

IMPLEMENTATION OF DATA LINKAGE- THE NAVRONGO EXPERIENCE

*Agorinya Isaiah, Paul Welaga, Frank Atuguba, Timothy Awine,
Martin Adjuik, Fred Binka*

NAVRONGO HEALTH RESEARCH CENTRE



Outline

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Introduction

- Fingerprint identification is one of the most popular biometric technologies used world wide.
- The performance of a fingerprint image-matching algorithm depends heavily on the quality of the input fingerprint image.
- It is very important to acquire good quality image but in practice a significant percentage of acquired images is of poor quality due to so many factors.
- These factors could be environmental , user body condition or demographic-

-Eun-Kyung Yun, Sung-Bae Cho, 2005

- It is therefore important to establish the behaviour of these factors/conditions that influence the quality of the fingerprint image captured among individuals.
- Measuring the quality of fingerprint is essential as it plays a vital role in image recognition and identification of individuals.

We seek to measure and quantify the quality of fingerprints collected by the INESS Data Linkage in the Navrongo DSS site.



Objectives

To assess finger prints quality, by

- Finger (type of finger)
- Sex
- Age group
- Season (Dry and wet)



Methodology

- A total of 86416 individuals were drawn for the study.
- Four fingers were captured for all individuals where possible. (i.e the two thumbs and the index fingers)
- The quality of finger prints obtained from members were categorised into two groups; Low quality (1-49%) & High quality (50-100%).
- Chi square (X^2) tests, T-tests, and logistic regression analyses were used to determine levels of association between quality and demographic characteristics.



Methods Cont..

population under surveillance	Fingerprint scanning device	Fingerprint processing Library	Host Computer
pop: 152,000 zones : 5 Households: 35,000	Secugen Hamster plus IV	Griaule Fingerprint SDK 2009	Microsoft Windows XP, SQL compact edition 3.5, INESSLink application, INESS Health Facility application, eBioreader

