

Staffing the public health sector in Sierra Leone, 2005-11: findings from routine data analysis'

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September 2014

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Abbreviations

ANC – Antenatal Clinic

CHA – Community Health Assistant

CHO – Community Health Officer

CHW – Community Health Worker

DHMT – District Health Management Team

DHS – District Health Sister

EDCU – Endemic Disease Control Unit

FHCI – Free Health Care Initiative

GOSL – Government of Sierra Leone

HO – House Officer

HRH – Human Resource for Health

HW – Health Worker

IP – In-patients

MCH – Maternal and Child Health

MO –Medical Officer

MOHS - Ministry of Health and Sanitation

OP – Out-patients

ReBUILD - **R**esearch for **B**UILDing Pro-poor Health systems during recovery from political and social conflict

SECHN – State Enrolled Community Health Nurse

SRN – State Registered Nurse

SMO –Senior Medical Officer

Acknowledgements

This work was carried out as part of ReBUILD research programme (Research for building pro-poor health systems during the recovery from conflict), funded by the UK Department for International Development. Our thanks go to the HR payroll department in the MoHS for the provision of data and assistance with its interpretation.

Executive summary

This report forms part of a multi-country ReBUILD study on the evolution of health worker incentives in post-conflict settings. It is based on the analysis of routine human resources data from Sierra Leone from 2005 to 2011. As the data includes the period of the introduction of the Free Health Care Initiative in Sierra Leone, it allows us to draw some preliminary conclusions about its apparent effects on staffing levels, number of posts filled, attendance, attrition, density to population changes and health worker outputs. The validity of these conclusions is dependent on the completeness and robustness of the secondary data.

The data shows an increase in the staffing numbers of health workers in the period running up to and accelerating in the FHCI implementation year. Cadres of health workers that were key to the effective implementation of the FHCI saw an increase in staffing numbers and a reduction in attrition. This implies that the rapid recruitment and salary increase had a positive impact on retention. The analysis of staff to population ratios showed a two fold increase in the number of health professionals in 2010 compared to 2009. Health care activity data from Koinadugu district, a hard to reach rural area, also showed improvements in the post- FHCI phase in comparison to the pre-FHCI phase. However, there was no accompanying increase in number of health workers, compared to that reported for the urban Western Area. This confirms regional disparities in the distribution of the human resource available for health. Increases in MCH outputs in Koinadugu district, with no changes to staffing, resulted in an apparent increase in productivity, especially for institutional deliveries and antenatal consultations. Despite a relative reduction in 2011, the output per health worker was higher post-FHCI than before for both general services and maternal health care.

The overall national attrition rate for health workers fell from 5-6% at the start of the period to 3-4% at the end. This was highly variable between cadres, with higher cadres more likely to leave the service. A number of senior positions, such as registrars, remained unfilled, and absolute numbers of staff remained low for a number of key cadres, including midwives.

The data showed improvements in the national level of absenteeism after the implementation of the Staff Sanction Framework and its accompanying attendance monitoring tool. National levels of absenteeism reduced to 1.1% in February 2014 from 12.5% in December 2010, if reporting of absenteeism remains robust.

These findings show some achievements of MOHS and other stakeholders, as well as the outstanding challenges. These challenges include continuing to fill essential positions, ensuring an even distribution of staff across the districts, maintaining a strong downward pressure on absenteeism, and further reducing attrition. These, combined with further actions to stimulate demand for and access to health care, are essential to improving the health system and health outcomes in Sierra Leone.

1. Introduction

Background to the ReBUILD health worker incentive survey in Sierra Leone

This research project primarily focuses on health workers incentives in the post-conflict period. Currently, there is a dearth in information on the effectiveness of health worker (HW) incentives in post-conflict countries such as Sierra Leone. Little is known as to whether they have an effect on motivating and retaining the healthcare workforce or how to maintain incentive environments to support access to rational and equitable health services. Research into HW incentives is needed to provide evidence to guide policy makers in the recruitment and retention of staff. The work of ReBUILD Project 2 can also inform the Ministry of Health and Sanitation (MOHS) on the different mechanisms that can be used to attract staff into new contracts and retain them especially in remote, hard to reach areas of Sierra Leone.

Under the Agenda for Change, the Government of Sierra Leone (GOSL) introduced the Free Health Care Initiative (FHCI) on 27th April 2010. This was to address Sierra Leone's unacceptably high levels of maternal and child mortality and morbidity by providing free healthcare services at the point of delivery for pregnant women, lactating mothers and children under the age of 5. Implementation of this initiative resulted in reconstruction of the health sector and reforms in human resource for health sector. The GOSL negotiated a substantial increase in pay for all technical health workers from March 2010. This was in line with the increased workload for health workers as a result of more FHCI beneficiaries in the health facilities.

The secondary data was used to analyse trends in health worker availability, attrition, and performance during the post conflict period. Data from 2005 to 2012 was analysed from the four project districts and was sourced from the HRH directorate at the MOHS, Statistics Sierra Leone and District Health Management Teams (DHMTs).

The indicators included:

- Staffing numbers for key cadres and proportion of filled posts
- Staff to population ratios
- Staff to output ratios (in-patients, out-patients, combined measures and for specific services such as midwives: deliveries, where data permits)
- Attrition rates
- Attendance and absenteeism amongst health workers post-FHCI

This research tool will provide vital information on the impact of the HRH reforms associated with the FHCI on staffing numbers, attendance, and maternal and child health outputs. These were all important to 'protecting the investment' in the FHCI.

2. Sources and methods

The selected study sites were representative of the different regions of Sierra Leone. These included urban and rural areas, remote regions and areas of low economic status. All of the research tools were applied in these sites, which were:

- Western Area District - including urban and rural areas
- Kenema District (Eastern Province)
- Bonthe District (Southern Province) – hard to reach, rural area
- Koinadugu District (Northern Province) - hard to reach, rural area

Data was collected from the HRH Directorate at the MOHS on:

- i. number of established posts for different health professionals from 2005 to 2011 at the national level (Table 1)
- ii. number of established posts filled for different health professionals for the given time period
- iii. Population data for the given time period for staffing density analysis
- iv. Absenteeism data at district level from 2011 to 2013 (i.e. post FHCI phase)
- v. Output data for productivity (i.e. total number of outpatients (OP), total number of inpatients (IP), total number of facility deliveries, total number of antenatal care (ANC) visits) for 2005 – 2011 for Koinadugu District

Technical difficulties with the Health Management Information System (HMIS) meant that output data was only available for Koinadugu district.

Research Limitations

During the analysis of the data a number of inconsistencies were encountered:

- i. Number of filled posts at the national level being less than the collated number of established posts in the four districts (i.e. Kenema, Koinadugu, Bonthe and Western Area)

- ii. Some cadres in the attrition data have none of the posts filled but the data shows x number (wherein $x > 1$) leaving the post
- iii. Data entry errors made the calculated attrition in one instance greater than 100%

Gaps in output data (e.g. total number of outpatients, inpatients, facility deliveries, antenatal care (ANC) visits) at national level meant that productivity analysis was only possible for one district.

These observed points question the quality and reliability of the data. However, plausible trends were generated during data analysis.

3. Findings

Percentage of established posts filled

As shown in Table 1, in 2005 the percentage of unfilled posts for health workers in this category was relatively high, with the exception of registrars, medical officers and senior medical officers. House officer posts were unfilled for four years, despite a 100% increase in the demand for house officers. This could have been due to delays in recruitment, low salaries, a lack of postgraduate training opportunities, or poor working environments. These newly trained doctors were either recruited by the private sector, forced to migrate away from Sierra Leone or underwent further postgraduate training before attempting to find work in the country.

2009 saw a 23% increase in the established posts being filled. By 2010 all the established posts were filled, possibly due to the introduction of the FHCI and the increase in health workers' salaries. The opposite was true for registrars in Sierra Leone, as the data showed all of the established posts being over filled in 2005 and 2006, followed by a subsequent steady decline (Table 1). However, these observed changes could be due to changes in the number of established posts which increased over the years.

Community health assistant (CHA) posts remained unfilled from 2005 to 2009. These positions were gradually filled from 2010 and led to a low percentage of unfilled posts in 2011. The established posts for community health officers (CHOs) were 80% filled in 2005 and 2006, and the annual percentage of unfilled posts reduced gradually till 2009. This was possibly due to the new CHOs being trained but not yet qualified to meet the demands of the health care sector as shown by the increase in established posts. The

data shows an increase in the retention of trained CHOs in 2010, with the annual percentage of unfilled posts increasing in 2011.

There was no change in the established and filled posts for State Registered Nurses (SRNs) between 2005 and 2007. The annual percentage of unfilled posts for maternal and child health (MCH) officers were very low, with established posts being oversubscribed. However, in 2010 and 2011, the number of established posts increased approximately three fold due to the FHCI. The number of MCH posts filled also increased to cater for the extra demand on the health care system.

The data shows a steady gap between established and filled State Enrolled Community Health Nurse (SECHN) posts from 2005 to 2008. The demand, in terms of established posts, increased in 2009 which correlated with an increase in filled posts and a decrease in the annual percentage of unfilled posts from 2009 onwards. The number of established midwifery posts increased gradually from 2005 to 2010 and was reduced in 2011, possibly due to the increase in the established SECHN posts. The number of filled SECHN posts also followed the same trend. Surprisingly, there was not an upsurge in filled or established posts in the FHCI year (2010), possibly to the SECHN meeting the demands on the health sector.

The annual percentage of unfilled posts for environmental workers was around 50% in 2005. However, in subsequent years the numbers of established posted increased eight to nine fold, with the number of filled posts remaining low. This resulted in a high annual percentage of unfilled posts. This trend changed in 2010 and 2011 as the number of filled posts increased, possibly due to more environmental workers being trained and retained.

The data for the annual percentage of unfilled posts for pharmacy technicians shows that this cadre of health worker was oversubscribed for in 2005, followed by a two year period of shortage. This was further followed by an 86% annual percentage of unfilled posts for health workers in this category and a gradual improvement in the retention of pharmacy technicians. However, looking at the raw data, there is a high possibility that this trend was due to human error during data input. The data for the annual percentage of unfilled posts of laboratory technicians shows a high annual percentage of unfilled posts from 2005 to 2007; 2008 saw an improvement in the number of filled posts compared to the number of established posts, resulting in a reduction in the annual percentage of unfilled posts. The number of established lab technician posts was increased from 2009 onwards, more so in 2010 possibly in anticipation of the free health care initiative. However, the number of filled posts stayed low compared to the number of established posts which translates into a high annual percentage of unfilled posts. The trends for Endemic

Disease Control Unit (EDCU) workers and pharmacists were similar from 2005 to 2009, with the annual percentage of unfilled posts between 50% - 60%. In 2010, all of the EDCU established posts were filled, however there was a high annual percentage of unfilled posts for pharmacists.

Table 1: National percentage unfilled posts for the different cadres of health professionals in Sierra Leone from 2005 to 2011

	2005			2006			2007			2008			2009			2010			2011		
	Established posts	Filled posts	% unfilled posts	Established posts	Filled posts	% unfilled posts	Established posts	Filled posts	% unfilled posts	Established posts	Filled posts	% unfilled posts	Established posts	Filled posts	% unfilled posts	Established posts	Filled posts	% unfilled posts	Established posts	Filled posts	% unfilled posts
MO/SMO	80	62	23%	80	65	19%	90	67	26%	90	67	26%	100	45	55%	116	79	32%	200	100	50%
HO	20	0	100%	20	0	100%	40	0	100%	40	0	100%	40	9	78%	66	72	-9%	20	19	5%
Registrar	5	8	-60%	5	8	-60%	10	8	20%	10	6	40%	15	6	60%	70	5	93%	20	4	80%
Specialist/Senior specialist	30	12	60%	30	12	60%	54	12	78%	54	12	78%	60	12	80%	73	40	45%	60	47	22%
Consultant	10	3	70%	15	5	67%	15	5	67%	15	5	67%	20	3	85%	10	2	80%	20	3	85%
CHO	150	120	20%	150	120	20%	200	120	40%	250	120	52%	350	157	55%	250	244	2%	350	248	29%
CHA	50	0	100%	50	0	100%	50	0	100%	50	0	100%	50	0	100%	150	33	78%	50	41	18%
SRN	300	227	24%	300	227	24%	300	227	24%	300	274	9%	300	190	37%	2386	223	91%	2386	271	89%
SECHN	700	274	61%	800	274	66%	800	274	66%	900	350	61%	1000	926	7%	1500	1354	10%	1500	1372	9%
Midwife	100	70	30%	150	70	53%	150	70	53%	150	70	53%	200	78	61%	450	60	87%	200	47	77%
Environmental officers	50	22	56%	400	22	95%	400	22	95%	400	14	97%	400	14	97%	450	152	66%	400	96	76%
MCH	400	471	-18%	458	578	-26%	700	689	2%	800	872	-9%	800	993	-24%	2540	1892	26%	2000	1892	5%
EDCU	500	250	50%	550	250	55%	600	250	58%	600	305	49%	600	208	65%	289	289	0%	289	189	35%
Lab technicians	200	18	91%	200	18	91%	250	15	94%	250	150	40%	300	21	93%	625	128	80%	400	85	79%
Pharmacy	50	25	50%	50	25	50%	60	25	58%	60	25	58%	70	18	74%	160	37	77%	80	50	38%
Pharmacy Technician	200	250	-25%	250	22	91%	250	22	91%	250	222	11%	300	43	86%	242	146	40%	300	211	30%
Other	1230	1205	2%	1230	1205	2%	1545	1345	13%	1545	1467	5%	2040	2040	0%	2040	4726	-132%	2540	4672	-84%
TOTAL	4075	3017	26%	4738	2901	39%	5514	3151	43%	5764	3959	31%	6645	4763	28%	11417	9482	17%	10815	9347	14%

