Lady Health Worker Programme

External Evaluation of the National Programme for Family Planning and Primary Health Care

Quantitative Survey Report

Oxford Policy Management
August 2009

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Cover photo: Mother and child in village, clients of the Lady Health Worker

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Executive summary

Introduction

This report presents the findings of a quantitative survey undertaken in 2008 by Oxford Policy Management (OPM) in order to evaluate the progress of the Pakistan Lady Health Worker Programme (LHWP). It is part of a comprehensive independent evaluation that will also include financial and economic, management and qualitative analysis. Separate provincial reports and an overall summary report will be published. Taken together, these new studies comprise the 4th Evaluation.

The survey

The survey covered 5,752 households and 554 LHWs. It was a nationally representative sample. The sample used five geographic strata: Punjab, Sindh, NWFP, Balochistan and AJK/FANA. Sampling weights were used to make representative estimates. It included households in areas already served by the LHWP in 2000, as well as households in areas to which the programme has expanded since then. A comparison group of unserved households were also surveyed, randomly selected from unserved areas within the same 60 districts. Separate interviews were conducted with 298 Lady Health Supervisors (LHSs), selected medical staff at 335 health facilities (FLCFs), and 572 community groups. The sample was not purposefully stratified to distinguish between urban and rural households. It therefore reflects the actual urban/rural proportion amongst served and unserved households. Served households belong to both groups, but the vast majority are rural. Unserved households are all rural.

The report presents information on:

- LHWs' demographic and educational characteristics
- Their clinical knowledge
- The characteristics, knowledge, work patterns and supervision of LHSs
- The functioning of key Programme support services: training, administration, supervision and performance management, supplies, equipment and district-level management structures and systems
- Clinical support services provided at the LHWs' health facilities
- The time spent on their work, by activity
- The coverage of the Programme
- The number of clients registered and seen by LHWs
- LHWs' role in the provision of curative care
- The level of service provision by LHWs and the factors associated with high performance
- The type of households served by the Programme, and how they compare with the unserved population
- Trends in health indicators since 2000 in the population served by the LHWP
- Differences in health indicators between the served and unserved populations
- Whether the Programme appears to have improved health indicators in the population that it serves.

Analysis is undertaken for the served and unserved households, as well as disaggregating by rural and urban populations, and by province, where relevant. Differences in the coverage

of the sample in NWFP and Balochistan might affect the trends observed there, although the effects are likely to be small at the national level.

Main findings

LHW characteristics

A comparison of the LHWs sampled in 2008, compared with 2000, shows that the demographic and educational characteristics of LHWs have changed only slightly since the last evaluation, despite the expansion in numbers. They are, on average, a little older and somewhat more likely to have been educated to intermediate level or above in 2008, although most are still at matriculation level or below.

Programme inputs

LHWs' clinical knowledge has improved since the 3rd Evaluation, but there is still room for improvement. The average score has increased from 69 to 74, and average scores have improved significantly in all of the provinces. There has been a noticeable improvement in their knowledge of the EPI vaccination schedule. However, the lack of knowledge in critical clinical domains should be cause of concern. While many gave correct answers to basic questions, an appreciable fraction gave incorrect answers in areas that are central to their work. Around one third failed to identify a number of life-threatening conditions. Only 9 per cent were able to state the correct doses of antibiotics or Chloroquine to be given. Answers to case-based questions showed only a slight improvement. The composite knowledge score increased from 69 per cent in 2000 to 74 per cent in 2008, with little variation between rural and urban areas. The area with lowest score was Balochistan, where it was 10 per cent lower than the overall mean.

Training continues to be carried out reliably for most LHWs. All LHWs have received the full-time three-month basic training course, and 96 per cent have received at least one refresher training course in the last year, most frequently Counselling Cards or Child Health courses.

There have been some changes in the timeliness of payments to LHWs. Compared with 2000, far fewer waited over three months to be paid, although it appears that a smaller proportion had been paid in the last month. Almost 11 per cent of LHWs received less money in their salary than they expected, although this was less than in 2000, when it was 20 per cent. Most of them did not know the reason for this deduction.

The survey also looked at three areas of Programme support that are essential for LHWs to undertake their job effectively: medical supplies, equipment and clinical services provided by the health facilities. It showed substantial problems in these areas. These shortfalls and the unpredictability of salary and supplies put a serious stress on programme implementation and may jeopardize the programme's overall effectiveness. The continuity of problems documented, compared with 2000, suggests that these areas need renewed focus, both within the Programme and within the health system generally.

An examination of the medicines held in stock by LHWs shows that many continue to be seriously undersupplied. However, it seems LHWs are more likely to have a given item in stock in 2008, and much less likely to have been out of stock for over three months. Stock-outs are therefore continuing for a shorter period than in 2000. Sindh has the largest problem with stock-outs enduring for two months or more. As in the 3rd Evaluation, expired stock was a less common problem. Interviews at the LHWs' health facilities confirmed these supply problems and showed that they were often a consequence of non-receipt of the requested

items from the DPIU. Some LHWs were also found to lack some basic items of equipment: around one third have functional weighing scale, for example.

There has been an improvement in the level of supervision of LHWs – some 78 per cent had had a supervision meeting in the preceding month. A similar proportion of LHWs reported that their supervisors used a checklist in the last supervision meeting. LHSs have, on average, fewer LHWs to supervise than in 2000, making proper supervision easier. They have better access to transport, although a significant number still have no access to a Programme vehicle, or have not received all the POL that they are due. LHSs are themselves better supervised by the Programme, with 93 per cent reporting a supervision meeting within the last month. LHSs also demonstrate an improvement in their average levels of knowledge, compared with 2000, increasing their score from 74 to 78. They are being trained systematically, and have seen improvements in the regularity of their pay. The districts generally provide support to the LHWP too, in terms of supervision time and also making facilities available to LHWs.

Programme outputs

There are now close to 90,000 LHWs nationwide. Each is supposed to serve around 1,000 individuals. The survey found that the mean number of people registered per LHW was 919, a drop from 980 in 2000. Very few registered households were found to be non-existent (less than 1 per cent), while some 6 per cent of surveyed households were not aware of being registered. This represents an improvement over the 3rd Evaluation, which found that 13 per cent were unaware of being registered. The number of households per LHW shows considerable variation though, with 18 per cent having fewer than 100 households, compared with the norm of 200 per LHW; 2 per cent have more than 200.

However, despite covering fewer people, the LHWs are working harder than they were in 2000. They report an average of 30 hours per week of work, compared with 20 in 2000. They are providing a wide range of services to a higher proportion of their clients than they were in 2000.

From the household perspective, 85 per cent report having had a visit from the LHW within the past three months, which indicates a substantial minority (15 per cent) who are not in regular contact. Community group reports on LHW performance are almost all improved, relative to 2000.

LHWs play an important role in the provision of preventive and promotive health care services. The level of provision varies with the type of service. Many services reach around half of eligible clients, but some have higher coverage: around two thirds of households report that the LHW has undertaken hygiene promotion, and vaccination promotion has reached three quarters of children under three years of age. In contrast, early visits to newborns (within 24 hours) and growth monitoring reach far fewer clients. There have been some substantial improvements in the level of service delivery since the 3rd evaluation, particularly for family planning services. While there is a need for a further increase in the coverage of services, so that they reach all registered clients, having increased the level of service provision to clients during a period of programme expansion should be recognised as a significant achievement.

LHWs remain an important source of curative consultations for the population they serve. Of all those who consult with regard to an illness, 17 per cent report consulting the LHW, usually as the first point of contact. They are particularly important for rural women, though the gap between rural and urban use has narrowed since 2000. Utilisation by adults appears to have

declined since 2000, but this is not the case for children. Many LHWs continue to treat emergency cases, although a slightly higher proportion says that they have never seen an emergency compared with the figure for 2000.

For those who did not consult the LHW (for children under five with diarrhoea), the main reason given was that the consultation was not necessary (31 per cent), which compares favourably with the 2000 results, where the main factor was that the LHW was not available or helpful (37 per cent). It appears however that a small proportion of LHWs appear to be charging for consultations; 9 per cent of consultations for diarrhoea were charged, according to households, and at a rate that exceeded all other providers, other than private hospitals/clinics.

While a clinical assessment of the treatment of patients by LHWs was not undertaken in this study, reports of their treatment of children with diarrhoea are encouraging. They compare particularly, favourably with other community-based care providers such as hakeems and homeopaths. LHWs continue to act as a link between health facilities and their communities.

Generally, the socioeconomic status of households in the survey has increased since 2000, both for households in old and new catchment areas. The Programme has expanded to serve populations that are, on average, somewhat more disadvantaged than those being served at the time of the last evaluation. This is an important achievement. However, the population that remains unserved is significantly more disadvantaged still, and efforts must be made to cover those areas.

Programme impact

Trends in the main target health indicators identified in the previous PC-1 were assessed, excepting mortality. Most show a substantial improvement. The improvements in tetanus toxoid coverage (five or more doses) and attended deliveries are particularly significant, with increases from 14 to 31 per cent and 27 to 48 per cent coverage, respectively. The proportion of children fully immunised has increased from 57 to 68 per cent. Measures of exclusive breastfeeding have also improved, although this may simply be due to expansion into populations that are poorer and more rural. The improvement in the contraceptive prevalence rate is small and statistically insignificant, having increased by only 1 percentage point. The improvements, even when they are substantial, are not usually as large as had been intended in the most recent PC-1, even over the longer period of 2000 to 2008. These improvements have taken place as the programme expanded to cover more disadvantaged populations, however, and are no doubt of considerable importance to the health of the population. The Programme might want to consider what would be realistic levels of change for these indicators when developing the next PC-1.

A number of other important indicators have also improved. There is an increased awareness amongst mothers of how to prepare ORS. There is a substantial increase in those receiving at least one antenatal consultation, from 58 per cent to 76 per cent. However, some other areas have stagnated, or even decreased. Knowledge by mothers of at least one way in which to prevent diarrhoea has reduced, and growth monitoring services continue to have a limited coverage. In relation to the national average, as indicated by the most recent DHS, the served households are not better in relation to some health promotion behaviours. Some 9 per cent of households clean their water before drinking, similar to the national average.

Although the served population has better health measures in 2008 compared with 2000, this is not necessarily due to the Programme. Trends in the national population as a whole, the

expansion of the programme into new areas, and differences in the populations surveyed might all have had an effect on the differences observed. The served population also has substantially better health status measures than the unserved population for almost all measures, with the exception of some indicators on breastfeeding and weaning. This also might not be due to the Programme, since the unserved population is disadvantaged on many dimensions. Two statistical techniques were used to try to assess the impact that can reliably be attributed to the programme, comparing served with unserved areas. Regression analysis was used to adjust for observable differences between served and unserved households, other than the intervention itself. In addition, Propensity Score matching was used to compare outcomes for served and unserved households with otherwise similar characteristics. Both techniques produced similar results, which suggest that the findings are reasonably robust.

