

Addressing the knowledge gap that ultrasound brings to rural prenatal clinics



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A little background...

- ◆ In April 2014, prior to starting residency, I traveled to Uganda with Child Family Health International and learned about barriers in maternal / child health in Uganda



Uganda Maternal / Child Health Statistics

2011 Uganda Health Assessment:

- ♦ infant mortality rate is 76 / 1,000 live birth (10x the rate as the United States)
- ♦ 6% of Ugandan women receive no antenatal care and the majority (68%) of women receive less than the recommended 4 antenatal care visits
- ♦ Only 39% of Ugandan women deliver at Health Facilities
- ♦ 84% of women receive their antenatal care from midwives
- ♦ And the problem is even worse in rural areas...

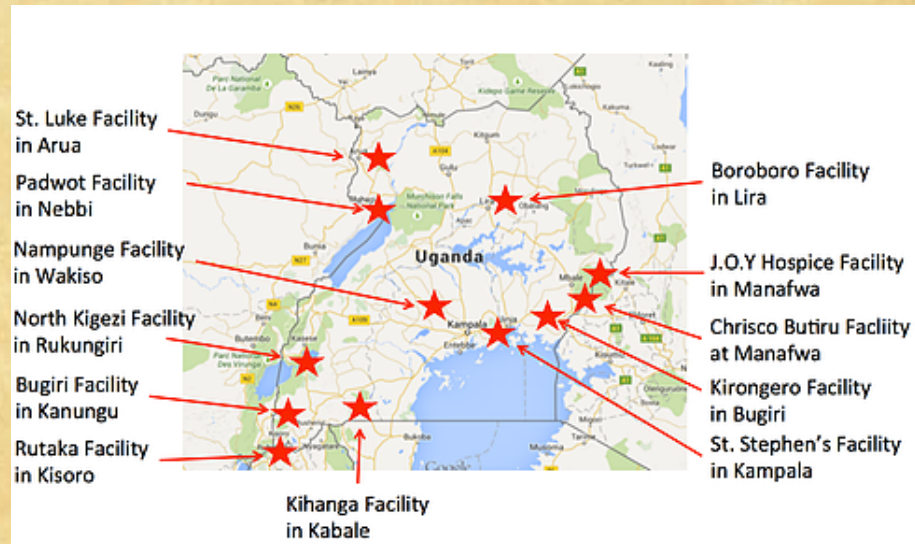


Rad Impact



- ◆ Rad Impact is a nonprofit organization trying to change some of those statistics by increasing access to medical imaging
- ◆ Ultrasound has been shown to
 - ◆ attract women to come to antenatal appointments to see a “video” of their baby.
 - ◆ increases detection of prenatal conditions
 - ◆ Increases opportunities for education and encouragement to deliver at health facilities

These 12 rural clinics received ultrasound machine donations to their prenatal clinics:



Ultrasound training for midwives

- ◆ One midwife from each of those 12 clinics came to a 6 week training course in January 2016 to learn how to use ultrasound to make basic obstetric diagnoses



Pre-Ultrasound Needs Assessment Survey

I emailed a contact at each of 7 initial clinics the following questions:

- ◆ 1. How many pregnant patients does your clinic see on average in 1 month?
- ◆ 2. What prenatal services does your clinic currently provide and where does the funding come from currently to provide those services?
- ◆ 3. What are current barriers that you are aware of that prevent pregnant women coming to the clinic to get prenatal care?

