Progress Report
Partnership in Health Project
July 2014 – December 2014

Papua New Guinea Institute of Medical Research

March 2015

Progress Report of Partnership in Health Project

Reporting period: July 2014 – December 2014

Authors

Dr. Bang Nguyen Pham	Scientific Coordinator	bang.pham@pngimr.org.pg
Seri Maraga	Scientific Officer	serimaraga@gmail.com
Jacob Kumai	Scientific Officer	jaolbosaj1@gmail.com
Rebecca Emori	Scientific Officer	rebecca.emori@pngimr.org.pg
Ronny Boli	Scientific Officer	ronnie.boli@pngimr.org.pg
Tess Aga	Scientific Officer	tess.aga@pngimr.org.pg
Miriam Vano	Scientific Officer	miriam.vano@pngimr.org.pg
Regina Wangnapi	Scientific Officer	wangnapi.regina@yahoo.com
Prof. Peter Siba	PNG IMR Director	peter.siba@pngimr.org.pg

List of iHDSS team

	iHDSS site			
Team	**Asaro/Goroka**	**Hiri/POM**	**Hides/Komo**	**Karkar/Madang**
Data analysis	Ronny Boli Miriam Vano Rebecca Emori	Seri Maraga		Dr. Regina Wangnapi
Data collection	Nanim Brown Jacob Joseph Alfred Alawaki	Lydia Kue Benjamin Fasi	Michael Kapu Billiam Degemba Vinson Silas Maryanne Hapolo	Jacob Kumai Campbell Asuak Noel Berry
Clinical and Laboratory	Helen Kave Albert Sie Jaukae Jaukae	Rosemary Simbil Beverlyn Warigi Theonilla Kware Vicky Gabee	Emmanuel Hapolo	Kaiok Mamore Ruth Larry
Data management	Tess Aga, Ronny Jorry Susan Bebes Collin Manase Joanne Tibu Morabi Joshua Dorothy Leo Freda Opgal			
Administrative and Financial	Maria Gipis Lynette Bureng Kim Papaso Lisa Kuvi Nancy Iva Roveleen Akunaii Masi Sima	Alexia Alois Felix Ame		Yalum Siba Babu Kudan

Note: This list as updated as of 31 December 2014

Technical Assistance of Independent Scientific Advisory Board (ISAB)

Maxine Whittaker, Professor of International and Tropical Health
Program Director AICEM and Co-Coordinator of APMEN Secretariat
School of Population Health, the University of Queensland

Marcel Tanner, Professor and Director
Swiss Tropical & Public Health Institute (Swiss TPH)
Chair of INDEPTH Board

Burt Singer, Professor (Adjunct)
Emerging Pathogens Institute
University of Florida

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Abbreviations

ACD	Active Case Detection
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal care
BCG	Bacillus Calmette-Guérin
BMI	Body Mass Index
CI	Confidence Interval
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular Disease
DENV	Dengue virus
DNA	Deoxyribonucleic acid
DOTS	Directly Observed Therapy - Short Course
DSS	Demographic Surveillance Survey
DST	Drug Sensitivity Test
DTP	Diphtheria, Tetanus and Pertussis
DWU	Divine World University
EHP	Eastern Highland Province
EM PNG	ExxonMobil PNG Ltd.
EPI	the Expanded Program on Immunization
EPTB	Extra Pulmonary Tuberculosis
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
HepB	Hepatitis B
Hib	Haemophilus influenza type B
HIV	Human Immunodeficiency Virus
HP	Hela Province
HPV	Human Papilloma Virus
HRV	Human rhinovirus

HSV-2	Herpes simplex type-2
IEC	Information, education and communication
iHDSS	Integrated Health and Demographic Surveillance System
IMR	Institute of Medical Research
IRB	PNG Institute of Medical Research Institutional Review Board
LAMP	Loop-mediated isothermal amplification
LBW	Low birth weight
LLG	Local Level Government
LNG	Liquefied Natural Gas
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
MDR/TB	Multi-drug resistant tuberculosis
MMR	Maternal mortality rate
MRAC	The PNG Medical Research Advisory Committee
MTB	Mycobacterium Tuberculosis
N/A	Not applicable
NCD	Non-Communicable Diseases
NDoH	National Department of Health
NMR	Neonatal mortality rate
OPV	Oral Polio Vaccine
ORS	Oral rehydration salts
PCD	Passive Case Detection
PCR	Polymerase chain reaction
PICT	Provider-initiated HIV counselling and testing
PiHP	Partnership in Health Project
PNG	Papua New Guinea
PNG Med J	Papua New Guinea Medical Journal
PNG IMR	Papua New Guinea Institute of Medical Research
PNG LNG	Papua New Guinea Liquefied Natural Gas
POM	Port Moresby
PPAQ	Papua New Guinea Physical Activity Questionnaire

PSI	Population Services International
PTB	Pulmonary Tuberculosis
QMLR	Queensland Mycobacterial Reference Laboratory
SOP	Standard Operating Procedures
STI	Sexually Transmitted Infections
TB	Tuberculosis
TBA	Traditional Birth Attendant
UNs	United Nations
UNSW	The University of New South Wales
UPS	Urinary pregnancy test
UQ	The University of Queensland
VA	Verbal Autopsy
VCT	Voluntary counselling and testing
VDS	Vaginal discharge syndrome
WASH	Water, Sanitation and Hygiene
WHO	World Health Organisation

Executive summary

As part of the Partnership in Health project (PiHP), the PNG Institute of Medical Research (PNGIMR) develops and submits semi-annual progress reports. This report covers and updates new data and finding since the last submission in September 2014. The work presented in this report includes new data and results covering the six month period, from July 2014 to December 2014. More updated data available for the period January-March 2015 were also included and indicative in the report.

As an interim deliverable of the PiHP, the March 2015 Report assumes a basic understanding of the overall effort and does not fully reiterate well-known background information of either the PNG LNG Project or the PiHP. Whenever possible the focus is on new results developed since the September 2014 Report. The PiHP is a longitudinal effort. Therefore, the presentation of certain types of time sequence information is critical.

Health and demographic indicators and socio-cultural determinants do not change rapidly. Rather, they evolve over a period of several years. This is the power of the integrated Health and Demographic Surveillance System (iHDSS) i.e. revealing trends so that appropriate actions can be considered and taken by concerned stakeholders, authorities and individuals.

The March 2015 Report, a new update of household data has been completed in four surveillance sites, including GPS data of dwellings and population census (including births, deaths, migration in and out of the surveillance sites), and morbidity and mortality data. This report presents major findings and observations of the iHDSS in interlinked chapters. Whenever possible, new findings and observations are emphasized in particular iHDSS locations such as Asaro, Hides, Hiri, and Karkar.

Five studies and sub-studies, which were also funded as part of the PiHP, have been completed by the end of 2014, including: (i) Febrile and diarrheal disease sentinel study; (ii) Maternal and infant health (MIH); (iii) Sexually transmitted infections (STI); (iv) Tuberculosis (TB); and (v) Non-communicable disease (NCD). Submissions of final reports of these studies are separate from this progress report.

1. CHAPTER 1 BACKGROUND AND INTRODUCTION

Papua New Guinea Institute of Medical Research (PNG IMR) has established and operated an ***integrated Health and Demographic Surveillance System*** (iHDSS) under the Partnership in Health Programme (PiHP) since 2011. The programme was financially supported by ExxonMobil, with technical assistance from the University of Queensland, Australia. The iHDSS database is updated twice a year with new information on socio-economic, demographic and population changes in life-cycle events such as birth, education, employment, marriage, migration, and death.

The iHDSS sites

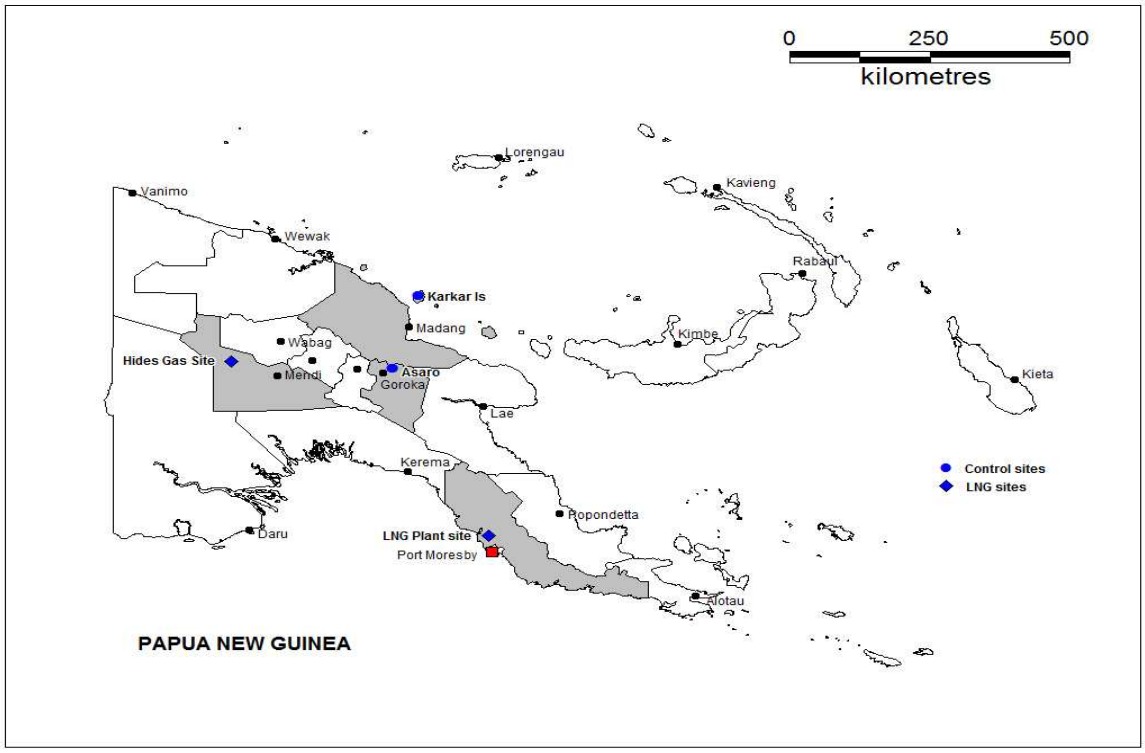

Figure 1-1 iHDSS sites: Asaro vs. Hides and Karkar vs. Hiri sites, PNG IMR iHDSS, 2015

Figure 1-1 showed the four iHDSS sites, including Asaro, Hiri, Hides and Karkar. These sites are representative for both coastal and mountainous areas, and urban and rural sectors. The iHDSS has currently covers approximately 55,000 of population in the study sites.

Asaro

With the total population approximately 10,000 Asaro has the main industry in farming and agricultural production. Growing coffee is the main crop. Major languages are spoken by people living in Asaro are *tokples,* Gahuku, Siane and Dano/Tokano, apart from *pidgin* that is also regularly spoken. There are four health facilities, namely *Goroka Provincial Hospital*, *Asaro health clinic, Urioka health clinic and Tafeto health clinic,* where local people can access to basic health services. Asaro has more than 10 public and private schools where local children attend at the primary and secondary educational levels.

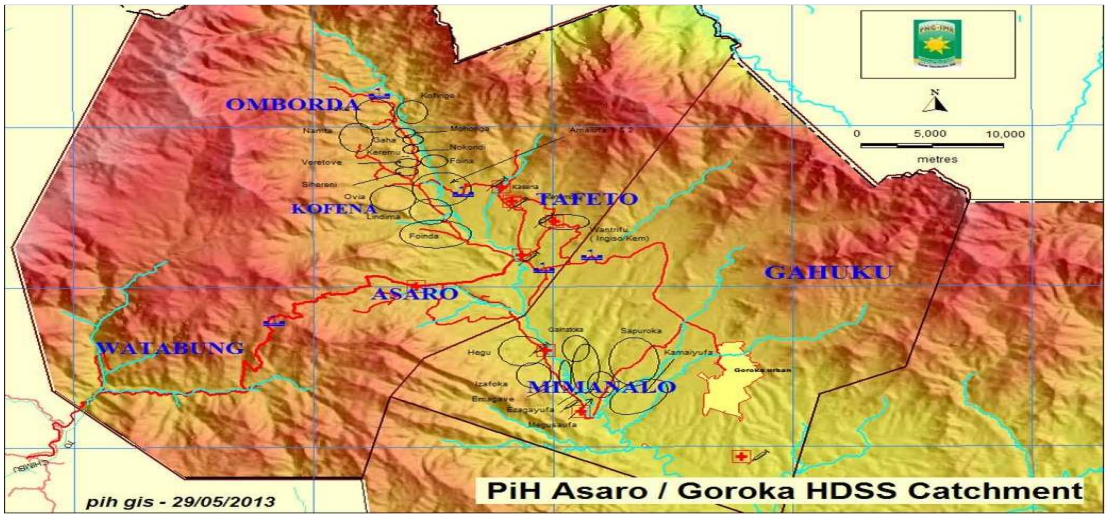

Figure 1-2 Map of Asaro iHDSS site and villages covered by the iHDSS, 2015

Figure 1-2 showed the villages of Asaro under the cover of iHDSS. The iHDSS of the Asaro site was re-established by the PiHP in 2011 and located approximately 40-45km in the Northeast of Goroka town. The site is designed as one iHDSS comparison site to compare with Hides, an intervention site in the highlands. There are currently 26 field reporters currently working in Asaro site.

Hides

Hides iHDSS is an intervention site of the PiHP, located in the highlands Hela Province with the total population of approximately 13,000. Geographically this iHDSS site is very remote and difficult to access. Tribal cultural norms and practices are an integral part of the local people'

lives, formulating close structure of the society. People live in clans and sub-clans, and maintain a traditional tribal lifestyle. Most of the houses are traditionally built with very few semi-permanent buildings. The main *tokples* language spoken is Huli, which is also the common name given to people from that region. Other languages include *pidgin* and a small number of English speakers. Hides iHDSS site is also home to the Komo Airfield, which to date is fully functional and the operation is hand overed to the PNG Government. The two main health facilities are Mananda Health Centre and Para Clinic, which are run by the Evangelical Church of PNG (EC-PNG). There are elementary and primary schools, but no evidence of high school.

Three main divisions the iHDSS concentrates on are *Haliago* (division 1), *Hibiria* (division 2) and *Gigiria* (division 3) (Figure 1-3). There has been a substantial increase in the population count for each division, particularly for Division 3, where there have been substantial socio-economic changes, possibly associated with the recent PNG LNG economic activities, that attract a number of young people migrated into the site for job and economic purposes. Given the new restructure of PiHP in 2015, the data of Division 3 is presented in details.

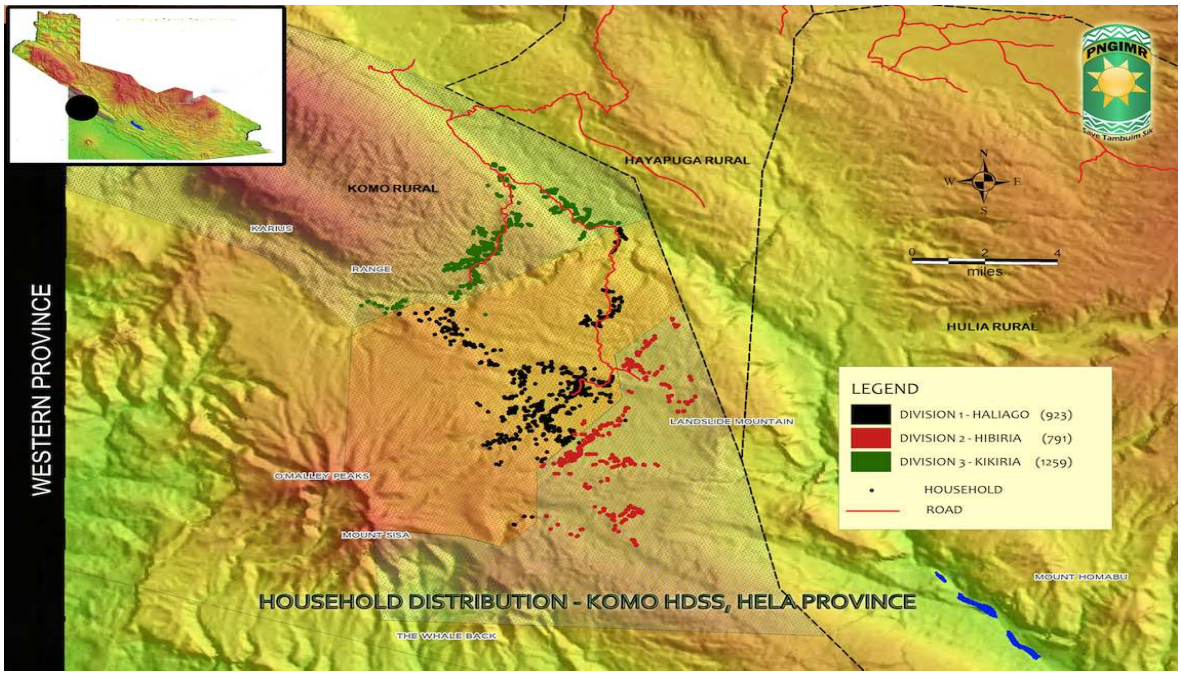

Figure 1-3 Map of Hides and division covered by Hides iHDSS, 2015

Hiri

The Hiri iHDSS is located in the west of Port Moresby, the National Capital of PNG. The iHDSS covers four coastal villages, including *Porebada, Boera, Papa* and *Lealea* (see Figure 1-4) with the total population approximately 12,000. Most inhabitants are either *Motu* or *Koitabu* speakers. Hiri iHDSS can be reached by road in less than one hour from Port Moresby. Like many rural communities in PNG, basic public services and infrastructures for education, healthcare and safe water supplies are in need in Hiri.

Karkar

Karkar district is a volcanic island located 30km off of the PNG coast in the Bismarck Sea and is part of Madang Province. The iHDSS covers a population of approximately 18,500 (the total population of Karkar is about 60,000). The island's soil is known for its fertility and the large plantations produce the island's main exports of cocoa and coconut and provide a large amount of the local employment opportunities. Inhabitants of the island come from one of two language groups: *Waskia* in the North half of the island and *Taskia* in the South. Most inhabitants are either Lutheran or Catholic (see Figure 1-5).

One main road runs around the coast of the island and provides access to the three available health facilities. Gaubin Hospital is the largest of the facilities and is a Lutheran run institution. Karkar has been unaffected by the extensive and intensive mining activity that has occurred in Madang; hence, Karkar is considered as an appropriate location for comparison with the coastal villages in Hiri, which might have been affected by the recent economic and development activities in the locality.

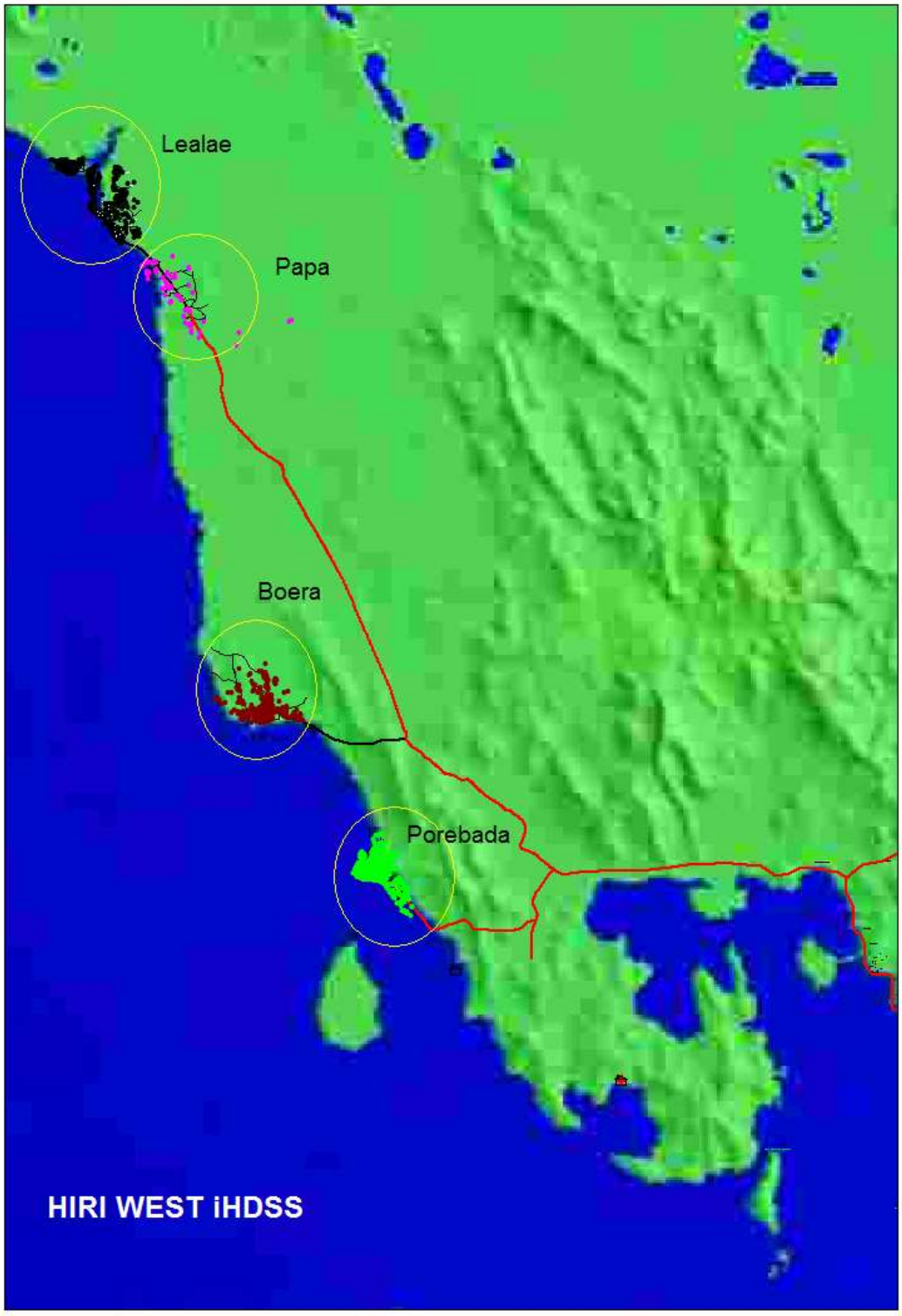

Figure 1-4 Map of Hiri and villages covered by iHDSS, 2014

Figure 1-5 Map of Karkar, iHDSS, 2015

2. CHAPTER 2 METHOD AND MATERIALS

This Chapter provides details of the data collection tools, data collection method, data entry and management processes as well as quality assurance/quality check (QA/QC) procedures, currently applied to the data collection, data processing and data analysis in all the iHDSS sites.

Data collection tools

Household Update Book

A new Household Update Book (UB) was developed, based on the last review of the data collection tools. This new HH UB was redesigned, based on the previous HH update book and integrated with other data collection tools such as Change Status Form, Household registration form, Birth registration form, and Death registration form. It is more in-line with requirements of the INDEPTH network for recording and reporting population data. The new HH UB was used for collecting updated population data over the reporting period July-December 2014 and document major population changes at the household and individual levels in iHDSS sites (see Annex 1 for more details). The new Household UB consists of 7 data components, including:

(A) Household identification information[1];
(B) Individual identification information of household member[2];
(C) Birth born since the last update;
(D) Death occurred since the last update;
(E) In-migration[3] since the last update;
(F) Out-migration[4] since the last update;
(G) GPS data was also collected as part of the fieldwork; and
(H) Date of Update.

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[1] A new Household ID code system has been recently developed based on the HH and individual identification information. This coding system is in line with the national coding system issued by the PNG National Statistics Office and international convention. It will be applied for the first time in the data collection in Quarter 4-2014. That will help to link different components of the iHDSS database, between HH and Individual information and with other data sources available in PNG and the INDEPTH network.
[2] HH member is defined as individuals, who resides in the HH for 3 months or more in the last six months of the reporting period i.e. from 1 July to 31 December, 2014, including newborn babies less than 3 months old, and are currently living or not living in the household at the time of update. This is definition is adopted from the INDEPTH network.
[3] In-migrant is defined as an individual, who moves in the iHDSS site from outside and currently living in the iHDSS site at the time of survey or update. This definition is adopted from the INDEPTH network.
[4] Out-migrant is defined as individual, who used to live in the iHDSS site, recorded in the iHDSS database, but have already moved out of the iHDSS site prior to the update time. This definition is adopted from the INDEPTH network.

Morbidity data collection form

To collect morbidity data from iHDSS sites for this report, a collection form was used to collect tally numbers of case load recorded in health facilities within the iHDSS site over the reporting period.

Verbal Autopsy Questionnaire (VA)

Two VA data modules for adult and adolescents (Annex 2) were used in this reporting period to collect information on causes of death.

