

# Infant Fingerprint Biometrics, A Comparative Study of Three Fingerprint Reading Technologies

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# BACKGROUND OF THE STUDY

- Birth Registration.
- Legal Identity.
- Infants Nutritional Support.
- Document Immunization.
- PMTCT.
- Child Trafficking.

# Infant Fingerprints

- Sir F. Galton's work (Galton, 1899) where he presented a study of newborn fingerprinting with ink and paper, concluding that fingerprints taken **before 17 months** after birth are not useful for identification.
- Jun 18, 2016 - "The pattern is there at birth," says Prof. Anil Jain of Michigan State University. But it is hard to capture.....

# Healthcare Needs

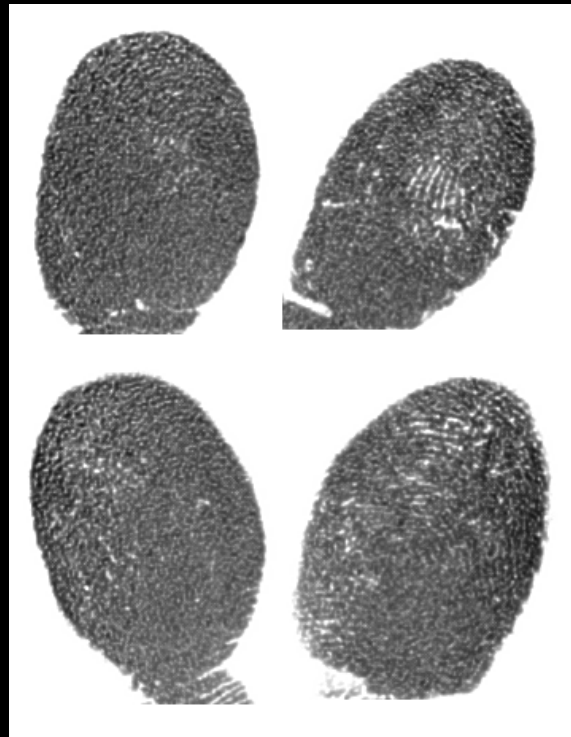
- Children lost after HIV testing; this was reported in five studies, pooled estimate 45.5%
- Study to measure the efficiency of immunization sessions and to identify the reasons for missing a vaccine in a session. Efficiency of immunization session was 66.7%.

# Comparative Study

# Fingerprint Reader Technologies

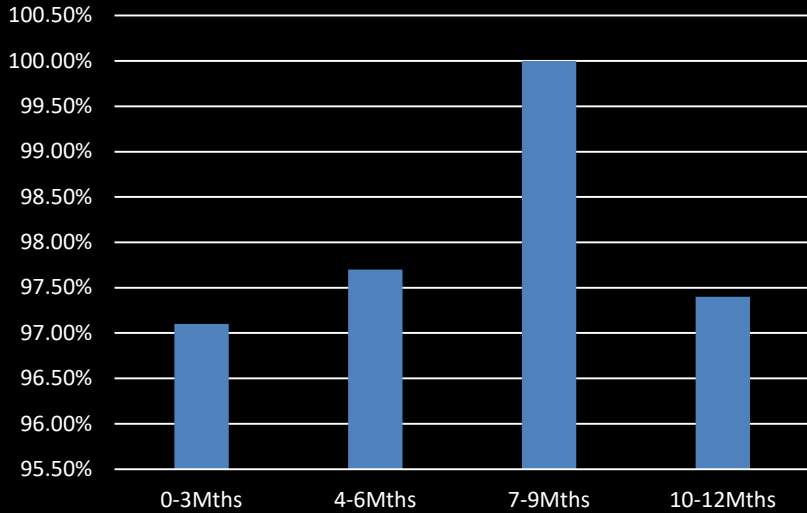
Resolution	500 DPI	900 DPI	1120 DPI
Image capture area (Platen size)	0.6" x 0.9"	0.8" x 1.0"	0.8" x 1.2" (20mm x 30mm)
Fingerprint image size	320 x 480 pixels	400 x 500 pixels	1,000 x 1,500 pixels
Sensor type	Optical, CMOS	LES	High Resolution CMOS Image Sensor with Fiber Optic Plate
Illumination	Infrared LEDs	None	SLDR (Scattered Light Direct Reading) Method
Device size	66 x 66 x 29 mm	46.5mm x 39mm x 27.5mm	7.5mm X 72mm X 2mm
Device weight	150g	<70g	<50g
Operating temperature	-10°C ~ +55°C	-10°C ~ +55°C	0°C ~ +35°C (Sensor)

