



Partnership in Health Project
Progress Report
(Reporting period: January – June 2015)

Papua New Guinea
Institute of Medical
Research

Goroka, September 2015

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Acknowledgement

The authors would like to thank the respective community leaders, councillors and church leaders in each of the study sites for their support of the PiHP. A special thank you is extended to the community members who participated in the various studies presented in this report. Many thanks to the Provincial Health divisions in Central Province, Hela Province, Eastern Highland Province and Madang Province for their enthusiastic supports to the PiHP and approvals for our iHDSS team to access the health facilities and medical records. We are grateful to our partners: Salvation Army, ECPNG, Lutheran Health Service and Catholic Health Services for their support for our fieldwork. We also thank the ISAB (Independent Scientific Advisory Board) and collaborators of the PiHP for their scientific guidance as well as the NewFields for their review and comment on the report. Lastly, we would like to acknowledge our donors, ExxonMobil PNG Ltd, Managing Director Mr. Andrew Barry and Mr. Andry Nowosiwsky, Occupational Health Manager, for their great support to PNG IMR and the PiHP in particular.

Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal care
BCG	Bacillus Calmette-Guérin
BMI	Body Mass Index
CI	Confidence Interval
COPD	Chronic Obstructive Pulmonary Disease
DENV	Dengue virus
DNA	Deoxyribonucleic acid
DOTS	Directly Observed Therapy - Short Course
DHS	Health and Demographic Survey
DTP	Diphtheria, Tetanus and Pertussis
DWU	Divine World University
EHP	Eastern Highland Province
EM PNG	ExxonMobil PNG Ltd.
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
HepB	Hepatitis B
Hib	Haemophilus influenza type B
HIV	Human Immunodeficiency Virus
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
LLG	Local Level Government
LNG	Liquefied Natural Gas
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
MMR	Maternal mortality rate
MRAC	The PNG Medical Research Advisory Committee
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
PiHP	Partnership in Health Project
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
PSI	Population Services International
SOP	Standard Operating Procedures
STI	Sexually Transmitted Infections
TB	Tuberculosis
TBA	Traditional Birth Attendant
UNs	United Nations
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 (PNG IMR) develops and submits semi-annual progress reports. This report covers and updates new data and finding since the last submission in March 2015. The work presented in this report includes new data and results covering the six-month period, from January to June 2015. Hiri and Hides are impact locations (significant, multi-year LNG construction occurred at these locations with ongoing production) while Karkar and Asaro are their respective comparison locations.

As an interim deliverable of the PiHP, the September 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.

For the September 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. Below is the summary of major findings and observations of the household data of the four surveillance sites over the reporting period January-June 2015.

DATA QUALITY CONTROL

A total of 8,389 households were approached by the data collection team, including 1,608 households in Hiri, 2,747 households in Asaro, 3,112 households in Karkar and 922 households in Hides (only division 3 of Hides was included in the iHDSS in 2015 onward). A total of 8,105 households agreed to participate in the interviews, accounted for 96.6%. All the household interviews were conducted in the period Jan-June 2015, of which 7,888 interviews were completed, accounted for 94%. All the data forms were then transferred to Goroka and entered into the iHDSS database. All data have been subjected to robust quality control and assurance procedures.

A total of 41,364 household members were recorded in the household interviews. Individual age and sex information are the most important variables for cross-table analysis of the surveillance population. Missing information on sex was 1.8% and only 0.1% on age, across all the four iHDSS sites. Asaro had the highest rate of missing information on sex (3.4%) and the highest response of 'Don't know' on age (3.3%).

A three-day training event was conducted for a core group of ten national scientific officers on data analysis and academic report writing skills. These national scientific officers used their newly acquired knowledge and skills to develop the 2015 September Report. The analysis of iHDSS data has confirmed the continuous improvement of the iHDSS.

POPULATION AND HOUSEHOLD CHARACTERISTICS

A total of 8,387 households and 41,364 people were analyzed for household characteristics, including size and structure. Across all locations, the mean household size was 4.96 persons, but the household size was largest in Hiri with 7.63 persons per household compared to 4.9 in Karkar. Household size was smallest in Asaro with 3.44 persons per household, compared to 4.7 in Hides. The mode of household size in Hiri was 5-6 persons, accounting for 27% of households, compared to 32% in Karkar. By contrast, the mode of household size of Hides was 3-4 persons, accounting for 35%, similar to that of Asaro, 37%.

More than half of households reported no children under 5 (U5) for all four sites. This proportion was lowest in Hiri, (29%) compared to 56% in Karkar, and 50% in Hides compared to 70% in Asaro. However, 40% of households had 1-2 children U5 with 58% in Hiri compared to 41% in Karkar, and 42% in Hides compared to 30% in Asaro.

More than half of households reported having one man of working age 15-64. This figure was 50% in Hides compared to 60% in Asaro, and 33% in Hiri compared to 52% in Karkar. Similarly, half of households had a woman of reproductive age 15-49, but this figure was only 40% in Hiri compared to 51% in Karkar and 47% in Hides compared to 50% in Asaro.

Child population aged 0-14 accounted for one third of the population and this proportion was similar across the four sites. Proportion of children U5 was only 9% of the total population with the sex ratio being balance at 104 males per every 100 females.

EDUCATION

There has been considerable progress in education in PNG over the last 20 years when comparing data between these two groups: (i) the population of schooling age 5-24 and (ii) the population aged 25+. The 5-24 age group have much better access to education than the 25+ age cohort, i.e. 74% of the younger population reported 'having ever attended school,' compared to only 40% of the older population. The 5-24 age cohort reported 'having ever attended school' was highest in Hiri and Karkar, 70% and 78%, respectively. It was only 54% in Hides compared to 79% in Asaro. These results continue to highlight the 'education lag' historically observed in the Hela Province.

Overall education attainment has significantly improved. More than a half of the population aged 5-24 reported having attained a primary education, compared to one third of the population aged 25+. While this is an extremely positive outcome, there continued to be significant attendance/enrolment problems across all locations.

Late enrolment was observed at all education levels, particularly at elementary and primary education i.e. only 43% of children aged 5-7 reported being currently enrolled at elementary school level. The late enrolment has resulted in a delay in completion of primary education across the four sites. For example, among children aged 15-18, who should be enrolled in secondary education (grade 9-12), 48% of these children were still studying at grade 6-8 in Hiri compared to 51% in Karkar, and 33% in Hides compared to 57% in Asaro.

Gender equality in education has significantly improved. This observation is illustrated in the marked decline in male-to-female attendance ratios, i.e., 162:100 among the older population aged 25+, who reported having ever attended school to the contemporary level of 116:100 among the younger population aged 5-24. However, gender gaps still exist across education levels. For example, the male-to-female ratio at primary education was slightly high, 108:100 for all sites.

EMPLOYMENT

A total of 25,046 people of working age (15-64 years) composed of 52% males and 48% females were included in the employment analysis. The majority (90%) of labourers were engaged in the “private sector,” of which 89% reported working in subsistence activities such as fishing, farming, and gardening. There is a marked difference across the different sites, specifically 16% in Hiri compared to 82% in Karkar, and 64% in Hides compared to 30% in Asaro.

Only 2.3% of the four site labour force reported working for foreign owned firms, with the highest proportion in Hiri (10.7%), compared to 1.2% in Karkar and 4.1% in Hides compared to 0.2% in Asaro. Hiri and Hides percentages illustrate the continued effect of PNG LNG operations.

Among 2,582 labourers reported having ever worked for PNG LNG, 70% were in Hiri and 26% in Hides, compared to only 2% in Karkar and 2.1% in Asaro. These findings are not surprising given that both Hiri and Hides are active PNG LNG locations. Labourers reported working 7.27, and 7.39 hours per day on average in Hiri and Hides, higher than that reported in Karkar and Asaro, 6.3 and 5.0 hours per day, respectively.

Although there were no significant differences in the payment between male and female workers, males are more likely than females to have access to paid employments across all four sites. Most of labourers reported a payment of 100-500 Kinas over the last two weeks. Labourers were paid highest in Hides, followed by Hiri, Asaro and Karkar.

BED NETS (BN)

Bed net (BN) data were collected from 2,927 households residing in the four surveillance sites. Most households reported having one or more BN with an average of 2.8 BN. However, Hiri households reported having 4 BN compared to 3.4 BN in Karkar, and 2.4 BN in Hides compared to 2.1 BN in Asaro.

Further analysis of the 13,985 BN records showed that 67% was long lasting BN and 32% were pre-treated. The distribution of these two BN types was relatively equal in Hiri (57% and 43%) respectively, while the majority of BN in Karkar were long lasting. Similarly, Hides had the majority of BN being long lasting while in Asaro the majority of BN were pre-treated.

Sleeping under BN among children U5 is an important indicator of Millennium Development Goals (MDG). A total of 1,644 children U5 were recorded in the four sites, of whom, 85% reported having slept under a BN last night. This figure was highest in Asaro (95%) compared to 84% in Hides, and lowest in Hiri (56%) compared to 90% in Karkar. There was no difference between male and female children who reported sleeping under a BN last night.

Further analysis of the type of BN indicated that 72% of children U5 slept under long lasting treated BN and 28% of them slept under pre-treated nets in all four sites. In Hiri, 63% of children U5 slept under long lasting BN compared to 85% in Karkar. This figure was 73% in Hides compared to only 10% in Asaro. By contrast, 90% of children U5 in Asaro slept under pre-treated BN. The proportion of children U5 slept under insecticide treated BN is an important indicator of the malaria control programme and the MDGs that needs to be closely monitored and reported by the iHDSS.

WATER AND SANITATION

More than 50% of 4,894 households reported having an improved water source for drinking. 25% of households reported having water piped into the residence in the four sites, i.e., 33% of household in Hiri compared to 27% in Karkar, and 32% in Hides compared to 27% in Asaro. However, the majority (75%) of households had to walk to some distance to fetch their water for drinking. Most of the households simply let their water to “settle” before drinking and only a quarter of households reported boiling water before drinking, with the highest proportion being recorded in Hiri (56%) and lowest in Hides, 27%.

898 households, (10% of households in the four iHDSS sites) reported using an improved sanitation facility, of which 66% used pit latrine with slab. This figure was 42% in Hiri compared to 89% in Karkar, and 54% in Hides compared to 80% in Asaro. By contrast, the proportion of households using pit latrines with ventilation was higher in Hiri than in Karkar, i.e., 27% compared to 2%. The percentage was significantly higher in Hides (30%) than in Asaro (7.5%).

HAND WASHING

Hand washing practices in the four surveillance sites (4,283 households) were monitored and observed. 64% had both water and soap; 19% had water, but no soap; and 6.8% had soap but no water; and 10% had neither water nor soap.

The proportion of households having both water and soap for hand washing was highest in Hiri, 92%, compared to 50% in Karkar, 65% in Asaro compared to 53% in Hides. About 10% of households still had no water or soap for hand washing. This figure was 1.9% in Hiri, but as high as 14% in Karkar, 9% in Hides, and 12% in Asaro.

HOUSEHOLD ASSETS

Half of the houses built in the last four years across all four surveillance sites were traditional non-permanent, i.e., 74% in Hides compared to 57% in Asaro. In contrast, Hiri (1%) had minimal non-permanent housing even compared to Karkar (59%). Not surprisingly, the proportion of semi-permanent and permanent houses was highest in Hiri, 29% and 62%, respectively, much higher than that in Karkar, 27% and 5%, respectively. The significant number of permanent and semi-permanent houses in Hiri likely

reflects the substantial economic impact of the multi-year PNG LNG construction phase. The proportions of these house types were similar between Hides and Asaro, 11% and 14%, and 5.4% compared with 4.7%, respectively. In Hides, the Huli (the dominant ethnic group) typically build non-permanent traditional houses.

The access and utilization of telecommunication services such as mobile phone also reflects ongoing socio-economic changes. 6,228 households, (75% of households) reported having mobile phone subscriptions. This figure was highest in Hiri (92%), compared to 75% in Karkar with 87% in Hides compared to 60% in Asaro. The (i) increased availability of cash via LNG employment and (ii) the rapid improvement and installation of cellular services triggered by the PNG LNG project were undoubtedly significant driving forces in the rapid household uptake of telecommunication services in Hiri and Hides as pre-PNG LNG cellular services were essentially non-existent.

ACCESS AND UTILIZATION OF HEALTH SERVICES

More than 80% of households in the surveillance sites had access to primary health care. The access to primary health care was reported highest in Hides (99%) compared to 78% in Asaro with 94% in Hiri compared to 72% in Karkar.

Walking was reported as the most common way for more than 80% of households to access the closest health facility. Public transportation means was reported by 10% of the households across the four sites. This figure was 13% of households in Hiri compared to 15% in Karkar, and only 1.8% in Hides compared to 4.2% in Asaro. Emergency ambulance service was reported available to about 10% of households in the four sites, with 18% in Asaro; however, almost no one reported using the service.

Regarding the distance from households to the closest health facility, participants reported that it took about 20 minutes to get into the closest health facility on foot. The cost for public transportation e.g., bus and boat was about 2 Kinas in Hides and Asaro, and less than 1 kina in Karkar, but as high as 25 kinas in Hiri. Hiri costs likely reflect proximity to Port Moresby.

In terms of utilisation of healthcare services, 80% of the households reported using out-patient services; 9% used in-patient services, while only 1% of households reported using laboratory services in their last visits to a primary healthcare facility. The outpatient services were used by 72% of household in Hiri compared to 79% in Karkar, with 90% in Hides compared to 87% in Asaro. By contrast, in-patient services were used by households in Hiri and Karkar (12% and 15% respectively) but by less than 3% of households in Hides and Asaro.

90% of households reported positive levels of satisfaction with the healthcare services provided in their last visits to a health facility. By contrast, the dissatisfactory rate was very low, reported by only 5% households in Hiri compared to 1.4% in Karkar, and 1% in Hides compared to 3% in Asaro.

MORBIDITY

The total patient caseload recorded in the iHDSS database was 12,017 in Asaro/Goroka site, 12,608 in Hides/Komo site, 3,962 in Hiri site, and 25,596 in Karkar site over the reporting period. Infectious diseases appeared the most common morbidity across all four surveillance sites, with 9,371 cases reported in Asaro/Goroka, 17,440 cases reported in Hides/Komo, 3,138 cases reported in Hiri, and 12,846 cases reported in Karkar. Respiratory infections were the most prevalent among infectious diseases accounting for 37% of all infections recorded in Asaro/Goroka, 24% in Hides/Komo, 48% in Hiri, and 30% in Karkar. TB cases were quite prevalent in Karkar (108 cases detected). No cases were reported in Hides.

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

1.1 THE IHDSS SITES



PAPUA NEW GUINEA – INSTITUTE OF MEDICAL RESEARCH

Gas (LNG) project has been developed since 2008 and in early 2010 construction began. In April 2014 the PNG LNG Project started production. The iHDSS is designed to provide insight and provide objective data into impacts, positive and negative of the PNG LNG Project.

1.2 ASARO

The Asaro iHDSS site was re-established by the PiHP in 2011 and located approximately 40-45km in the Northeast of Goroka town. Asaro is an agricultural area with a population of approximately 10,000. Major languages 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, *Goroka Provincial Hospital* and three health centres in *Asaro*, *Kwongi* and *Tafeto* villages, where local people can access basic health services. Asaro has more than 10 public and private schools where local children attend at the primary and secondary educational levels. There are currently 26 data reporters currently working within the Asaro iHDSS.

1.3 HIDES

The Hides area is home to major PNG LNG activities including the gas wells and conditioning plant. The Hides iHDSS is located in relative close proximity to the Hides Gas Conditioning Plant (HGCP) and surveys a population of approximately 5-7,000. The total population in the overall Hides area is substantially larger; however, many locations are extremely difficult to access. Tribal cultural norms and practices are an integral part of the local people's lives. 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 close to the Komo Airfield, which was a major logistics centre during PNG LNG Project construction but has now been transferred 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 consistent functioning of higher level schools, i.e., high school. The iHDSS was initially designed to cover three divisions, namely *Haliago* (division 1), *Hibiria* (division 2) and *Gigiria* (division 3) with a total population of approximately 13,000. However due to a combination of funding restraints and security/logistics issues the September 2015 Report includes only division 3, i.e., the area in close proximity to the HGCP. Since PNG LNG Project production began in April 2014, most of PNG LNG activities are concentrated in division 3.

1.4 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* with the total population of 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 and there has been a marked transportation infrastructure improvement since 2010. With both the continued growth of Port Moresby and improvement in transportation links, the Hiri villages are becoming more urbanised and influenced by proximity to Port Moresby.

1.5 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 (of 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. 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 in mainland Madang; hence, Karkar is considered as an appropriate location for comparison with Hiri.

2.0 METHODS AND MATERIALS

This chapter provides details of the data collection tools, methods, data entry and management processes as well as quality control procedures that are applied across the iHDSS sites.

2.1 HOUSEHOLD QUESTIONNAIRE

Data used in this report are extracted from the household data component of the iHDSS database, which were updated over the reporting period Jan-June 2015, using the Household Questionnaire (HHQ). “Household” is defined as a person or a group of persons, related or unrelated, who live together in the same dwelling, unit or house. This questionnaire was initially designed for conducting the 2011 baseline population census. Socio-economic status and demographic characteristics of households at the iHDSS sites were also obtained. The HHQ was redesigned in 2014 and adapted new elements from data collection tools, currently in use in other INDEPTH Network’s country members, as well as from international organisations such as Multi-indicator Cluster Survey (MICS) of UNICEF, Household Expenditure and Living Standard Survey of the World Bank, and Employment and Labour Survey of ILO.

The new household questionnaire comprises eight data modules:

- (i) Household identification information, code and geographic positioning system (GPS);
- (ii) List of household members and their relationship to household head;
- (iii) Education level of household members aged 5 or above;
- (iv) Employment status of household members of working age 15-64;
- (v) Access, availability and utilisation of bed-nets;
- (vi) Water and sanitation status of households;
- (vii) Household characteristics and assets; and
- (viii) Household access and utilisation of health services.

2.2 TRAINING

A “training of trainers” (TOT) training was conducted by the Scientific Coordinator for core staff of PiHP including site managers, fieldwork coordinators, and scientific officers of the four iHDSS sites in October 2014. This training focused on the new design of the HHQ, its structured data modules and household interviewing skills. The training included pre-test and post-test of the HH questionnaire with local people. A post-training evaluation was also conducted with a standard evaluation tool, adopted from the University of Queensland. The HHQ was also translated back into Tok-Pisin by national scientific officers to facilitate the fieldwork, data collection and interviews with households. The TOT training was then followed up by refresh trainings, conducted by Site Managers in collaboration with Fieldwork Coordinators for data collectors at iHDSS sites in November and December 2014. These refresh training provided data collection team essential understandings of the HHQ as well as skills necessary for conducting interviews at households.

2.3 FIELD WORK AND DATA COLLECTION

Fieldwork and data collection were conducted over the Jan-June 2015, using the new HHQ. Data reporters collected household data on a daily basis. Data reporters are based in the villages. Fieldwork was organised by data collection Team Leaders and closely supervised by the Fieldwork Coordinators. A total of 8,389 households were approached for interviews, of which 8,105 households (96.6%) agreed to participate. Hence, there was a refusal rate of 3.4% of households (see Table 2-1). Almost half of the households were interviewed in February and about one fourth were conducted in March (see Table 2-1).

Table 2-1 Permission given to interviews, iHDSS, 2015

Permission given to interview		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
Yes	N	1,571	2,545	3,067	922	8,105
	%	97.7%	92.6%	98.6%	100.0%	96.6%
No	N	37	202	45	0	284
	%	2.3%	7.4%	1.4%	0.0%	3.4%
Total	N	1,608	2,747	3,112	922	8,389
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-2 Distribution of household interviews by month, PNG IMR's iHDSS, 2015

Month of interview		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
January	N	184	272	789	6	1251
	%	11.4%	9.9%	25.4%	0.7%	14.9%
February	N	241	1894	1579	6	3720
	%	15.0%	68.9%	50.7%	0.7%	44.3%
March	N	845	423	728	12	2008
	%	52.5%	15.4%	23.4%	1.3%	23.9%
April	N	292	18	4	289	603
	%	18.2%	0.7%	0.1%	31.3%	7.2%
May	N	41	138	11	605	795
	%	2.5%	5.0%	0.4%	65.6%	9.5%
June	N	3	2	1	4	7
	%	0.2%	0.1%	0.0%	0.4%	0.1%
Total	N	1,608	2,747	3,112	922	8,389
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-3 Outcome of household interview by iHDSS site, 2015

Outcome of HH interviews		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
Completed	N	1507	2459	3002	920	7888
	%	93.7%	89.5%	96.5%	99.8%	94.0%
Not completed	N	37	84	7	0	128
	%	2.3%	3.1%	0.2%	0.0%	1.5%
No HH competent member available	N	4	45	17	0	66
	%	0.2%	1.6%	0.5%	0.0%	0.8%
Entire household absent	N	5	41	24	0	70
	%	0.3%	1.5%	0.8%	0.0%	0.8%
Entire household had moved	N	9	102	5	0	116
	%	0.6%	3.7%	0.2%	0.0%	1.4%
Other	N	14	12	0	0	26
	%	0.9%	0.4%	0.0%	0.0%	0.3%
Missing	N	32	4	57	2	95
	%	2.0%	0.1%	1.8%	0.2%	1.1%
Total	N	1,608	2,747	3,112	922	8,389
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Among households that agreed to take part interviews, 7888 were completed (accounting for 94%), while 128 were not completed (1.5%).

2.4 DATA ENTRY AND MANAGEMENT

Table 2-4 Distribution of data entries by staff, PNG IMR's iHDSS, 2015

Data entry clerk #		Hiri	Asaro	Karkar	Hides	All sites
Data entry clerk #1	N	231	199	788	0	1218
	%	14.4%	7.2%	25.3%	0.0%	14.5%
Data entry clerk #2	N	165	182	719	139	1205
	%	10.3%	6.6%	23.1%	15.1%	14.4%
Data entry clerk #3	N	425	400	118	132	1075
	%	26.4%	14.6%	3.8%	14.3%	12.8%
Data entry clerk #4	N	88	856	150	73	1167
	%	5.5%	31.2%	4.8%	7.9%	13.9%
Data entry clerk #5	N	191	1	529	236	957
	%	11.9%	.0%	17.0%	25.6%	11.4%
Data entry clerk #6	N	144	752	73	155	1124
	%	9.0%	27.4%	2.3%	16.8%	13.4%
Data entry clerk #7	N	136	1	610	86	833
	%	8.5%	0.1%	19.8%	9.3%	10.2%
Data entry clerk #8	N	228	356	125	101	810
	%	14.2%	13.0%	4.0%	11.0%	9.7%
Total	N	1,608	2,747	3,112	922	8,389
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Data collection forms were sent to the PNG IMR main office in Goroka for data entry into the iHDSS database. The data management team has eight data entry clerks. The distribution of data entries by entry clerk is shown in Table 2-4. HH information was entered into the iHDSS database using a standard data entry template for the HHQ. The Data manager used a My SQL/Process Maker to develop this template. A data quality control officer monitored the data entry progress and provided technical assistance to data entry clerks as required.