Trainings

A TOT training was conducted by the Scientific Coordinator for core staff of PiHP including site managers, fieldwork coordinators, and scientific officers from all four iHDSS sites in late Oct 2014. The training focused on new design of the iHDSS, including the new data collection tools such as the HH UB, HH Questionnaires, the Morbidity Questionnaire and Mortality Questionnaire.

This TOT training was then followed up by refresh trainings in each iHDSS site. The refresh training was conducted by Site Managers in collaboration with Fieldwork Coordinators in November and December 2014 with focus on data collection tools and data collection processes which were applied in this reporting period.

Data collection and field monitoring

There has been no change in data collection framework of the iHDSS over the last four years. Data collection forms and the HH UB have remained the same until the reporting period of Jan-June 2014. The newly designed HH UB, HH Questionnaire, and Morbidity Questionnaire were used for the first time to collect data for the reporting period, July-Dec 2014.

The Mortality Questionnaire, which was developed by the Population Health Metrics Research Consortium in 2007 and has been used by the PiHP in the last few years are still in use for collecting the mortality data in this reporting period. There is a minor change in the coding

structure of the Mortality Questionnaire, from 4 digits to 19 digits to be consistent with the iHDSS coding system and facilitate data link with other data components of the iHDSS database.

Data collection process was closely monitored by Field-work Coordinators. Data collection forms, including the Household Update Book and Morbidity tally forms were checked by the assigned Data Editors in the field and verified upon arrival in the office by the Site Manager. Identified mistakes were highlighted and cross-checked with the Field-work Coordinators for clarifications and corrections.

It was note that Morbidity and Mortality data of Hides were collected by a clinical team of Asaro. This is the third time, iHDSS team has sent out clinical staff to Hides to collect the morbidity and mortality. Clinical staff of Asaro also provided technical assistance to Karkar site in collecting Mortality and Morbidity data.

Data entry and management

According to the new QA/QC procedures, data entry work was shifted from the Data Manager, who is based in iHDSS sites, to the data management team, based in PNG IMR main office in Goroka. This change has been made as part of QA/QC procedures to standardize data entry processes and unify data entry template, improving the quality of iHDSS data and building the iHDSS database.

The information was then entered into the PiHP central database by data entry clerks, who based in PNG IMR offices in Goroka. Data management team has four data entry clerks. Each acts as a focal point for entering data of one site. HH UBs are entered into the iHDSS database, using the same data entry template, developed on the Process Maker programme. Data entry clerks are requested to check systematically every 10 individual entries.

One data quality controller supervises, monitors the data entry progress and provides technical support to data entry clerks when required.

Once all the information has been transferred from the HH UB into the iHDSS database, the data manager will review the database, edits the data if needed and extracts raw dataset as required.

About ten percent of the responses were randomly cross-checked by the data managers in the second round of quality control during the data entry process.

Dataset generation and cleaning

Raw dataset is the output of the data generation process. The HH UB dataset was extracted from the iHDSS database, using 'date of interview' conducted during the reporting period, between 1 July 2014 and 31 December 2015 from iHDSS sites. For M&M data, the analysis includes data, collected in Quarter 1-2015.

Data sets were extracted from the iHDSS database in the format of excel spreadsheet and checked by the Scientific Coordinator for the final round of quality assurance before they were released to the study design team for data analysis and report writing.

Data analysis and report writing

A two-day training workshop on basic data analysis and report writing skills was held by the Scientific Coordinator for a core group of eight national Scientific Officers. With new acquired new skills, national scientific officers for the first time have been able to take part in the development of the PiHP progress report.

Cleaned dataset were then converted into SPSS (Statistical Package for Social Study) for the analysis of population data, producing tables and graphs.

MapInfo Package was used to develop maps of population and household distribution, using the GPS data.

Assessment of the quality of iHDSS data for the March 2015 report

Figure 2-1 describes the QA/QC procedures currently applied to the data collection, recording and processing of the iHDSS. This QA/QC procedure is divided into three stages covering three respective steps of data processing process:

(i) Data collection;
(ii) Data entry and management;
(iii) Data generation.

Data collection

Data collectors conduct HH visits and individual interviews, using the HH UB. Every ten data collectors have one team leader, who monitors, supervises, and certifies the completeness of data collection forms i.e. the HH UB. Each iHDSS site has one or two Fieldwork data editors, who are responsible for review of the collected information, make correction if needed and verifies the collected data. Fieldwork coordinator oversees the fieldwork activities in an iHDSS site to ensure activities are planned and implemented in a coordination manner to meet the deadline. Fieldwork coordinator records and sends all the completed data collection forms to Goroka once he/she has completely checked and certified the collected data and information.

Data Entry and Management

Data entry clerks are assigned as focal point for each iHDSS site. He/she is responsible for entering the information of his/ her iHDSS site into the database. Data entry clerks have systematically checked every patch of 10 entries. If all the ten entries are correct, then she/he will move forward. If any mistake is identified, then she/he will re-enter the whole patch. Data entry and management team has a QA/QC officer, who supervises, monitors the data entry processes and provide technical assistance to the data entry clerks. Data manager has responsible for development of data entry templates, using MySQL/ process maker. The main task of the data manager is to maintain the iHDSS database to make sure all the data components are linked and generate the dataset for data analysis purpose by extracting raw data from the database on

demand, using inclusion and exclusion criteria. He/she can edit the database if any error is detected. Raw dataset was then passed to the study design team for data analysis purpose.

Data cleaning

The Scientific Coordinator ran statistical tests and checked multiple entries of the generated dataset. Missing values and missing system were calculated, recorded and corrected if needed. The internal consistency within the dataset was also cross-checked and corrected. Outlier values were recorded for further examination to identify their potential contribution to the change in the data analysis results. The final dataset was then released for data analysis and report writing.

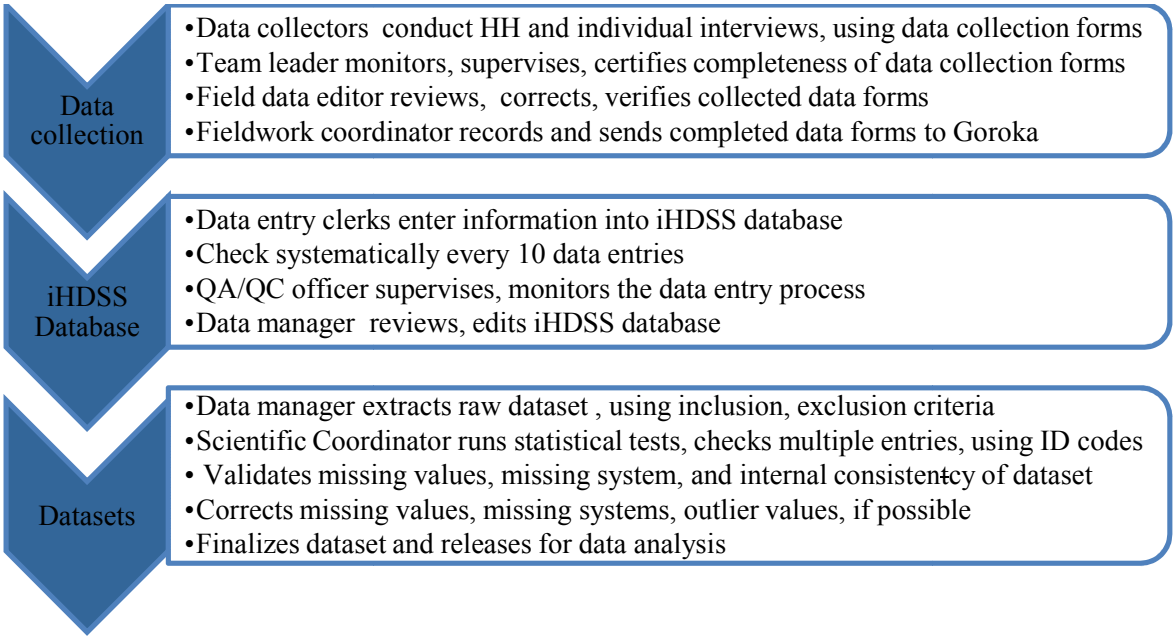


Figure 2-1 QA/QC measures of the PNG IMR iHDSS, 2015

Error! Reference source not found. showed the quality of population data, recorded in the iHDSS for the reporting period July-2014 December 2014 as shown in the completeness of data of four key variables, namely: Relationship to the HH head, Sex, Year of Birth, and Province of Birth in four iHDSS sites: Hiri/POM, Asaro/Goroka, Karkar/Madang, and Hides/Komo.

Table 2-1 Quality of population data by iHDSS site, 2015

Variables	Data Values	Hiri/ POM		Asaro/ Goroka		Karkar/ Madang		Hides/ Komo		Total	
		N	%	N	%	N	%	N	%	N	%
Relationship to HH head	Valid values	10569	84.5	9802	98.5	18279	98.2	12977	97.9	51627	95.0
	DK values	15	0.1	2	0.0	4	0.0	9	0.1	30	0.1
	Missing values	1926	15.4	149	1.5	340	1.8	267	2.0	2682	4.9
	Total values	12510	100.0	9953	100.0	18623	100.0	13253	100.0	54339	100.0
Sex	Valid values	12393	99.1	9932	99.8	18595	99.8	13152	99.2	54072	99.5
	DK values	24	0.2	13	0.1	9	0.0	12	0.1	58	0.1
	Missing values	93	0.7	8	0.1	19	0.1	89	0.7	209	0.4
	Total values	12510	100.0	9953	100.0	18623	100.0	13253	100.0	54339	100.0
Year of Birth	Valid values	12186	97.4	9484	95.3	18465	99.2	11804	89.1	51939	95.6
	DK values	297	2.4	459	4.6	138	0.7	1319	10.0	2213	4.1
	Missing values	27	0.2	10	0.1	20	0.1	130	1.0	187	0.3
	Total values	12510	100.0	9953	100.0	18623	100.0	13253	100.0	54339	100.0
Province of birth	Valid values	12079	97.47	9473	95.38	18443	99.18	11758	89.40	51753	95.71
	DK values	287	2.32	449	4.52	133	0.72	1312	9.98	2181	4.03
	Missing values	27	0.22	10	0.10	19	0.10	82	0.62	138	0.26
	Total values	12393	100.0	9932	100.00	18595	100.0	13152	100.0	54072	100.0

The iHDSS has captured 54,339 population records[5] in four sites, including 9953 records (18.3%) in Asaro, 13,253 (24.4%) in Hides, 12,510 records in Hiri (23%), and 18,623 records in Karkar (34.3%). The data indicated that the completeness of data were very high, above 95% across all four selected variables. It reached 99.5% for the data on 'Sex'. The 'Missing values'

[5] Population records include: (i) Residents in iHDSS sites at the update times; (ii) Births born in iHDSS sites since the last update; (iii) Deaths occurred in iHDSS sites since the last update; (iv) Migrants out of the iHDSS sites since the last update; and (v) Migrants into the iHDSS sites since the last update.

were less than 5% across variables, but was relatively high, 15.4%, for the variable on 'Relationship to HH head' in Hiri/POM site. Overall, the quality checks suggest that the quality of the data from the iHDSS data for the reporting period July 2014- December 2014 are reliable for further data analysis.

3. CHAPTER 3 POPULATION SIZE, AGE AND SEX POPULATION STRUCTURE

Abstract

This Chapter reports key findings and observations on socio-demographic characteristics of the study population in four iHDSS sites, namely Asaro, Hiri, Hides and Karkar. A total of 54,339 population records were extracted from the iHDSS Database by the end of March 2015, providing an updated data on dynamics and health status of the population over the reporting period July-December 2014. The data analysis focuses on key demographic indicators such as population size and population distribution.

Table 3-1 showed the overall population records captured in the iHDSS sites, including Hiri/POM, Asaro/Goroka, Karkar/Madang and Hides/Komo as of March 2015. A total of 11,251 dwellings were included in the GPS database, with the population coverage of 54,339 individuals in the four sites. A total of 755 births born in 2014 was recorded in the system. Also 151 deaths were reported in the study sites. Around 278 persons migrated into the study sites and on the other hand, 469 persons migrated out of the study site.

Table 3-1 Population Data Update by iHDSS site, 2015

Census Update	Hiri/POM	Asaro/Goroka	Karkar/Madang	Hides/Komo	Total
Number of dwelling	1,691[6]	2,872[7]	3,980[8]	2,708[9]	11,251
Population records	12510	9953	18623	13253	54339
Birth records	254	114	153	234	755
Death records	12	35	58	46	151
In-migration records	40	81	4	153	278
Out-migration records	23	151	136	159	469

[6] Including 319 in Boera, 468 in Lealea, 228 in Papa, and 676 in Porebada

[7] Including 1224 in Asaro and 1648 in Goroka

[8] Including 1456 in Takia and 2524 in Waskia

[9] Including 1182 in Division 3 and 1526 in Division 1 and 2

Age and sex population structure of the study population

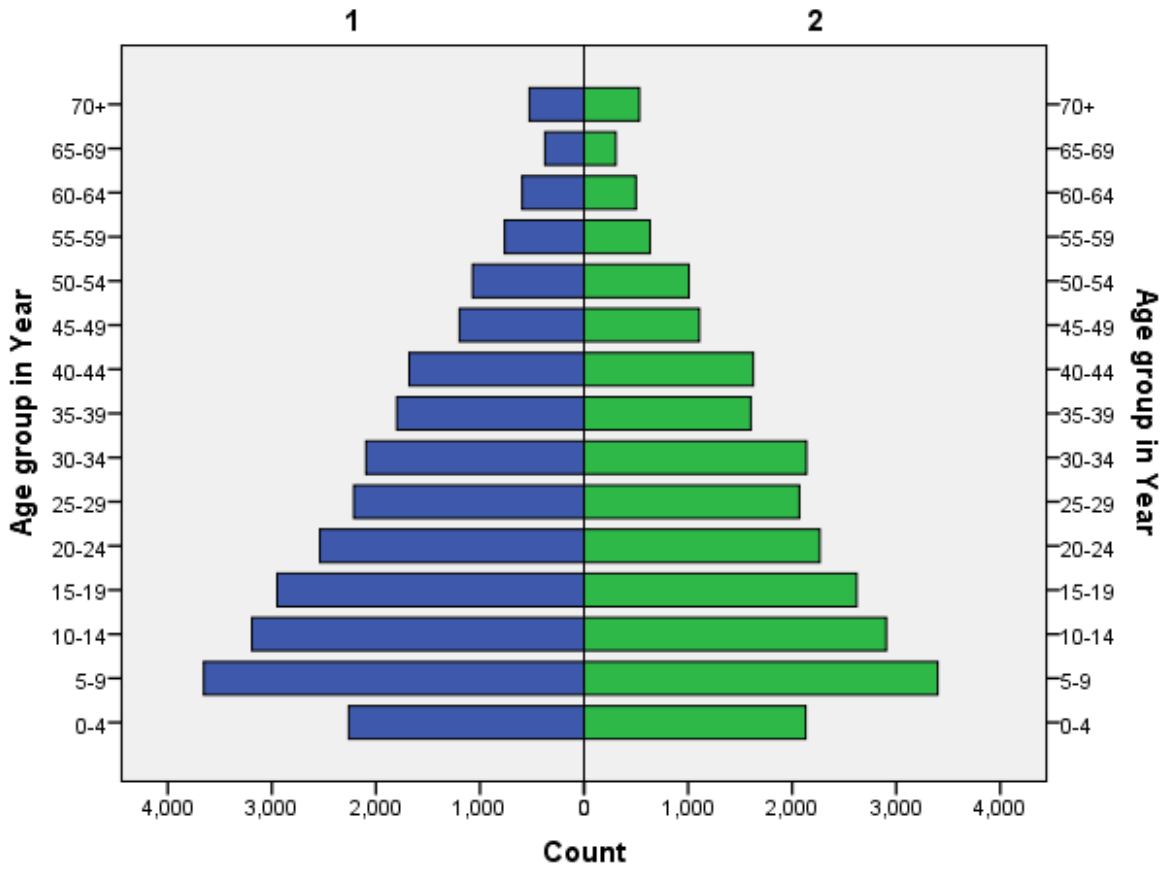


Figure 3-1 Population pyramid of the study population, all iHDSS sites 2015 (1: Male, 2: Female)

Figure 3-1 showed the age and sex population structure of the population study in four iHDSS sites: Asaro, Hiri, Hides, and Karkar[10]. The population pyramid shows the study population of the four iHDSS sites are very young, with longer bars at the bottom. The overall sex composition of the population is balance.

[10] This population pyramid was built for four iHDSS sites based on a total population of approximately 54,000 recorded in the system by the end of March 2015.

As highlighted in the previous report, a couple of observations should be re-emphasised in this population pyramid. Firstly, the shorter bars of the population in age group of 0-4 at the bottom of the population pyramid suggest fewer children were born in the last four years. Secondly, the population in age group of 35-39 was a relatively smaller than other age groups, reflecting a lower fertility of the population (few children were born) in the period 1975-1980.

Table 3-2 Age and sex population structure of study population, PNG IMR's iHDSS, 2015

Age group	Male		Female		Total		Sex ratio
	N	%	N	%	N	%	
0-4	2262	8.4%	2130	8.6%	4392	8.5%	106
5-9	3653	13.6%	3399	13.7%	7052	13.6%	107
10-14	3193	11.9%	2906	11.7%	6099	11.8%	110
15-19	2949	11.0%	2620	10.5%	5569	10.8%	113
20-24	2539	9.4%	2266	9.1%	4805	9.3%	112
25-29	2211	8.2%	2070	8.3%	4281	8.3%	107
30-34	2096	7.8%	2137	8.6%	4233	8.2%	98
35-39	1800	6.7%	1602	6.4%	3402	6.6%	112
40-44	1679	6.2%	1627	6.5%	3306	6.4%	103
45-49	1196	4.4%	1108	4.5%	2304	4.5%	108
50-54	1072	4.0%	1009	4.1%	2081	4.0%	106
55-59	763	2.8%	635	2.6%	1398	2.7%	120
60-64	595	2.2%	500	2.0%	1095	2.1%	119
65-69	375	1.4%	306	1.2%	681	1.3%	123
70+	524	1.9%	531	2.1%	1055	2.0%	99
Total	26907	100.0%	24846	100.0%	51753	100.0%	108

The following sections present age and sex population structure of each iHDSS site, aiming to figure out the impact of the recent economic development activities on the social changes in the study sites.

Asaro

Table 3-3 Population distribution by sex and age groups, Asaro, iHDSS, 2015

Age group	Male		Female		Total		Sex Ratio
	n	%	n	%	n	%	M:F
0-4	399	8.1	350	7.7	749	7.9	114:100
5-9	675	13.8	599	13.1	1274	13.4	113:100
10-14	542	11.1	518	11.3	1060	11.2	105:100
15-19	513	10.5	460	10.1	973	10.3	112:100
20-24	429	8.7	371	8.1	800	8.4	116:100
25-29	377	7.7	374	8.2	751	7.9	101:100
30-34	314	6.4	399	8.7	713	7.5	79:100
35-39	317	6.5	261	5.7	578	6.1	121:100
40-44	312	6.4	360	7.9	672	7.1	87:100
45-49	218	4.4	229	5.0	447	4.7	95:100
50-54	222	4.5	198	4.3	420	4.4	112:100
55-59	170	3.5	108	2.4	278	2.9	157:100
60-64	154	3.1	111	2.4	265	2.8	139:100
65-69	94	1.9	79	1.7	173	1.8	119:100
70+	168	3.4	152	3.3	320	3.4	111:100
Total	4,904	100	4,569	100	9,473	100	107:100

Age group	Male		Female		Total		Sex Ratio
	n	%	n	%	n	%	M:F
0-14	1,616	33.0	1,467	32.1	3,083	32.5	110:100
15-64	3,026	61.7	2,871	62.8	5,897	62.3	105:100
65+	262	5.3	231	5.1	493	5.2	113:100
Total	4,904	100	4,569	100	9,473	100	107:100

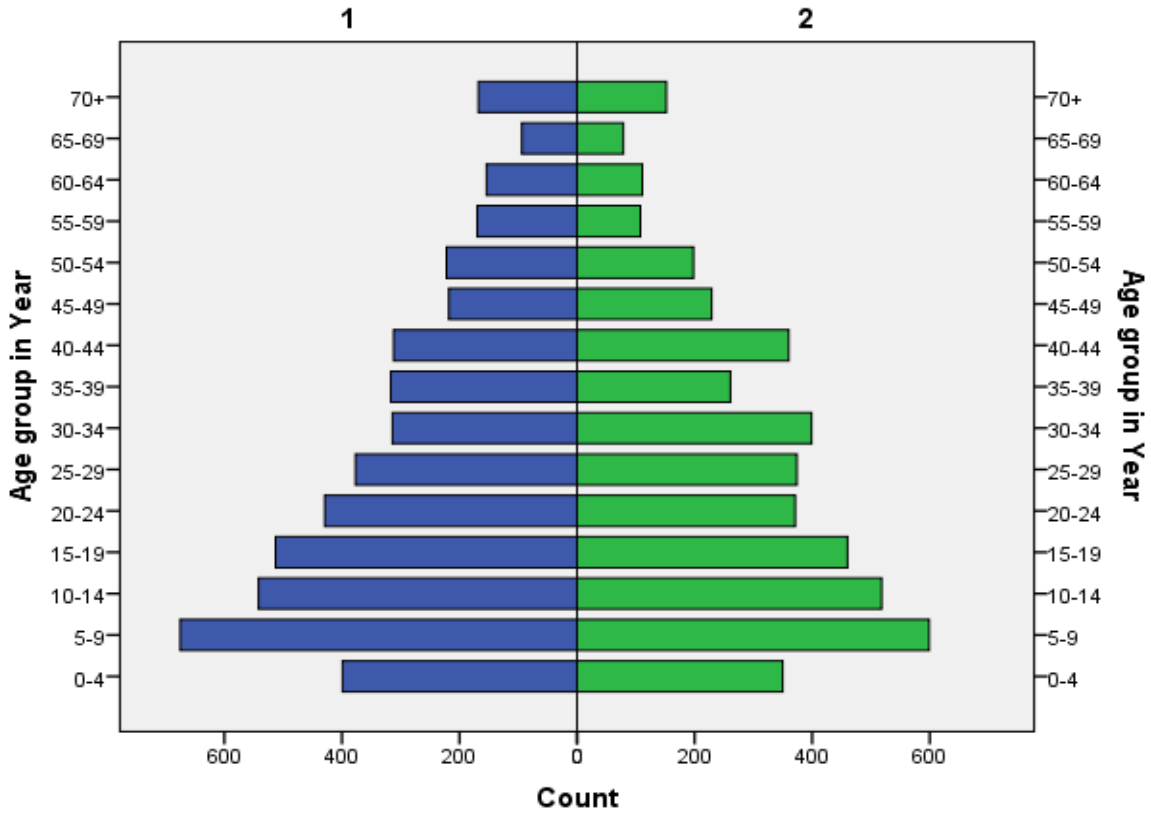


Figure 3-2 Population pyramid of Asaro, iHDSS, 2015 (1: Male, 2: Female)

Table 3-3 shows the population distribution by age group and sex of Asaro. The Asaro iHDSS covers 9,473 people. Sex ratio of the whole population was balance at the level of 107 males per 100 females. However, the sex ratios were relatively high among populations in age groups of 50-64. In contrast, the sex ratios were lowest in age group 30-34 and 40-49 (79-95 males per 100 females). The variations of sex ratios across age groups could have been biased, due to age and sex specific migration rates. The data suggested that females in age groups of 40-49 are more likely than male counterparts to migrate in Asaro. By contrast, there were more males of age group 35-39 than females of this age group being recorded in the system. Further analysis of the migration flows and reasons for migration could provide insights into this observation on the population pyramid of Asaro (Figure 3-2).

It is noted that population of working age, 15-64, accounts for 62.3% of the population in Asaro. The total dependency was 37.7%, including 32.5% of child dependency and 5.2% of elderly

dependency. The population is very young as reflected in the Population Ageing Index of 16% only[11]. The population pyramid of Asaro show shorter bars of the population aged 0-4 at the bottom of the population pyramid, reflecting the declined fertility in the last 4 years. This observation has been captured in Asaro iHDSS site in the last two years. That might require further investigation to better understand the phenomenon.