# Fingerprint Templates 0 – 3 Mth Olds

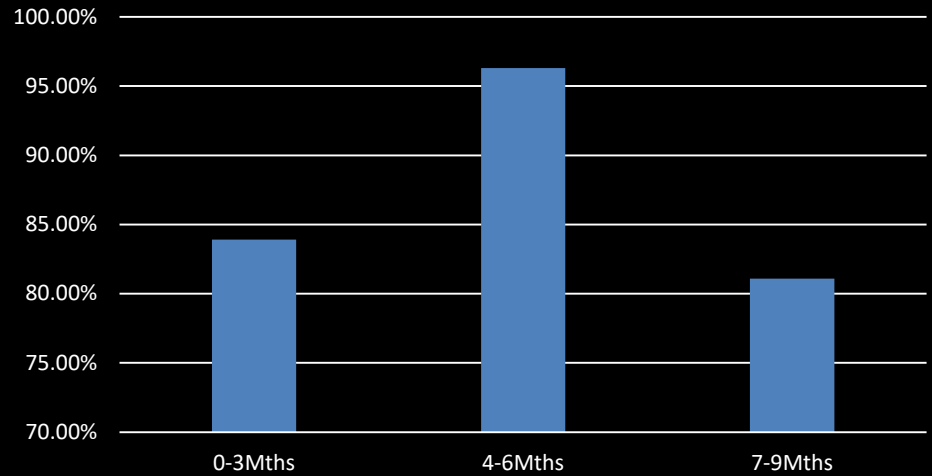


# Fingerprint Matching

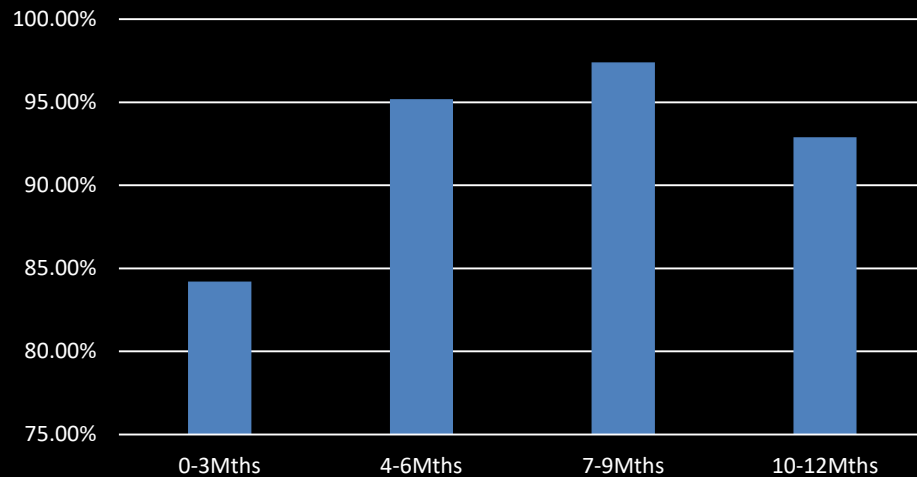
900 DPI



500 DPI



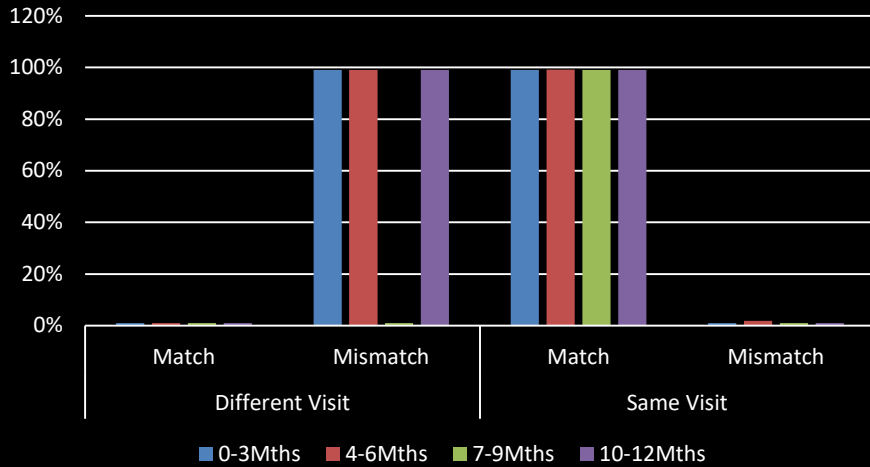
1200 DPI



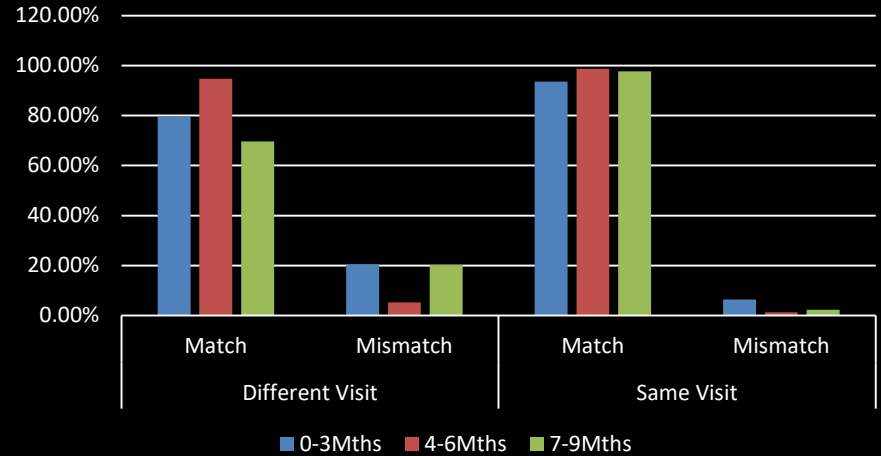


