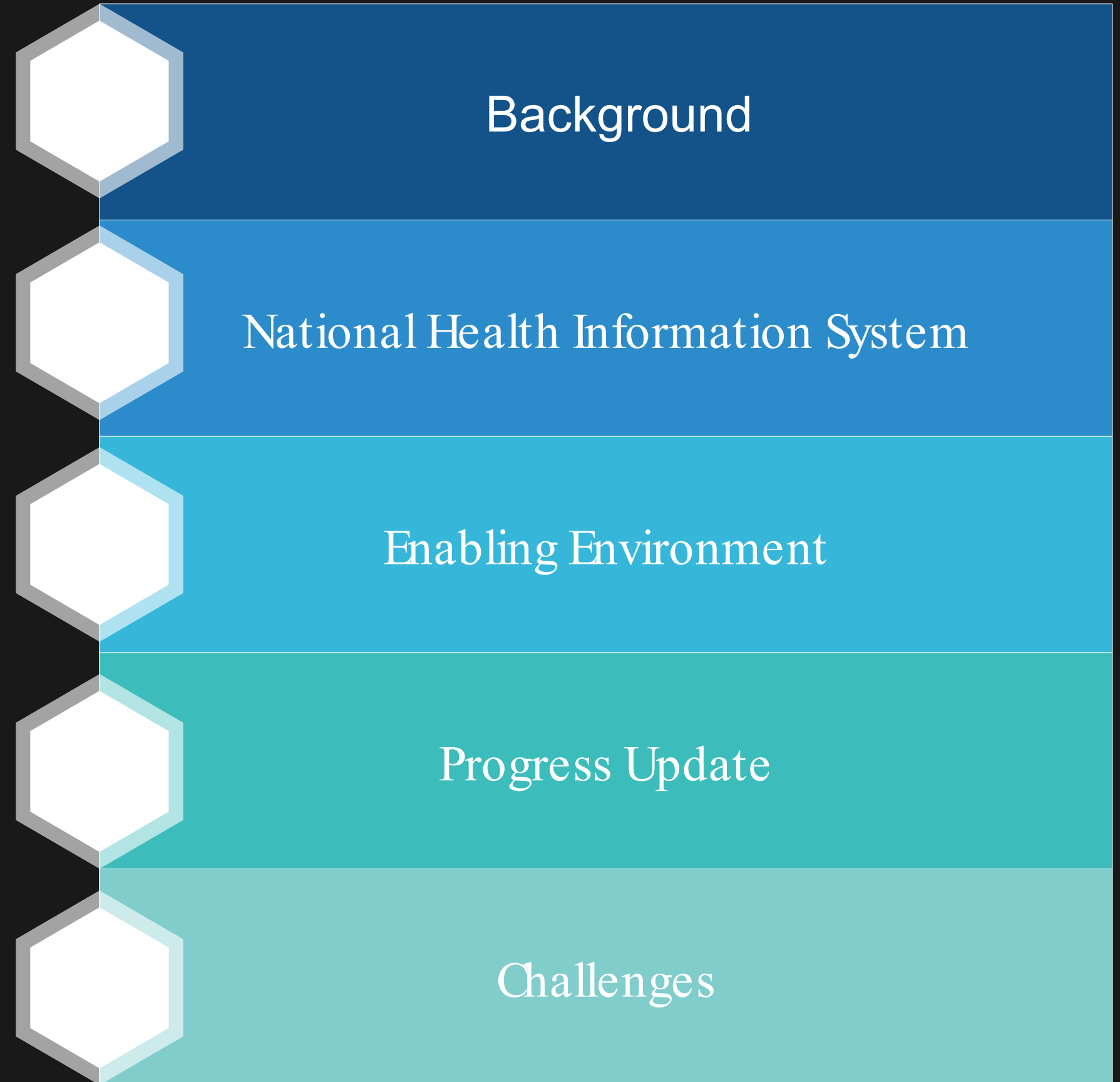


IMPLEMENTATION OF NATIONAL HEALTH INFORMATION SYSTEM

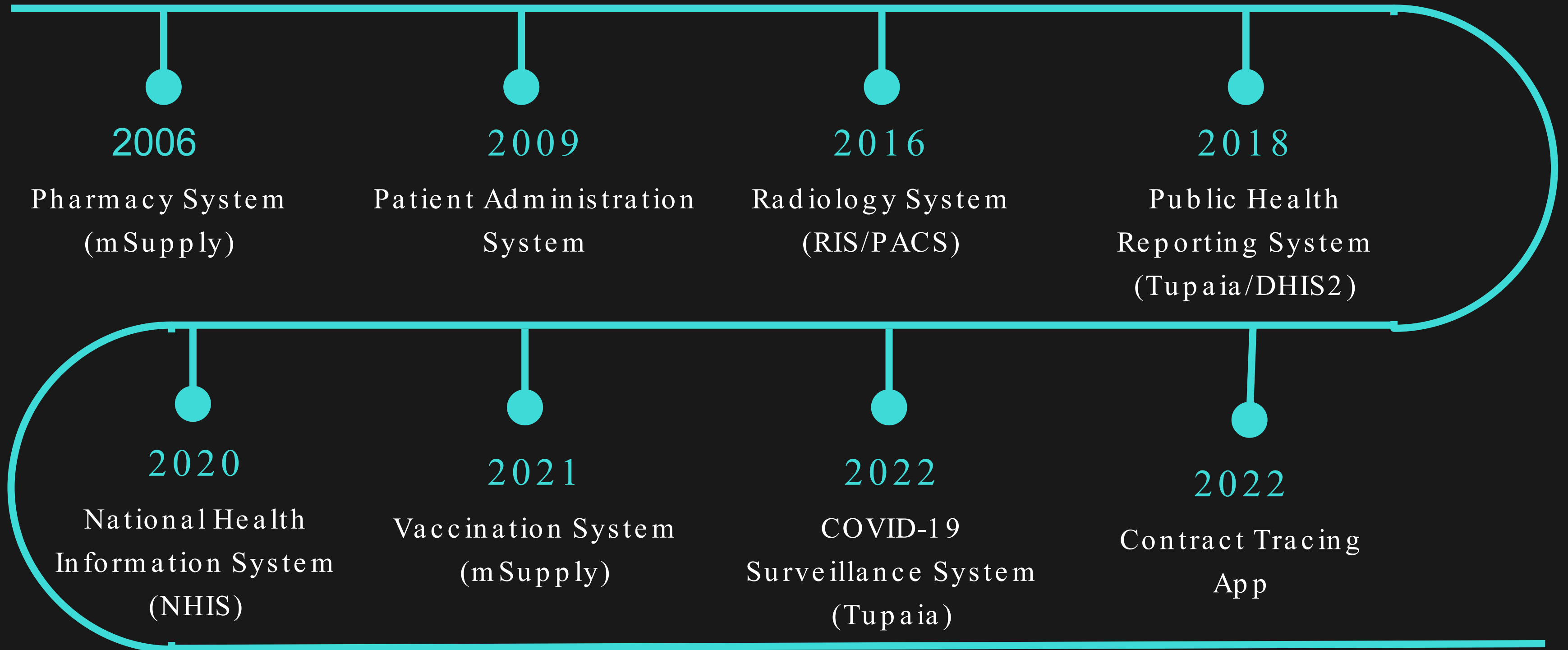
PHIN MEETING - TONGA'S DIGITAL HEALTH JOURNEY



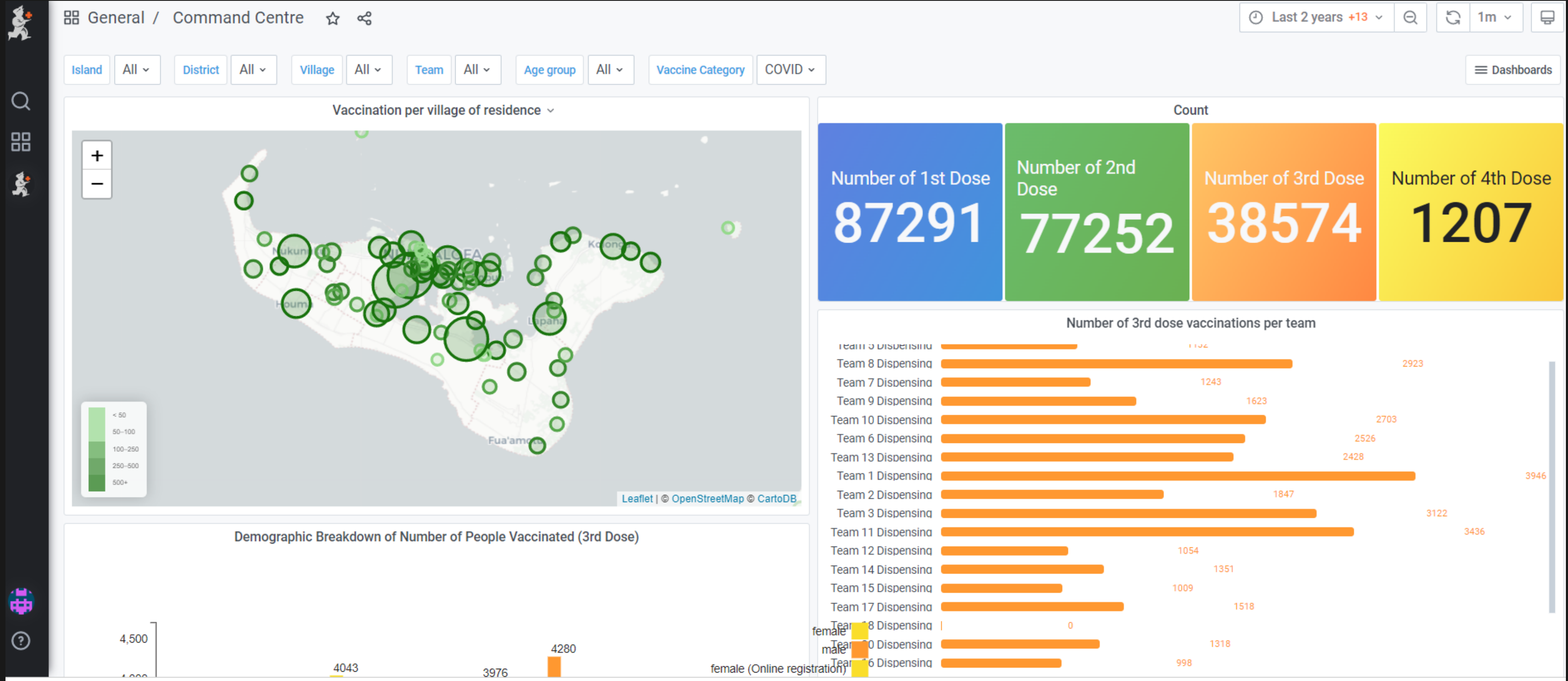
AGENDA



Implementation Timeline of Digital Health Systems



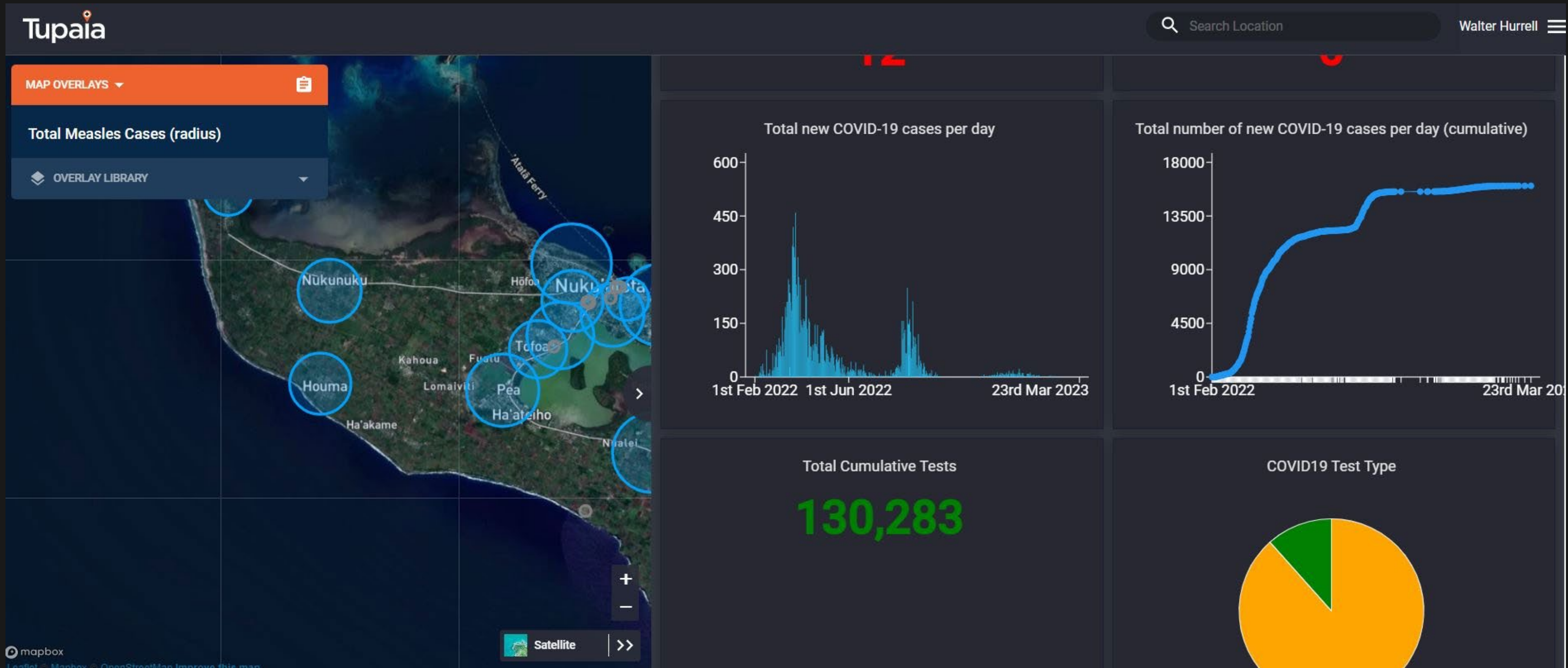
COVID-19 VACCINATION SYSTEM