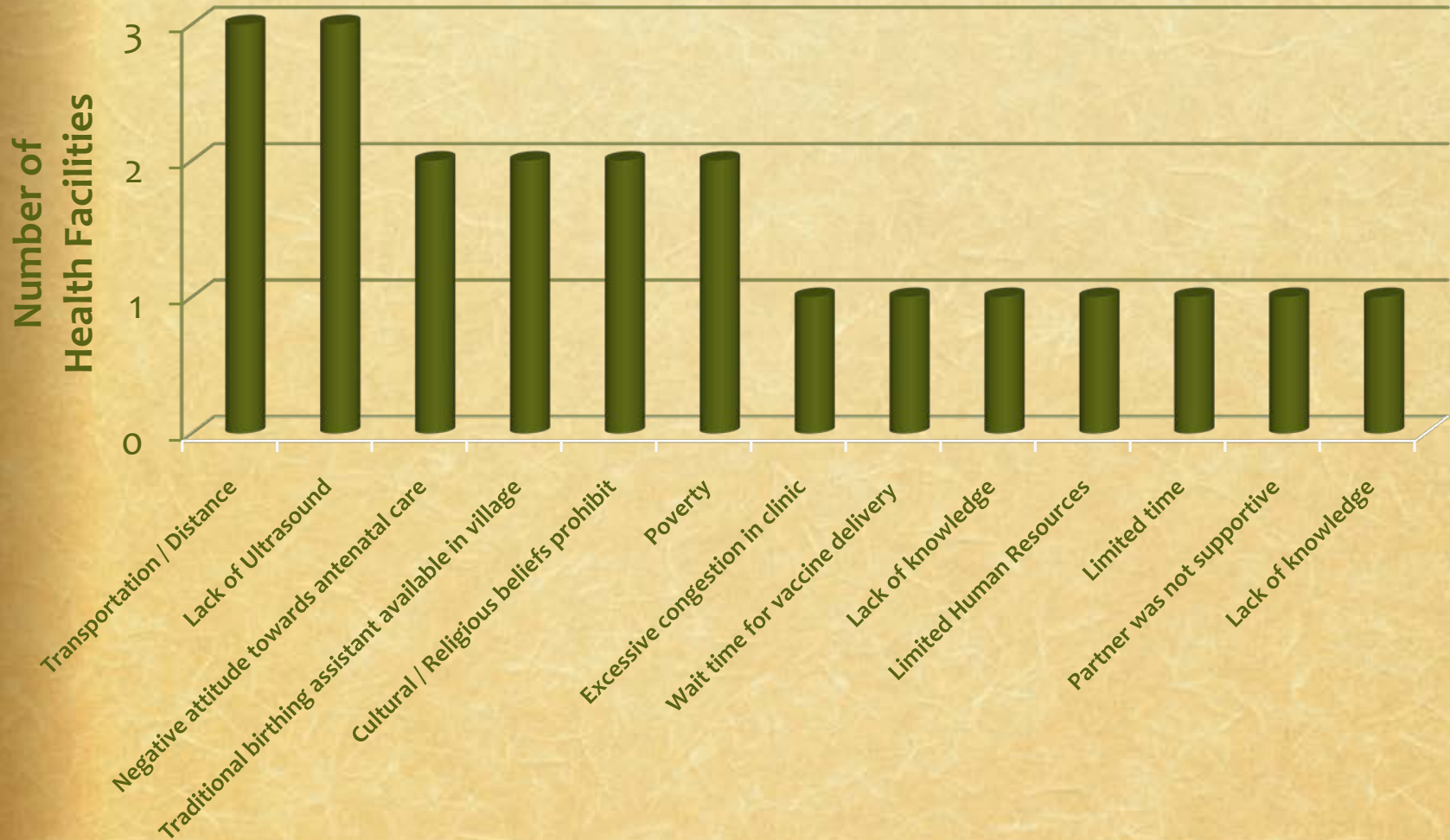
Pre-Ultrasound Needs Assessment Survey

- ◆ 4. For pregnant women who receive prenatal care, at what gestational age do they typically present and on average, how many appointments do they attend prior to delivery?
- ◆ 5. Do you provide HIV testing? If so, how many HIV positive patients do you serve on average in a year and where do the patients get treatment?
- ◆ 6. What prenatal services, if any, do you wish you could provide but are currently not able to?
- ◆ 7. We are hopeful that bringing an ultrasound machine to your clinic will increase the number of pregnant patients that come to be seen. What challenges do you foresee with being able to serve the increased number of patients?

