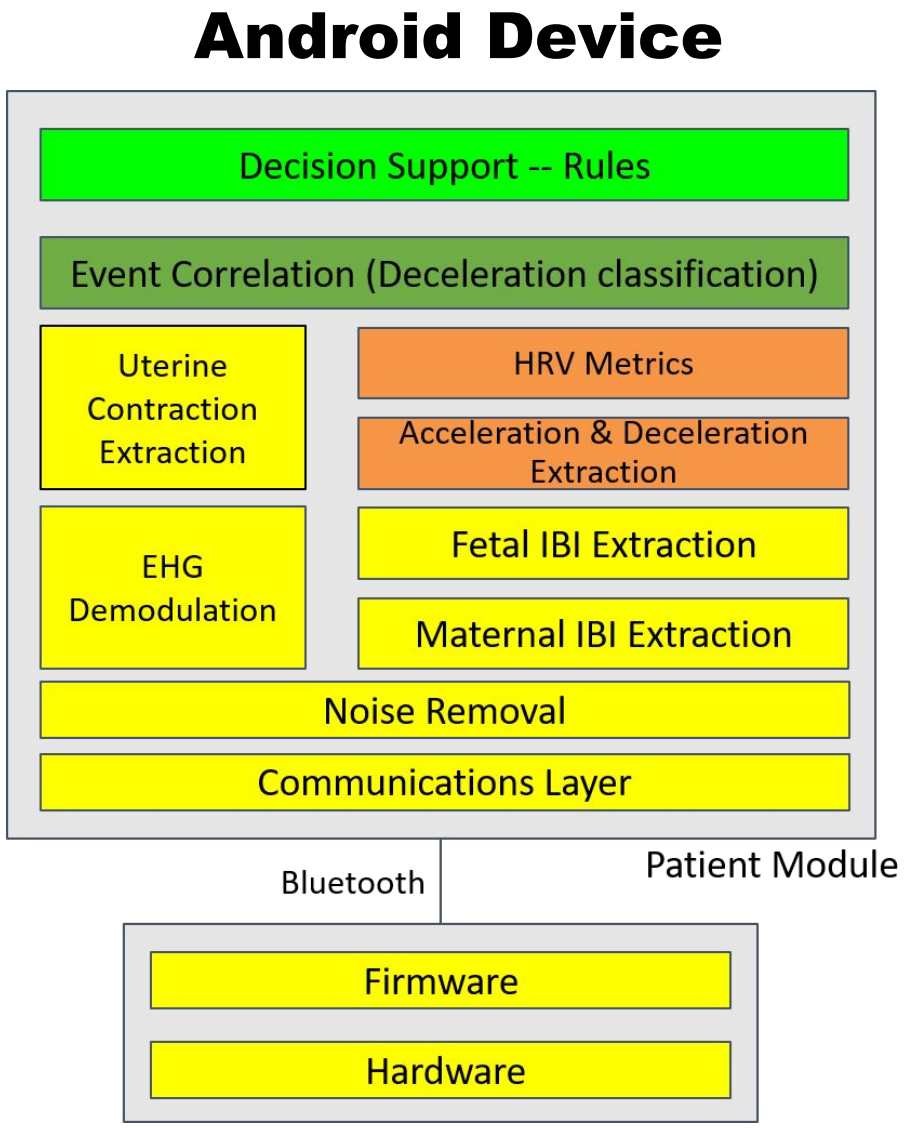
Signal Processing

The Software Stack



- Visualization
- Advanced Analysis
- Decision Tools

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CTG classification

2015 revised FIGO guidelines on intrapartum fetal monitoring

	Normal	Suspicious	Pathological
Baseline	110-160 bpm	Lacking at least one characteristic of normality, but with no pathological features	< 100 bpm
Variability	5-25 bpm		Reduced variability. Increased variability. Sinusoidal pattern.
Decelerations	No repetitive* decelerations		Repetitive* late or prolonged decelerations for > 30 min (or > 20 min if reduced variability). Deceleration > 5 min
Interpretation	No hypoxia/acidosis	Low probability of hypoxia/acidosis	High probability of hypoxia/acidosis
Clinical management	No intervention necessary to improve fetal oxygenation state	Action to correct reversible causes if identified, close monitoring or adjunctive methods	Immediate action to correct reversible causes, adjunctive methods, or if this is not possible expedite delivery. In acute situations immediate delivery should be accomplished

*Decelerations are repetitive when associated with > 50% contractions.
Absence of accelerations in labour is of uncertain significance.