The results of this analysis confirm that the LHWP has had a positive impact, particularly in relation to family planning and antenatal care. Comparable served households are 11 percentage points more likely to be using a modern FP method. Women who had a birth in the 3 years before the survey are 13 percentage points more likely to have had tetanus toxoid during their pregnancy, and neo-natal check-ups are 15 percentage points more likely to have occurred. Children under three years of age are 15 percentage points more likely to be fully immunised.

Some of these effects are likely to be linked directly to LHW activities, as the LHW is a main provider of some of these services, providing, for example, 60 per cent of pills and condoms.

On the other hand, the impact on health knowledge and sanitation has been weak:

- There is no evidence of a positive effect on breastfeeding – in fact, there appears to be even a small negative relationship
- There is no evidence of an increase in skilled attendance at delivery
- Limited effects on growth monitoring
- No evidence at all on the incidence of diarrhoea and respiratory infections in children.

Some of these areas present more difficult behavioural issues, although it was found that high performing LHWs had an impact on a number of them, suggesting there is scope for improvements if performance can be strengthened and the issues are given sufficient attention.

By dividing served and unserved households into quintiles, based on consumption, we were also able to analyse the differential impact of the LHWP on better off and poorer households. In general, the analysis found that effects were larger for poorer households, especially in relation to maternal and neo-natal health practices, immunisation and growth monitoring. However, knowledge-based interventions, such as treatment of diarrhoeal diseases, were more effective amongst better-off households. The same applied for some more demand-driven services, such as family planning.

LHW performance

The mean LHW performance score, which measures the extent to which key preventive and promotive services have been delivered to clients, has increased from 42 to 52. Looking at ‘comparable’ LHWs (that is, ones serving in the same areas as in the 2000 survey), the increase, to 55, is even higher. The mean performance score has increased in all provinces since the 3rd Evaluation. There remains a substantial group of under-performing LHWs,

however. Effective supervision and good district management practices are important in improving LHW levels of service delivery.

For LHWs, performance appears to be correlated across different services, indicating that specialisation is not taking place, and high performing LHWs are likely to deliver relatively high levels of all services. This is consistent with the findings of the 3rd Evaluation.

The evaluation investigated the determinants of this performance. A number of factors are positively linked to performance:

- LHW-specific factors – experience, hours worked, training and supervision received
- District-level factors – the proportion of time the Executive District Officer-Health [EDO-H] spends working on LHWP and the total number of LHWs working in the district, for example
- Community factors – such as the existence of women's health committees.

However, some factors that might be expected to be significant were not found to be so, including LHWs having another paid job, non-residency, drug availability, LHW supervisors having access to vehicles and the knowledge score of the LHW.

Relating the LHW performance index to household knowledge, practice, and health outcome measures leads to the clear conclusion that better LHW performance has a positive effect on most of the health practice indicators considered in the study. LHWs in the top distribution of the performance score make an additional difference to many of the Programme's impacts. The effect of the knowledge score is more concentrated, particularly focused on the case of health knowledge outcomes and the proper treatment of basic illnesses.

Conclusions

The Programme has expanded substantially since 2000, at the same time as facing the challenges due to decentralisation. As it has expanded, it has penetrated into more rural and less advantaged areas, although it is still not reaching the most disadvantaged areas. Coverage rates, work levels, knowledge and delivery of services have generally improved.

LHWs play a substantial role in preventive and promotive care, and in delivering some of the basic curative care in their communities, as well as providing a link to emergency and referral care. Even taking into account other differences between served and unserved populations, modern contraceptive use is more prevalent in served areas, pregnant women are significantly more likely to receive tetanus toxoid vaccination, and children in served areas are significantly more likely to be fully vaccinated. The LHWs are also appreciated by the communities in which they are based. There are a number of areas where the Programme, as a whole, is not having the intended impact, however, including in hygiene and sanitation behaviour, breastfeeding, growth monitoring and attendance at deliveries. Additional attention by the programme to the performance of LHWs might bring substantial health benefits in these areas.

The Programme has managed to institute a number of improvements that were identified as important in the 3rd evaluation. It has improved supervision and has increased average levels of knowledge. The level of service delivery has increased. However, there remain a group of underperforming LHWs whose working practices must be improved, and gaps in LHWs' knowledge. There remain significant failures in supply systems, both in medicines and equipment. These are issues that must still be addressed going forwards.

Recommendations

Expanding the LHWP

These findings suggest that the further expansion of the Programme is warranted, particularly since the unserved areas are more disadvantaged and as Programme impact is often larger for poorer households. In expanding, however, it is important that the programme does not lose sight of the need to ensure that the number of households registered per LHW is appropriate (that is, ensure service volumes are sufficiently high) and does not vary too much (that is, ensure there are few very under- and over-worked LHWs), while recognising that different environments may impose constraints on what can be expected. The quality of LHW service delivery must also be maintained and enhanced, which might be challenging, given the relationship between performance and the education and training of the LHW.

Providing the necessary inputs

A number of areas of weakness have been identified that have not been fully resolved since the last evaluation and that require urgent attention. These include improving the availability of drugs for LHWs and, at health facilities, increasing the availability of certain equipment and materials (for example, weighing scales) and increasing the regularity of LHW pay.

Reviewing LHW functions and training

The evaluation has found that the effect of the programme is relatively limited in the area of health knowledge and sanitation practices, except for relatively better-off beneficiaries and in the case of particularly well performing and knowledgeable LHWs. It is also surprising to see apparently very little effect on breastfeeding behaviours. Our analysis suggests that the guidelines for LHWs' action in this field might not be sufficiently clear. In addition, overall levels of growth monitoring remain low. These are all areas that would benefit from review in order to ensure that LHWs have the skills, knowledge and equipment to be effective in promoting healthy practices; and that they are properly supervised to do so.

Charging practices

Nearly one in ten households reported paying LHWs for treatment of diarrhoeal disease in children. This appears to have increased since 2000 (when households paid for 4 percent of cases). The regulations on charging should be clarified and enforced.

Enhancing LHW productivity

The regression analysis on LHW performance identified a range of determinants, some of which are within the control of the Programme and that therefore provide some clear policy implications. Specifically, it suggests that efforts should be made to:

- Retain experienced LHWs
- Ensure LHWs are working the full hours required of them – this requires adequate supervision support, but LHWs should not be working a seven-day week
- Ensure that LHW supervisors are themselves regularly and effectively supervised by the FPO, and that performance monitoring tools such as the diaries and work-plans continue to be used

- Encourage women's health committees to be established/maintained in all served areas.
- Maintain a focus on MIS reporting – in particular, making clear the services that the LHW should be providing, and that LHWs understand their performance in delivering these services is being monitored
- Encourage DPIUs to instigate effective LHW performance management regimes with effective procedures for reporting and sanctioning LHW non-performance – punishing LHWs with salary deductions or delays does not appear to be an effective response to non-performance, in contrast to providing additional training (ideally directed at the specific area of non-performance)
- Ensure all served health facilities have an individual person with overall responsibility for overseeing LHWP activities.

Overall our findings indicate that positive programme impacts are the result of a combination of LHWs' commitment and knowledge. By working along both lines, the Programme is likely to improve its overall impact significantly. The joint importance of performance and knowledge also suggests that factors positively affecting both scores – for instance, efficient Programme management systems at the district levels – are particularly important.

As the LHWP matures it should begin to consider broader issues of efficiency, maximising impact for a fixed level of financial inputs. It should identify areas that have the potential for substantial health benefits that have not yet been properly realised. It should consider the combination of inputs and of services that can be expected to maximise the impact on health outcomes.

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Abbreviations

AJK	Azad Jammu and Kashmir
DC	District Coordinator (of the LHWP)
DHO	District Health Officer
DPIU	District Programme Implementation Unit
EDO-H	Executive District Officer-Health
FANA	Federally Administered Northern Areas
FATA	Federally Administered Tribal Areas
FLCF	First Level Care Facility (Health Facility)
HMIS	Health Management Information System
FPO	Field Programme Officer
LHW	Lady Health Worker
MIS	Management Information System
LHWP	Lady Health Worker Programme
LHS	Lady Health Supervisor
MoS	Measure of Size
NWFP	North Western Frontier Province
OPM	Oxford Policy Management
POL	Petrol, Oil and Lubricants

1 Introduction

1.1 Background

The National Programme for Family Planning and Primary Health Care (LHWP) was created in 1993. It established an organisation of paid community health workers providing basic primary health care to the community where they live. It soon employed only female community health workers – Lady Health Workers (LHWs). LHWs provide health education and promote improved health behaviour, including the use of basic preventive health services. They supply some types of family planning. They provide some basic curative care, and are trained to identify and refer more serious cases.

The strategy document that relates to the period covered by the evaluation (the PC-1 for 2003–2008) states that the specific goals of the programme are:[1]

- To develop the necessary health manpower in support of the Programme by selection, training and deployment of 100,000 LHWs throughout the country
- To address the primary health care problems in the community, providing promotive, preventive, curative and appropriate rehabilitative services to which the entire population has effective access
- To bring out community participation through creation of awareness, changing of attitudes, organisation and mobilisation of support
- To expand the family planning services availability in urban slums and rural areas of Pakistan.

According to the 2003–2008 PC-1, the Programme targets include contributing to:

- A reduction of IMR from 85 to 55 per 1000 live births
- A reduction of MMR from 400 to 180 per 100,000 live births
- An increase in the Contraceptive Prevalence Rate from the existing 22 per cent to 42 per cent in rural areas, and from 40 per cent to 58 per cent in urban areas
- An increase in immunisation coverage in children aged 12–35 months fully vaccinated from 45 per cent to 80 per cent in rural areas, and from 64 per cent to above 90 per cent in urban areas (in liaison with EPI)
- An increase in TT-5 immunisation coverage amongst women of childbearing age from 12 per cent to 40 per cent
- An increase in the percentage of children being exclusively breastfed till age of 6 months from the existing 18 per cent to 50 per cent
- An increase in births assisted by a skilled birth attendant from the existing 12 per cent to 30 per cent in rural areas, and from 43 per cent to 80 per cent in urban areas covered by the Programme.

The Programme's performance against these targets is assessed through a combination of independent programme evaluations, analysis of the Pakistan Integrated Household Survey (PIHS), Pakistan Social and Living Standards Measurement Survey (PSLMS) and the Programme's own monitoring and supervisory system (MIS).

1 Ministry of Health, Government of Pakistan – National Programme for Family Planning and Primary Health Care, PC-1 August 2003, p. 3.

This evaluation assesses trends for all these target health indicators, with the exception of IMR and MMR, which would have entailed a larger fieldwork exercise (additional and more complex questionnaire modules and larger sample sizes).

The Ministry of Health commissioned the most recent independent evaluation of the LHW Programme (LHWP) in 1999, and this implemented by Oxford Policy Management (OPM). This was the third independent LHWP programme, and is referred to in this report as the 3rd Evaluation. The key conclusion of the 3rd Evaluation was that the LHWP had managed to buck the international and national trend of poor performing Community Health Worker Programmes (CHWPs) and was, in fact, providing a service that had an impact on key health indicators.