Survey 1 results

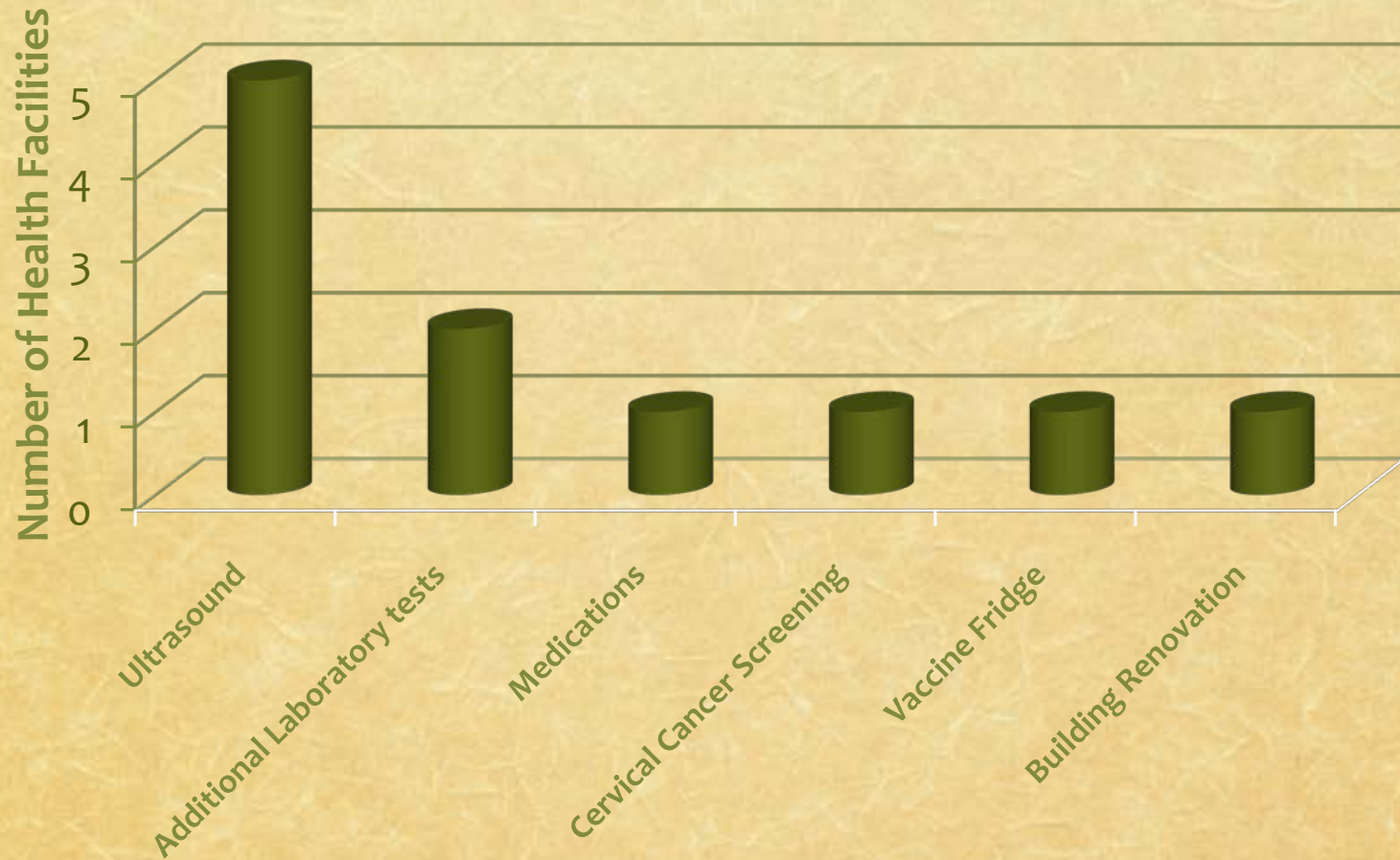
5 of the 7 clinic contacts responded to my initial survey