# Match vs Visits

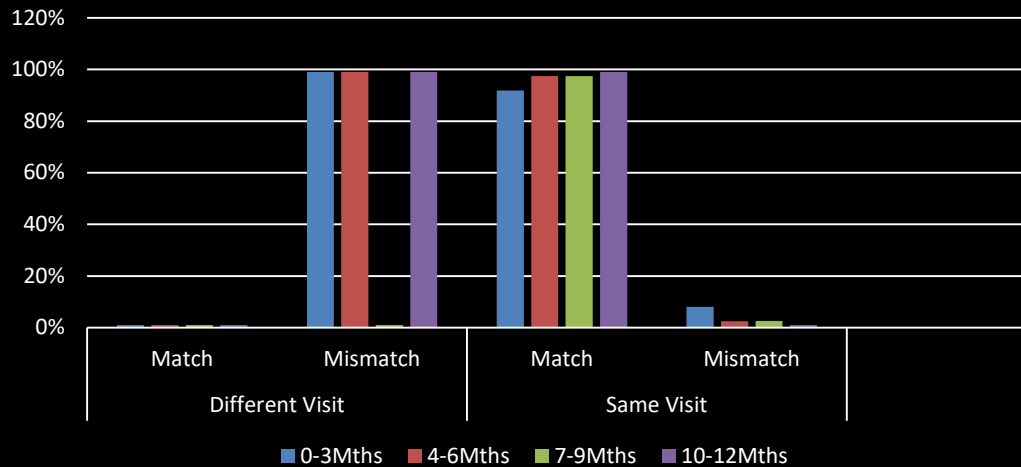
900 DPI



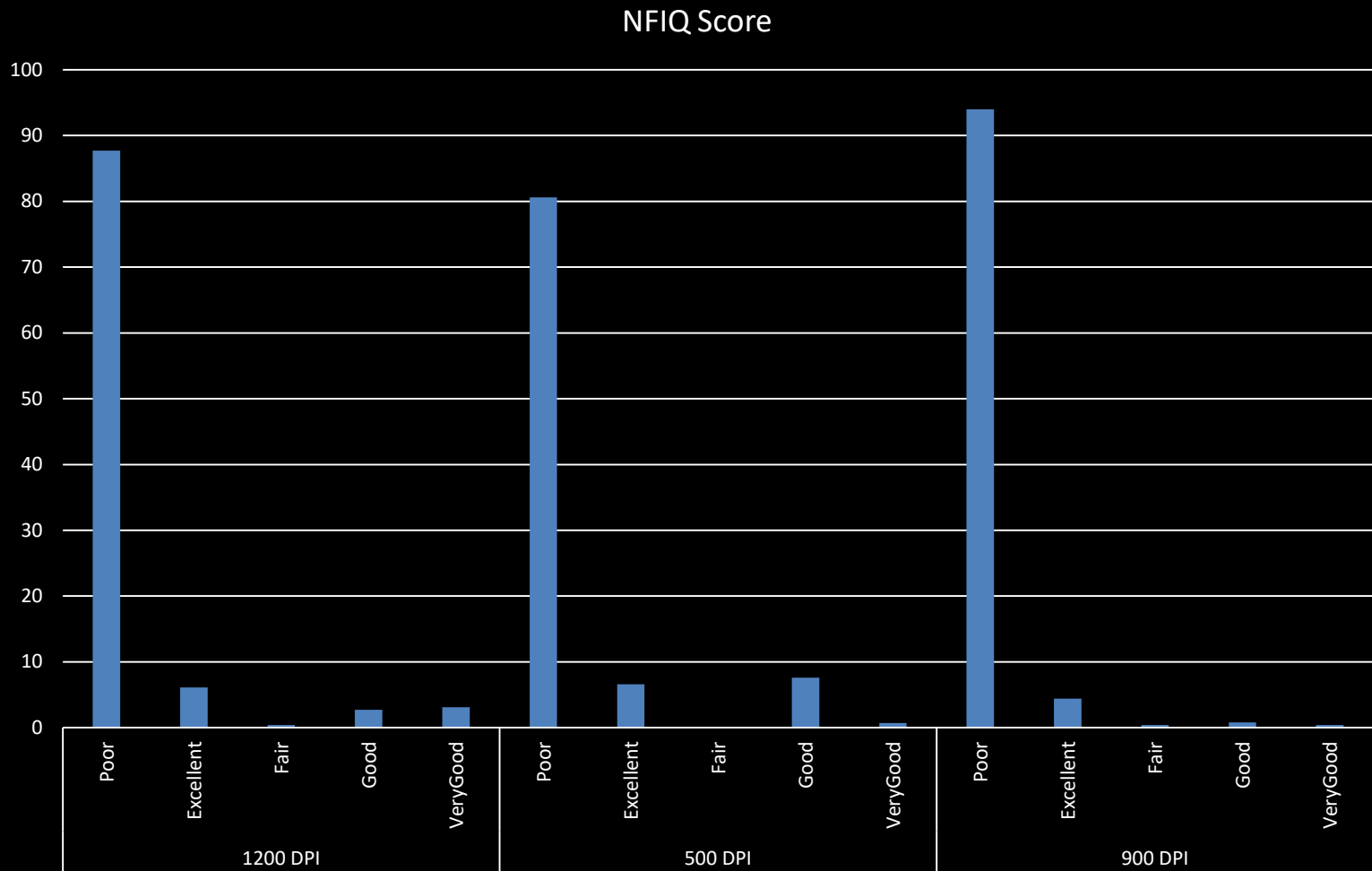
500 DPI



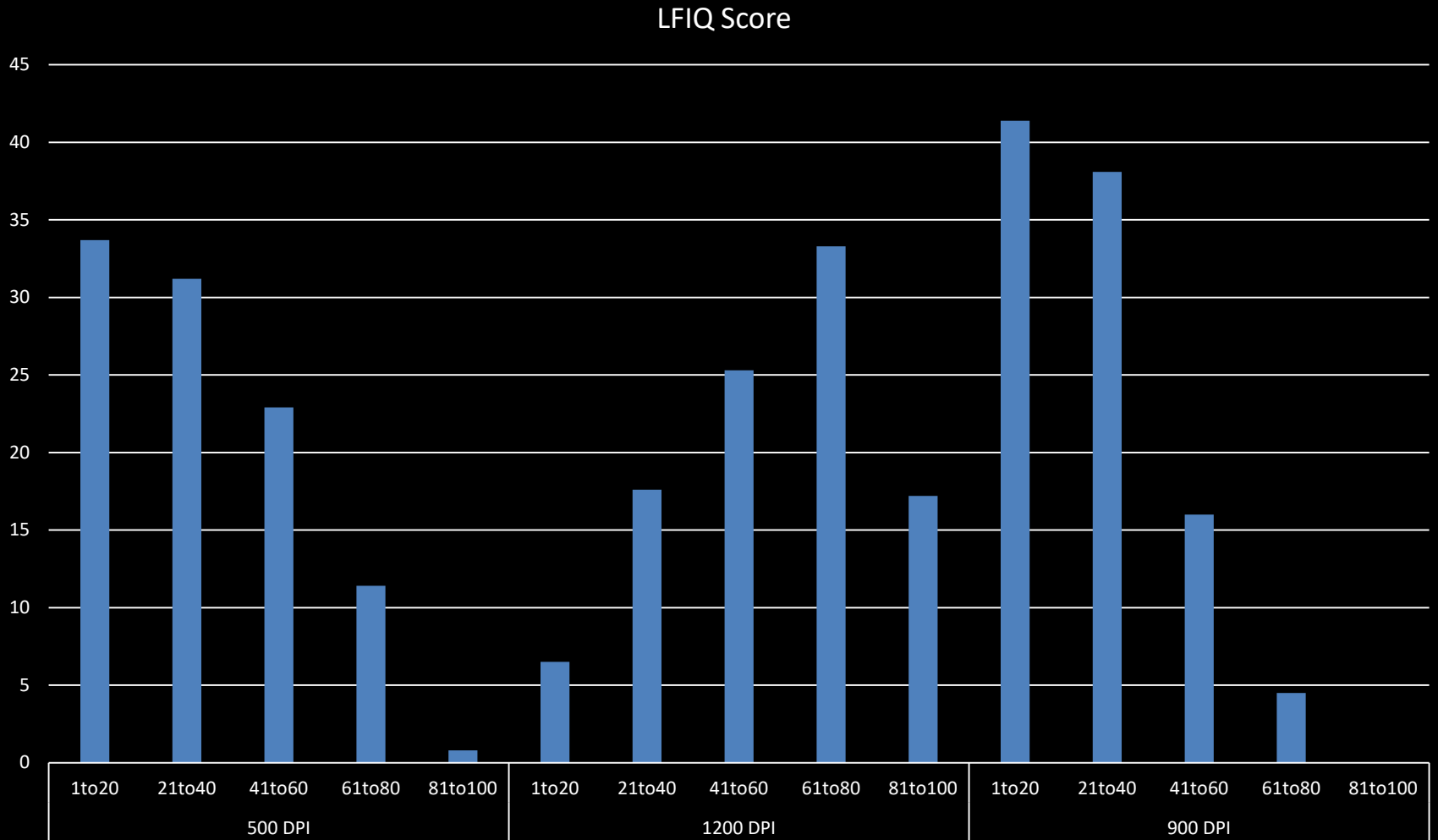
1200 DPI



# NFIQ Scores



# LFIQ Score



# Lesson Learnt and Recommendation

- End user training.
  - Nurse, Social worker, Counsellor
- Usability and User Experience.
  - Device User friendly; Infant, User
- Data Analysis.
  - Periodic review of templates
- Software customization
  - Auto detect NFIQ score at collection

# Next Steps

- Concentrate on 0 – 3 month olds.
  - Point of entry
- Explore other factors.
  - Moisture, Skin condition, oil
- Collaborations
  - Software and Hardware providers.

# Acknowledgement

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