Hides

Table 3-4 Population distribution by sex and age groups, Hides, iHDSS, 2015

Age group	Male		Female		Total		Sex Ratio
	n	%	n	%	n	%	M:F
0-4	605	10.2	586	10.1	1191	10.1	103:100
5-9	763	12.8	768	13.2	1531	13.0	99:100
10-14	689	11.6	625	10.7	1314	11.2	110:100
15-19	658	11.1	582	10.0	1240	10.5	132:100
20-24	511	8.6	526	9.0	1037	8.8	97:100
25-29	497	8.4	513	8.8	1010	8.6	97:100
30-34	588	9.9	662	11.4	1250	10.6	89:100
35-39	461	7.8	445	7.6	906	7.7	104:100
40-44	443	7.5	446	7.7	889	7.6	99:100
45-49	261	4.4	208	3.6	469	4.0	125:100
50-54	193	3.2	178	3.1	371	3.2	108:100
55-59	113	1.9	82	1.4	195	1.7	138:100
60-64	64	1.1	90	1.5	154	1.3	71:100
65-69	41	0.7	45	0.8	86	0.7	91:100
70+	53	0.9	62	1.1	115	1.0	85:100
Total	5,940	100	5,818	100	11,758	100	102:100

Age group	Male		Female		Total		Sex Ratio
	n	%	n	%	n	%	M:F
0-14	2,057	34.6	1,979	34.0	4,036	34.3	104:100
15-64	3,789	63.8	3,732	64.1	7,521	64.0	102:100
65+	94	1.6	107	1.8	201	1.7	88:100
Total	5,940	100	5,818	100	11,758	100	102:100

[11] PAI is measured by the ratio between proportion of the elderly aged 65+ and proportion of the children aged 0-14. Some countries calculate proportion of population aged 60+.

Table 3-4 shows the population data of Hides. The Hides iHDSS recorded 11,758 people in the last update. Sex ratio of the entire population is of 102 males per 100 females. The sex ratios tend to increase in higher age groups i.e. age groups 55+. However, the population size of this age group is relative small that do not allow for further analysis of age-specific mortality rate to identify the underlying cause for this observation. It is obvious that small number of population aged 65 and above suggest higher mortality rate for both sexes among this age group.

By contrast, sex ratios are relatively low in younger age groups of 20-34. This could be biased due age and sex specific migration rates among these population groups. However, more in-depth analysis presented in the following chapter on migration will provide better understanding of this observation.

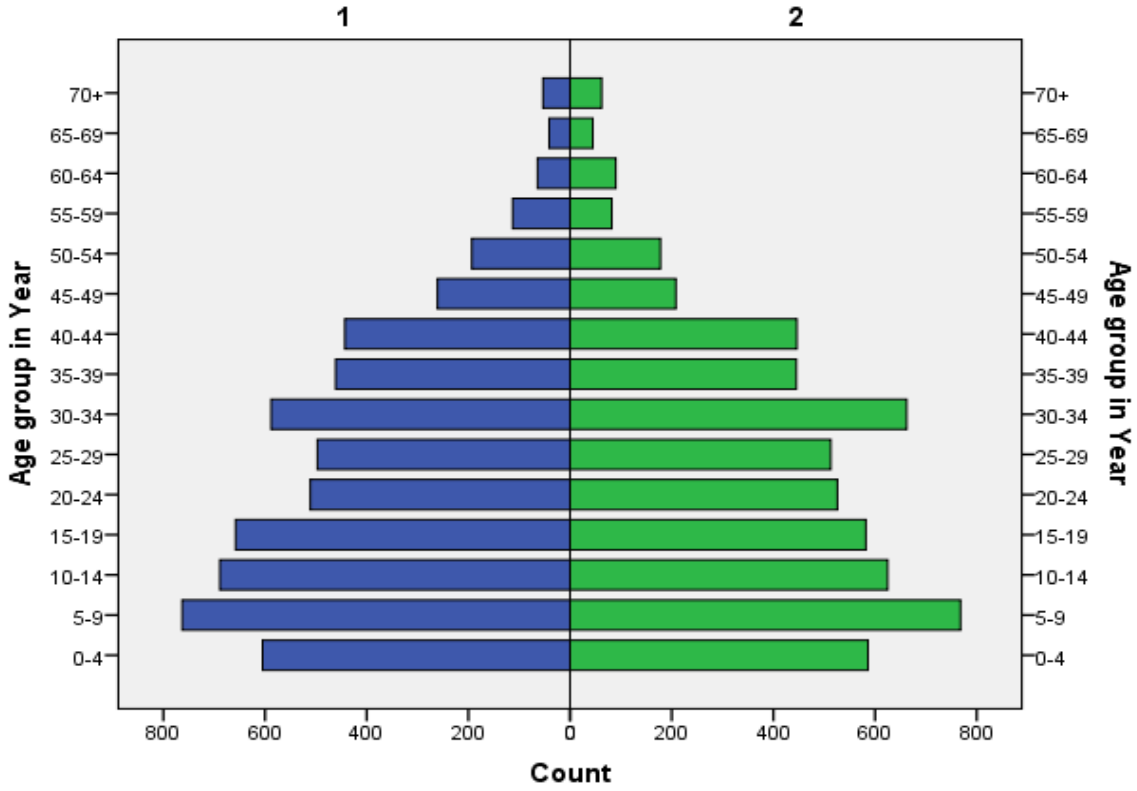


Figure 3-3 Population pyramid of Hides, iHDSS, 2015 (1: Male, 2: Female)

The population pyramid of Hides is distorted as shown in Figure 3-3, probably due to the migration flows as reflected in larger populations of working age, particularly 30-34. However,

this hypothesis cannot explain the larger population of age group 30-34. This observation could be due to the selection of study population/site and/or the age specific in-migration rate could be playing a role. The shorter bar of population aged 0-4 is a result from the declined fertility in Hides in the last few years.

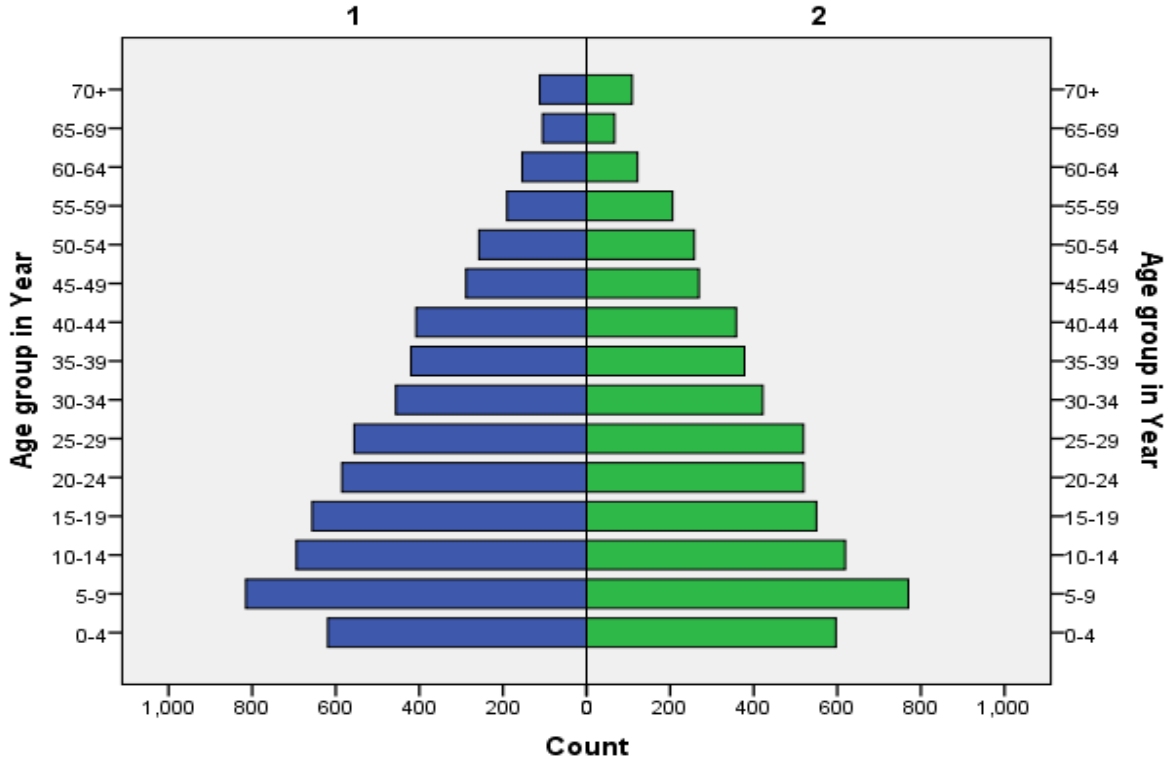
Hiri

Table 3-5 Population distribution by sex and age groups, Hiri, iHDSS, 2015

Age group	Male		Female		Total		Sex Ratio
	n	%	n	%	n	%	M:F
0-4	619	9.8	597	10.4	1216	10.1	103:100
5-9	815	12.9	770	13.4	1585	13.1	106:100
10-14	694	11.0	619	10.7	1313	10.9	112:100
15-19	656	10.4	550	9.5	1206	10.0	119:100
20-24	585	9.3	520	9.0	1105	9.1	113:100
25-29	556	8.8	519	9.0	1075	8.9	107:100
30-34	456	7.2	422	7.3	878	7.3	108:100
35-39	420	6.7	378	6.6	798	6.6	111:100
40-44	408	6.5	358	6.2	766	6.3	114:100
45-49	288	4.6	269	4.7	557	4.6	107:100
50-54	257	4.1	258	4.5	515	4.3	100:100
55-59	190	3.0	206	3.6	396	3.3	92:100
60-64	154	2.4	122	2.1	276	2.3	126:100
65-69	105	1.7	67	1.2	172	1.4	157:100
70+	112	1.8	109	1.9	221	1.8	103:100
Total	6315	100	5764	100	12079	100.0	110:100

	Male		Female		Total		Sex Ratio
Age group	n	%	n	%	n	%	M:F
0-14	2,128	33.7	1,986	34.5	4,114	34.1	107:100
15-64	3,970	62.9	3,602	62.5	7,572	62.7	110:100
65+	217	3.4	176	3.1	393	3.3	124:100
Total	6,315	100	5,764	100	12,079	100	109:100

Table 3-5 shows the data on population distribution by age and sex in Hiri. A total population of 12,476 was recorded in the Hiri iHDSS by March 2015. Child dependency[12] was 34.1% and elderly dependency[13] was only 3.3%. Total dependency therefore, was only 37.4% of the population. Total dependency ratio[14] was 59.9%, meaning that there are approximately 60 dependants per every 100 working population. With such a low total dependency ratio, the Hiri has resourceful and potential labour force for socio-economic development in coming years[15].



[12] Child dependency ratio is measured by the proportion of child population aged 0-14 per 100 population of working age.
[13] Elderly dependency is measured by the proportion of the population aged 65+ or more per 100 population of working age.
[14] Total dependency ratio is measured by the ratio between the total dependency and proportion of population of working age 15-64
[15] A population is conventionally considered as 'demographic dividends' if the total dependency of that population is equivalent or less than 50% of the population. In other words, there is only one dependant (or less) per each person of working age.

Figure 3-4 Population pyramid of Hiri, iHDSS, 2015 (1: Male, 2: Female)

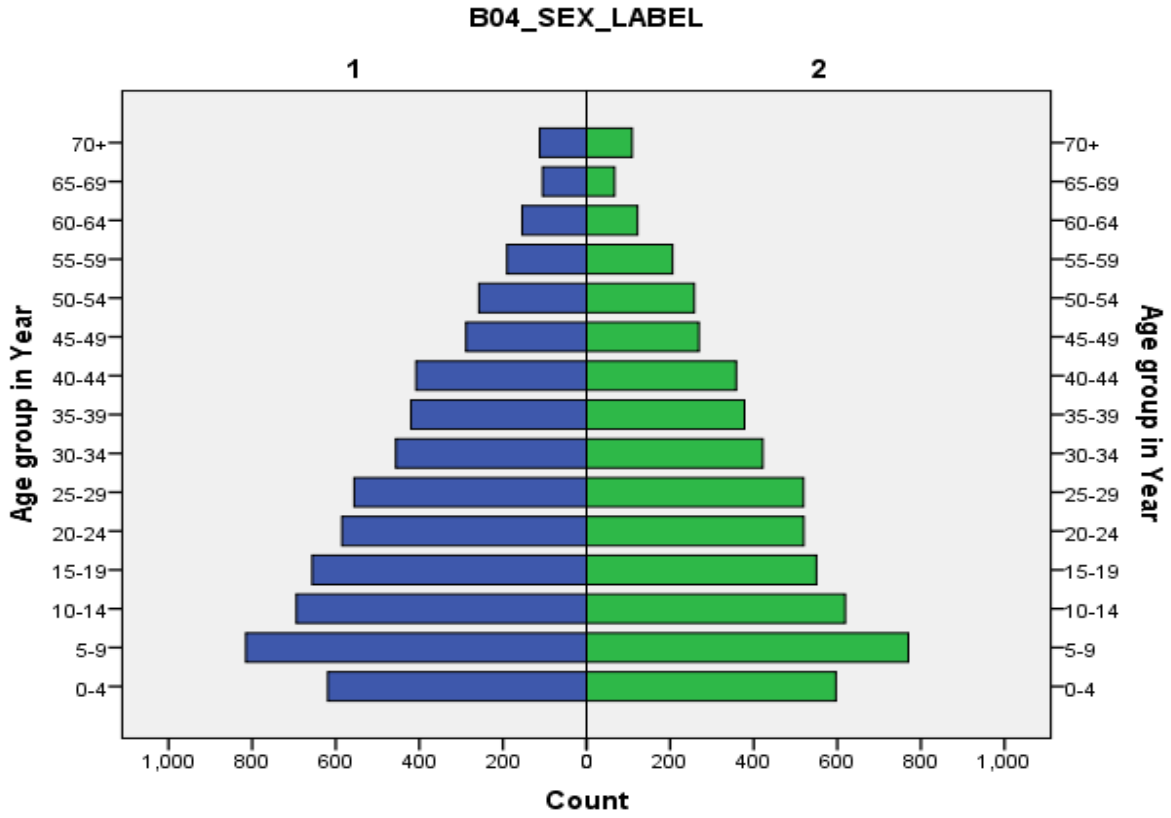


Figure 3-4 is the population pyramid of Hiri. Hiri has a typical population pyramid of a young population. The base bar is consistent with the observation of 'baby boom' among children under 4 of age. Unlike the September 2014 Report, in which the population in age group 20-24 were relatively larger than other age groups, reflecting a larger in-migration flow of this young population into Hiri associated with PNG LNG economic activities in Hiri, this update provided a normal proportion of 20-24-age-group population, suggesting the in-migration flow into Hiri is no longer impact on the population structure of Hiri.

Karkar

Table 3-6 shows the population distribution in Karkar. A total of 18,441 people recorded in the iHDSS in Karkar over the reporting period. The age structure of Karkar population is typical for a young population with the larger proportions of younger age groups and smaller proportions of higher age groups i.e. the proportion of population was highest at age group of 5-9 (14.4%) and declined gradually to 1% for the age group 65-69.

Sex ratio of the entire population of Karkar is moderately high, 112 males per 100 females, i.e. it was 110/100 for children age 0-14, but increased to 114/100 for population of working age 15-64. However, the sex ratio of the elderly population age 65+ was only 101/100. It suggests a flow of female out-migration in Karkar. Further study on sex ratio of the population could provide more insights into this observation.

The population of working age accounted for 62.3%, with a total dependency of 37.7% and the total dependency ratio was only 60.6%, meaning that there are only 61 dependents for every 100 people of working age. This implies great potential of the labour force in Karkar.

Table 3-6 Population distribution by sex and age groups, Karkar, iHDSS, 2015

Age group	Male		Female		Total		Sex Ratio
	n	%	n	%	n	%	M:F
0-4	639	6.6	597	6.9	1236	6.7	107:100
5-9	1400	14.4	1262	14.5	2662	14.4	111:100
10-14	1268	13.0	1144	13.2	2412	13.1	111:100
15-19	1122	11.5	1028	11.8	2150	11.7	109:100
20-24	1014	10.4	849	9.8	1863	10.1	119:100
25-29	781	8.0	664	7.6	1445	7.8	118:100
30-34	738	7.6	654	7.5	1392	7.5	113:100
35-39	602	6.2	518	6.0	1120	6.1	116:100
40-44	516	5.3	463	5.3	979	5.3	111:100
45-49	429	4.4	402	4.6	831	4.5	107:100
50-54	400	4.1	375	4.3	775	4.2	107:100
55-59	290	3.0	239	2.7	529	2.9	121:100
60-64	223	2.3	177	2.0	400	2.2	126:100
65-69	135	1.4	115	1.3	250	1.4	117:100
70+	191	2.0	208	2.4	399	2.2	92:100
Total	9,748	100	8695	100	18,443	100	112:100

Age group	Male		Female		Total		Sex Ratio
	n	%	n	%	n	%	M:F
0-14	3,307	33.9	3,003	34.5	6,310	34.2	110:100
15-64	6,115	62.7	5,369	61.7	11,484	62.3	114:100
65+	326	3.3	323	3.7	649	3.5	101:100
Total	9,748	100	8,695	100	18,443	100	112:100

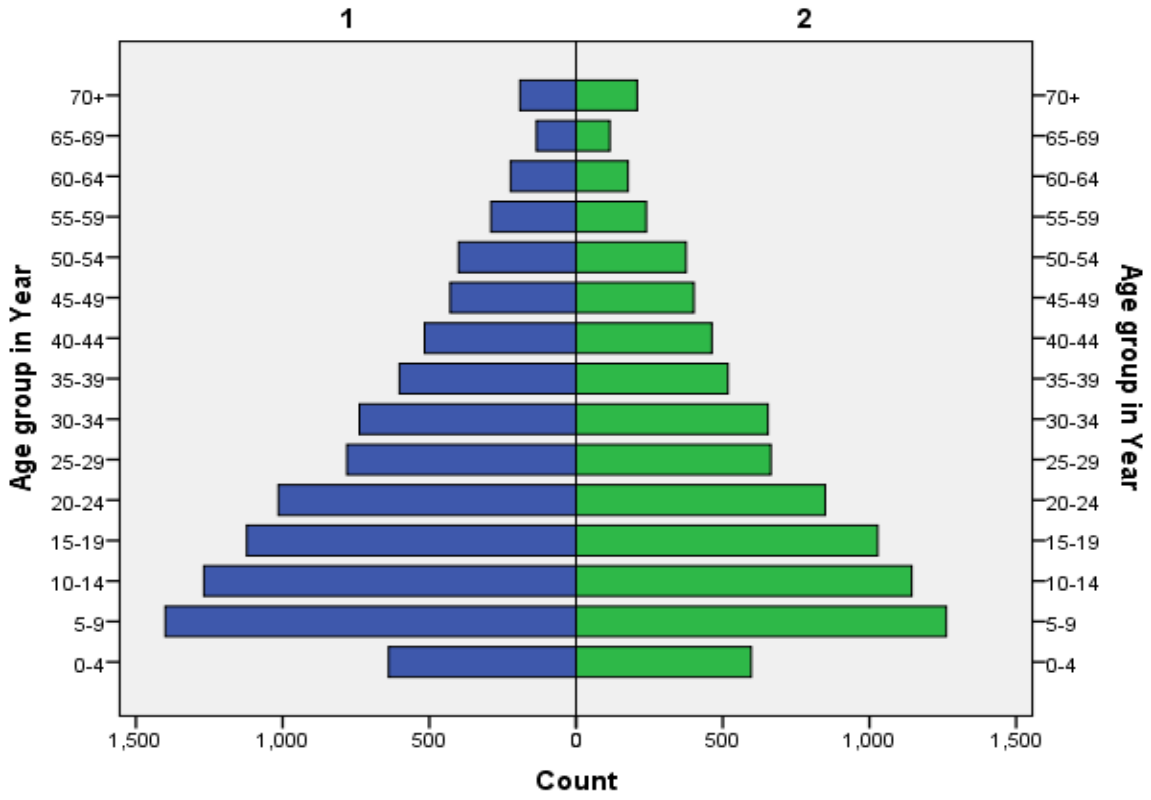


Figure 3-5 Population pyramid of Karkar, iHDSS, 2015 (1: Male, 2: Female)

Figure 3-5 is the population pyramid of Karkar, which is a typical for a young population and similar to that for the entire population of the four iHDSS sites. However, it is markedly shorter bar of the children in age group 0-4, reflecting a sharp decline in fertility in the Karkar recently.

4. CHAPTER 4 MIGRATION AND HOUSEHOLD DISTRIBUTION

Abstract

Using GPS data from the iHDSS, population distribution and migration, both into and out of the iHDSS sites: Hides, Karkar and Asaro were analysed. Hiri migration data has been reported in a separate report. It was therefore not included in this Chapter.

Similar to the finding from the migration data of Hiri, other iHDSS sites, including Asaro, Karkar and Hides experienced out-migration flows larger than in-migration as shown in Net Gross Migration Rates across these sites. Possible drivers of these new out-migration trend is unknown, but they are likely associated with the recent demobilization of the PNG LNG Project activities in both Hiri and Hides as the construction phase has been finished by the end of 2014.

Interestingly, both Asaro and Karkar also reported larger migration flows out of the sites than in-migration. Migrants were most likely in working age, 15-64. There was no clear difference in sex of migrants. But the most common reasons for both in and out migrations were 'Marriage/ family affairs'. 'Work/employment was often referred to as the reason for both groups of in and out migrants, but it appeared not the strongest driver pushing people to migrate out or pulling people to migrate into the iHDSS sites.

Further monitoring of the migration trend is needed to confirm the initial observation.

Migration rates

Table 4-1 shows the population migration rates of iHDSS, including in and out of the iHDSS sites. It is noted that the INDEPTH's definition of migration was used in this type of analysis. According to that an individual is considered as a migrant if he/she moves across the boundary of an iHDSS site. It means mobility of the population within an iHDSS site is not defined as migration.

Table 4-1 Migration Rates by site, iHDSS, 2015

		Asaro	Karkar	Hides
	Population size	9953	18623	13253
In-migration	Number of In-migrants	81	4	153
	Crude In Migration Rate (%)	0.81	0.02	1.15
Out-migration	Number of Out-migrants	151	136	159
	Crude Out Migration Rate (%)	1.52	0.73	1.2
Gross Migration	Total of In and Out Migrants	232	140	312
(In-Migration + Out-Migration)	Crude Gross Migration Rate (%)	2.33	0.75	2.35
Net Migration	Net number of Migrants	-70	-132	-6
(In-Migration – Out-Migration)	Crude Net Migration Rate (%)	-0.70	-0.71	-0.05

Note: Hiri migration data was analysed and submitted in a separate report in 2014

The results of migration data analyses showed three iHDSS sites had considerable low rates of migration as shown in the Crude Gross Migration Rates i.e. 2.33% in Asaro, 0.75% in Karkar and 2.35% in Hides. Importantly, the out-migration rates were relatively higher than the in-migration rates in all three iHDSS sites, resulted in the Crude Net Migration Rates at -0.7% in Asaro, -0.71% in Karkar and -0.05% in Hides, meaning that the out-migration flows were relatively larger than the in-migration ones in the three iHDSS sites in the reporting period.

Further analysis of in-migration by iHDSS site is presented in the following section.

In-Migration

Table 4-2 Distribution of In-migrants by age and sex, iHDSS site, 2015

Age of in-migrants	iHDSS site								
	Asaro			Karkar			Hides		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	9	9	18	1	0	1	14	12	26
15-64	19	29	48	0	1	1	25	46	71
65+	8	4	12	0	0	0	4	6	10
Total	36	42	78	1	1	2	43	64	107

Table 4-2 shows the distribution of in-migrants by age and sex in three iHDSS sites: Asaro, Karkar and Hides over the reporting period. Hides iHDSS recorded 107 people migrated into the site. The majority of in-migrants into Hides were of working age 15-64 (71) and female migrants were outnumbered of male counterparts, 46 compared to 25. Similarly, Asaro iHDSS recorded 78 in-migrants, of which 48 people were of working age 15-64 and 29 were females. Karkar iHDSS reported only one person migrating into the site in the reporting period.

Table 4-3 Reasons for In-migration by sex of in-migrants and iHDSS site, 2015

Reasons for in-migration	iHDSS sites								
	Asaro			Karkar			Hides		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Work/employment	0	0	0	1	1	2	3	1	4
Education/training	1	3	4	0	0	0	2	3	5
Marriage/family affairs	9	21	30	0	1	1	14	30	44
Health/medical	0	0	0	0	0	0	1	0	1
Security/conflict	6	3	9	0	0	0	13	15	28
Return to original place	21	16	38	1	0	1	22	27	49
Others	37	43	81	0	0	0	4	4	8
Total	74	86	162	2	2	4	59	80	139

Table 4-3 showed the reasons for migration into the iHDSS sites: Asaro, Karkar and Hides over the reporting period. For Asaro, 'other reasons' accounted for the majority of the responses. It was followed by 'return to original place' and 'marriage/family affairs' reasons. It is noted that no one responded 'Job/employment' as reason for migrating into Asaro. Similar patterns of responses was also found among people who migrated into Hides over the reporting period with the majority moved to Hides as 'returning to original place' and 'Marriage/family affairs'. Only four responses were 'Job/employment' as reason for migration into Hides in the reporting period. Only four responses to the question of reason for migration into Karkar iHDSS site were recorded over the reporting period.