Oxford Policy Management has been commissioned to undertake this current evaluation (the 4th Evaluation). The evaluation again focuses on assessing the effectiveness with which the LHWP is being implemented, and whether public money is being spent effectively. The specific objectives of the evaluation are:

- To provide the Ministry of Health (MoH) and other stakeholders with accurate, credible and usable information on the performance of the LHWP
- To examine changes in the programme's performance since the 3rd evaluation in 2000
- To explore the determinants of performance
- To document the socioeconomic benefits to the LHWs and the Lady Health Supervisors (LHSs), their families and communities of working with the programme
- To provide findings and policy options that enable the Programme to further strengthen its performance.

To fulfil these objectives, the key outputs of the evaluation will be:

- Final report – summary of key findings and policy options
- Provincial/Regional reports for Punjab/ICT, Sindh, NWFP, Balochistan and AJK/FANA
- Quantitative and qualitative reports
- Management and systems review
- Economic and financial analysis
- Report on the socioeconomic benefits and experiences of the LHW and LHS.

This report presents the results of the quantitative survey.

1.2 The survey

The objective of the quantitative survey was to provide a nationally representative picture of the functioning of the Programme. Interviews were conducted with Lady Health Workers, the households that they serve, the communities where they work, the LHWs' supervisors, and the First Level Care Facilities (FLCFs) to which the LHWs are attached ('served' FLCFs).

This information provides a comprehensive picture of the work carried out by the LHWs and of the functioning of the Programme support services necessary to their work. Information was collected on a set of unserved households in areas where the Programme does not operate to enable an assessment of the impact of the LHWs on the health status of the population they serve. Information was also collected from health facilities and from the community in these areas.

Altogether, 554 LHWs and 5,752 households were interviewed. The final sample sizes for each type of interview used in the analysis are shown in Table 1.1.

Table 1.1 Sample sizes by served/unserved area status and province

Unit of observation	Area							Total
	LHW areas	Unserved areas	Punjab and ICT	Sindh	NWFP	Balochistan	AJK/ FANA	
Districts	–	–	19	12	9	10	7	57
Lady Health Workers	554	–	189	119	86	90	70	554
Households	4,378	1,374	1,864	1,925	853	978	762	5,752
FLHFs*	267	68	116	71	52	51	45	335
Community interviews	486	86	178	132	73	105	84	572
Lady Health Supervisors	298	–	96	73	45	45	39	298

Note: * = First Level Health Facilities.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

The sample used five geographic strata, which were provinces or federally administered areas: Punjab/ICT[2], Sindh, NWFP, Balochistan, and AJK/FANA.[3] The focus of this report is on the performance of the Programme as a whole, although some of the key estimates are also presented by stratum. Separate reports have also been produced for each of the five strata.

The sample was not purposefully stratified to distinguish between urban and rural households.[4] It therefore reflects the actual urban/rural proportion amongst served and unserved households.[5] Served households belong to both groups, but the vast majority is rural. One fifth of households in 2008 are urban compared to one quarter in 2000. This is a reflection of the fact that the Programme's expansion strategy has been targeted at rural areas. Unserved households are all rural.

Sampling weights were defined to allow the calculation of representative national and provincial estimates. All estimated standard errors used in significance testing and in the econometric modelling have been adjusted for sample clustering. More details on the sampling methodology and the calculation of the survey weights are given in Annex A.

In the first stage of sampling, 60 districts were selected for coverage by the survey. Districts assessed to be too insecure for fieldwork to be conducted safely were excluded. This resulted in the exclusion of nine of the 133 districts in existence in Pakistan in April 2008 from the sample frame due to insecurity, two in the North West Frontier Province (NWFP), and the whole of the Federally Administered Tribal Areas (FATA). In addition, after the district sample was drawn, three of the selected NWFP districts were dropped, also due to insecurity. The final number of districts covered by the evaluation is therefore 57.

2 Although the ICT/Punjab samples are representative of ICT and Punjab combined, the degree to which the results presented in this report can be extrapolated for ICT alone are limited: out of 1,864 households and 189 LHWs in the Punjab/ICT sample, only 71 households and 9 LHWs were in ICT.

3 Note that two districts in NWFP and all seven districts in FATA were excluded from the sample frame in 2008 due to high levels of insecurity.

4 Note that the rural/urban distinction is based on the interviewers' in-field assessment of the characteristics of the communities served by the LHWs. Rural communities can be served by LHWs attached to a FLCF based in an urban setting.

5 Adequate coverage of urban areas was imposed by sampling with certainty ten districts containing main cities (Rawalpindi, Lahore, Faisalabad, Multan, Karachi, Hyderabad, Sukkur, Peshawar, Quetta, Muzaffarabad).

In each selected district, a sample of served health facilities (that is, those with LHWs attached) was drawn from the Programme database.[6] LHWs were then sampled from these facilities. LHWs were included in the sample if they had completed their initial three months' training.[7] Households were sampled from the selected LHWs' registers. The supervisor of each selected LHW was interviewed; community interviews were also conducted for each LHW sampled.

A different sampling scheme was used for the unserved population. One or two FLCFs not attached to the LHWP ('unserved' FLCFs) were sampled in each of the 60 selected districts. Since it was not possible to construct a reliable national list of all unserved health facilities, these were identified in each of the sampled districts with the help of District Coordinators of the Programme. For each sampled unserved FLCF, the person in charge of the health facility was consulted to assist the field-teams in dividing the FLCF catchment area into small territorial segments. The segmentation was designed so as to mimic the partition of the area into the territories of 'virtual LHWs' (see Annex A for details). At each facility, one segment was randomly selected. All households were listed in the selected segments, and a sample of unserved households was randomly selected for interviewg.

Fieldwork was conducted between July and November 2008. Losses were generally low. The largest problem of non-response was at the unserved FLCFs, where around 23 per cent of interviews with facility staff could not be undertaken (although households attached to these FLCFs were interviewed in any case). Data quality was generally high. These issues are discussed in depth in Annex B.

1.3 Comparability of results with the third evaluation

1.3.1 Exclusion of insecure areas and sample frame comparability

The fact that, due to insecurity, some districts were not eligible for inclusion in the evaluation survey (that is, were excluded from the district sample frame) has implications for the comparability of the results with the 3rd evaluation. Furthermore, in addition to the nine districts in FATA and NWFP that were excluded from the sample frame, some of the selected districts were subsequently found to be insecure and therefore had to be dropped from the survey. In NWFP, three of the 12 sampled districts (Lakki, Karak and Dir Lower) and two served and two unserved FLCF clusters in the Malakand district could not be surveyed due to insecurity. These insecure areas were not replaced because this could have introduced bias. Further details are provided in Annex A.

The implication of this is that the survey is representative of all areas in Pakistan that were secure at the time of the fieldwork. In contrast, the 3rd Evaluation was representative of all Pakistan, because the whole country was accessible to field teams in 2000. This needs to taken into account when comparing results from the two surveys – for example, in interpretation of trends in health indicators between 2000 and 2008. Apparent improvements might simply be due to differences in the populations covered by the survey (see the following sub-section for a discussion. Particular care needs to be taken when comparing NWFP/FATA estimates from 2000 with the NWFP 2008 estimates, which exclude FATA completely and are only representative of those parts of NWFP that were secure enough to be accessible at the time of the survey.

6 The sampling procedure was designed such that the served FLCF sample included a small panel of FLCFs that had been covered in the 3rd Evaluation.

7 Note this is a difference from the design of the 3rd Evaluation where only LHWs with at least three years experience were covered by the evaluation.

In addition to the problem of the comparability of sample representativeness caused by insecurity, there was an additional problem caused by the fact that the district sample frame was incomplete. The district sample frame, derived from the served FLCF and LHW lists provided by the LHWP-MIS unit, only contained 118 districts, whereas there were actually 133 districts in Pakistan in April 2008 when the sample frame was constructed. Thus, 15 districts were missing from the sample frame. The problem is most acute for Balochistan, since 11 of the 15 'missed' districts are in Balochistan. However, analysis has been undertaken (see Annex A for details) that shows that, whilst some care should be taken in interpreting provincial-level trends for Balochistan, the overall national results and the provincial estimates for the other provinces are unaffected.

1.3.2 LHWP expansion

The LHWP has expanded considerably since the 3rd Evaluation was undertaken in 2000. Programme expansion has occurred both through the LHWP extending coverage to FLCFs previously not covered, as well as by increasing the number of households served in the catchment areas of FLCFs that were already served in 2000. The households covered in the current evaluation can therefore be categorised into the following four groups:

- Households attached to 'new' FLCFs
- 'New' households in 'old' FLCFs
- 'Old' households in 'old' FLCFs
- Unserved households.

'New' FLCFs are those that would not have been represented in the 3rd evaluation. The 3rd evaluation only covered FLCFs that had at least one LHW in place who had completed her task-based training before 31 December 1997. Therefore, in the current evaluation, any FLCF that did not have at least one such LHW in place before 31 December 1997 is defined as 'new'. All other FLCFs are defined as 'old'.

There has also been expansion *within* the catchment areas of 'old' FLCFs. 'Old' households in 'old' FLCFs are those that have been registered with an LHW since April 2001, which is when the fieldwork data collection for the 3rd Evaluation ended. All other households attached to 'old' FLCFs are defined as 'new' households in 'old' FLCFs.

'Old' households in 'old' FLCFs are most comparable to the served households covered in the previous report in terms of the geographical areas they represent. For this reason, where household-level estimates from the previous report are presented alongside the current statistics, as well as the overall 2008 figures, the estimates relating to this comparable sub-group are generally also reported.

Chapter 5 presents the characteristics of these groups, while also discussing the main features of the Programme's expansion patterns.

1.3.3 LHWs covered by the evaluation

For the 3rd Evaluation, only 'eligible' LHWs were sampled and interviewed. An LHW was defined as eligible if she had completed her task-based training before 31 December 1997. The 3rd Evaluation fieldwork was implemented between October 2000 and April 2001. This means that eligible LHWs had at least 33–39 months' experience at the time of the 3rd Evaluation survey. By contrast, the current evaluation covers all LHWs that had completed their task-based training at the time the interview team visited the FLCF. A comparison of the

two could potentially be misleading, because the 2008 estimates are calculated over all LHWs, including those with less than three years' experience.

For this reason LHWs in the current sample were categorised into two groups:

- 'Comparable' LHWs – those with at least three years' experience (that is, finished task-based training before 31 September 2005)
- Non-comparable LHWs – those with less than three years' experience (that is, finished task-based training after 31 September 2005).

In the current evaluation, estimates were generated for all LHWs and also for the 'comparable' LHWs only. In fact, with the exception of characteristics that are directly age-related (such as marital status and the length of time in post), there is usually little difference between the two groups, including for the knowledge and performance measures. For this reason, the 'comparable' LHW estimates are not presented in the main body of the report. However, where there are apparent differences these are noted in the text and, in addition, all 'comparable LHW' estimates are presented in Annex C for reference.