COVID-19 SURVEILLANCE SYSTEM



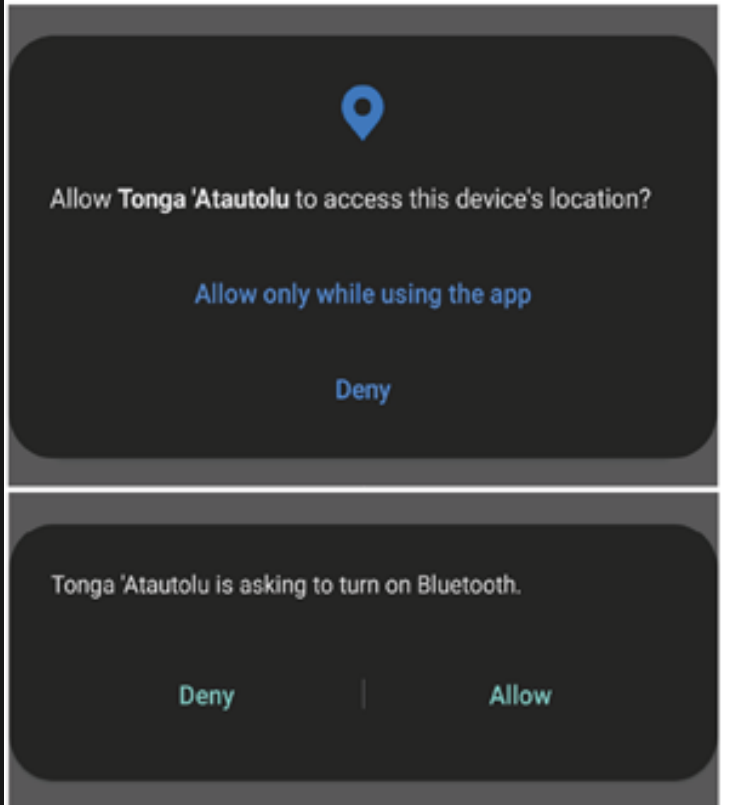
COVID-19 SURVEILLANCE SYSTEM



CONTACT TRACING APP

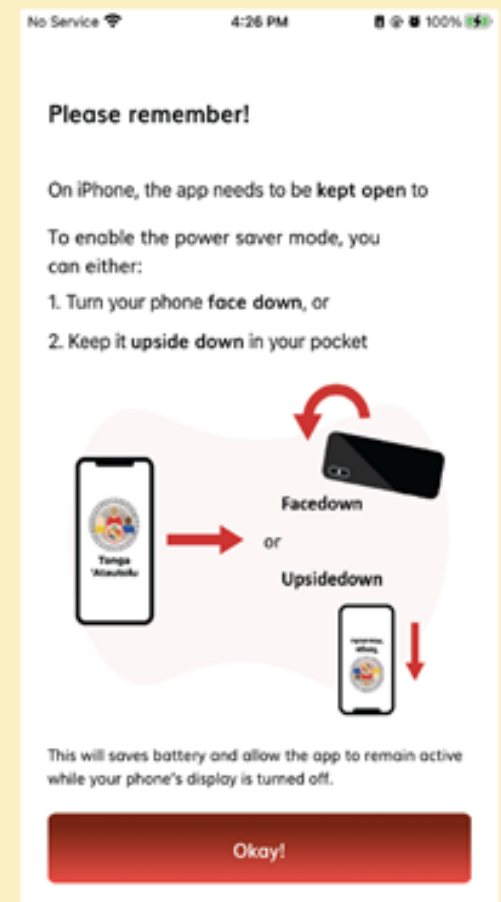
NOW

5 Due to the underlying system architecture of Android operating system, Android devices need to use location permission to enable **Bluetooth** feature.