Table 4-4 Intention of stay of in-migrants by sex and iHDSS site, 2015

Intention of stay in year	iHDSS site					
	Asaro			Hides		
	Male	Female	Total	Male	Female	Total
1 year	0	0	0	5	9	14
2 years	0	0	0	1	4	5
3 years	0	0	0	1	3	4
4 years	0	0	0	0	2	2
5 years+	0	1	1	2	2	4
DK	18	24	42	7	7	14
Total	18	25	43	16	27	43

Table 4-4 shows the responses to the question of how long was the intention of stay among the people who migrated into the iHDSS sites. About one thirds of the responses (14 out of 43) of migrants into Hides were intention of stay for one year. Five responses were for 2 years, fours were for three years, two for four years and four for 5 years and above. Fourteen responses were 'Don't know'. It was noted that most of all responses of migrants into Asaro (42/43) were 'Don't know' and there was no response being recorded in Karkar iHDSS site.

Out-Migration

Table 4-5 Distribution of Out-migrants by age and sex and iHDSS site, 2015

Age of out-migrants	iHDSS site								
	Asaro			Karkar			Hides		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
0-14	2	9	11	4	5	9	13	9	22
15-64	46	55	101	36	41	77	35	26	61
65+	6	5	11	7	2	9	14	9	23
Total	54	69	123	47	48	95	62	44	106

Table 4-5 shows the distribution of out-migrants by age and sex across three iHDSS sites over the last reporting period. A total of 123 people migrated out of Asaro, of which the majority (101) was of working age, 15-64, males and females were quite balance, 46 and 55, respectively.

At the same time, 95 people migrated out of Karkar, of which 77 were of working age, including 36 males and 41 females. A number of 106 out-migrants were recorded in Hides over the reporting period, of which 61 out-migrants were of working age, including 35 males and 26 females.

Table 4-6 Reasons for Out-migrant by sex and iHDSS site, 2015

Reason for out-migration	iHDSS site								
	Asaro			Karkar			Hides		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Work/employment	13	8	21	11	4	15	7	3	10
Education/training	0	4	4	3	1	4	2	1	3
Marriage/family	16	31	47	14	29	43	10	11	21
Health/medical	0	1	1	0	1	1	4	3	7
Security/conflict	5	10	15	1	0	1	9	7	16
Return to original place	16	17	33	22	15	37	40	30	70
Others	2	2	4	2	5	7	6	5	11
DK	4	3	7	3	5	8	3	1	4
Total	65	86	151	71	64	135	84	70	154

Table 4-6 shows the reasons for people to migrate out of iHDSS sites over the reporting period. While the main reason for migrants to move out of Asaro and Karkar was 'marriage/ family affairs', and more females than males reported this reason. A half of people left Hides for the reason of 'home return', of whom, there were 40 males compared to 30 females. It is noted that 16 people reported 'security/safety' as the reason for them to move out of Hides. 'Work/ employment' appeared a strong factor pushing people to migrate out of the sites since 21 people in Asaro, 15 people in Karkar and 10 people in Hides reported this motivation.

Table 4-7 Duration of stay of migrants before migrating out of iHDSS site, 2015

Duration of stay	iHDSS site								
	Asaro			Karkar			Hides		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1 year	1	1	2	4	1	5	8	6	14
2 years	0	0	0	2	0	2	4	1	5
3 years	0	0	0	0	2	2	0	0	0
4 years	0	0	0	0	0	0	2	0	2
5 years	1	2	3	0	0	0	0	0	0
6 years	0	0	0	0	1	1	0	0	0
7 years	0	1	1	3	3	6	0	0	0
8 years	0	0	0	0	0	0	0	0	0
9 years	0	1	1	0	0	0	0	0	0
10 years	0	0	0	0	0	0	1	1	2
DK	20	24	44	4	1	5	15	6	21
Total	22	29	51	13	8	21	30	14	44

Table 4-7 shows the duration of time that people had stayed in the iHDSS site before they migrated out of the site over the reporting period. There were quite few people responded to this question in all three sites and many reported as 'Don't know'. 14 out-migrants reported staying for 1 year and 5 reported staying for 2 years in Hides before they migrated out of this site.