The data manager edited the database and extracted raw datasets, using scripts. The HH dataset and sub-data sets were converted from excel spreadsheet into Statistical Package for Social Study (SPSS) for the training and later on for data analysis, in order to produce tables and graphs of the report.

2.5 DATA QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

Figure 2-1 describes the QA/QC procedures that have been applied to the data collection, recording and processing of the iHDSS since mid 2014. These QA/QC procedures are applied to all three data activities:

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

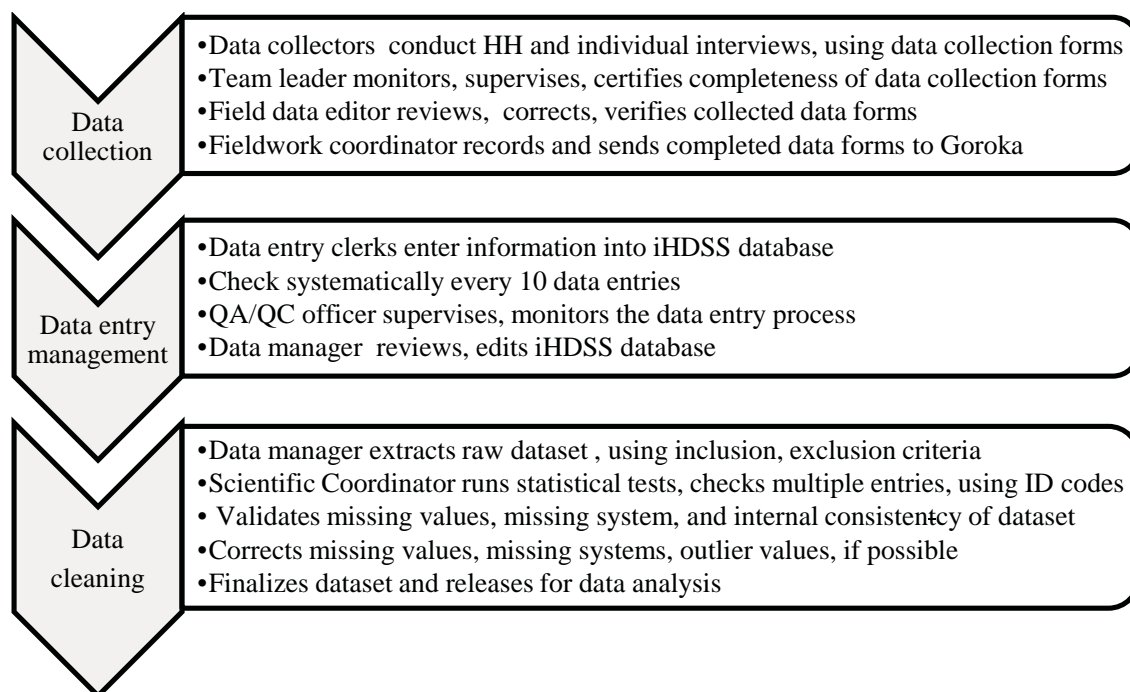


Figure 2-1 QA/QC measures of the PNG IMR iHDSS, 2015

With the assistance of data collection team leaders, data collectors visited households and conducted interviews with household members, primarily with household heads. Data collection team leaders supervise data collection process in their respective villages. Every ten data collectors have one team leader on average to ensure they have sufficient time to supervise the data collection properly. Each iHDSS site has one or two field-based Data Editors, depending on the population size and geographical coverage of the site. Data Editors reviewed data forms and identified mistakes, double-checked with the Fieldwork Coordinators for clarifications and corrections. The fieldwork coordinator supervised the fieldwork activities in his/her iHDSS site in order to ensure activities were conducted as planned and in a coordinated manner to meet quality and progress requirements. Site managers endorsed all data collection forms and sent them to Goroka office for data entry into the database.

Data QC officer monitored the data entry process, randomly checked about ten percent of the entries and edited the iHDSS database to see if any errors were detected. The data manager maintains the database in order to make sure all the data modules of HH data components are linked via the HH and individual unique ID codes. Data manager generated the HH datasets by extracting relevant variables from the iHDSS database. Raw dataset and sub-datasets were then passed to the study design team for data analysis.

The Scientific Coordinator took the final check of the HH datasets, ran statistical tests to check multiple entries, missing values and missing system. The internal consistency within the dataset was also cross-checked between related variables. Corrections were made to the datasets as needed. Outlier values were recorded for further examination in order to identify their potential to change the results of the data analysis. The final datasets were released to the study design team for data analysis and report writing.

2.6 ASSESSMENT OF THE DATA QUALITY

Table 2-5 Completeness of sex variables by site, PNG IMR's iHDSS, 2015

		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
Male	N	6391	4413	8189	2212	21205
	%	51.6%	50.0%	51.9%	50.4%	51.3%
Female	N	5796	4099	7347	2152	19394
	%	46.8%	46.5%	46.6%	49.0%	46.9%
DK	N	3	5	3	3	14
	%	0.0%	0.1%	0.0%	0.1%	0.0%
Missing	N	195	303	231	22	751
	%	1.6%	3.4%	1.4%	0.5%	1.8%
Total	N	12,385	8,820	15,770	4,389	41,364
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 2-5 and Table 2-6 show the completeness of age and sex information for the 41,364 individuals recorded in the iHDSS database. Age and sex are the most important variables for cross-table analysis of the surveillance population. Consistently across all the four iHDSS sites missing information for sex was 1.8% and only 0.1% for age. Asaro had the highest rate of missing information for sex, 3.4% and highest response of 'Don't know' for age, 3.3%.

Table 2-6 Completeness of age variable by site, PNG IMR's iHDSS, 2015

Age	iHDSS site					All sites
	Hiri	Asaro	Karkar	Hides		
0	N	54	4	15	6	79
	%	.4%	.0%	.1%	.1%	.2%
1	N	359	73	242	68	742
	%	2.9%	.9%	1.5%	1.6%	1.8%
2	N	351	144	205	105	805
	%	2.9%	1.7%	1.3%	2.4%	2.0%
3	N	352	178	336	93	959
	%	2.9%	2.1%	2.1%	2.1%	2.4%
4	N	323	209	441	134	1107
	%	2.6%	2.5%	2.8%	3.1%	2.7%
5	N	345	231	476	149	1201
	%	2.8%	2.7%	3.0%	3.4%	2.9%
6	N	306	245	408	116	1075
	%	2.5%	2.9%	2.6%	2.7%	2.6%
7	N	311	218	405	98	1032
	%	2.5%	2.6%	2.6%	2.2%	2.5%
8	N	296	221	470	98	1085
	%	2.4%	2.6%	3.0%	2.2%	2.7%
9	N	296	215	436	121	1068
	%	2.4%	2.5%	2.8%	2.8%	2.6%
10	N	323	182	468	99	1072
	%	2.6%	2.1%	3.0%	2.3%	2.6%
11	N	257	230	424	107	1018
	%	2.1%	2.7%	2.7%	2.5%	2.5%
12	N	235	176	394	82	887
	%	1.9%	2.1%	2.5%	1.9%	2.2%
13	N	257	167	377	112	913
	%	2.1%	2.0%	2.4%	2.6%	2.2%
14	N	222	151	316	62	751
	%	1.8%	1.8%	2.0%	1.4%	1.8%
15	N	313	209	425	104	1051
	%	2.6%	2.5%	2.7%	2.4%	2.6%
16	N	208	183	395	87	873
	%	1.7%	2.2%	2.5%	2.0%	2.1%
17	N	227	186	379	72	864
	%	1.9%	2.2%	2.4%	1.6%	2.1%
18	N	210	156	334	73	773
	%	1.7%	1.8%	2.1%	1.7%	1.9%
19	N	227	161	346	77	811
	%	1.9%	1.9%	2.2%	1.8%	2.0%
20	N	225	132	319	57	733
	%	1.8%	1.6%	2.0%	1.3%	1.8%
21	N	241	118	347	85	791
	%	2.0%	1.4%	2.2%	1.9%	1.9%
22	N	195	136	302	63	696
	%	1.6%	1.6%	1.9%	1.4%	1.7%
23	N	223	123	345	101	792
	%	1.8%	1.4%	2.2%	2.3%	1.9%
24	N	209	138	239	71	657
	%	1.7%	1.6%	1.5%	1.6%	1.6%
25	N	259	99	273	85	716
	%	2.1%	1.2%	1.7%	1.9%	1.8%
26	N	223	140	256	84	703
	%	1.8%	1.6%	1.6%	1.9%	1.7%

Age		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
27	N	181	103	226	96	606
	%	1.5%	1.2%	1.4%	2.2%	1.5%
28	N	204	136	234	106	680
	%	1.7%	1.6%	1.5%	2.4%	1.7%
29	N	217	137	224	100	678
	%	1.8%	1.6%	1.4%	2.3%	1.7%
30	N	196	111	259	96	662
	%	1.6%	1.3%	1.7%	2.2%	1.6%
31	N	193	95	240	90	618
	%	1.6%	1.1%	1.5%	2.1%	1.5%
32	N	162	131	253	105	651
	%	1.3%	1.5%	1.6%	2.4%	1.6%
33	N	171	119	242	143	675
	%	1.4%	1.4%	1.5%	3.3%	1.7%
34	N	146	156	152	42	496
	%	1.2%	1.8%	1.0%	1.0%	1.2%
35	N	165	90	218	76	549
	%	1.3%	1.1%	1.4%	1.7%	1.3%
36	N	169	118	183	60	530
	%	1.4%	1.4%	1.2%	1.4%	1.3%
37	N	142	58	171	47	418
	%	1.2%	.7%	1.1%	1.1%	1.0%
38	N	153	100	154	88	495
	%	1.3%	1.2%	1.0%	2.0%	1.2%
39	N	160	137	201	48	546
	%	1.3%	1.6%	1.3%	1.1%	1.3%
40	N	188	123	181	41	533
	%	1.5%	1.4%	1.2%	.9%	1.3%
41	N	131	89	188	45	453
	%	1.1%	1.0%	1.2%	1.0%	1.1%
42	N	164	123	158	62	507
	%	1.3%	1.4%	1.0%	1.4%	1.2%
43	N	164	130	212	129	635
	%	1.3%	1.5%	1.4%	3.0%	1.6%
44	N	105	152	89	37	383
	%	.9%	1.8%	.6%	.8%	.9%
45	N	117	62	147	54	380
	%	1.0%	.7%	.9%	1.2%	.9%
46	N	155	100	159	22	436
	%	1.3%	1.2%	1.0%	.5%	1.1%
47	N	93	71	139	25	328
	%	.8%	.8%	.9%	.6%	.8%
48	N	84	53	100	47	284
	%	.7%	.6%	.6%	1.1%	.7%
49	N	83	92	139	19	333
	%	.7%	1.1%	.9%	.4%	.8%
50	N	128	81	102	26	337
	%	1.0%	1.0%	.7%	.6%	.8%
51	N	124	55	152	22	353
	%	1.0%	.6%	1.0%	.5%	.9%
52	N	100	73	145	31	349
	%	.8%	.9%	.9%	.7%	.9%
53	N	87	69	155	46	357
	%	.7%	.8%	1.0%	1.1%	.9%
54	N	85	111	78	10	284

Age	iHDSS site					All sites
		Hiri	Asaro	Karkar	Hides	
	%	.7%	1.3%	.5%	.2%	.7%
55	N	80	44	122	27	273
	%	.7%	.5%	.8%	.6%	.7%
56	N	84	42	102	14	242
	%	.7%	.5%	.7%	.3%	.6%
57	N	89	32	99	10	230
	%	.7%	.4%	.6%	.2%	.6%
58	N	66	48	69	9	192
	%	.5%	.6%	.4%	.2%	.5%
59	N	71	75	66	6	218
	%	.6%	.9%	.4%	.1%	.5%
60	N	58	28	70	4	160
	%	.5%	.3%	.4%	.1%	.4%
61	N	67	41	83	5	196
	%	.5%	.5%	.5%	.1%	.5%
62	N	43	49	60	11	163
	%	.4%	.6%	.4%	.3%	.4%
63	N	56	35	92	24	207
	%	.5%	.4%	.6%	.5%	.5%
64	N	27	65	33	2	127
	%	.2%	.8%	.2%	.0%	.3%
65	N	52	27	53	10	142
	%	.4%	.3%	.3%	.2%	.3%
66	N	29	30	47	0	106
	%	.2%	.4%	.3%	0.0%	.3%
67	N	25	21	43	1	90
	%	.2%	.2%	.3%	.0%	.2%
68	N	27	27	29	4	87
	%	.2%	.3%	.2%	.1%	.2%
69	N	30	44	26	6	106
	%	.2%	.5%	.2%	.1%	.3%
70	N	31	21	29	5	86
	%	.3%	.2%	.2%	.1%	.2%
71	N	17	18	27	0	62
	%	.1%	.2%	.2%	0.0%	.2%
72	N	16	33	26	2	77
	%	.1%	.4%	.2%	.0%	.2%
73	N	21	29	40	5	95
	%	.2%	.3%	.3%	.1%	.2%
74	N	8	35	24	1	68
	%	.1%	.4%	.2%	.0%	.2%
75	N	10	9	40	2	61
	%	.1%	.1%	.3%	.0%	.1%
76	N	8	6	25	0	39
	%	.1%	.1%	.2%	0.0%	.1%
77	N	13	7	23	0	43
	%	.1%	.1%	.1%	0.0%	.1%
78	N	9	4	8	2	23
	%	.1%	.0%	.1%	.0%	.1%
79	N	12	21	5	0	38
	%	.1%	.2%	.0%	0.0%	.1%
80	N	5	4	9	0	18
	%	.0%	.0%	.1%	0.0%	.0%
81	N	8	5	8	0	21
	%	.1%	.1%	.1%	0.0%	.1%

Age	iHDSS site				All sites
	Hiri	Asaro	Karkar	Hides	
82	N	5	11	4	21
	%	.0%	.1%	.0%	.1%
83	N	10	3	3	16
	%	.1%	.0%	.0%	.0%
84	N	4	12	1	17
	%	.0%	.1%	.0%	.0%
85	N	5	6	6	18
	%	.0%	.1%	.0%	.0%
86	N	0	3	4	7
	%	0.0%	.0%	.0%	.0%
87	N	6	3	2	11
	%	.0%	.0%	.0%	.0%
88	N	2	3	1	7
	%	.0%	.0%	.0%	.0%
89	N	2	8	1	11
	%	.0%	.1%	.0%	.0%
90	N	0	2	0	2
	%	0.0%	.0%	0.0%	.0%
91	N	1	2	1	4
	%	.0%	.0%	.0%	.0%
92	N	1	1	1	3
	%	.0%	.0%	.0%	.0%
93	N	1	0	1	2
	%	.0%	0.0%	.0%	.0%
94	N	6	8	2	17
	%	.0%	.1%	.0%	.0%
95	N	62	41	59	168
	%	.5%	.5%	.4%	.4%
DK	N	49	281	9	419
	%	0.4%	3.3%	0.1%	1.0%
Missing	N	10	5	18	36
	%	0.1%	0.1%	0.1%	0.1%
Total	N	12240	8489	15645	40739
	%	100.0%	100.0%	100.0%	100.0%

2.7 DATA ANALYSIS AND REPORT WRITING

The Scientific Coordinator conducted a three-day training workshop on basic data analysis and report writing skills in the last week of August 2015. A core group of ten national scientific officers attended the training and used their newly acquired knowledge and skills to develop the 2015 September Report. Statistics Package for Social Science (SPSS) version 20 was used for the data analysis. MapInfo was used for making maps of household distribution of iHDSS sites, using the household GPS data.

3.0 POPULATION AND HOUSEHOLD CHARACTERISTICS

3.1 ABSTRACT

This Chapter reports key findings and observations on socio-demographic characteristics of households for the four iHDSS sites, Asaro, Hiri, Hides and Karkar. A total of 41,364 individuals and 8,387 households were recorded and extracted from the iHDSS database by the end of August 2015. These data provide an update on socio-economic development and health status of the defined population over the reporting period. The data analysis focuses on key demographic indicators such as household size, distribution and structure.

The first level of household size was 3-4 persons, (30% of all households), followed by the second level of 5-6 persons, (26% of households). More than half of households reported no children under age five (U5). However, 40% of households had 1-2 children U5 and less than 5% of households reported having 5 children or more. The proportion of children U5 was even lower in Asaro and Karkar, 7.4% and 7.9%, respectively.

More than half of households reported having one man of working age 15-64 with 20% having two men of working age. Ten percent of households had no man of working age. Similarly, almost half of households had a woman of reproductive age 15-49 and 20% of households had two women in this age group. The number of households without women aged 15-49 accounted for 20% of surveyed households.

One third of the surveillance population are children aged 0-14. The proportion of children U5 accounted for only 9% of the total population. The sex ratio (Males: Females) was 104:100.

3.2 POPULATION AND HOUSEHOLD DISTRIBUTION

Table 3-1 showed the overall population and household distribution by the iHDSS sites as of June 2015. A total of 8,387 households were included in the update round, with the population coverage of 41,364 individuals across the four sites.

Table 3-1 Population and household distribution by iHDSS site, 2015

	iHDSS site				Total
	Asaro	Hides	Hiri	Karkar	
Number of households	2,747	922	1,606	3,112	8,387
Population records	8,820	4,389	12,385	15,770	41,364

3.3 HOUSEHOLD CHARACTERISTICS

Table 3-2 shows the household size, the main household demographic characteristic. The level of household size was 3-4 persons (30%), followed by 5-6 persons (26%). Less than 5% of households had 11-30 persons. Hiri had almost 20% of households with 10-30 persons. The implications for communicable disease transmission i.e. tuberculosis, for a high population density at the household level are significant. Previous PNG IMR studies demonstrated that TB prevalence and incidence rates in Hiri are significantly higher than the other surveillance sites.

Table 3-2 Household size, PNG IMR's iHDSS, 2015

Household size		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
1-2 Person	N	91	882	433	169	1575
	%	5.94%	35.82%	14.24%	18.41%	19.81%
3-4 persons	N	229	916	945	322	2412
	%	14.96%	37.21%	31.09%	35.08%	30.34%
5-6 persons	N	415	489	967	247	2118
	%	27.11%	19.86%	31.81%	26.91%	26.64%
7-8 persons	N	301	144	475	108	1028
	%	19.66%	5.85%	15.63%	11.76%	12.93%
9-10 persons	N	190	28	162	50	430
	%	12.41%	1.14%	5.33%	5.45%	5.41%
11-30 persons	N	305	3	58	22	388
	%	19.92%	0.12%	1.91%	2.40%	4.88%
Total	N	1,531	2,462	3,040	918	7,951
	%	100.00%	100.00%	100.00%	100.00%	100.00%
Mean of HH size		7.63	3.44	4.93	4.68	4.96

Table 3-3 shows marked differences in children U5 populations across the four sites. There is a marked difference between Hiri and the other sites. Whether this observed difference is related to cultural differences or changes in income/standard of living is unknown. Previous PNG IMR surveys observed a 'birth boom' in Hiri over the 2011- 2014 time frame.

Table 3-3 Number of children under 5 years of age in households, PNG IMR's iHDSS, 2015

		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
None	N	391	1716	1644	440	4191
	%	28.7%	69.7%	56.3%	49.7%	54.9%
1-2	N	786	730	1197	373	3086
	%	57.7%	29.7%	41.0%	42.1%	40.5%
3-4	N	148	14	68	62	292
	%	10.9%	0.6%	2.3%	7.0%	3.8%
5-6	N	29	0	6	8	43
	%	2.1%	0.0%	0.2%	0.9%	0.6%
7+	N	8	2	5	1	16
	%	0.6%	0.1%	0.2%	0.1%	0.2%
DK	N	0	0	0	1	1
	%	0.0%	0.0%	0.0%	0.1%	0.0%
Total	N	1,362	2,462	2,920	885	7,629
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3-4 and Table 3-5 showed the numbers of men of working age 15-64 and women of reproductive age 15-49 in the households. The number of households with one man aged 15-64 was similar to the number of households with one woman aged 15-49. However, there were only 10% of households without men age 15-64 compared to 20% of households without women 15-49. Again marked differences across sites are observed, particularly in Hiri.

Table 3-4 Number of men of working age, 15-64 in households, PNG IMR's iHDSS, 2015

No of men 15-64		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
0	N	36	443	237	126	842
	%	2.4%	18.1%	7.9%	13.8%	10.7%
1	N	498	1482	1566	452	3998
	%	32.8%	60.4%	52.2%	49.7%	50.7%
2	N	344	396	614	173	1527
	%	22.7%	16.1%	20.5%	19.0%	19.4%
3	N	289	105	354	86	834
	%	19.0%	4.3%	11.8%	9.5%	10.6%
4	N	178	22	168	38	406
	%	11.7%	0.9%	5.6%	4.2%	5.2%
5+	N	173	6	60	34	273
	%	11.4%	0.2%	2.0%	3.7%	3.5%
DK	N	0	0	0	1	1
	%	0.0%	0.0%	0.0%	0.1%	0.0%
Total	N	1,518	2,454	2,999	910	7,881
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3-5 Number of women of reproductive age 15-49, PNG IMR's iHDSS 2015

No of women 15-49		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
0	N	81	803	570	117	1571
	%	5.4%	32.6%	19.0%	12.9%	20.0%
1	N	594	1232	1522	430	3778
	%	39.5%	50.0%	50.8%	47.4%	48.0%
2	N	424	323	575	208	1530
	%	28.2%	13.1%	19.2%	22.9%	19.4%
3	N	241	87	255	101	684
	%	16.0%	3.5%	8.5%	11.1%	8.7%
4	N	98	15	60	36	209
	%	6.5%	.6%	2.0%	4.0%	2.7%
5+	N	64	3	16	15	98
	%	4.30%	0.10%	0.50%	1.60%	1.30%
DK	N	0	0	0	1	1
	%	0.0%	0.0%	0.0%	.1%	.0%
Total	N	1,502	2,463	2,998	908	7,871
	%	100.0%	100.0%	100.0%	100.0%	100.0%

3.4 AGE AND SEX POPULATION STRUCTURE

Table 3-6 Age and sex structure of surveillance population, PNG IMR's iHDSS, 2015

Age group	Male		Female		Total		Sex ratio (M:F)
	N	%	N	%	N	%	
0-4	1859	8.9	1792	9.4	3651	9.1	104
5-9	2860	13.7	2571	13.5	5431	13.6	111
10-14	2422	11.6	2195	11.5	4617	11.5	110
15-19	2241	10.7	2099	11.0	4340	10.8	107
20-24	1939	9.3	1713	9.0	3652	9.1	113
25-29	1733	8.3	1624	8.5	3357	8.4	107
30-34	1552	7.4	1528	8.0	3080	7.7	102
35-39	1344	6.4	1180	6.2	2524	6.3	114
40-44	1300	6.2	1202	6.3	2502	6.3	108
45-49	942	4.5	813	4.3	1755	4.4	116
50-54	869	4.2	804	4.2	1673	4.2	108
55-59	617	2.9	529	2.8	1146	2.9	117
60-64	481	2.3	366	1.9	847	2.1	131
65-69	287	1.4	244	1.3	531	1.3	118
70+	471	2.3	447	2.3	918	2.3	105
Total	20,917	100.0	19,107	100.0	40,024	100.0	109

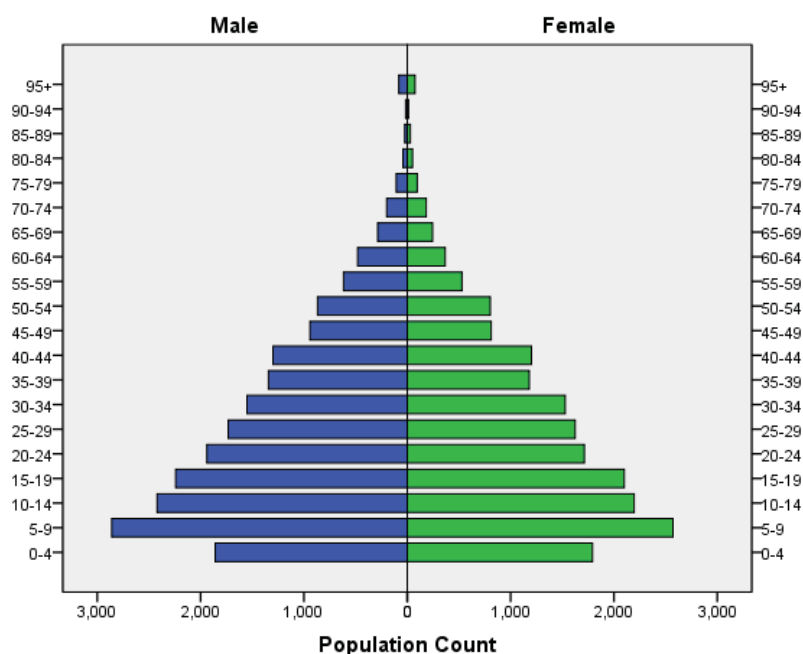


Figure 3-1 Population pyramid of surveillance population, four PNG IMR's iHDSS sites, 2015

Figure 3-1 showed the age and sex population structure of the surveillance population in four iHDSS sites. The pyramid shows the population is very young, with longer bars at the bottom. The overall sex composition of the population is balance.