Annual percentage change in staff numbers and types

Table 2: National annual percentage change in filled posts for health workers in Sierra Leone from 2005 to 2011

	2005			2006			2007			2008			2009			2010			2011		
	Established posts	Filled posts	Annual % change in filled posts	Established posts	Filled posts	Annual % change in filled posts	Established posts	Filled posts	Annual % change in filled posts	Established posts	Filled posts	Annual % change in filled posts	Established posts	Filled posts	Annual % change in filled posts	Established posts	Filled posts	Annual % change in filled posts	Established posts	Filled posts	Annual % change in filled posts
MO/SMO	80	62	N/A	80	65	5%	90	67	3%	90	67	0%	100	45	-33%	116	79	76%	200	100	27%
HO	20	0	N/A	20	0	-	40	0		40	0		40	9		66	72	700%	20	19	-74%
Registrar	5	8	N/A	5	8	0%	10	8	0%	10	6	-25%	15	6	0%	70	5	-17%	20	4	-20%
Specialist/Senior specialist	30	12	N/A	30	12	0%	54	12	0%	54	12	100%	60	12		73	40	233%	60	47	18%
Consultant	10	3	N/A	15	5	67%	15	5	0%	15	5	0%	20	3	-40%	10	2	-33%	20	3	50%
CHO	150	120	N/A	150	120	0%	200	120	0%	250	120	0%	350	157	31%	250	244	55%	350	248	2%
CHA	50	0	N/A	50	0	-	50	0		50	0		50	0		150	33		50	41	24%
SRN	300	227	N/A	300	227	0%	300	227	0%	300	274	21%	300	190	-31%	2386	223	17%	2386	271	22%
SECHN	700	274	N/A	800	274	0%	800	274	0%	900	350	28%	1000	926	165%	1500	1354	46%	1500	1372	1%
Midwife	100	70	N/A	150	70	0%	150	70	0%	150	70	0%	200	78	11%	450	60	-23%	200	47	-22%
Environmental officers	50	22	N/A	400	22	0%	400	22	0%	400	14	-36%	400	14	0%	450	152	986%	400	96	-37%
MCH	400	471	N/A	458	578	23%	700	689	19%	800	872	27%	800	993	14%	2540	1892	91%	2000	1892	0%
EDCU	500	250	N/A	550	250	0%	600	250	0%	600	305	22%	600	208	-32%	289	289	39%	289	189	-35%
Lab technicians	200	18	N/A	200	18	0%	250	15	-17%	250	150	0%	300	21	40%	625	128	510%	400	85	-34%
Pharmacy	50	25	N/A	50	25	0%	60	25	0%	60	25	0%	70	18	-28%	160	37	106%	80	50	35%

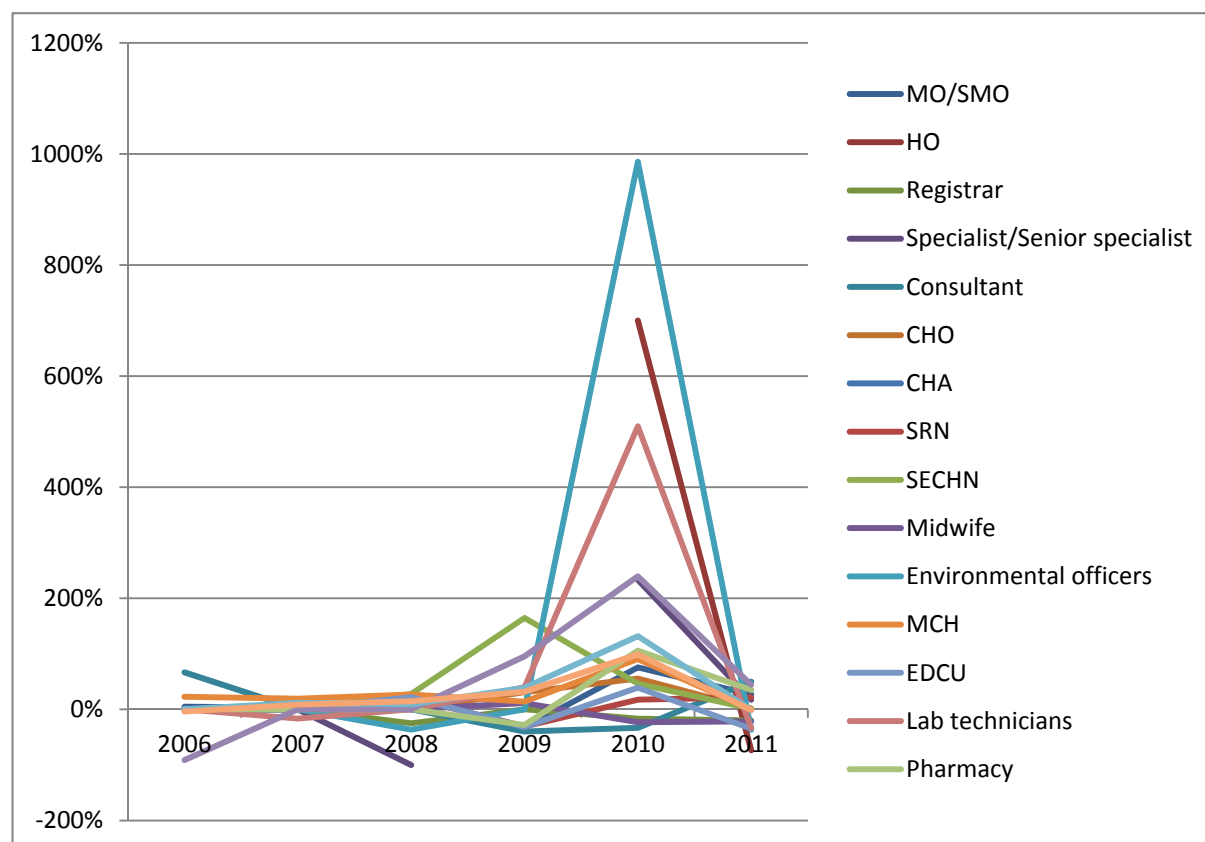
Pharmacy Technician	200	250	N/A	250	22	-91%	250	22	0%	250	222	0%	40%		95%	242	146	240%	300	211	45%
Other	1230	1205	N/A	1230	1205	0%	1545	1345	12%	1545	1467	9%	-132%		39%	2040	4726	132%	2540	4672	-1%
TOTAL	4075	3017		4738	2901	-4%	5514	3151	9%	5764	3947	15%	6645	4763	32%	11417	9482	99%	10815	9347	-1%

Table 3: Brief job description of the health workers included in this report

Cadre of health professional	Grade	Job description
Endemic disease control unit		District Operations Officer Responsible for vaccination and occasionally manning rural health facilities
Environmental Officers	6	Oversees environmental health activities within a district
Maternal and Child Aides (MCH aides)	2	Conducts safe motherhood services including ANC, deliveries, postnatal care, family planning and immunisation, and participates in community outreach services. Mostly posted at MCH posts but also found in some Community Health Centres (CHC)
State enrolled community health nurse (SECHN)	4	Conducts routine ward functions, outreach services (e.g. immunisation, health education) and assists in the provision of safe motherhood services. Mostly posted in CHCs and in some tertiary hospitals
State registered nurse(SRN)	6	Assists in ward administration and management including ward functions. Mostly found in hospitals and some CHCs in the Western Area
Staff Midwife	6	Conducts maternity services at PHU and community level, manages basic obstetric and neonatal emergencies and is involved in community sensitisation on basic obstetric and neonatal care and other health related issues. SRN qualified midwives are mostly found in hospitals and SECHNs with midwifery qualifications are found in CHCs and hospitals
Public Health Sister/District health sister	7	Organises, plans and implements MCH/extended programme on immunisation (EPI) activities at the PHU level and monitors and evaluates health programmes and activities at the district and PHU level. In addition they participate in health reviews and collaborate with other district health management teams (DHMTs) and other international and national non-government organisations (NGOs) on health activities in the district. Mostly found working within the DHMTs and National Health programs e.g. Extended immunization programme (EPI)
Matron	8	Responsible for the management and supervision of the nursing/midwifery staff and other support staff. In addition, assists with the preparation of the annual work plan, budget, and the formulation of protocols and guidelines in their area of operation. They also assist in the preparation of annual requisitions for the hospital and in the preparation of the human resource for health (HRH) plan for the health facility. Found working in tertiary hospitals
Community Health Officer (CHO)	6	In charge of primary health care units (PHUs), including managing drug stock, diagnosis, providing treatment for common diseases, and referring medical,

		surgical and obstetrics emergencies appropriately. Mostly found working in CHOs and some regional hospitals
Senior Community Officer (CHO in charge)	7	In addition to the above, serves as a zonal supervisor of other CHOs at the PHU level and/or at district level as assigned by the District Medical Officer (DMO).
Medical Officer (MO)/Senior Medical Officer (SMO)	10	Serves as a medical officer-in-charge in a district hospital who sanctions and orders the admission of patients into the hospital and undertakes patient care and treatment. In addition, they deal with referral cases coming from the PHUs. Found in hospitals
Specialist/ Senior Specialist	13	Carries out high-level procedures that require specialised skills and offer training to other medical and nursing staff and usually also serve as programme, unit or directorate heads. Found in hospitals

Figure 1: Proportionate increases in numbers, by cadre, 2005-11



As shown in table 2, overall staff numbers increased from 3,017 in 2005 to 9,347 in 2011, peaking at 9,482 in 2010, the FHCI implementation year. This was associated with a one off fast-track recruitment and deployment process, aimed to fill many gaps in the available human resource for health. Staff numbers doubled in 2010 across the different cadres of health workers (Figure 1). This was a big increase on previous years' trends, even allowing for the fact that some of these new recruits were already working but simply not on payroll.

However, some key cadres were still very limited in terms of absolute numbers. Medical Officers, including Senior Medical Officers increased from 62 in 2005 to 100 in 2011 (see table 1). This accounts for only 50% of the established posts, which is still very inadequate to serve the whole country i.e. 1 Medical Officer(MO)/Senior Medical Officer (SMO) per 58,901 of the population.

There has been a large influx of SECHNs into the health workforce, with numbers growing from 274 in 2005 to 1,372 in 2011. Likewise, the number of filled MCH aids posts increased from 471 in 2005 to 1,892 in 2011. However, the number of registered nurses only grew from 227 to 271 over the same period, and the number of midwives dropped from 70 to 47. This can be attributed to the length of training needed to produce the lower cadres of health workers compared to the mid to high level cadres of health workers.

For further analysis, the health workers were grouped based on the roles they play in health facilities. The following groupings were made:

- Medical officers and Senior Medical officers, House Officers, Registrar, Specialist/Senior specialist and Consultants were grouped as Doctors
- CHOs, CHAs, Environmental officers and EDCU assistants were grouped as Community Health Workers
- SRNs and SECHNs were grouped as Nurses
- Midwives and MCH aides were grouped as Midwives
- Lab technicians, Pharmacists and Pharmacy Technicians were grouped as Allied Health Professionals
- Other health workers were grouped as Other

Figure 2: Annual percentage change in number of filled posts for medical doctors (medical officers/senior medical officers, house officers, registrars, specialist/senior specialist and consultants) from 2006 to 2011 in Sierra Leone