Barriers to Antenatal Care



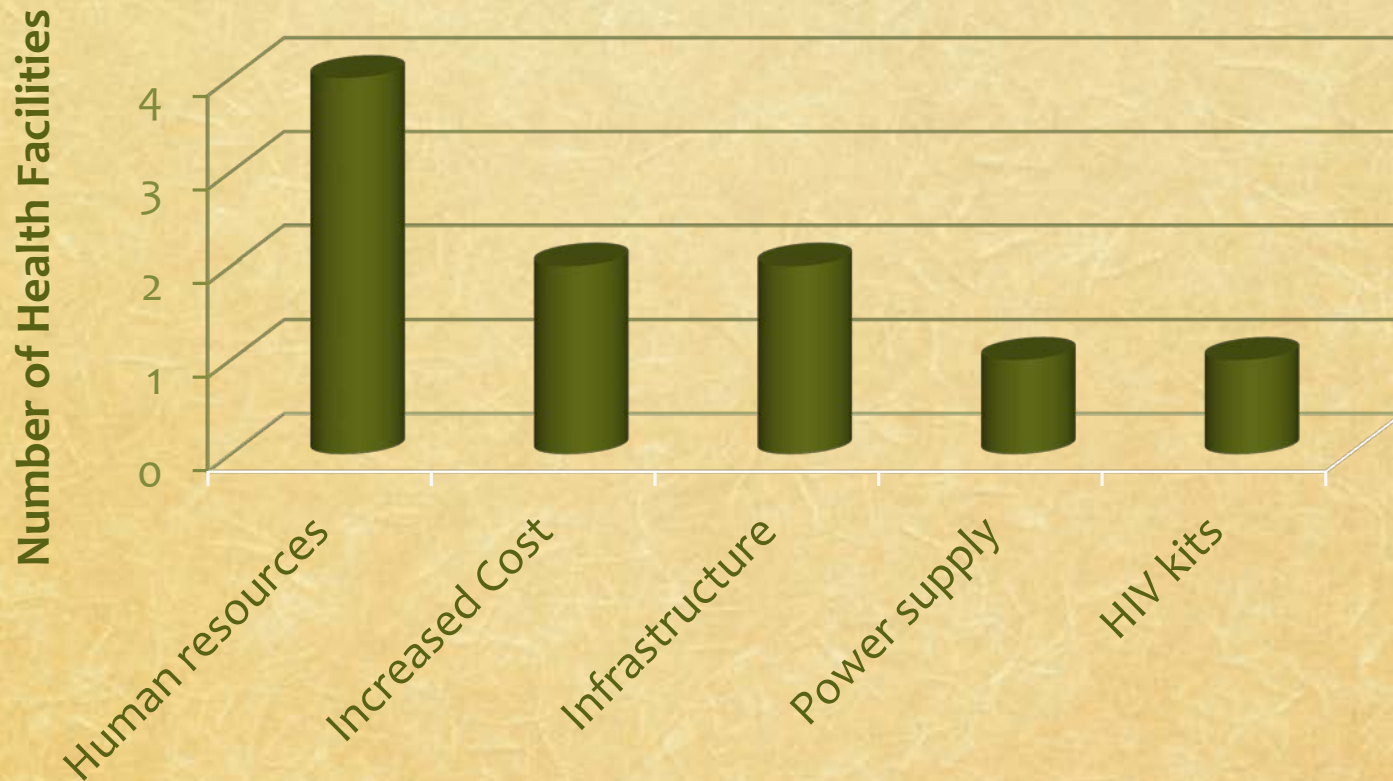
Survey 1 results

Additional Prenatal Services Desired



Survey 1 results




Anticipated Needs with New Ultrasound Machine



Survey 2

- ◆ 5 additional clinics and midwives were selected by Rad Impact to receive ultrasound machines and training
- ◆ 6 week training course started in early January
- ◆ Survey 2 was administered to each of the 12 midwives on the first day of their training
- ◆ The survey was printed and responses scanned and sent back electronically. Response rate was 100%

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Midwife Survey

Dear Midwives,
Please complete this survey as best and honestly as you can, prior to starting your training on OB ultrasound. This survey will be helpful in understanding how having the ultrasound in your clinic and receiving training on its use will make an impact on prenatal care. We will have you complete a similar survey in several months after you have been using the ultrasound machines in your clinics with patients. All answers will be anonymous. Thank you for your time and the work you do!

Question	Answer
How many years have you been practicing as a midwife?	4 years
Where did you receive your training as a midwife?	Finema Highgate - APAN Good Samaritan - International - LMA
How long did it take you to complete your training as a midwife?	2 1/2 years + 6 months Capcity Building
Have you ever received any prior training on OB ultrasound?	NO
Do you assist with vaginal deliveries? If yes, approximately how many babies do you help deliver in a month?	50-60 Babies
Approximately how many women do you see each day for antenatal care?	10-15
At approximately what gestational age do most women first come to clinic for antenatal care?	14-16 weeks
How many antenatal care appointments do most women attend? 1? 2? 3? 4 or more?	2nd and 4th
Approximately how many women do you refer for an antenatal consultation with an OB doctor each month?	2-3
Approximately how many women do you refer during labor?	1-2

each diagnosis

1 very knowledgeable on what diagnosis is and the cal significance on prenatal and fetal h

Assessment of Knowledge of Management of Diagnoses Made with Ultrasound

Diagnosis	Comfort level in managing a patient if this diagnosis was made in an antenatal clinic (please check one)		
	Not at all comfortable	Somewhat comfortable	Very comfortable
Placenta Previa		✓	
Placenta Accreta	✓		
Vasa Previa	✓	✗	
Breech Presentation		✓	
Cervical Insufficiency (short cervix)	✓		
Fetal Macrosomia	✓		
Miscarriage		✓	
Placental Abruption	✓		
Oligohydramnios	✓		

1. Placenta previa
2. Placenta accreta
3. Vasa Previa
4. Breech Presentation
5. Cervical Insufficiency
6. Fetal Macrosomia
7. Miscarriage
8. Placental Abruption
9. Oligohydramnios
10. Polyhydramnios
11. IUGR

Survey 2 results

Midwife sur

- Average
- Average
- Number
- (average
- Average
- Average
- Average
- Average

Survey question	Statistical Analysis
How many years have you been practicing as a midwife? (in years)	Mean: 3.1 Median: 2.5 Range: 0.42 to 12.0
How long did it take you to complete your training as a midwife? (in years)	Mean: 2.6 Median: 2.5 Range: 0.5 to 4.0
Do you assist with vaginal deliveries? If yes, approximately how many babies do you help deliver in a month?	Mean: 15.1 Median: 11.0 Range: 0.0 to 60.0
Approximately how many women do you see each day for antenatal care?	Mean: 9.3 Median: 5.3 Range: 1.5 to 30.0
At approximately what gestational age do most women first come to clinic for antenatal care? (in wks)	Mean: 19.3 Median: 20 Range: 15.0 to 28.0
How many antenatal care appointments do most women attend? 1? 2? 3? 4 or more?	Mean: 3.1 Median: 3.3 Range: 1.5 to 4.0
Approximately how many women do you refer for an antenatal consultation with an OB doctor each month?	Mean: 6.5 Median: 2.5 Range: 0.5 to 50
Approximately how many women each month do you refer for a C-section during active labor?	Mean: 3.3 Median: 2.5 Range: 0.0 to 8.5
Approximately how many women each month do you refer for a C-section prior to active labor?	Mean: 1.6 Median: 1.3 Range: 0.0 to 4.0
Approximately how many patients do you see each month that are HIV positive?	Mean: 9.8 Median: 4.8 Range: 0.5 to 65.0
Do you manage the care of newborns? If so approximately how many babies do you see in a week?	Mean: 4.0 Median: 3.5 Range: 0.0 to 12.5