Household distribution of Hiri

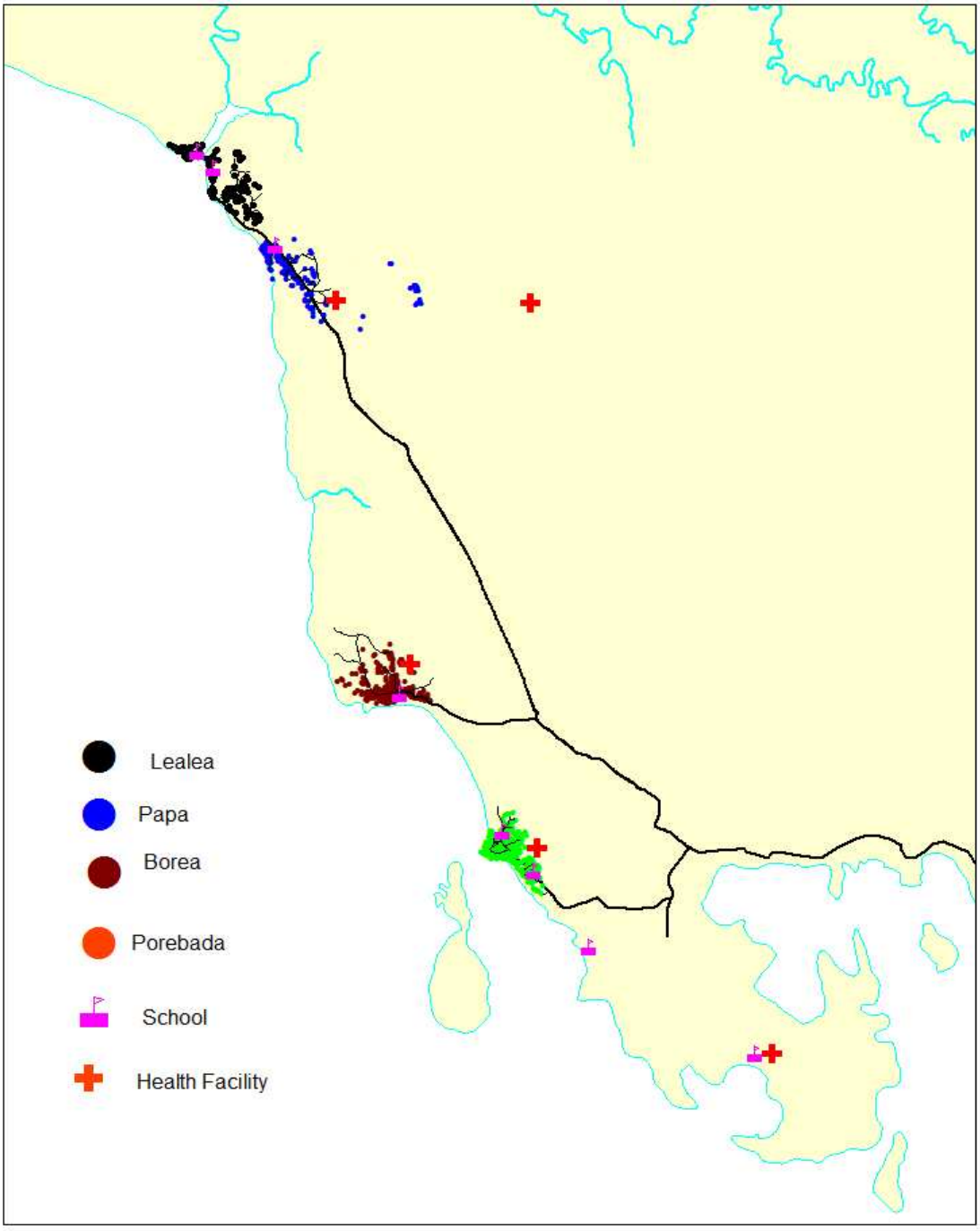


Figure 4-1 Household distribution of Hiri iHDSS site, 2015

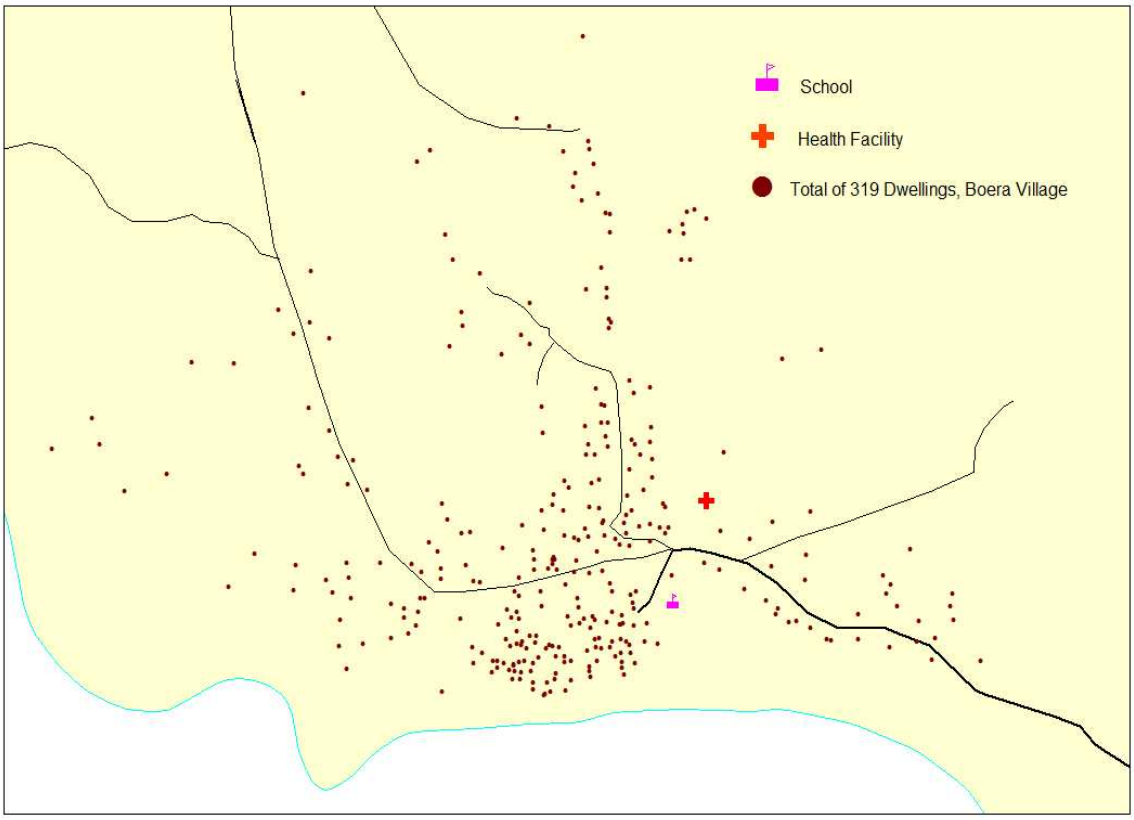


Figure 4-2 Household Distribution of Boera village, Hiri iHDSS, 2015

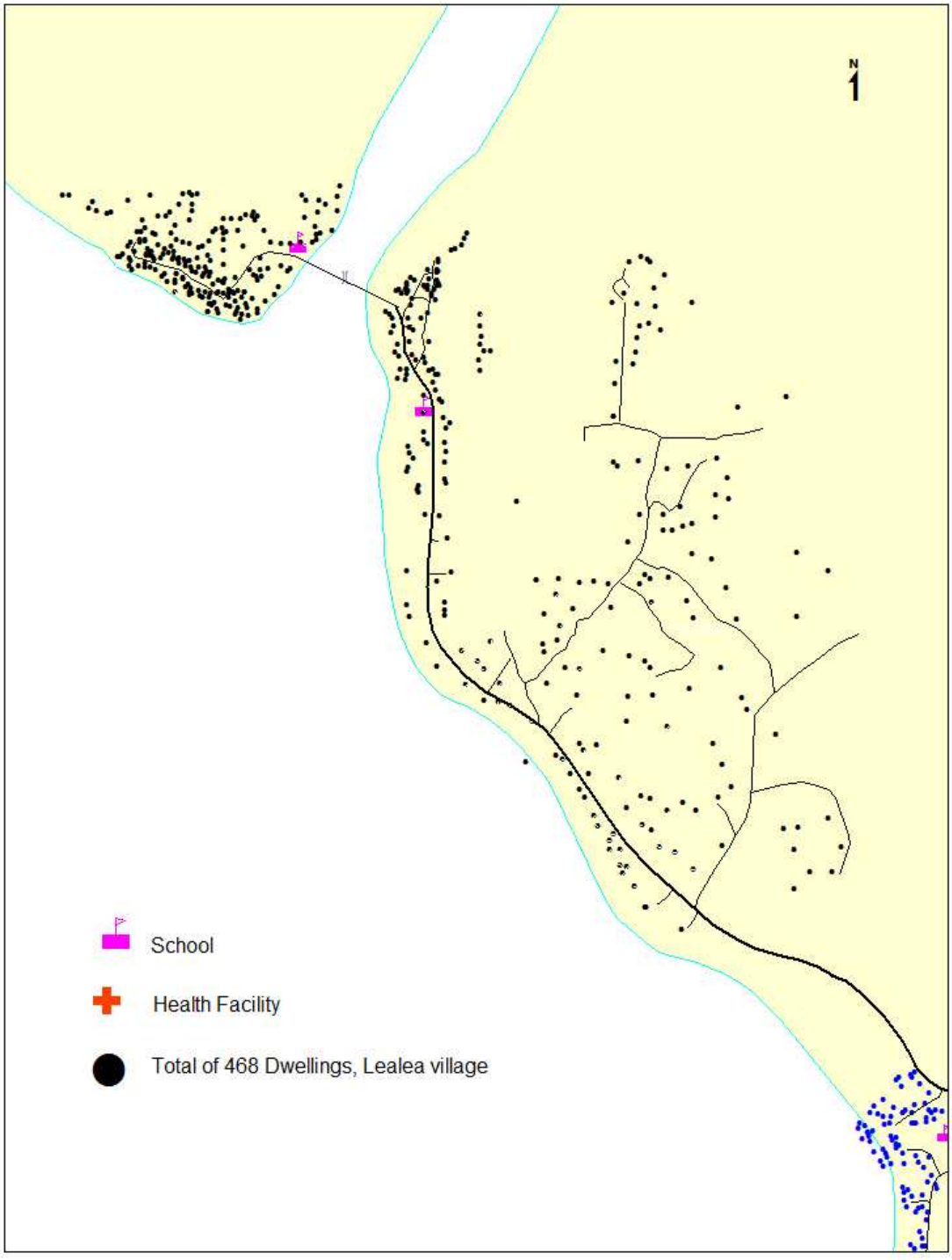


Figure 4-3 Household distribution of Lealea village, Hiri iHDSS, 2015

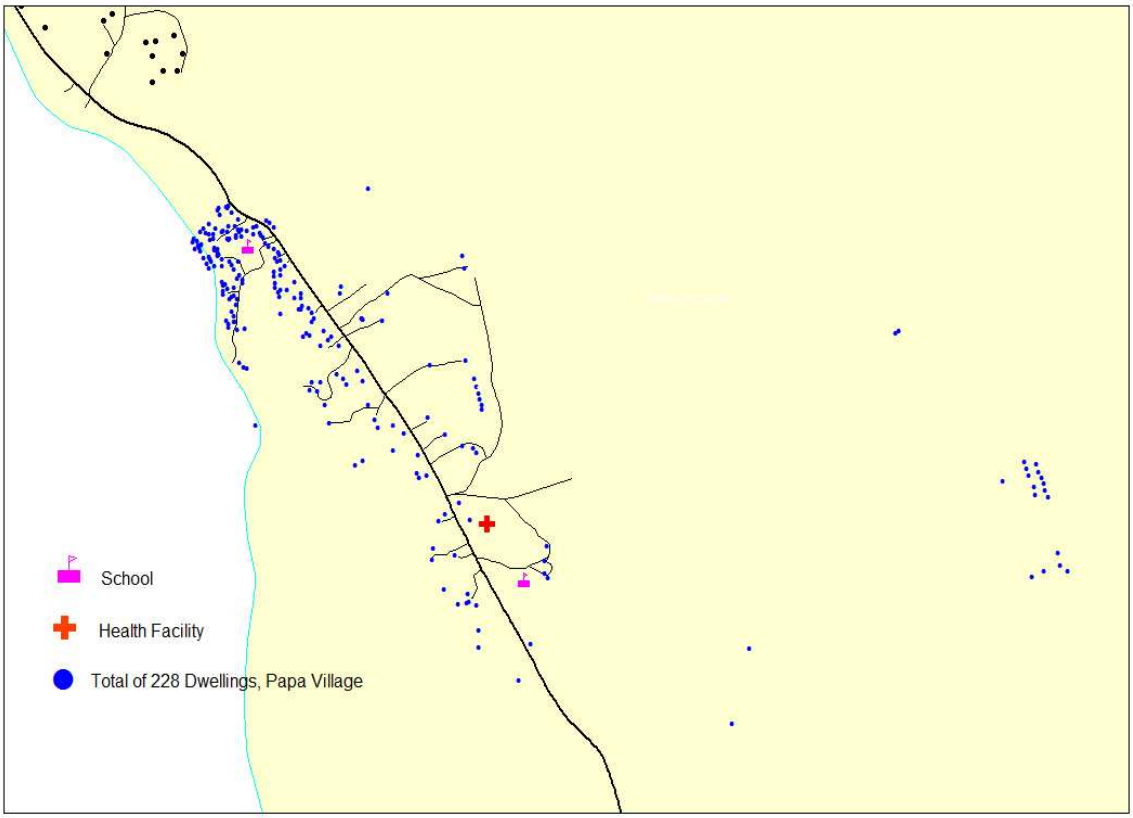


Figure 4-4 Household distribution of Papa village, Hiri iHDSS, 2015

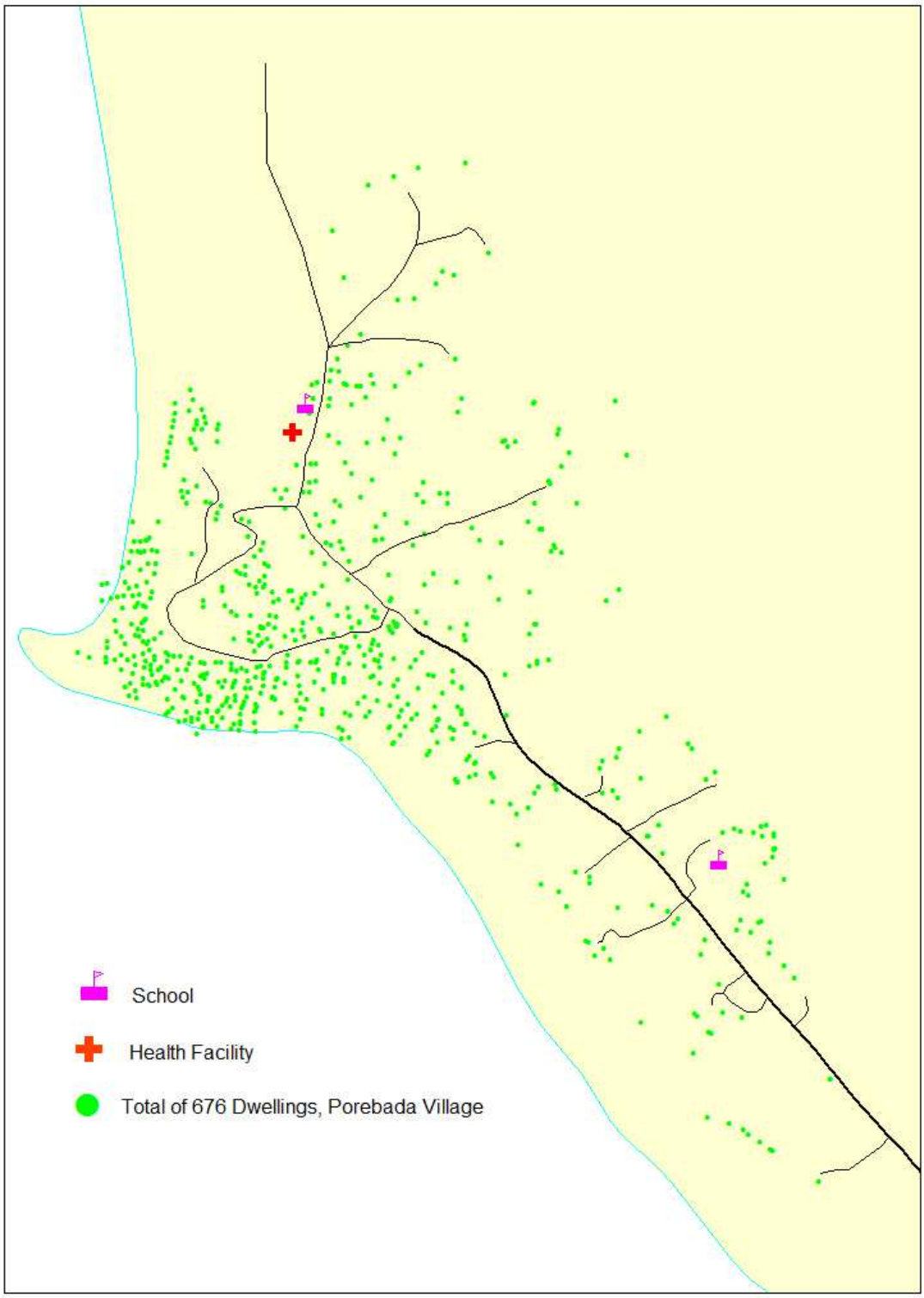


Figure 4-5 Household distribution of Porebada village, Hiri iHDSS, 2015

Household distribution of Asaro

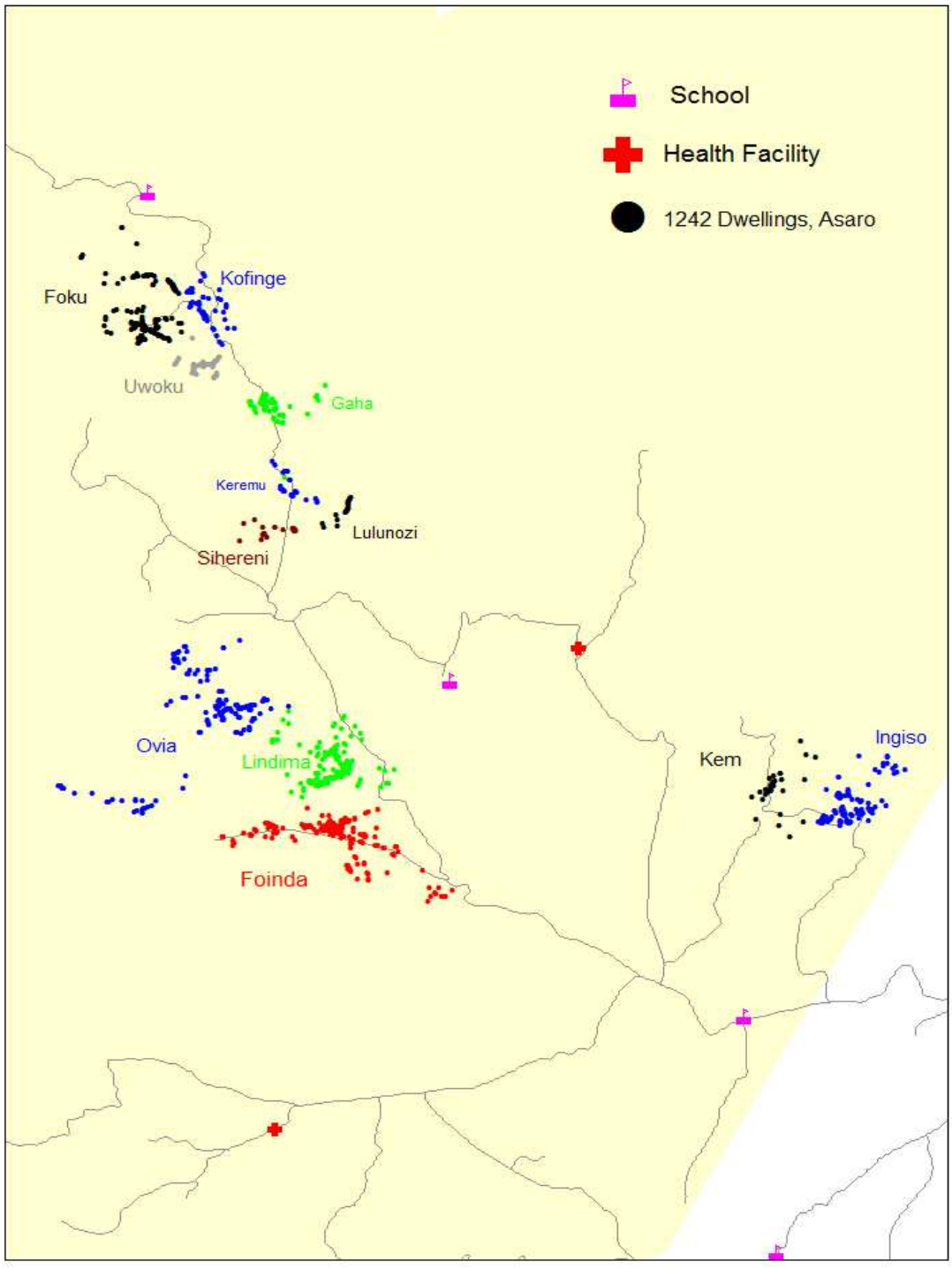


Figure 4-6 Household distribution of Asaro site, iHDSS, 2015

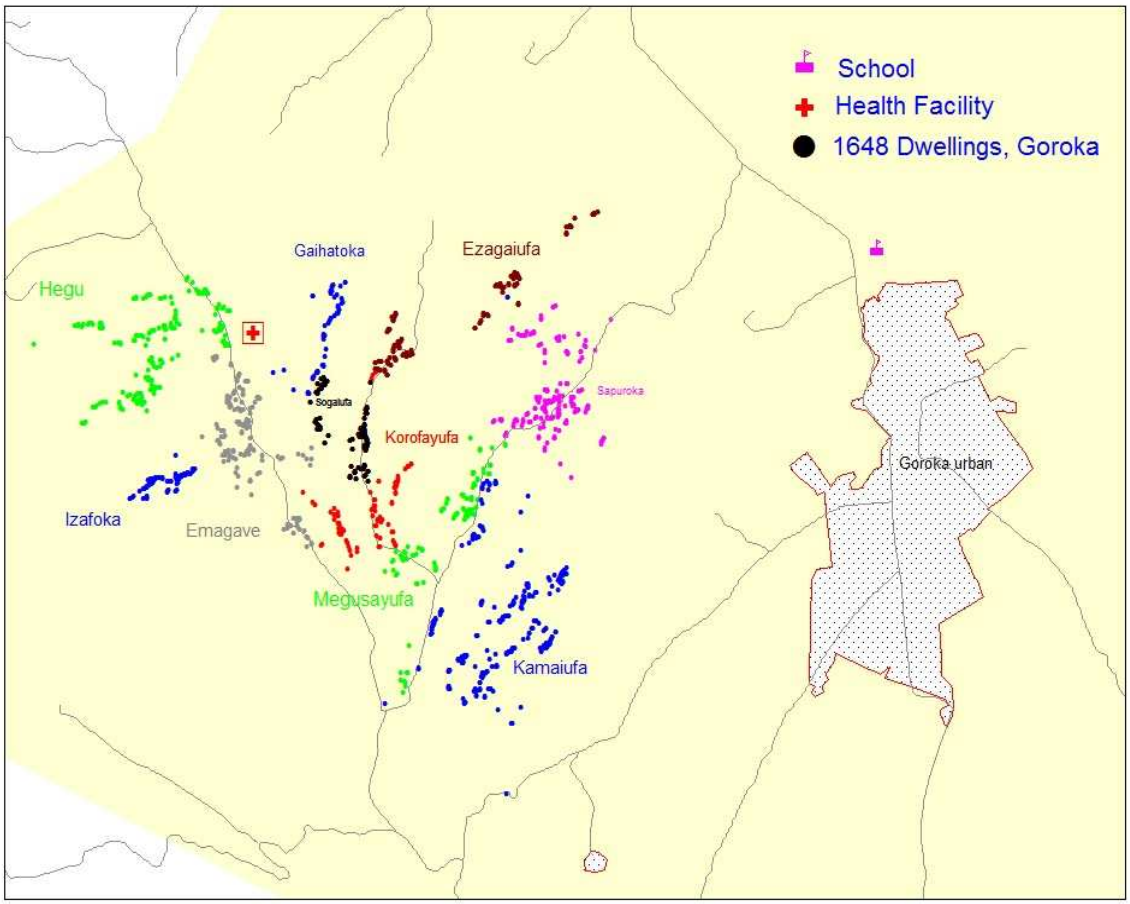


Figure 4-7 Household Distribution of Goroka, iHDSS, 2015

Household distribution of Hides

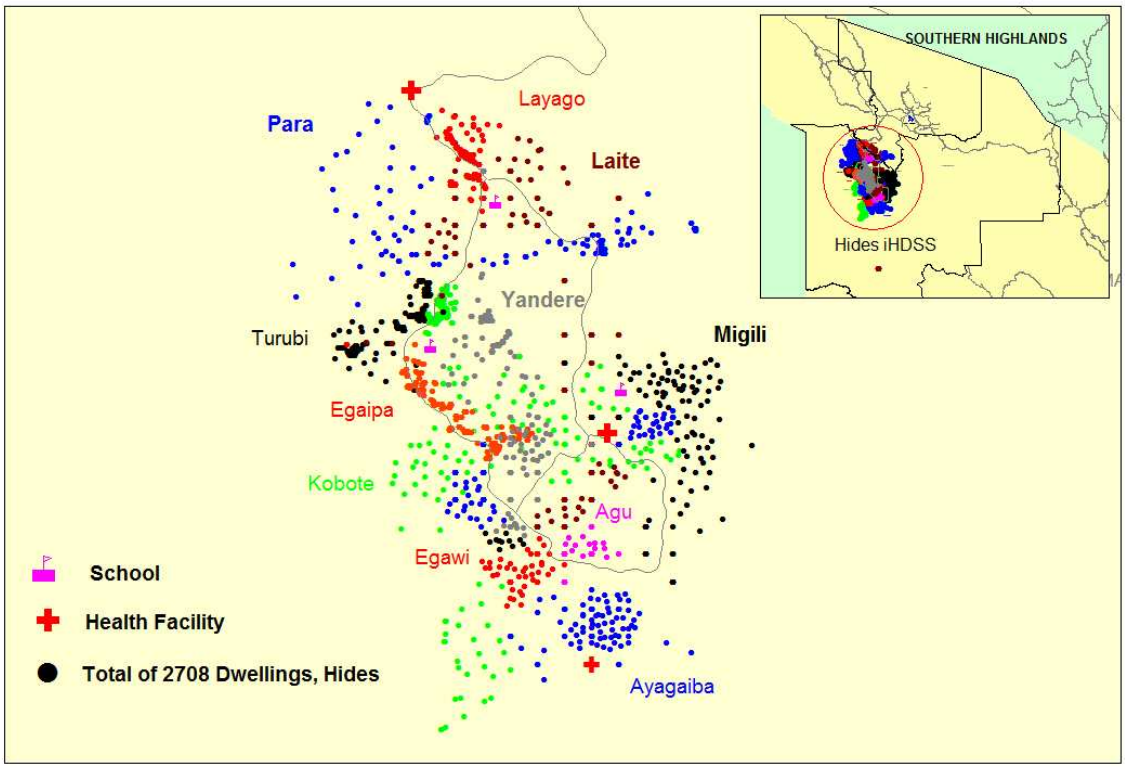


Figure 4-8 Household Distribution of Hides, iHDSS, 2015

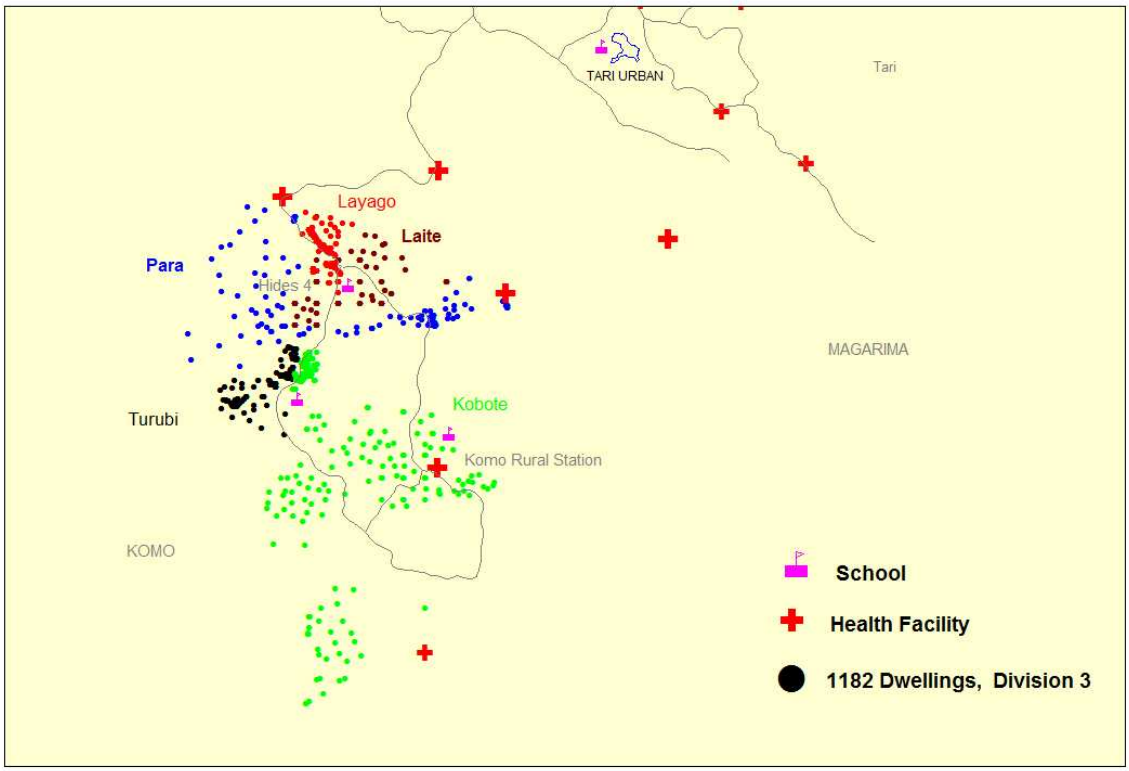


Figure 4-9 Household Distribution, Division 3 of Hides iHDSS, 2015

Household distribution of Karkar

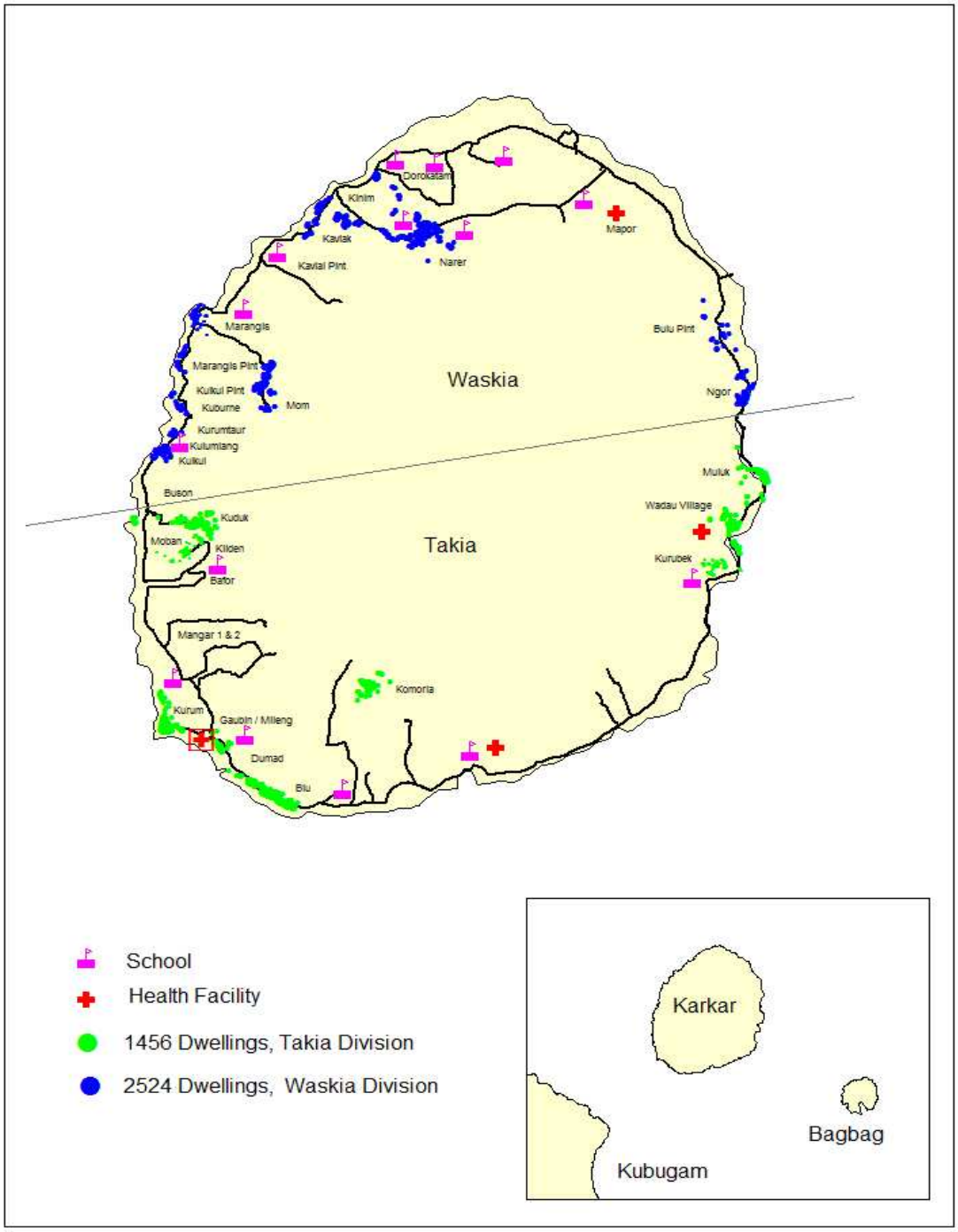


Figure 4-10 Household Distribution of Karkar island, Karkar iHDSS, 2015

5. CHAPTER 5 BIRTH AND DEATH RATES

Abstract

The birth and date rates remain a public health concern in Papua New Guinea. This Chapter presents birth and death data collected by the iHDSS in four sites.

From our findings regarding birth rates, Asaro recorded a Crude Birth Rate of 11.5 per thousand population, Hides recorded a crude birth rate of 17.7 per thousand population. Hiri recorded a Crude Birth Rate of 20.3 per thousand and Karkar recorded a Crude Birth Rate of only 8.2 per thousand in 2014.

The findings about death rate showed that Asaro had Crude Death Rate of 3.2 per 1000 population, Hides had 2.4 per 1000, Hiri had 0.9 per 1000, and Karkar had 2.5 per 1000 population in 2014.

The importance of this study is that it provides essential information about the birth and death rate records in the 4 iHDSS sites of PNG. Thus, having this information available can assist the PNG National Health of Department and other stake holders take measures in addressing the current situation in the country.

According to the National Health Plan 2011-2010, PNG had a high Crude Birth Rate, 32 per 1000 population, compared to Fiji, 21 per 1000 population in 2006. Looking at the death rates, the neonatal, infant and child mortality rates remain high in the country as reported also in the PNG National Health Plan, despite efforts made to address these issues.

Birth and death Certificates

Table 5-2 shows the number of children under 5 years of age and their birth certificate status recorded in the 4 iHDSS sites (Asaro, Hides, Hiri, Karkar) over the reporting period. Among 207 children under 5 recorded in the system, Hiri had 13 birth certificates among 87 children, accounted for 14.94%. Asaro recorded 2 children having birth certificates among 31 children, accounted for 6.45. Karkar recorded 5 out of 15 children having birth certificates, 33.33%.

Interestingly, Hides recorded 36 children with birth certificates among 74 children under 5, accounted for 48.65%. It is clearly that Hides had the significantly higher proportion of children under 5 years of age reported having birth certificates than other three sites despite it is known as having lower socio-economic development status than other sites. It was followed by Karkar and Asaro has the lowest proportion of children under 5 having birth certificates.

Table 5-1 Birth certificate among children U5 by site, iHDSS 2015

	iHDSS Site				
	Hiri	Asaro	Karkar	Hides	Total
Number of children U5 records	87	31	15	74	207
Having birth certificate	13	2	5	36	56
%	14.94	6.45	33.33	48.65	27.05

Table 5-2 show the death certificate status among people who died in 2014 and recorded in the iHDSS. Hiri recorded 2 death certificates among 11 deaths, accounted for 18.18%, Asaro recorded 1 among 32 death records (3.13%), Karkar recorded 4 out of 46 deaths (8.7%) and Hides recorded 3 among 32 deaths (9.38%).

Table 5-2 Death certificates among deaths in 2014 by site, iHDSS 2015

	iHDSS site				
	Hiri	Asaro	Karkar	Hides	Total
Number of death records in 2014	11	32	46	32	121
Having death certificate	2	1	4	3	10
%	18.18	3.13	8.70	9.38	8.26

Although, the registration of births and deaths are important, the findings illustrates that this legal rights of the people are not widely in practice in the four iHDSS sites. People in the iHDSS sites should increase their practise of birth and death registration with the relevant government bodies because it will help them in one way or another.

Birth and death rates

Table 5-3 Crude Birth Rate, Crude Death Rate and Net Natural Population Growth Rate by site, iHDSS, 2015

	iHDSS Site				
	Hiri	Asaro	Karkar	Hides	Total
Population	12510	9953	18623	13253	54339
Birth records	254	114	153	234	755
Crude birth rate (per 1000 population)	20.3	11.5	8.2	17.7	13.9
Death records	11	32	46	32	121
Crude death rate (per 1000 population)	0.9	3.2	2.5	2.4	2.2
Net natural population growth rate (per 1000 population)	19.4	8.2	5.7	15.2	11.7

Table 5-3 demonstrates the Crude Birth Rate, Crude Death Rate and the Net Natural Population Growth Rate in study sites in 2014 as recorded in the iHDSS over the reporting period. Hiri had the highest Crude Birth Rate, 20.3 per 1000 population, but the lowest Crude Death Rate, 0.9 per 1000 and as a result of this, it had the highest Net Population Growth Rate at 19.4 per 1000.

By contrast, Karkar had lowest Crude Birth Rate, 8.2 per 1000 while the Crude Death Rate was relatively high, 2.5 per 1000. Consequently, Karkar had the lowest Net Natural Population Growth Rate, at only the level of 5.7 per 1000. Among the four iHDSS sites, Karkar recorded the lowest Crude Birth Rate and Natural Population Growth Rate.

For Hides the Crude Birth Rate was recorded at 17.7‰ and the Crude Death Rate was recorded at 2.4‰, while the Net Natural Population growth rate was 15.2‰. Looking at the four iHDSS sites, Hides recorded the second highest Crude Birth Rate, Crude Death Rate and Natural Population Growth Rate.

For Hiri, the data demonstrates the Crude Birth Rate at 20.3‰, and the Crude Death Rate was recorded at 0.9‰, while the Net Natural Population growth rate was 19.4‰. Among the four iHDSS sites, Hiri recorded the highest Crude Birth Rate, Crude Death Rate and Natural Population Growth Rate.

For all four iHDSS sites, the Net Natural Population Growth Rate was 11.7 per 1000 population.

Age-specific fertility rate

Table 5-4 showed the Age-specific fertility rate (ASFR[16] per thousand women) by iHDSS site in 2014. For all four site, the highest ASFR, 52.2% fall into the women age group of 25-29. However, the ASFR varied across the four sites. Hiri is likely to have highest ASFR at women age groups of 20-24 and 25-29, 90.4 and 94.4, respectively. By contrast, Karkar had relatively low ASFR in these age groups, only 16.5 and 28.6.

Table 5-4 Age-specific fertility rate (per 1000 women) by iHDSS site, 2015

Age group	Hiri	Asaro	Karkar	Hides	Total
15-19	32.7	4.3	4.9	3.4	10.3
20-24	90.4	45.8	16.5	28.5	41.0
25-29	94.4	45.5	28.6	44.8	52.2
30-34	61.6	42.6	16.8	33.2	35.6
35-39	60.8	23.0	11.6	40.4	33.1
40-44	08.4	2.8	2.2	42.6	14.8
45-49	3.7	4.4	0.0	14.4	4.5

Age of father at giving birth

Table 5-5 illustrates the age of fathers at the time when their babies were born in iHDSS sites, which were recorded in the system over the reporting period[17]. The modes of father age varied across the sites i.e. Asaro the mode was found between the ages of 35-39 (n=17), while the second mode was recorded between the ages of 25-29 (n=13).

For Hides the mode of father age was found between the ages of 30-34 (n=28) and the second highest reproductive age group was recorded in 40-49 (n=20). Interestingly, the finding in this study showed that the recent age group of women giving birth in Hides was 30-34, while the recent age group of men having babies was also 30-34. Both women and men in Hides iHDSS

[16] Age-specific fertility rate is measured by the proportion of number of live births per 1,000 women in a particular age group e.g. 20-24 in a given year.
[17] The current data don't allow us to calculate father and mother age at first birth

have the same age of mother and father who had given birth to babies during that period of reporting.

Table 5-5 Age of father when having a newborn in 2014 by iHDSS, 2015

Age Group of Father	Hiri		Asaro		Karkar		Hides		Total	
	N	%	N	%	N	%	N	%	N	%
15-19	1	0.73	0	0.00	0	0.00	1	1.03	2	0.59
20-24	28	20.44	6	10.71	8	15.69	3	3.09	45	13.20
25-29	42	30.66	13	23.21	9	17.65	8	8.25	72	21.11
30-34	27	19.71	12	21.43	8	15.69	28	28.87	75	21.99
35-39	17	12.41	17	30.36	15	29.41	14	14.43	63	18.48
40-44	19	13.87	3	5.36	7	13.73	17	17.53	46	13.49
45-49	2	1.46	3	5.36	2	3.92	20	20.62	27	7.92
50+	1	0.73	2	3.57	2	3.92	6	6.19	11	3.23
Total	**137**	**100**	**56**	**100**	**51**	**100**	**97**	**100**	341	**100**

For Hiri, the age of father at giving birth, the highest reproductive age group was found between the ages of 25-29 (n=42). While the second highest reproductive age group was recorded in 20-24 (n=28). It is important to mention most people in Hiri iHDSS during that time were giving birth to babies between 20-29 years of age.

The highest reproductive age group of father in Karkar was found between the ages of 35-39 (n=15). While the second highest reproductive age group was recorded in 25-29 (n=9).

Child mortalities

Table 5-6 illustrates Child mortalities, including Children under-5 mortality, Infant mortality and Neonatal mortality in iHDSS sites over the reporting period. For Children U5, the death rate was 151 per 1000 live births. For the Infant mortality rate was 61 per 1000 live births. And for the Neonatal mortality, the death rate was 54 per 1000 live births.

The data analysis revealed that Asaro site had the highest rates of child mortalities, with Children U5 mortality rate at 473 per 1000 live bith and Infant mortality rate at 210.53 per thousand live births and Neonatal death rate was of 201.75 per 1000 live births in 2014. By contrast, death data

of Hiri showed considerable low levels i.e. Children under-5 mortality ratio at 35.43 per 1000 live births, IMR at 15.75 per 1000 live births, and Neonatal mortality at 15.75 per 1000 live births in 2014.

It is noted that the Child mortalities were reported for the first time by the iHDSS. Since the scope of child mortality data was small, it requires cautious to interpret these findings.

Table 5-6 Child mortality rates by iHDSS sites, 2015

	Hiri	Asaro	Karkar	Hides	Total
Total number of live births	254	114	153	234	755
Total deaths U5	9	54	17	34	114
Children U5 mortality rate (per 1000 live births)	35.43	473.68	111.11	145.30	150.99
Total infant deaths	4	24	7	11	46
Infant mortality rate (per 1000 live births)	15.75	210.53	45.75	47.01	60.93
Total neonatal deaths	4	23	7	7	41
Neonatal mortality rate (per 1000 live births)	15.75	201.75	45.75	29.91	54.30

6. CHAPTER 6: MORBIDITY

Abstract

At each iHDSS site clinics are staffed by nurses who record visits by patients and collect data on the diagnoses given by the medical staff. All major clinics in the study areas are included.

Results presented here should be interpreted with a degree of caution. That is because some clinics have faced significant challenges in collecting and compiling data. Furthermore, in many cases it may be that patients may bypass health clinics and sub-health clinics and go directly to hospitals.

Key findings from the preliminary data indicate that high levels of respiratory cases presenting at local clinics. Skin diseases and diarrhoea also contribute heavily to the clinical case loads at most sites. These results were consistent with previous observations from the data of iHDSS.

Asaro

The 2015 March Report further reported an incompleteness of morbidity data from health facilities in Asaro iHDSS. This paragraph presents preliminary morbidity data collected from three clinics, namely *Asaro*, *Tafeto* and *Kwongi* health centres. Unfortunately, data for *Uritoka* clinic was not included in this reporting period due to the closure of the health facility by the end of 2014. The total number of visitors to Asaro and Tafeto sub-health centre increased drastically for this reporting period than that reported in the previous period, suggesting an increased demand for healthcare and a potentially over-burdened service in the reporting period.