1.4 The analysis

The analysis provides a comprehensive picture of the functioning of the Programme. The report presents information on:

- LHWs' demographic and educational characteristics
- Their clinical knowledge
- The characteristics, knowledge, work patterns and supervision of LHSs
- The functioning of key Programme support services: training, administration, supervision and performance management, supplies, equipment and district-level management structures and systems
- Clinical support services provided at the LHWs' health facilities
- The time spent on their work, by activity
- The coverage of the Programme
- The number of clients registered and seen by LHWs
- LHWs' role in the provision of curative care
- The level of service provision by LHWs and the factors associated with high performance
- The type of households served by the Programme, and how they compare with the unserved population
- Differences in health indicators in the served and unserved populations
- Whether the Programme appears to have improved health indicators in the population that it serves.

In addition to the limitations that relate to the comparability between this survey and the 3rd Evaluation (described in the previous sub-section), it should be noted that the analysis of the programme impact is limited by the design of the study. As for the 3rd Evaluation, the evaluation was commissioned after the Programme began to operate, and it was clearly not possible to use a controlled trial to assess its impact on health indicators. In spite of this, it has been possible, using statistical techniques, to undertake a rigorous evaluation of the LHWP's impact. These techniques attempt to overcome the confounding factors that would undermine a simple, direct comparison of served and unserved households.

1.5 Report structure

This report is structured as follows:

Chapter 2 presents information on the inputs that enable the LHWP to deliver the services it provides: the characteristics and knowledge levels of the LHWs themselves; the medical supplies, equipment and clinical support services that are required by LHWs in order to do their job; and, finally, the support and monitoring they receive from LHSs and district-level management.

Chapter 3 focuses on the outputs of the Lady Health Worker Programme, assessing the Programme's coverage; the activities and workload of the LHWs; and the volume of preventative, promotive and curative services being provided to served households.

Chapter 4 builds on the description of outputs in Chapter 3, by summarising and explaining overall LHW performance, across the different areas of responsibility. LHW performance is measured in terms of how successfully the LHW is managing to make all the contacts required of her.

Chapter 5 describes the pattern of Programme expansion since 2000; it compares the socioeconomic status of households covered in the 2008 survey with the 3rd evaluation, and served and unserved households in the current survey.

Chapter 6 presents health measures for the served population in the 2008 survey and compares a selection of them with the 2000 survey.

Chapter 7 estimates the impact that the LHWP is having on a range of key health indicators through statistical analysis that allows for other differences between the served and unserved populations.

Chapter 8 sets out the key conclusions from the analysis.

2 Programme inputs

This chapter presents information on the core inputs required to deliver the services provided by the LHWP:

- The Lady Health Workers themselves
  - Social and demographic characteristics (Section 2.1)
  - Levels of knowledge and skills (Section 2.2)
- Management and supervision of LHWs
  - Training and remuneration (Section 2.3)
  - Supervision and performance management (Section 2.4)
  - Characteristics and workload of Lady Health Workers' Supervisors (Sections 2.5 and 2.6)
- District-level management structures (Section 2.7)
  - Supplies, equipment and clinical support services (Section 2.8)

The chapter focuses mainly on trends in these inputs between 2000 and 2008. Analysis was conducted for all LHWs, but also for a sub-set of LHWs that was most comparable to those surveyed in 2000. However, as differences were not substantial between the comparable group and all LHWs, the sub-group analysis has been placed in Annex C. Any differences that were noted are highlighted in this chapter.

2.1 Demographic and social characteristics of LHWs

This section describes a number of demographic and social characteristics of LHWs. The measures are presented in Table 2.1. Many of the characteristics of current LHWs are remarkably similar to those surveyed in 2000 in the 3rd Evaluation.

2.1.1 Age and marital status

LHWs should be aged between 20 and 50 at the time of recruitment, though 18- and 19-year-olds might be admitted if married. A very small fraction of LHWs did not meet these criteria, being under 20 and unmarried or over 50 years of age. LHWs are predominantly young women; 66 per cent are under 35 years of age. The majority of LHWs are currently married, as preferred by the Programme, although just over one quarter has never been married. Compared with 2000, the LHWs currently employed by the Programme are a little older and a little more likely to be married currently.

2.1.2 Residence

Almost all LHWs live in the village/mohalla in which they serve, as is specified by Programme standards. However, a small fraction of LHWs were non-residents (3 per cent). LHWs are very much part of the community they serve: over half of those resident in the community were born there, and over 89 per cent have been resident for more than five years.

2.1.3 Education

LHWs should be educated until at least the eighth class, though it is preferable for them to be matriculated. Based on LHW self-reporting, less than 1 per cent has received fewer than 8 years' of education, though 36 per cent reported receiving fewer than the ten years

required for matriculation. However, only around three quarters of LHWs could prove their education with a school certificate. Compared with 2000, a slightly higher proportion of LHWs have intermediate levels of education or above.

2.1.4 Other employment and access to mass media

The Programme discourages LHWs from taking another job and, in fact, only 4 per cent reported having other paid work. However, as will be shown later in this report, having a second job does not appear to have a significant negative impact on LHW performance.

Most LHWs have reasonably regular exposure to some form of mass media, either radio or television. Almost two thirds of LHWs reported watching television at least once a week, substantially higher than the proportion that reported listening to the radio. Exposure to both sources appears to be lower than it was in 2000, possibly due to the Programme expanding into more rural areas. Over three quarters of LHWs have access to a mobile phone, almost always shared with another person – usually, but not always, her husband.

2.1.5 Family planning and fertility desires

LHWs are very likely to have used family planning: over 70 per cent of married LHWs reported having used a modern method. This figure did not vary significantly between urban and rural areas. They also desire quite low family sizes: on average, LHWs would prefer a total of 3.1 children for themselves and believe that an average of 3.5 children is appropriate for the women in the population that they serve.

Table 2.1 LHW characteristics

Characteristics	**2000**	**2008 All LHWs**
Age distribution (%)		
15–19	1	1
20–24	20	13
25–29	41	25
30–34	15	27
35–39	10	16
40–44	11	9
45+	2	9
Mean age	29.6	32.4
Mean age when recruited	24.5	25.3
***Marital status* (%)**		
Never married	28	26
Currently married	62	66
Widow/divorced/separated	10	9
***Years LHW has resided in village/mohalla* (%)**:		
0–2	5	4
3–4	2	5
5–20	35	31
More than 20	5	8
Since birth	53	52
Mean years resided	–	21.78
***Educational level* (%)**		
Less than 8 years	2	1

Characteristics	2000	2008 All LHWs
8 or 9 years	38	36
Matriculated (10–11 years)	50	44
Intermediate (12–13 years)	9	15
Graduate (14+ years)	2	4
Mean education level (1–5)	–	9.94
With class certificate seen and confirmed (%)	76	77
Other characteristics		
LHWs who listen to radio at least once a week (%)	29	22
LHWs who watch TV at least once a week (%)	72	65
LHWs with another paid job (%)	15	4
Married LHWs who have ever used modern family planning (%)	71	72
LHWs have access to mobile phone (%)		75
LHWS share mobile phone with someone (%)		71
LHWs share mobile phone with husband (%)		45
LHWs share mobile phone with other family members (%)		53
LHWs share mobile phone with other (%)		2
Mean total number of children desired:		
For themselves (LHWs)	3.1	3.1
For women in village/mohalla	3.5	3.5

Notes: (1) Corresponds to Table 2.1 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.2 LHW knowledge and skills

During the interviews, LHWs were asked a number of questions testing their knowledge and skills in areas essential to their work. The questions covered a range of preventive and curative health care issues, hygiene and nutrition. They were also presented with a number of hypothetical case histories, where they were asked to identify the problem and to respond with the treatment and advice they would provide to the patient.

2.2.1 LHW responses to the knowledge questions

Table 2.2 shows the percentage of LHWs giving correct responses to a selection of questions on general health knowledge. It can be seen that:

- The level of general clinical knowledge is reasonably good and seems to have improved since the 3rd Evaluation. For most of the questions presented in Table 2.2, between 85 to 100 per cent of LHWs could give at least one correct answer. Nearly three quarters of LHWs questioned were able to name the four EPI vaccines, give the correct number of doses, and the correct age at which the doses are given. This compares with less than half in the 3rd Evaluation.
- However, some 5 to 15 per cent of LHWs were still unable to give even a single correct answer on some of the most basic areas of knowledge. LHWs' knowledge is sometimes rather shallow: the proportions that gave three correct answers were appreciably lower.
- There are also serious deficiencies in the ability of LHWs to provide the correct doses of medicines required in basic situations. Only 9 per cent of LHWs were able to state the correct dose of Chloroquine to give to a child, even though they were encouraged to use the Programme manual or medicine box to answer the question.

Table 2.2 LHWs giving correct answers: selected general health questions (%)

Measure	2000	2008 All LHWs
***Contraindications for the contraceptive pill* (%)**:		
LHW giving at least one correct answer	93	98
LHW giving three or more correct answers	50	55
***Contraindications for injectable contraceptives* (%)**:	n/a	97
LHW giving at least one correct answer	n/a	51
LHW giving three or more correct answers		
***Contraindications for the IUD* (%)**:		
LHW giving at least one correct answer	76	97
LHW giving three or more correct answers	5	11
***Breastfeeding and nutrition* (%)**:		
LHW stating that mothers should start breastfeeding within 4 hours of birth	98	97
LHW stating that weaning foods should be introduced at the age of 4-6 months	88	82
LHW stating that breastfeeding should be initiated immediately /within 30 minutes of birth	n/a	83
LHW stating that exclusive breastfeeding should continue till 6 months	n/a	93
LHW stating that semi solid food should start at 6 months	n/a	93
***EPI vaccination schedule* (%)**:		
LHW who could name all four vaccines (BCG, DPT, polio, measles)	94	94
LHW identifying all four vaccines and giving correct number of doses	73	91
LHW identifying all four vaccines and giving the number of doses and correct ages for each dose	43	72
***Diarrhoea* (%)**:		
LHW giving at least one correct answer to mother of child with diarrhoea and mild dehydration, if lacking packets of ORS	100	100
LHW giving three or more correct answers to mother of child with diarrhoea and mild dehydration, if lacking packets of ORS	58	57
LHW responding with SSS solution/rice water, give fluids or continue feeding	99	99
LHW giving at least one correct answer to mother of a child that will not take ORS	85	89
LHW giving three correct answers to mother of child that will not take ORS	20	21
LHW able to give at least one correct response on how to prevent diarrhoea	96	98
LHW able to give three or more correct responses on how to prevent diarrhoea	53	67
***Malaria* (%)**:		
LHW giving correct answer on how malaria is caught	92	99
LHW giving Chloroquine	56	73
LHW referring immediately or if the child doesn't improve	80	77
LHW giving correct dose of Chloroquine for a child referred to health facility	6	9
***HIV* (%)**:		
LHW giving at least one correct response on how HIV is transmitted	93	93
LHW giving three or more correct responses on how HIV is transmitted	20	77
***TB* (%)**:		

Measure	2000	2008 All LHWs
LHW giving at least one correct response on how to identify a TB patient	n/a	100.0
LHW giving three or more correct responses on how to identify a TB patient	n/a	91

Notes: (1) Corresponds to Table 2.2 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.3 shows the percentage of LHWs giving correct responses for a selection of case-based questions.

