# FEASIBILITY OF USING INFANT FINGERPRINT BIOMETRICS FOR TREATMENT FOLLOW-UP

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# BACKGROUND OF THE STUDY

- Early infant diagnosis (EID) among human immunodeficiency virus (HIV)-exposed infants (HEIs) is a critical component of prevention of mother-to-child transmission programs .

- 20% of HIV positive infants die before the age of 6 months and 35% to 40% before they attain the age of 12 months.

- In 2015, Kenya estimated 12,000 HEI's were born, about 6,000 infected and 5,000 died.

# OBJECTIVES OF THE STUDY

- To Adapt and implement an Android phone-based biometric system for HEI follow-up at different time points over a 3-month period.

- To evaluate the use of infant fingerprints for unique identification using different biometric matching algorithms.

- To conduct a preliminary costing estimate of implementing a National biometric unique identifier system for HEI follow-up.

# Specific Objective 1:

## To Adapt and implement a mobile phone-based biometric system for HEI follow-up at different time points over a 3-month period

- 3 FGDs with HEI Mothers
- 11 in-depth interviews with PMTCT HCWs
- 4 in-depth interviews with PMTCT policy makers

# Main Themes

- Technology Acceptance
- Transfer outs
- System Security and reliability
- System Scalability

# Transfer outs

"If I stay here in Kayaba and I move to Rongai, will I not attend a clinic that is nearest to my place of residence?"

HEI Mother

"I think it is common, not very common, but it happens, I think because they are in an urban setting, and most of the time, our clientele is casual laborers."

PMTCT HCW

# System Security and reliability

"if the finger print changes, then there will be false information somewhere"

PMTCT HCW

"The greatest concern on the part of the care giver would be, where would we use this information? "

PMTCT Policy maker

"Does the biometric have back up in case, so that the system starts slowing down, hanging?"

HEI Mother

# System Scalability

"only if systems from different hospitals are universal"

PMTCT HCW

"It would, as long as facilities are linked"

PMTCT Policy maker

"And even as you move to another hospital, they will not need to ask you many questions"
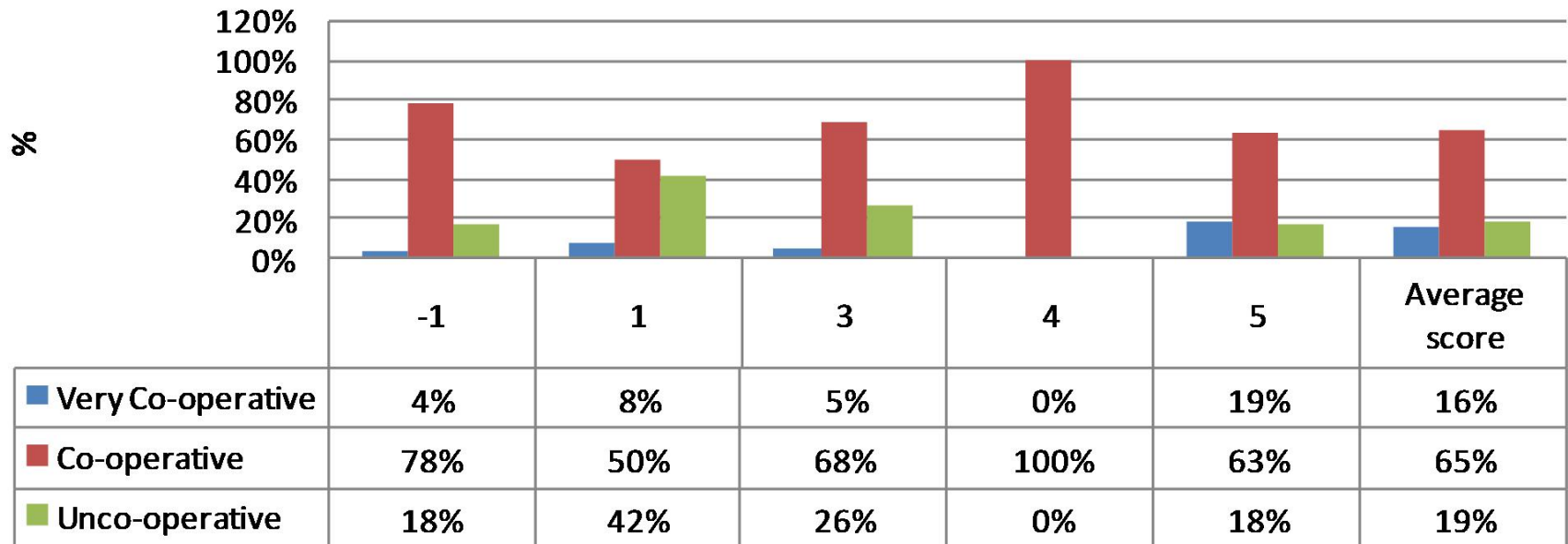
HEI Mother