As shown in Table 6-1, Asaro clinic recorded high levels of respiratory, skin and diarrhoeal diseases in its health facilities and it remained the main reason for health centre visitations. Records of cases visiting Asaro health facilities due to non-communicable diseases are relatively low or none, which reflects low morbidity rate of these (NCD) illnesses in the site. Morbidity data collection is ongoing with further emphasizes on good record keeping by research nurses.

Unlike other health facilities, however, Tafeto sub-health centre recorded an increase number of caseloads in the reporting period compared to the other health centres in the site. This clinic also diagnosed high numbers of suspected measles in the July 2014 period. This has triggered massive measles immunization coverage (4,038) for communities around Tafeto sub-health centre as noted in the table above. Tafeto health centre is run by the Catholic Church and does not provide family planning services, but limited sexual health consultations. As a result, none or low caseload of FP and STI was recorded in this clinic. This is due to under recorded, and does not reflect the high prevalence of STI in the site. Tafeto health centre further recorded an increase number of antenatal visits during the reporting period. The high record is due to the antenatal awareness/campaign conducted by nurses in the surrounding villages.

Table 6-1 Cases load and health services, Asaro iHDSS, July – Dec 2014 and Jan - Mar 2015

	Asaro	Kwongi	Tafeto	Total
Case Load	1,982	978	3,608	6,568
Antenatal Visits	444	462	2,156	3,062
Family Planning	518	94	NA	612
Immunisation	883	652	4,038	5,573

Table 6-2 shows the percentage of various diseases recorded in three health centres in Asaro site in the reporting period. The data showed that the morbidity profile presented at the three Sub-Health Centres has reported high rates of skin infections, respiratory diseases and diarrhoeal diseases, but lower rates sexually transmitted infections (STI) and malaria. Interesting, Asaro and Tafeto sub-health centres have no records of Tuberculosis (TB) during the reporting period. The possible explanation could be due to the nurses not filling the tallies in the study forms or misdiagnosis of the presenting disease. As expected, the morbidity cases for “other infections” were relatively high as it included other common diseases on the survey form. Asaro and Tafeto health centres recorded the highest number of cases, than Kwongi health centre because these two facilities can be easily access by the patients as they are located close to the main national highway while Kwongi health centre is located further inland. Skin infections and Respiratory diseases continues to have high rates in the last reporting period and this reporting period, therefore measures needs to be taken to reduce the incidence of these diseases.

Table 6-2 Morbidity records in Health Centres in Asaro, July-Dec 2014 and Jan-Mar 2015

	Asaro		Kwongi		Tafeto		Total	
	Number	%	Number	%	Number	%	Number	%
TB	0	0	20	1.47	0	0	20	0.24
STIs	0	0	28	2.06	16	0.37	44	0.53
Skin infections	350	13.73	103	7.56	44	1.02	497	6.04
Respiratory diseases	294	11.53	117	8.59	201	4.65	612	7.43
Antenatal care	444	17.42	462	33.92	2,156	49.9	3,062	37.2
Suspected Measles	2	0.08	8	0.59	44	1.02	54	0.66
Diarrhoea	160	6.28	72	5.29	230	5.32	462	5.61
Malaria	68	2.67	25	1.84	3	0.07	96	1.67
Other infections	1,231	48.29	527	38.69	1,627	37.65	3,385	41.12
Total	2,549	100%	1,362	100%	4,321	100%	8,232	100%

Hides

Table 6-3 showed the caseload recorded in Para Clinic in the Hides iHDSS catchment area. Unfortunately, there is no mention of data for Mananda health centre because the facility is located in Division One of Komo Urban LLG, which is one of the divisions excluded from Hides iHDSS study site in early 2015 so that the mobile team could not have access to Mananda clinic for collecting the data. Para clinic is the only operating facility in the Hides iHDSS study area. Para clinic recorded 741 cases which is lower than the figure reported in the last reporting period. The rapid PNG LNG demobilization in Hides, forcing people to migrate to their place of origin could be a major contributor to such rapid decline.

Table 6-3: Case load recorded at health clinics in Hides iHDSS, Nov-Dec 2014

	Para	Mananda	Total
Case load	741	5,593	6,334
Antenatal and FP	140	747	887
Immunisation	105	2,468	2,573

It was also noticed that there were no records of measles immunization. This showed that there was no measles outbreak as predicted in the previous report. The other reason may be due to the high level of measles vaccination coverage as reported in the previous PiHP report. There were a total of 140 Antenatal and family planning services records in the clinic. This showed that more mothers went to the clinics to seek health services of all kind, thus putting more strain on the lone nurse and the facility.

Table 6-4 shows the morbidity records in Para clinic. Respiratory diseases dominated the morbidity tallies in Hides clinics in the previous report, followed by diarrhoea and skin disease. However, this trend had changed, with diarrhoea taking over, followed by respiratory and skin infection with percentage ranging from 21.76%, 15% and 13.35 respectively as shown in Table 6-4. The increase numbers of diarrhoeal diseases were related to unhygienic practices and usage of unsafe drinking water. A significant portion of the morbidity record was for accident and injuries with 9.51%; signifying as one of the leading causes of hospital visitations during the reporting period.

Table 6-4 Morbidity records in Health Centres, Hides iHDSS, Nov-Dec 2014

Morbidity	Para Clinic		Mananda H/C		Total	
	N	%	N	%	N	%
STIs	12	2.19	124	2.15	136	2.16
Skin infections	73	13.35	296	5.14	369	5.85
Respiratory diseases	82	15	1289	22.39	1371	21.75
Accident and Injuries	52	9.51	133	2.31	185	2.94
Antenatal care	92	16.82	747	12.98	839	13.31
Diarrhoea	119	21.76	491	8.53	610	9.68
Malaria (clinical)	5	0.91	51	0.89	56	0.89
Other infections	112	20.48	2625	45.60	2737	43.42
Total	547	100.00	5756	100.00	6303	100.00

Hiri

Table 6-5 Case load at health clinics, Hiri iHDSS, Nov – Dec 2014 and Jan – Mar 2015

	Papa	Boera	Total
Case load	4,315	918	5,233
Antenatal visits	415	0	415
Family Planning	93	74	167
Immunisation	748	0	748

Table 6-5 shows the number of caseload recorded in two health centres: Papa and Boera in Hiri iHDSS site in 2015. Unfortunately, data from Porebada health centre was not recorded in this report because the clinic staff refused to provide data. It is noticeable that Papa clinic has relatively high number of case load recorded compared to that of Boera clinic. This is because the health worker in Boera clinic was on leave on the month of October and November, thus reporting data for December 2014 and January 2015 only. In addition, Papa clinic has high number of Antenatal visits and Immunisation recorded while Boera clinic has no data recorded because the health worker was on leave and no Antenatal and Immunisation was conducted for the tallied months. Reference to reports of Boera on antenatal visits and immunisations for the mothers and children, both are vital thus require at least a health worker to attend to them when the colleague responsible is on leave.

Table 6-6 Morbidity records in Health Centres, Hiri iHDSS, Nov-Dec 2014 and Jan-Mar 2015

	Papa		Boera		Total	
	N	%	N	%	N	%
TB	7	0.41	0	0	7	0.34
STIs	16	0.93	2	0.61	18	0.88
Skin infections	261	15.16	45	13.62	306	14.91
Respiratory diseases	249	14.46	9	2.73	258	12.57
Antenatal care	415	24.1	NA	NA	415	20.22
Diarrhoea	302	17.54	73	22.12	375	18.27
Malaria	9	0.52	135	40.91	144	7.02
Other infections	427	24.80	56	16.97	483	23.54
Accidents and Injuries	36	2.10	10	3.03	46	2.24
Total	1,722	100%	330	100%	2,052	100%

Table 6-6 shows the number and proportion of diseases recorded in Papa Health Centre and Boera Health centre in Hiri in the reporting period July-Dec 2014 and Jan-March 2015. As per

the table, highest proportions of morbidity were reported to other infections, diarrhoea, skin and respiratory infections, ranging from 12 to 24% of the tallies reported in these clinics. Morbidity data from previous reporting period is high compared to current may be due to reasons as highlighted, staff on leave.

Contradictory to the high mortality data on TB, STI and Malaria as reported in previous reports, these diseases were recorded at very low level, suggesting low presentation of patients seeking for treatment of these diseases at the two clinics.

There are a number of potential explanations for these observations. For example, patients may prefer seeking health care at secondary and tertiary healthcare facilities such as POM general hospital. Secondly, there is likely that the communities lack the knowledge of such diseases like TB, STI and Malaria so that they do not recognise early symptoms of such health problems to seek for consultations at the primary health centres. Lastly, in the absence of appropriate diagnostic tests, physicians maybe more inclined to diagnose certain conditions. This is not only true in the clinic but also in the process of assigning probably causes of death to verbal autopsy results. Symptoms associated with malaria, for example, could be due to other infections. Malaria as a cause of death may be over assigned by physicians while reviewing death data. Verbal autopsies are therefore, needed to be carefully considered in on-going work to indentify cause of death properly.

To support for morbidity data collection, the PiHP also funds for establishment and operation of a laboratory based in POM city, near by the National University of PNG since 2013. As part of capacity building for the lab, several trainings on TB have been organised for the lab staff:

Table 6-7 Trainings for POM Lab, Hiri iHDSS, 2015

Staff	Training Institute	Training course	Duration/Year
Beverlyne Warigi	TB Culture& DST	QMRL Brisbane	6 weeks, 2014
Beverlyne Warigi	TB Microscopy	CPHL Port Moresby	1 week, 2014
Rosemary Simbil	Dangerous Goods	Air Niugini Training Centre	1 week, 2014

Table 6-8 Number tests conducted at POM Lab by study, Hiri iHDSS, 2015

Study	Type of test	2013		2014		As of March 2015	
		N	%	N	%	N	%
NCD	Lipid Profile	289	26.08	233	13.44	NA	NA
	HbA1c	289	26.08	233	13.44	NA	NA
TB	Ziehl-Neelsen Light Microscopy	367	33.12	653	37.66	20	50.00
	Gene Expert	163	14.71	615	35.47	20	50.00
Total		1108	100	1734	100	40	100

Note: Molecular testing (Chlamydia Trichomonas, Neisseria Gonorrhoea) and Serological Testing (HSV-2, Anti-TP, RPR) are also conducted at the POM Lab

Karkar

Like other iHDSS health facilities, Karkar have faced many challenging situations in collecting, compiling, and reporting the data, and as such, the preliminary results presented here were interpreted with some caution.

Table 6-9 Total number of cases load at health clinics, Karkar iHDSS, Jan – Feb 2015

	Gaubin	Kulubob	Miak	Mapor	Total
Case load	177	380	1,115	569	2,241
Antenatal and FP	34	NA	NA	119	153
Immunisation	NA	NA	NA	NA	NA

Table 6-9 shows morbidity statistics collected from four health facilities in Karkar iHDSS site for the first two months of 2015. The preliminary figures in these tallies showed that most patients who visited the health centres were for respiratory diseases across all health facilities, followed by skin infections and malaria. On the other end, there were no records of immunization in all the facilities in Hiri. One of the reasons was that the Officers in charge of the clinics were reluctant to provide data to the research nurses. Another notable reason was because some of the clinical nurses working in those health facilities were still on leave vacation (holidays) and the facility was operated by skeletal staffs, thus not keeping proper records for the services provided. The data collection methods are currently ongoing in line with other sites and a clear picture of the disease load will be reflected in the next report.

Table 6-10 compares morbidity data collected among patients in three health facilities in Karkar for the first two months of 2015. The data reported in this table are preliminary and should be interpreted with some caution. Although it was too early to predict, the data indicated that respiratory diseases (32.97%); skin infections (13.93%) and malaria (11.72%) were the leading burdens of diseases recorded in nearly all the facilities. The trend of respiratory disease and skin infections were similar when compared with cases in other facilities in other iHDSS sites. Malaria was mostly on clinical-based diagnosis, rather than lab-test confirmation. Without confirmation by rapid diagnostic test (RDTs) kits, many of these cases could be misdiagnosed as respiratory or other infections. There were no reports of NCDs in all the facilities in the first two months of 2015. Non-availability of diagnostic equipments to confirm the diagnoses of various diseases were one of the likely reasons for the low record of NCDs. Further data collection and investigation on the caseload could be required to provide further insight into the observation.

Table 6-10 Morbidity records in Health Centres, Karkar iHDSS, Jan-Feb 2015

	Kulubob clinic		Miak clinic		Mapor clinic		Total	
	N	%	N	%	N	%	N	%
TB	0	0	8	0.85	0	0	8	0.46
STIs	4	1.41	6	0.64	0	0	10	0.58
Skin infections	60	21.20	126	13.39	54	10.82	240	13.93
Respiratory diseases	81	28.62	326	34.64	161	32.26	568	32.97
Antenatal care	0	0	NA	0	45	9.02	45	2.61
NCDs	0	0	0	0	0	0	0	0
Diarrhoea	11	3.89	33	3.51	5	1.0	49	2.84
Malaria	25	8.83	88	9.35	89	17.84	202	11.72
Other infections	102	36.04	354	37.62	145	29.06	601	34.88
Total	283	100%	941	100%	499	100%	1, 723	100%

7. CHAPTER 7 CAUSES OF DEATH

Abstract

This chapter presents an updated summary of key findings from the cause of death study, using the Population Health Metrics Research Consortium (PHMRC) Verbal Autopsy instrument to follow up on deaths in the iHDSS sites. Here we present all deaths, reviewed by a physician and ascribed a probable cause of death as a preliminary analysis of the cause-specific mortality trends. Ascribing the probable cause of death can be an iterative process whereby further information can be sought from the interviewee or from hospital records that may be collected retrospectively. The reviews were also undergone regularly by a senior physician. Diagnoses may therefore, change over time.

Findings from this analysis continue to build the evidence for an epidemiological transition from a mortality structure dominated by infectious diseases to one where deaths a largely caused by non-communicable diseases (NCD). This transition is likely to be developing and progressing at different rates across the country. While many of these diseases, such as cardiovascular diseases and diabetes, are indicative of a change in lifestyles, other conditions most likely due to indoor air pollution like chronic obstructive pulmonary diseases and asthma, significantly contribute to this burden in some locations. Of all the sites presented here Hiri is the most developed population in terms of urbanisation and exhibits the highest rates NCDs. This is particularly evident when chronic obstructive pulmonary disease is excluded from the analysis in other sites. This data supports the recommendation for immediate NCD intervention programs across all sites and in Hiri in particular.

Mortality surveillance data from the Hides iHDSS is currently incomplete and interpretation of cause of death results must be conducted with caution. The small numbers of deaths collected thus far, however, reveal emerging mortality patterns dominated by HIV/AIDS and homicide. Further research is recommended to better understand the social determinants in Hides that may be contributing to these deaths.

Background

Most deaths in the Pacific region are not medically certified. Causes of death data are crucial for informing policy debates about priorities to reduce premature mortality and improve population health. In the absence of routine medical certification of deaths, Verbal Autopsies (VAs) are the only proven means of providing reliable data about COD patterns at the population level. Previous reports have described the verbal autopsy instrument and methodology in detail. Here we use the Population Health Metrics Research Consortium (PHMRC) VA instrument to follow up on deaths in iHDSS. VAs is routinely used in Demographic and Health Surveillance Systems around the world such as the International Centre for Diarrheal Disease Research, Matlab site in Bangladesh and the KEMRI/Centre for Disease Control (CDC) site in Kenya.

The aims of the Partnership in Health Project (PiHP) are to compare changes over time in two impact sites where the PNG-LNG project is active (Hides in Hela Province and West Hiri in Central Province) and two comparison sites (Asaro in the Eastern Highlands Province and Karkar an island that is part of Madang Province). The cause of death study aims to provide the following to the PiHP:

- To follow up on every reported death in the iHDSS and where –possible conduct a verbal autopsy interview with a relative of the deceased;
- To assign a probable cause of death to each death using physician review

This Chapter presents total number of deaths as recorded in the iHDSS over the reporting period, as well as the results of preliminary analyses of specific causes of deaths, which were reviewed and verified by qualified and trained physicians taking part in the PiHP. As the numbers of deaths recorded in each year in the study site are relatively small, the presented analyses are longitudinally shown as all years combined.

Methods

Households in the iHDSS are followed up every three months by local reporters. During these visits the reporters record any in or out migrations, pregnancies, births and deaths. Identified deaths are listed and given to the verbal autopsy team. Trained field staff coordinates with reporters to arrange a household visit at a time and location that suits the respondent. The

interviews usually take place soon after the mourning period has come to an end. VA interviews can be emotional. After consent is obtained the respondent is ensured that they can stop the interview at any time and it is their choice to resume it at another time if they wish.

We have employed the Population Health Metrics Research Consortium (PHMRC) VA instrument in this study. Aside from asking questions about the signs and symptoms the deceased experienced prior to death, the standardised questionnaire also collects information on basic demographic and socio-economic covariates as well as some health care utilisation data. VA interviewers also ask to see and copy any information on health records that might be available. All VA forms are checked by independent members of the VA team for accuracy and consistency. Any forms with problems are sent back to the field for correction prior to data entry. VA forms, and where possible any health records included with the form, are then reviewed by a trained physician who ascribes a probable cause of death.

Causes of death were coded according to the International Classification of Disease-10. The VA forms are then entered into an Access database. Data analyses were conducted using SPSS Statistics 20. The VA data collected will also be analysed using computer-based analytical software developed at the Institute of Health Metrics and Evaluation (IHME) in Seattle and results will be compared with those of the physicians.

Results

Table 7-1 Physician reviewed verbal autopsies by site, iHDSS 2015

iHDSS site	Asaro		Hides		Hiri		Karkar		Total
	n	%	n	%	n	%	n	%	n
VA completed	652	43.8%	165	11.1%	305	20.5%	365	24.5%	1,487
COD completed	614	42.7%	162	11.3%	300	20.9%	361	25.1%	1,437

VA Verbal Autopsy
COD Cause of death

Table 7-1 showed that up to date, 1487 verbal autopsies have been conducted on deaths from the four iHDSS sites by March 2015. Of these a total of 1437 (96.6%) have been reviewed by the PiHP physician and have been assigned a probable cause of death.

Table 7-2 Number of deaths collected by year of death and site[18]

	Asaro	Hides	Hiri	Karkar	Total
2009	0	0	13	0	13
2010	57	3	59	49	168
2011	212	5	69	60	346
2012	211	56	69	122	458
2013	132	72	68	98	370
2014	40	29	27	36	132
Total	652	165	305	365	1487

Table 7-2 shows the distribution of deaths analysed by VA for which a year of death is available. The death data were collected by the iHDSS and presented over the last six years. In order to capture all deaths, during the first census at each site reporters asked if any deaths had occurred in the households since the first of January 2010. In most locations the collection of deaths began before the demographic surveillance officially commenced. Indeed, the verbal autopsy project started in Hiri a number of months before the demographic surveillance; hence, verbal autopsies were conducted on deaths beginning in 2009.

Table 7-3 Distribution of deaths by site and age, iHDSS, 2015

	Asaro		Hides		Hiri		Karkar		Total	
Age group	N	%	N	%	N	%	N	%	N	%
Adults 15+	527	80.8	103	62.4	257	84.3	278	76.2	1165	78.3
Children 0-14	68	10.4	58	35.2	30	9.8	47	12.9	203	13.7
Neonates	57	8.8	4	2.4	18	5.9	40	10.9	119	8.0
Total	652	100%	165	100%	305	100%	365	100%	1487	100%

Table 7-3 showed the numbers of deaths that have been reviewed by physician and distributed across age groups in each of the iHDSS sites. On average 78% of deaths collected from each site are adults and about 14% are children and 8% are neonates. The numbers of deaths collected

[18] Slight changes in numbers over analyses may result from on-going data cleaning efforts

from Hides are relatively smaller than that of other sites. However, death data in Hides and Karkar indicates a greater proportion of deaths in neonates and infants (under one year of age).

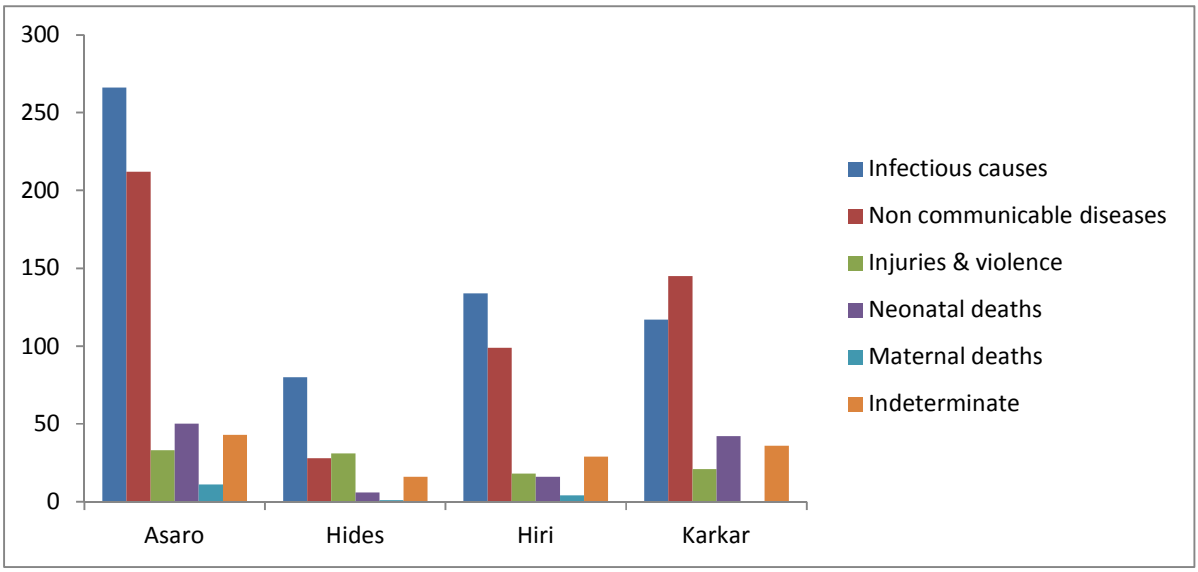


Figure 7-1 Probable cause of death (main groups of diseases) by iHDSS site[19], 2015

Figure 7-1 presents the proportion of deaths by site and the different major groups of diseases: infectious diseases, non-communicable diseases (NCD), injuries and violence, maternal deaths and neonatal deaths. Those deaths for which no cause of death could be assigned are known here as indeterminate. Amongst adults, there were more male deaths in all disease groups except for infectious diseases in Hiri where females and males make up almost equal proportions. Equal numbers of males and females were represented amongst neonatal deaths in Hides and Karkar but in both Hiri and Asaro males made up more than 60% of neonatal deaths.

The overall mortality patterns by site have not changed substantially. Hides iHDSS continues to demonstrate a mortality pattern dominated by infectious diseases which make up almost 50% of deaths in that population. The majority of deaths in Asaro and Hiri are also infectious in nature but non-communicable diseases like cardiovascular diseases and cancers are a very close second. Majority of deaths in Karkar were due to non-communicable diseases making up 40% of the total deaths with no maternal deaths at all. Injuries and violence continue to be the cause of

[19] Neonatal deaths include stillbirths

especially higher number of deaths in Hides, reaching almost 20% of all deaths. The previous report presented leading causes of death by site. In the next section, the analysis mortality is differentiated by adult and child deaths.

Adult leading causes of death

Asaro

Chronic obstructive pulmonary disease (COPD) makes a major contribution to the total number of deaths particularly in Asaro where it was responsible for more than 15% of all adult deaths (Figure 7-2). Almost 40% of cancers in Asaro are thought to be cervical, while 21% are liver. A total of sixteen maternal deaths between the ages of 25-34 which make up 50% were identified in all four sites but the majority of these deaths took place in Asaro (11 out of 16) (data not shown). All forms of tuberculosis have increased dramatically with pulmonary TB leading with more than 50% while external causes covered minority. However, external causes of death play a significant role in mortality trends in both Asaro and Hides. Almost 60% of all external deaths in Asaro are attributed to homicide while homicide and road traffic accidents make up 70% of all external deaths in Hides.