As highlighted in the previous report, several observations are highlighted. Firstly, the shorter bar of the overall iHDSS population in the 0-4 age group suggests fewer children were born in the last four years. Secondly, the population in the age group 35-39 was relatively smaller than other age groups. These observations refer to the entire iHDSS population; however, there are individual site differences. The next sections present age and sex population structure of each iHDSS site.

3.4.1 Asaro

Table 3-7 shows the population distribution by age group and sex for the Asaro iHDSS. The Asaro iHDSS covers 8,187 people. The sex ratio (M: F) was 108 males per 100 females. The sex ratios were heavily weighted across age groups of 50-64. In contrast, the sex ratios were lowest in age group 30-34 and 40-44 (80-84 males per 100 females). In contrast, there were more males in age group 35-39 than females. Further analysis of the migration flows and reasons for migration could provide insights into these findings.

It is noted that population of working age, 15-64, accounts for 62.7% of the population in Asaro. The total dependency ratio was 37.4%, including 32.5% of child dependency and 5.2% of elderly dependency.

Table 3-7 Population distribution by sex and age groups, Asaro iHDSS site, 2015

Age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-4	321	7.6	285	7.2	606	7.4	113
5-9	596	14.0	532	13.5	1128	13.8	112
10-14	454	10.7	452	11.5	906	11.1	100
15-19	482	11.4	410	10.4	892	10.9	118
20-24	345	8.1	301	7.6	646	7.9	115
25-29	299	7.0	314	8.0	613	7.5	95
30-34	272	6.4	339	8.6	611	7.5	80
35-39	264	6.2	237	6.0	501	6.1	111
40-44	281	6.6	336	8.5	617	7.5	84
45-49	202	4.8	176	4.5	378	4.6	115
50-54	215	5.1	174	4.4	389	4.8	124
55-59	149	3.5	91	2.3	240	2.9	164
60-64	124	2.9	94	2.4	218	2.7	132
65-69	85	2.0	64	1.6	149	1.8	133
70+	153	3.6	140	3.5	293	3.6	109
Total	4242	100.0	3945	100.0	8187	100.0	108

Dependency age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-14	1371	32.3	1269	32.2	2640	32.2	108
15-64	2633	62.1	2472	62.7	5105	62.4	107
65+	238	5.6	204	5.2	442	5.4	117
Total	4242	100.0	3945	100.0	8187	100.0	108

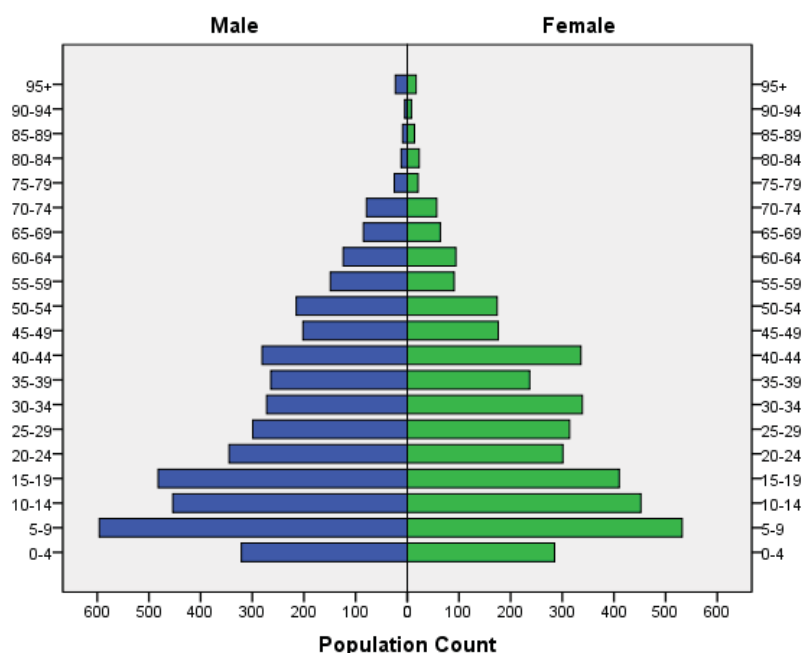


Figure 3-2 Population pyramid of Asaro iHDSS site, 2015

Figure 3-2 shows the population pyramid of Asaro with shorter bars for the population aged 0-4 at the bottom of the pyramid. This observation has been seen for the last two years and requires further investigation to better understand the phenomenon. The population of age group 40-44, particularly females, is larger than usual and could have been due to in-migration flow for seasonal employment during the reporting period.

3.4.2 Hides

Table 3-8. shows the population data of Hides. The Hides iHDSS recorded 4,265 people in the last update. Sex ratio of the entire population was 103 males per 100 females. The sex ratios tend to increase in higher age groups i.e. age groups 65+. However, the population size of this age group is relatively small so that conclusions should be drawn cautiously. Further analysis of age-specific mortality rate to identify the underlying cause for this observation is needed. The small number of population aged 65+ suggests further investigation into age and sex specific mortality among this age group. By contrast, sex ratios are relatively low in younger age groups of 20-34, but quite elevated in ages 40-60 requiring more in-depth analysis in order to better understand these observations.

Table 3-8 Population distribution by sex and age groups, Hides iHDSS site, 2015

Age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-4	196	9.1	210	10.0	406	9.5	93
5-9	313	14.5	267	12.7	580	13.6	117
10-14	235	10.9	226	10.8	461	10.8	104
15-19	198	9.1	213	10.1	411	9.6	93
20-24	172	7.9	203	9.7	375	8.8	85
25-29	225	10.4	244	11.6	469	11.0	92
30-34	220	10.2	253	12.0	473	11.1	87
35-39	163	7.5	156	7.4	319	7.5	104
40-44	173	8.0	139	6.6	312	7.3	124
45-49	98	4.5	67	3.2	165	3.9	146
50-54	76	3.5	59	2.8	135	3.2	129
55-59	47	2.2	19	0.9	66	1.5	247
60-64	19	0.9	26	1.2	45	1.1	73
65-69	13	0.6	8	0.4	21	0.5	163
70+	16	0.7	11	0.5	27	0.6	145
Total	2164	100.0	2101	100.0	4265	100.0	103

Dependency age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-14	744	34.4	703	33.5	1447	33.9	106
15-64	1391	64.3	1379	65.6	2770	64.9	101
65+	29	1.3	19	0.9	48	1.1	153
Total	2,164	100.0	2,101	100.0	4,265	100.0	103

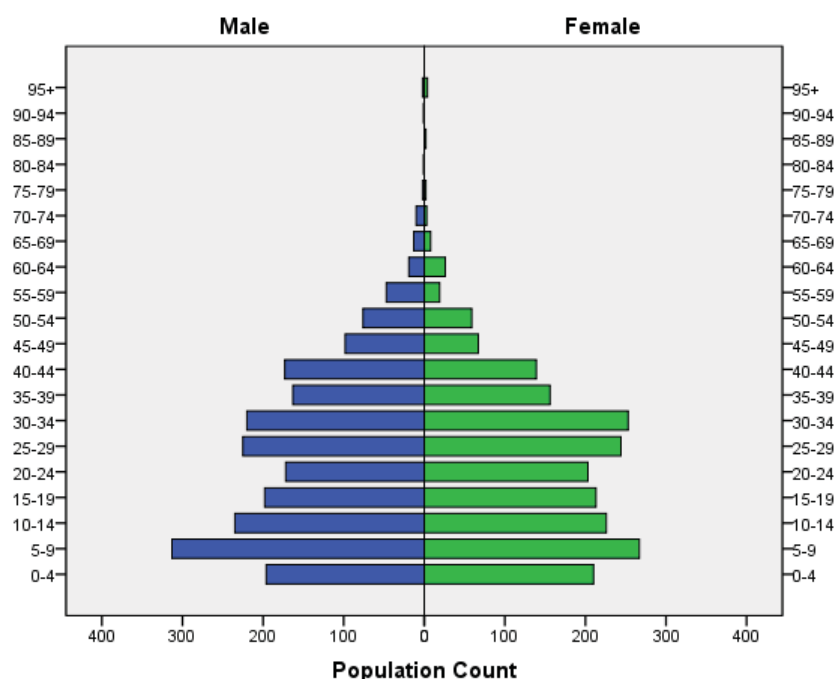


Figure 3-3 Population pyramid of Hides iHDSS site, 2015

The population pyramid of Hides is distorted as shown in Figure 3-8, probably due to the migration flows as reflected in larger populations in the age groups of 25-29 and 30-34. This observation could be due to age specific in-migration flows into the site. The shorter bar of population aged 0-4 suggests a decline in fertility in Hides over the last few years.

3.4.3 Hiri

Table 3-9 shows the data on population distribution by age and sex in Hiri. A total population of 12,097 was recorded in the Hiri iHDSS by September 2015. Child dependency¹ was 35.1% and elderly dependency² was only 3.5%. Total dependency therefore, was only 38.6% of the population. Total dependency ratio³ was 62.8%, meaning that there are approximately 63 dependants per every 100 working population. With such a low total dependency ratio, the Hiri community has a large potential labour force for socio-economic development in the coming years⁴.

¹ Child dependency ratio is measured by the proportion of child population aged 0-14 per 100 population of working age.

² Elderly dependency is measured by the proportion of the population aged 65+ or more per 100 population of working age.

³ Total dependency ratio is measured by the ratio between the total dependency and proportion of population of working age 15-64

⁴ 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 dependent (or less) per each person of working age.

Table 3-9 Population distribution by sex and age groups, Hiri iHDSS site, 2015

Age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-4	730	11.5	685	11.9	1415	11.7	107
5-9	804	12.7	742	12.9	1546	12.8	108
10-14	682	10.7	604	10.5	1286	10.6	113
15-19	611	9.6	568	9.9	1179	9.7	108
20-24	566	8.9	524	9.1	1090	9.0	108
25-29	546	8.6	526	9.1	1072	8.9	104
30-34	468	7.4	396	6.9	864	7.1	118
35-39	422	6.6	363	6.3	785	6.5	116
40-44	423	6.7	327	5.7	750	6.2	129
45-49	277	4.4	253	4.4	530	4.4	109
50-54	261	4.1	261	4.5	522	4.3	100
55-59	191	3.0	197	3.4	388	3.2	97
60-64	144	2.3	106	1.8	250	2.1	136
65-69	89	1.4	74	1.3	163	1.3	120
70+	133	2.1	124	2.2	257	2.1	107
Total	6347	100.0	5750	100.0	12097	100.0	110

Dependency age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-14	2216	34.9	2031	35.3	4247	35.1	109
15-64	3909	61.6	3521	61.2	7430	61.4	111
65+	222	3.5	198	3.4	420	3.5	112
Total	6347	100.0	5750	100.0	12097	100.0	110

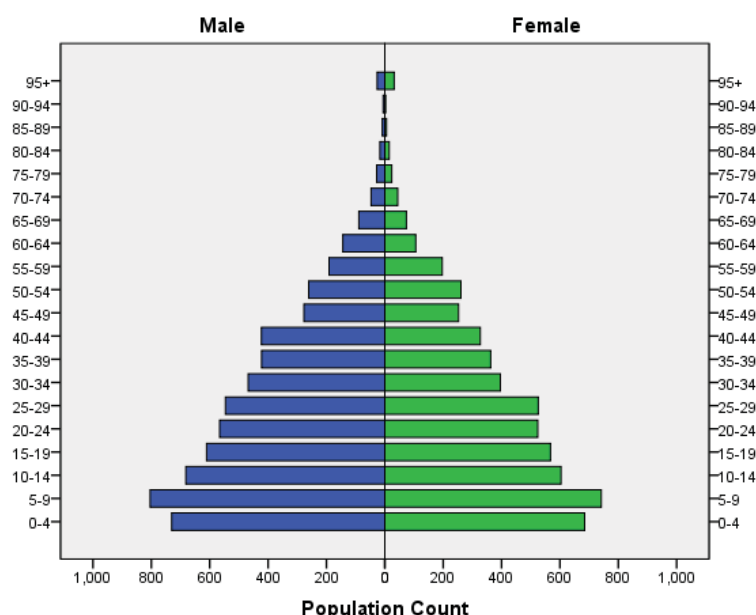


Figure 3-4 Population pyramid of Hiri iHDSS site, 2015

Figure 3-4 is the population pyramid for Hiri. Hiri has a typical population pyramid of a young population. Unlike the September 2014 Report, in which the population in age group of 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. The September 2015 update demonstrates a normal proportion of 20-24 age-group population, suggesting the in-migration flow into Hiri is no longer impacting the population structure of Hiri site.

Table 3-10 shows the population distribution of Hiri iHDSS site by the four villages. Porebada has the largest population of 5,373, followed by Lealea with 3,378. Boera and Papa villages have the similar population sizes, 1,769 and 1,667, respectively. The population of male population was slightly higher than females in Boera and Papa villages.

Table 3-10 Population distribution of Hiri iHDSS site by village, PNG IMR, 2015

Village	Reporting period	Male		Female		Both sexes	
		N	%	N	%	N	%
BOERA	Jan-June 2015	942	53.3	827	46.7	1,769	100.0
	Jul-Dec 2014						
LEALEA	Jan-June 2015	1728	51.2	1650	48.8	3,378	100.0
	Jul-Dec 2014						
PAPA	Jan-June 2015	886	53.1	781	46.9	1,667	100.0
	Jul-Dec 2014						
POREBADA	Jan-June 2015	2835	52.8	2538	47.2	5,373	100.0
	Jul-Dec 2014						
Total		6,391	52.4	5,796	47.6	12,187	100.0

3.4.4 Karkar

Table 3-11 shows the population distribution in Karkar. A total of 15,475 people recorded in the iHDSS in Karkar over the reporting period. The age structure of Karkar population is typical for a young population with 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 (14.1%) and declined gradually to 1.3% for the age group 65-69.

Table 3-11 Population distribution by sex and age groups, Karkar iHDSS site, 2015

Age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-4	612	7.5	612	8.4	1224	7.9	100
5-9	1147	14.0	1030	14.1	2177	14.1	111
10-14	1051	12.9	913	12.5	1964	12.7	115
15-19	950	11.6	908	12.4	1858	12.0	105
20-24	856	10.5	685	9.4	1541	10.0	125
25-29	663	8.1	540	7.4	1203	7.8	123
30-34	592	7.3	540	7.4	1132	7.3	110
35-39	495	6.1	424	5.8	919	5.9	117
40-44	423	5.2	400	5.5	823	5.3	106
45-49	365	4.5	317	4.3	682	4.4	115
50-54	317	3.9	310	4.2	627	4.1	102
55-59	230	2.8	222	3.0	452	2.9	104
60-64	194	2.4	140	1.9	334	2.2	139
65-69	100	1.2	98	1.3	198	1.3	102
70+	169	2.1	172	2.4	341	2.2	98
Total	8164	100.0	7311	100.0	15475	100.0	112

Dependency age group	Male		Female		Total		Sex Ratio M:F
	N	%	N	%	N	%	
0-14	2810	34.4	2555	34.9	5365	34.7	110
15-64	5085	62.3	4486	61.4	9571	61.8	113
65+	269	3.3	270	3.7	539	3.5	100
Total	8164	100.0	7311	100.0	15475	100.0	112

Sex ratio of the entire population of Karkar is high, 112 males per 100 females, i.e. it was 110/100 for children age 0-14, but increased to 113/100 for population of working age 15-64, suggesting 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 61.8%, with a total dependency of 38.2% and the total dependency ratio was only 61.7%, meaning that there are only 62 dependents for every 100 people of working age. This implies great potential of the labour force in Karkar.

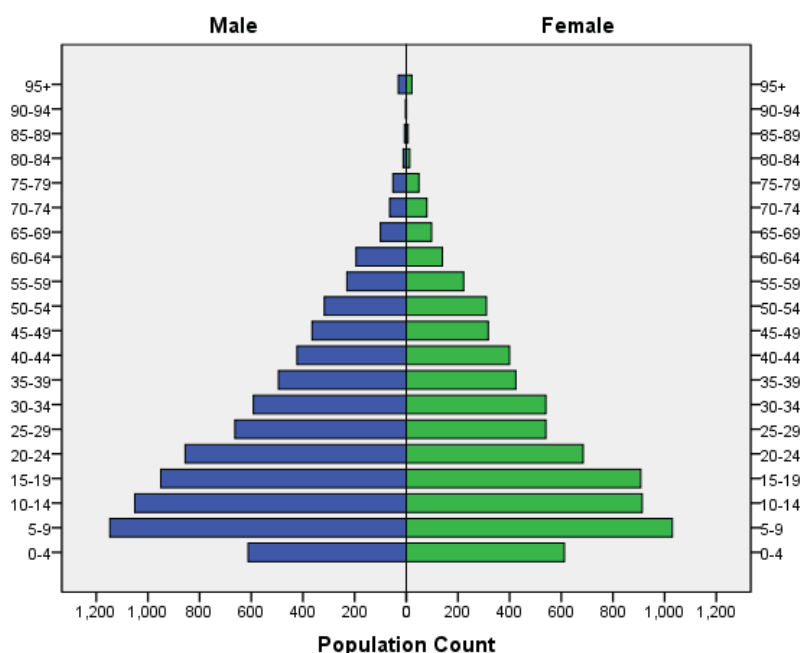


Figure 3-5 Population pyramid of Karkar iHDSS site, 2015

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 has a markedly shorter bar for children in age group 0-4, reflecting a sharp, recent decline in fertility.

3.5 HOUSEHOLD DISTRIBUTION

The next sections, 3.6-3.9, present maps, by iHDSS catchment area, of the spatial distribution of households relative to key public services, i.e., schools and health care.

3.6 ASARO

Figure 3-6 and Figure 3-7 shows the *map* of spatial distribution of households in the relation to the distance to the closest public services such as education and health in the catchment area of Asaro/Goroka iHDSS site. The maps indicated that these public services are located relatively far away from the households, particularly in Asaro. The influence of distance to the utilisation of healthcare services are further analysed in Chapter 10 on access and utilisation of health services.

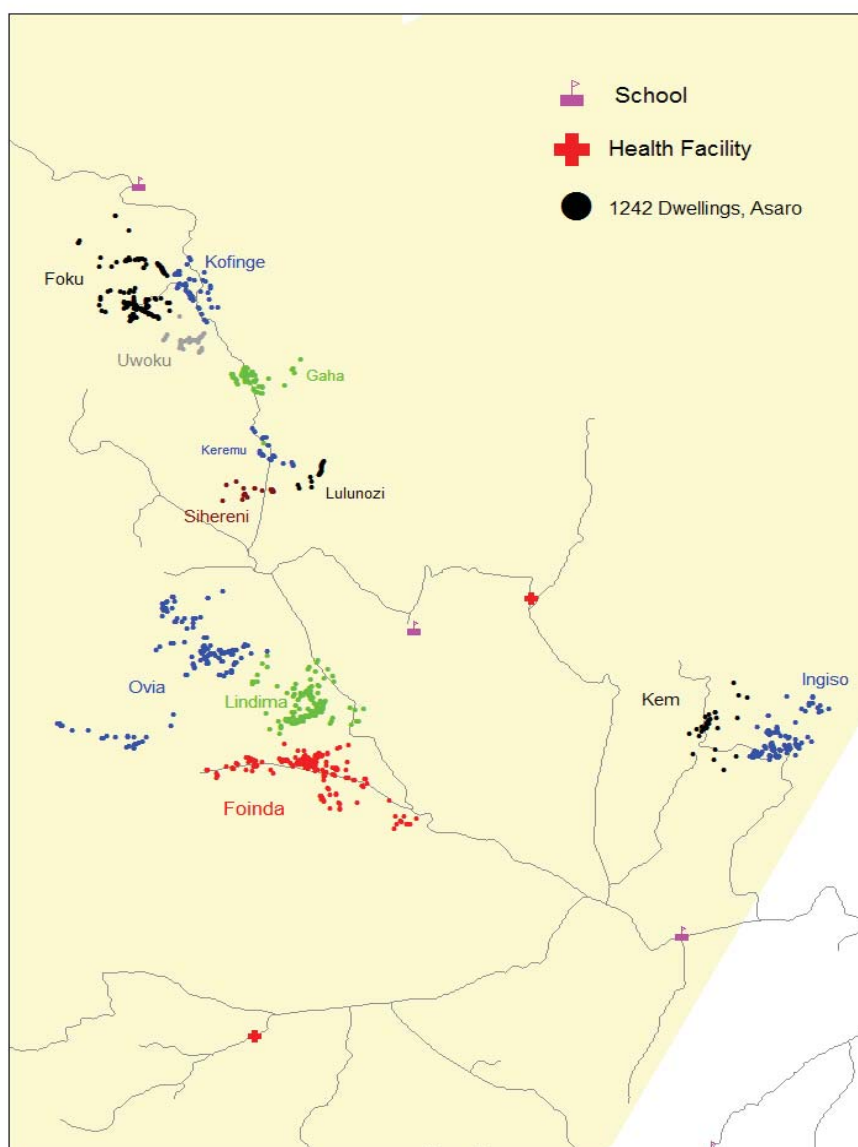


Figure 3-6 Household distribution of Asaro iHDSS site, 2015

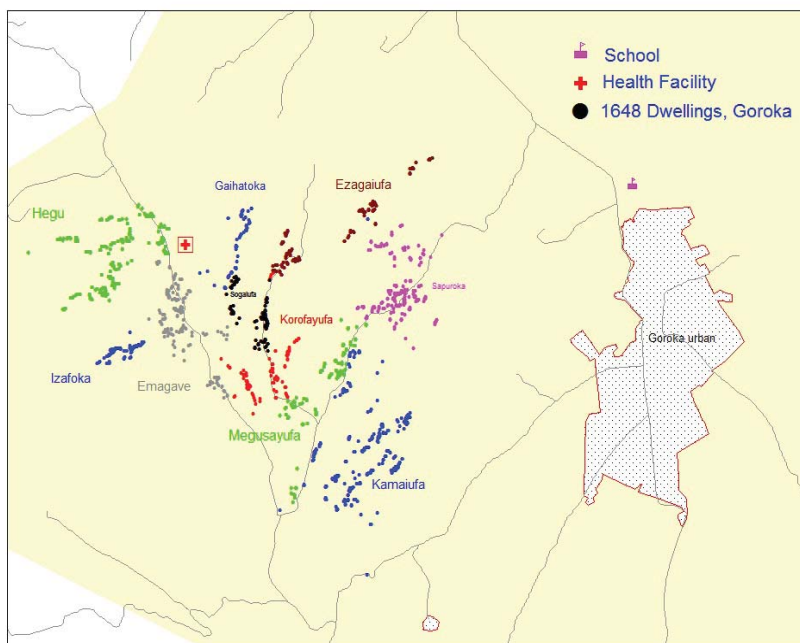


Figure 3-7 Household Distribution of Goroka iHDSS site, 2015

3.7 HIDES

Figure 3-8 show spatial distribution of households in division 3 of Hides iHDSS site. GPS data of 922 households were recorded in the iHDSS database. The map showed that school and health facility were relatively closed to the community, which might have facilitate the access and utilisation of those services. Further analysis of access and utilisation of health services are presented in Chapter 10.

