

ASLM

AFRICAN SOCIETY FOR LABORATORY MEDICINE

ADVANCING THE LABORATORY PROFESSION AND NETWORKS IN AFRICA

Technology innovation in service of women

The case of antenatal care

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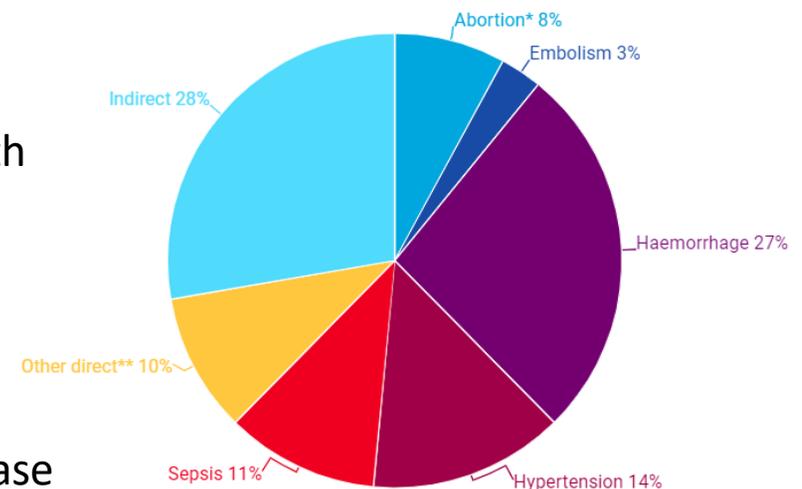
ICASA- 2019

Maternal and child mortality in sub-Saharan Africa (1)

- **533 maternal deaths per 100,000 live births:**
>68% of all maternal deaths per year worldwide.
- **28 infant deaths per 1,000 live births:**
10 times more risk to die during first month than in high-income countries

Maternal and child mortality in sub-Saharan Africa (2)

- 14% of maternal death from hypertension (eclampsia)
- 2.7 % of women infected with syphilis: >900,000 pregnancies at risk each year
- 57% of pregnant women are anemic
 - ➔ 23% of indirect cause of maternal death
 - Preterm birth
 - Low weight birth
- 386 Rhesus disease/100,000 live births
- 5%-16% of <5 years death due to Rhesus Disease
- **6% of infant deaths due to HIV**