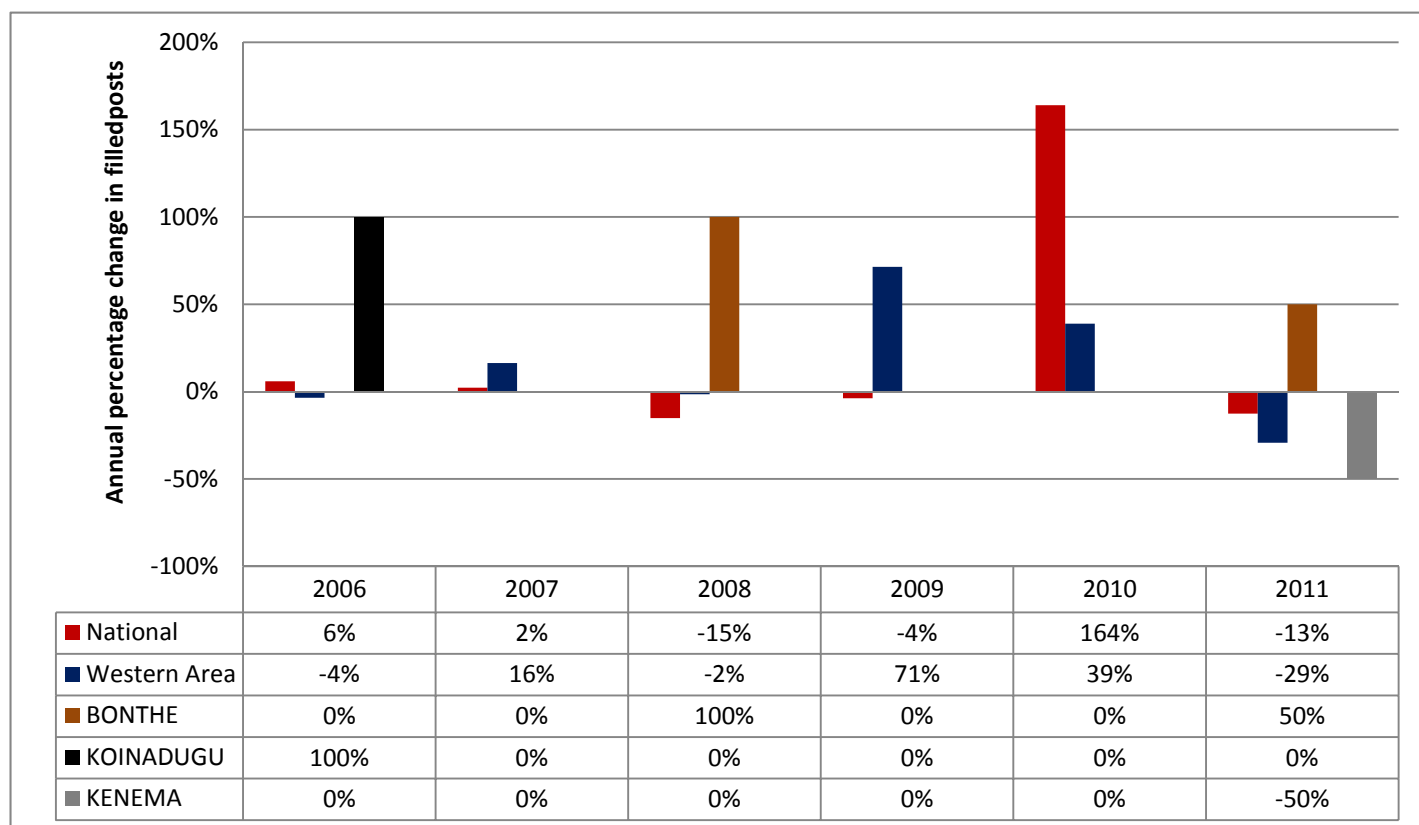
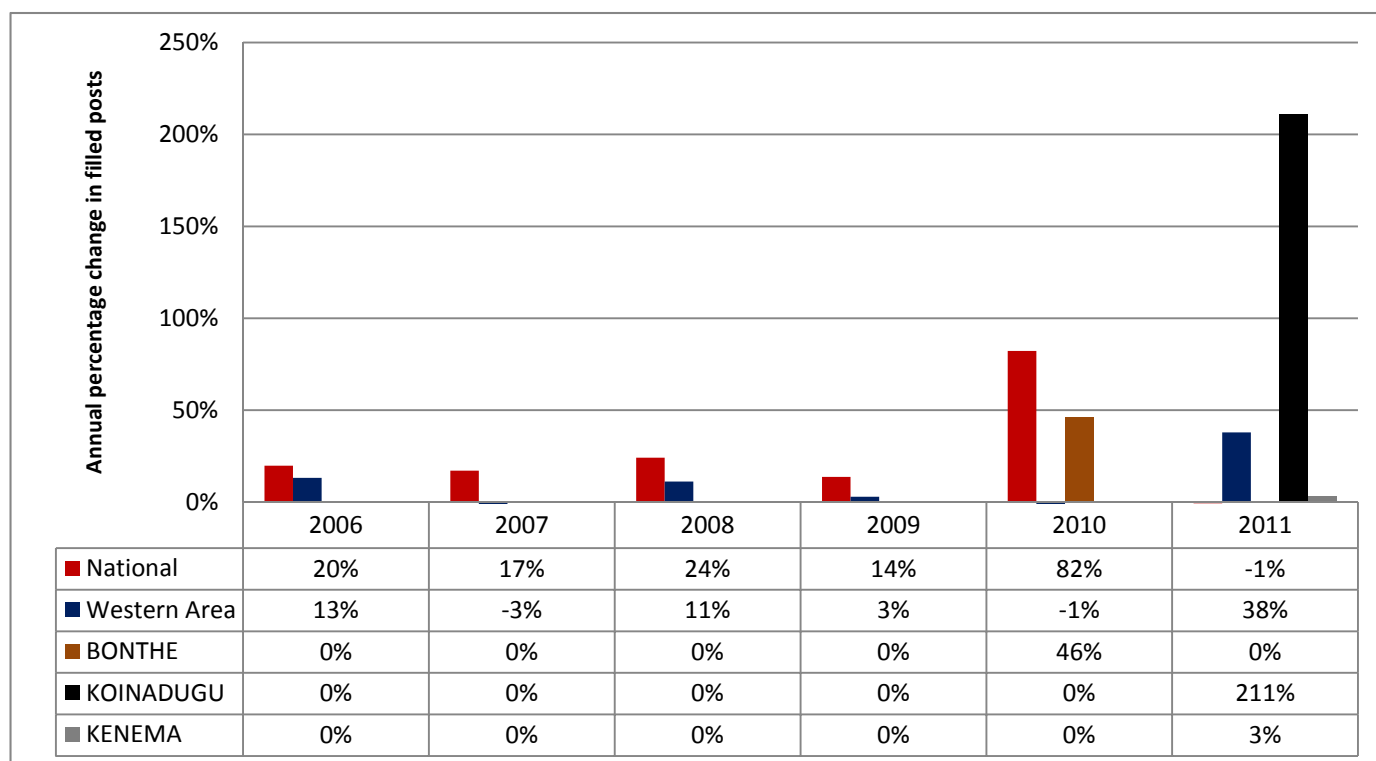


Figure 2 shows that before 2010, minimal changes were made in the number of doctors at the national level. In 2008, 2009 and 2011 a negative association was seen. In the Western Area there was decrease in the annual percentage change from 2009 - 2010, which can be mostly attributed to a decline in the number of MO/SMOs, which the increase in HO numbers could not compensate for. A negative annual was also observed in 2011, mostly due to a steep decline in the number of HOs.

The data painted a different picture for the other study sites outside of the Western Area. In general there was no proportionate change in Kenema (urban city), Bonthe (rural and hard to reach) and Koinadugu (rural and hard to reach), which the exception of a few time points. The 100% change in doctors in Koinadugu for 2006 and likewise for Bonthe in 2008, is due to small changes in the numbers of doctors in post (i.e. In Koinadugu there was 1 Medical Officer in 2005 and 2 Medical Officers in 2006. In Bonthe there were 2 Medical Officers in post in 2007 and 3 in post in 2008). Alarmingly, there was no change in the filled posts in the FHCI implementation year in these three study sites, despite huge changes at the national level.

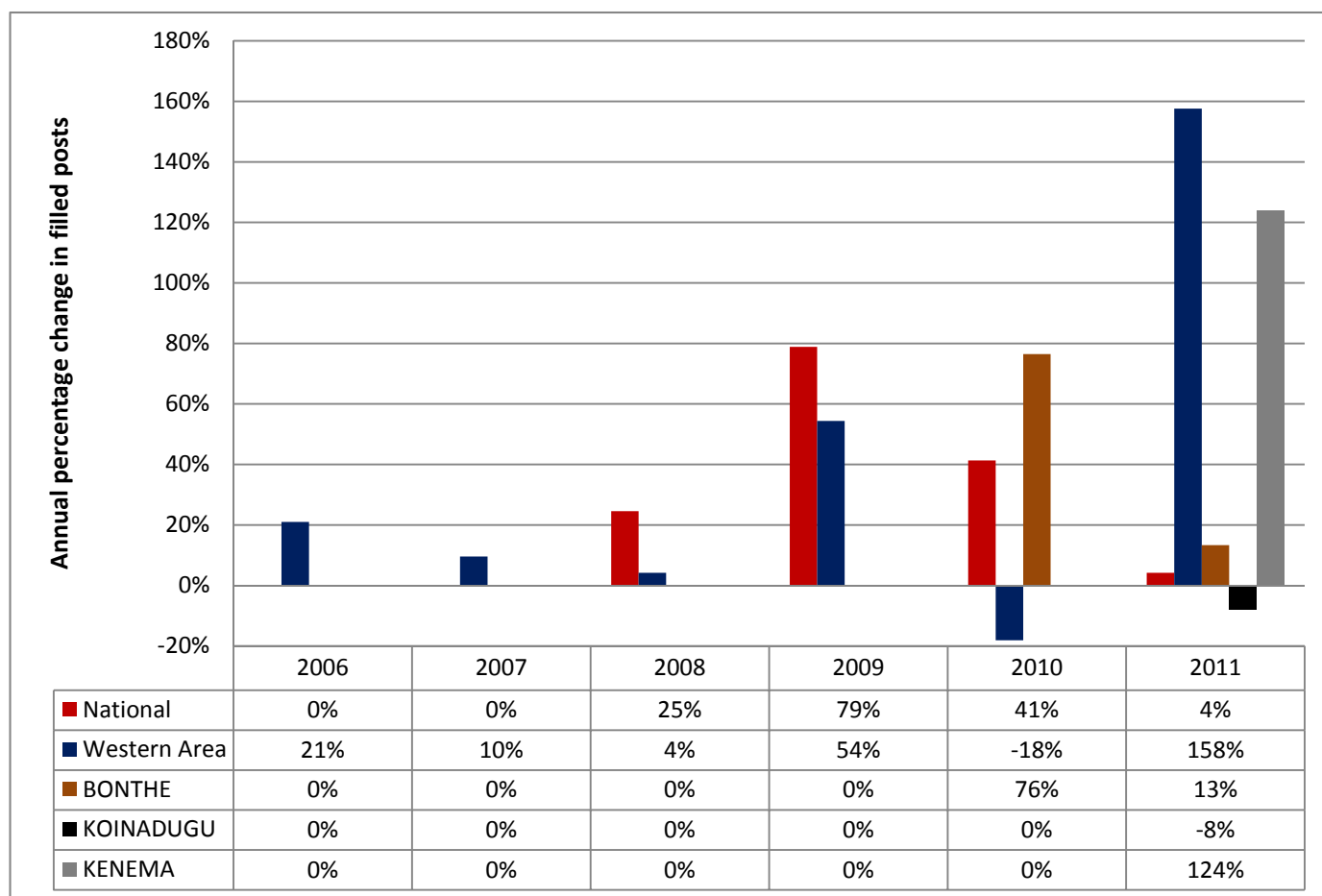
Figure 3: Annual percentage change in midwives in Sierra Leone



There was an almost linear trend in the percentage change in the numbers of midwives in the years preceding the FHCI implementation year. In 2010, a positive association was seen, followed by a negative trend the following year as the mass recruitment drive for this group of health professionals had slowed down. Bonthe reported a 46% change in 2010 compared to 2009. There was 1 midwife in 2009 compared to 3 in 2010, and there were 25 MCH aides in 2009 compared to 35 in 2010. Looking at the actual numbers, this is relatively small change. A 211% change was observed in 2011 for Koinadugu as there was a large increase in the number MCH aides in post in 2011 compared to 2010 (as supposed to fully qualified midwives).

In the Western Area, 2010 saw a decrease in the number of midwives and MCH aides, however these numbers were substantial compared to the other districts (58 midwives in 2009 vs 56 in 2010 and 228 MCH aides in 2009 versus 226 in 2010). However, in relative terms these numbers might not be enough to cater for the population.

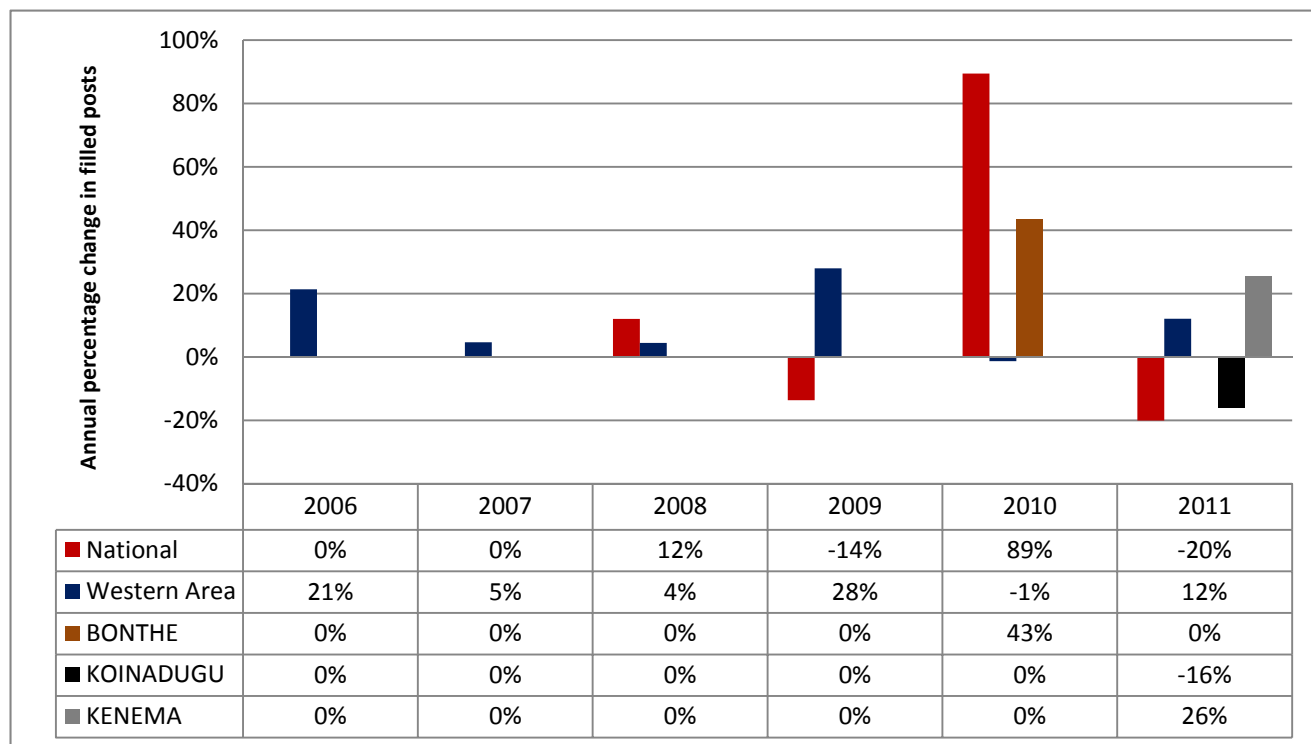
Figure 4: Annual percentage change in nurses in Sierra Leone from 2006 to 2011



The observed trend for Western Area and national data was similar in 2009, with increases in the annual percentage change for nursing staff. There was a decrease in 2010 for Western Area, with more SECHNs in post compared to SRNs. This was followed by a considerable increase in 2011 as a result of a large influx of SRNs (110 in 2011 and 44 in 2010) and SECHNs (704 in 2011 and 272 in 2010). For the other districts, no change was observed before 2010. Bonthe reported a 76% increase in 2010. Four SRNs were in post in 2010 compared to two in 2009 and 26 SECHNs in post in 2010 compared to 15 in 2009.