Tonga 'Atautolu does not capture location information. Location service can be turned off after setup is completed.

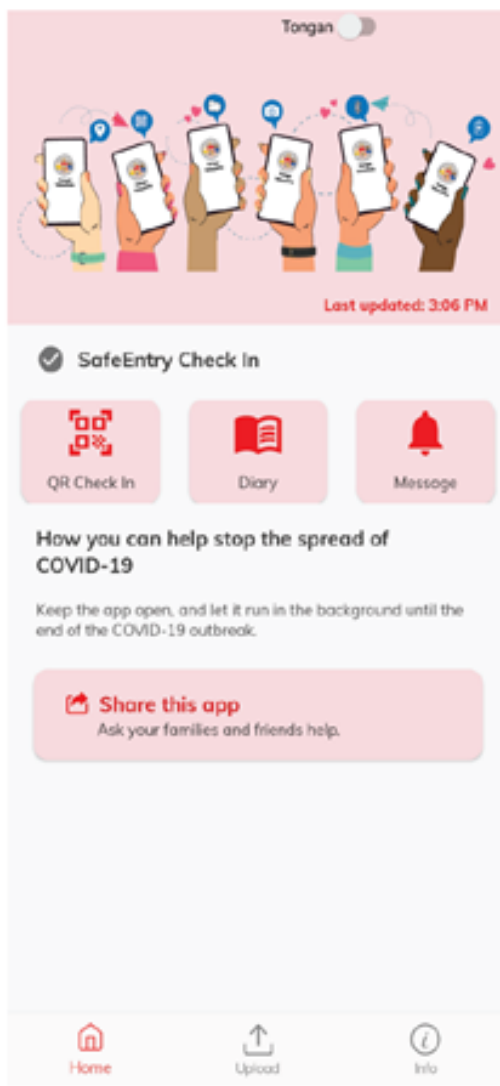
6 Apple/iOS devices need to allow notifications and turn on Bluetooth to complete setup.



Please use the in-app Power Saver Mode while having the **Tonga 'Atautolu** app in the foreground.