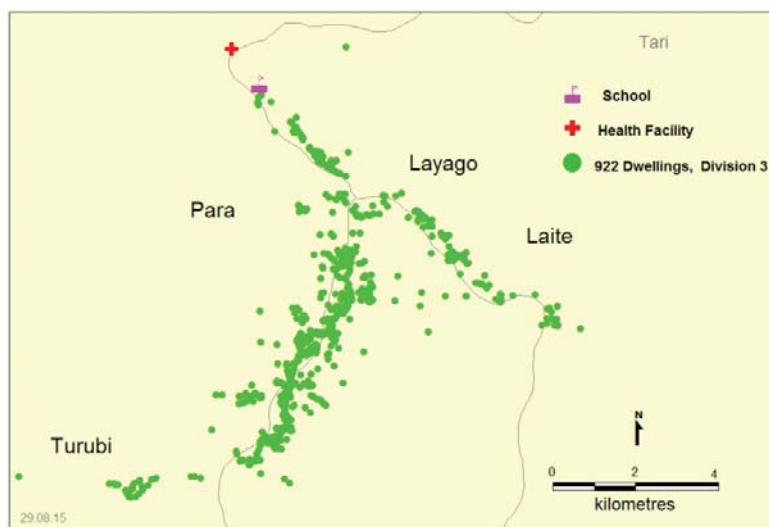


Figure 3-8 Household distribution in division 3 of Hides iHDSS site, 2015

3.8 HIRI

Figure 3-9 shows the map of spatial household distribution of Boera village of Hiri iHDSS site. The map indicated that both school and health facility are located near by the main road, closed and accessible to the population. This could be an important factor influencing the utilization of education and health services of the surveillance population.

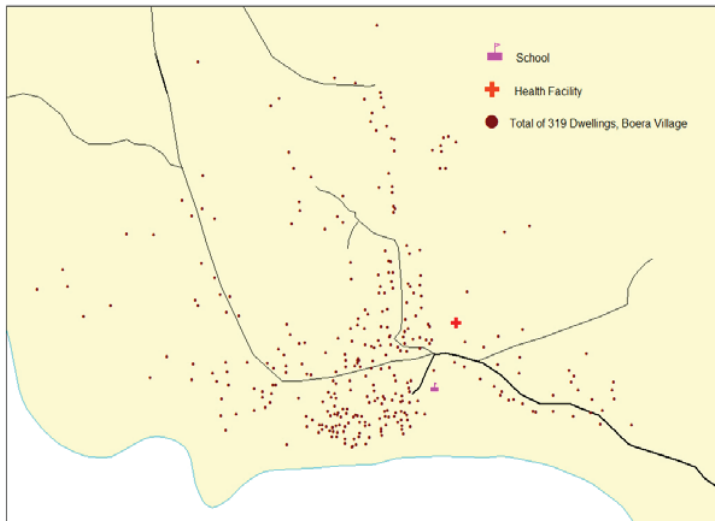


Figure 3-9 Household Distribution of Boera village, Hiri iHDSS, 2015

Figure 3-10 and Figure 3-11 show the maps of household distribution of Lealea and Papa villages of the Hiri iHDSS site. The map showed that Lealea had two schools, which were located closed to the population, but there was no health facility. In contrast, Papa village had two schools and one health facility; both are near by the main road, closed and accessible to the population. Papa clinic is the most frequently used by the surveillance population, not only from Papa village, but also from other surrounding villages of the Hiri site.

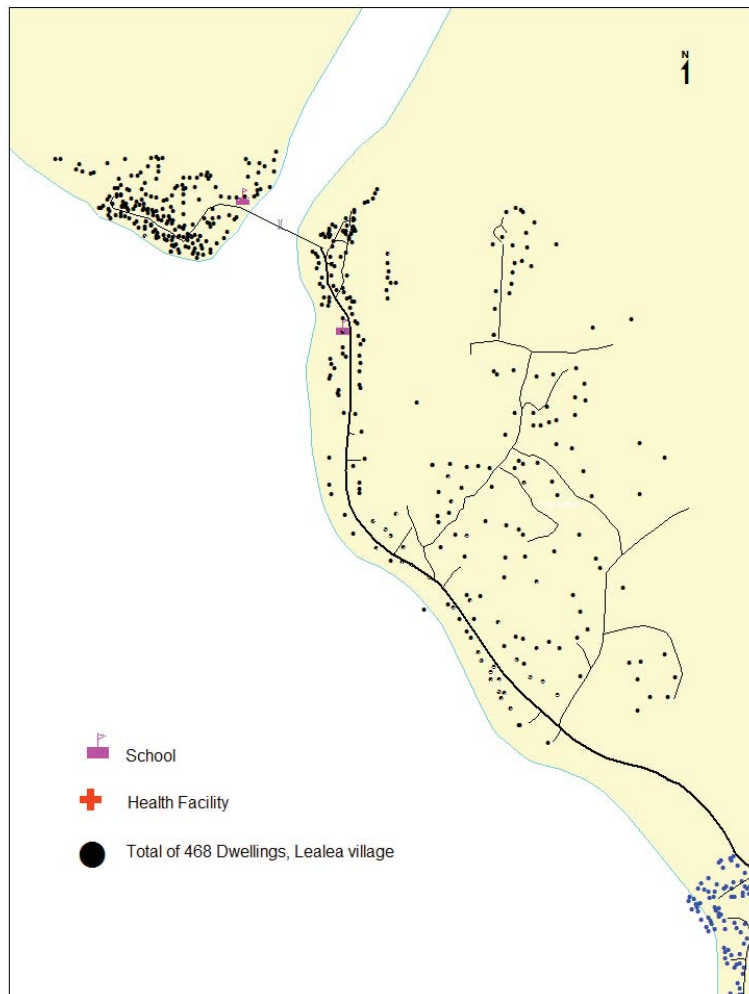


Figure 3-10 Household distribution of Lealea village, Hiri iHDSS site, 2015

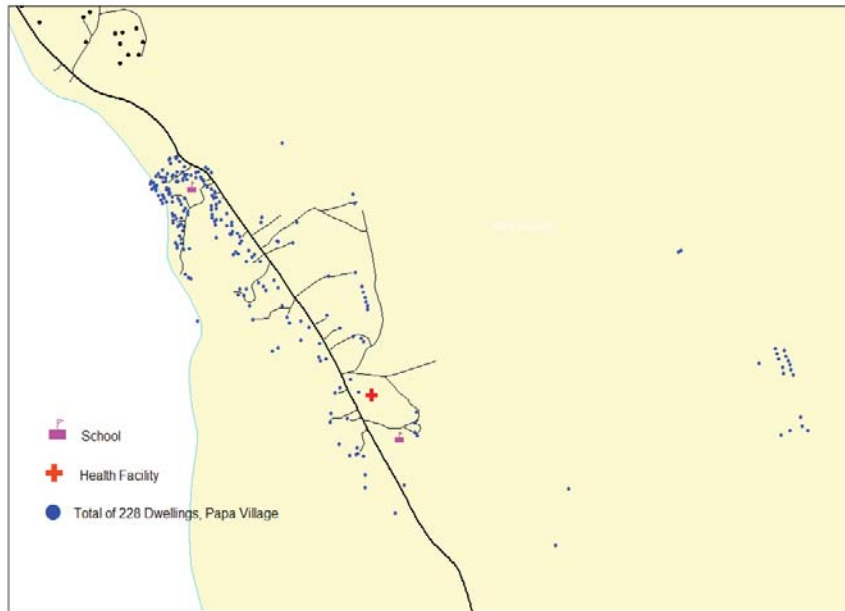


Figure 3-11 Household distribution of Papa village, Hiri iHDSS site, 2015

Figure 3-12 show the map of household distribution of Porebada village. Similar to Papa village, Porebada had two schools and one health facility, which are accessible to the population. This could be an important factor contributing to the increase of utilisation of health services of the population in the village.

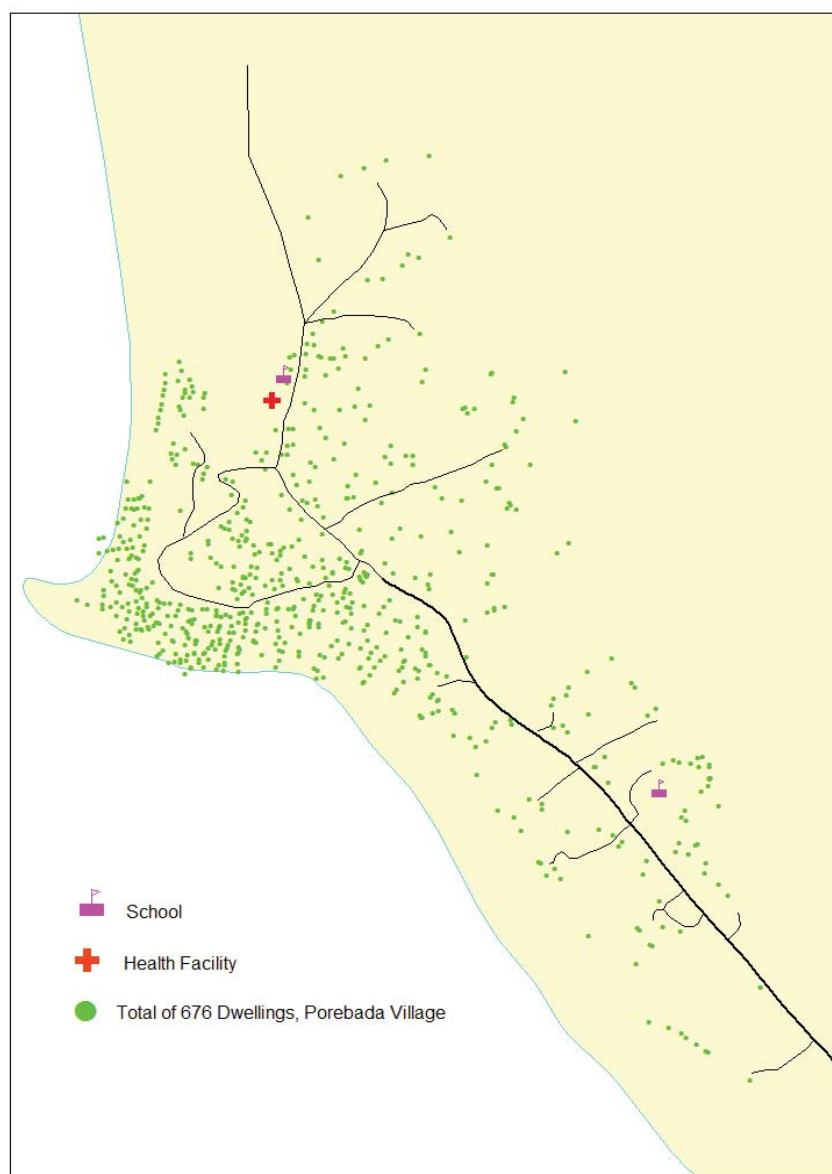


Figure 3-12 Household distribution of Porebada village, Hiri iHDSS site, 2015

3.9 KARKAR

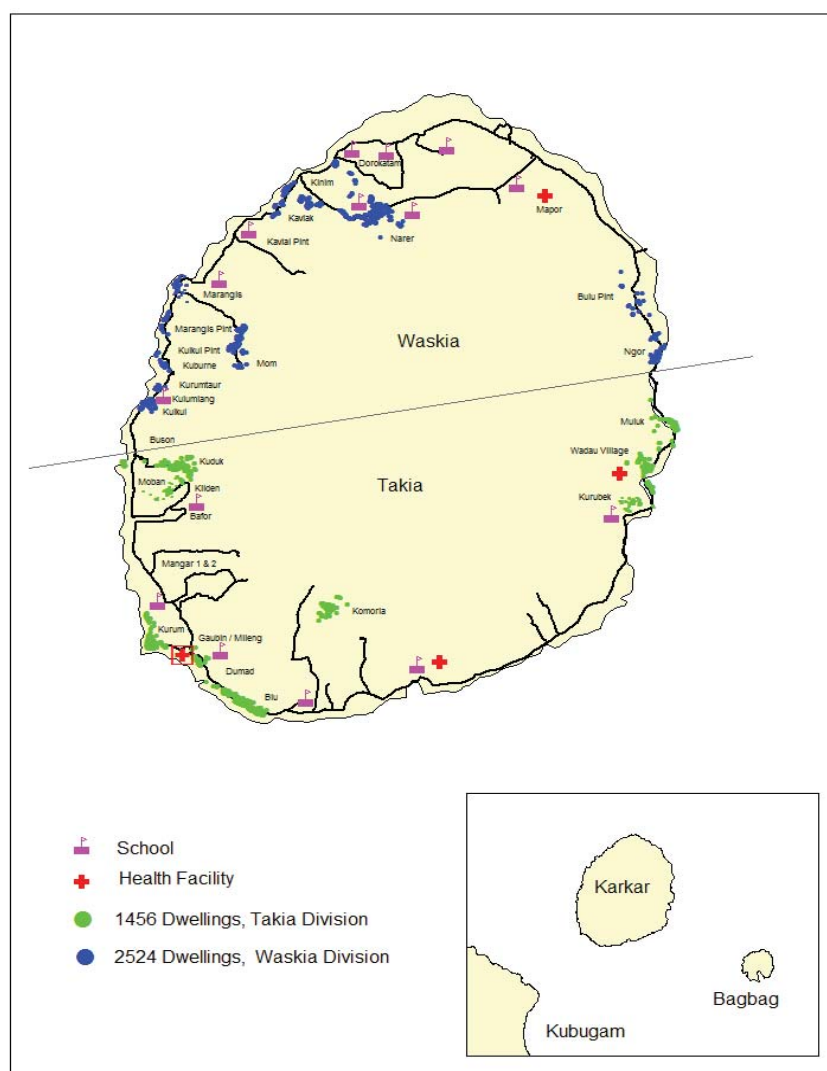


Figure 3-13 Household Distribution of Karkar iHDSS site, 2015

4.0 EDUCATION

4.1 ABSTRACT

This Chapter reports key findings and observations on education of the surveillance population in the four iHDSS sites, namely Asaro, Hiri, Hides and Karkar. Data analysis focuses on school attendance, highest educational level attainment and school grade enrolment in 2015 among the population of schooling age, 5-24 years, compared to the population aged 25+, who presumably have finished their core schooling. Educational analysis was disaggregated by sex, age groups and by iHDSS sites in order to identify the differentials.

The overall data show a considerable progress in education in PNG over the last 20 years. The population in the age group of 5-24 have much better access to education than the population aged 25+ i.e. 74% of the younger cohort reported having ever attended school, compared to 40% of the older cohort. More than a half of the population aged 5-24 reported having attained a primary education, compared to 32% reported by the population aged 25+.

Gender equality (M:F ratios) in education has also improved as reflected in the declining male-to-female ratios, i.e., a very high level of 162 among the older population aged 25+, who have attended school to the level of 116 among the younger population aged 5-24.

Of concern is the low enrolment rate and late enrolment across age groups i.e. only 43% of children aged 5-7 reported being enrolled at elementary; 48% of children aged 8-14 still being enrolled at elementary education; while only 17% of children aged 15-18 enrolled at secondary education. The data also show that educational disparities still exist between males and females at different education levels.

4.2 SCHOOL ATTENDANCE AMONG SURVEILLANCE POPULATION

Table 4-1 and Table 4-2 show school attendance of the surveillance population of 16,333 people aged 5-24 years (8,618 males and 7,715 females) and 859 people aged 25+ (485 males and 374 females). Looking at the proportions of population reported as "Ever attending school" and those reported as "Never attending school", the data show much improvement for the young cohort, compared to the older one i.e. 73.5% of the younger population reported having ever attended school, compared to 40.6% of the older population in the four sites. A concern remains for the younger population in Hides as 46.9% of them never attended school.

The data also indicates that the male-to-female ratio has declined from the very high level of 162 among the population aged 25+ to the level of 116 among the younger population aged 5-24, who reported having 'ever attended/attending school', suggesting an improvement in gender equality in access to education. However, the ratio of 116 is still of a concern as it means males are still more likely than females to have access to education among the schooling age population, 5-24. Chi-square tests confirmed the sex differential in access to education with statistically significant difference for all iHDSS sites and particularly for Hides site ($p < 0.01$).

Table4-1 School attendance among people of schooling age 5-24 year, PNG IMR's iHDSS 2015

iHDSS site		Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
Asaro	Never attending school	347	20.0	335	21.4	682	20.7	104
	Ever attending school	1382	79.8	1226	78.4	2608	79.2	113
	DK	2	0.1	2	0.1	4	0.1	100
	Total	1731	100	1563	100	3294	100	111
Hides	Never attending school	361	42.3	417	49.6	778	45.9	87
	Ever attending school	491	57.6	424	50.4	915	54.0	116
	DK	1	0.1	0	0.0	1	0.1	0
	Total	853	100	841	100	1694	100	101
Hiri	Never attending school	667	28.3	663	31.2	1330	29.7	101
	Ever attending school	1679	71.3	1454	68.4	3133	69.9	115
	DK	10	0.4	10	0.5	20	0.4	100
	Total	2356	100	2127	100	4483	100	111
Karkar	Never attending school	724	19.7	697	21.9	1421	20.7	104
	Ever attending school	2901	78.9	2445	76.8	5346	77.9	119
	DK	53	1.4	42	1.3	95	1.4	126
	Total	3678	100	3184	100	6862	100	116
All sites	Never attending school	2099	24.4	2112	27.4	4211	25.8	99
	Ever attending school	6453	74.9	5549	71.9	12002	73.5	116
	DK	66	0.8	54	0.7	120	0.7	122
	Total	8,618	100	7,715	100	16,333	100	112

Note: *p*-value <0.05 for Hides and *p*-value <0.01 for all sites

Table4-2 School attendance among people aged 25+ years, PNG IMR's iHDSS 2015

iHDSS site		Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
Asaro	Never attended school	34	35.8	34	40.5	68	38.0	100
	Ever attended school	60	63.2	50	59.5	110	61.5	120
	DK	1	1.1	0	0.0	1	0.6	0
	Total	95	100	84	100	179	100	113
Hides	Never attended school	32	66.7	35	74.5	67	70.5	91
	Ever attended school	16	33.3	12	25.5	28	29.5	133
	DK	0	0.0	0	0.0	0	0.0	0
	Total	48	100	47	100	95	100	102
Hiri	Never attended school	94	74.6	75	78.9	169	76.5	125
	Ever attended school	31	24.6	20	21.1	51	23.1	155
	DK	1	0.8	0	0.0	1	0.5	0
	Total	126	100	95	100	221	100	133
Karkar	Never attended school	105	48.6	97	65.5	202	55.5	108
	Ever attended school	109	50.5	51	34.5	160	44.0	214
	DK	2	0.9	0	0.0	2	0.5	0
	Total	216	100	148	100	364	100	146
All sites	Never attended school	265	54.6	241	64.4	506	58.9	110
	Ever attended school	216	44.5	133	35.6	349	40.6	162
	DK	4	0.8	0	0.0	4	0.5	0
	Total	485	100	374	100	859	100	130

4.3 HIGHEST EDUCATIONAL LEVEL ATTAINMENT

Table 4-3 and Table4-4 shows the highest education level attained by the surveillance population of 12,207 people aged 5-24 years (6,568males and 5,639females) and 139 people aged 25+ (91 males and 48 females)⁵. More than half of the population aged 5-24 reported having attained the primary education level, and a quarter reported having completed elementary education. These figures are higher than those reported by the older population aged 25+, 32% and 12%, respectively, suggesting an improvement of education over the past 20 years.

More gender equality in education was also reconfirmed when comparing the sex ratios between the two groups of population. The sex ratios were lower in the younger population than the older population across all educational levels i.e. the sex ratios declined from the level of 600 among the population aged 25+ to a balance level of 100 among the population aged 5-24, who reported having attained the tertiary education level.

⁵There were only 139 responses to the question of highest education attainment among the population aged 25+ so the analysis was conducted using this figure. Due to small number of responses, interpretation of the data analysis could be limited.

Table4-3 Educational level attainment among population of schooling age 5-24⁶, iHDSS, 2014

Educational Level	Male		Female		Total		M:F ratio
	n	%	n	%	n	%	
Preparatory	562	8.6	498	8.8	1060	8.7	113
Elementary	1668	25.4	1392	24.7	3060	25.1	120
Primary	3330	50.7	3053	54.1	6383	52.3	109
Lower Secondary	654	10.0	464	8.2	1118	9.2	141
Upper Secondary	166	2.5	94	1.7	260	2.1	177
Vocational training	83	1.3	53	0.9	136	1.1	157
College/University	35	0.5	35	0.6	70	0.6	100
Post graduate	4	0.1	2	0.0	6	0.0	200
DK	66	1.0	48	0.9	114	0.9	138
Total	6,568	100.0	5,639	100.0	12,207	100.0	116

Table4-4 Educational level attained by population aged 25+ years, iHDSS 2015

Educational Level	Male		Female		Total		M:F ratio
	N	%	n	%	n	%	
Preparatory	3	3.3	5	10.4	8	5.8	60
Elementary	9	9.9	8	16.7	17	12.2	113
Primary	28	30.8	17	35.4	45	32.4	165
Lower Secondary	21	23.1	9	18.8	30	21.6	233
Upper Secondary	12	13.2	3	6.3	15	10.8	400
Vocational training	10	11.0	3	6.3	13	9.4	333
College/University	6	6.6	1	2.1	7	5.0	600
Post graduate	0	0.0	0	0.0	0	0.0	0
DK	2	2.2	2	4.2	4	2.9	100
Total	91	100.0	48	100.0	139	100.0	190

The data indicated that about 50% of the schooling age population, 5-24 attained primary education and a quarter attained the elementary education level. Male population tended to attain higher educational levels than female counterparts, particularly at the secondary education and vocational/professional training, with the male-to-female ratios at 177 and 157, respectively.