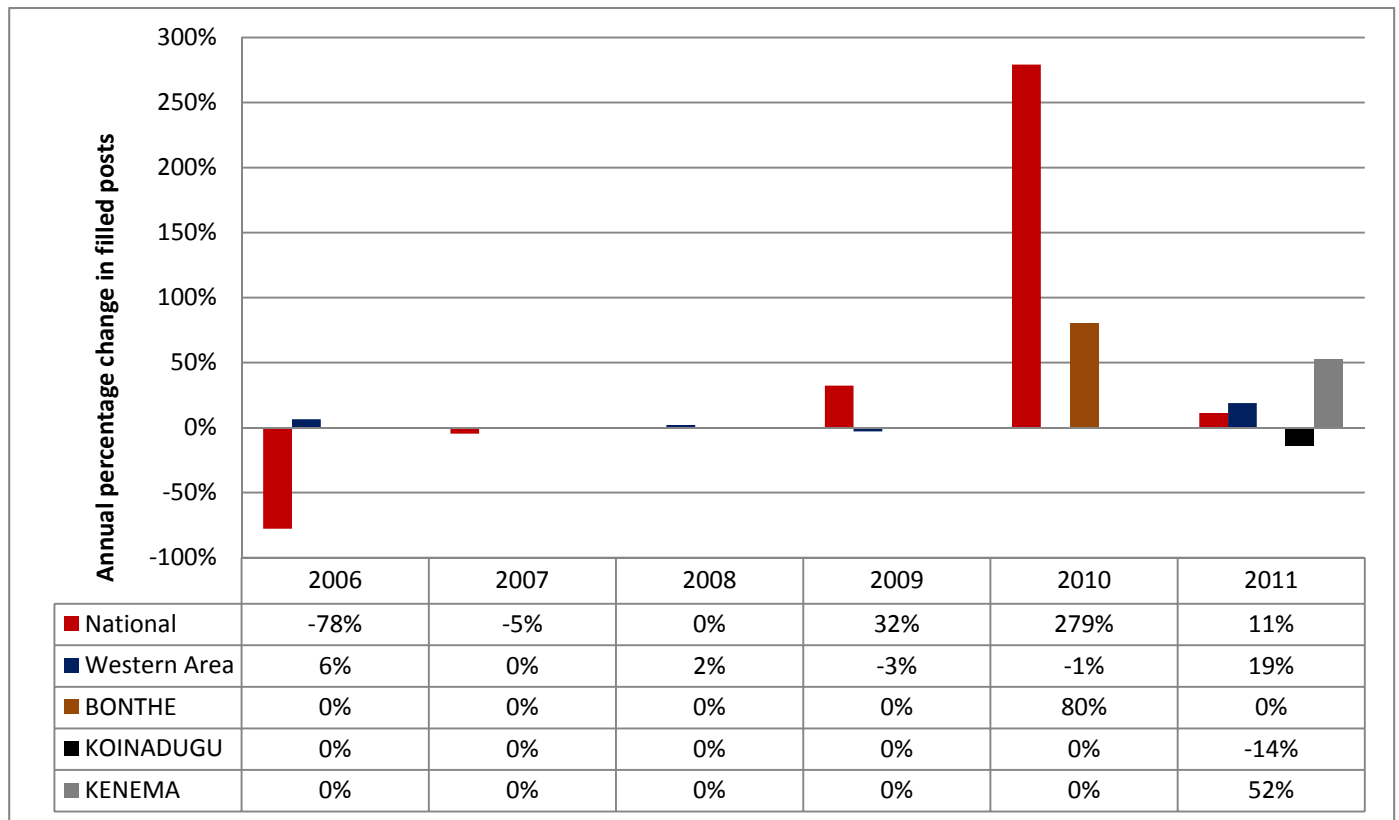
Kenema observed a 124% change in 2011, mainly due to more SECHNs in post. Koinadugu appeared to gain no nursing staff at all, and with staff numbers falling in 2011 (data reports 5 SRNs and 20 SECHNs in post from 2005 to 2010, and 6 SRNs and 13 SECHNs in post in 2011). Koinadugu is a hard to reach area of Sierra Leone and it is possible that established posts were not filled due to rural posting being unfavourable (Wurie & Witter, 2014).

Figure 5: Annual change in community health workers in Sierra Leone from 2006 to 2011



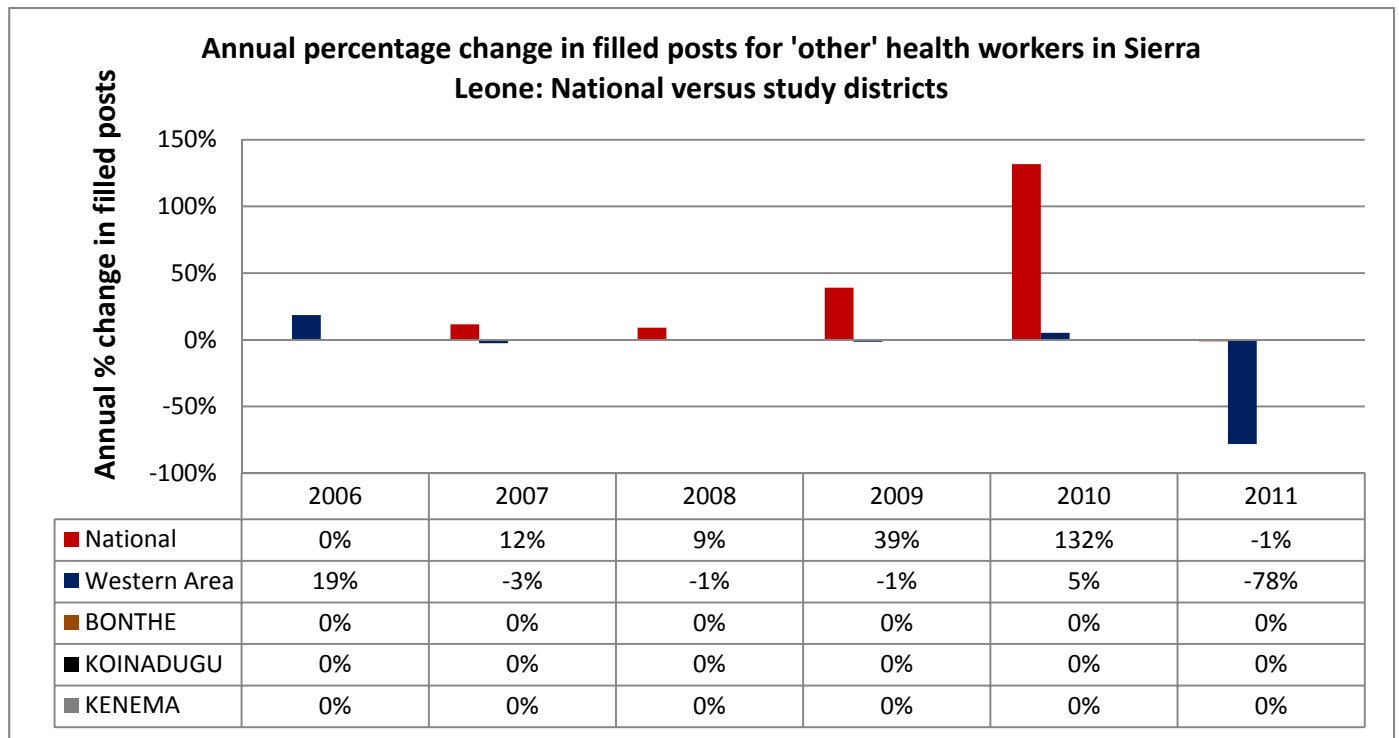
There was an 89% increase observed for community health workers in 2010 at the national level. In general, no considerable positive changes were observed for this group in the rural districts. The 43% increase observed for Bonthe is due to a relative small increase in the actual numbers. The Western Area observed an increase in 2011, which can be attributed to a large influx of EDCU Assistants.

Figure 6: Annual change in allied health professionals in Sierra Leone from 2006 to 2011



Large increases were observed at the national level from 2009 to 2010, followed by a decrease in 2011. For the Western Area, gradual increases were observed from 2009 with the highest change observed in 2011. Small changes in the actual numbers of personnel in post resulted in the positive changes recorded for Bonthé and Kenema. Koinadugu reported a negative change in 2011.

Figure 7: Annual change in 'other' health professionals in Sierra Leone from 2006 to 2011



Only at national level and in the Western Area were changes reported for this group of health workers, who are mostly volunteers. There was a gradual increase in the national level data, followed by a substantial rise in 2010.

Attrition of health workers in post conflict Sierra Leone

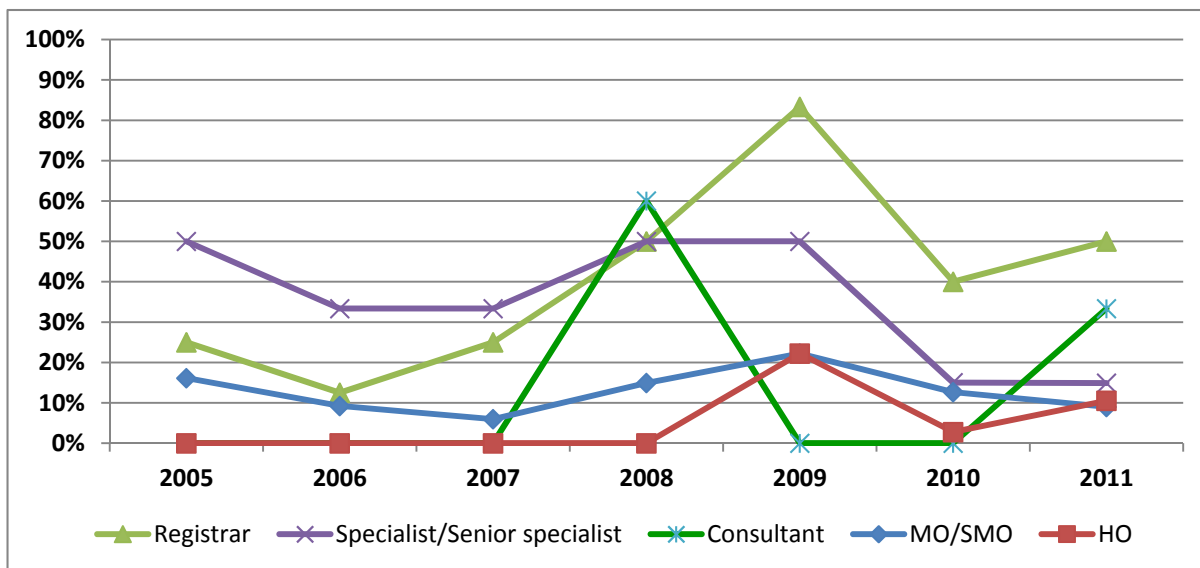
Table 4: National attrition rates for health workers in Sierra Leone from 2005 to 2011