This information is necessary to register contact you, at the earliest.

7 The **Tonga 'Atautolu** app is now running.



 Share the **Tonga 'Atautolu** app to friends and family.

 Please ensure that Bluetooth is always enabled on your phone or tablet.

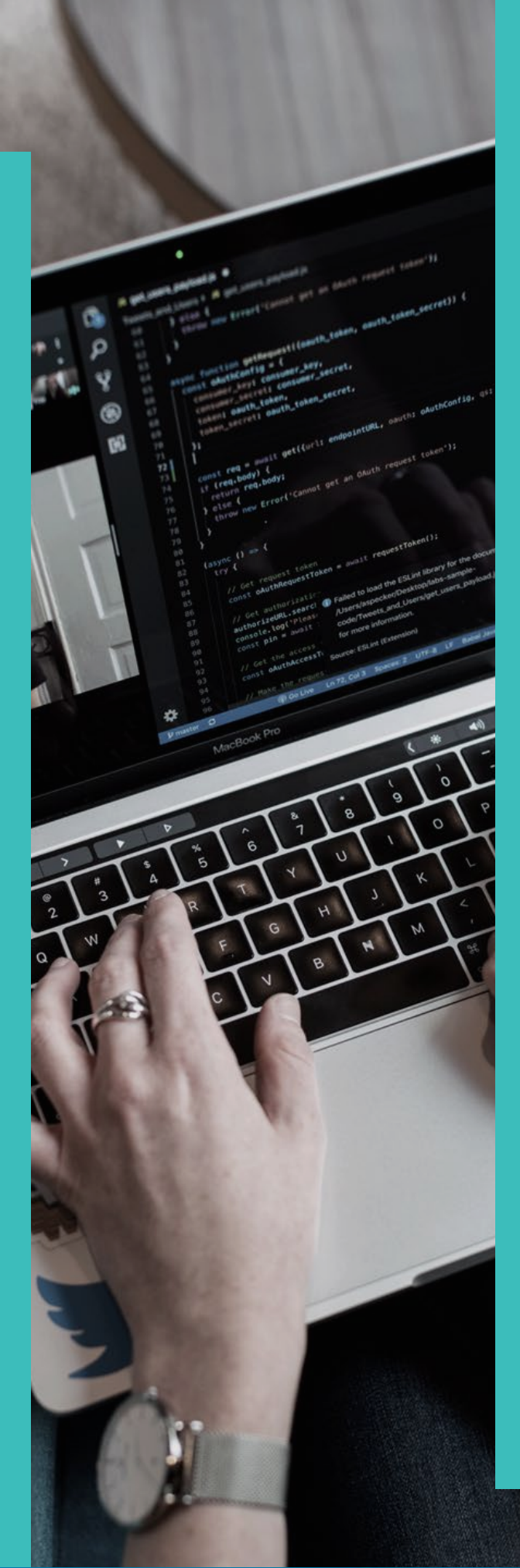
You will receive a 6 digit one-time PIN to verify your mobile number.