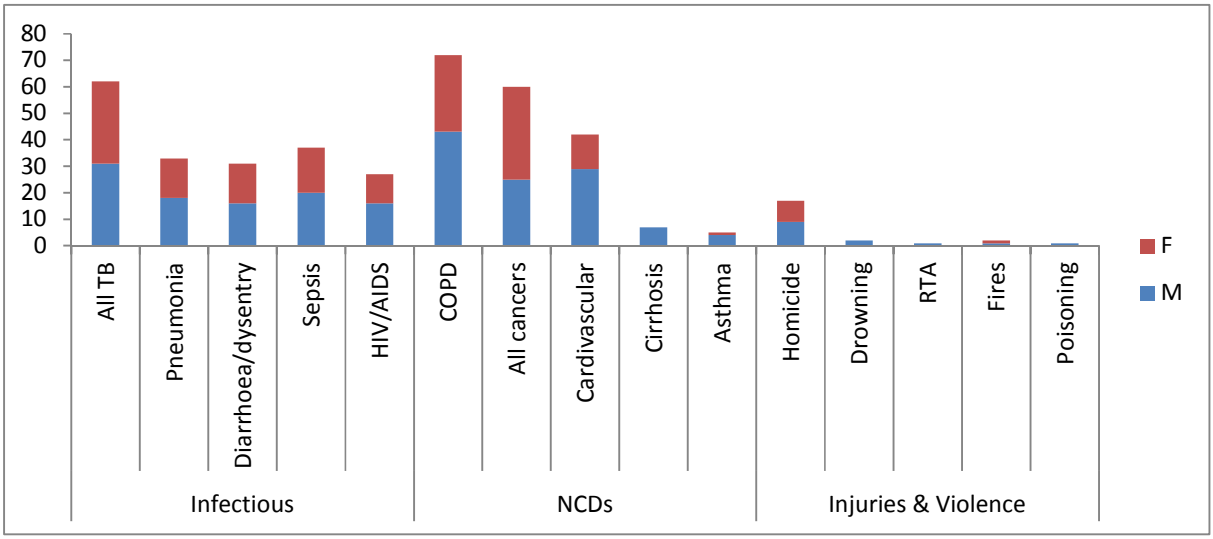


Figure 7-2 Leading causes of adult death in Asaro iHDSS, 2014
COPD: Chronic obstructive pulmonary disease
HIV/AIDS: Human Immunodeficiency Virus/ Acquired Immunodeficiency Disorder Syndrome
NCD: Non-communicable diseases
RTA: Road traffic accidents

Hides

Figure 7-3 shows the leading cause of death among adults in Hides. HIV/AIDS, Homicide and Pneumonia are obviously the leading causes of death. Non-communicable respiratory conditions, i.e. asthma and chronic obstructive pulmonary disease (COPD), together make up 13% of adult deaths. Additionally, homicide is also a major contributor to the death toll (15.4%) amongst adults in this area.

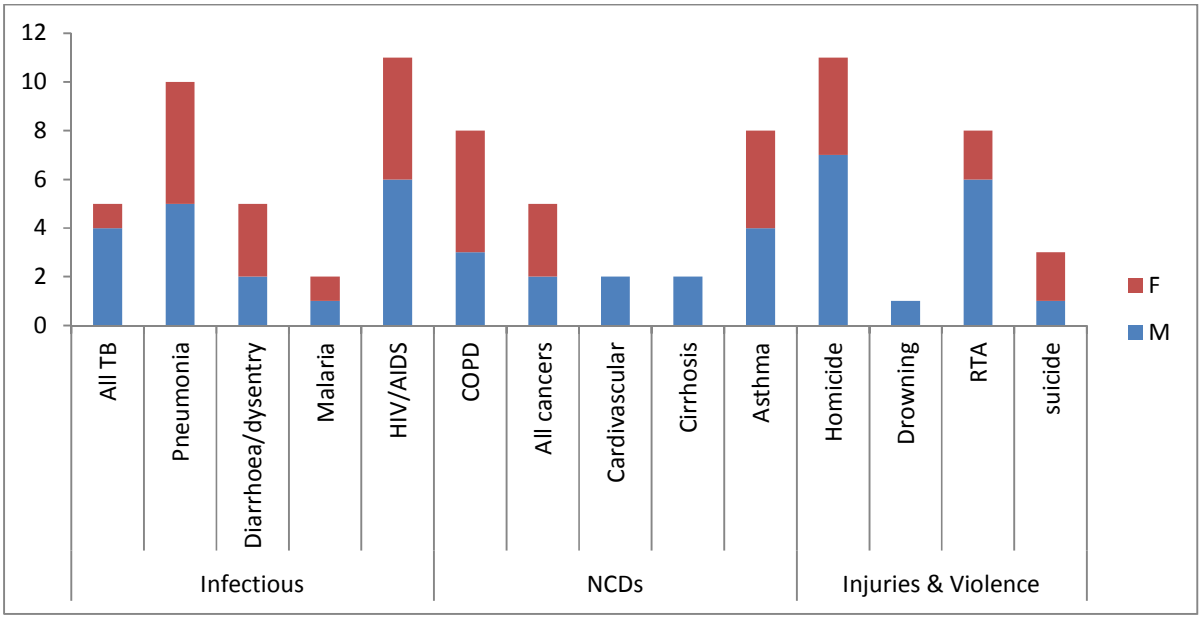


Figure 7-3 Leading causes of adult death in Hides iHDSS
COPD: Chronic obstructive pulmonary disease
HIV/AIDS: Human Immunodeficiency Virus/ Acquired Immunodeficiency Disorder Syndrome
NCD: Non-communicable diseases
RTA: Road traffic accidents

Hiri

Hiri provides a uniquely distinct mortality pattern compared to the other three sites. Unlike the other iHDSS populations, diabetes features in the top five causes of death and is the leading cause of NCD deaths in Hiri (Figure 7-4). TB is the leading cause of infectious disease deaths in the Hiri iHDSS (11.3%) of all adult deaths followed by malaria (6.4%) and HIV/AIDS (6%).

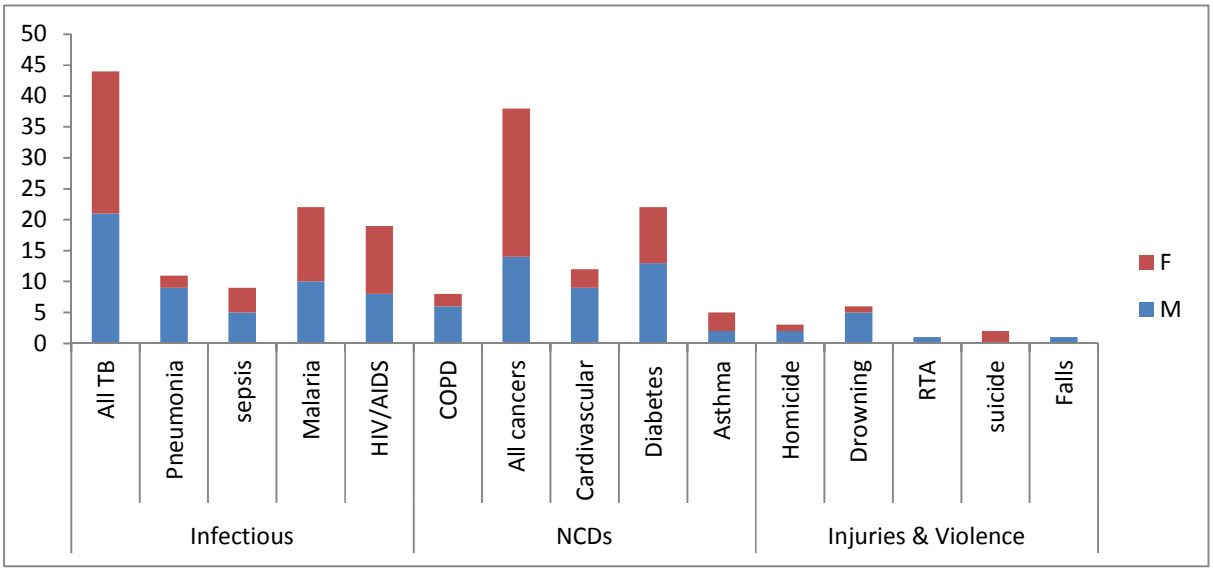


Figure 7-4 Leading causes of adult death in Hiri iHDSS, 2014

COPD: Chronic obstructive pulmonary disease
HIV/AIDS: Human Immunodeficiency Virus/ Acquired Immunodeficiency Disorder Syndrome
NCD: Non-communicable diseases
RTA: Road traffic accidents

Karkar

Figure 7-5 presents the leading causes of adult deaths in Karkar iHDSS. High levels of NCDs are evident in this population, but like in Asaro and Hides, this is largely dominated by COPD including cardiovascular diseases. Deaths caused by cancers are also highly prevalent, predominantly amongst males. Most of these cancers originate from the liver and mouth. External causes are minor causing deaths.

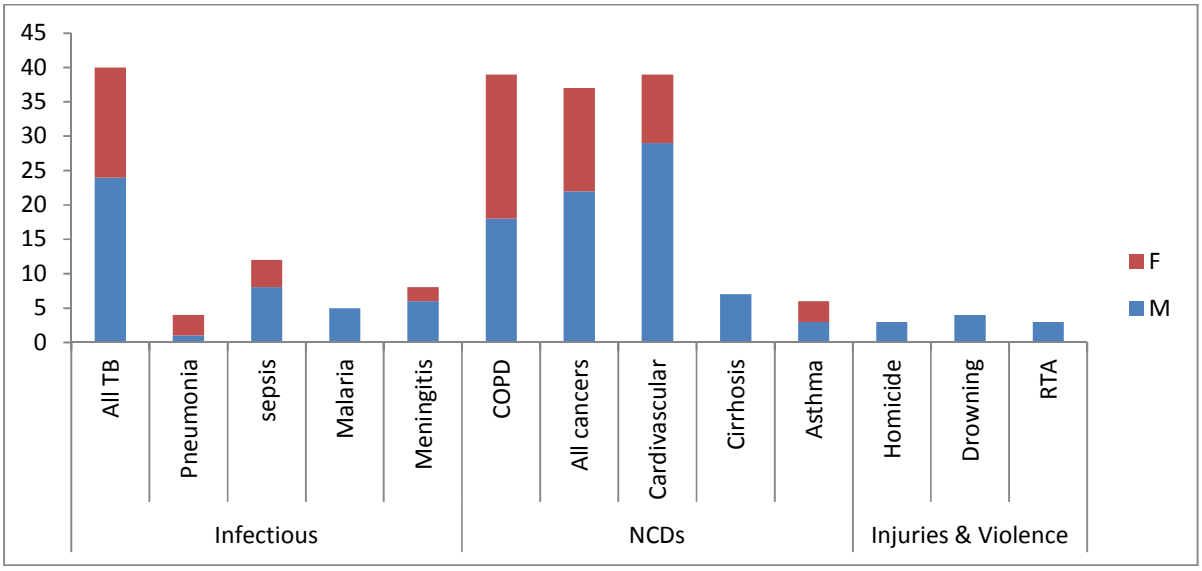


Figure 7-5 Leading causes of adult death in Karkar iHDSS
COPD: Chronic obstructive pulmonary disease
NCD: Non-communicable diseases
RTA: Road traffic accidents

Child leading causes of death

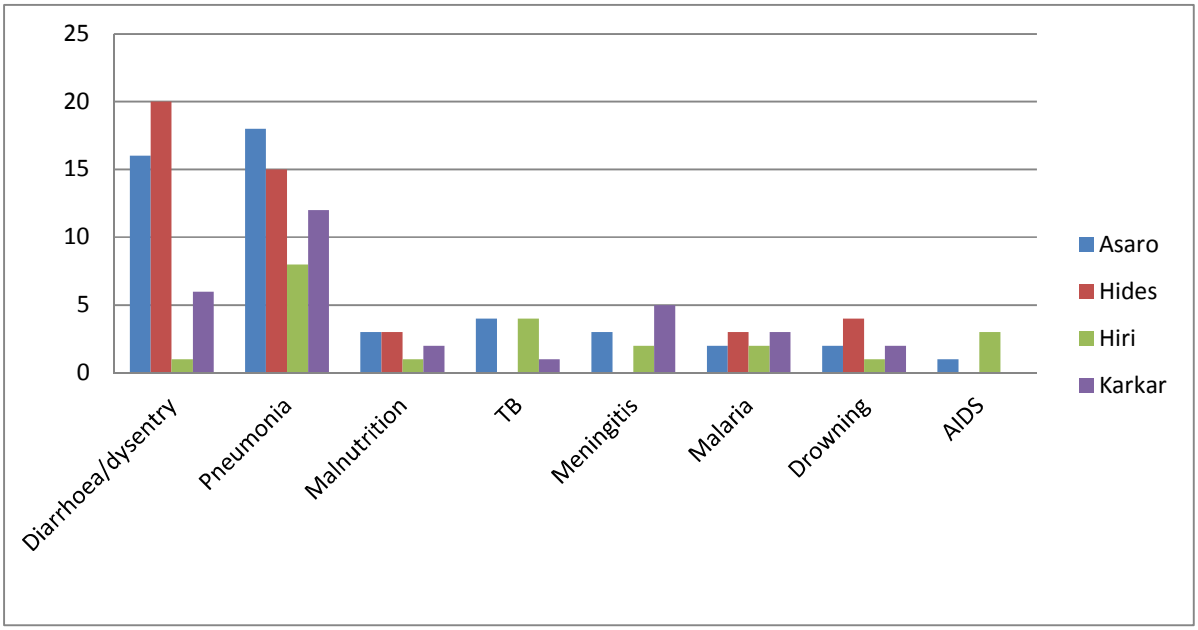


Figure 7-6 Leading causes of child deaths by site, iHDSS, 2015

Figure 7-6 shows the leading causes of deaths among children by study site. The data indicated that diarrhoea/dysentery and pneumonia remain the major killers for children under the age of 15 across all sites including tuberculosis and AIDS being the top three leading causes of deaths for children in Hiri.

Table 7-4 Causes of deaths across iHDSS sites by age group, iHDSS 2015

	Infectious		NCDs		Injuries		Neonatal		Maternal		Indeterminate		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
<1	57	9.5	5	1	6	5.8	112	98.2	3	18.8	4	3.2	187	13
1-4	57	9.5	6	1.2	7	6.8	0	0	0	0	4	3.2	74	5.1
5-14	36	6	4	0.8	9	8.7	1	0.9	0	0	4	3.2	54	3.8
15-24	48	8	13	2.7	11	10.7	0	0	4	25	8	6.4	84	5.8
25-34	80	13.4	34	7.1	18	17.5	0	0	8	50	15	12	155	11
35-44	63	10.6	60	12.4	29	28.2	0	0	1	6.2	8	6.4	161	11
45-54	50	8.4	71	14.7	3	2.9	0	0	0	0	16	12.8	140	9.7
55-64	80	13.4	108	22.3	14	13.6	1	0.9	0	0	12	9.6	215	15
65+	126	21.2	183	37.8	6	5.8	0	0	0	0	54	43.2	369	26
Total	**597**	**100**	**484**	**100**	**103**	**100**	**114**	**100**	**16**	**100**	**125**	**100**	**1439**	**100**

Table 7-4 shows the leading causes of death by age groups. More than 50% of the causes of deaths in age groups 15-34 were attributable to infectious diseases. In contrast, NCDs accounted for approximately 47.7% or more of cause of deaths among population in age groups of 35+. Approximately 18% of deaths among adults were also due to external causes such as injury and violence among adults aged 35-44.

8. CHAPTER 8 DISCUSSION

Previous Chapters of the report has presented major findings and observations from the population data, extracted from the iHDSS for the reporting period July-December 2014. However, the data available for Jan-March 2015 have been included in the report to provide most updated data of the system. The findings were presented for all iHDSS sites and also for each iHDSS site for comparison purposes.

In this Chapter, three main issues to be discussed, including: (i) the quality of iHDSS data; (ii) major demographic trends such as fertility and migration in different iHDSS sites; (iii) illness patterns and leading causes of deaths in children and adult populations in different iHDSS sites.

Improvement of the quality of iHDSS data

The analysis of iHDSS data has confirmed once again the improvement of the data quality of the iHDSS. This has been evident in three aspects of the iHDSS population data: (i) the increased coverage of geographical areas and study population; (ii) the increased completeness of population data; and (iii) the increased internal consistency within population data and variables.

Firstly, the improvement of the iHDSS data quality has been shown in the increase of geographical coverage as reflected in the GPS data of the four iHDSS sites, as shown in Table 3-1, Figure 4-1, Figure 4-6, Figure 4-7, and Figure 4-8.

Further examinations of the GPS data of Hiri iHDSS site at the village level as shown in the maps of Household distribution of four villages in Figure 4-2, Figure 4-3, Figure 4-4, and Figure 4-5 have further reconfirmed this observation.

Table 8-1 Number of dwelling included in Hiri GPS database, iHDSS, 2015

Reporting period	Boera	Lealea	Papa	Porebada	Total
Jul-Dec 2013	24	296	164	446	930
Jan-June 2014	332	383	171	679	1565
Jul-Dec 2014	319	468	228	676	1691

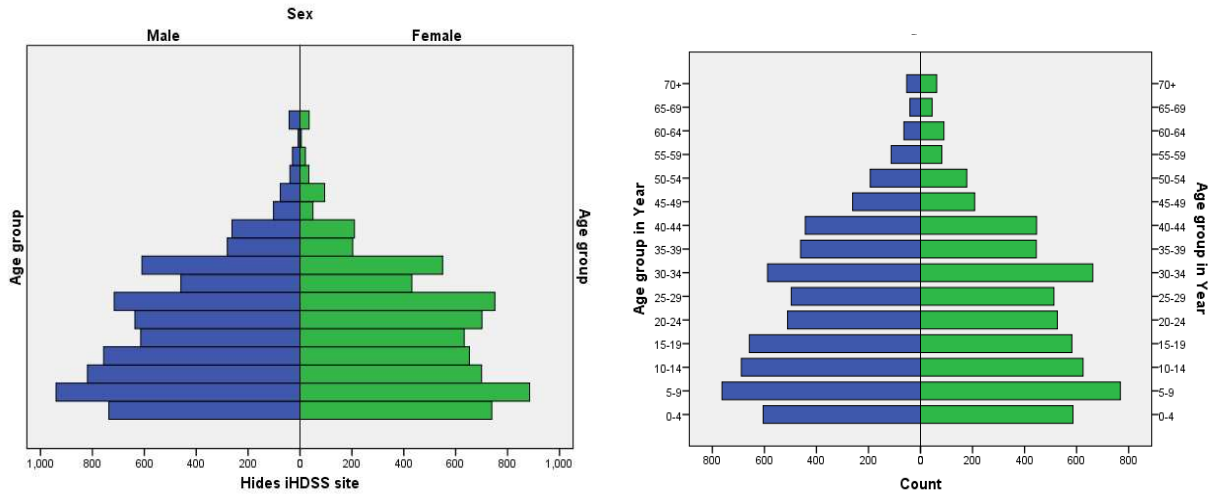
The improvement of the data quality of Hiri can be seen as comparing between the GPS data of this collection round and the previous ones. Table 8-1 shows that 319 dwellings in Boera, 468 in Lealea, 228 in Papa, and 676 in Porebada, totalling up to 1,691 dwellings were included in this reporting period. It increased by 126 dwellings compared to the previous data collection round.

Secondly, the improvement of iHDSS data quality has been also reflected in the increased numbers of households included in the iHDSS population database. Let's take population data of Hiri as example to illustrate this point. Table 8-2 shows that the number of households covered by the Hiri iHDSS has increased by 204, from 1390 captured in the Jan-Jun 2014 reporting period to 1594 recorded in this reporting period.

Table 8-2 Number of households recorded in the Hiri population database, iHDSS, 2015

Reporting period	Boera	Lealea	Papa	Porebada	Total
Jan-June 2014	264	359	169	598	1390
Jul-Dec 2014	297	446	203	648	1594

Thirdly, the improvement of iHDSS data quality can be also indicated in the increased consistency between different population variables. For instance of Hides, it has been always a concern about the population data of Hides due to many challenges faced by the iHDSS team during the data collection process, from logistics to technical problems.



Population Pyramid of Hides, September 2014 Population Pyramid of Hides, March 2015

Figure 8-1 Comparison of Population Pyramid of Hides in Dec 2014 and March 2015, iHDSS

Figure 8-1 compares the two population pyramids of Hides, drawn out from the Sept 2014 Report and this March 2015 Report. The population pyramid, which were built on the basis of two important variables: 'age' and 'sex' of the population, does not only show the structure of a population by age and sex, but is also an indicative for the quality of data as it reflects the internal consistency between the two variables. Visual comparison of the two graphs suggests that the quality of population data of Hides has been considerably improved over the last reporting periods. The current population pyramid looks much more 'normal distribution' as reflected in more balance between the two sexes and smooth between age groups. The significant longer bar of the population aged 30-34 in both sexes could be explained as bias due to a higher age-specific migration flow of this population into the iHDSS site for economic purposes. This phenomenon has been discussed in previous reports.

The last point regarding the improvement of iHDSS data quality has been evident in the significant level of completeness of the population data, with key population variables having 95% of completeness as shown in Table 2-1.

The assessment of data quality has proof showing that the quality of iHDSS data has been considerably improved over the last year, particularly in this data collection. This improvement is the result from a series of new QC/QA measures, which have been applied to the iHDSS recently. There is no doubt that these measures have been fruitful, contributing to strengthening of the entire iHDSS and its efficiency.

Declining Fertility

The iHDSS data have highlighted some key population changes in the study sites over the reporting period. The overall population data have shown that the study population are very young. However, the trend of declining fertility has been continuously observed in the past 5 years, as reflected in smaller proportions of the population aged 0-4 in the total population. This population group accounted for 10.4% in Hiri compared to 6.7% in Karkar, and 10.1% in Hides compared to 7.9% in Asaro, lower than those reported in the last report. The low fertility rate of Asaro could also have been factored by out-migration flow (see Table 4-1), particularly among young women moving out of this site (see Table 4-5) for 'Marriage/ family' purposes (see Table 4-6).

Given the limited scope of birth data, the TFR was not calculated. Further study of fertility of the population is required to provide further insights into this observation and better understand local differentials.

The information on birth certificate status among children under 5 was also collected and reported for the first time in this report.

Migration trends

The development of LNG activities in PNG has been considered as a driver boosting the socio-economic development of PNG, particularly in the two iHDSS sites: Hides and Hiri, where the 22.7 and 17.7 % of the population of working age reported having ever been employed by the LNG. Job and employment opportunities clearly acted as an economic driver, pulling a large number of young males and female workers migrating in Hides and Hiri. The social impact of such economic activities also reflected in the structure of the labour force in Hides and Hiri as discussed in previous report.

Since the construction phase of the PNG LNG Project ended by the end of 2014, the demobilization of such the work force could have been started, creating a new out-migration flow from these sites, as reflected in the negative Crude Net Migration Rates in both Hiri and Hides sites (see Table 4-1). Indeed, the majority of out-migrants of these sites were of working age, 15-65 (see Table 4-5) and many of them reported 'Job/employment' and 'Return home' as the reasons for them to leave the places (see Table 4-6) after the duration of stay for 1 or 2 years (see Table 4-7).

While out-migration from Hiri site has been captured by the iHDSS over the period January 2014-June 2014 and reported in the September 2014 Report, it is likely that this out-migration flow has just started in Hides as reflected the Crude Net Migration Rate at -0.05%. Hides iHDSS site has never experienced out-migration before, with Division 3 experiencing significant population gain thank to in-migration. At the mean time, migration data of Hides showed a high volume, but mixed-up between in and out migration flows, as reflected in a high Crude Gross Migration Rate at 2.35%, including 1.15% of in-migration and 1.2% of out-migration. Future

analysis will need to be done to confirm migration trends in both Hiri and Hides in relation to PNG LNG demobilization.

Changes in pattern of diseases

PNG is entering a phase of rapid economic development and one that is likely to be characterised by major shifts in traditional social structures and therefore in lifestyles of the population. Population-based studies like the iHDSS have the potential to provide longitudinal and reliable data which can supplement and enhance the understanding of this transition and inform the heath policy decision-makings that should be considered.

The morbidity data presented in this report have a number of limitations. Firstly, the clinic tallies do not provide an individual identifier and therefore, it cannot be inferred to as new cases or repeated visits to the health clinics. Secondly, while these clinics presented here would capture the population of interest to the iHDSS, it is not clear whether or not the patients may receive their healthcare services and what is the quality of the service they have received. As noted above, the Hiri population is quite close to Port Moresby and may choose to attend clinics and hospitals in the city. Mortality data indicate that many people in Hiri die in Port Moresby General Hospital. Similarly, the presence and distance of a Goroka Provincial Hospital may also motivate Asaro residents to bypass Asaro Health Centres and Sub-Health Centres for what may be perceived as better or more appropriate services. The results presented in this report should be interpreted with caution because the limitations of the data, not only in terms of sample size, but also the process to recording and reporting the morbidity data at health clinics, particularly in Hides due to social unrest. Failure of follow-ups cases to verify the diagnosis could be another challenge to the improvement of morbidity data. Results will be cross-checked with population surveys conducted within iHDSS populations.

The iHDSS has outlined the overall picture of the burdens of diseases in four iHDSS sites in Asaro, Hides, Hiri and Karkar. The analysis of morbidity data has provided some changes in the patterns of diseases over the last few years, particularly in the impact sites, where PNG LNG has deployed large economic activities. The preliminary results indicate that respiratory cases are

still dominant at local level. It was followed by skin infection diseases and diarrhoea, which accounted for majority of the caseload in the iHDSS clinics (see Table 6-9).