Access to diagnostic tests for antenatal care

Focused Antenatal care (ANC) services: 4 visits

In Senegal

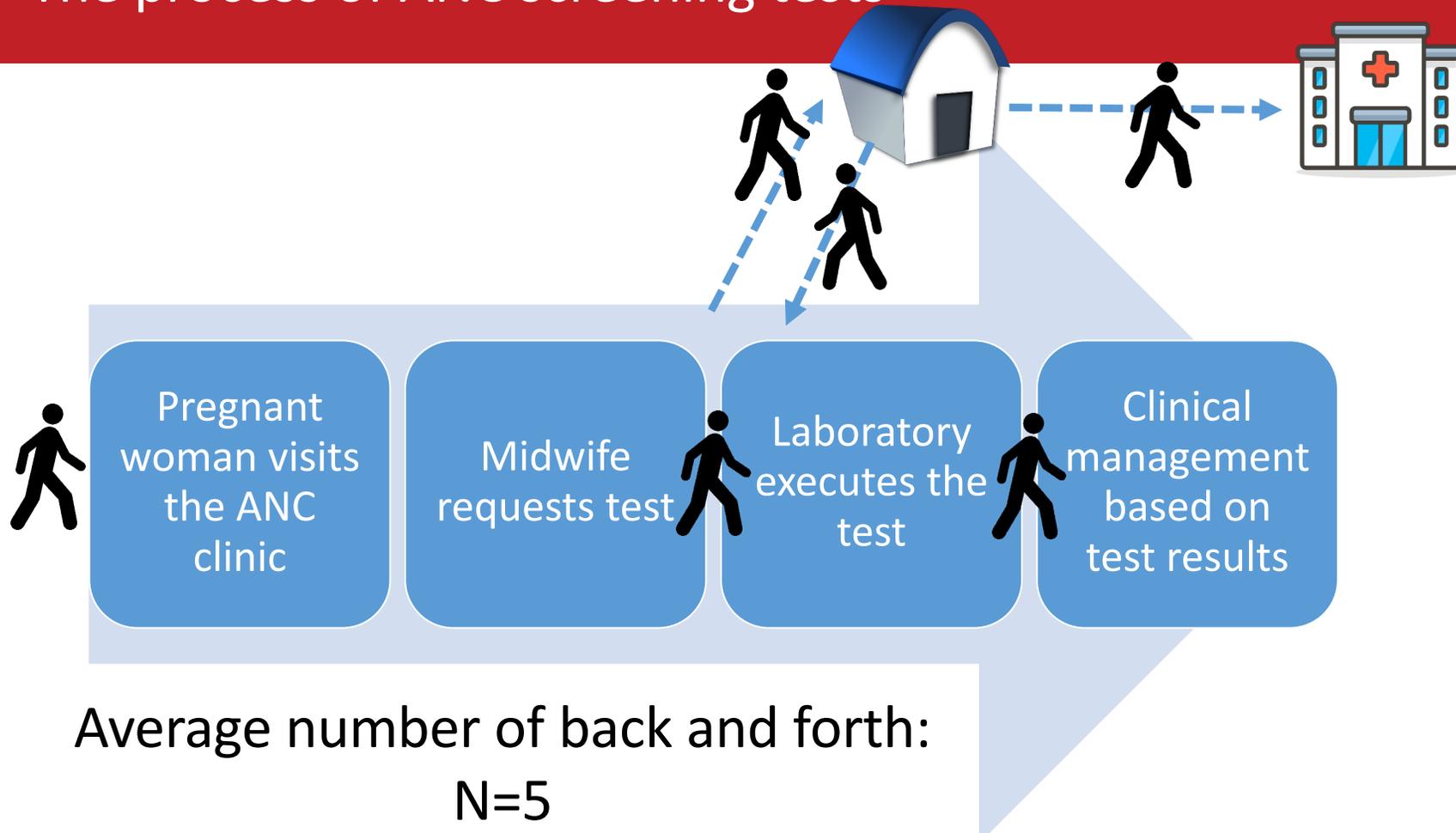
Minimal screening test package visit 1	Purpose
HIV serology (Rapid Test – for free)	PMTCT
Syphilis serology	Congenital syphilis
Proteinuria (rapid test)	(Pre-)eclampsia
Blood group/Rhesus factor	Rhesus disease, hyperbilirubinemia
Glycemia	Diabetes. Child overweight
Emmel test	Sickle cell anemia
Hemoglobin level	Anemia

\$ 9 to \$22



- ANC screening package is part of the minimal testing package down to level 2 laboratories
- In Health Posts (level 1) only rapid tests (**HIV** and proteinuria) can be done
- When laboratory is available in the facility, rapid tests are done by the laboratory staff

The process of ANC screening tests



How are laboratory screening tests utilized in ANC services?