ge 0 to 60

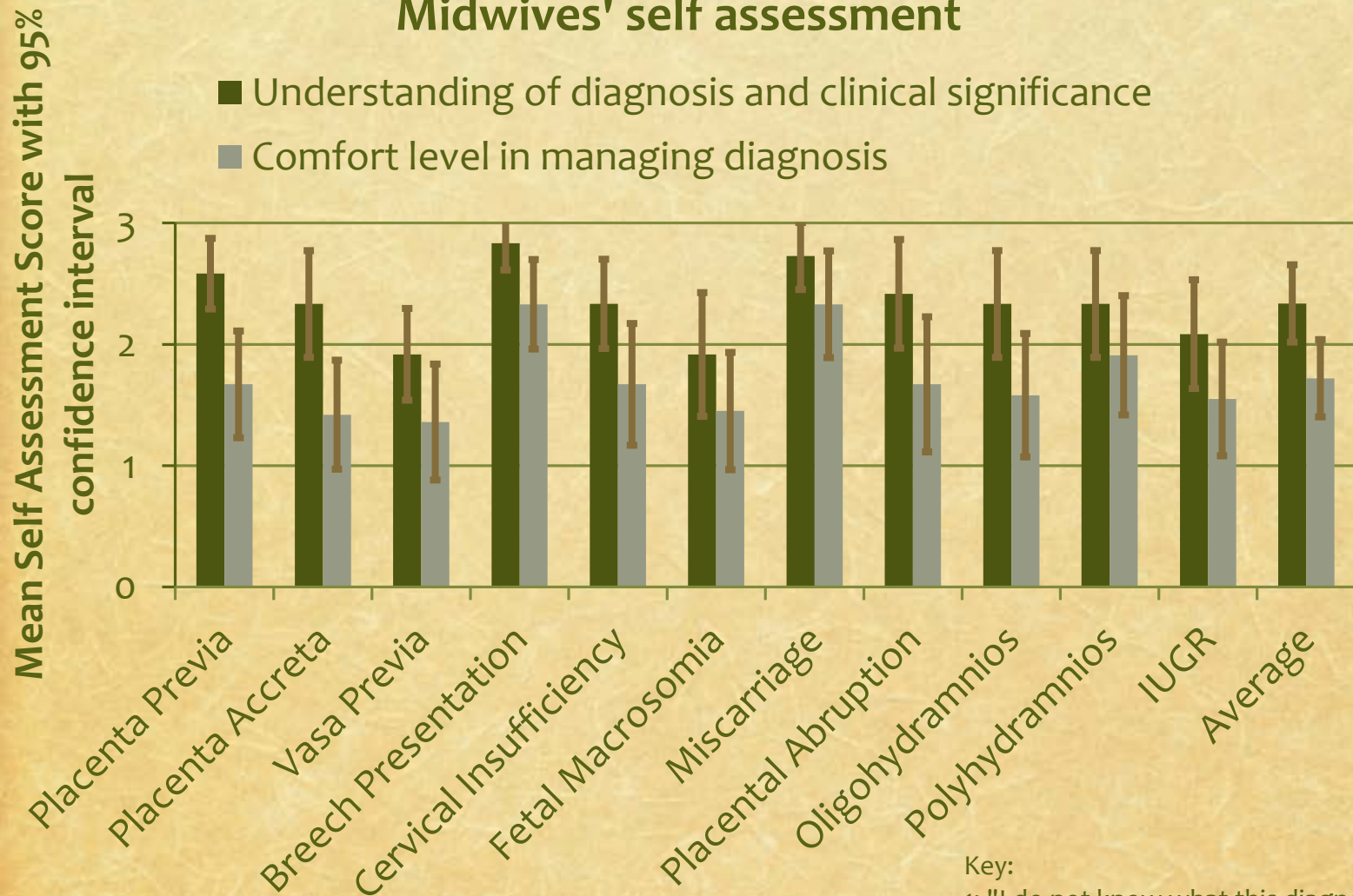
ay: 9.3

0 weeks

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Survey 2 Results

Midwives' self assessment



Key Point: The midwives have some understanding of the clinical significance of these conditions, but most lack knowledge in management

Key:

- 1: "I do not know what this diagnosis is"
- 2: "I have a limited understanding"
- 3: "I am very knowledgeable."

Survey 2 Results

- ◆ Free response questions:
 - ◆ How do you think ultrasound will help or change your midwifery practice?
 - ◆ Do you recall any cases where you (or someone you know) cared for a patient that had a complication (during her antenatal care, delivery or postnatal care) that you think could have been prevented or had a better outcome if the patient had access to ultrasound imaging?