Specific Aim 2:

Evaluate the use of infant fingerprints for unique identification using different biometric matching algorithms

# NFIQ Scores by Age Group

| | NFIQ Score | | 0 to 3 months | 4 to 6 months | 7 to 9 months | 10 to 12 months | Total |
|---|---|---|---|---|---|---|---|
| | | | **Age Group** | | | | |
| | 1 | Count | 8 | 1 | 2 | 1 | 12 |
| | | % within Age Group | 67% | 8% | 17% | 8% | |
| | 3 | Count | 2 | 10 | 23 | 3 | 38 |
| | | % within Age Group | 5% | 26% | 61% | 8% | |
| | 4 | Count | 1 | 0 | 0 | 0 | 1 |
| | | % within Age Group | 100% | 0% | 0% | 0% | |
| | 5 | Count | 124 | 114 | 124 | 54 | 416 |
| | | % within Age Group | 30% | 27% | 30% | 13% | |
| **Total** | | Count | 176 | 130 | 153 | 58 | 517 |
| | | % within Age Group | 34% | 25% | 30% | 11% | |

# NFIQ Score by Participant Cooperation

## NFIQ vs Participant Cooperation



| | -1 | 1 | 3 | 4 | 5 | Average score |
|---|---|---|---|---|---|---|
| ■ Very Co-operative | 4% | 8% | 5% | 0% | 19% | 16% |
| ■ Co-operative | 78% | 50% | 68% | 100% | 63% | 65% |
| ■ Unco-operative | 18% | 42% | 26% | 0% | 18% | 19% |