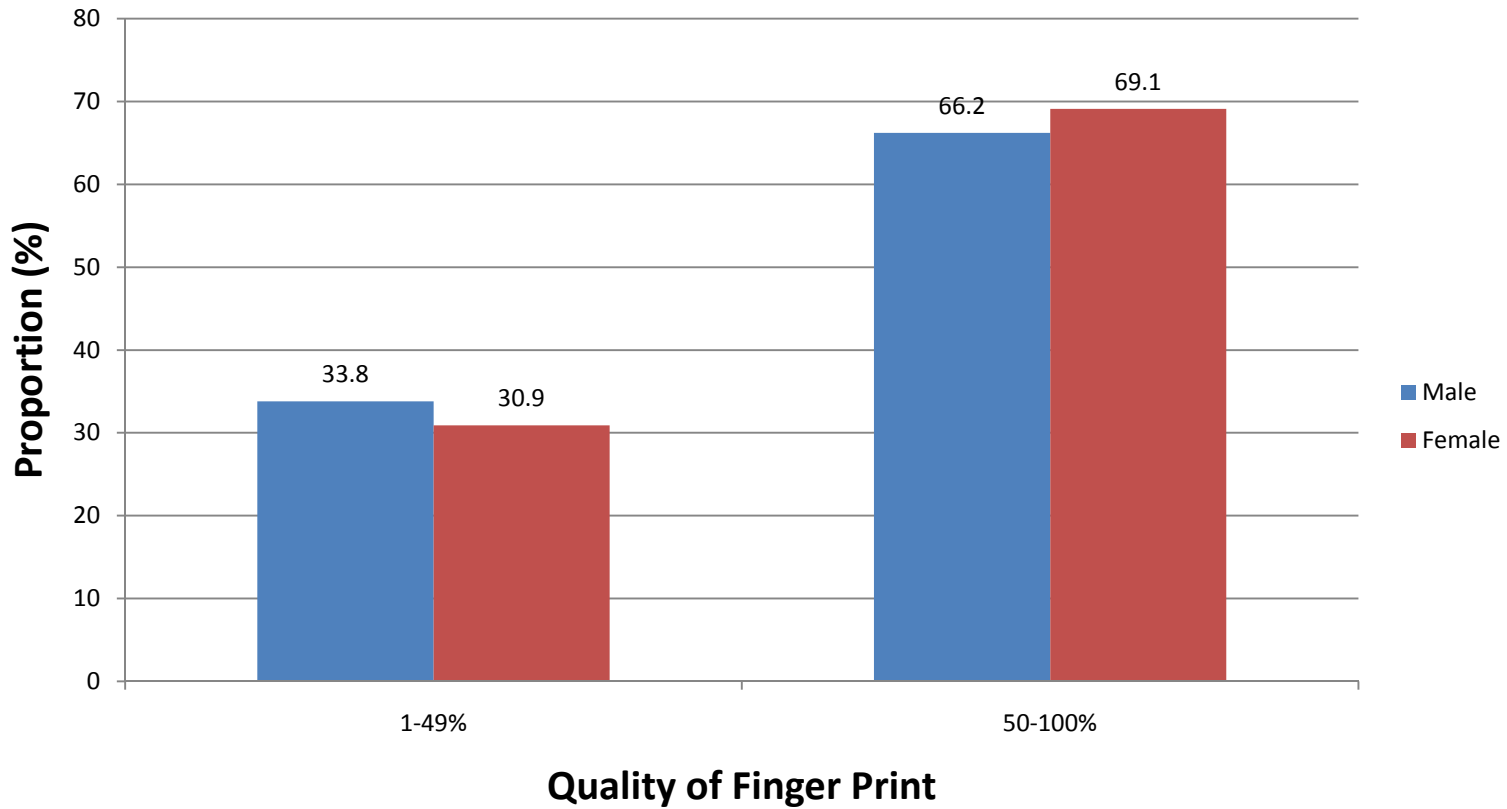


Test Of Quality For Fingers

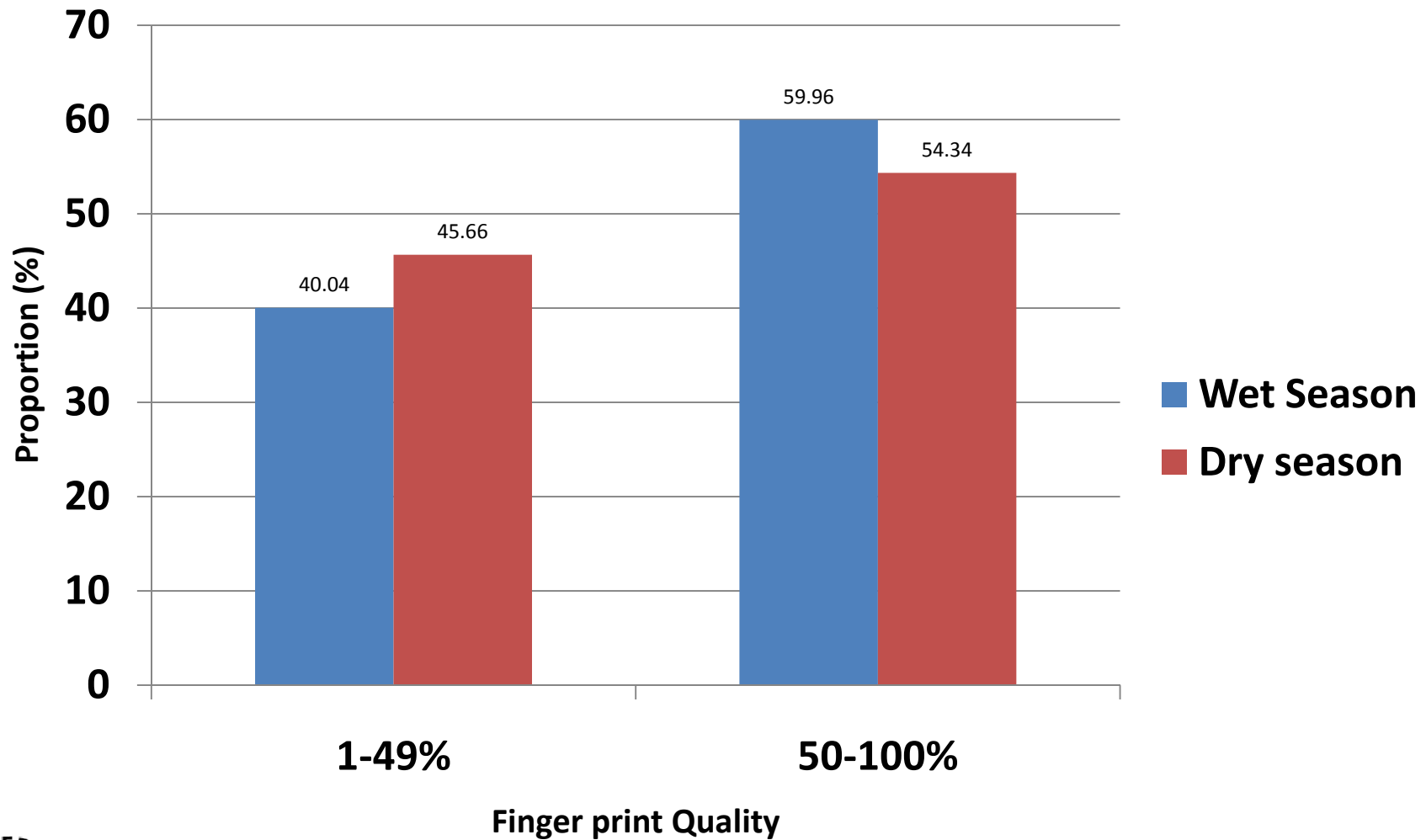
Variable	Proportion for high quality (50-100%)	Diference (%)	P-value
Thumb	63.6	27.2	<0.001
Index finger	36.4		
Right Thumb	48.9	2.3	<0.001
Left Thumb	51.1		