Sample Quotes

- ◆ “One mother never knew that she had placenta previa because she had not done ultrasound scan. She got some complications and she even lost her baby.”
- ◆ “Someone was managing a mother in HCII with multiple pregnancy (twins) without knowing and the end a mother delivered the first twin, finally had a retained second twin and in the long of referring her to hospital for further management, both the mother and baby died immediately as they reached in the hospital due to transport delay and long distance covered.”

Research publication

- ◆ Results of the 2 surveys were submitted for publication



Key message from survey results

- ◆ The midwives received training in how to use ultrasound to diagnose prenatal conditions but there is a lack of knowledge of what to do with that information in the field...

Field Guide

- ◆ Clinical resource guide for the management of 11 diagnoses primarily made using ultrasound
- ◆ Primary resources used were ACOG guidelines, AAFP articles and Up-to-date
- ◆ Uganda specific data was used when commenting on macrosomia and intrauterine growth restriction as normal estimated fetal weights vary in different populations

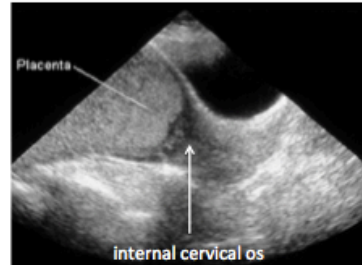
Example excerpts

Low Lying Placenta



<http://www.fetalultrasound.com/online/text/33-033.htm>

Placenta Previa



<http://top.elebarazo.net/placenta-previa.html>

Management:¹⁻³

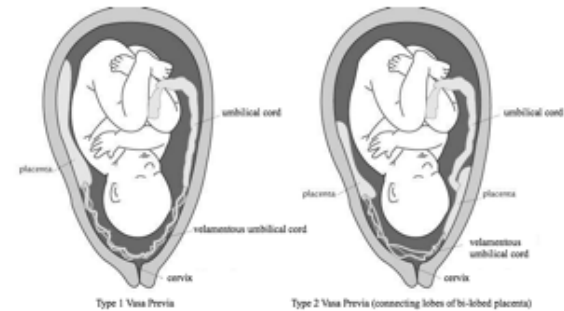
Gestational Age	Management of Low Lying Placenta
16-32 weeks	Follow-up ultrasonography for placental location at 32 weeks
32-35 weeks	Follow-up ultrasonography for placental location at 36 weeks
> 36 weeks	If 1-10 mm from os, then perform C-section as soon as labor begins If 10-20 mm from os, then perform trial of labor, but recommend delivering in a facility that has C-section capabilities.

Gestational Age	Management of Placenta Previa
16-32 weeks	Follow-up ultrasonography for placental location at 32 weeks and counsel patient on previa.
32-35 weeks	Follow-up ultrasonography for placental location at 32 weeks and counsel patient on previa.
> 36 weeks	Schedule a C-Section at 37 weeks

Vasa Previa

Definition – The fetal blood vessels run between the presenting part and the internal cervical os.

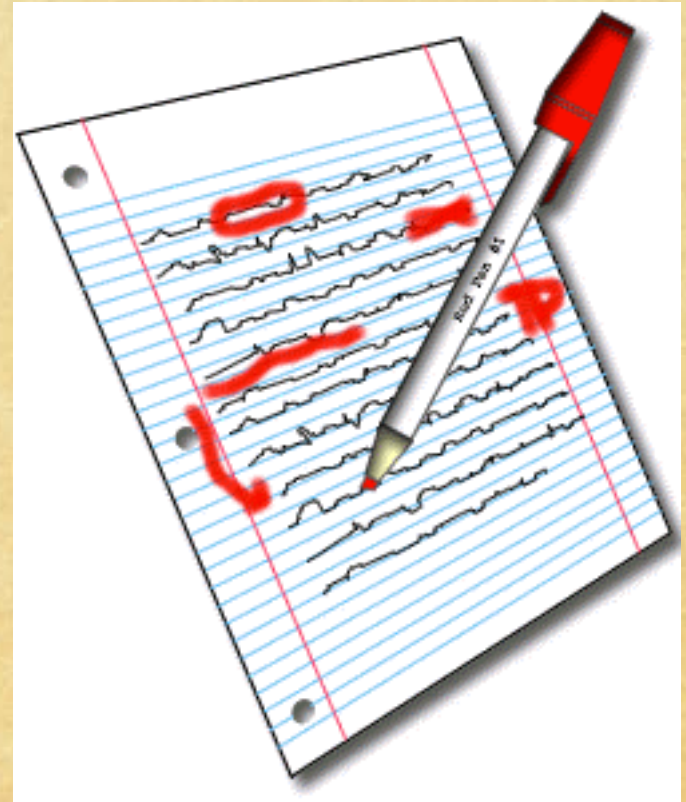
- **Type 1:** associated with a velamentous umbilical cord (the placental end of the cord travels within the membranes and is not covered by the protective Wharton's jelly).
- **Type 2:** connect the lobes of a bi-lobed placenta or the placenta and a succenturiate lobe (extra separate lobe of the placenta).⁷