- Though there has been some improvement in the response to selected case-based questions since the 3rd Evaluation, the trends have been variable, and performance remains weak in some important areas. For many questions, some 20 to 30 per cent of LHWs did not give the correct answer, and for some questions the proportion was higher. Only around two thirds of LHWs identified life-threatening conditions such as severe dehydration or severe pneumonia. A somewhat higher proportion recognized that these cases needed to be referred to a health centre, though around 8 per cent did not.
- There were deficiencies in LHWs' ability to read and interpret child growth cards. Only about 35 per cent were able to state that a severely malnourished child was failing to gain weight. Many still did not know the correct doses for medicines that they administer.

Table 2.3 LHWs giving correct answers: case-based questions

Measure	2000	2008 All LHWs
Growth monitoring card		
Case 1: *Normal to moderate malnutrition*		
LHW giving correct weight of child	39	50
LHW saying that the child is normal or moderately malnourished	68	86
LHW stating that the child is growing adequately	68	71
LHW correctly stating that referral is not necessary	78	74
Case 2: *Severely malnourished*		
LHW giving correct weight of child	68	58
LHW saying that the child is severely malnourished	40	37
LHW stating that the child is failing to gain weight	30	35
LHW correctly stating that referral is necessary	68	62
LHW requesting information about eating and feeding practices	81	83
LHW requesting information about recent illnesses	62	58
LHW requesting information about eating and feeding practices, and recent illnesses	56	54
Diarrhoea/dehydration management		
Case 1: *Some dehydration*		
LHW stating that the child has some dehydration	75	73
LHW stating that the child should be rehydrated (ORS or SSS)	84	82
LHW stating that the child should be breastfed more often	77	81
LHW stating that the child should be rehydrated (ORS/SSS) or breastfed more often	94	96
LHW stating that the child should be brought back soon for reassessment	1	1
LHW stating that the parents should seek help soon if the child does not	9	9

Measure	2000	2008 All LHWs
improve		
LHW correctly stating that referral is not necessary	38	31
Case 2: *Severe dehydration*		
LHW stating that the child is severely dehydrated	65	64
LHW stating that the child should be rehydrated (ORS or SSS) or breastfed more often	86	87
LHW stating that the child should be rehydrated (ORS or SSS) or breastfed more often and referred to a health centre	58	80
LHW stating that the child should be referred to a health centre	84	93
Respiratory infections		
Case 1: *Severe pneumonia*		
LHW identifying severe/very severe pneumonia	71	63
LHW stating that the child should be referred to a health centre	89	92
LHW stating that the child should be given antibiotics	84	87
LHW stating that the child should be given a single dose of antibiotics and referred	74	76
Case 2: *Pneumonia*		
LHW identifying pneumonia	21	20
LHW stating that they would give antibiotics	85	88
LHW stating that the child should be given fluids or breastfed more often	42	58
LHW stating that the child should be watched for danger signs	6	8
LHW stating that they would give a full course of Cotrimoxazole (of *all* LHWs)	62	67
LHW stating correct dose and duration of Cotrimoxazole course (of those who would give a full course)	23	24
Pregnancy		
Case 1: *Anaemia*		
LHW identifying anaemia	93	97
LHW stating that they would examine the patient's conjunctiva/eye for anaemia	77	92
LHW stating that they would examine the patient's conjunctiva/eye for anaemia, ask about the patient's diet and ask about recent illnesses	16	24
LHW stating that they would give iron tablets (Fefan)	80	87
LHW stating that they would advise the patient to eat foods containing iron	78	80
LHW stating that they would advise the patient to avoid heavy work and to rest	15	19
Case 2: *Pre-eclampsia*		
LHW stating that they would refer to a health centre and that it would be urgent	61	73

Notes: (1) Corresponds to Table 2.3 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Overall, the lack of knowledge of a minority of LHWs is still a concern. While the general improvements since 2000 are encouraging, there is an ongoing need to continue improving knowledge and addressing the critical gaps in LHWs' knowledge where relevant.[8]

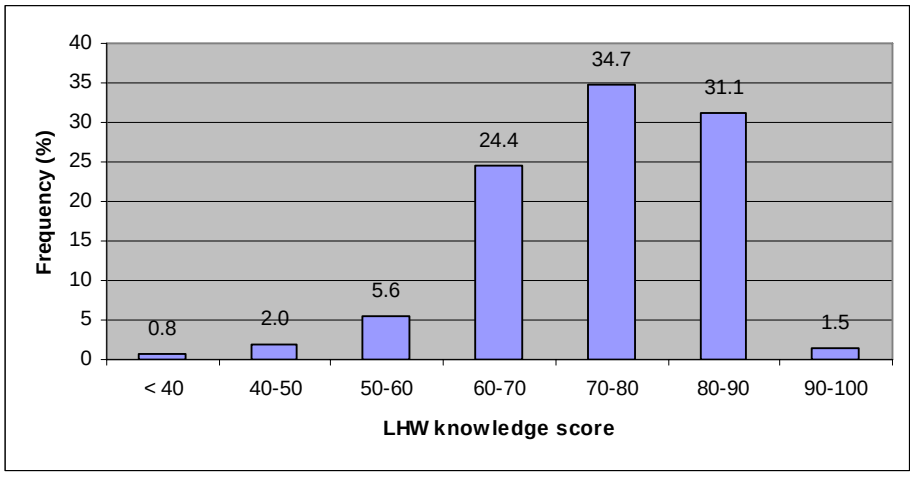
8 Some differences were noted in knowledge between all and 'comparable' LHWs. Comparable LHWs had similar knowledge levels overall, but were more likely to give three or more correct answers regarding contraindications to contraceptive use, and showed consistently better knowledge on indicators for EPI, malaria, HIV and TB.

2.2.2 Summarising LHW knowledge levels

A composite knowledge score was created by assigning points for specific questions that LHWs answered correctly. The total score includes 55 items, taken from both the general and case-based sections. The details of how the score is constructed are given in the Annex. It differentiates LHWs with a greater depth of knowledge by assigning, for questions with multiple possible responses, one point if an LHW was able to provide one correct response and a further point if she was able to provide 3 or more correct responses. The score achieved was divided by the highest possible score to give a percentage of the potential maximum. Note that the additional aspects of LHW knowledge presented in Annex D were not included in the knowledge score to ensure comparability with the 3rd Evaluation.

The overall mean score was 74 per cent, an improvement on the mean score of 69 in 2000. There was some variation in the score between LHWs, although some 90 per cent of LHWs scored between 60 and 90 per cent of the possible total. Around 8 per cent of LHWs scored below 60 per cent; fewer than 3 per cent of LHWs scored less than 50 per cent. There was little difference between the scores of LHWs in urban and rural areas.

Figure 2.1 Distribution of LHW knowledge score



Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Looking at the variation across provinces, the mean score is highest in NWFP. As was the case in 3rd Evaluation, LHWs in Balochistan again had consistently lower scores than their counterparts in other areas, with a mean score 10 percentage points below the overall mean (Table 2.4).

Table 2.4 Mean LHW knowledge score by province

Stratum	2000	2008 All LHWs
Punjab and ICT	70	73**
Sindh	71	74**
NWFP	67	78***
Balochistan	60	64
AJK / FANA	69	77***
Overall	69	74***

Notes: (1) Corresponds to Table 2.4 in 3rd Evaluation. (2) For year 2000 estimates for Balochistan and AJK/FANA are based on less than 100 observations (67 and 68 LHWs respectively). (3) Significance Tests have been performed on the differences between the 2000 and 2008 scores. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.2.3 Explaining LHW knowledge levels

Regressions methods were used to evaluate which factors show the strongest relationship with LHW knowledge, taking into account the effect of other variables.[9] The LHW knowledge score was used as the dependent variable, with a wide range of factors that could have an effect on LHW performance considered as possible explanatory factors. The potential explanatory factors can be split into various groups: LHW characteristics; the characteristics of the LHW's supervisor, the characteristics of the community served by the LHW, and district-level factors. A detailed list of the range of measures used as potential explanatory factors for the model can be found in Annex E.

Table 2.5 shows the coefficients and significance level for the preferred specification model. The model only includes explanatory factors that are found to be significant at the 90 per cent level. Coefficients show the impact of the explanatory factors on LHW knowledge levels, taking into account the effect of other factors. A factor with a positive coefficient is positively associated with LHW performance, with the opposite being true of those with a negative sign.

Potential explanatory factors of LHW knowledge scores that were found to be statistically *insignificant* include:

- Attendance at Counselling Cards, Child Health, Injectable Contraceptives, Revised MIS Tools and/or OBSI refresher training courses and possession of refresher training manuals (other than the Counselling Cards manual)
- Total number of Refresher Training courses attended in past year
- LHW's age
- Whether the LHW was previously a VBFPW, CHW or NCHD LHW
- LHW performance score (see Chapter 4 for details of how this was constructed)
- Number of LHWs reporting to the LHS
- Last meeting with LHS was within the last month
- LHS used her checklist at the last meeting
- Whether LHW receives continuing education at the monthly meeting.

9 Linear regression models were used. Initially a stepwise regression approach was taken to identify a preliminary set of key explanatory variables. This 'baseline' specification was then refined, with some explanatory variables re-specified and certain factors considered important *a priori* added back into the specification, and then tested back down to deliver a tight specification with a high R-squared value. Standard errors were estimated allowing for sample clustering by district (see Annex A for details of the sampling strategy). The variables found to be significant in the final specification are robust in the sense that their coefficients remain significant and of the same sign when other variables are added or removed from the specification.

Table 2.5 Factors associated with LHW knowledge levels

Explanatory variable	Regression results Regression Coefficient
LHW characteristics:	
LHW is currently married	2.08**
LHW's household's main source of income is agricultural wage earnings	-4.38**
LHW has passed matriculation level education or higher	2.71***
LHW has Counselling Cards refresher training manual	6.37***
LHW attended additional training course: Food and nutrition	2.76**
LHW received continuing education training at last monthly meeting	2.34***
LHW has produced monthly plan for current month	5.60***
LHW's experience (months in post)	0.03***
Characteristics of LHW's supervisor:	
LHS's knowledge score	0.09**
Characteristics of the community served by the LHW:	
Poor roads into the community	-3.50**
District-level factors:	
Each served health facility has individual with overall responsibility for LHWP and regular meetings held with DPIU	3.16**
NWFP dummy	1.73***
AJK dummy	1.59***
ICT dummy	1.12***
Constant	47.50***

Notes: (1) R-squared = 0.3261; 554 observations. (2) Standard errors calculated allowing for sample clustering. (3) Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The results show that LHWs who are more experienced and/or more educated tend to have higher knowledge scores. The knowledge score increases by 3.6 percentage points with every additional 10 years' experience. LHWs that are currently married will, all other matters being equal, have higher knowledge scores. A possible interpretation of this is that married LHWs are more likely to have gathered knowledge and skills from personal experience, particularly with regard to family planning practices, and child and maternal health.

Knowledge scores are considerably lower amongst LHWs whose household's main source of income is agricultural wage earnings, suggesting that LHWs from poorer households will have lower knowledge levels. This is also suggested by the finding that LHWs serving communities with poor road access have lower knowledge levels.