The example of Senegal

On 1694 women attending 16 ANC clinics across the country



95% of pregnant women attend the 1st ANC visit

32% of women receive a complete test request

30% of test requests are executed

<30% of women with abnormal test results are adequately managed

Pregnant woman visits the ANC clinic

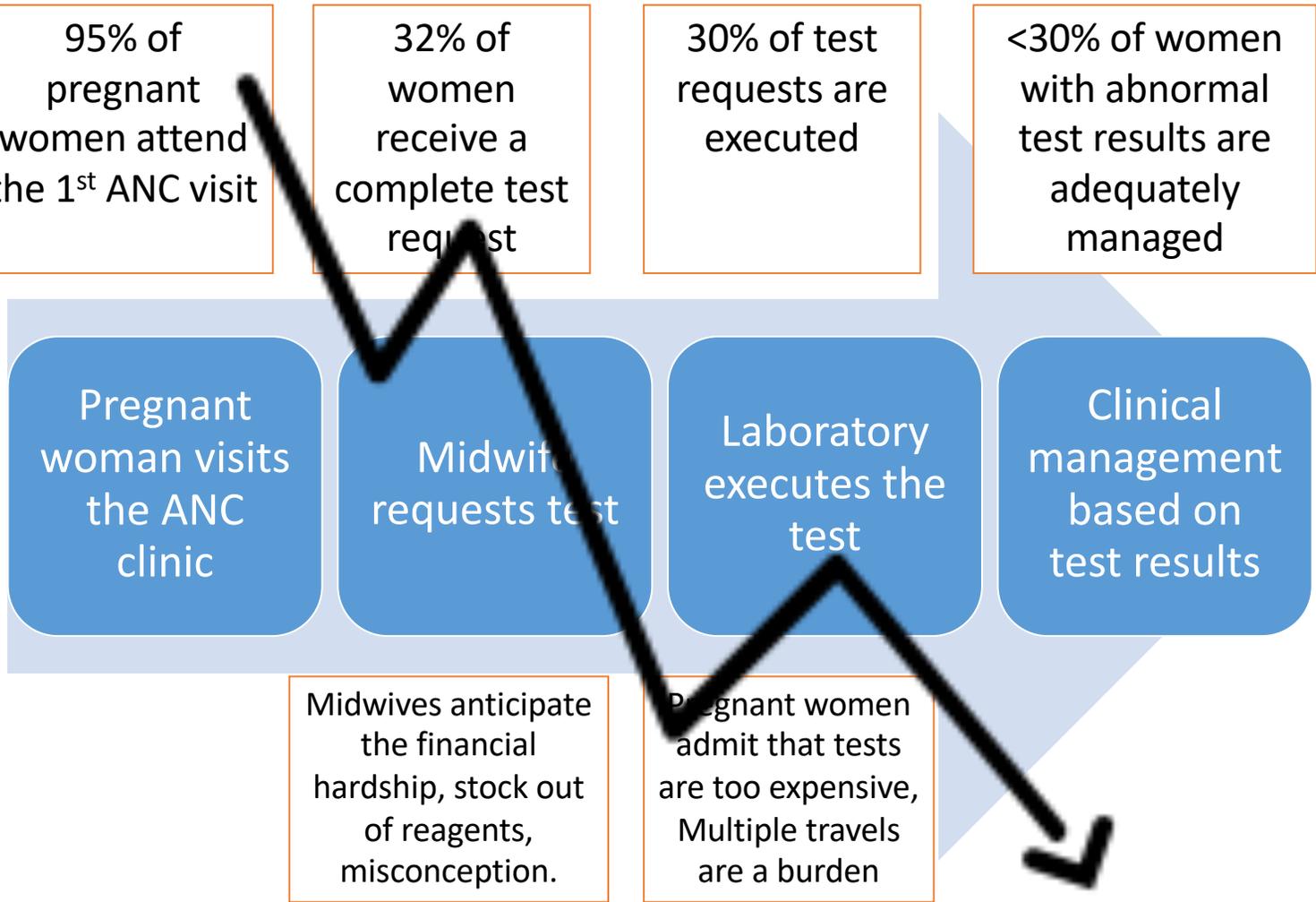
Midwife requests test

Laboratory executes the test

Clinical management based on test results

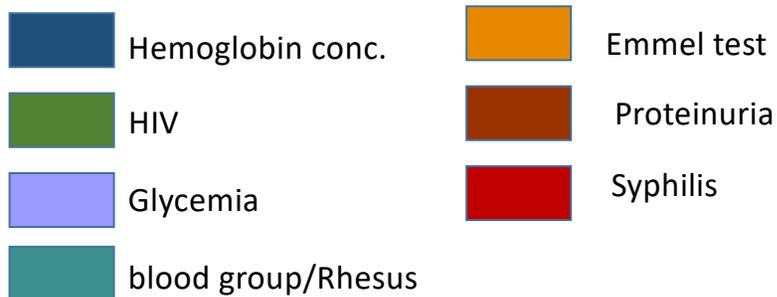
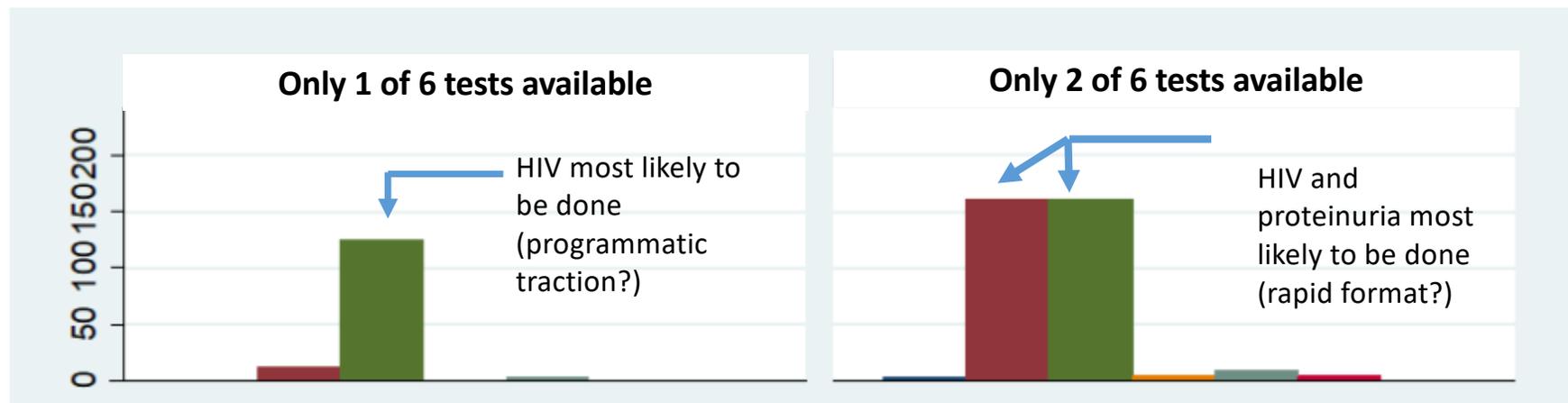
Midwives anticipate the financial hardship, stock out of reagents, misconception.

Pregnant women admit that tests are too expensive, Multiple travels are a burden



ANC screening tests are severely underused in the context of available laboratory infrastructure and high attendance to ANC

Rapid test format (and gratuity?) associated with higher uptake



38 % of women have 0 to 2 tests available

Choice of technology contributes to lack of uptake



TESTS	RESULT	FLAG	UNITS	REFERENCE INTERVAL	LAB
CBC With Differential/Platelet					
WBC	5.7		x10E3/uL	4.0-10.5	01
RBC	5.27		x10E6/uL	4.10-5.60	01
Hemoglobin	15.4		g/dL	12.5-17.0	01
Hematocrit	44.1		%	36.0-50.0	01
MCV	84		fL	80-98	01