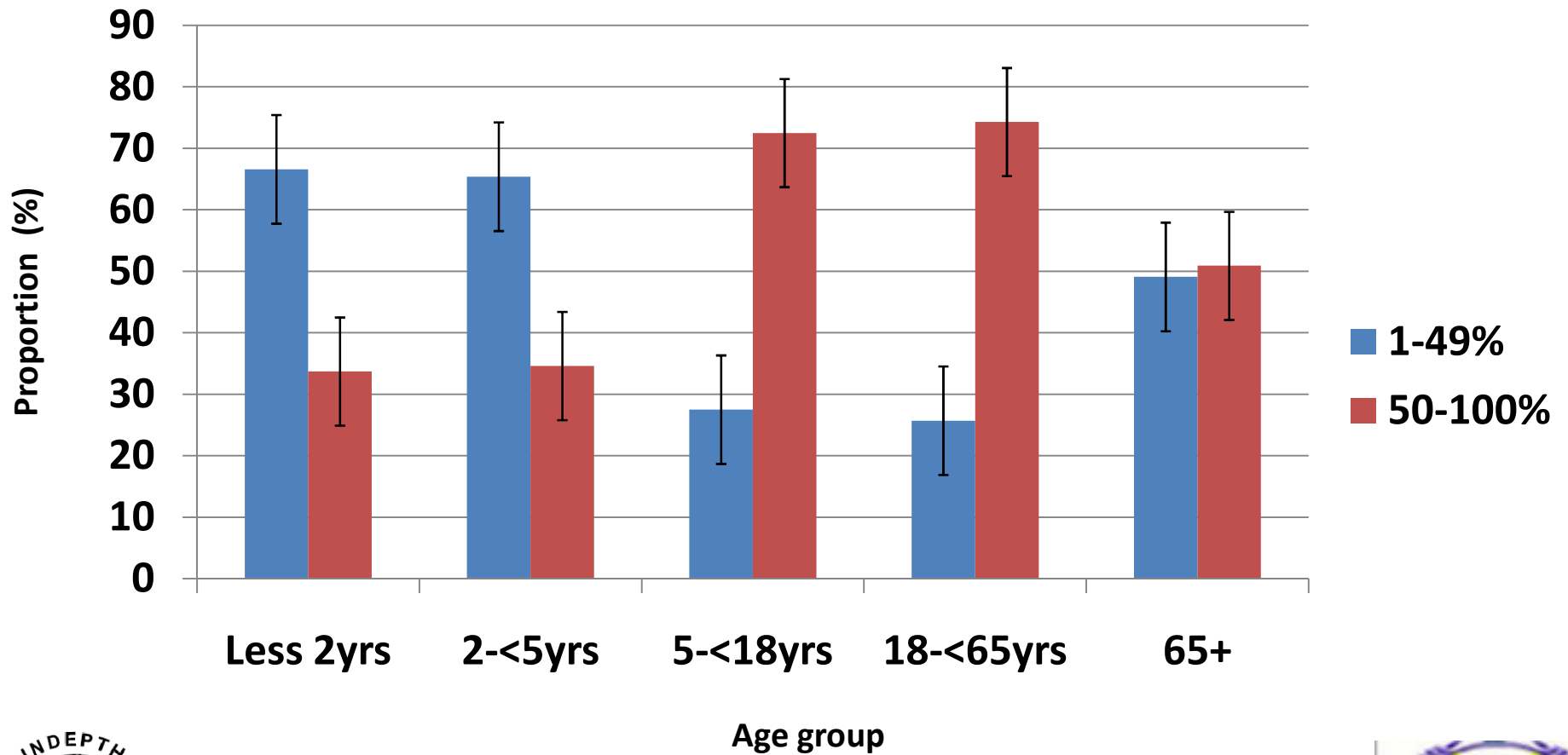
Quality Of Fingerprint By Sex For Left Thumb