Comparing the school grade attended by the two groups: people aged 5-24 (16,333 persons, including 8,618 males and 7,715 females) and people aged 25+ (859 people, including 485 males and 375 females), the data showed that there has been considerable progress in education in PNG over the last 20 years. Indeed, the proportion of older population with no school was doubled than that of the young population, 58.9% and 25.8%, respectively. The separation of these two groups in education analysis has provided a clearer picture of the education in the past (as reflected in the population aged 25+) and for the present (as shown in the population aged 5-24 who are currently going to school) in PNG.

⁶The new education system of PNG structures three years for elementary (grade 1-3), five years for primary (grade 4-8), and four years for secondary (grade 9-10 for lower and 11-12 for upper).

Not surprisingly, more females than males aged 25+ reported having had no schooling. By contrast, the proportion of males currently attending school was relatively higher than females.

4.4 ENROLMENT AT ELEMENTARY EDUCATION⁷

Among 3,139 children aged 5-7 in the surveillance population in the four iHDSS sites, only 1,346 children were enrolled in school year 2015, accounting for 43% of the children in this age cohort. Table 4-5 show distribution of enrolment at elementary education among the population of 1,338 children aged 5-7 (693 males and 645 females). These data demonstrate the improved educational attainment picture for elementary education across the four surveillance sites. The majority of children aged 5-7 were enrolled in preparatory and grade 1 i.e. 45% and 42% respectively at the four sites. The proportions of male children enrolled in elementary education were modestly different than the female cohorts, as reflected in the overall ratio of 107:100 across all four sites. Four percent of children of children in this age group were already enrolled at grade 3 (as a result of an early start), which is categorised under primary education in the current PNG education system.

Table 4-5 Enrolment at elementary education among children 5-7, PNG IMR's iHDSS, 2015

iHDSS site	Elementary school		Sex		Total	M:F ratio
			Male	Female		
Hiri	Preparatory	N	126	102	228	124
		%	51.6	47.6	49.7	
	Grade 1	N	96	93	189	103
		%	39.3	43.4	41.2	
	Grade 2	N	19	14	33	136
		%	7.7	6.5	7.2	
	Grade 3+	N	3	5	8	60
		%	1.2	2.3	1.7	
	Total	N	244	214	458	114
		%	100	100	100	
Asaro	Preparatory	N	52	54	106	96
		%	28.5	29.8	29.2	
	Grade 1	N	87	86	173	101
		%	47.8	47.5	47.6	
	Grade 2	N	27	33	60	82
		%	14.8	18.2	16.5	
	Grade 3+	N	16	8	24	200
		%	8.7	4.4	6.6	
	Total	N	182	181	363	101
		%	100	100	100	
Karkar	Preparatory	N	113	116	229	97
		%	54.3	62.0	57.9	
	Grade 1	N	82	59	141	139
		%	39.4	31.5	35.7	
	Grade 2	N	8	10	18	80
		%	3.8	5.3	4.5	
	Grade 3+	N	5	2	7	250
		%	2.4	1.0	1.7	
	Total	N	208	187	395	111
		%	100	100	100	

⁷Analysis of enrollment rates was conducted in accordance with the new structure of the education system of PNG: elementary (including preparatory, grade 1-2), primary (grade 3-8), secondary education (grade 9-12).

iHDSS site	Elementary school		Sex		Total	M:F ratio
			Male	Female		
Hides	Preparatory	N	18	16	34	113
		%	30.5	25.4	27.8	
	Grade 1	N	25	28	53	89
		%	42.3	44.4	43.4	
	Grade 2	N	9	12	21	75
		%	15.2	19.0	17.2	
	Grade 3+	N	7	7	14	100
		%	11.8	11.1	11.4	
All sites	Preparatory	N	309	288	597	107
		%	44.5	44.6	44.6	
	Grade 1	N	290	266	556	109
		%	41.8	41.2	41.5	
	Grade 2	N	63	69	132	91
		%	9.0	10.7	9.8	
	Grade 3+	N	31	22	53	141
		%	4.4	3.4	3.9	
	Total	N	693	645	1338	107
		%	100	100	100	

4.5 ENROLLMENT AT PRIMARY EDUCATION

A total of 6,707 children aged 8-14 years recorded in the four sites, of which 5,939 children, (accounting for 88.5%) were enrolled at school in 2015. Table4-6 show the enrolment of 5,833 children aged 8-14 (2978 males and 2855 females) enrolled at different school grades at the primary educational level. For children of this age cohort, it is expected that most of them would have enrolled at Grade 3 and upward (primary education level). However, the data showed that 48.5% of those children were still enrolled at the elementary education, including 6.6% at preparatory, 18.6% at grade 1 and 23.3% at Grade 2. There are high levels of late enrolment rate (and/or repetition rate) among this population. Hiri has a significantly better enrolment than the three other sites.

Table4-6 Enrolment at primary education among children aged 8-14, PNG IMR's iHDSS 2015

iHDSS site	Grade of enrolment	Sex				Total		M:F ratio
		Male		Female				
		N	%	N	%	N	%	
Hiri	Preparatory	27	2.9	25	2.6	52	2.8	108
	Grade 1	134	14.3	133	13.9	267	14.1	101
	Grade 2	171	18.3	164	17.2	335	17.7	104
	Grade 3	172	18.4	190	19.9	362	19.2	91
	Grade 4	125	13.4	142	14.9	267	14.1	88
	Grade 5	97	10.4	123	12.9	220	11.6	79
	Grade 6	115	12.3	96	10.1	211	11.2	120
	Grade 7	61	6.5	56	5.9	117	6.2	109
	Grade 8+	33	3.5	26	2.7	59	3.1	127
			100.				100.	
	Total	935	0	955	100.0	1890	0	98
Asaro	Preparatory	21	3.5	23	4.0	44	3.8	91

iHDSS site	Grade of enrolment	Sex				Total		M:F ratio
		Male		Female				
	Grade 1	55	9.3	55	9.5	110	9.4	100
	Grade 2	128	21.6	126	21.7	254	21.7	102
	Grade 3	105	17.7	140	24.1	245	20.9	75
	Grade 4	133	22.5	106	18.3	239	20.4	125
	Grade 5	77	13.0	65	11.2	142	12.1	118
	Grade 6	35	5.9	38	6.6	73	6.2	92
	Grade 7	28	4.7	13	2.2	41	3.5	215
	Grade 8+	10	1.7	14	2.4	24	2.0	71
			100.				100.	
	Total	592	0	580	100.0	1172	0	102
Karkar	Preparatory	153	12.8	124	11.3	277	12.1	123
	Grade 1	330	27.5	290	26.5	620	27.0	114
	Grade 2	320	26.7	311	28.5	631	27.5	103
	Grade 3	177	14.8	169	15.5	346	15.1	105
	Grade 4	134	11.2	115	10.5	249	10.9	117
	Grade 5	54	4.5	47	4.3	101	4.4	115
	Grade 6	21	1.8	24	2.2	45	2.0	88
	Grade 7	9	0.8	5	0.5	14	0.6	180
	Grade 8+	2	0.2	8	0.7	10	0.4	25
				100.				100.
	Total	1200	0	1093	100.0	2293	0	110
Hides	Preparatory	8	3.2	4	1.8	12	2.5	200
	Grade 1	44	17.5	46	20.3	90	18.8	96
	Grade 2	75	29.9	62	27.3	137	28.7	121
	Grade 3	63	25.1	43	18.9	106	22.2	147
	Grade 4	36	14.3	44	19.4	80	16.7	82
	Grade 5	12	4.8	12	5.3	24	5.0	100
	Grade 6	12	4.8	11	4.8	23	4.8	109
	Grade 7	1	0.4	2	0.9	3	0.6	50
	Grade 8+	0	0.0	3	1.3	3	0.6	0
				100.				100.
	Total	251	0	227	100.0	478	0	111
All sites	Preparatory	209	7.0	176	6.2	385	6.6	119
	Grade 1	563	18.9	524	18.4	1087	18.6	107
	Grade 2	694	23.3	663	23.2	1357	23.3	105
	Grade 3	517	17.4	542	19.0	1059	18.2	95
	Grade 4	428	14.4	407	14.3	835	14.3	105
	Grade 5	240	8.1	247	8.7	487	8.3	97
	Grade 6	183	6.1	169	5.9	352	6.0	108
	Grade 7	99	3.3	76	2.7	175	3.0	130
	Grade 8+	45	1.5	51	1.8	96	1.6	88
				100.				100.
	Total	2978	0	2855	100.0	5833	0	104

It is noted that there was no difference in the enrolment rate at the primary education between male and female children of the age group 8-14 as reflected in the balance sex ratio at 104:100 (M:F) for all the four surveillance sites. This sex ratio varied lightly, from the lowest level of 98:100 in Hiri to the highest level of 111:100 in Hides, meaning that gender equality in access to primary education was the best in Hiri and the worst in Hides.

4.6 ENROLMENT AT SECONDARY EDUCATION

There were 3,404 children aged 15-18 recorded in the iHDSS as of the middle 2015. Of this total, 2,805 children (82%) reported being enrolled at school.

Table4-7 show the distribution of enrolment at secondary education among 2,738 children aged 15-18 years (1,449 males and 1,289 females). Based on these data, the proportions of this cohort children enrolled in secondary education was 16.9%, including 7.9% enrolled at Grade 9, 6.6% at Grade 10, 1.6% at grade 11, and 0.8% at grade 12. Only 3.4% of children in this age group still reported being enrolled at elementary (preparatory, grade 1 and 2), 29.2% at grade 3-5 and 50.5% at grade 6-8.

Although sex ratios varied across sites and grades, males achieved a better attainment level than females at the higher grade and educational levels, i.e. the overall sex ratios were 112:100 for all four sites, but increased from grade 3-5 (109:100) to grade 6-8 (112:100), grade 10 (128:100) and grade 11 (153:100).

Table4-7 Enrolment at secondary education among children aged 15-18, PNG IMR's iHDSS, 2015

iHDSS site	Enrolment	Sex				Total		M:F ratio
		Male		Female		N	%	
		N	%	N	%			
Hiri	Elementary (pre-grade 2)	10	2.3	5	1.4	15	1.9	200
	Grade 3-5	48	10.9	42	12.1	90	11.4	114
	Grade 6-8	222	50.2	160	46.0	382	48.4	139
	Grade 9	63	14.3	63	18.1	126	15.9	100
	Grade 10	69	15.6	57	16.4	126	15.9	121
	Grade 11	22	5.0	14	4.0	36	4.6	157
	Grade 12	8	1.8	7	2.0	15	1.9	114
	Total	442	100.0	348	100.0	790	100.0	127
Asaro	Elementary (pre-grade 2)	6	2.0	8	2.8	14	2.4	75
	Grade 3-5	64	21.5	62	21.9	126	21.7	103
	Grade 6-8	169	56.9	164	58.0	333	57.4	103
	Grade 9	32	10.8	26	9.2	58	10.0	123
	Grade 10	21	7.1	17	6.0	38	6.6	124
	Grade 11	3	1.0	3	1.1	6	1.0	100
	Grade 12	2	.7	3	1.1	5	.9	67
	Total	297	100.0	283	100.0	580	100.0	105
Karkar	Elementary (pre-grade 2)	27	4.4	21	3.8	48	4.1	129
	Grade 3-5	253	40.9	234	42.1	487	41.4	108
	Grade 6-8	318	51.4	286	51.4	604	51.4	111
	Grade 9	10	1.6	9	1.6	19	1.6	111
	Grade 10	10	1.6	5	.9	15	1.3	200
	Grade 11	1	.2	0	0.0	1	.1	N/A
	Grade 12	0	0.0	1	.2	1	.1	N/A

iHDSS site	Enrolment	Sex				Total		M:F ratio
		Male		Female		N	%	
		N	%	N	%			
	Total	619	100.0	556	100.0	1175	100.0	111
Hides	Elementary (pre-grade 2)	8	8.8	7	6.9	15	7.8	114
	Grade 3-5	51	56.0	45	44.1	96	49.7	113
	Grade 6-8	23	25.3	41	40.2	64	33.2	56
	Grade 9	7	7.7	7	6.9	14	7.3	100
	Grade 10	2	2.2	1	1.0	3	1.6	200
	Grade 11	0	0.0	1	1.0	1	.5	N/A
	Grade 12	5	.3	4	.3	9	.3	125
	Total	91	100.0	102	100.0	193	100.0	89
All sites	Elementary (pre-grade 2)	51	3.5	41	3.2	92	3.4	124
	Grade 3-5	416	28.7	383	29.7	799	29.2	109
	Grade 6-8	732	50.5	651	50.5	1383	50.5	112
	Grade 9	112	7.7	105	8.1	217	7.9	107
	Grade 10	102	7.0	80	6.2	182	6.6	128
	Grade 11	26	1.8	17	1.3	43	1.6	153
	Grade 12	10	.7	12	.9	22	.8	83
	Total	1,449	100.0	1,289	100.0	2,738	100.0	112

Table4-8 shows 52% of the population aged 19-24 attained the highest educational level at primary education, 37% at secondary education and 8.8% at tertiary education, including 5.5% at vocational training and 3.1% at university and 0.2% at post-graduate. There were more males than females in this age group across all educational levels as shown in the high sex ratios. The number of records in Hides was too small to provide meaningful interpretations of the data for education at this site.

Table4-8 Educational level attainment among population aged 19-24, PNG IMR's iHDSS, 2015

iHDSS site	Enrolment	Sex				Total		M:F ratio
		Male		Female		N	%	
		N	%	N	%			
Hiri	Elementary	6	2.4	0	0.0	6	1.3	N/A
	Primary	87	34.8	67	32.7	154	33.8	130
	Secondary	108	43.2	104	50.7	212	46.6	104
	Vocational	22	8.8	14	6.8	36	7.9	157
	University	21	8.4	16	7.8	37	8.1	131
	Post-graduate	4	1.6	1	.5	5	1.1	400
	DK	2	.8	3	1.5	5	1.1	67
	Total	250	100.0	205	100.0	455	100.0	122
Asaro	Elementary	4	1.5	4	1.5	8	1.5	100
	Primary	118	43.5	127	49.0	245	46.2	93
	Secondary	140	51.7	115	44.4	255	48.1	122
	Vocational	4	1.5	2	.8	6	1.1	200
	University	5	1.8	11	4.2	16	3.0	45
	Total	271	100.0	259	100.0	530	100.0	105
Karkar	Elementary	10	1.7	9	1.8	19	1.7	111
	Primary	362	61.8	314	61.4	676	61.6	115
	Secondary	175	29.9	136	26.6	311	28.4	129
	Vocational	34	5.8	41	8.0	75	6.8	83
	University	4	.7	11	2.2	15	1.4	36
	DK	1	.2	0	0.0	1	.1	N/A
	Total	586	100.0	511	100.0	1097	100.0	115
Hides	Elementary	1	1.9	3	4.2	4	3.2	33
	Primary	32	59.3	47	65.3	79	62.7	68
	Vocational	4	7.4	0	0.0	4	3.2	N/A
	Total	54	100.0	72	100.0	126	100.0	75
All sites	Elementary	21	1.8	16	1.5	37	1.7	131
	Primary	599	51.6	555	53.0	1154	52.3	108
	Secondary	440	37.9	377	36.0	817	37.0	117
	Vocational	64	5.5	57	5.4	121	5.5	112
	University	30	2.6	38	3.6	68	3.1	79
	Post-graduate	4	.3	1	.1	5	.2	400
	DK	3	.3	3	.3	6	.3	100
	Total	1,161	100.0	1,047	100.0	2,208	100.0	111

5.0 EMPLOYMENT

5.1 ABSTRACT

This chapter will discuss the employment status of the working age population, 15 to 64 years old. A total of 25,046 people of working age were included in the data analysis. Males are more likely than females to participate in the labour force, 52% were males compared to 48%. The majority (90%) of labourers were engaged in the “private sector,” of which 89% worked in subsistence agriculture. However, in Hiri, only 7.3% of labourers worked in agriculture. In terms of main occupation, 49% of labourers reported as unskilled gardening and farm worker with 20% involved in home duties.

Among 2582 labourers reported having ever worked for PNG LNG, 70% were in Hiri and 26% in Hides. This is not surprising as there were no PNG LNG activities in the comparison sites of Asaro and Karkar. In addition, the length of the workday was longer at the PNG LNG sites versus comparison areas. Although there were no significant differences in the payment to male and female workers, males are more likely than females to have paid employment across the four sites. The mode of payment was 100-500 Kinas in the last two weeks, and labourers were paid highest in Hides, followed by Hiri, Asaro and Karkar.

Employment is all of the working activities for at least one hour creating income without legal prohibition, including: (i) *Paid employment*: by cash, or other forms that employee has to complete in the given time with specific demand in quantity and quality of the work assigned by the employer without caring of individual or agency, enterprise, etc.; (ii) *Self-employment* is jobs whose income is dependent directly on the profit attained from the production of commodity and service. Self-employment includes self-working to make income or work for their family/ household economy without salaries/wages. Employment is significant issue for the young population of PNG.

Table 5-1 shows the total of 25,046 population of working age, 15-64 living in the four iHDSS sites, of which 51.9% of males and 48.1% of females.

Table 5-1 Distribution of population of working age 15-64, PNG IMR's iHDSS 2015

Sex		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
Male	N	3843	2874	4888	1402	13007
	%	51.8%	52.1%	52.0%	51.8%	51.9%
Female	N	3580	2644	4510	1305	12039
	%	48.2%	47.9%	48.0%	48.2%	48.1%
Total	N	7,423	5,518	9,398	2,707	25,046
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 5-2 shows the age and sex structure of the labour force recorded in the four sites during the reporting period. The distribution of the labour force decreases by age group, with the highest proportion (15%) at the age group of 15-19, while the lowest proportion is at age group 60-64, (3.6%). More males than females participated in the labour force, as reflected in the male-to-female sex ratio of 111:100 across all four sites. More males than females took part in the labour force in Hiri and Karkar as reflected in high male-to-female ratios, 113 and 115, respectively while it was balanced in Asaro and Hides, 106 and 103, respectively.

Table 5-2 Age and sex structure of the labour force by site, PNG IMR's iHDSS, 2015

iHDSS Site	Age group	Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
Hiri	15-19	484	13.3	441	13.7	925	13.5	110
	20-24	527	14.5	477	14.8	1004	14.6	110
	25-29	516	14.2	482	15.0	998	14.6	107
	30-34	438	12.0	366	11.4	804	11.7	120
	35-39	413	11.3	344	10.7	757	11.0	120
	40-44	409	11.2	310	9.6	719	10.5	132
	45-49	264	7.3	241	7.5	505	7.4	110
	50-54	259	7.1	256	8.0	515	7.5	101
	55-59	189	5.2	193	6.0	382	5.6	98
	60-64	140	3.8	108	3.4	248	3.6	130
	Total	3639	100.0	3218	100.0	6857	100.0	113
Asaro	15-19	401	16.0	352	15.0	753	15.5	114
	20-24	321	12.8	285	12.1	606	12.5	113
	25-29	290	11.6	312	13.3	602	12.4	93
	30-34	268	10.7	321	13.7	589	12.1	83
	35-39	262	10.5	229	9.7	491	10.1	114
	40-44	275	11.0	329	14.0	604	12.5	84
	45-49	198	7.9	172	7.3	370	7.6	115
	50-54	211	8.4	171	7.3	382	7.9	123
	55-59	150	6.0	88	3.7	238	4.9	170
	60-64	123	4.9	90	3.8	213	4.4	137
	Total	2499	100.0	2349	100.0	4848	100.0	106
Karkar	15-19	733	15.9	691	17.3	1424	16.5	106
	20-24	760	16.5	589	14.7	1349	15.7	129
	25-29	599	13.0	473	11.8	1072	12.4	127
	30-34	565	12.2	508	12.7	1073	12.5	111
	35-39	473	10.3	401	10.0	874	10.1	118
	40-44	410	8.9	379	9.5	789	9.2	108
	45-49	357	7.7	310	7.8	667	7.7	115
	50-54	312	6.8	297	7.4	609	7.1	105
	55-59	220	4.8	214	5.4	434	5.0	103
	60-64	185	4.0	135	3.4	320	3.7	137
	Total	4614	100.0	3997	100.0	8611	100.0	115
Hides	15-19	179	13.8	181	14.4	360	14.1	99
	20-24	146	11.3	183	14.6	329	12.9	80
	25-29	200	15.5	224	17.8	424	16.6	89
	30-34	213	16.5	232	18.5	445	17.5	92
	35-39	163	12.6	147	11.7	310	12.2	111
	40-44	165	12.8	128	10.2	293	11.5	129
	45-49	93	7.2	61	4.9	154	6.0	152
	50-54	72	5.6	56	4.5	128	5.0	129
	55-59	46	3.6	18	1.4	64	2.5	256

iHDSS Site	Age group	Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
All Sites	60-64	16	1.2	25	2.0	41	1.6	64
	Total	1293	100.0	1255	100.0	2548	100.0	103
	15-19	1797	14.9	1665	15.4	3462	15.1	108
	20-24	1754	14.6	1534	14.2	3288	14.4	114
	25-29	1605	13.3	1491	13.8	3096	13.5	108
	30-34	1484	12.3	1427	13.2	2911	12.7	104
	35-39	1311	10.9	1121	10.4	2432	10.6	117
	40-44	1259	10.5	1146	10.6	2405	10.5	110
	45-49	912	7.6	784	7.2	1696	7.4	116
	50-54	854	7.1	780	7.2	1634	7.1	109
	55-59	605	5.0	513	4.7	1118	4.9	118
	60-64	464	3.9	358	3.3	822	3.6	130
	Total	12045	100.0	10819	100.0	22864	100.0	111

5.2 EMPLOYMENT

Table 5-3 illustrates employment structure of the economic sector, including private, collective, public, foreign investment by sex of labourers in the four iHDSS sites during the reporting period. The private sector does not only include private enterprises, family businesses, but also household agricultural activities for subsistence such as fishing and farming.