	2005			2006			2007			2008			2009			2010			2011			AVERAGE ATTRITION
	Filled posts	No. leaving post	Attrition rate	Filled posts	No. leaving post	Attrition rate	Filled posts	No. leaving post	Attrition rate	Filled posts	No. leaving post	Attrition rate	Filled posts	No. leaving post	Attrition rate	Filled posts	No. leaving post	Attrition rate	Filled posts	No. leaving post	Attrition rate	
MO/SMO	62	10	16%	65	6	9.2%	67	4	6%	67	10	15%	45	10	22%	79	10	13%	100	9	9%	13%
HO	0	2	N/A	0	2	N/A	0	2	N/A	0	5	N/A	9	2	22%	72	2	3%	19	2	11%	12%
Registrar	8	2	25%	8	1	12.5%	8	2	25%	6	3	50%	6	5	83%	5	2	40%	4	2	50%	41%
Specialist/ Senior specialist	12	6	50%	12	4	33.3%	12	4	33%	12	6	50%	12	6	50%	40	6	15%	47	7	15%	33%
Consultant	3	0	0%	5	0	0.0%	5	0	0%	5	3	60%	3	0	0%	2	0	0%	3	1	33%	13%
CHO	120	12	10%	120	7	5.8%	120	7	6%	120	12	10%	157	17	11%	244	12	5%	248	12	5%	7%
CHA	0	0	N/A	0	0	N/A	0	0	N/A	0	0	N/A	0	0	N/A	33	0	0%	41	0	0%	0%
SRN	227	17	7%	227	13	5.7%	227	10	4%	274	17	6%	190	26	14%	223	17	8%	271	34	13%	8%
SECHN	274	31	11%	274	24	8.8%	274	18	7%	350	31	9%	926	43	5%	1354	31	2%	1372	57	4%	7%
Midwife	70	9	13%	70	9	12.9%	70	7	10%	70	9	13%	78	9	12%	60	29	48%	47	69	147%*	36%
Environmental officers	22	10	45%	22	10	45.5%	22	6	27%	14	10	71%	14	24	171%*	152	10	7%	96	8	8%	34%
MCH	471	27	6%	578	20	3.5%	689	12	2%	872	27	3%	993	39	4%	1892	42	2%	1892	59	3%	3%
EDCU	250	6	2%	250	6	2.4%	250	3	1%	305	12	4%	208	12	6%	289	7	2%	189	9	5%	3%
Lab technicians	18	7	39%	18	7	38.9%	15	6	40%	150	7	5%	21	18	86%	128	7	5%	85	11	13%	32%
Pharmacy	25	3	12%	25	3	12.0%	25	3	12%	25	5	20%	18	10	56%	37	3	8%	50	13	26%	21%
Pharmacy Technician	250	6	2%	22	6	27.3%	22	6	27%	222	6	3%	43	20	47%	146	6	4%	211	15	7%	17%

Other	1205	40	3%	1205	27	2.2%	1345	21	2%	1467	58	4%	2040	59	3%	4726	104	2%	4672	71	2%	3%
TOTAL	3017	188	6%	2901	145	5%	3151	111	4%	3947	221	6%	4763	300	6%	9482	288	3%	9347	379	4%	

Note: Annual attrition rate of health workers was calculated as the percentage of people leaving the service each year. (N/A: number of filled positions is zero but data shows x (>1) number of people leaving a post OR number of filled positions and people leaving is zero; filled position data missing)

Figure 8: Attrition rate of health workers grouped as doctors in Sierra Leone from 2005 to 2011



The attrition rate for MOs and SMOs was low from 2005 to 2011, as shown in table 4 and figure 8. The data shows a dip in the number of filled positions in 2009 compared to the other years, resulting in a slightly higher attrition rate. The data shows some irregularities for the attrition rates of House Officers from 2005 to 2008; the number of House Officers in post was zero, but the data shows a number of people leaving the post. In subsequent years, the attrition rate was low, particularly in 2010, which corresponds with a high annual increase (see Figure 2 and table 2). A low number of registrars were shown to leave their posts from 2005 to 2007. This was followed by a 50% attrition rate in 2008, and by 83% of registrars leaving their post in 2009.

The number of filled specialists/senior specialists posts was more or less constant from 2005 to 2009, with a slight difference in the number leaving the post resulting in similar attrition rates. However, the increase in filled positions from 2010 to meet the demands of the health care system, was counterbalanced by similar numbers leaving their posts (probably due to improved working conditions/ conditions of service) therefore resulting in a lower attrition rate. The attrition for consultants was 0% from 2005 to 2007 with none leaving their position. In 2008, saw three consultants leaving their position, mostly due to retirement which caused an increase in the attrition rate, followed by a decrease (i.e. none leaving in 2009 and 2010 and one retiring in 2011).

Figure 9: Attrition rates for health workers grouped as 'Midwives' in Sierra Leone from 2005 to 2011

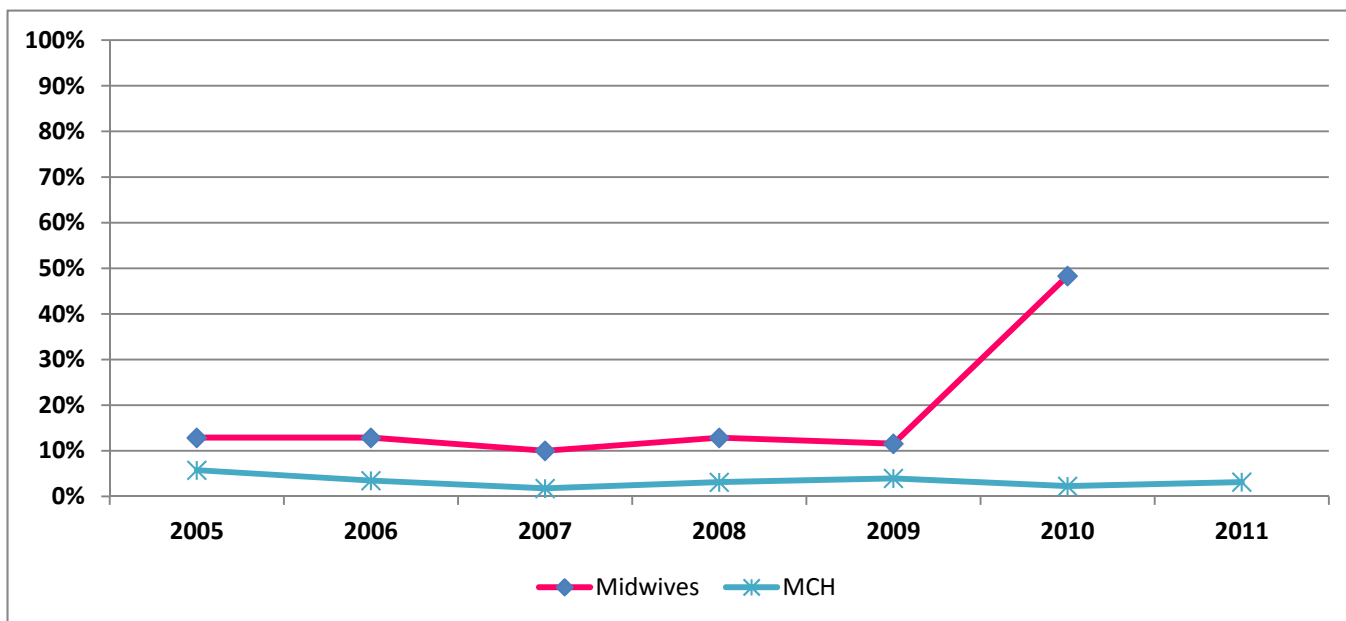
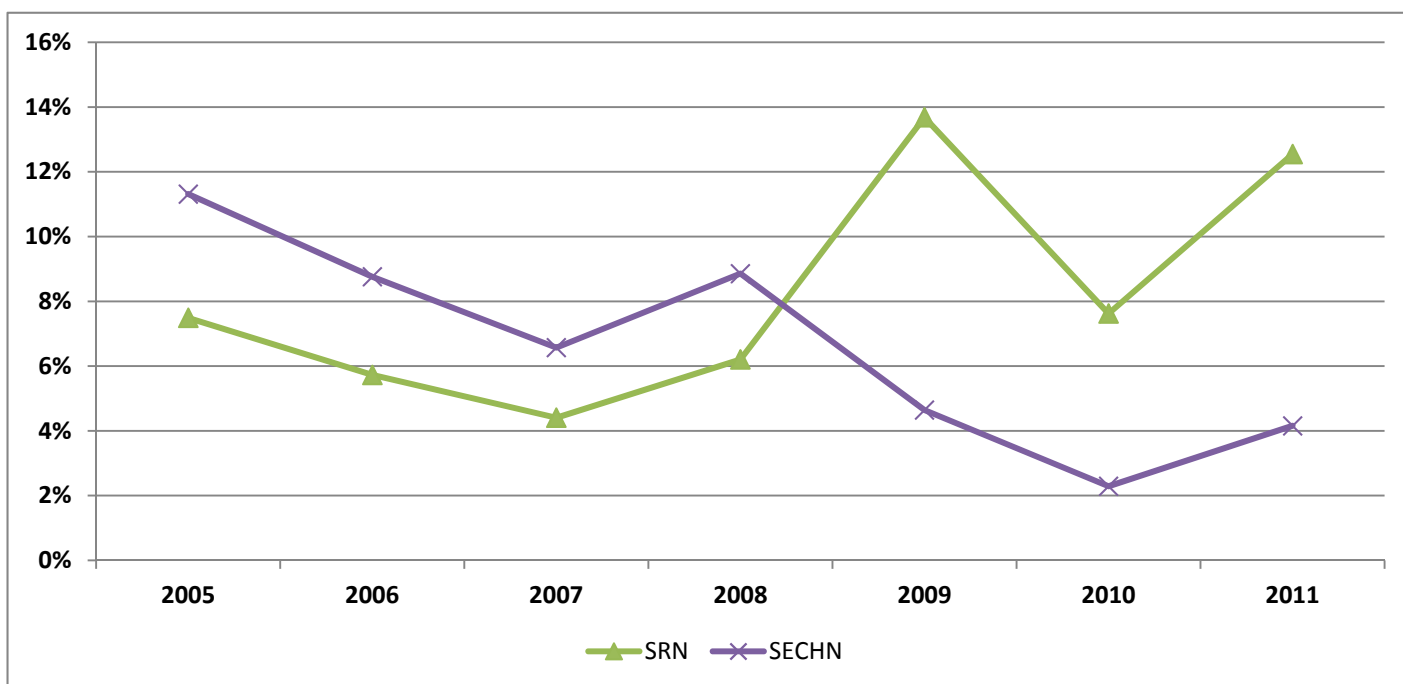
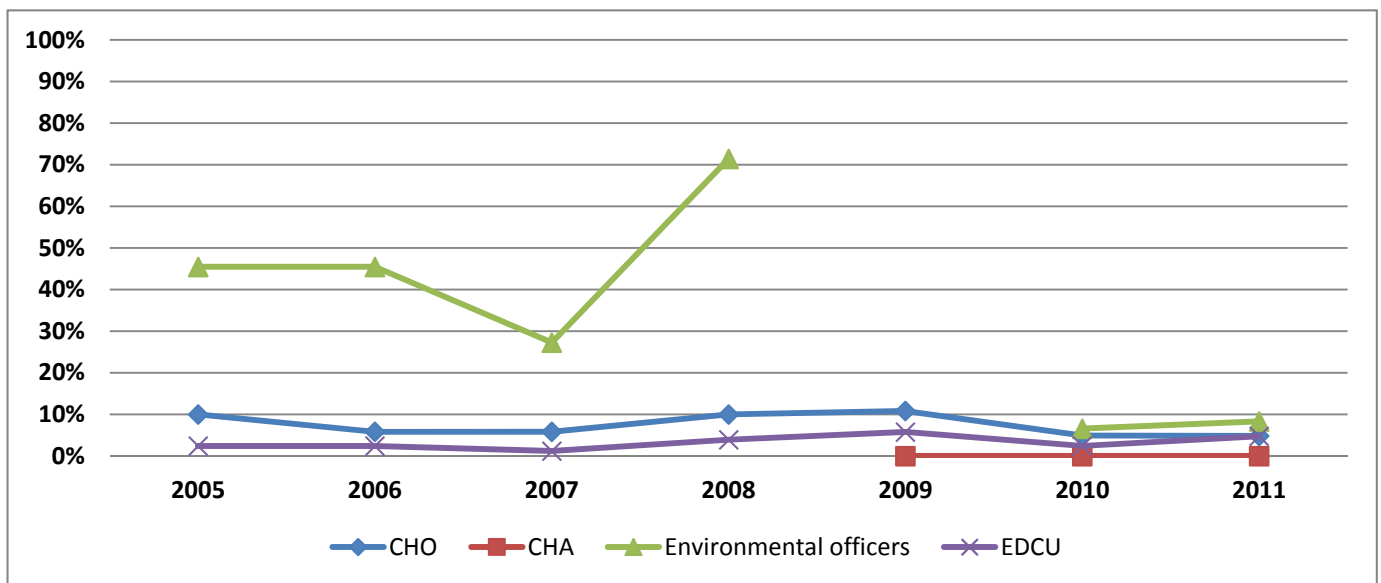


Figure 10: National attrition rates for health workers grouped as 'Nurses' in Sierra Leone from 2005 to 2011.



In general, the attrition rate for SRNs, SECHNs, midwives and MCHs was low, as shown in figures 9 and 10. However, the data shows an increased attrition rate for midwives from 2010 onwards. This was due a large proportion of midwives being trained to meet the demands of the FHCI, being transferred to other senior positions, such as Matrons and District Health Sisters (DHS), or leaving to secure further additional training.