 An initiative of the Government of the Kingdom of Tonga



NATIONAL HEALTH INFORMATION SYSTEM



BUSINESS REQUIREMENTS

Core Functionality of the System



PROCESS MAPPING

Mapping Workflows and Processes -
Existing and Future Changes



TECHNICAL REQUIREMENTS

Security, Back-up, Disaster Recovery,
Integration, Data Migration, Data
Center, Network, Computers etc



CHANGE MANAGEMENT

Focuses on People Side,

CUSTOMIZATION TO MEET HEALTHCARE FACILITIES REQUIREMENTS

HOSPITALS	HEALTH CENTERS	REPRODUCTIVE HEALTH CLINICS
4	14	15+

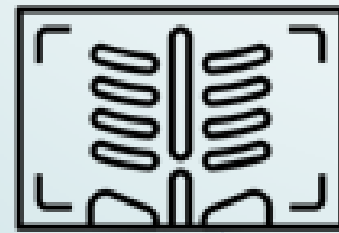
Birth/Death Register

CRVS



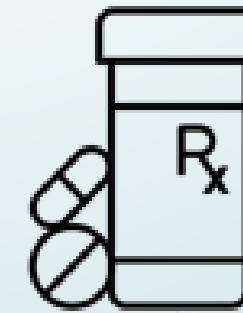
Radiology

Voyager PACS



Pharmacy / CPMS

mSupply



EMR

VESALIUS



HL7 ORU

HL7 ORM

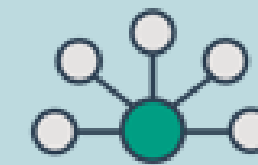
JSON (Update)

JSON (Order)

HL7 ORM, XML

HL7 ORU, XML

Integration Platform Orchestra



XML

CSV

CSV

ASTM

HL7 ORM, JSON (Result)

HL7 ORU

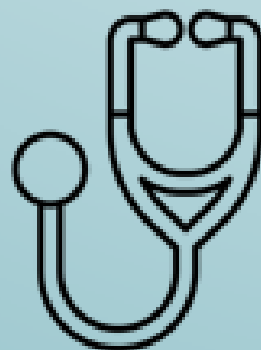
Health Management

DHIS2/Tupaia



Cancer Register

Canreg5



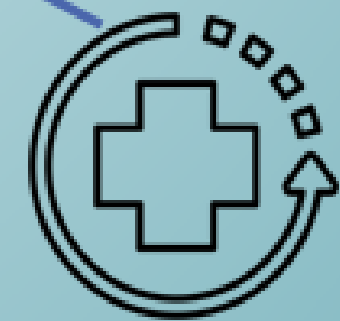
Lab Devices

e.g. Sysmex XN 550,
Cobas C111, C311



Laboratory

LIS



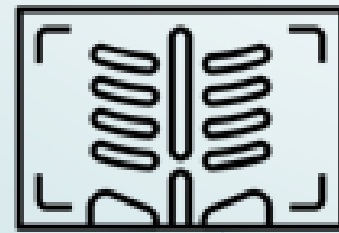
Birth/Death Register

CRVS



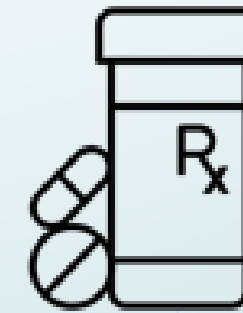
Radiology

Voyager PACS



Pharmacy / CPMS

mSupply



EMR

VESALIUS



HL7 ORU

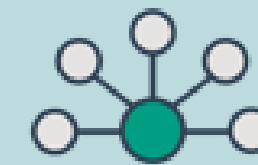
HL7 ORM

JSON
(Update)

JSON
(Order)