Table 5-3 Employment structure of economic sector by sex and site, PNG IMR's iHDSS, 2015

Site	Economic sector	Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
Asaro	Private	2424	94.5	2347	97.5	4771	95.9	103
	Collective	20	0.8	3	0.1	23	0.5	667
	Public	114	4.4	56	2.3	170	3.4	204
	Foreign invest	8	0.3	2	0.1	10	0.2	400
	Total	2566	100.0	2408	100.0	4974	100.0	107
Hides	Private	1180	88.1	1269	97.5	2449	92.7	93
	Collective	56	4.2	6	0.5	62	2.3	933
	Public	13	1.0	9	0.7	22	0.8	144
	Foreign invest	91	6.8	17	1.3	108	4.1	535
	Total	1340	100.0	1301	100.0	2641	100.0	103
Hiri	Private	514	42.9	248	42.5	762	42.8	207
	Collective	346	28.9	144	24.7	490	27.5	240
	Public	191	15.9	149	25.5	340	19.1	128
	Foreign invest	147	12.3	43	7.4	190	10.7	342
	Total	1198	100.0	584	100.0	1782	100.0	205
Karkar	Private	4264	93.2	3860	96.6	8124	94.8	110
	Collective	59	1.3	34	0.9	93	1.1	174
	Public	159	3.5	86	2.2	245	2.9	185
	Foreign invest	91	2.0	14	0.4	105	1.2	650
	Total	4573	100.0	3994	100.0	8567	100.0	114
All sites	Private	8382	86.6	7724	93.2	16106	89.7	109
	Collective	481	5.0	187	2.3	668	3.7	257
	Public	477	4.9	300	3.6	777	4.3	159
	Foreign invest	337	3.5	76	0.9	413	2.3	443
	Total	9,677	100.0	8,287	100.0	17,964	100.0	117

In Asaro, most of all labourers (96%) reported working in private sector. The similarity was observed in Hides, 92.7% and Karkar, 94.8%. Interestingly, Hiri has people working in all economic sectors, with only 42.8% working in private sector. Generally, most of the people engaged in private sector, 89.7% and very few people were involve in other economic sectors.

Table 5-4 provided further data on the employment structure of labour force in the private sector, disaggregated by site and sex of the labourers. Among 16,215 people working in private sector in all four sites, 8388 males and 7827 females accounted for 51.7% and 48.3%, respectively. It is noted that 14,942 people, 92% of the sector reported working in agriculture, meaning that majority of the population worked for subsistence. Few people work in forestry (38), fishery (200), production (49), services (210), and trade (144).

Table 5-4 Employment structure of private sector by sex and site, PNG IMR's iHDSS, 2015

Private Sector		Sex	iHDSS site				All sites
			Hiri	Asaro	Karkar	Hides	
Agriculture	Male	N	43	2382	4087	1235	7747
		%	51.8%	52.2%	51.7%	51.7%	51.8%
	Female	N	40	2184	3819	1152	7195
		%	48.2%	47.8%	48.3%	48.3%	48.2%
	Total	N	83	4566	7906	2387	14942
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Forestry	Male	N	4	10	22	2	38
		%	40.0%	43.5%	46.8%	33.3%	44.2%
	Female	N	6	13	25	4	48
		%	60.0%	56.5%	53.2%	66.7%	55.8%
	Total	N	10	23	47	6	86
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Fishery	Male	N	85	1	112	2	200
		%	46.4%	20.0%	52.8%	28.6%	49.1%
	Female	N	98	4	100	5	207
		%	53.6%	80.0%	47.2%	71.4%	50.9%
	Total	N	183	5	212	7	407
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Production	Male	N	17	4	20	8	49
		%	47.2%	57.1%	46.5%	66.7%	50.0%
	Female	N	19	3	23	4	49
		%	52.8%	42.9%	53.5%	33.3%	50.0%
	Total	N	36	7	43	12	98
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Services	Male	N	139	33	35	3	210
		%	50.7%	53.2%	53.0%	75.0%	51.7%
	Female	N	135	29	31	1	196
		%	49.3%	46.8%	47.0%	25.0%	48.3%
	Total	N	274	62	66	4	406
		%	100.0%	100.0%	100.0%	100.0%	100.0%

Private Sector	Sex	iHDSS site					All sites
			Hiri	Asaro	Karkar	Hides	
Trade	Male	N	103	12	25	4	144
		%	54.5%	50.0%	45.5%	50.0%	52.2%
	Female	N	86	12	30	4	132
		%	45.5%	50.0%	54.5%	50.0%	47.8%
	Total	N	189	24	55	8	276
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Total private sector	Male	N	391	2442	4301	1254	8388
		%	50.5%	52.1%	51.6%	51.7%	51.7%
	Female	N	384	2245	4028	1170	7827
		%	49.5%	47.9%	48.4%	48.3%	48.3%
	Total	N	775	4687	8329	2424	16215
		%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 5-5 shows the employment structure of the labour force in the collective sector by sex and site. Among 671 labourers, the majority (497) worked in Hiri, and a half (249) worked in services, with similar numbers between males and females. Very few labourers worked in collective sector in other sites.

Table 5-5 Employment structure of collective sector by sex and site, PNG IMR's iHDSS, 2015

Collective Sector	Sex	iHDSS site					All sites
			Hiri	Asaro	Karkar	Hides	
Agriculture	Male	N	6	4	25	2	37
		%	75.0%	100.0%	51.0%	66.7%	57.8%
	Female	N	2	0	24	1	27
		%	25.0%	0.0%	49.0%	33.3%	42.2%
	Total	N	8	4	49	3	64
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Forestry	Male	N	-	-	0	0	0
		%	-	-	0.0%	0.0%	0.0%
	Female	N	-	-	1	1	2
		%	-	-	100.0%	100.0%	100.0%
	Total	N	-	-	1	1	2
		%	-	-	100.0%	100.0%	100.0%
Fishery	Male	N	35	-	5	-	40
		%	61.4%	-	62.5%	-	61.5%
	Female	N	22	-	3	-	25
		%	38.6%	-	37.5%	-	38.5%
	Total	N	57	-	8	-	65
		%	100.0%	-	100.0%	-	100.0%
Production	Male	N	27	0	3	2	32
		%	50.9%	0.0%	42.9%	66.7%	50.0%
	Female	N	26	1	4	1	32
		%	49.1%	100.0%	57.1%	33.3%	50.0%
	Total	N	53	1	7	3	64
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Service	Male	N	119	6	21	27	173
		%	47.8%	42.9%	75.0%	58.7%	51.3%
	Female	N	130	8	7	19	164
		%	52.2%	57.1%	25.0%	41.3%	48.7%

Collective Sector	Sex		iHDSS site				All sites
			Hiri	Asaro	Karkar	Hides	
Trade	Total	N	249	14	28	46	337
		%	100.0%	100.0%	100.0%	100.0%	100.0%
	Male	N	69	1	0	0	70
		%	53.1%	33.3%	0.0%	0.0%	50.4%
	Female	N	61	2	3	3	69
		%	46.9%	66.7%	100.0%	100.0%	49.6%
	Total	N	130	3	3	3	139
		%	100.0%	100.0%	100.0%	100.0%	100.0%
	Total collective sector	Male	256	11	54	31	352
		%	51.5%	50.0%	56.3%	55.4%	52.5%
	Female	N	241	11	42	25	319
		%	48.5%	50.0%	43.8%	44.6%	47.5%
	Total	N	497	22	96	56	671
		%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 5-6 shows employment structure of the labour force of the public sector. Among 774 labourers, there were 403 males, 52.1%, and 371 females, 47.9%, and many of them were from Hiri (340) and Karkar (247). Most of labourers worked for government agencies or institutes across all four sites. In Hiri, some worked in administration.

Table 5-6 Employment structure of public sector by sex and site, PNG IMR's iHDSS, 2015

Public Sector	Sex		iHDSS site				All sites
			Hiri	Asaro	Karkar	Hides	
Agency, institute	Male	N	88	70	114	8	280
		%	50.3%	54.7%	58.5%	53.3%	54.6%
	Female	N	87	58	81	7	233
		%	49.7%	45.3%	41.5%	46.7%	45.4%
	Total	N	175	128	195	15	513
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Administration	Male	N	68	15	7	3	93
		%	48.2%	44.1%	25.0%	50.0%	44.5%
	Female	N	73	19	21	3	116
		%	51.8%	55.9%	75.0%	50.0%	55.5%
	Total	N	141	34	28	6	209
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Enterprise	Male	N	10	3	17	0	30
		%	41.7%	100.0%	70.8%	0.0%	57.7%
	Female	N	14	0	7	1	22
		%	58.3%	0.0%	29.2%	100.0%	42.3%
	Total	N	24	3	24	1	52
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Total public sector	Male	N	166	88	138	11	403
		%	48.8%	53.3%	55.9%	50.0%	52.1%
	Female	N	174	77	109	11	371
		%	51.2%	46.7%	44.1%	50.0%	47.9%
	Total	N	340	165	247	22	774
		%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 5-7 shows the employment structure of the labour force of the foreign investment sector by site and sex. There were 293 labourers working in foreign enterprises in the four sites, 54 females and 139 females, but only four in Asaro. Hiri had the largest number, 115 out of 129 labourers working for international organisations (64 males and 51 females), and very few labourers were from other sites.

Table 5-7 Employment structure of foreign investment sector by sex and site, PNG IMR's iHDSS, 2015

Foreign investment sector	Sex		iHDSS site				All sites
			Hiri	Asaro	Karkar	Hides	
Foreign enterprises	Male	N	44	2	54	54	154
		%	52.4%	50.0%	51.9%	53.5%	52.6%
	Female	N	40	2	50	47	139
		%	47.6%	50.0%	48.1%	46.5%	47.4%
	Total	N	84	4	104	101	293
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Int'l organisations	Male	N	64	3	1	4	72
		%	55.7%	50.0%	33.3%	80.0%	55.8%
	Female	N	51	3	2	1	57
		%	44.3%	50.0%	66.7%	20.0%	44.2%
	Total	N	115	6	3	5	129
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Other	Male	N	1162	79	115	5	1361
		%	52.8%	54.1%	54.5%	35.7%	52.9%
	Female	N	1038	67	96	9	1210
		%	47.2%	45.9%	45.5%	64.3%	47.1%
	Total	N	2200	146	211	14	2571
		%	100.0%	100.0%	100.0%	100.0%	100.0%
Total foreign investment	Male	N	1206	84	170	63	1587
		%	50.3%	53.8%	53.5%	52.5%	53.0%
	Female	N	1129	72	148	57	1406
		%	47.1%	46.2%	46.5%	47.5%	47.0%
	Total	N	2399	156	318	120	2993
		%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 5-8 shows the employment structure by industries across iHDSS sites. Generally, subsistence agriculture was the dominant industry with 89% of labourers reporting work in this sector. Hiri recorded 242 labourers (19.3%) working in Fishery, 505 (40.3%) in Services and 318 (25.4%) in Trade. By contrast, Hides, Karkar and Asaro recorded the majority of labourers working in Agriculture industry i.e. Hides recorded 2,414 (96.1%), Karkar 7,755 (94.4%) and Asaro 4645 (96.9%). Males were dominant in all industries, except for agriculture, where the relative balance between males and females was observed, as reflected in male-to-female ratio at 104.

Table 5-8 Employment structure by industry⁸, site and sex PNG IMR's iHDSS, 2015

Site	Industry	Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
Hiri	Agriculture	33	3.8	59	15.1	92	7.3	56
	Forestry	3	0.3	6	1.5	9	0.7	50
	Fishery	213	24.8	29	7.4	242	19.3	734
	Production	78	9.1	8	2.0	86	6.9	975
	Service	396	46.0	109	27.8	505	40.3	363
	Trade	137	15.9	181	46.2	318	25.4	76
	Total	860	100.0	392	100.0	1252	100.0	219
Asaro	Agriculture	2315	94.7	2330	99.1	4645	96.9	99
	Forestry	20	0.8	3	0.1	23	0.5	667
	Fishery	4	0.2	1	0.0	5	0.1	400
	Production	8	0.3	1	0.0	9	0.2	800
	Service	71	2.9	11	0.5	82	1.7	645
	Trade	26	1.1	4	0.2	30	0.6	650
	Total	2444	100.0	2350	100.0	4794	100.0	104
Karkar	Agriculture	4080	94.4	3675	94.4	7755	94.4	111
	Forestry	30	0.7	19	0.5	49	0.6	158
	Fishery	82	1.9	129	3.3	211	2.6	64
	Production	34	0.8	14	0.4	48	0.6	243
	Service	60	1.4	36	0.9	96	1.2	167
	Trade	37	0.9	21	0.5	58	0.7	176
	Total	4323	100.0	3894	100.0	8217	100.0	111
Hides	Agriculture	1155	93.4	1259	98.7	2414	96.1	92
	Forestry	5	0.4	2	0.2	7	0.3	250
	Fishery	6	0.5	1	0.1	7	0.3	600
	Production	10	0.8	6	0.5	16	0.6	167
	Service	51	4.1	5	0.4	56	2.2	1020
	Trade	9	0.7	2	0.2	11	0.4	450
	Total	1236	100.0	1275	100.0	2511	100.0	97
Total	Agriculture	7583	85.6	7323	92.6	14906	88.9	104
	Forestry	58	0.7	30	0.4	88	0.5	193
	Fishery	305	3.4	160	2.0	465	2.8	191
	Production	130	1.5	29	0.4	159	0.9	448
	Service	578	6.5	161	2.0	739	4.4	359
	Trade	209	2.4	208	2.6	417	2.5	100
	Total	8863	100.0	7911	100.0	16774	100.0	112

Table 5-9 illustrates the main occupations of the labour force disaggregated by sex in the four iHDSS sites. As seen in the table, almost a half (49%) of labourers reported working in unskilled gardening/farming in all four sites. This figure varied across the sites, with highest numbers in Karkar, 7,377 (82.1%), and Hides, 1,733 (63.5%), followed by Asaro, 3,047 (58.8%) and lowest in Hiri, 1,168 (16.3%).

⁸Industry sector including Sector 1: Agriculture, forestry and fishing; Sector 2: Production, Industry and Construction and Sector 3: Services and Trade.

Table 5-9 Employment structure by occupation⁹, PNG IMR's iHDSS, 2015

iHDSS site	Occupation	Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
Hiri	Staff,professional,manager,leader	283	7.5	165	4.9	448	6.2	172
	Skilled sale,service workers	210	5.5	106	3.1	316	4.4	198
	Skilled agricultural,animal,	1	0.0	1	0.0	2	0.0	100
	Skilled handicraftsmen	47	1.2	2	0.1	49	0.7	2350
	Mining,construction,transportation	257	6.8	44	1.3	301	4.2	584
	Assemblers and machine operator	20	0.5	1	0.0	21	0.3	2000
	Other skilled manual workers	129	3.4	25	0.7	154	2.1	516
	Unskilled gardening,farming,	1021	26.9	147	4.4	1168	16.3	695
	Home duties	1228	32.4	2396	71.0	3624	50.6	51
	Military personnel	17	0.4	4	0.1	21	0.3	425
	Total	3793	100.0	3376	100.0	7169	100.0	112
Asaro	Staff, professional, manager, leader	103	3.8	64	2.6	167	3.2	161
	Skilled sale, service workers	91	3.4	37	1.5	128	2.5	246
	Skilled agricultural, animal,	1578	58.7	1469	58.9	3047	58.8	107
	Skilled handicraftsmen	18	0.7	5	0.2	23	0.4	360
	Mining, construction,	19	0.7	0	0.0	19		
	transportation						0.4	0
	Assemblers and machine operator	1	0.0	0	0.0	1	0.0	0
	Other skilled manual workers	5	0.2	4	0.2	9	0.2	125
	Unskilled gardening, farming,	730	27.2	804	32.2	1534	29.6	91
	Home duties	23	0.9	25	1.0	48	0.9	92
	Military personnel	4	0.1	1	0.0	5	0.1	400
	Total	2687	100.0	2496	100.0	5183	100.0	108
Karkar	Staff, professional, manager, leader	114	2.4	47	1.1	161	1.8	243
	Skilled sale, service workers	57	1.2	39	0.9	96	1.1	146
	Skilled agricultural, animal,	73	1.5	21	0.5	94	1.0	348
	Skilled handicraftsmen	21	0.4	2	0.0	23	0.3	1050
	Mining, construction,	20	0.4	5	0.1	25		
	transportation						0.3	400
	Assemblers and machine operator	16	0.3	0	0.0	16	0.2	0
	Other skilled manual workers	145	3.0	37	0.9	182	2.0	392
	Unskilled gardening, farming,	3987	83.1	3390	81.0	7377	82.1	118
	Home duties	133	2.8	414	9.9	547	6.1	32
	Military personnel	10	0.2	6	0.1	16	0.2	167
	Total	4800	100.0	4186	100.0	8986	100.0	115
Hides	Staff, professional, manager, leader	17	1.2	7	0.5	24	0.9	243
	Skilled sale, service workers	55	4.0	10	0.7	65	2.4	550
	Skilled agricultural, animal,	2	0.1	2	0.1	4	0.1	100
	Skilled handicraftsmen	8	0.6	0	0.0	8	0.3	0
	Mining, construction,	33	2.4	5	0.4	38		
	transportation						1.4	660
	Assemblers and machine operator	9	0.6	0	0.0	9	0.3	0
	Other skilled manual workers	46	3.3	10	0.7	56	2.1	460
	Unskilled gardening, farming,	942	67.7	791	59.1	1733	63.5	119
	Home duties	221	15.9	469	35.0	690	25.3	47
	Military personnel	3	0.2	4	0.3	7	0.3	75
	Total	1391	100.0	1339	100.0	2730	100.0	104
All Sites	Staff, professional, manager, leader	517	4.1	283	2.5	800	3.3	183
	Skilled sale, service workers	413	3.3	192	1.7	605	2.5	215
	Skilled agricultural, animal,	1654	13.1	1493	13.1	3147	13.1	111

⁹Occupation was classified according to the International Occupation Standard Classification 2008 (ISCO 88) and the current position system in PNG.

iHDSS site	Occupation	Male		Female		Total		M:F ratio
		N	%	N	%	N	%	
	Skilled handicraftsmen	94	0.7	9	0.1	103	0.4	1044
	Mining, construction, transportation	329	2.6	54	0.5	383	1.6	609
	Assemblers and machine operator	46	0.4	1	0.0	47	0.2	4600
	Other skilled manual workers	325	2.6	76	0.7	401	1.7	428
	Unskilled gardening, farming,	6680	52.7	5132	45.0	11812	49.1	130
	Home duties	1605	12.7	3304	29.0	4909	20.4	49
	Military personnel	34	0.3	15	0.1	49	0.2	227
	Total	12671	100.0	11397	100.0	24068	100.0	111

Across all four iHDSS sites, males dominated formal occupations while females dominated home duties. For example, Hiri had a 2:1 percentage ratio of females versus males in Home duties. This is not surprising, as in most parts of Papua New Guinea, home duties are traditionally considered for the females.

The proportion of labourers working in the mining, construction and transportation industry was only 1.6%, the highest proportion was observed in Hiri, 4.2%, followed by Hides, 1.4% while the lowest figures, 0.4% and 0.3% were observed in Asaro and Karkar, respectively.

Table 5-10 describes the distribution of 2,582 labourers reported having ever worked for the PNG-LNG project in the four iHDSS sites, i.e. 1,798 in Hiri (69.9%) and 680 in Hides (26.3%). Asaro and Karkar recorded 53 and 51 people, respectively. It is noted that the construction phase of the PNG LNG project has been completed. In addition, as previously discussed, Hides divisions 1 and 2 were omitted from this data collection round.

Table 5-10 Proportion of reported ever working for PNG LNG project, PNG IMR's iHDSS, 2015

Sex		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
Male	N	948	24	26	360	1358
	%	36.7%	.9%	1.0%	13.9%	52.6%
Female	N	850	29	25	320	1224
	%	32.9%	1.1%	1.0%	12.4%	47.4%
Total	N	1798	53	51	680	2582
	%	69.6%	2.1%	2.0%	26.3%	100.0%

Table 5-11 shows the average number of working hours/day self reported by labourers in the last two weeks. People reported working 6.28 hours per day on average. There was no difference between male and female workers. Labourers in Hiri and Hides reported working 7.27 and 7.37 hours per day, longer than that reported in Asaro and Karkar, 5.04 and 6.36 hours, respectively, suggesting possible under employment or a difference associated with the PNG LNG construction across impact versus comparison sites.

Table 5-11 Average number of working hours/ day¹⁰ in last two weeks, PNG IMR's iHDSS, 2015

iHDSS site	Male	Female	Total
Asaro	5.23	4.85	5.04
Hiri	7.29	7.24	7.27
Hides	6.66	8.11	7.39
Karkar	6.98	5.74	6.36
All sites	6.28	6.27	6.28

Table 5-12 Average income (in PNG Kinas) in the last two weeks¹¹, PNG IMR's iHDSS, 2015

iHDSS site	Income	Male		Female		Total		M:F ratio
		Mean	N	Mean	N	Mean	N	
Asaro	<100	48.62	269	51.89	409	50.26	678	66
	100-500	273.14	422	230.64	253	251.89	675	167
	500-1000	653.29	97	671.79	39	662.54	136	249
	>1000	1707	30	3450	5	2578.5	35	600
Hides	<100	46	3	26.67	3	36.34	6	100
	100-500	351.2	50	440	15	395.6	65	333
	500-1000	727.98	54	721.74	23	724.86	77	235
	>1000	1628.58	83	3261.75	4	2445.17	87	2075
Hiri	<100	80.39	125	81	64	80.7	189	195
	100-500	366.45	394	334.12	175	350.29	569	225
	500-1000	642.18	302	623.87	97	633.03	399	311
	>1000	1966.98	27	1950	12	1958.49	39	225
Karkar	<100	55.67	220	36	268	45.84	488	82
	100-500	216.12	405	254.21	101	235.17	506	401
	500-1000	588.12	49	539	17	413.56	66	288
	>1000	1473.64	11	1350	2	1411.82	13	550
All sites	<100	57.56	1361	48.57	744	52.65	1361	183
	100-500	286.97	1271	274.08	544	283.1	1815	234
	500-1000	648.28	502	639.08	176	645.89	678	285
	>1000	1934.69	162	3717.19	21	2139.24	183	771

¹⁰ Working hour refers to the average number of hours that a worker spent for work in the reference week. Actual hours worked including overtime hours, but do not include the number of hours not working but is still paid.

¹¹ Average fortnight Income: Earnings include categories such as salaries/wages, bonuses and allowances of all kinds have properties such as wages (overtime and hazardous).

Table5-12 shows the average income in PNG kina earned by those working in the iHDSS sites in the last two weeks prior to the survey dates. Across all four iHDSS sites, mode of payment was 100-500 Kinas (1,815 labourers), with the mean of 283 Kinas and number of males was more doubled than females to get that pay (male-to-female ratio of 234). Within this range of payment of 100-500, the highest mean of payment was in Hides (395.6 Kinas), followed by Hiri (350.3 kinas), and lowest in Karkar (235). In contrast, among those who were paid more than 1,000 Kinas, the highest mean of payment was in Asaro (2,578), followed by Hides (2,445 kinas), and Hiri (1,958 kinas) and lowest in Karkar (1,411 kinas). The differences between the average payments for males and females were minimal, suggesting that males and females were somewhat paid equally although males are more likely than females to involved in paid employment.

6.0 BED NETS (BN)

6.1 ABSTRACT

This chapter presents the bed net data collected by the PNG IMR's iHDSS in 2,927 households residing in the four surveillance sites over the reporting period of January – June 2015. The findings showed that almost of all households in the four surveillance sites reported having one or more bed nets (BN) and each household had 3 BN on average, highest in Hiri (4 BN) and lowest in Asaro (2 BN). The majority of households (67%) had long lasting BN in all four sites, with highest figure in Karkar, 84% and the lowest figure in Asaro, 12%.