Finger Print Quality By Season



Quality Of Fingerprint By Age Group Left Thumb



Logistic Regression (Univariate)

Variable	Odds Ratio	P-value	95% CI
Age group			
Less 2yrs	0.49	<0.001	0.45 - 0.53
2-<5 yrs	0.51	<0.001	0.48 - 0.54
5-<18 yrs	2.54	<0.001	2.42 - 2.68
18-<65 yrs	2.78	<0.001	2.65 - 2.93
65+	1		
Sex			
Female	1.14	<0.001	1.12 -1.17
Male	1		
Season			
Wet	1		
Dry	1.26	<0.001	1.25-1.29

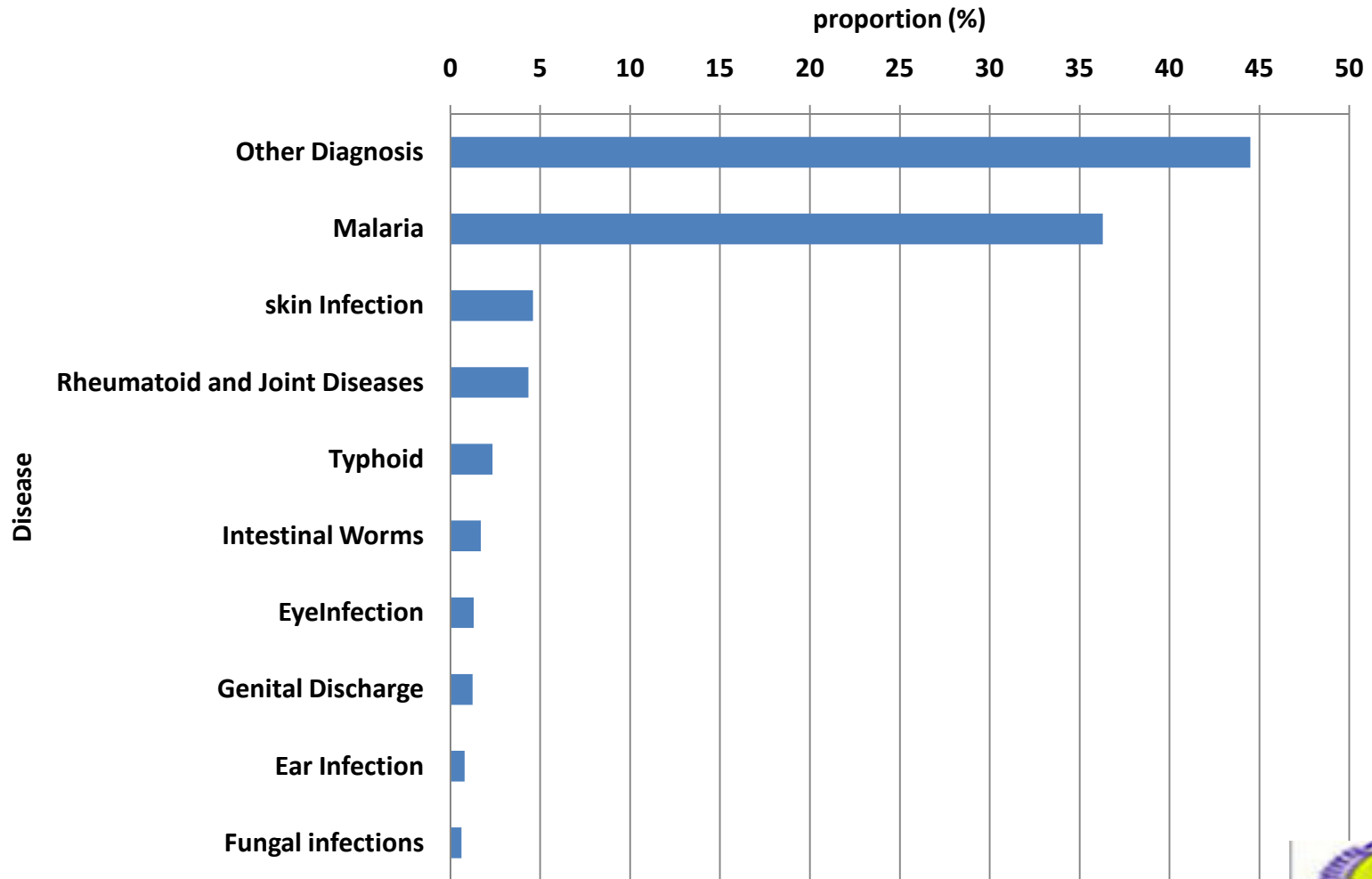
Logistic Regression (Multivariate)

Variable	Odds Ratio	P-value	95% CI
Age group			
Less 2yrs	0.49	<0.001	0.46-0.53
2-<5 yrs	0.52	<0.001	0.49-0.55
5-<18 yrs	2.63	<0.001	2.50-2.77
18-<65 yrs	2.85	<0.001	2.71-3.0
65+	1		
Sex			
Female	1.12	<0.001	1.09-1.14
Male	1		
Season			
Wet	1.13	<0.001	1.29-1.35
Dry	1		



Data From Health Facility Application

TOP 10 DISEASE PREVALENCE CHART - SIRIGU HC



Summary of Results

- There is significant statistical difference in Fingerprint quality by age, season and sex
- The **thumb** records better fingerprint quality than the **index** finger
- The **left** thumb records better fingerprint quality than the **right** thumb
- People between the age group of 5-64 tend to give better fingerprint quality than children under five and individuals 65 yrs and above
- Fingerprint collection is highly possible in any rural setting
- Multiple enrolment strategies must be employed to be able to successfully carry out fingerprint collection exercise in any rural settings
- Data linkage is the quickest way to estimate disease prevalence in any given population
- Data linkage will help check “disease migration”.



Conclusion

- Quality of fingerprint varies from finger to finger
- Fingerprint quality varies by age group, season and sex for left thumb
- Data Linkage can be used as a health management system to check “disease migration”



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Thank You