MCH	29.2		pg	27.0-34.0	01
MCHC	34.9		g/dL	32.0-36.0	01
RDW	13.7		%	11.7-15.0	01
Platelets	268		x10E3/uL	140-415	01
Neutrophils	47		%	40-74	01
Lymphs	46		%	14-46	01
Monocytes	6		%	4-13	01
Eos	1		%	0-7	01
Basos	0		%	0-3	01
Neutrophils (Absolute)	2.6		x10E3/uL	1.8-7.8	01
Lymphs (Absolute)	2.6		x10E3/uL	0.7-4.5	01
Monocytes (Absolute)	0.4		x10E3/uL	0.1-1.0	01
Eos (Absolute)	0.1		x10E3/uL	0.0-0.4	01
Baso (Absolute)	0.0		x10E3/uL	0.0-0.2	01
Immature Granulocytes	0		%	0-1	01
Immature Grans (Abs)	0.0		x10E3/uL	0.0-0.1	01



Equipment breakdown/stock out of reagents/cost

Glycemia and Hemoglobin levels can be tested using rapid test technology



- Decreases the costs
- Avoids multiple trips of pregnant women
- Can be used in Health Posts
- Less opportunities for expensive equipment break down

All ANC care screening tests have the potential to be delivered in POC rapid test formats

Senegal introduced HIV/Syphilis Duo under PMTCT

[1 + 2]



HIV/Syphilis

3



proteinuria

4



Glycemia

5



Hemoglobin

6



BG/Rh

7



Emmel test

All these technologies are well established

What women need?: all-in-one ANC test kit including HIV rapid test



- 1st ANC visit
- 7 tests
- Lower price
- Done at community level
- Easy to QC-QA