Refresher training does not appear to have had an effect on LHW knowledge levels in general, although those LHWs with a Counselling Cards refresher training manual (received during refresher training) do have considerably higher knowledge scores. Knowledge levels are higher for LHWs who received continuing education training at the last monthly meeting at the health facility, and also for those who have attended additional food and nutrition training in the past year, perhaps because this is an area of particular weakness. LHWs that

produced a monthly plan for the previous month tend to have much higher knowledge scores.

In terms of the impact of LHS and DPIU supervision and support, it appears that those LHWs with more knowledgeable supervisors have higher knowledge scores, although the extent of LHS support does not seem to affect knowledge scores. Furthermore, LHWs in districts where all served facilities have a specific person with responsibility for overseeing LHWP activities also have higher knowledge scores.

These results have some clear policy implications for the Programme. Specifically, efforts should be made to:

- Retain experienced LHWs;
- Strive to ensure new LHW recruits have high levels of education. Since this is often at odds with efforts to increase coverage (remaining unserved areas tend to have fewer educated women), this might require innovative approaches;
- Maintain and improve the frequency and quality of refresher training courses. Current training courses should be reviewed to ensure they focus on areas where LHW knowledge is weakest (for example, growth monitoring, diarrhoea treatment, pneumonia);
- Make efforts to monitor and maintain the LHWs' supervisors knowledge levels. Section 2.5 shows that LHSs who are older, more experienced and received all the required training tend to have higher knowledge levels; and
- Ensure all served health facilities have an individual person with overall responsibility for overseeing LHWP activities, and that, within each district, regular meetings are held between these individual persons and the DPIU.

2.3 LHW training and remuneration

2.3.1 Training

LHWs are expected to undertake three months of full time basic training at their health facility. This is followed by 12 months' task-based (in service) training, which is supposed to be provided by the health facility for one full week per month over 12 months. In practice, training patterns have varied between provinces, with some areas providing task-based training for a longer period than 12 months, sometimes for fewer days per month.

Table 2.6 shows the LHWs' experience of training and illustrates several important points. All LHWs have received the full-time 3-month basic training course and 95 per cent have received at least some in-service training.

Table 2.6 Training of LHWs

Measure	2000	2008 All LHWs
Proportion of LHWs who received initial (basic) training:	100	100
Duration of initial training		
Fewer than two months	0	0
Two months	1	0
Three months	94	94
More than three months	5	6
Total	100	100
Mean number of months of initial training	3.1	3.1

Training was imparted by:[2]		
Medical doctor (male)	87	88
Medical doctor (female)	20	18
Lady health visitor	70	67
Dispenser	48	25
Male medical health technician	20	17
Female medical health technician	8	5
Others	3	8
LHW training was given by any female trainers:		
At least one female trainer	n/a	82
Percentage of LHWs who attended task-based training of one week per month:	94	95
Mean months of part-time training attended	12.4	11.6
Percentage of LHWs who received refresher/additional training courses in the past year:		
Any additional training (including refreshers)	95	97
Any refresher training courses (counselling cards; child health; injection contraceptives; revised MIS manuals; OBSi)	n/a	96
Mean number of refresher trainings attended	n/a	3

Notes: (1) Corresponds to Table 6.1in 3rd Evaluation. (2) LHWs listed all staff members who gave training and the panel sums to over 100 per cent because of multiple responses.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The health facility staff who most usually provide training are male doctors, lady health visitors and dispensers. LHWs are less likely to have received training from dispensers in 2000, presumably representing a focusing of recent training onto more qualified medical staff.

In recent years, the LHWP has put a lot of effort into providing additional refresher training courses. Table 2.7 shows, for each of the five training areas, the proportion of LHWs that attended refresher training and who have the refresher training manual. Note that the manual is only distributed at the training sessions. Some LHWs have a manual, but reported not having attended refresher training in the past year. This means they are likely to have attended training prior to the previous 12 months.

Although the vast majority of LHWs have received at least one refresher training session in the last year (most frequently Counselling Cards or Child Health courses), Table 2.7 shows that, for each of the five courses, there are some LHWs who have not had each specific refresher training course, either in the last year or prior to that.

It should be noted that despite the high levels of training being provided, as noted previously, there are still some gaps in LHWs' knowledge.

Table 2.7 LHW refresher training

Proportion of LHWs (%)	Counselling cards	Child health	Injectable contraceptives	Revised MIS tools	OBSI
Attended training in past year and had manual	62	74	56	32	61
Attended training in past year and no manual	10	6	6	12	9
No training in past year but had manual	23	16	27	32	21
No training in past year and no manual	5	5	11	24	9

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.3.2 Remuneration

LHW salaries are supposed to be paid monthly, with payment directly into the LHW's own bank account. The survey revealed serious problems in the operation of the salary payments system. However, as discussed in the Systems Review, it should be noted that, at the time of the survey, the LHWP was in an unusually difficult financial position, and it is observed that the system has reportedly recently improved. Nevertheless, this finding represents a serious concern, since it is likely to de-motivate staff.

Compared with the 3rd Evaluation, there appear to have been both negative and positive trends. As can be seen in Table 2.8, more LHWs had not been paid within the past month; but, on the other hand, there are fewer LHWs who have to wait extreme lengths of time for pay (that is, up to four months or more). It is still worrying that salary payments continue to be delayed so often. Similarly, although there has been an improvement in terms of fewer LHWs receiving less salary than expected, the fact that this is still a problem for some LHWs is a cause for concern.

Table 2.8 LHW remuneration

Measure	2000	2008
Distribution of time since LHW last received her salary:		
Within last month (last 31 days)	32	21
32 to 62 days ago	16	45
63 to 93 days ago	18	21
Over 94 days ago	34	10
Never	–	2
Do not know	–-	2
Receiving less salary than expected (%)	20	11

Notes: (1) Corresponds to part of Table 6.2 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.4 LHW supervision and performance management

2.4.1 Supervision

Adequate supervision is one of the key building blocks for a successful community health care programme. Programme norms state that every LHW should have at least one supervisory meeting each month in the community where she lives and works. As part of the supervision process, the supervisor should ideally meet with client households, both with the LHW and independently of the LHW. In addition, the LHW should attend monthly meetings at

the health facility. These meetings provide an opportunity to review the past month's work and plan work for the following month.

Table 2.9 shows what LHWs report about their experience of supervision. It can be seen that:

- The level of supervision is reasonably high, with 80 per cent of LHWs reporting having had a supervision meeting in the last 30 days, and a higher proportion still having at least met with their supervisor in the last month
- A high proportion of supervision meetings are held in the community where the LHW serves; in over half of all these meetings, LHWs said that their supervisors went with her to meet her clients
- The vast majority of LHWs have had a monthly meeting at their health facility during the last month, and almost all LHWs had attended a monthly meeting in the last two months
- Most LHWs could show the interviewer a report for the previous month; over 80 per cent could show a work plan for the current month.

Overall, there has been an improvement in the level of supervision since the 3rd Evaluation. Although a modest fraction of LHWs had not seen their supervisor within the last 30 days, only 2.5 per cent said they did not have a supervisor at all, compared with 7 per cent in the 3rd Evaluation.

Table 2.9 Levels of supervision

Measure	2000	2008 All LHWs
Percentage of LHWs who met their supervisor during the last:		
30 days	81	84
31–60 days	6	10
More than 60 days	7	3
No supervisor	7	3
Total	100	100
Distribution of time since LHW last had a supervision meeting with their supervisor:		
30 days	70	78
31–60 days	12	13
More than 60 days	10	5
Never had a meeting	1	1
No supervisor	7	3
Total	100	100
Percentage of LHWs who have had a supervision meeting in the village served (of those who had a meeting in the last 60 days):	96	90
Of meetings held in the village served, % where supervisor visited some of the served households with the LHW	53	59
Of meetings held in the village served, % where supervisor visited some of the served households without the LHW	28	39
Percentage of LHWs who have had a monthly meeting at the health facility within:		
Last 30 days	85	91
31–60 days	8	7
More than 60 days	5	2

Measure	2000	2008 All LHWs
Never attended	2	0.4
Total	100	100
Percentage of LHWs who had produced and could show a work plan for the current month:		
Produced	70	86
Produced and seen	67	84
Percentage of LHWs who had produced and could show a report for the previous month:		
Produced	98	98
Produced and seen	84	89

Notes: (1) Corresponds to Table 6.2 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

In the current evaluation, LHWs were also asked about their experiences during the actual supervision meeting. Over three-quarters of LHWs mentioned that their supervisors used a checklist during her meeting (Table 2.10).

In the LHW supervision meetings, the LHS is supposed to give the LHW a performance score and record it. If the score is below 60, this triggers actions. Only one third of all LHWs reported that their supervisors had informed them of their performance score. Less than one tenth scored below 60.

Table 2.10 Supervision meetings

	2008 All LHWs
LHWs mentioned that LHS used checklist during her meeting with LHS (%):	78
LHW was informed about her performance score:	
By writing in diary	28
Verbally	11
No	61
LHS performance score of LHWs:	
Below 60	7
60–79	45
80 and more	48
Total	100
LHWs reported their score was ever registered by LHS during January to June 2008 (%):	31
LHWs reported that they had ever been told by LHS that their score was low (%) (<60%):	5

Notes: (1) Corresponds to Table 6.2 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The LHSs were also asked the same questions about their experiences during the actual supervision meetings. Over four fifths of the LHSs reported using a checklist during the meeting (Table 2.11). This is a higher proportion than reported by the LHWs.

Nearly one quarter stated that at least one LHW had a performance score of less than 60 for three consecutive months in the last 12 months. In such cases, most LHSs (87 per cent)

discussed the issue personally with the LHW, around three quarters were reported to the District Coordinator (DC) or Assistant District Coordinator (ADC), and three quarters were subsequently supervised more closely.

Table 2.11 Use of checklist and performance score by LHS

Measure	2008
LHSs using her checklist during her meeting with LHW (%):	83
LHSs reporting that at least one of her LHWs had a performance score of less than 60 for three consecutive months during last 12 months (%):	24
Action taken if there was any LHW who scored less than 60 for 3 consecutive months (%):	
Discussed the case with DC/ADC	74
Discussed the case with FPO	35
Referred the LHW to DC/ADC	47
Referred the LHW to FPO	9
Discussed personally with LHW	86
Closer supervision of LHW	76
On-the-job training for the LHW	31
Sent back to initial training	8
Sent to additional session of refresher training	23
Sent to additional session of other training	13
Nothing	3
LHSs reporting that at least one of her LHWs had a performance score of less than 60 in at least one month in the past year (%):	32
Action taken if there was any LHW whose scored less than 60 in at least one month (%):	
Discussed the case with DC/ADC	53
Discussed the case with FPO	27
Referred the LHW to DC/ADC	9
Referred the LHW to FPO	9
Discussed personally with LHW	85
Closer supervision of LHW	81
On the job training to the LHW	35
Sent back to initial training	7
Sent to additional session of refresher training	20
Sent to additional session of other training	9
Nothing	5
LHSs definition of a non-performing LHW (%):[1]	
Performance score lower than 60	23
Performance score lower than 60 for 3 consecutive months	11
Not visiting households	90
Not attending LHWs' monthly meetings	36
Not recording and updating MIS information	59

Notes: (1) Multiple definitions were allowed, therefore the proportions do not sum to 100 per cent.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.5 LHS characteristics, knowledge and skills

2.5.1 Age and educational qualifications of the LHSs

One third of supervisors are in their twenties (Table 2.12). The programme standard is that they should be aged 22–45 at the age of recruitment. At the time of the survey, 0.4 per cent of the LHS are below the age of 22; while 3.9 per cent are above 45 years of age. Whilst the selection criteria for supervisors require at least an intermediate Class 12 pass, in practice most supervisors are considerably better qualified. Almost two thirds of the supervisors in 2008 have graduated or completed higher degrees.