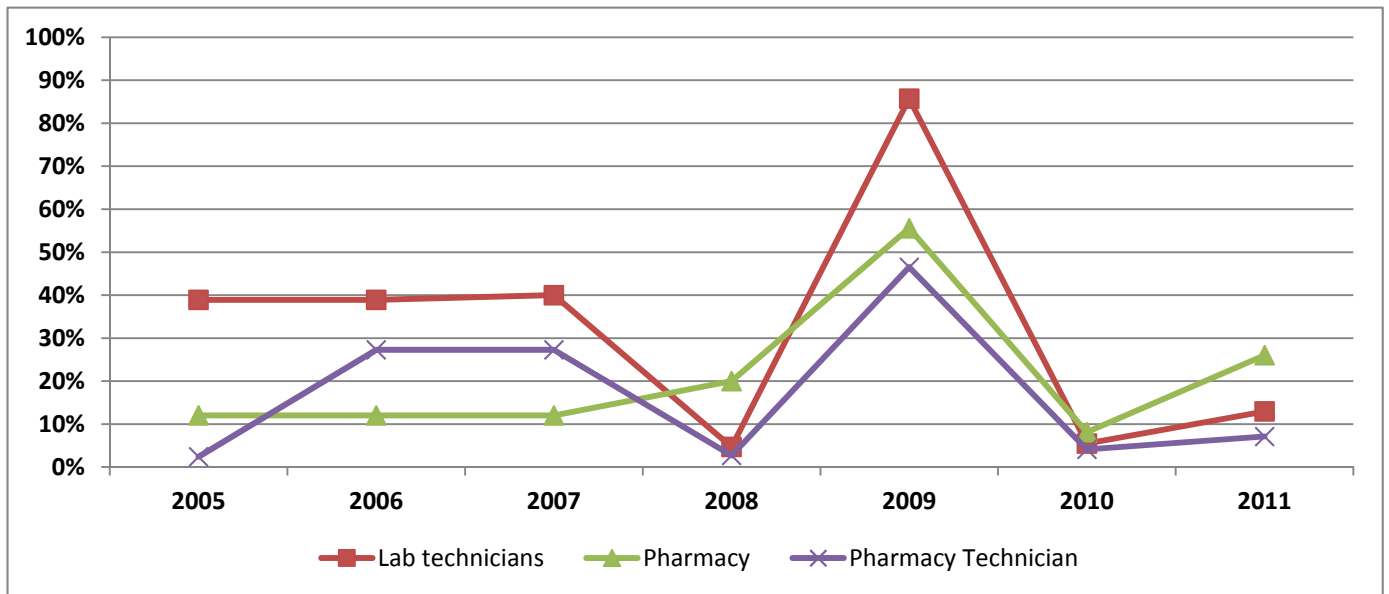
Figure 11: National attrition rates for health workers grouped as ‘Community health workers’ in Sierra Leone from 2005 to 2011



As shown in figure 11, the attrition rate for CHOs and CHAs was very low from 2005 - 2011. The data shows that the CHA position remained unfilled up until 2010 (with none leaving this position from 2010), implying that this position was created as a result of the FHCI. The slight difference in the attrition rate of CHOs was due to changes in the number of filled posts and the number of people leaving their posts over the years. In 2009, the attrition rate for Environmental Officers was very high. This could be due to a typographical error (data point taken out) during data input as the number leaving the post exceeded the number in filled posts. The rate reduced in 2010 and 2011 due to a considerable increase in the number of filled posts compared to the other years, with the number leaving the post staying within the same range.

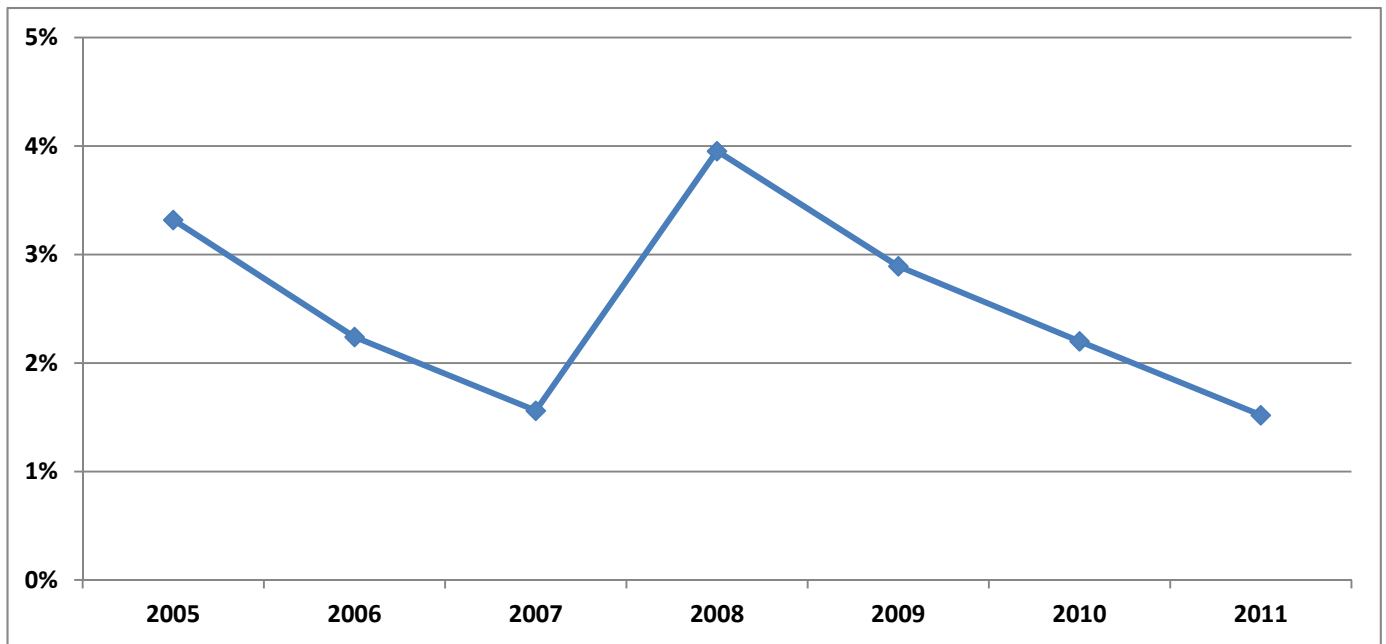
The attrition rate for EDCU assistants stayed low throughout the observation period (average of 3%) showing good retention of health workers in this cadre. This was also true for the other category of health workers.

Figure 12: National attrition rates for health workers grouped as 'Allied Health Professional' from 2005 to 2011 in Sierra Leone



The attrition rate for Laboratory Technicians stayed constant at around 40% from 2005 to 2007. This was followed by a decrease in the attrition rate due to an approximately 10 fold increase in the number of filled posts in 2008. This could have been due to a data entry error as the number of filled posts reduced in 2009 to the same range 2005 - 2007. In 2010, the number of filled posts increased, possibly due to the onset of the FHCI and the accompanying improved working conditions. The attrition rate of pharmacy staff showed no notable changes over the years, until 2009 with an increase to 56%, followed by a drop in 2010. The number of filled posts for this cadre stayed around the same range throughout the observation period. The number of filled pharmacy technician posts did not follow any logical trend (i.e. 250 filled posts in 2005, follow by 22 in 2006 and 2007, and 222 in 2008) and the data suggests this could be due to data entry error. However, as with the majority of the other cadres, the attrition rate was low in 2010.

Figure 13: National attrition rates for health workers grouped as 'Others' from 2005 to 2011 in Sierra Leone



The attrition rate for 'other' health workers was very low (below 5%), with very little variation seen throughout the observation period (see figure 13 and table 4). This group of health workers is mainly comprised of volunteers not on the main HRH payroll system who were subsequently absorbed into the payroll system post FHCI upon implementation of the payroll clean up. Thus in theory, the observed 'attrition' within this group cannot be considered as leaving the health workforce entirely, as some of these volunteers are being maintained within the health workforce in a different capacity.

Overall, the attrition rate appears to be variable by year (which may relate in part to data quality), and remains high, though it has declined over the period.

Figure 14: Average attrition rates for health workers in Sierra Leone for the period of 2005 to 2011, by cadre

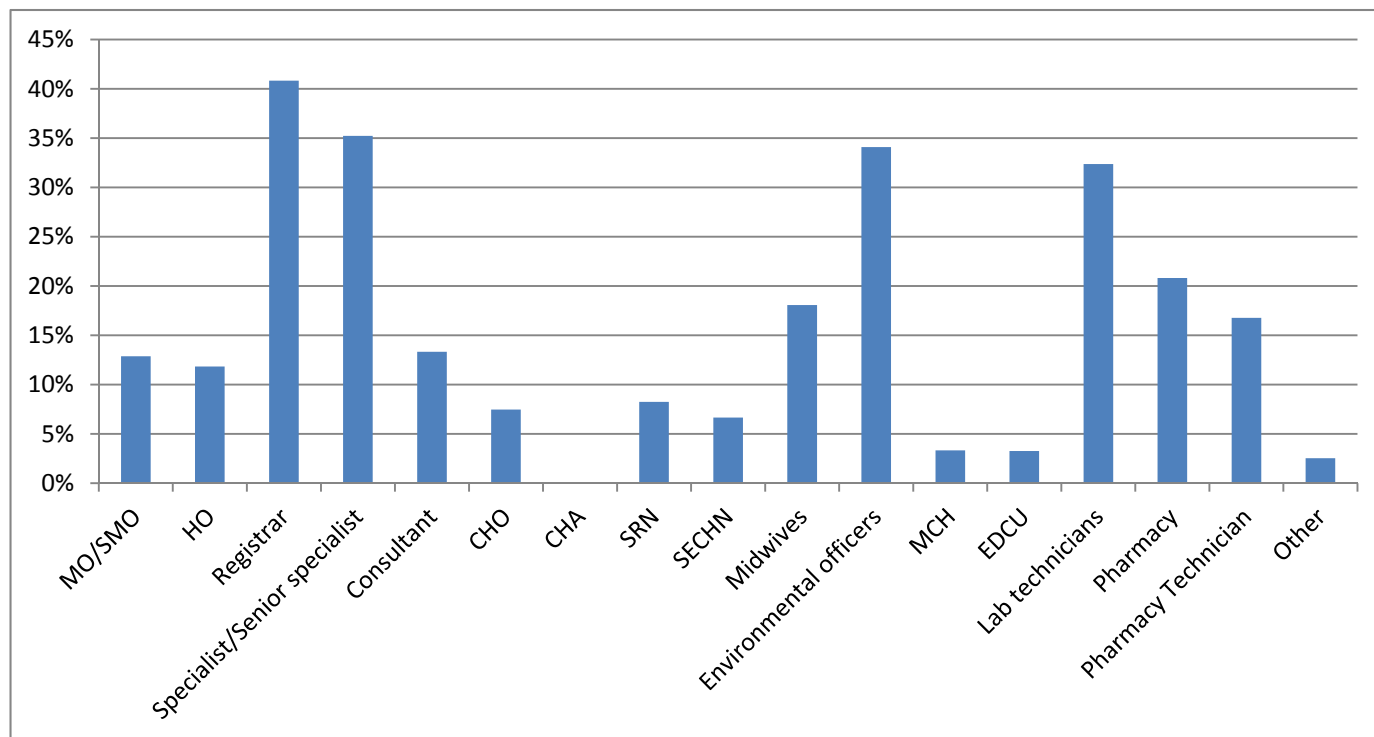


Figure 14 above shows the average attrition rates for the different cadres of health workers included in this study. Lower attrition rates (below 5%) were observed for lower level cadres of health workers (e.g. CHAs, MCH aides, EDCU assistants and ‘other’ health workers). Conversely, the data showed a higher attrition rate for higher level cadres of health professionals (i.e. Registrars Specialists/Senior Specialists, Environment Officers and Lab Technicians).

Staffing density analysis

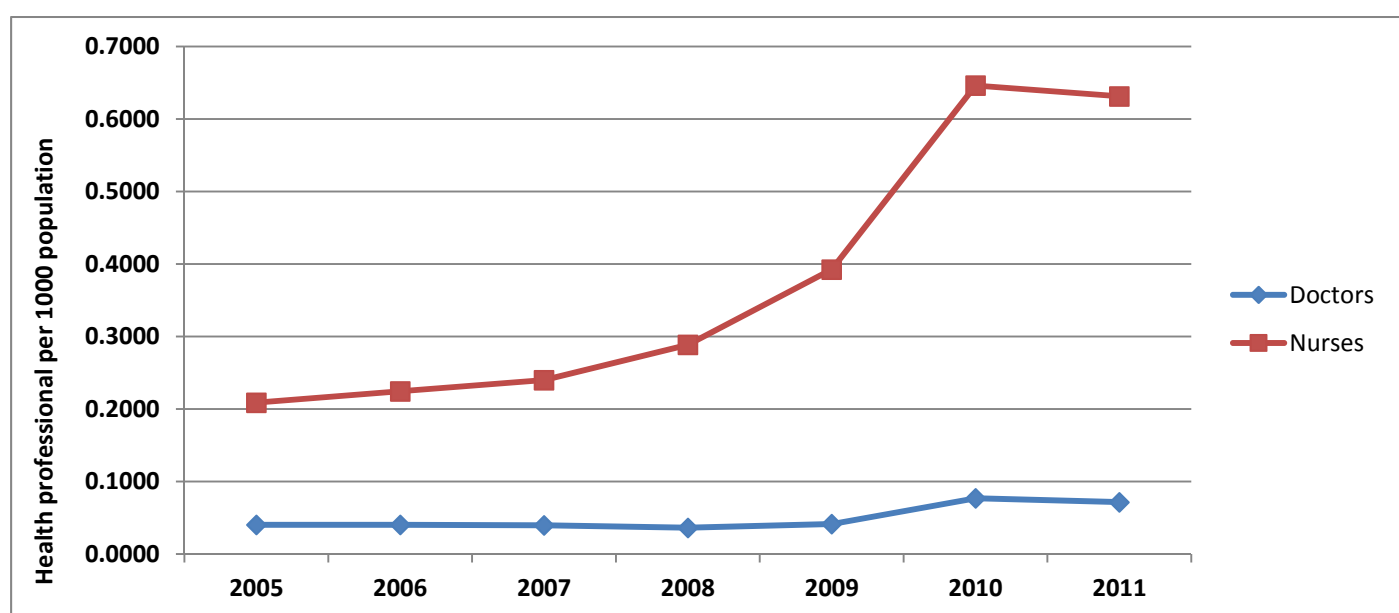
Figure 15 and Table 5 shows that on average there are 7 nurses for every doctor, with the number of nurses gradually increasing over time. 2010 had the greatest increase due to the introduction of FHCI and the corresponding increase in the salaries of health workers. The number of doctors per 1000 in the population stayed constant from 2005 to 2009 and increased approximately two fold in the FHCI years.