# NFIQ Score and Fingerprint Condition



**NFIQ vs Fingerprint Condition**

| | -1 | 1 | 3 | 4 | 5 | Average score |
|---|---|---|---|---|---|---|
| ■ Moist | 48% | 58% | 34% | 100% | 45% | 45% |
| ■ Dry | 52% | 42% | 66% | 0% | 55% | 55% |
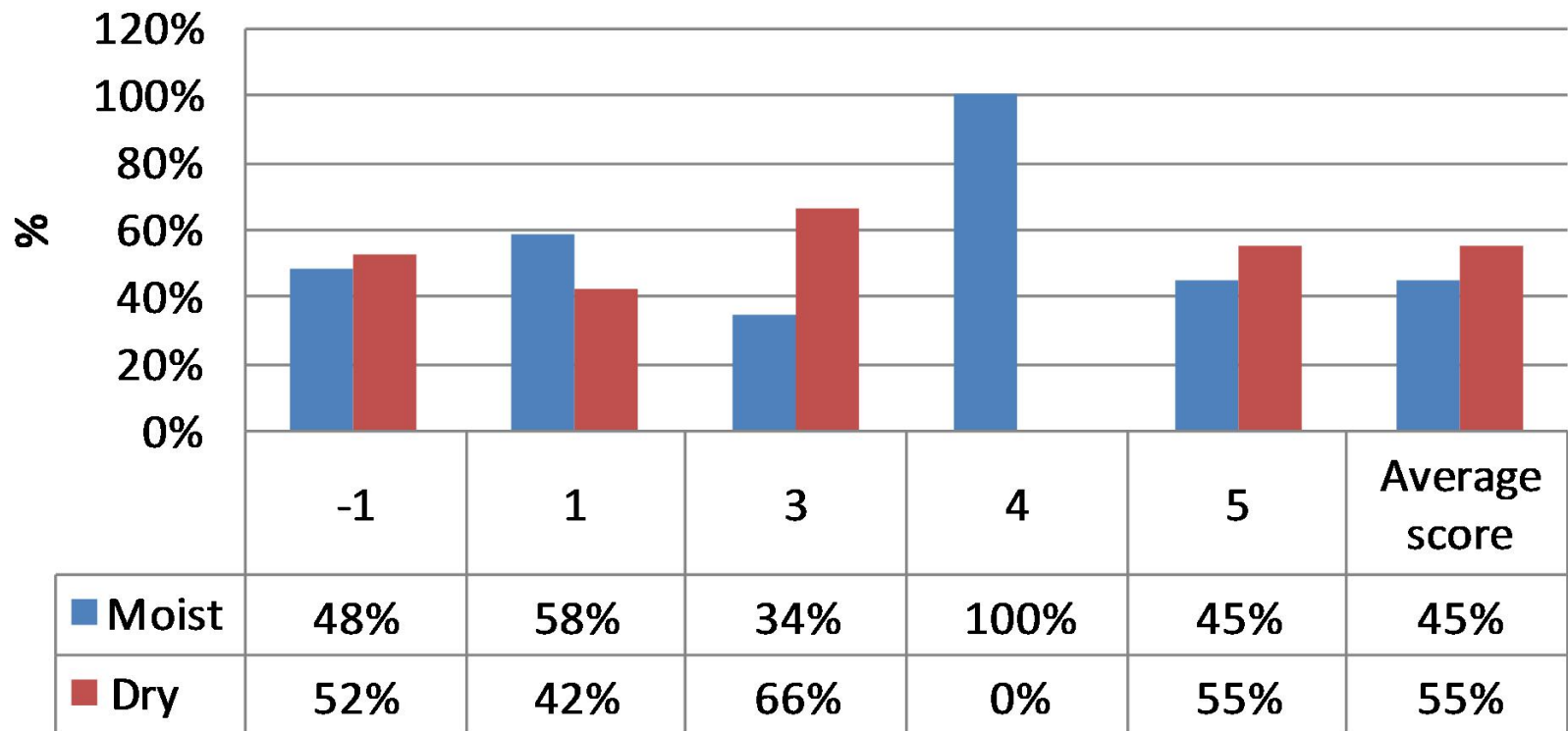
# Specific Aim 3:

Conduct a preliminary costing estimate of implementing a National biometric unique identifier system for HEI follow-up

# Preliminary costing of the system (1000 infants)

Kenya's Dynamic Costing Model estimate the current costs of providing the Kenya Essential Package of Health (KEPH) services

| ITEM | NUMBER | COST PER YEAR $ |
|------|--------|-----------------|
| HTC Counselor | 2 | 2,700 |
| Biometric system | 1 | 10,000 |
| Smart phones | 2 | 400 |
| Fingerprint readers | 2 | 400 |
| Internet bundles | 2 | 24 |
| Server internet | 1 | 1,000 |
| Depreciation 3% | N/A | 24 |
| TOTAL | | 14548 |

# CONCLUSIONS AND RECOMMENDATIONS

- A reliable, scalable and sustainable backup system is a must for HEI biometric system.

- It's feasible and acceptable

- The fingerprint reading technologies need further development and customization to be able to collect quality fingerprint images for biometric matching.

# Next Steps

- Upcoming publications
  - IST Africa 2017
- Identified Advanced fingerprint technology
  - NEC Infant Fingerprint  Reader
  - Pilot (May – Aug 2017)
- Collaborations
- Exploring  a High burden Kenyan County

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