Though TB and COPD are reported as the leading causes of death in Karkar, these patients are less likely to visit health clinics in the site as reflected in low records of the morbidity data (see Table 6-10). As showed in the previous PiHP reports, the TB data is relatively low in health clinics in this island. The under utilization and/or a lack of proper expertise and/or appropriate laboratory equipments could be the reasons underlying an ineffective TB interventions at the clinic level.

Further analysis of health seeking behaviour and health service utilisation at the household level are needed to shed lights onto morbidity data that would provide better understanding and interpretation for health policy decision-making and guide the country responses to new emerging health issues and trends.

Leading causes of deaths

The population study was very young as shown in the overall population pyramid for all four iHDSS site as well as the population pyramid of each iHDSS site. The death rates of the study population therefore, were relatively low as reflected in the Crude Death Rates (see Table 5-3). For the first time, child mortality data were collected and reported in this report (see Table 5-6). The information on death certificate was also for the first time reported (see Table 5-2).

Progress on the Mortality study has been slow but steady. Limited access to iHDSS sites, particularly Hides due to the internal instability could affect the safety and security of field staff has substantially affected to the fieldwork in the last six months. Despite this, all other sites have kept up with the deaths identified through the iHDSS. Mortality surveillance in Hides is incomplete and requires review before conclusions can be made about local trends and patterns.

As discussed previously, there remain a number of limitations to this analysis. Firstly, deaths in this analysis have been presented as proportions of total deaths and not as yearly rates. The calculation of rates will soon possible when a full year of data collection has been complete and physician review on these deaths has been conducted. Therefore, interpretation of results should

be done with a degree of caution. Secondly, no standard approach to physician review has been agreed. In order to ensure the highest accuracy in ascribing a probable cause of death to a VA physician review some researchers recommend that reviews be conducted independently by two physicians. Where disagreements arise a third physician might be consulted and a consensus must be achieved. At present there are only one trained physicians dedicated to the task of reviewing VA forms for the PiHP and forms have to be transported to be reviewed by those available making double review challenging. Physician review diagnoses may change over time as results are reviewed and physicians continue to receive on-going training in assigning causes of death to verbal autopsies. Verbal autopsies thus far collected can be analysed by computer-based analytical software and results will be compared with the physician review results.

Lastly, this analysis only examines one probable underlying cause of each identified death. A number of conditions, like HIV/AIDS and TB and diabetes and TB, are often associated with one another and many deaths are likely to be due to multiple causes of death. Future analyse should consider potential methods for in-depth investigations into this subject.

High rates of deaths due to NCDs in Hiri and HIV/AIDS, as well as violence, in Hides warrant further investigation and demands attention by national and provincial public health authorities. The development of targeted interventions and prevention programs should be also considered.

9. CHAPTER 9 CONCLUSION

The PiHP was reformed over the last reporting period. That included a restructure of the staff, new design of data collection tools, and the application of a new series of QA/QC measures. The population census update has been successfully conducted in the four iHDSS sites in the reporting period, using the new HH Update Book, Morbidity data collection form. Refresh and follow up trainings have been conducted for data analysis team, data collection team, and data management team, plus a fieldwork for planning and monitoring in the Hiri iHDSS site.

For the reporting period July-Dec 2014, iHDSS recorded a total of 54339 population records, 11,251 dwellings, 755 births, 121 deaths, 278 in-migrants and 469 out-migrants.

New QA/QC procedures were applied to this data collection and data processing. The new QA/QC procedures also required data entries in the main PNG IMR office in Goroka. This minimised data error such as duplications, inconsistency in variable names and data entry templates that have been occurred during the data entry process in previous reporting periods. QA/QC measures applied in data collection, data entry, and data processing processes are new to most of the PiHP staff; further trainings and instructions are therefore, needed to reinforce the staff's compliance to the procedures. The implementation of QA/QC measures need closely monitor for effective implementation across all iHDSS sites. This approach has allowed an improvement of the operation of the iHDSS in PNG, from data collection, to data entry, data processing and data generation. That will help to produce timely and reliable data. As part of strengthening of the QA/QC measures in data collection, a fieldwork monitoring was in Hiri iHDSS site in November 2014. The fieldwork has provided further insights into the data collection, recording and reporting processes. It is noted that the GPS data for the first time, were included in the HH data form and GPS data were entered as an integral part of the iHDSS database. That has helped to link between the GPS data and the HH data and verify the coverage of the iHDSS.

As a result, the data quality of the iHDSS has been improved as reflected in the increased geographical coverage, population records with the data completeness of 95% for key population variables. More households and individuals were recorded in the iHDSS as reflected in the increase in number of households included in the iHDSS as well as the number of household members interviewed in this reporting period.

The restructure of the iHDSS and the application of new QA/QA measures in particular need to be continuously reinforced across all four iHDSS sites. Although lessons learnt from the fieldwork in Hiri can be replicated in other iHDSS sites, more technical monitoring are needed to conduct in Asaro, Hides and Karkar to ensure that QA/QC measures are appropriately applied to the entire iHDSS, contributing to the overall performance of the iHDSS in producing timely and reliable health and demographic evidence for policy development.

10. REFERENCES

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11. ANNEXES:

Annex 11.1 Household Update Book

Household back ground update information						
A						
1	2	3	4	5	6	7
Province/ City of residence	District of residence	LLG of residence	Ward/ Commune of residence	Village/ Street of residence	Dwelling/ compound number	Household number

Individual background update information										
B										
1	2	3	4	5	6	7	8	9	10	11
Individual Line number (refer to module HL)	Individual Name (refer to module HL)	Relation to HH head (refer to Code Book)	Sex (1:M; 2:F)	Day of birth (1-31, 88 if DK)	Month of birth (1-12, 88 if DK)	Year of birth (yyyy, 8888 if DK)	Country of Birth	Province/ city of Birth	District of Birth	Village of birth

Births since the last update							
C							
1	2	3	4	5	6	7	8
Age at Update in year (if >= 1)	Age at Update in month (1-11 if <12 months)	Age at Update in day (1-27 if <28 days)	Birth Certificate (1:Yes, 2:No)	Name of mother	Age of mother at birth in year	Name of Father	Age of father at birth in year

Deaths since the last update						
D						
1	2	3	4	5	6	7
Day of death (1-31, 88 if DK)	Month of death (1-12, 88 of DK)	Year of death (yyyy, 8888 if DK)	Age at death in year (if >=1 year)	Age at death in month (1-11 if <12 months)	Age at death in day (1-27 if <28 days)	Death Certificate (1:Yes, 2:No)

In-migration since the last update													
E													
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Year of in-migration (yyyy, 8888 if DK)	Month of in-migration (1-12, 88 if DK)	Day of in-migration (1-31, 88 if DK)	Age at in-migration in year (if >=1 year)	Age at in-migration in month (1-11 if <12 months)	Age at in-migration in day (1-27 if <28 days)	Country of Origin	Province/ City of Origin	District of Origin	Village of Origin	Reason for In-migration (refer to Code Book)	Intention of stay in year (if stay >= 1 year)	Intention of stay in month (1-11 if stay < 12 months)	Intention of stay in day (1-29 if stay < 30 days)

Out-migration since the last update															
F															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	13	15
Year of out-migration (yyyy, 8888 if DK)	Month of out-migration (1-12, 88 of DK)	Day of out-migration (1-12, 88 of DK)	Age at out-migration in year (if >=1 year)	Age at out-migration in month (1-11 if <12 months)	Age at in-migration in day (1-27 if <28 days)	Country of Destination	Province/ City of Destination	District/ Town of Destination	LLG of Destination	Ward/ Commune of Destination	Village/ Street of Destination	Reason for Out-migration (refer to Code Book)	Duration of stay in year (if >= 1 year)	Duration of stay in month (1-11 if <12 months)	Duration of stay in day (1-29 if <30 days)

Date of update			
G			
1	2	3	4
Year of Update (yyyy)	Month of Update (1-12, 88 of DK)	Day of Update (1-31, 88 if DK)	Name of Data collector

Household GPS Coordinates		
H		
Latitude (Degree South)	Longitude (Degree East)	Elevation (m)
_ _ _ . _ _ _ _ _ (3 digits before, 5 digits after decimal)	_ _ _ . _ _ _ _ _ (3 digits before, 5 digits after decimal)	_ _ _ _ . _ _ (4 digits before, 2 digits after decimal)

Annex 11.2 Adult and adolescent verbal autopsy module

Patient ID code (19 digits, refer to Code Book)

SECTION 1: HISTORY OF CHRONIC CONDITIONS OF THE DECEASED

1.1 Did the deceased have any of the following?

Asthma	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Arthritis	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Cancer	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
COPD (Chronic Obstructive Pulmonary Disease)	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Dementia	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Depression	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Diabetes	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Epilepsy	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Heart Disease	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
High Blood Pressure	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Obesity	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Stroke	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
Tuberculosis	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐
AIDS	1. Yes	☐
	2. No	☐
	8. Refused to answer	☐
	9. Don't know	☐

SECTION 2: SYMPTOM CHECKLIST

2.1	For how long was _____ ill before s/he died?	1. Months ___ ___ 2. Days ___ ____ 8. Refused to answer 9. Don't know	☐ ☐
2.2	Did _____ have a fever?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.7.

2.3	How many days did the fever last?	Days ___ ____ 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐
2.4	How severe was the fever?	1. Mild 2. Moderate 3. Severe 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐ ☐
2.5	What was the pattern of fever?	1. Continuous 2. On and off 3. Only at night 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐ ☐
2.6	Did _____ have sweating with the fever?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐
2.7	Did _____ have a rash?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.10.

2.8	How many days did _____ have the rash?	Days ___ ____ 8. Refused to answer 9. Don't know	☐ ☐
2.9	Where was the rash located?	1. Face 2. Trunk 3. Extremities 4. Everywhere 5, Other (specify) _____ 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐ ☐ ☐ ☐
2.10	Did ____ have sores?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.12.

2.11	Did the sores have clear fluid or pus?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐
2.12	Did _____ have itching of skin?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐
2.13	Did _____ have an ulcer (pit) on the foot?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.16.

2.14 Did the ulcer ooze pus?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.16.

2.15 For how many days did the ulcer ooze pus?
Days ___ ____
8. Refused to answer ☐
9. Don't know ☐

2.16 Did _____ experience "pins and needles" in their feet?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.17 Did _____ have blue lips?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.18 Had _____ lost weight in the three months prior to death?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.20.

2.19 How substantial was the loss of weight?
1. Slight ☐
2. Moderate ☐
3. Large ☐
8. Refused to answer ☐
9. Don't know ☐

2.20 Did _____ look pale?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.21 Did _____ have yellow discoloration of the eyes?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.23.

2.22 For how long did _____ have the yellow discoloration?
1. Months ___ ___
2. Days ___ ____
8. Refused to answer ☐
9. Don't know ☐

2.23 Did _____ have ankle swelling?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.25.

2.24 For how long did _____ have ankle swelling?
1. Months ___ ___
2. Days ___ ____
8. Refused to answer ☐
9. Don't know ☐

2.25 Did _____ have puffiness of the face?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.27

2.26 For how long did _____ have puffiness of the face?
1. Months ___ ____
2. Days ____ _____
8. Refused to answer ☐

9. Don't know ☐

2.27 Did _____ have general puffiness all over his/her body?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.29.

2.28 For how long did _____ have puffiness all over his/her body?
Months ___ ____
Days ____ _____
8. Refused to answer ☐
9. Don't know ☐

2.29 Did _____ have a lump in the neck?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.30 Did _____ have a lump in the armpit?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.31 Did _____ have a lump in the groin?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.32 Did _____ have a cough?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.36.

2.33 For how long did _____ have a cough?
1. Months ___ ____
2. Days ____ ____
8. Refused to answer ☐
9. Don't know

2.34 Did the cough produce sputum?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.35 Did _____ cough blood?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.36 Did _____ have difficulty breathing?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.40.

2.37 For how long did ____ have difficulty breathing?
1. Months ___ ____
2. Days ____ ____
8. Refused to answer ☐
9. Don't know ☐

2.38 Was the difficulty continuous or on and off?
1. Continuous ☐
2. On and off ☐
8. Refused to answer ☐
9. Don't know ☐

2.39 In what position did the difficulty get worse?

(Read each choice in sequence)
1. Lying ☐
2. Sitting ☐
3. Walking/During exertion ☐
4. Didn't matter ☐
8. Refused to answer
9. Don't know

2.40 Did _____ have fast breathing?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.42.

2.41 For how long did _____ have fast breathing?
1. Months ___ ____
2. Days ____ ____
8. Refused to answer ☐
9. Don't know ☐

2.42 Did _____ wheeze?
(Demonstrate)
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.43 Did _____ experience pain in the chest in the month preceding death?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.47.

2.44 How long did the pain last?
1. Less than 30 minutes ☐
2. 30 minutes to 24 hours ☐
3. More that 24 hours ☐
8. Refused to answer ☐
9. Don't know ☐

2.45 Was the pain during physical activity?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.46 Where was the pain located?
(Read each choice in sequence.)
1. Upper or middle chest ☐
2. Lower chest ☐
3. Left arm ☐
4. Other (Specify: _____) ☐
8. Refused to answer ☐
9. Don't know ☐

2.47 Did _____ have more frequent loose or liquid stools than usual?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.49.

2.48 For how long before death did _____ have loose or liquid stools?
1. Days ____ _____
8. Refused to answer ☐
9. Don't know ☐

2.49 Did _____ have a change in bowel habits?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.50 Was there blood in the stool?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.52.

2.51 Was there blood in the stool up until death?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.52 Did _____ stop urinating?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.53 Did _____ vomit in the week preceding the death?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.57.

2.54 For how long before death did _____ vomit?
1. Days ___ ___
2. Hours ___ ___
8. Refused to answer ☐
9. Don't know ☐

2.55 Was there blood in the vomit?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.56 Was the vomit black?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.57 Did _____ have difficulty swallowing?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.60.

2.58 For how long before death did _____ have difficulty swallowing?
1. Months ___ ___
2. Days ___ ___
8. Refused to answer ☐
9. Don't know ☐

2.59 Was the difficulty with swallowing with solids, liquids, or both?
1. Solids ☐
2. Liquids ☐
3. Both ☐
8. Refused to answer ☐
9. Don't know ☐

2.60 Did _____ have pain upon swallowing?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.61 Did _____ have belly pain?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.64.

2.62 For how long before death did _____ have belly pain?
1. Days ___ ___
2. Hours ___ ___
8. Refused to answer
9. Don't know
☐
☐

2.63 Was the pain in the upper or lower belly?
1. Upper belly ☐
2. Lower belly ☐
8. Refused to answer ☐
9. Don't know ☐

2.64 Did _____ have a more than usual protruding belly?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.67.

2.65 For how long before death did _____ have a protruding belly?
1. Months ___ ___
2. Days ___ ___
8. Refused to answer ☐
9. Don't know ☐

2.66 How rapidly did _____ develop the protruding belly?
1. Rapidly ☐
2. Slowly ☐
8. Refused to answer ☐
9. Don't know ☐

2.67 Did _____ have any mass in the belly?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.69.

2.68 For how long before death did _____ have a mass in the belly?
1. Months ___ ___
2. Days ___ ___
8. Refused to answer ☐
9. Don't know ☐

2.69 Did _____ have headaches?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.72.

2.70 For how long before death did _____ have headaches?
1. Hours ___ ___
2. Days ___ ___
8. Refused to answer ☐
9. Don't know ☐

2.71 Was the onset of the headache fast or slow?
1. Fast
2. Slow
8. Refused to answer
9. Don't know

2.72 Did _____ have a stiff neck?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.74.

2.73 For how long before death did _____ have stiff neck?
1. Months ___ ___
2. Days ___ ___
8. Refused to answer ☐
9. Don't know ☐

2.74 Did _____ experience a period of loss of consciousness?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.78.

2.75 Did the period of loss of consciousness start suddenly or slowly?
1. Suddenly ☐
2. Slowly ☐
8. Refused to answer ☐
9. Don't know ☐

2.76 For how long did the period of loss of consciousness last?
1. Days ___ ___
2. Months ___ ____
8. Refused to answer ☐
9. Don't know ☐

2.77 Did it continue until death?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

2.78 Did _____ experience a period of confusion at any time in the three months prior to death?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.81.

2.79 For how long did the period of confusion last?
1. Days ___ ___
2. Months ___ ___
8. Refused to answer
9. Don't know ☐
☐

2.80 Did the period of confusion start suddenly or slowly?
1. Suddenly ☐
2. Slowly ☐
8. Refused to answer ☐
9. Don't know ☐

2.81	Did _____ experience memory loss at any time in the three months prior to death?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
2.82	Did _____ have convulsions? *(Demonstrate)*	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to question 2.85.

2.83	For how long before death did the convulsions last?	1. Minutes ___ ___ 2. Hours ___ ___ 8. Refused to answer ☐ 9. Don't know ☐
2.84	Did the person become unconscious immediately after the convulsions?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
2.85	Was _____ in any way paralyzed?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐

If "No" or "Refused to answer" or "Don't know" go to 2.88.

2.86	For how long before death did _____ have paralysis?	1. Days ___ ___ 2. Months ___ ___ 3. Years ___ ___ 8. Refused to answer ☐ 9. Don't know ☐
2.87	Which were the limbs or body parts paralyzed? *Read through the list in sequence and MARK ALL THAT APPLY*	1. Right side (arm and leg) ☐ 2. Left side (arm and leg) ☐ 3. Lower part of the body ☐ 4. Upper part of the body ☐ 5. One leg only ☐ 6. One arm only ☐ 7. Whole body ☐ 8. Refused to answer ☐ 9. Don't know ☐ 10. Other (specify) ☐ _____

2.88

STOP.

If the deceased is female then continue to Section 3: Questions for Women.

If the deceased was male then go to Section 4: Alcohol and Tobacco.

SECTION 3: QUESTIONS FOR WOMEN

3.1	Did _____ have any swelling or lump in the breast?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.2	Did _____ have any ulcers (pits) in the breast?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.3	Had _____ period's stopped naturally because of menopause? *If no, skip to 3.5.*	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.4	Did _____ have vaginal bleeding after cessation of	1. Yes ☐ 2. No ☐

	menstruation? (post menopausal)	8. Refused to answer ☐ 9. Don't know ☐
	After asking 3.4, skip to Section 4.	
3.5	Did _____ have vaginal bleeding other than her period? (intermenstrual)	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.6	Was there excessive vaginal bleeding in the week prior to death?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.7	At the time of death was her period overdue?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
If "No" or "Refused to answer" or "Don't know" go to question 3.10.		
3.8	For how many weeks was her period overdue?	1. Weeks ___ ___ 8. Refused to answer ☐ 9. Don't know ☐
3.9	Did she have a sharp pain in the belly shortly before death?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.10	Was she pregnant at the time of death?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
	If "No" or "Refused to answer" or "Don't know", skip to 3.17.	
3.11	For how many months was she pregnant?	Months __ ___ 8. Refused to answer ☐ 9. Don't know ☐
3.12	Did _____ die during an abortion?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
	If "Yes" skip to 3.19	
3.13	Did bleeding occur while she was pregnant?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.14	Did she have excessive bleeding during labor or delivery?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.15	Did she die during labor or delivery? *(Labor is the period of time by which contractions are less than 10 minutes apart.)*	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
3.16	For how long was she in labor?	1. Hours ___ ____ 8. Refused to answer ☐ 9. Don't know ☐
	If she died while in labor, skip to Section 4.	
3.17	Did she die within 6 weeks of having an abortion?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐ 9. Don't know ☐
	If "Yes", skip to 3.19.	
3.18	Did she die within 6 weeks of childbirth?	1. Yes ☐ 2. No ☐ 8. Refused to answer ☐
	If "No" or "Refused to answer" or "Don't know", skip to Section 4.	9. Don't know ☐

3.19	Did she have excessive bleeding after delivery or abortion?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐
3.20	Did _____ have bad smelling vaginal discharge within 6 weeks after delivery or abortion?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

STOP.

Go to Section 4: Alcohol and Tobacco.

SECTION 4: ALCOHOL AND TOBACCO

4.1	Did _____ use tobacco?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

If "No" or "Refused to answer" or "Don't know" go to question 4.5.

4.2	What kind of tobacco did _____ use? *Each site should tailor option four to this question to meet their need*	1. Cigarettes 2. Pipe 3. Chewing tobacco 4. Local form of tobacco 5. Other (specify) 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐ ☐ ☐

If "Yes" to chewing tobacco, continue to 4.3. If "Yes" to cigarettes, skip to 4.4. If "No" to chewing tobacco and cigarettes skip to 4.5.

4.3	How much chewing tobacco did _____ use daily?	1. Number of "chew" or "dips" per day ___ ___ 8. Refused to answer 9. Don't know	 ☐ ☐
4.4	How many cigarettes did _____ smoke daily?	1. Number ___ ___ 8. Refused to answer 9. Don't know	 ☐ ☐
4.5	Did _____ drink alcohol?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

If "No" or "Refused to answer" or "Don't know" go to question 5.1.

4.6	Would you say the amount of alcohol _____ drank daily was…?	1. Low 2. Moderate 3. High 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐ ☐

SECTION 5: INJURIES/ACCIDENTS

5.1	Did _____ suffer from an injury or accident such as a…….? *Ask respondent each in sequence and mark <u>all</u> to which the respondent indicated "Yes."*	1. Road traffic injury 2. Fall 3. Drowning 4. Poisoning 5. Bite or sting by venomous animal 6. Burn 7. Violence (suicide, homicide, abuse) 8. No 9. Other injury (Specify) _____	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

If no boxes are checked, go to Section 6. If at least one box is checked, continue to 5.2.

5.2	Was the injury or accident self-inflicted?	1. Yes 2. No 8. Refused to answer 9. Don't know	☐ ☐ ☐ ☐

If "Yes" skip to 5.4.

5.3 Was the injury or accident intentionally inflicted by someone else?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

5.4 How long did _____ survive after the injury?
1. Hours ___ ___
2. Days ___ ____
3. Month ___ ____
4. Years ____ ____
8. Refused to answer ☐
9. Don't know ☐

SECTION 6: HEALTH RECORDS

6.1 Was care sought outside the home while _____ had this illness?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Don't know" or "Refused to answer" go to Question 6.4.

6.2 Where or from whom did you seek care?

(CHECK ALL THAT APPLY)
1. Traditional Healer ☐
2. Homeopath ☐
3. Religious leader ☐
4. Government Hospital ☐
5. Governmental health center or clinic ☐
6. Private Hospital ☐
7. Community-based practitioner associated with health system ☐
8. Trained birth attendant ☐
9. Private physician ☐
10. Pharmacy, drug seller, store, market ☐
11. Other provider ☐
12. Relative, friend (outside household) ☐
13. Refused to answer ☐
99. Don't Know ☐

6.3 *Record the name and address of any hospital, health center or clinic where care was sought:*

6.4 Do you have any health records that belonged to the deceased?
1. Yes ☐
2. No ☐
8. Refused to answer ☐
9. Don't know ☐

If "No" or "Don't know" or "Refused to answer" go to question 6.10.

6.5 Can I see the health records?
1. Yes ☐
2. No ☐
8. Refused to answer ☐

If "No" or "Refused to answer" go to question 6.10; If "Yes", and respondent allows you to see the records, transcribe all the entries

6.6 *Record the dates of the two most recent visits*

If not listed, mark 9999
1. _ _/_ _/_ _ _ _
dd mm yyyy
2. _ _/_ _/_ _ _ _
dd mm yyyy

6.7 *Record the date of the last note*

_ _/_ _/_ _ _ _

dd mm yyyy

6.8 *Transcribe the note:*

6.9	Was a death certificate issued?	1. Yes	☐
		2. No	☐
		8. Refused to answer	☐
		9. Don’t know	☐

If “No” or “Don’t know” or “Refuse to answer” go to Section 7.

6.10	Can I see the death certificate?	1. Yes	☐
		2. No	☐
		8. Refused to answer	☐

If “No” go to Section 7.

6.11 *Record the immediate cause of death from the certificate.*

6.12 *Record the first underlying cause of death from the certificate.*

6.13 *Record the second underlying cause of death from the certificate.*

6.14 *Record the third underlying cause of death from the certificate.*

6.15 *Record the contributing cause(s) of death from the certificate.*

SECTION 7: OPEN ENDED RESPONSE AND INTERVIEWER COMMENTS/OBSERVATIONS

7.1

INSTRUCTIONS TO INTERVIEWER: Say to the respondent: “Thank you for the patient responses to this exhaustive set of questions. Could you please summarize, or tell us in your own words, any additional information about the illness and/or death of your loved one?”

To the Interviewer: Write down what the respondent tells you in his/her own words. Do not prompt except for asking whether there was anything else after the respondent finishes. While recording, underline any unfamiliar terms. You may also use this space to write down your comments and observations about the interview.

END OF INTERVIEW

Thank respondent for their cooperation