HL7 ORM, XML
HL7 ORU, XML

Integration Platform Orchestra



XML

CSV

CSV

ASTM

HL7 ORM, JSON (Result)
HL7 ORU

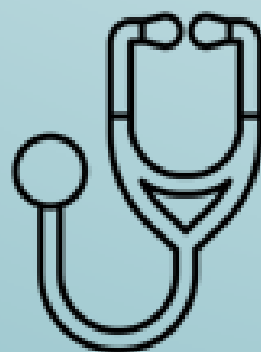
Health Management

DHIS2/Tupaia



Cancer Register

Canreg5



Lab Devices

e.g. Sysmex XN 550,
Cobas C111, C311



Laboratory

LIS



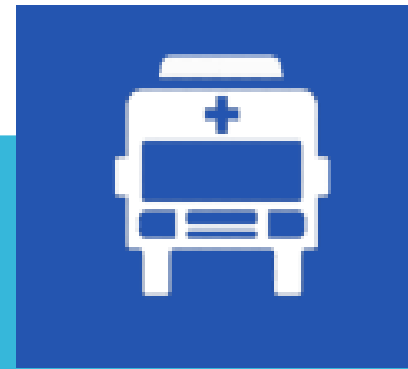
EMR MODULES



Outpatient



Inpatient



Accident &
Emergency

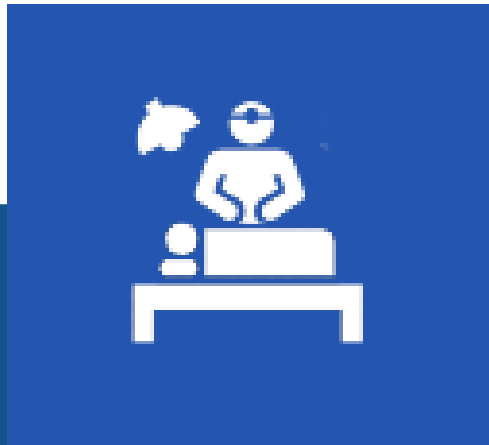


Doctors



Nurses

EMR MODULES



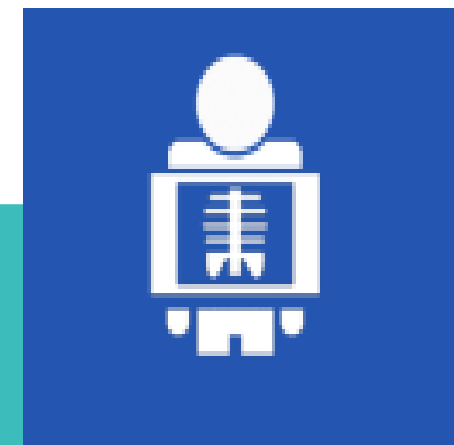
Operating
Theatre



Pharmacy



Laboratory



Radiology

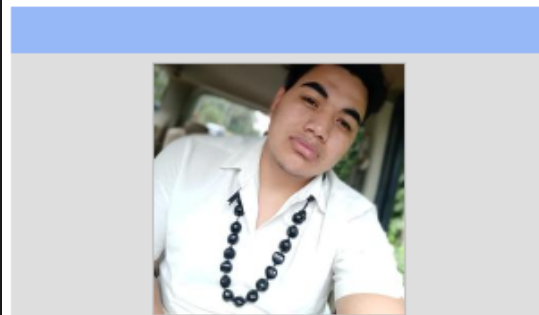


Billing

PATIENT MEDICAL RECORD

View

[Facesheet](#)
[View](#)
[Chart](#)
[Assess](#)
[Order](#)
[Manage](#)



MR. Mesui Fakahoko Iolahia

PRN **000006**
 Born **27-Jan-1997 (26Y 2M)**
 Gender **MALE**
 Marital **SINGLE**
 Race **Tongan**
 Religion **TOKAIKOLO CHURCH**
 Nationality **TONGAN**
 Contact **25317**

Clinical Information

Weight **120 KG**
 Height **185 CM**
 Waist -
 BMI **35.06**
 LMP **NA**

Red Flags

ADR
 Carbamazepine 200mg tab (tegretol),
 Cardiac Drugs

Medical Alerts
 Hepatitis B, Falls Risk, Complex Case,
 Asthma, Diabetes, Dementia, Heart
 Failure, Renal Failure, Seizures, Mild,
 Severe, mahaki moa

Infectious Disease
 Hepatitis B, Covid , HIV

Family / Social History

Family History

Family/Social History:
 none

Father is alive.
 Mother is alive.
 Alive Brother(s): 2
 Alive Sister(s): 3

Created by 'Ofa Talanoa on 29-Sep-2022

[+ Edit Note](#)

Past Medical History

Health Status:
 Very alive

Patient has hospitalization history.

Current reported problems include (Blood Problems (Bleeding disorder), Diabetes, Heart Problems, Hepatitis, High Cholesterol, Stroke).

Sought treatment previously for (Lungs, Hernia, Brain).

Created by Sione Vailala Soakai on 29-Jul-2022

[+ Edit Note](#)

Progress Note

Clinical Note

Problem List:

Current Medication:

General Status:

O/E:

Created by MRS. Uinise Lolohea on 28-Mar-2023

[+ Edit Note](#) [History](#)

Active Diagnosis

Diagnosed with

- AVI (24-Mar-2023)
- AVi (15-Mar-2023)
- AVU (15-Feb-2023)
- AVI (31-Jan-2023)
- palopalema (25-Oct-2022)
- Pain in a joint, multiple sites (18-Oct-2022)

Created by MRS. Uinise Lolohea on 28-Mar-2023

[+ Edit Note](#)

Investigation

FBC/CBC Panel	* LAB PANEL *	
(Barium Enema (Single Contrast)) - R24		
BETA HCG (BHCG) (Pregnancy)	> 10000.0	
T4	8.9	
Sodium - Urine	3.8	
BETA HCG (BHCG) (Pregnancy)	1.9	

Vitals

BODY SURFACE AREA	2.48	
-------------------	------	--

Created by MRS. Uinise Lolohea on 28-Mar-2023

[+ Edit Note](#)

LABORATORY ORDERS

View EMR

Visit View

- Chart
- Assess
- Order
- Manage
- Other

I / O Summary

Growth Chart

Order

Visit

28-Mar-2023 20:49

Summary

Chart

- Clinical Notes
- Scribble Notes
- Clinical Template
- Clinical Charting
- Vaccination
- Annotation
- Vital Sign
- Nursing Care Plan

Assess

- Allergies and Alerts
- Diagnosis

Order

- Investigation
- Services
- OT
- Rx
- Package

Date / Time	Order Indicators	Description	Details	Status	Created By
-------------	------------------	-------------	---------	--------	------------

Triage:

28-Mar-2023 20:53		Adult Triage Form		✓	MR Loupua Falevai
-------------------	--	-------------------	--	---	-------------------