Table 2.12 Age, education and marital status of LHSs

Measure	2000	2008
Age distribution of supervisor:		
20–24 years	27	6
25–29 years	50	27
30–34 years	16	34
35–39 years	4	23
40 years and above	4	10
Total	100	100
Mean age of the supervisor	28	32.5
Mean age at recruitment	25	27.0
Education:		
Matriculated	4	0
Intermediate	41	34
Graduate	39	44
Post-graduate	15	22
Total	100	100
Marital status:		
Never married	46	28
Currently married	52	69
Widow/divorced/separated	2	4
Total	100	100

Notes: (1) Corresponds to Table 6.5 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The LHSs employed by the programme in 2008 are appreciably older, more educated and less likely to be unmarried than were the supervisors employed in 2000. This seems likely to increase their capacity for supervision. In comparison with the LHWs that they supervise, LHSs are much more educated and more likely to be married (see Table 2.12).

2.5.2 LHS training

LHSs receive three months' full-time basic training at the District Health Office. Prior to 2005, this was followed by two weeks' class-based training per month for three months, decreasing to one week's class-based training per month for the next six months. In 2005, this changed to one week's class-based training per month, running for nine months. Additional training can be provided through specialist short courses that either reinforce the basic training course or cover new areas. Training can also be provided by the supervisor in one-to-one monthly supervisory meetings.

Table 2.13 LHS training

Measure	2000	2008
Percentage of supervisors who had initial (3 months') training:	96	100
Duration of initial training:		
Less than two months	1	0.2
Two months	32	20
Three months	48	70
More than three months	19	9
Total	100	100
Mean length of initial training (months)	3.5	3.0
Initial training was imparted by: (1)		
Medical doctor (male)	94	85
Medical doctor (female)	59	42
Field Programme Officer	16	4
Lady health visitor	47	53
Dispenser	5	6
Male medical health technician	3	10
Female medical health technician	9	4
Others	20	26
Supervisors received (%):		
All expected training (initial and task-based)	76	76
Initial and one of the part time training periods	14	8
Only initial training	7	16
None	4	1
Total	100	100
Received any additional training (%)	83	79

Notes: (1) Corresponds to Table 6.12 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.13 shows the supervisors' experience of training and illustrates several important points:

- Almost all supervisors said that they had received the initial full-time training for at least two months; many had received it for longer
- The main providers of training are male and female doctors and Lady Health Visitors (LHVs), meaning that supervisors receive training from appreciably better qualified staff than the LHWs
- Most supervisors had also received the in-service training sessions of two weeks and one week per month
- Three quarters of supervisors have received all types of training that they are supposed to (though not necessarily for the full duration), and less than 1 per cent did not receive any training at all
- About 79 per cent of supervisors have received some type of additional training. This has declined somewhat from 83 per cent in 2000.

2.5.3 Supervisors' knowledge and skills

During the interviews, supervisors were asked a number of questions testing their knowledge and skills in areas necessary to their work. These were the same questions that the LHWs were asked in their interviews. They covered a range of preventive and curative health care issues, hygiene and nutrition. They were also presented with a number of hypothetical case

histories: they were asked to identify the problem and to respond with the treatment or advice they would provide the patient.

Tables 2.14 and 2.15 show the percentage of supervisors providing the correct responses for each set of questions. It can be seen that:

- Unsurprisingly, supervisors' knowledge levels are generally high. A higher proportion of supervisors give one correct answer than LHWs; they are also more likely to be able to give three correct answers, showing a greater depth of knowledge. Supervisors prove themselves to have a substantially better understanding of growth monitoring than the LHWs.
- Supervisors were less successful on the case histories than on the general knowledge questions; for many of the case history questions, an appreciable minority of supervisors did not give the correct answer.
- Particularly worrying is the lack of knowledge displayed by LHSs in regard to assessing and treating children for pneumonia.
- In some areas, there seems to have been a decline in the knowledge levels of LHSs since the last survey, notably for some of the case-based questions. Whilst nearly all LHSs could say whether a child was severely malnourished in the 3rd Evaluation, only 48 per cent could in this current survey.

Table 2.14 LHSs giving correct answers: selected general health questions (%)

Measure	2000	2008
Contraindications for the contraceptive pill:		
LHS giving at least one correct answer	100	99
LHS giving three or more correct answers	88	66
Contraindications for the injectables:		
LHS giving at least one correct answer	n/a	97
LHS giving three or more correct answers	n/a	55
Contraindications for the IUD:		
LHS giving at least one correct answer	98	95
LHS giving three or more correct answers	36	17
Breastfeeding and nutrition:		
LHS stating that mothers should start breastfeeding within 4 hours of birth	100	99
LHS stating that weaning foods should be introduced at the age of 4–6 months	98	84
EPI vaccination schedule:		
LHS who could name all four vaccines (BCG, DPT, polio, measles)	98	99
LHS identifying all four vaccines and giving correct number of doses	83	93
LHS identifying all four vaccines and giving the number of doses and correct ages for each dose	59	76
Diarrhoea:		
LHS giving at least one correct answer to mother of child with diarrhoea and mild dehydration, if lacking packets of ORS	100	100
LHS giving three or more correct answers to mother of child with diarrhoea and mild dehydration, if lacking packets of ORS	81	67
LHS giving at least one correct answer to mother of a child that will not take ORS	100	94
LHS giving three correct answers to mother of child that will not take ORS	38	30
LHS able to give at least one correct response on how to prevent diarrhoea	100	100
LHS able to give three or more correct responses on how to prevent diarrhoea	78	80
Malaria:		
LHS giving correct answer on how malaria is caught	97	99
LHS saying that they would give Chloroquine	61	73
LHS saying that they would refer to a health facility	88	78

Measure	2000	2008
LHS giving correct dose of Chloroquine	10	7
HIV:		
LHS giving at least one correct response on how HIV is transmitted	100	100
LHS giving three or more correct responses on how HIV is transmitted	70	91
TB:		
LHS giving at least one correct response on how to suspect a TB patient	n/a	100
LHS giving three or more correct responses on how to suspect a TB patient	n/a	96

Notes: (1) Corresponds to Table 6.14 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.15 LHSs giving correct answers: case-based questions (%)

Measure	2000	2008
Growth monitoring card:		
Case 1: *Normal to moderate malnutrition*		
LHS giving correct weight of child	75	63
LHS saying that the child is normal to moderately malnourished	64	95
LHS stating that the child is growing adequately	76	69
LHS correctly stating that referral is not necessary	86	79
Case 2: *Severely malnourished*		
LHS giving correct weight of child	79	75
LHS saying that the child is severely malnourished	93	48
LHS stating that the child is failing to gain weight	50	33
LHS correctly stating that referral is necessary	75	70
LHS requesting information about eating and feeding practices	90	95
LHS requesting information about recent illnesses	73	61
LHS requesting information about eating and feeding practices, and recent illnesses	69	60
Diarrhoea/dehydration management:		
Case 1: *Some dehydration*		
LHS stating that the child is experiencing some dehydration	88	83
LHS stating that the child should be rehydrated (ORS or SSS)	83	80
LHS stating that the child should be breastfed more often	84	84
LHS stating that the child should be rehydrated (ORS or SSS) or breastfed more often	98	96
LHS stating that the child should be brought back soon for reassessment	8	3
LHS stating that the parents should seek help soon if the child does not improve	15	11
LHS correctly stating that referral is not necessary	53	39
Case 2: *Severe dehydration*		
LHS stating that the child is severely dehydrated	63	70
LHS stating that the child should be rehydrated (ORS or SSS) or breastfed more often	76	87
LHS stating that the child should be referred to a health centre	84	98
Respiratory Infections:		
Case 1: *Severe pneumonia*		
LHS identifying severe/very severe pneumonia	68	68
LHS stating that the child should be referred to a health centre	85	91
LHS stating that the child should be given antibiotics	87	88
LHS stating that the child should be given a single dose of antibiotics and referred	75	80
Case 2: *Pneumonia*		
LHS identifying pneumonia	28	31
LHS stating that they would give antibiotics	77	87
LHS stating that the child should be rehydrated or breastfed more often	51	63
LHS stating that the child should be watched for danger signs	11	10

Measure	2000	2008
LHS who would give a full course of Cotrimoxazole (of *all* supervisors)	50	65
LHS stating correct dose and duration of Cotrimoxazole course (of those who would give a full course)	31	34
Pregnancy:		
Case 1: *Anaemia*		
LHS identifying anaemia	91	99
LHS stating that they would examine the patient's conjunctiva/eye for anaemia	82	96
LHS stating that they would examine the patient's conjunctiva/eye for anaemia, ask about the patient's diet, and ask about recent illnesses	19	25
LHS stating that they would give iron tablets (Fefan)	72	89
LHS stating that they would advise the patient to eat foods containing iron	87	83
LHS stating that they would advise the patient to avoid heavy work and to rest	18	18
Case 2: *Pre-eclampsia*		
LHS stating that they would refer to a health centre and that the referral would be urgent	61	78

Notes: (1) Corresponds to Table 6.15 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

A summary knowledge score index was constructed for the LHW supervisors' responses in the same way as for the LHWs' (see Section 2.2). The mean score for supervisors was 78 per cent (Table 2.16); higher than the LHW current mean score of 74, and also higher than the LHS score for 2000 of 74.

Table 2.16 LHSs' knowledge score

Measure	2000	2008
Distribution of score:		
Up to 50	3	1
51–60	2	4
61–70	23	9
71–80	45	42
81–90	27	40
Over 90	0	4
Total	100	100
Mean score	74	78*

Notes: (1)* denotes that difference between mean scores 2000–2008 is significant at the 5 per cent level (2) Corresponds to Table 6.16 in the 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.17 shows the LHSs' mean knowledge score disaggregated according to various measures. The estimates presented in the table show that knowledge scores tend to rise with age, duration of service, and amount of training received. The Programme should therefore ensure that all LHSs receive all the required training, and that efforts are made to retain experienced LHSs.