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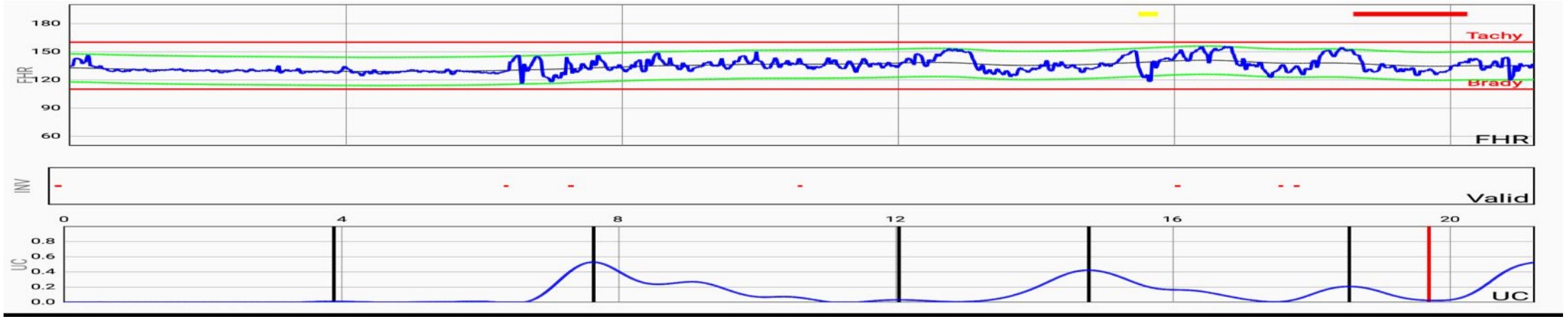
Decision Support

✓ validated rules
✓ reproducible data analysis



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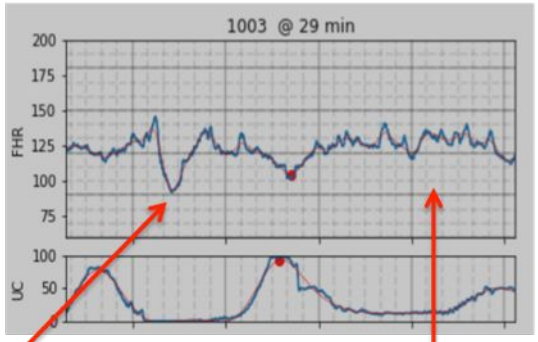
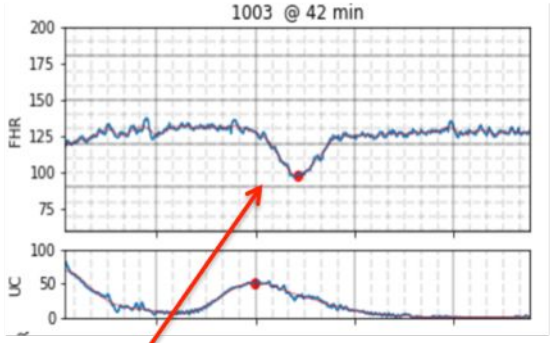