Among 1,644 children under 5 (U5) recorded in the four sites, 85% of them reported having slept under a BN last night. This figure was highest in Asaro, 95% and lowest in Hiri 56%. There was no difference between male and female child proportion slept under BN.

Further analysis of type of BN indicated that 72% of children U5 slept under long lasting treated BN and 28% of them slept under pre-treated nets in all four sites, but Asaro had the highest proportion of children U5 slept under pre-treated nets, 90% and only 10% slept under long lasting treated nets.

The findings about Children under 5 sleeping under bed nets show that more males (n=869) slept under a bed net last night than female (n=783) for the 4 iHDSS sites. For the specific type of bed net used last night, long lasting net (LLN) usage was high, Asaro had 180, Hides had 56, Hiri had 164 and Karkar had 923. For the findings about children under 5 who slept under an Insecticide treated net last night by sex, more females (n=54) in the 4 iHDSS sites slept under an insecticide treated net than males (n=47).

According to World Health Organisation (WHO), 250 million people become infected with malaria each year and around 1 million deaths occur among children under 5. The essential malaria control strategies include insecticide-treated mosquito nets (ITNs) and long-lasting insecticidal nets (LLINs). International research has shown that these strategies have been efficient in reducing children mortality and morbidity. Malaria contributes to anaemia in children and is a common cause of school absenteeism. Preventive measures, especially the use of insecticide treated mosquito nets (ITNs), can dramatically reduce malaria mortality rates among children. Malaria remains one of the highest in the Asia and the Pacific. Although, PNG is considered a high malaria prevalence country, it has considerable achievements in the prevention of malaria. The National Malaria Control Programme aims to reduce mortality and morbidity caused by malaria and still continues to address malaria related issues in the country.

6.2 AVAILABILITY OF BED NETS IN HOUSEHOLD

Table 6-1 demonstrates the availability of bed nets in each household across the four (4) iHDSS sites: Asaro, Hides, Hiri, and Karkar. A total of 2927 households were observed. More than 50% of households in all four sites had two BN. Hiri reported the highest number, 4 BN per household. Karkar had an average of 3.4 BN per household. Both Hiri and Karkar are places located in the coastal areas

where malaria is a common health problem. By contrast, the highlands sites, where malaria prevalence has traditionally been lower, had about two bed nets per household. However, only four households in Karkar had no BN.

Table 6-1 Number of bed net available in household, PNG IMR's iHDSS, 2015

Number of BN		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
0	N	0	0	4	0	4
	%	0.0%	0.0%	.8%	0.0%	.1%
1	N	6	248	13	24	291
	%	.8%	18.6%	2.5%	7.0%	9.9%
2	N	188	888	190	220	1486
	%	25.8%	66.8%	36.2%	64.1%	50.8%
3	N	96	106	90	48	340
	%	13.2%	8.0%	17.1%	14.0%	11.6%
4	N	168	55	108	45	376
	%	23.0%	4.1%	20.6%	13.1%	12.8%
5	N	108	15	25	0	148
	%	14.8%	1.1%	4.8%	0.0%	5.1%
6	N	140	18	95	6	259
	%	19.2%	1.4%	18.1%	1.7%	8.8%
8	N	8	0	0	0	8
	%	1.1%	0.0%	0.0%	0.0%	.3%
9	N	9	0	0	0	9
	%	1.2%	0.0%	0.0%	0.0%	.3%
10	N	6	0	0	0	6
	%	.8%	0.0%	0.0%	0.0%	.2%
Total	N	729	1330	525	343	2927
	%	100.0%	100.0%	100.0%	100.0%	100.0%
Mean		4.0	2.1	3.4	2.4	2.8

Table 6-2 Type of bed net available in household, PNG IMR's iHDSS, 2015

Type of BN		iHDSS site				Total
		Hiri	Asaro	Karkar	Hides	
Long lasting	N	1703	253	6877	594	9427
	%	56.9%	12.4%	84.3%	75.4%	67.4%
Pre-treated	N	1271	1787	1217	186	4461
	%	42.5%	87.5%	14.9%	23.6%	31.9%
Other type	N	19	2	68	8	97
	%	.6%	.1%	.8%	1.0%	.7%
Total	N	2,993	2,042	8,162	788	13,985
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 6-2 shows type of BN available in households. Among 13,985 BN recorded in the system, long-lasting treated BN were most common, accounted for 67.4% of all BN and pre-treated BN accounted for 31.9%. Other type BN accounted for less and 1%. It is noted that the majority of BN in Karkar and Hides were long-lasting, 84% and 75%, respectively while most of all BN in Karkar, and 87% were pre-treated ones. Long lasting and pre-treated BN shared equally in Hiri.

6.3 CHILDREN UNDER 5 SLEEPING UNDER BED NETS¹²

For this study, we refer to (i) Insecticide Treated Nets (ITN) or long-lasting treated nets; (ii) Pre-treated nets obtained within the past 12 months; and (iii) Other nets treated in the previous 12 months. Any other types of mosquito nets are considered untreated.

Table 6-3 shows the proportion of children U5 years of age reported having slept under a BN last night in each iHDSS site. Overall, a total of 1,644 children U5 were recorded in the system, of which 1,389 children U5 reported having slept under a BN last night, accounted for 85% of all children in the four sites. This figure varied widely, with approximately 90% reported in three sites Asaro, Karkar and Hides, but only 56% reported in Hiri. There was no difference between male and female children reported sleeping under a BN last night for all sites, except for Hiri, where male children are more likely than female children slept under a BN last night in Hiri, 59% compared to 53%, respectively.

Table 6-3 Proportion of children U5 slept under a BN last night, PNG IMR's iHDSS, 2015

iHDSS site	Children U5 slept under BN last night		Sex of children		Total
			Male	Female	
Hiri	Yes	N	88	73	161
		%	59.1%	52.5%	55.9%
	No	N	61	66	127
		%	40.9%	47.5%	44.1%
	Total	N	149	139	288
		%	100.0%	100.0%	100.0%
Asaro	Yes	N	110	82	192
		%	98.2%	92.1%	95.5%
	No	N	2	7	9
		%	1.8%	7.9%	4.5%
	Total	N	112	89	201
		%	100.0%	100.0%	100.0%
Karkar	Yes	N	498	477	975
		%	89.6%	90.7%	90.1%
	No	N	58	49	107
		%	10.4%	9.3%	9.9%
	Total	N	556	526	1082
		%	100.0%	100.0%	100.0%
Hides	Yes	N	36	25	61
		%	81.8%	86.2%	83.6%
	No	N	8	4	12
		%	18.2%	13.8%	16.4%
	Total	N	44	29	73
		%	100.0%	100.0%	100.0%
All sites	Yes	N	732	657	1389
		%	85.0%	83.9%	84.5%
	No	N	129	126	255
		%	15.0%	16.1%	15.5%
	Total	N	861	783	1644
		%	100.0%	100.0%	100.0%

¹²Proportion of children U5 slept under a BN is an indicator of MDG 6 on malaria.

Table 6-4 shows further analysis of the distribution of children U5 who reported having slept under a bed net last night by type of bed net, sex of the child and surveillance site. Among 1353 children U5, who slept under a BN last night, the majority slept under long lasting BN, 72% and 27% slept under pre-treated BN, very few (less than 0.5%) slept under other type of BN. There was no difference between male and female children U5 reported having slept under a BN last night. Most children U5 reported having slept under long lasting insecticide treated BN, i.e. 63% in Hiri, 79% in Hides, and 85% in Karkar. By contrast, only 10% of children U5 in Asaro reported having slept under a long lasting BN. In Asaro, 85% of the U5 children reported having slept under pre-treated BN.

Table 6-4 Distribution of children under 5 who slept under insecticide treated bed net last night by type of bed net (BN), sex and site, PNG IMR's iHDSS, 2015

iHDSS site	Type of BN		Sex		Total
			Male	Female	
Hiri	Long lasting	N	57	42	99
		%	64.8%	60.0%	62.7%
	Pre-treated	N	31	27	58
		%	35.2%	38.6%	36.7%
	Other type	N	0	1	1
		%	0.0%	1.4%	.6%
	Total	N	88	70	158
		%	100.0%	100.0%	100.0%
Asaro	Long lasting	N	11	8	19
		%	10.2%	10.1%	10.2%
	Pre-treated	N	97	71	168
		%	89.8%	89.9%	89.8%
	Total	N	108	79	187
		%	100.0%	100.0%	100.0%
Karkar	Long lasting	N	414	396	810
		%	85.9%	85.0%	85.4%
	Pre-treated	N	68	67	135
		%	14.1%	14.4%	14.2%
	Other type	N	0	3	3
		%	0.0%	.6%	.3%
	Total	N	482	466	948
		%	100.0%	100.0%	100.0%
Hides	Long lasting	N	26	18	44
		%	72.2%	75.0%	73.3%
	Pre-treated	N	10	5	15
		%	27.8%	20.8%	25.0%
	Other type	N	0	1	1
		%	0.0%	4.2%	1.7%
	Total	N	36	24	60
		%	100.0%	100.0%	100.0%
Total	Long lasting	N	508	464	972
		%	71.1%	72.6%	71.8%
	Pre-treated	N	206	170	376
		%	28.9%	26.6%	27.8%
	Other type	N	0	5	5
		%	0.0%	.8%	.4%
	Total	N	714	639	1353
		%	100.0%	100.0%	100.0%

7.0 WATER AND SANITATION

7.1 ABSTRACT

According to the World Health Organisation, poor sanitation threatens public health. Adequate drinking water and sanitation are the important ingredients required to ensure human health. Access to safe water and sanitation is a major challenge to the both government and aid agencies, especially in the rural parts of Papua New Guinea. The current study on water supply and sanitation coverage was carried out to assess the uptake of improved water supply and sanitation across the iHDSS locations.

The current iHDSS data demonstrate that more than half of the total household use improved water sources for drinking. A quarter of the households who use improved water source have their water piped into the residence whereas the other three quarter has to walk some distance to the protected water source. The status of water quality is uncertain at the household level i.e. inadequate treatment prior to usage. Most households do not adequately treat their water i.e. lack of boiling and/or chemical disinfection. Only 25% of households boil their water. The use of improved sanitation facilities is minimal across the iHDSS location i.e. only 10% use an improved sanitation facility.

The current survey results demonstrate the need for a proactive and long-term intervention regarding water and sanitation services.

7.2 AVAILABILITY AND ACCESS TO IMPROVED WATER SOURCES

The population using *improved sources* of drinking water are those using any of the following types of supply: piped water (into dwelling, compound, yard or plot, public tap/standpipe), tube well/borehole, protected well, protected spring, and rainwater collection. Bottled water is considered as an improved water source only if the household population is using an improved water source for other purposes, such as hand washing and cooking.

Table 7-1 presents the different types of improved water supply sources among 4,894 households across the four iHDSS sites. The main source of drinking water in the two coastal sites (Hiri and Karkar) used is public tap or stand pipe, rain water tank and protected well. In Asaro households use public tap or stand pipe, rainwater tank and protected spring where as households in Hides use rain water tanks and protected springs as their main source of improved drinking.

Table 7-1 Improved main source of water for drinking, PNG IMR's iHDSS, 2015

iHDSS site		Piped into dwelling	Piped into compound, yard or plot	Piped to neighbour	Public tap /standpipe	Tube/drill well	Protected well	Protected spring	Rainwater tank	Bottled water	Total
Hiri	N	1	12	1	627	33	195	3	307	0	1179
	%	0.1%	1.0%	0.1%	53.2%	2.8%	16.5%	0.3%	26.0%	0.0%	100.0%
Asaro	N	52	87	47	480	2	91	126	93	1	979
	%	5.3%	8.9%	4.8%	49.0%	0.2%	9.3%	12.9%	9.5%	0.1%	100.0%
Karkar	N	94	170	148	782	13	268	163	479	0	2117
	%	4.4%	8.0%	7.0%	36.9%	0.6%	12.7%	7.7%	22.6%	0.0%	100.0%
Hides	N	6	1	0	15	0	4	335	257	1	619
	%	1.0%	0.2%	0.0%	2.4%	0.0%	0.6%	54.1%	41.5%	0.2%	100.0%
All sites	N	153	270	196	1904	48	558	627	1136	2	4894
	%	3.1%	5.5%	4.0%	38.9%	1.0%	11.4%	12.8%	23.2%	0.0%	100.0%

Table 7-2 presents data regarding access and improved water source across the four iHDSS locations. Twenty-five percent of households obtain their water either in their own dwelling or in their yard while half of the household participants have to walk less than 30 minutes to a water source. The remaining 25% of households walk over 30 minutes to obtain water. There is a marked sex bias in regards to obtaining water, i.e. supplying water via distant sources (not directly in the household) is dominated by women (75%) versus men (20%) and children (10%). The water consumption rate is such that majority of the participants (74%) resupplied their water supply container once a day; however, 26% resupplied the household water twice or three times a day.

Table 7-2 Time to source of water, person collecting water and frequency of collecting water, PNG IMR's iHDSS, 2015

iHDSS site		Time to water source			Person collecting water				Frequency of collecting water		
		Water on Premises	<30 minutes	>30 minutes	Adult woman	Adult man	Female child	Male child	Once a day	Twice a day	Three time+
Hiri	N	332	464	206	576	109	18	5	484	132	83
	%	33.13%	46.31%	20.56%	81.4%	15.4%	2.5%	0.7%	69.2%	18.9%	11.9%
Asaro	N	275	1120	375	836	449	184	59	1457	51	11
	%	15.54%	63.28%	21.19%	54.7%	29.4%	12.0%	3.9%	95.9%	3.4%	0.7%
Karkar	N	495	614	708	1282	102	23	2	813	454	86
	%	27.24%	33.79%	38.97%	70.5%	7.2%	1.6%	0.1%	60.1%	33.6%	6.4%
Hides	N	290	445	177	433	127	63	5	336	147	118
	%	31.8%	48.8%	19.41%	68.9%	20.2%	10.0%	0.8%	55.9%	24.5%	19.6%
All sites	N	1392	2643	1466	3127	787	288	71	3090	784	298
	%	25.3%	48.05%	26.65%	73.2%	18.4%	6.7%	1.7%	74.1%	18.8%	7.1%

Table 7-3 Household water treatment for drinking, PNG IMR's iHDSS, 2015

iHDSS site		Boil	Add bleach / chlorine	Strain it through a cloth	Use water filter	Solar disinfection	Let it stand, settle	Total
Hiri	N	415	53	17	1	0	255	741
	%	56.00%	7.15%	2.29%	0.13%	0.00%	34.41%	100.00%
Asaro	N	202	1	11	0	1	728	943
	%	21.42 %	0.11%	1.17%	0.00%	0.1%	77.20%	100.00%
Karkar	N	253	0	10	1	2	465	731
	%	34.61%	0.00%	1.37%	0.13%	0.27%	63.61%	100.00%
Hides	N	60	0	9	0	0	152	221
	%	27.15%	0.00%	4.07%	0.00%	0.00%	68.78%	100.00%
All sites	N	930	54	47	2	3	1,600	2,636
	%	35.28%	2.05%	1.78%	0.08%	0.11%	60.70%	100.00%

Table 7-4 Improved sanitation facility, PNG IMR's iHDSS, 2015

iHDSS site		Piped sewer system	Septic tank	Pit latrine	Pit latrine with ventilation	Pit latrine with slab	Composting toilet	Total
Hiri	N	1	10	5	85	132	79	312
	%	0.3%	3.2%	1.6%	27.2%	42.3%	25.3%	100.0%
Asaro	N	3	1	4	12	130	11	161
	%	1.9%	0.6%	2.5%	7.5%	80.7%	6.8%	100.0%
Karkar	N	17	6	2	6	268	1	300
	%	5.7%	2.0%	0.7%	2.0%	89.3%	0.3%	100.0%
Hides	N	2	2	5	37	68	11	125
	%	1.6%	1.6%	4.0%	29.6%	54.4%	8.8%	100.0%
All sites	N	23	19	16	140	598	102	898
	%	2.6%	2.1%	1.8%	15.6%	66.6%	11.4%	100.0%

7.3 AVAILABILITY AND UTILIZATION OF IMPROVED SANITATION FACILITY

Inadequate disposal of human excreta and personal hygiene are associated with a range of diseases including diarrhoeal diseases and polio. An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. Improved sanitation can reduce diarrhoeal disease and can significantly lessen the adverse health impacts of other disorders responsible for death and disease among children. Improved sanitation facilities for excreta disposal include flush or pour flush toilets flowing to a piped sewer system, septic tank, or latrine; ventilated improved pit latrine, pit latrine with slab, and composting toilet.

Table 7-4 shows that among 898 households who used improved sanitation, 66% used pit latrine with slab; 15% used Pit latrine with ventilation; and 11% used composting toilet while the rest 8% used another type of improved sanitation facility.

Table 7-5 Shared use of sanitation facility, PNG IMR's iHDSS, 2015

iHDSS site		Non-shared private toilet	Public toilet	Shared private toilet	Total
Hiri	N	395	29	234	658
	%	60.03%	4.40%	35.57%	100.00%
Asaro	N	1535	14	413	1962
	%	78.24%	0.71%	21.05%	100.00%
Karkar	N	1152	17	839	2008
	%	57.37%	0.85%	41.78%	100.00%
Hides	N	829	6	45	880
	%	94.20%	0.68%	5.12%	100.00%
All sites	N	3911	66	1531	5508
	%	71.01%	1.20%	27.80%	100.00%

Table 7-5 shows the shared or private sanitation in the four iHDSS sites. 71% of those who had a toilet had private non-shared toilet whereas 28% had a shared private toilet with the neighbours or other families but not with public. Only 1% of the household used a public toilet. The majority of the people who had toilets used it as a private toilet and shared it with neighbours rather than public.

8.0 HAND WASHING

8.1 ABSTRACT

This report has presented major findings and observations in all the PNGIMRs' iHDSS sites on the hand-washing practises with soap and water. Two main findings were: (i) availability of soap and water at the hand washing place; and (ii) the availability of different types of soap in the household.

A total of 4283 households residing in the four iHDSS sites were observed over the reporting period. 3299 households had both water and soap, (64%), 19% of the households had water, but no soap, and 6.8% had soap but no water. Approximately 10% of households had neither water nor soap.

Further investigation of the availability of different types of soap in the households indicated that soap bar was the most common type available in all four sites, (48%), followed by detergent, (14%), liquid (5.3%) and ash/ mud/ sand (4.7%). 18% of households had no soap and 7% of households did not want to show their washing place.

Hand washing with water and soap is the most cost-effective health intervention to reduce both the incidence of diarrhoea and pneumonia in children U5 years of age. It is most effective when done using water and soap after visiting a toilet or cleaning a child, before eating or handling food, and before feeding a child. Monitoring correct hand washing behaviour at these critical times is challenging. A reliable alternative to observations or self-reported behaviour is assessing the likelihood that correct hand washing behaviour takes place by observing if a household has a specific place where people most often wash their hands and if water and soap (or other local cleansing materials) are present at a specific place for hand washing.

8.2 AVAILABILITY OF WATER AND SOAP FOR HAND-WASHING

Table 8-1 shows the availability of water and soap at place for hand-washing in a total of 4,283 households, of which, 3,299 households had both water and soap, accounted for 64%, 19% of the households had water, but no soap, and 6.8% had soap but no water. Around 10% of households had neither water nor soap. It is noted that Hiri had the highest proportion of households having both water and soap at the hand washing place, 92% and only 2% of households had no water or soap for washing hands. Only about 50% of households in Karkar and Hides had both water and soap.

Table 8-1 Availability of water and soap at place for hand-washing, PNG IMR's iHDSS, 2015

iHDSS site			Soap available	Soap unavailable	Total
Hiri	Water available	N	1287	61	1348
		%	92.1%	4.4%	96.5%
	Water unavailable	N	22	27	49
		%	1.6%	1.9%	3.5%
	Total	N	1309	88	1397
		%	93.7%	6.3%	100.0%
Asaro	Water available	N	578	167	745
		%	65.7%	19.0%	84.7%
	Water unavailable	N	34	101	135
		%	3.9%	11.5%	15.3%
	Total	N	612	268	880
		%	69.5%	30.5%	100.0%
Karkar	Water available	N	1132	716	1848
		%	49.6%	31.4%	81.1%
	Water unavailable	N	113	319	432
		%	5.0%	14.0%	18.9%
	Total	N	1245	1035	2280
		%	54.6%	45.4%	100.0%
Hides	Water available	N	302	40	342
		%	52.9%	7.0%	59.9%
	Water unavailable	N	178	51	229
		%	31.2%	8.9%	40.1%
	Total	N	480	91	571
		%	84.1%	15.9%	100.0%
All sites	Water available	N	3299	984	4283
		%	64.3%	19.2%	83.5%
	Water unavailable	N	347	498	845
		%	6.8%	9.7%	16.5%
	Total	N	3646	1482	5128
		%	71.1%	28.9%	100.0%

8.3 AVAILABILITY OF SOAP IN HOUSEHOLDS

Table 8-2 illustrates the availability of the different types of soap in the households by site. Soap was the most common type available in all four sites, 48%, followed by detergent, 14%, liquid 5.3% and ash/ mud/ sand 4.7%. Still 18% of households had no soap and 7% of households did not want to show the washing place.

For the availability of soap, Hiri and Hides recorded the highest proportions with 74.5% and 77% of households being observed having soap, respectively. Asaro had only 36% of households having soap and also had the highest proportions of households without soap (32%) and that did not want to show (15%). The situation of Karkar was a little bit better with 37% of households having soap bar and 14% having detergent.

Table 8-2 Availability of soap in household, PNG IMR's iHDSS, 2015

iHDSS sites		Soap bar	Detergent	Liquid	Ash/mud/ sand	Unavailable	Not shown
Hiri	N	1198	736	326	35	36	37
	%	74.5%	45.8%	20.3%	2.2%	2.2%	2.3%
Asaro	N	994	4	16	162	903	409
	%	36.2%	.1%	.6%	5.9%	32.9%	14.9%
Karkar	N	1162	436	98	41	578	89
	%	37.3%	14.0%	3.1%	1.3%	18.6%	2.9%
Hides	N	713	19	6	157	16	61
	%	77.3%	2.1%	.7%	17.0%	1.7%	6.6%
All sites	N	4067	1195	446	395	1533	596
	%	48.5%	14.2%	5.3%	4.7%	18.3%	7.1%

9.0 HOUSEHOLD ASSETS

9.1 ABSTRACT

Chapter 9 describes household characteristics (HC) in the four iHDSS sites. Information on household characteristics and availability of assets is essential to understand the socioeconomic status at the individuals, household levels.

Housing type is an indicative of wealth of household. About half of houses were traditional non-permanent houses in all four sites, with the highest proportion (74%) being observed in Hides. By contrast, Hiri had the higher proportion of semi-permanent and permanent houses, 29% and 62%, respectively. Half of houses were built in the past 4 years in all four sites and 30% were built between 5-9 years ago. Hiri was likely the only site with about 40% of houses being built more than 10 years ago.

The utilization of telecommunication services, including computer use, fixed telephone and mobile cellular were also analysed. Almost of all the households reported having at least one cell phone. In contrast, only 5% of households had a computer and less than 1% of them had a landline phone.