Table 5: Changing ratio of doctors and nurses to population, 2005-11

	2005	2006	2007	2008	2009	2010	2011
Doctors (per 1,000 population)	0.0402	0.0403	0.0397	0.0362	0.0414	0.0769	0.0715
Nurses (per 1,000 population)	0.2089	0.2245	0.2399	0.2887	0.3925	0.6463	0.6314
Ratio of nurses: doctors	5	6	6	8	9	8	9

Note: MO/SMO, HO, Registrars, Specialist/Senior Specialist, Consultant and CHO were classed as doctors. CHA, SRN, SECHN, Midwife, Environmental officers and MCH were classed as nurses. Data was sourced from the Human Resources for Health at the Ministry of Health and Sanitation.

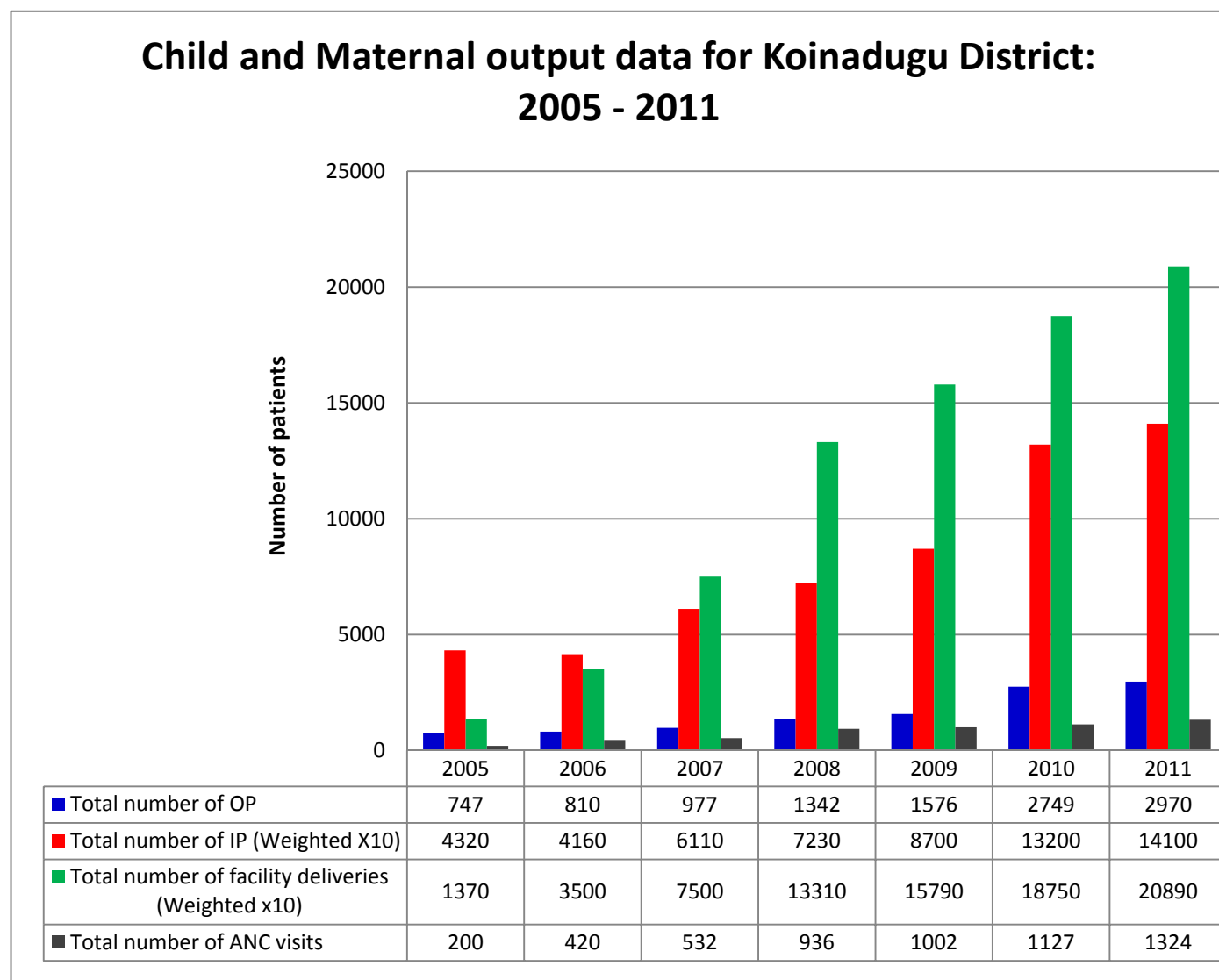
Figure 15: Population data analysis of doctors and nurses in Sierra Leone (2005 to 2011)



Outputs – child and maternal health outputs in Koinadugu District

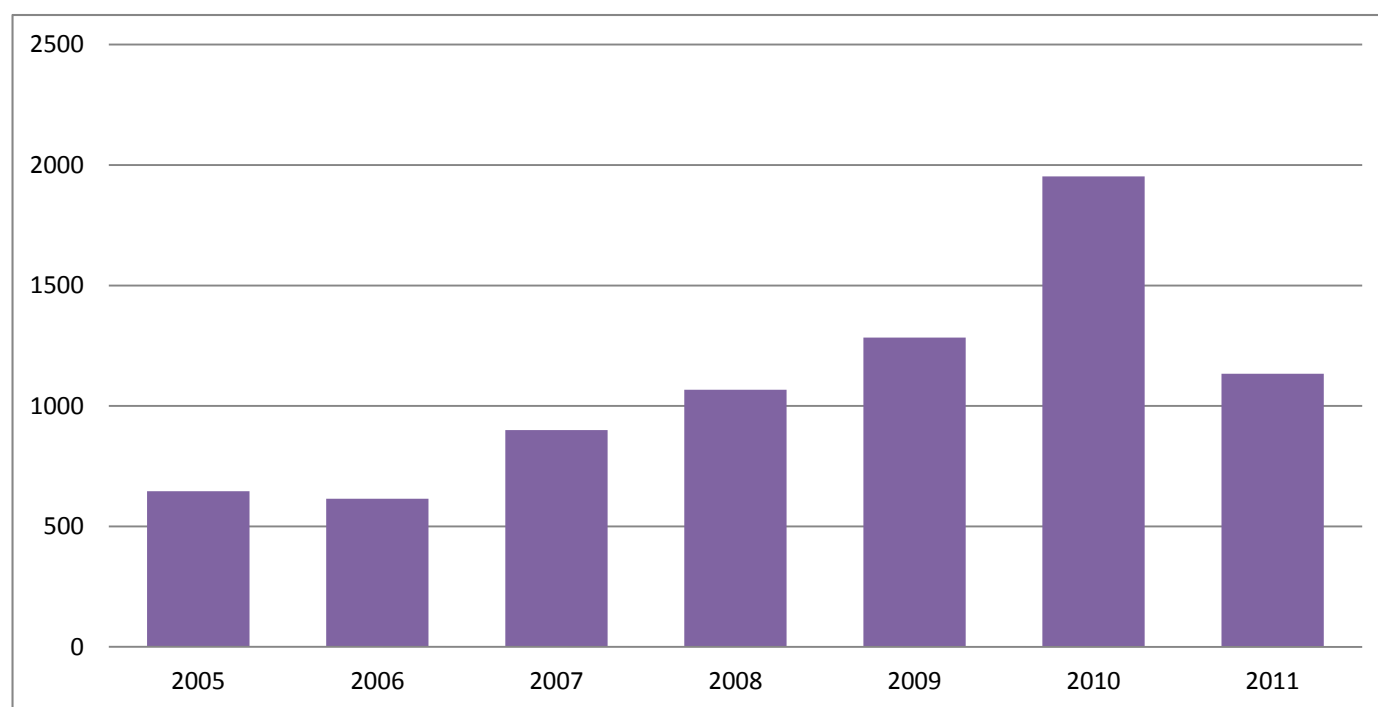
As shown in figure 16, there was a general increase in the total number of out-patients (OP), in-patients (IP), facility deliveries and antenatal care (ANC) visits from 2005 to 2011 in Koinadugu. There was a sharp increase in the total number of OPs from 2009 to 2010, which marks the transition into the FHCI era. The number of ANC visits was considerably lower than the number of institutional deliveries, which raises questions about under-utilisation of ANC services.

Figure 16: Trends in Child and Maternal outputs for Koinadugu District: 2005 - 2011



Note: IP were weighted by a factor of ten, to reflect their greater resource intensity compared to OP. Institutional delivery calculated as having a 10:1 weighting compared to ANC

Figure 17: Ratio of combined outputs to health facility based health workers, Koinadugu, 2005-11



Note: EDCU assistants, Environmental Officers and 'others' were excluded as they do not treat patients at health facilities. IP were weighted by a factor of ten, to reflect their greater resource intensity compared to OP.

Table 6: Combined OP and IP per health worker Koinadugu, 2005-11

	2005	2006	2007	2008	2009	2010	2011
Total number of health workers*	68	69	69	69	69	69	127
Total number of OP	747	810	977	1342	1576	2749	2970
Total number of IP	432	416	611	723	870	1320	1410
Weighted IPs	4320	4160	6110	7230	8700	13200	14100
Combined OP and weighted IP	5067	4970	7087	8572	10276	15949	17070
Ratio output per health worker	83	80	114	138	165	257	141

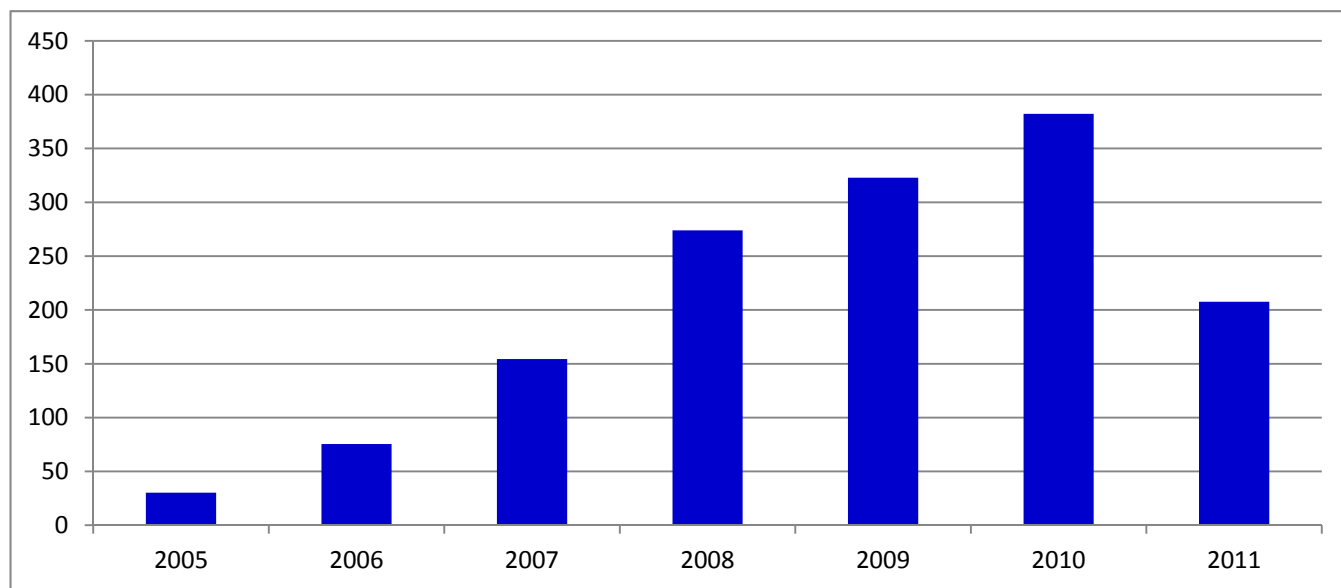
(*excluding EDCU assistants and Environmental officers as they do not treat patients at health facilities)

Figure 17 and table 6 show the ratio of combined traffic of OPs and IPs at the health facilities per total number of health workers (i.e. all of the different cadres of health workers presented in this study). This ratio gradually increased from 2005 to 2009, followed by a step increase in 2010 and a decrease in 2011. As expected, the FHCI implementation year recorded the highest ratio. As shown in table 6, the number of health workers considered in this category remained unchanged from 2005 to 2010 and doubled in 2011.

The combined figures for OPs and IPs showed an upward trend, with a 55% increase from 2009 to 2010, followed by a 7% change in 2011 estimates compared to 2010. The increased utilisation of health services by the target groups of the FHCI would have impacted this figure. In 2010, the data shows that there were 257 combined OP and IP units per health worker compared to 141 per health worker in 2011.

A similar trend was observed for combined ANC and institutional deliveries and combined nursing and midwifery staff. However in this case, ratios increased from 30 combined institutional deliveries and ANC visits in 2005 to 382 in 2010. 2010 recorded the highest ratio of combined institutional deliveries and ANC per combined nursing and midwifery staff, which corresponds to the increased utilisation of maternal services in the FHCI implementation year (see figure 18). Again, staffing numbers were unchanged from 2005 to 2010 but doubled in 2011. The decrease in the ratio in 2011 can be attributed to the increase in staffing numbers and the 12% increase in the combined outputs in 2011, compared to 2010 (see table 7).