'Variable Deceleration': Indication of potential umbilical cord occlusion

'Variability': Reassuring indication of autonomic nervous system function



'Late Deceleration': Indication of potential placental abruption

Decision Support

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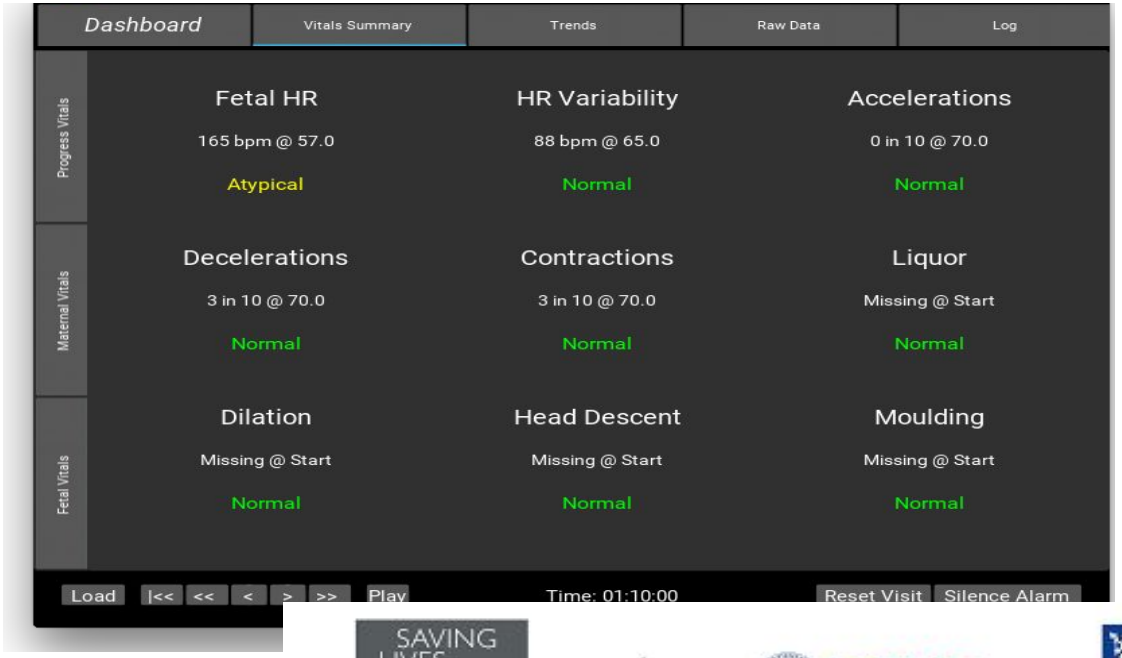
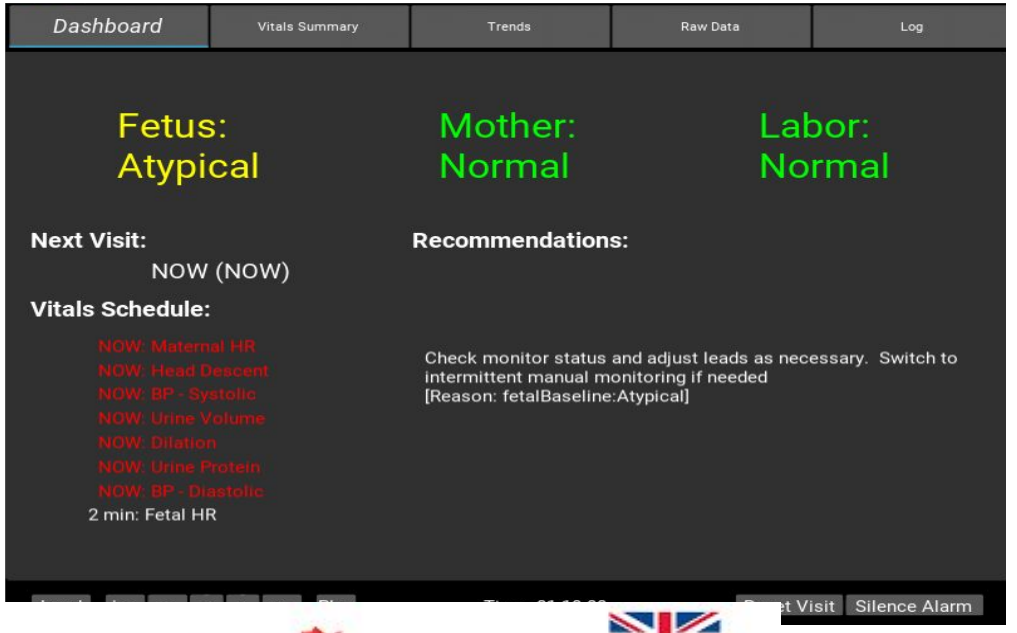
- ✓ interpretation of data
- ✓ easy to understand dashboards





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Take Action

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Impact

✓ healthy mother

✓ healthy baby

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Questions for the Panelists & Open Discussion

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