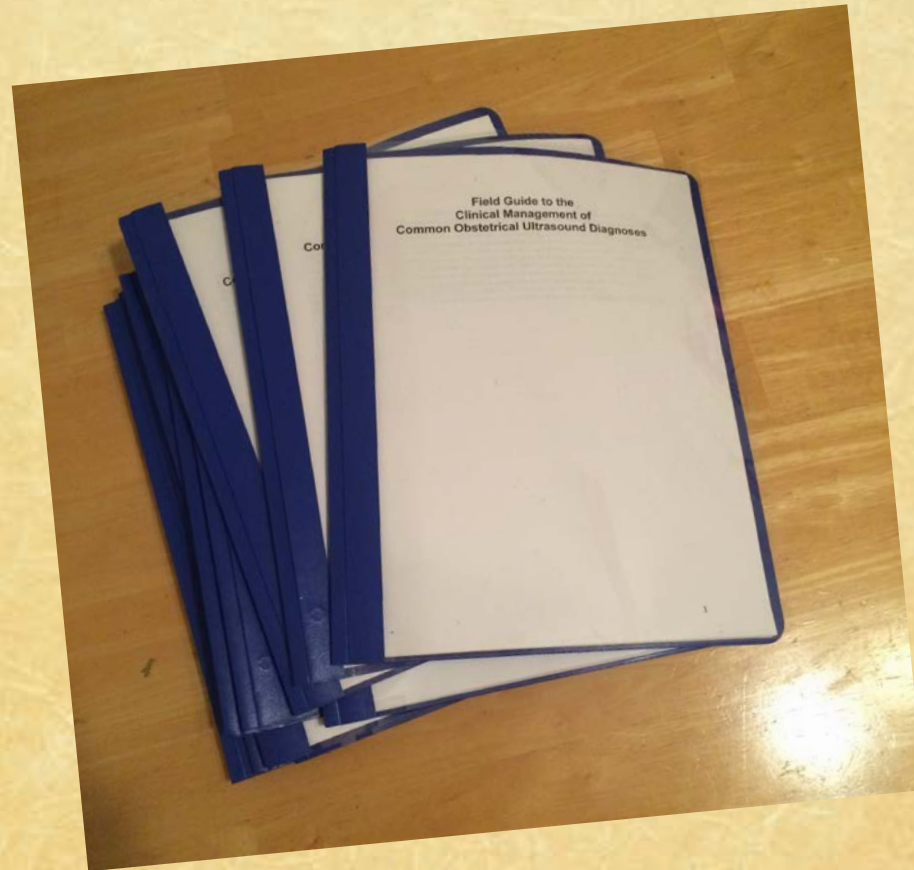
Bi-lobed placenta with Velamentous Insertion

Field Guide

- ◆ Multiple revisions were made using feedback obtained from
 - ◆ 2 FP/OB physicians
 - ◆ 1 radiologist
 - ◆ 1 labor and delivery nurse



Field Guide Sent to the Midwives to review



Survey 3

- ◆ Requested feedback on how the Field Guide might be helpful. Responses included:
 - ◆ “It will guide me on how to identify the risk factors and timely referral”
 - ◆ “It helps guide me to be able to identify a topic to use while health educating, like ‘the benefits of delivery at a health facility’”
 - ◆ “the field guide will help me to know how to deal with my mothers”
 - ◆ “Illustrate the pictures to the mothers. Ask and answer questions about ultrasound. How to health education the mothers about benefits of use of ultrasound.”
 - ◆ “It will increase the turn up of mothers for antenatal clinic in the health center. It will add on my skills in identifying diagnosis and early referral of complications. It’s an additional skill to me”

Survey 3

- ◆ Requested feedback and recommendations for topics that could be improved:
 - ◆ A few requested clarification on the IUGR and macrosomia sections
 - ◆ Almost all midwives stated they still find diagnosing vasa previa difficult
- ◆ Overall, there was a dramatic increase in the comfort level reported in managing conditions after having been provided the Field Guide

Survey 3

Pre –training and Field Guide example

Post –training and Field Guide example

Diagnosis	Comfort level in managing a patient if this diagnosis was made in an antenatal clinic (please check one)		
	Not at all comfortable	Somewhat comfortable	Very comfortable
Placenta Previa		✓	
Placenta Accreta	✓		
Vasa Previa	✓	✓	
Breech Presentation		✓	
Cervical Insufficiency (short cervix)	✓		
Fetal Macrosomia	✓		
Miscarriage		✓	
Placental Abruption	✓		
Oligohydramnios	✓		

3

Polyhydramnios		✓	
Intrauterine growth restriction	✓		

Condition	Comfort in diagnosing condition using ultrasound			Comfort in managing patient after training course and reviewing the Field Guide		
	Not at all comfortable	Somewhat comfortable	Very comfortable	Not at all comfortable	Somewhat comfortable	Very comfortable
Placenta Previa			✓			✓
Placenta Accreta			✓			✓
Vasa Previa		✓			✓	
Breech presentation			✓			✓
Cervical Insufficiency (short cervix)			✓			✓
Fetal Macrosomia		✓			✓	
Miscarriage			✓			✓
Placental Abruption			✓			✓
Oligohydramnios			✓			✓
Polyhydramnios			✓			✓
Intrauterine growth restriction		✓			✓	