Lab Orders: Lab Results Lab Results Chart

28-Mar-2023 21:35		UEC/Renal Panel		SAMPLE TAKING (F)	DR Seluvaia Fatafehi Taunaholo
28-Mar-2023 21:34		MCS - Pus Swabs		SAMPLE TAKING (F)	DR Seluvaia Fatafehi Taunaholo
28-Mar-2023 21:32		CRP - C-Reactive Protein		SAMPLE TAKING (F)	DR Seluvaia Fatafehi Taunaholo
28-Mar-2023 21:32		FBC/CBC Panel	* LAB PANEL *	VALIDATION (F)	DR Seluvaia Fatafehi Taunaholo

Radiology Orders:

28-Mar-2023 21:37		Hand Lat	Emergency Care / Clinic Room 1	ORDER (F)	DR Seluvaia Fatafehi Taunaholo
28-Mar-2023 21:36		Hand PA/Obl	Emergency Care / Clinic Room 1	PERFORM (F)	DR Seluvaia Fatafehi Taunaholo

Services:

No records found.

LABORATORY RESULT



Laboratory Services Report

Test Required	Package Name	Results	Units	Reference Range	Order Date / Time
Haematology					
FBC/CBC Panel					28-Mar-2023 21:32
WBC		<u>14.70</u>	x 10 ⁹ /L	ADULTS: 4-11	
RBC		<u>5.73</u>	x 10 ¹² /L	M: 4.5-6.5 F: 3.8-5.8	
HGB		<u>16.50</u>	g/dl	M: 13.0-18.0 F: 11.5-16.5	
HCT		<u>0.46</u>	Ratio	M: 0.40-0.54 F: 0.37-0.47	
MCV		<u>80.80</u>	fl	ADULTS: 79-96	
MCH		<u>28.80</u>	pg	ADULTS: 27-32	
MCHC		<u>35.60</u>	g/dl	31-35	
PLT		<u>307.00</u>	x 10 ⁹ /L	150-400	
RDW-SD		<u>35.80</u>	fl	--	
RDW-CV		<u>12.30</u>	%	--	
PDW		<u>9.80</u>	fl	--	
MPV		<u>9.20</u>	fl	--	
P-LCR		<u>17.70</u>	%	--	

RADIOLOGY ORDERS

View EMR

Visit View

- Chart
- Assess
- Order
- Manage
- Other

I / O Summary

Growth Chart

Order

Date / Time	Order Indicators	Description	Details	Status	Created By
-------------	------------------	-------------	---------	--------	------------

Triage:

28-Mar-2023 20:53		Adult Triage Form		✓	MR Loupua Falevai
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28-Mar-2023 21:36		Hand PA/Obl	Emergency Care / Clinic Room 1	PERFORM (F)	DR Seluvaia Fatafehi Taunaholo

Services:

No records found.

Visit

28-Mar-2023 20:49

Summary

Chart

- Clinical Notes
- Scribble Notes
- Clinical Template
- Clinical Charting
- Vaccination
- Annotation
- Vital Sign
- Nursing Care Plan

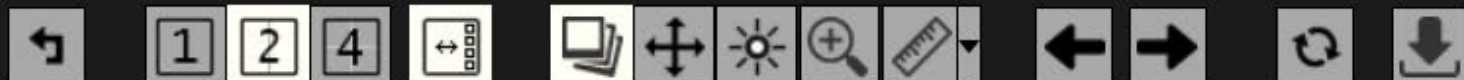
Assess

- Allergies and Alerts
- Diagnosis

Order

- Investigation
- Services
- OT
- Rx
- Package

RADIOLOGY IMAGES



KATA ISILELI, DOB: 18/08/01, 76605, Hand PA/Obl



Powered By:
VOYAGER
IMAGING

KATA ISILELI
PID:76605
ACC:158159-CR
28/03/2023 CR
Image:1
W:4096 C:2047



KATA ISILELI
PID:76605
ACC:158159-CR
28/03/2023 CR
Image:1
W:4096 C:2046



E-PRESCRIBING

View



Visit View



I / O Summary

Growth Chart

Visit

Medication:

06-Oct-2022 10:45 Start: 06-Oct-2022			METFORMIN 500MG BLISTER PACK, FILM COATED (TOP00534)	Folo 2 tu'o UA he 'aho / qty: 120 (dispense: 120)	INTERVENED	DR Veisia Matoto
			METFORMIN 500MG BLISTER PACK, FILM COATED (TOP00534)	Folo 2 tu'o UA he 'aho / qty: 120	Dispense (F)	
06-Oct-2022 10:45 Start: 06-Oct-2022			GLIBENCLAMI DE 5MG TAB (DAONIL) (TOP0370)	Folo 2 tu'o UA he 'aho / qty: 120 (dispense: 120)	INTERVENED	DR Veisia Matoto
			GLIBENCLAMI DE 5MG TAB (DAONIL) (TOP0370)	Folo 2 tu'o UA he 'aho / qty: 120	Dispense (F)	
06-Oct-2022 10:27 Start: 06-Oct-2022			ATORVASTATIN 40MG (ZARATOR) (TOP0043)	Folo 1 he 'aho / qty: 30 (dispense: 30)	Dispense (F)	DR Veisia Matoto