9.2 TYPE OF HOUSE

Table 9-1 shows the type of houses in the four surveillance sites. A total of 8389 houses were recorded in four sites, of which about half were traditional non-permanent houses. This type of house was most prevalent in Hides(73%), but only 1% in Hiri. Asaro and Karkar had similar proportion of 57% and 58%, respectively. Around 20% of houses are semi-permanent, about one third in Hiri and Karkar and 10% in Asaro and Hides. It is noted that more than 10% of houses in Asaro were unknown about type, higher than that of the three other sites.

Table 9-1 Type of house by site, PNG IMR's iHDSS, 2015

Type of house		iHDSS site				Total
		Hiri	Asaro	Karkar	Hides	
Traditional non-permanent house	N	16	1574	1811	676	4077
	%	1.0%	57.3%	58.2%	73.3%	48.6%
Adapted traditional house	N	32	366	220	88	706
	%	2.0%	13.3%	7.1%	9.5%	8.4%
Semi-permanent house	N	468	380	836	97	1781
	%	29.1%	13.8%	26.9%	10.5%	21.2%
Permanent house	N	995	128	160	50	1333
	%	61.9%	4.7%	5.1%	5.4%	15.9%
DK	N	97	299	85	11	492
	%	6.0%	10.9%	2.7%	1.2%	5.9%
Total	N	1608	2747	3112	922	8389
	%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 9-2 presents the information on how many years the house has been built at each site. A total of 7822 houses were recorded in the system. Half of the houses were built within the last 4 years, with the highest figure in Karkar (63%), followed by Hides (57%), and Asaro (44%) and lowest in Hiri (25%). By contrast, one third of houses were built between 5 to 9 years ago. This proportion was slightly higher in Asaro and Hides (35%) and lowers in Hiri and Karkar (20%). Among the four sites, Hiri had a significant higher number of houses which were built more than 10 years ago, i.e. Hiri had 27% of houses which were built 20-80 years ago, compared with 5% in Asaro, 2% in Karkar and 0.5% in Hides.

Table 9-2 How many years the house has been built by site, iHDSS, 2015

Number of year house has been built		iHDSS site				All sites
		Hiri	Asaro	Karkar	Hides	
0-4	N	366	1077	1891	522	3856
	%	24.7%	44.1%	63.4%	57.3%	49.3%
5-9	N	285	890	865	325	2365
	%	19.2%	36.4%	29.0%	35.7%	30.2%
10-14	N	251	255	134	44	684
	%	16.9%	10.4%	4.5%	4.8%	8.7%
15-19	N	176	88	41	16	321
	%	11.9%	3.6%	1.4%	1.8%	4.1%
20-80	N	406	133	53	4	596
	%	27.4%	5.4%	1.8%	.4%	7.6%
Total	N	1484	2443	2984	911	7822
	%	100.0%	100.0%	100.0%	100.0%	100.0%

9.3 UTILISATION OF TELECOMMUNICATION SERVICES

Table 9-3 presents information on the utilisation of telecommunication services by households in the four iHDSS sites: Hiri, Karkar, Hides and Asaro. A total of 8,398 households were recorded in the database in all the sites, of which 6,228 households (74%) owned at one or more mobile phone. The highest proportion was recorded in Hides and Hiri, 87% and 91%, respectively followed by Karkar, 75% and the lowest in Asaro at 60%. These data are is an indicative of mobile cellular network coverage in all the study sites. In contrast, most households did not have a fixed line phone, only 0.8% of households reported owning a landline phone. Similarly, just more than 5% of households reported having a computer, 321 household in Hiri and 49 households in Hides.

Table 9-3 Utilisation of telecommunication services*

HDSS site		Mobile-cellular subscriptions	Computer users	Fixed-telephone subscriptions
Asaro	N	1648	26	12
	%	59.88	0.95	0.44
Hides	N	801	49	3
	%	87.26	5.34	0.33
Hiri	N	1466	321	35
	%	91.56	20.05	2.19
Karkar	N	2313	55	15
	%	74.58	1.77	0.48
All sites	N	6,228	451	65
	%	74.45	5.39	0.78

*Note: These are MDGs indicators

10.0 ACCESS AND UTILISATION OF HEALTH SERVICES

10.1 ABSTRACT

Access and utilization of health services among households is one of the key factors to improving people's health and wellbeing. To have a better understanding of such issues in PNG, and especially in remote rural areas, this chapter aims to provide initial evaluation of households' access to different types of health care facilities, transportation means available to get to the closest health facility, time to get to the closest health facility as well as cost involved. Data from the four (4) iHDSS sites was analysed using SPSS.

The majority of households (80%) had access to primary health care as the closest health facility to their home. In addition, 14% of households reported having access to secondary and tertiary health care. Walk to a health facility was reported as the most common way for households (80%) to travel to the closest health facility. It was followed by the use of public transportation means, which was reported available by more than a quarter of households, but was actually used by only 10% of the households.

Analysis of time and cost involved in transportation indicated that it takes households about 20 minutes on average to get to a closest health facility by walk in all four sites. Interestingly, the time to get onto a health facility by public transportation means such as bus and boat are almost the same to walk, but it costs up to 25 Kinas in Hiri.

In terms of healthcare services that the household used in their last visit to the closest health facility, more than 80% of the total households used out-patient healthcare services and 9% used in-patient services, and only 1% of households reported using laboratory services. Interestingly, among 8,389 households, 90% of them reported satisfactory with the health care services they were provided in the last visit to the health facilities. Only 3.5% of households were dissatisfied with the provided health services.

10.2 AVAILABILITY AND ACCESSIBILITY TO HEALTH SERVICES

Table 10-1 shows the availability of health care services and the households' access and utilisation of health services in the four iHDSS sites in 2015. Primary health care facilities were mostly available in all the iHDSS sites, with 81.2% of households reported closest to primary health care facilities. Indeed, 98% of Hela households reported close to a primary health facility. By contrast, 12% of households reported close to a secondary health facility and only 1.3% of households were closed to a tertiary health care facility.

Table 10-1 Availability, Accessibility and Utilisation of health services, PNG IMR's iHDSS, 2015

		iHDSS site									
		Asaro		Hides		Hiri		Karkar		All sites	
		N	%	N	%	N	%	N	%	N	%
Closest health facility	Primary	2143	78.0	910	98.7	1517	94.3	2239	71.9	6809	81.2
	Secondary	194	7.1	2	0.2	6	0.4	776	24.9	978	11.7
	Tertiary	111	4.0	1	0.1	0	0.0	0	0.0	112	1.3
	Other	299	10.9	9	1.0	85	5.3	97	3.1	490	5.8
	Total	2747	100.0	922	100	1608	100.0	3112	100.0	8389	100.0
Available transportation means	Walk	2327	84.7	891	96.6	1459	90.7	2906	93.4	7583	90.4
	Cot carriage	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
	Animal carts	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
	Motorbike	106	3.9	1	0.1	5	0.3	14	.4	126	1.5
	Public bus/boat	604	22.0	401	43.5	359	22.3	836	26.9	2200	26.2
	Private car/boat	470	17.1	19	2.1	208	12.9	592	19.0	1289	15.4
	Ambulance car	510	18.6	0	0.0	23	1.4	321	10.3	854	10.2
	Helicopter	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
Most common use of transportation mean	Walk	2300	87.7	888	96.3	1228	76.4	2515	80.8	6931	82.6
	Cot carriage	8	0.3	4	0.4	6	0.4	6	0.2	24	0.3
	Animal carts	0	0.0	0	0.0	1	0.1	2	0.1	3	0.0
	Motorbike	1	0.0	0	0.1	1	0.1	2	0.1	5	0.1
	Public bus/boat	115	4.2	17	1.8	210	13.1	475	15.3	817	9.7
	Private car/boat	4	0.1	4	0.4	57	3.5	13	0.4	78	0.9
	Ambulance car	1	0.0	1	0.1	1	0.1	3	0.1	6	0.1
	Helicopter	0	0.0	0	0.0	0	0.0	1	0.0	1	0.0
	Other	0	0.0	0	0.0	2	0.1	3	0.1	5	0.1
	Missing values	318	11.6	7	0.8	102	6.3	92	3.0	519	6.2
	Total	2747	100.00	922	100.0	1608	100.0	3112	100.0	8389	100.0

The majority of households (90%) reported walking as the most common way to travel to the health facility. Public transportation such as bus and boat was the second most common means available for households to travel to a health facility, with more than 26% of households reported using it. This figure was even higher in Hides, where 46% of the households used a public transportation means for transferring people to a health facility. It was noted that ambulance car were available to only 10% of households in the four sites, mostly in Asaro, 19% and Karkar, 10%. There was no ambulance transportation available in Hiri and Hides.

Further analysis of the most common use of available transportation means by the households indicated that more than 82% of households actually walked to the health care facilities, only less than 10% of households used public transportation to travel to a health facility. Despite of availability of the ambulance car service in Asaro and Karkar, almost no one reported using it.

Table 10-2 shows the average time and cost to get to the closest health facility by the transportation means mostly used by the households in the four iHDSS sites. Across the four sites, it took less than 30 minutes to get to a closest health care facility by walk or by public transportation means such as bus and boat, or by private car and boat.

Table 10-2 Average time (in minutes) and cost (in kinas) to get to the closest health facility by site and transportation means, iHDSS 2015

Transportation means	iHDSS site							
	Asaro		Hides		Hiri		Karkar	
	Time	Cost	Time	Cost	Time	Cost	Time	Cost
Walk	24.64	0.66	25.3	0.65	14.99	2.08	20.53	0.53
Cot carriage	21.67	0.86	35	N/A	14.67	25	16.6	0.5
Animal carts	N/A	N/A	N/A	N/A	30	N/A	45	N/A
Motorbike	2	2	N/A	N/A	10	50	35	1
Public bus/boat	10.17	2.12	27.5	2.13	16.96	25.23	20.03	0.7
Private car/boat	23.75	1	17.25	1.5	12.17	9.53	18.75	3.29
Ambulance car	5	5	40	N/A	7	N/A	10.5	20
Other	N/A	N/A	N/A	N/A	16.5	N/A	20	4

With regard to the cost for transportation from home to a closest health care facility, public transportation means costed households about 2 kinas on average to get to the closest healthcare facility in Asaro and Hides, but only 1 kina in Karkar. It was also noted that Hiri households pay considerably higher fares than other sites to get to a closest health facility by i.e. 25 kinas for cot carriage, 50 kinas for motorbike, 25 kinas for public bus/boat, and 9 kinas for a private car/boat.

The above data on availability of transportation means and the transportation associated cost to the households to get onto a health care facility suggest that these factors would not be a barrier to the household in access to a health care facility near by their place.

10.3 SATISFACTION AND UTILIZATION OF HEALTH SERVICES

Table 10-3 shows the household's utilisation and satisfaction of health services in their last visit to a health care facility. The most commonly health care service being utilised by household in their last visit was the out-patient health service with 81.1% of the total number of households using it in the iHDSS sites. In-patient clinical healthcare services were used by 9% of the households in the last visit. Laboratory health service was used by only 1.2% of the households. It was noted that out-patient services were used most in Hides (90% of households) compared to other sites. By contrast, in-patient services were mostly used in Karkar compared to other sites, with 15% of households reported using it.

Table 10-3 Households' satisfaction of health services, iHDSS 2015

	iHDSS site								All sites	
	Asaro		Hides		Hiri		Karkar			
	N	%	N	%	N	%	N	%	N	%
Out-patient	2377	86.5	825	89.5	1149	71.5	2454	78.9	6805	81.1
In-patient	58	2.1	25	2.7	194	12.1	478	15.4	755	9.0
Laboratory	5	0.2	52	5.6	9	0.6	34	1.1	100	1.2
Very highly satisfaction	581	21.2	538	58.4	38	2.4	443	14.2	1600	19.1
Highly satisfaction	386	14.1	281	30.5	123	7.6	573	18.4	1363	16.2
Satisfaction	1378	50.2	71	7.7	1116	69.4	1921	61.7	4486	53.5
Dissatisfaction	76	2.8	10	1.1	82	5.1	45	1.4	213	2.5
Very dissatisfaction	10	0.4	0	0.0	60	3.7	18	0.6	88	1.0
Missing	316	11.5	22	2.4	189	11.8	112	3.6	639	7.6
Total	2747	100.0	922	100	1608	100.0	3112	100.0	8389	100.0

Regarding the households satisfactory with the provided health care services in the last visits to a health facility, 19% of households reported very highly satisfactory, 16% of highly satisfactory and 53% of satisfactory. By contrast, the proportion of households reported dissatisfaction was 2.5% and very dissatisfaction was 1%.

It was noted that in Hides, 58% and 30% of households reported very highly satisfactory and highly satisfactory, respectively, and only 1% reported dissatisfaction. These levels of household satisfaction toward the provided healthcare services in Hides were much higher than that in other three sites.

10.4 ASARO/GOROKA

Table 10-4 show the caseload recorded in two health facilities in Asaro/Goroka surveillance site over the reporting period. A total of 12,017 cases, including 9,274 visits to the health facilities were recorded in Asaro health clinic and 2,743 visits in Tafeto health clinic. Among these case loads, 1,189 visits for antenatal care, and 602 for family planning services and 2,026 cases for immunisation services.

Table 10-4 Cases load and health services, Asaro iHDSS, Jan-June 2015

	Asaro	Tafeto	Total
Total case Load	9,274	2,743	12,017
Antenatal Visits	943	246	1,189
Family Planning	602	N/A	602
Immunisation	1,296	729	2,026

Note: PiHP does not have staff working at Kwongi health centre this year. Kwongi OIC has been travelling away so no access to medical cards/books. Family planning services are not available in Tafeto clinic as it is run by Catholic mission.

Table 10-5 shows the morbidity data on infection diseases in the two clinics. Respiratory infections were the most common, accounted for more than one third of all cases. It was followed by other infections. Only 6 TB patients but none measles were identified in the reporting period.

Table 10-5 Morbidity of infection diseases in Health Centres in Asaro, Jan-June 2015

	Asaro		Tafeto		Total	
	N	%	N	%	N	%
TB	1	1.18	5	54.47	6	6.40
STIs	466	5.51	45	4.90	511	5.45
Skin infections	867	10.26	264	28.76	1,131	12.07
Respiratory diseases	3,347	39.60	118	12.85	3,465	36.98
Suspected Measles	0	0.00	0	0.00	0	0.00
Diarrhoea	587	6.94	80	8.71	667	7.12
Malaria	186	2.20	5	0.54	191	2.04
Other infections	2,999	35.48	401	43.68	3,400	36.28
Total	8,453	100	918	100	9,371	100

10.5 HIDES/KOMO

Table 10-6 shows the case load recorded in Para health clinic and Mananda health clinic in Hides iHDSS site over the reporting period. A total of 12,608 cases were recorded in the two health facilities, of which 1,040 visits for family planning services and antenatal cares and 3,255 visits for immunisation services.

Table 10-6: Case load recorded at health clinics in Hides iHDSS, Jan-June 2015

	Para	Mananda	Total
Total case load	3,527	9,081	12,608
Antenatal and FP	322	718	1,040
Immunisation	1,222	2,033	3,255

Table 10-7 shows the morbidity of infectious diseases recorded in the two health clinic in Hides iHDSS site for the period January-September 2015. Again respiratory infections accounted for almost one fourth of the case load while other infections accounted for the highest proportion of 63% of the case load. No TB or measles was identified in the reporting period.

Table 10-7 Morbidity of infection diseases in Health Centres, Hides iHDSS, 2015

Morbidity	Para Clinic		Mananda H/C		Total	
	N	%	N	%	N	%
TB	0	0	0	0	0	0
STIs	103	1.61	251	2.28	354	2.03
Skin infections	237	3.70	537	4.87	774	4.44
Respiratory diseases	1,088	16.97	3,086	27.98	4,174	23.93
Suspected Measles	0	0.00	0	0.00	0	0.00
Diarrhoea	473	7.38	623	5.65	1,096	6.28
Malaria	1	0.02	27	0.24	28	0.16
Other infections	4,510	70.34	6,504	58.98	11,014	63.15
Total	6,412	100	11,028	100	17,440*	100

Note: * This figure includes reported cases presented in July, August and September 2015

10.6 HIRI

Table 10-8 shows a total of 3,862 cases recorded in three clinics in Hiri iHDSS site over the reporting period, of which 3,138 cases were infectious diseases as shown in

Table 10-9. Respiratory diseases accounted for 48% of all infections, followed by skin infections, 28.7%. Only 4 TB cases were detected in TB and 29 cases of suspected malaria.

Table 10-8 Case load at health clinics, Hiri iHDSS, Jan-June 2015

	Papa	Boera	Porebada	Total
Case load	1,568	563	1,831	3,962
Antenatal visits	147	50	68	265
Family Planning	58	12	15	85
Immunisation	660	192	549	1,401

Table 10-9 Morbidity of infection diseases in Health Centres, Hiri iHDSS, Jan-June 2015

	Papa		Boera		Porebada		Total	
	N	%	N	%	N	%	N	%
TB	1	0.08	0	0.00	3	0.20	4	0.13
STIs	6	0.47	0	0.00	6	0.39	12	0.38
Skin infections	262	20.65	49	14.54	590	38.51	901	28.71
Respiratory diseases	752	59.26	100	29.67	657	42.89	1509	48.09
Diarrhoea	173	13.63	107	31.75	191	12.47	471	15.01
Malaria	17	1.34	0	0.00	12	0.78	29	0.92
Other infections	58	4.57	81	24.04	73	4.77	212	6.76
Total	1,269	100	337	100	1,532	100	3,138	100

Note: Porebada clinic re-opened in April – No disease tally from January to March. Boera Clinic – Clinical staff on annual leave from January – February

Table 10-10 Number tests conducted at POM Lab, Hiri iHDSS, Jan-June 2015

Study	Type of test	2013		2014		Jan-June 2015	
		N	%	N	%	N	%
NCD	Lipid Profile	289	26.08	233	13.44	No samples collected	
	HbA1c	289	26.08	233	13.44		
TB	Ziehl-Neelsen Microscopy	367	33.12	653	37.66	59	62.77
	Gene Expert	163	14.71	615	35.47	35	37.23
Total		1108	100%	1734	100%	94	100%

Note: Molecular testing (*Chlamydia Trichomonas*, *Neisseria Gonorrhoea*) and Serological Testing (HSV-2, Anti-TP, RPR) are also conducted at the POM Lab. This activity is financially supported by another PNG IMR project, therefore, not included in the report.

10.7 KARKAR

Table 10-11 shows the caseload of 25,569 cases presented at three health facilities in Karkar iHDSS site over the reporting period, of which 1,217 visits for antenatal cares and family planning services, 3,198 cases for Immunisation services.

As shown in Table 10-12, the caseload of infections was 12,846, in which respiratory infections accounted for one third, followed by malaria and skin infections. Other infections accounted for most of the cases, at 45.74%.

Table 10-11 Total number of cases load at health clinics, Karkar iHDSS, Jan-June 2015

	Gaubin	Kulubob	Miak	Mapor	Total
Case load	9,881	2,522	8,515	4,678	25,596
Antenatal and FP	539	0	0	678	1,217
Immunisation	2,018	0	0	1,180	3,198

Table 10-12 Morbidity of infection diseases in Health Centres, Karkar iHDSS, Jan-June 2015

	Kulubob clinic		Miak clinic		Mapor clinic		Gaubin hospital		Total	
	N	%	N	%	N	%	N	%	N	%
TB	1	0.05	80	1.45	3	0.12	24	0.77	108	0.84
STIs	15	0.73	11	0.2	2	0.08	54	1.73	82	0.64
Skin infections	390	18.91	294	5.32	125	5.1	476	15.23	1285	10.00
Respiratory diseases	1096	53.15	1051	19.03	420	17.12	1257	40.22	3824	29.77
Diarrhoea	90	4.36	54	0.98	22	0.9	98	3.14	264	2.06
Malaria	133	6.45	783	14.18	147	5.99	346	11.07	1409	10.97
Other infections	337	16.34	3202	57.99	1715	69.91	620	19.84	5874	45.73

Total	2,062	100	5,475	100	2,434	100	2,875	100	12,846	100
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11.0 DISCUSSION AND CONCLUSION

The PiHP continued its restructuring processes over the reporting period January-June 2015. Changes included a new design of the household questionnaire and the application of a new QA/QC measures. The household update was successfully conducted in the four iHDSS sites, using the new HH Questionnaire. The iHDSS has been continuously strengthened via refresh and follow-up trainings for the data analysis team, data collection team, and data management team, plus technical monitoring conducted in all the four surveillance sites in Hiri, Karkar, Hides and Asaro.

The 2015 September Report has provided a range of socio-economic and development information and data at the household and individual levels in the four surveillance sites, namely Asaro, Hides, Hiri and Karkar.

The iHDSS has recorded a total of 8,389 households and 41,364 individuals (21,205 males, 51.3% and 19,394 females, 46.9%). The surveillance population were included 7,629 children U5, 7,871 women of reproductive age 15-49 and 7,881 men of working age 15-64.

The missing information on sex was 1.8%, and missing information on age was 0.1%. These data reconfirm the improvement of the overall performance of the iHDSS and the quality of data in particular.

The household size was 4.96 persons on average. 40% of households had 1-2 children U5. More than half of households had one man of working age 15-64 and half of households had a woman of reproductive age 15-49 in the all four sites.

In term of education, data have suggested that there is an improvement in access to education services in the four surveillance sites over the last 20 years. 74% of the population in the age group 5-24 had access to education compared to only 40% of the population aged 25+. 50% of the younger population compared to 32% of the older population had attained primary education level. Despite more or less equal access to education, gender gaps still exist as reflected in high male-to-female ratios across all education levels, particularly at primary education.

A total of 25,046 people of working age, 15-64 years, 52% of males and 48% of females were analysed. 90% of the labour force engaged in private sector, of which 89% worked in subsistence agriculture.

BN data were collected from 2,927 households in the four surveillance sites, of which 67% of BN were long lasting and 32% were pre-treated BN. Among 1,644 children U5 records in the four sites, 85% slept under a BN last night, of which 72% slept under long lasting treated BN and 28% slept under pre-treated nets.

More than 50% of households had access to improved water source for drinking, but 75% of households had to walk to collect the water. Prior to drinking, passive settling of the water drinking

was the most common way to treat the water. Only a quarter of households boiled the water prior to drinking. Only 10% of interviewed households reported access to an improved sanitation facility.

Hand washing practices were observed in 4,283 households, of which 64% had both water and soap; 19% had water only; 6.8% had soap only; and, 10% had no water or soap for hand washing.

Half of the dwellings were traditional non-permanent and half of these houses were built in the past 4 years across all four sites. 75% of households had a mobile phone but very few had a landline phone or a computer.

Regarding the access and utilisation of healthcare services, 80% of households reported having access to primary health care. 80% of households reported a 20-minute walking distance to the closest primary health facility. Public transportation cost was used by 13% of households with the cost of about 2 kinas. 80% of households used outpatient services. 90% of outpatient service users reported high levels of satisfaction with the provided services during their last visit to a health facility.

The household data of the PNG IMR's iHDSS is detailed and available in great depth. This report updates some of the major findings and observations. Additional longitudinal analysis is planned and will be presented in subsequent PiHP reports.

12.0 REFERENCES

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