Survey 3

- ◆ Additional training desired by the midwives:
 - ◆ Obstetrical and neonatal emergencies (most common)
 - ◆ Care of premature baby and resuscitation
 - ◆ Breech deliveries
 - ◆ Post abortal care
 - ◆ Family planning



Course

- ◆ At the completion of the 6 week ultrasound training course, 10 of the 12 midwives requested additional training in obstetrical and neonatal emergencies management
- ◆ 4 FP/OB and OB faculty members from my program at Sutter Health and Dr. Sams, my mentor, have expressed interest in going to Uganda in January 2017 to teach an ALSO course to the midwives
- ◆ 12/12 of the midwives said they have never received ALSO training (or similar course), but it would be of interest to them
- ◆ I have registered for an ALSO instructor course in North Carolina in June of this year during my vacation
- ◆ A proposal to sponsor an International Advanced Life Support in Obstetrics (ALSO®) Program has been submitted and is awaiting approval



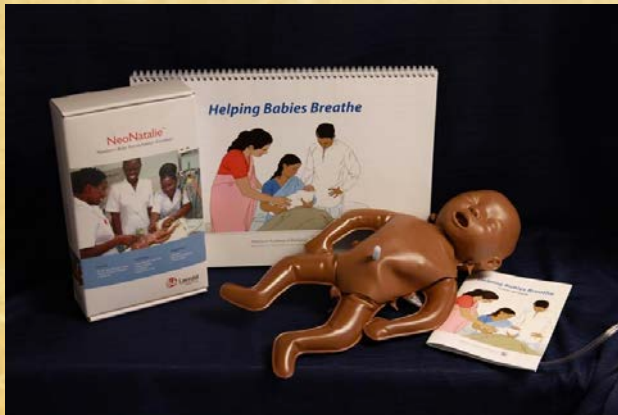
NRP Course / Helping Babies Breathe



- ♦ The midwives at the 12 clinics are the primary care providers for infants they deliver; none of the health facilities have a physician on site
- ♦ In survey 3, there was expressed interest in neonatal emergency management
- ♦ 10/12 midwives reported never having taken a NRP course or any similar training
- ♦ Helping Babies Breathe is an evidence based educational program to teach neonatal resuscitation techniques in resource limited areas (based off NRP curriculum)

Helping Babies Breathe

- ◆ According to the online report of Helping Babies Breathe courses conducted, only 2 were taught in all of Uganda in 2015
- ◆ I am planning to go to a weekend Helping Babies Breathe Master Trainers course in early June 2016 in Washington D.C.
- ◆ The plan is to incorporate a HBB training course into the schedule before or after ALSO training



Project Funding

- ◆ Dr. Sams and I are currently in the process of applying for grants to fund this project
 - ◆ Options we are exploring so far: Bill and Melinda Gates foundation grants, Family Medicine Cares Resident Service Award, Sutter Foundation philanthropy grant

- ◆ Estimated costs so far:
 - ◆ ALSO course materials: \$1,975.70
 - ◆ Global CD-ROM: \$45
 - ◆ instructor manual: \$75
 - ◆ Course syllabi: $\$145 \times 12 = \$1,750$
 - ◆ Perineal repair DVD: \$10
 - ◆ 6 Educational Posters: $6 \times \$15.95 = \95.70
 - ◆ Pelvic models: going to try and borrow
 - ◆ HBB course materials: \$470
 - ◆ Facilitator set: \$105
 - ◆ student workbook $\$20 \times 12 = \240
 - ◆ neonatal model \$125
 - ◆ Midwives' travel expenses: \$466
 - ◆ Classroom space rental: \$190
 - ◆ Instructor round trip flights from U.S. to Uganda: $\$1,500 \times 6$ instructors: \$9,000

Future Vision



- ◆ If our trip in January 2017 is successful and we can continue to secure grant funding, we would like to make this an annual endeavor
- ◆ I am interested in academic medicine and would like to bring medical students and residents interested in global primary care on future trips
- ◆ Once established in a region, we would like to train local providers to become instructors for future courses
- ◆ There are currently discussions about securing visas for midwives from Afghanistan to travel to Uganda to also receive training

Project Summary

- ◆ 3 needs assessment surveys conducted that highlighted knowledge deficiencies in management of prenatal conditions primarily diagnosed with ultrasound
- ◆ Survey data compiled into project report submitted for publication
- ◆ A Field Guide was created to assist with management of 11 prenatal conditions diagnosed with ultrasound
- ◆ Currently arranging a team of instructors to teach ALSO and neonatal emergencies courses in January 2017, hopefully on an ongoing annual basis