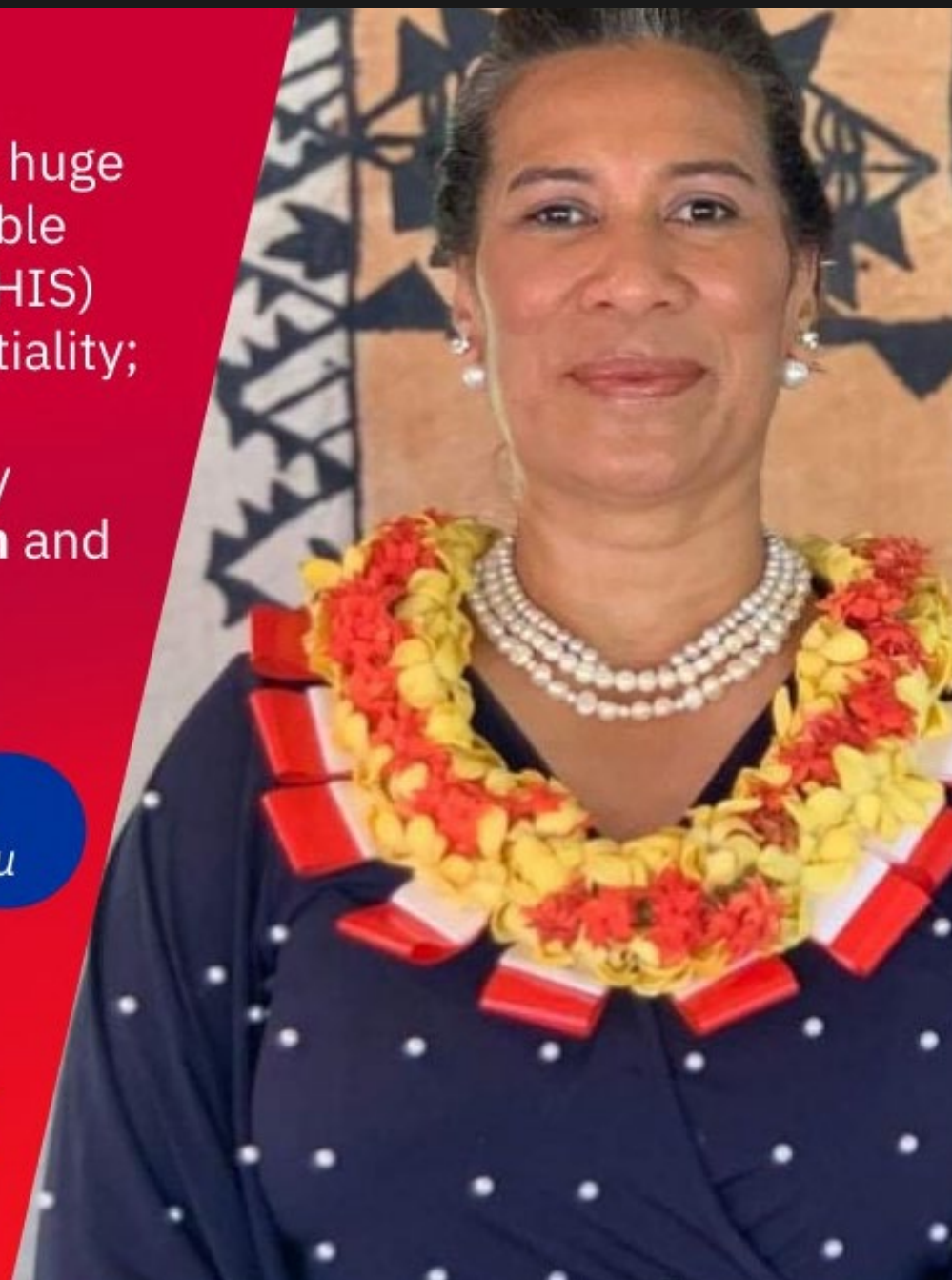
- 27-Mar-2023 09:20**
VAIO-23-0051355
DR Titania Peti
- 08-Dec-2022 08:31**
VAIO-22-0152417
DR Ane Siulolovao Fang...
- 28-Oct-2022 09:03**
VAIO-22-0131314
MR Atonio Apikotoa
- 06-Oct-2022 09:45**
VAIO-22-0118907
DR Veisia Matoto
- 27-Jul-2022 09:35**
VAIO-22-0082282
DR Ane Siulolovao Fang...
- 09-Jun-2022 10:44**
VAIO-22-0056974
DR Titania Peti
- 28-Apr-2022 11:04**
VAIO-22-0039897
DR Titania Peti

“The **KINGDOM** is making a huge global **LEAP** with a sustainable health information system (HIS) to effectively, with confidentiality; manage healthcare data supporting healthcare policy decisions for Greater **Health** and **Wealth** for the **FUTURE!**”

*Honourable Associate Professor
'Amelia Afuha'amango Tu'ipulotu*

Minister of Health, Tonga

#eHealthTON



ENABLING ENVIRONMENT



Digital Health Strategy



Personal Health Information Privacy Act



Personal Health Information Privacy Policy

PERSONAL HEALTH PRIVACY ACT

COLLECTION,
USE AND
DISCLOSURE OF
DATA

ACCESS TO
DATA

INDEPENDENT
REVIEW AND
RESOLUTION
OF
COMPLAINTS

RIGHT TO
REQUIRE THE
CORRECTION
OR
AMENDMENT

PERSONAL
HEALTH
PRIVACY
POLICY

DATA USE

DATA
CONFIDENTIALITY

DATA
SECURITY &
AUDIT

PERSON
IDENTITY
MANAGEMENT

PRACTITION
IDENTY
MANAGEMENT



PROGRESS UPDATE

1



NHIS implementation to complete by end of July
2023

2



NHIS rollout to 2 hospitals and 7 health centers – DONE!

3



NHIS utilized by 4 hospitals, 14 health centers, 15+
reproductive health clinics



CHALLENGES



COVID-19



Local Workforce



Change Management



System Capability



Data Quality Assurance



Data Migration



Back-up connections

MALO 'AUPITO

PHIN MEETING - TONGA'S DIGITAL HEALTH JOURNEY