94% of attendance to ANC 1 visit =
94% of complete ANC test screening done

Integrating diagnostics...
not only centered on the testing platform

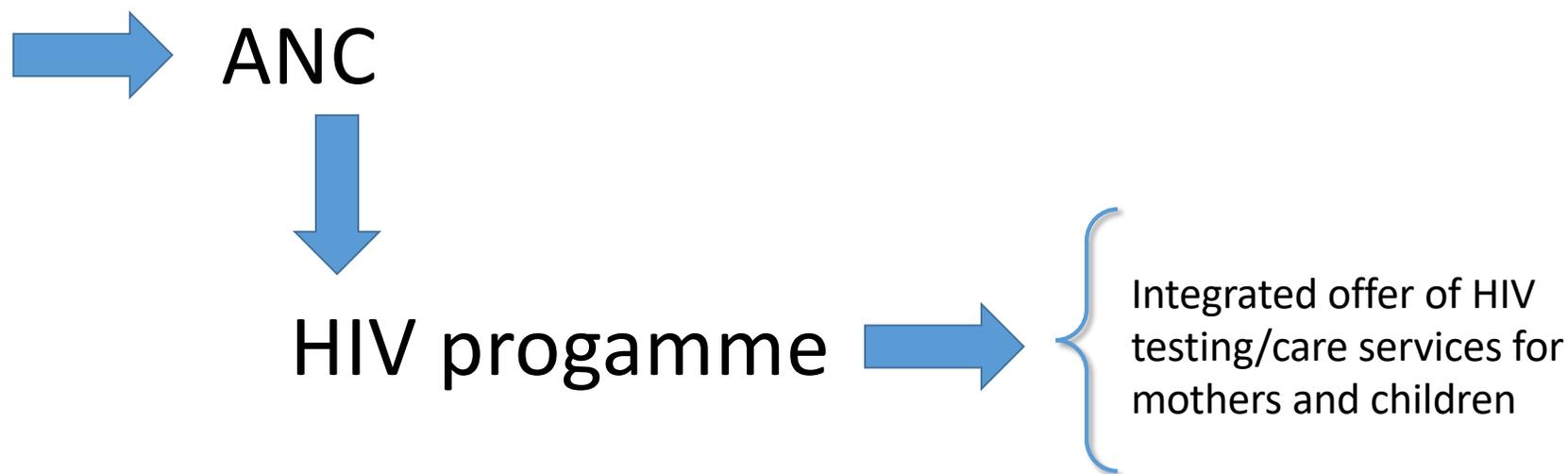
Client centered



Community friendly



From ANC screening test to HIV care:
The role of innovation in integrated testing



Latest trends

Test area	Near term diagnostic priorities	
HIV viral load	Point-of-care testing for pregnant and breast-feeding women	HIV care for mothers and children
HIV early infant diagnosis	Point-of-care tests for infants under 18 months of age	
TB	Low-cost and easy to scale tests to screen for active and latent TB	
Cervical cancer	Low-cost test to screen for persistent HPV infection in women 30 years of age and above + improved visual exam	
Viral Hepatitis C	Easily accessible tests to confirm persistent HCV infection	
STIs	Chlamydia, Gonorrhea, dual HIV-syphilis tests, HIV self tests	ANC

Diagnostics is evolving towards (i) integrated use of both centralized laboratory and point-of-care platforms and (ii) integrated multiplex testing for TB, HIV, HCV, HBV, HPV, other tests

		Roche CAP/CTM 96	Roche 6800/8800	Abbott m2000sp	Hologic Panther	Molbio	Cepheid GeneXpert IV/16
							
Max daily throughput		168 (8hrs); 312 (24hrs)					12 (8hrs)
Test Menu	HCV VL	✓					✓
	HBV VL	✓					✓
	HIV EID	✓					✓
	HIV VL	✓					✓
	TB/M DRTB	✗	✓	✓	✗	✓	✓
	HPV	✗	✓	✓	✓	✓	✓

- Programmatic relevance?
- Placement of instruments for maximal out reach and network performance?
- Affordability?
- Optimal demand and test result utilization?

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Thank you