Figure 18: Change in combined institutional deliveries and ANC: staff ratio (per combined nursing and midwifery staff in Koinadugu: 2005 - 2011



Note: institutional delivery calculated as having a 10:1 weighting compared to ANC

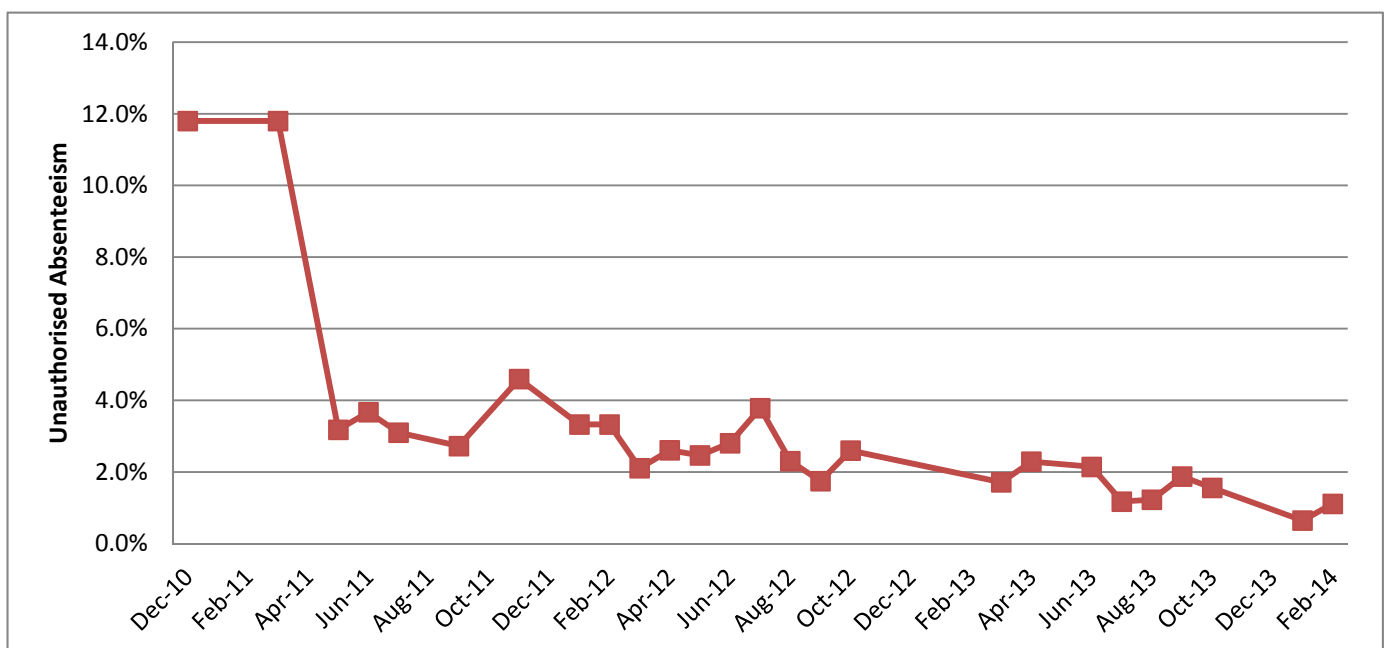
Table 7: Combined deliveries (weighted x 10) and ANC visits per combined nursing and midwifery staff in Koinadugu, 2005-11

	2005	2006	2007	2008	2009	2010	2011
Total number of nursing and midwifery staff	52	52	52	52	52	52	107
Total number of ANC visits	200	420	532	936	1002	1127	1324
Total number of deliveries	137	350	750	1331	1579	1875	2089
Weighted number of deliveries (x10)	1370	3500	7500	13310	15790	18750	20890
Combined output of deliveries and ANC	1570	3920	8032	14246	16792	19877	22214
Ratio	30	75	154	274	323	382	208

Trends in reported absenteeism in the work place

This study also investigated changes in absenteeism following the introduction of the staff sanction framework in 2010. Unfortunately, there was an absence of baseline data prior to the FHCI, but subsequent trends can still be analysed. There is the need to continue with spot-checks to ensure that the reported data is robust. Figure 19 shows the national picture from December 2010 (post FHCI) to February 2014. This shows a significant drop from baseline of 12.5% in December 2010, when the Staff Sanction Framework was implemented, down to 1.1% in February 2014.

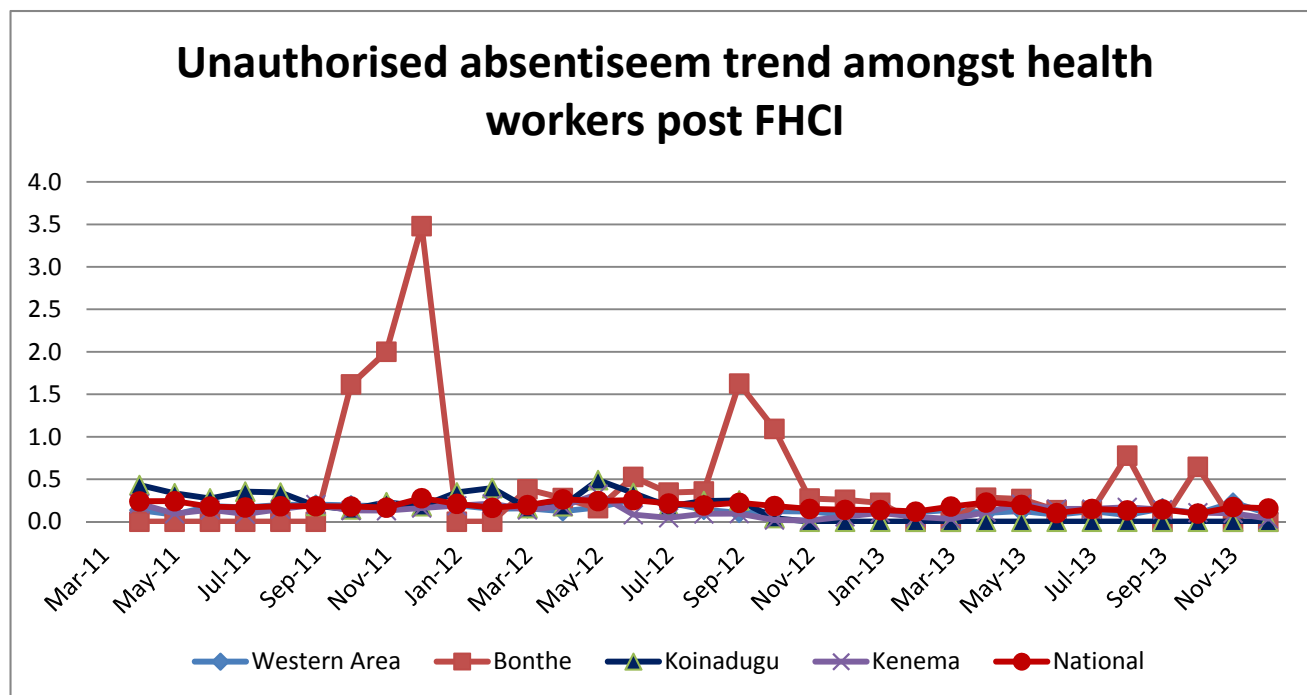
Figure 19: National trends in unauthorised absenteeism



(Note: Unauthorised absenteeism calculated as 'staff with one or more days of unauthorised absence /number of staff on payroll)

Available data also included the average number of days of unexcused absences in the work place. As shown in Figure 20, national level, Western Area, Kojnadugu and Kenema reported low levels of unexcused absences. However Bonthe reported higher numbers of unauthorised absence from the work place at specific time points, which may be related to the rainy season and access difficulties.

Figure 20: Average days of unauthorised absenteeism trend amongst health workers post FHCI by district



4. Conclusions

The secondary data shows that the onset of the FHCI and the accompanying increase in the salaries of health workers seemed to be strongly linked to the retention of health workers. Health worker categories key to the effective implementation of the FHCI saw an increase in numbers and a reduction in attrition. This was confirmed by a density analysis that showed approximately a two fold increase in the number of health professionals grouped into doctors and nurses categories (MO/SMO, HO, Registrars, Specialist/Senior Specialist, Consultants and CHO were classed as doctors. CHA, SRN, SECHN, Midwives, Environmental Officers and MCH were classed as nurses).

The overall average national attrition rate for the majority of health workers was high, but reduced over the period. A number of other categories remained unfilled, such as registrars. There were also high

percentages of unfilled positions and attrition rates due to a shortage of trained health personnel and poor working conditions. Due to the inadequate trained human resource for health situation in Sierra Leone, filling established posts will also prove to be a challenge. With working conditions and the conditions of service for health workers in Sierra Leone needing to be addressed for so long pre-FHCI, the majority of these health workers had very limited choice but to stay in post. A major proportion of established positions remained un-filled due to a shortage in trained staff and because qualified health personnel left Sierra Leone to seek for employment in other countries. Health outputs centred around maternal and child health also showed improvements in the post FHCI phase in comparison to the pre-FHCI phase. However, there was no accompanying increase in number of health workers.

The data also confirms regional disparities in the human resource available for health. More positions were filled in the Western Area compared to Kenema, Bonthe and Koinadugu. Key health personnel, instrumental to the overall success of the FHCI, were reported as having low percentage changes in the FHCI year, despite a mass recruitment campaign at national level. Poor working conditions, limited available housing, lack of transport allowance, irregular payments of the remote area allowance and political interference are some of the de-motivating factors listed in a study by Wurie & Witter (2014). These factors form the basis for a recommendation package to increase the attraction and retention of health workers in rural areas of Sierra Leone.

The data shows improvements in the national level of absenteeism in the work place after the implementation of the Staff Sanction Framework, an appendage of the FHCI, which aimed to reduce staff absence and increase efficiency (Martineau & Tapera, 2012). The Staff Sanction Framework in Sierra Leone was implemented to address existing weak top-down performance discipline, resulting in high rates of staff absenteeism and the non-existence of official mechanisms to sanction poor health worker performance (Simson, 2013). The MOHS together with support from development partners, namely DFID and Global Fund, sought to address and improve on this top-down performance discipline by establishing an attendance monitoring system (AMS). This AMS keeps records of the daily attendance of all employees within the health sector and provides a medium wherein unauthorised absences can be penalised and ghost health workers are removed from the payroll (Bertone et al., 2013). As shown in this report, the AMS appears to have had a positive impact by reducing national levels of absenteeism (1.1% in February 2014 down from 12.5% in December 2010). This will create a positive ripple effect on levels of staff discipline; an initiative welcomed by health facilities managers who can now enforce staff attendance, and health workers who appreciate the increased fairness and accountability the AMS has brought (Simson, 2013). It was reported in 2011 that approximately 600 staff were sanctioned due to unauthorised absences or

unknown workstations. Several frontline managers said that use of this external monitoring and the line of disciplinary action taken removed the pressure from them, as staff knew that the sanctions came from a higher chain of command (Martineau & Tapera, 2012).

In addition, there is an added economic incentive of implementing the Staff Sanction Framework. In 2011 the Government of Sierra Leone saved 240 million Leones (approximately US \$54,000) on the salary bill (Martineau & Tapera, 2012). Looking at the data at the district level and national, there were slight variations in the number of days taken as unexcused absence from work. Anecdotal evidence suggests that health workers in hard to reach areas sometimes take up positions of mentorship in the communities they work, in addition to their role as health workers. This can reduce the time they spend away from work as they feel a sense of obligation to the communities. In some cases this can mean less time spent visiting their families. However, Bonthe district (a hard to reach riverine district) reported high numbers of days with unexcused absences from work at particular time points. These can be seen to coincide with the rainy season, festive periods and with limited and infrequent modes of transportation from the mainland to the riverine area, making getting to the health facilities a challenge.

Productivity analysis was restricted by limitations in HMIS output data, but data for Koinadugu district suggests that the FHCI coincided with a large increase in productivity, followed by a drop as staffing numbers increased. The increase was especially large for deliveries and antenatal consultations. Despite the relative reduction in 2010, the output per health worker was higher post-FHCI than before both for general services and maternal health care.

The MOHS and policy makers should work towards reducing attrition rates for the different categories of health workers, continue with effective monitoring of unauthorised absences in the work place and continue to fill established posts by creating the right development environment and improving the conditions of service. This includes continued professional development, the creation of an enabling working environment, and the provision of incentives. A concerted effort from all these different parameters will improve health outcomes and ultimately strengthen the health care delivery system in Sierra Leone.

References

1. Bertone, M. P., Witter, S., & Samai, M. H. (2013). *'The development of HRH policy in Sierra Leone, 2002-2012 – a document review'*. Liverpool and Freetown: ReBUILD Consortium.
2. Martineau, T., & Tapera, S. (2012). *Support to Reproductive and Child Health Sierra Leone systems: A rapid assessment of staff performance management systems*. London: Options.
3. MOHS secondary data on staffing numbers, attrition, absenteeism and output
4. Simons R, 2013, Addressing pay and attendance of health workers in Sierra Leone, Overseas Development Institute
5. Wurie, H. & Witter, S. 2014, *Serving through and after conflict: life histories of health workers in Sierra Leone*, ReBUILD, Freetown.