Table 2.17 Mean LHS knowledge score by age, service duration and training received

Measure	Mean score	
	2000	2008
Age group:		
20–24	71	77
25–29	75	76
30–34	74	78
35–39	75	78
40 and above	70	81
Duration of service:		
Under one year	67	68
1–2 years	70	75
2–3 years	73	76
More than 3 years	75	80
Training received:		
All required training	75	79
Initial and one of part times	74	76
Only initial	65	73
None(2)	68	64

Notes: (1) Corresponds to Table 6.17 in 3rd Evaluation. (2) Mean score (2008) for those LHSs that received no training is based on very few observations.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.6 LHS workload, working patterns and support

2.6.1 Supervisors' working patterns

On average, supervisors are working 24 days a month (Table 2.18), a slight increase compared with 2000. Well over three quarters reported working a full month and only 8 per cent worked for 14 days or fewer. Leave and sickness were often given as a reason for not working a full month, showing a very large increase since 2000. Some 7 per cent said that it was due to problems with vehicles, POL or drivers – a topic examined in greater detail below.

Table 2.18 Working patterns of LHSs during the preceding month

Measure	2000	2008
Number of days supervisor worked last month:		
0–7 days	3	3
8–14 days	6	5
15–23 days	36	6
24 or more days	55	86
Total	100	100
Mean number of days worked last month	22	23.9
Reasons for not working for a full month:		
Taking leave or sickness	29	65
Work completed/not enough to do	9	10
No fuel for vehicle or vehicle broken down	13	5
Driver not available	4	2
Others	47	19
Total	100	100

Notes: (1) Corresponds to Table 6.2 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

There is a substantial increase in the reported hours worked since 2000, with 16 per cent of supervisors working fewer than 15 hours in the week preceding the survey, compared with 27 per cent in 2000.

Table 2.19 Distribution of total number of hours worked last week by LHSs

Number of hours	Supervisors (%)	
	2000	2008
0	8	4
1–4	1	2
5–9	8	4
10–14	10	6
15–19	10	7
20–24	14	12
25–35	23	19
More than 35	25	46
Total	100	100

Notes: (1) Corresponds to Table 6.8 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.6.2 Supervisors' workload

The ratio of supervisors to LHWs should be 1:25; however, based on the needs of the Programme and terrain of the area, this ratio might be reduced to 1:20. On average, they currently supervise 23 LHWs. The average number supervised has declined since the 3rd Evaluation. Accordingly, supervisory responsibilities have become better spread across supervisors. Less than one tenth of supervisors now have responsibility for more than 30 LHWs, and only 1 per cent per cent have to cover LHWs attached to four or more FLCFs. This reduced burden would be expected to improve the capacity for adequate supervision.

Table 2.20 Number of LHWs assigned per supervisor

Measure	2000	2008
Number of LHWs assigned for supervision:		
Up to 10	3	2
11–20	17	39
21–30	49	50
31–40	25	6
More than 40 LHWs	6	4
Total	100	100
Mean number of LHWs currently supervised by each supervisor	27	23
Mean distance to the furthest LHW supervised (km)	26	23
Percentage of the LHS vehicles parked at the FLCF	n/a	63
Number of FLCFs to which supervised LHWs are attached:		
One	31	50
Two	28	44
Three	25	5
Four	11	1
Five or more FLCFs	7	0.4

Notes: (1) Corresponds to Table 6.6 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The average distance from the supervisor's home to the furthest LHW supervised is 23 km, while the mean distance between a selected facility and LHS residence is 6 km (Table 2.21). The importance of adequate transport to the supervisors' places of work is clear. Programme policy is to leave the vehicle at the facility, unless there is no chowkidar at the facility level.

Table 2.21 Distances travelled by the LHS

Distances travelled	Kilometres
Mean distance between the selected facility and LHS residence	6
Mean distance between the selected facility and furthest LHW	20
Mean distance between LHS residence and furthest LHW	23

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

On average, LHSs reported making 30 visits to LHWs in the month preceding the survey, visiting an average of 20 LHWs, slightly lower than in 2000. The percentage of LHWs who were visited by their supervisor at least once in the preceding month has increased appreciably since 2000, and the number of visits per FLCF has increased – both presumably reflecting the reduction in the proportion of supervisors that have to cover large numbers of each.

Table 2.22 Supervisory visits undertaken by supervisors

Measure	2000	2008
Mean number of visits made to LHWs	31.0	29.6
Mean number of LHWs visited last month	22.0	20.4
Mean number of visits per LHW supervised	1.4	1.5
Percentage of LHWs visited by supervisor at least once	83.0	91.3
Mean number of FLCFs visited last month	2.3	1.6
Mean number of visits made to FLCFs	7.7	9.6
Mean number of visits per FLCF	3.3	7.0

Notes: (1) Corresponds to Table 6.9 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.6.3 Supervisors' transport

Supervisors' access to a vehicle has increased substantially since 2000, with 60 per cent now reporting full-time access in the month prior to the survey (Table 2.23). Their dependence on public transport has declined appreciably. These are important improvements to the supervision system. However, still not all supervisors are receiving the required petrol, oil and lubricants (POL) allowance.

Table 2.23 LHSs' access to Programme vehicles and POL received

Measure	2000	2008
Supervisor's usual access to a programme vehicle:		
Usually or always available	64	72
Sometimes available	11	6
Never	25	22
Total	100	100
Access to vehicle in month preceding the survey:		

Measure	2000	2008
Full time	37	60
Part time	26	17
None	37	23
Total	100	100
Supervisors having a monthly POL budget (%):	71	77
Supervisors receiving any POL allowance in previous month (% of all):	35	58
Supervisors who used public transport during last month:	48	20

Notes: (1) Corresponds to Table 6.10 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.24 elaborates on the type of transport used by LHSs who do not have full access to programme vehicles. About 45 per cent of LHSs use public transport, and a similar proportion also use their own family vehicles. Nearly all (99 per cent) LHSs reported to have paid the transport from their own money, and only two thirds reported that they expect to be reimbursed. The lack of access to Programme vehicles, and the fact that around one third of LHSs are not expecting to be reimbursed their transport costs, is likely to reduce the effectiveness of supervision

Table 2.24 LHS transport

Measure	2008
Type of transport used by those LHS who do not have full access to Programme vehicle:	
Public transport	45
Bicycle/on foot	12
Own/family vehicle	41
Given lift from friends	10
Other	14
LHS reported expenses incurring on using transport other than Programme:	91
Mean cost incurred on use of transport other than Programme (PKRs) (%)	1,730
LHS paid transportation cost from their own money (%)	99
LHS expect to be reimbursed (%)	66
LHS reported Programme vehicle is kept at FLCF (%)	64
LHS responsible for repair of programme vehicle (%)	62
LHS are reimbursed vehicle repair cost (%)	77
Mean number of times vehicle broken down during last 12 months	3.0
Age of programme vehicle (as reported by the LHS):	
Fewer than 3 years	38
3–5	15
6–9	5
10 or more	12
Do not know	31

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.6.4 Supervision and management of LHSs

Supervisors are themselves supervised by the LHWP District Coordinator (DC) and Assistant Coordinator (ADC). Table 2.25 shows an improvement in their level of supervision since the 3rd Evaluation. The majority of supervisors are regularly supervised: 93 per cent of supervisors had had a supervisory meeting in the last month, and 98 per cent had had a

meeting in the last two months. Compliance with reporting procedures has also improved. Some 90 per cent of supervisors could show the interviewer a copy of their work plan for the current month, and around 80 per cent could show a report for the previous month.

Salary payments to supervisors have also seen a marked improvement since the last survey. About three quarters of supervisors had received a salary payment in the last month, and only 5 per cent of supervisors had waited for four or more months. Moreover, when salary payments are received, only 6 per cent of supervisors did not receive the amount that was expected – lower than the corresponding proportion of LHWs. It is noteworthy that LHSs are so much less likely than LHWs to suffer delays in payment, because the same payment system is used for both LHWs and LHSs.

Table 2.25 Supervision and pay of LHSs

Measure	2000	2008
Distribution of time since supervisors last had a supervision meeting with their supervisor:		
Last month	70	93
Two months ago	17	5
Three months ago	3	1
Four or more months ago	6	1
Never had meeting or no supervisor	4	0
Total	100	100
Supervisors who had produced and could show a work plan for the current month (%):		
Produced	84	94
Produced and seen	74	89
Supervisors who had produced and could show a report for the previous month (%):		
Produced	87	96
Produced and seen	53	79
Distribution of time since supervisor last received her salary:		
Within last month (last 31 days)	37	73
32 to 62 days ago	15	17
63 to 93 days ago	14	5
Over 94 days ago	33	5
Receiving less salary than expected (%):	3	7

Notes: (1) Corresponds to Table 6.11in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.7 District-level management

A key change in the survey between the 3rd Evaluation and the current evaluation was the implementation of a district-level questionnaire, administered at the DPIU in each of the 57 districts covered by the survey.[10] In addition to enabling a descriptive analysis of LHWP management structures and processes at the district level (presented in this sub-section), it also allows the impact of district-level management on LHW performance to analysed (see Chapter 4).

10 Note that three of the 60 districts selected to be covered by the evaluation had to be dropped due to insecurity. See Annex A for details.

In interpreting the descriptive statistics presented in this sub-section, it is important to bear in mind the small sample size used to generate the estimates (57).

Tables 2.26 and 2.27 show the characteristics of the DPIU staff in terms of education, training, and working patterns. Although the role of the Executive District Officer-Health (EDO-H) is mainly managerial, over one third of EDO-Hs have no management education. Only one fifth of EDO-Hs received training or orientation sessions organized by the LHWP; and less than half qualified as master trainers of the LHWP programme. With regard to working patterns on LHW activities, over half spend at least 20 per cent of their week on LHW activities; no EDO-H spends more than 50 per cent of his or her week on LHWP activities. Around one in five do not make any field visits per month with the LHWP.

District Coordinators and Assistant District Coordinators are even less likely to have management education. Around three quarters of both DCs (73 per cent) and ADCs (71 per cent) have no management education. The major responsibility of DC and ADV is to supervise LHSs. Despite this, Table 2.26 shows that one fifth and one quarter of ADCs and DCs, respectively, have not qualified as master trainers.

Probably as a result of the supervisory roles that DCs and ADCs have, both spend slightly more time on LHWP activities than EDO-Hs: 62 per cent of DCs and 72 per cent of ADCs typically work more than 36 hours a week in their office on LHWP. Between them, only 2 per cent made no field visits on the LHW programme: 90 per cent of DCs and 81 per cent of ADCs spend more than 7 days a month on the field with LHWP, with most spending typically around 8 hours a day in the field.

Table 2.26 Characteristics of DPIU staff: EDO-H

Measure	Value
Without management education (%):	37
Qualified as master trainers for LHWP (%):	49
Percentage of working week spent on LHWP activities:	
Up to 20 per cent	59
21–30 per cent	27
31–50 per cent	15
More than 50 per cent	0
Total	100
Percentage of EDO who receive any training/orientation session organized by LHWP in 2007–2008:	20
Number of field visits days per month with LHWP:	
None	18
1–7 days	27
More than 7 days	55
Total	100
Median number of days	8

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.27 Characteristics of DPIU Staff: District Coordinator and Assistant District Coordinator

Measure	District Coordinator	Assistant District Coordinator
Percentage without management education	73	71
Percentage qualified as Master trainers for LHWP	74	80
Hours worked in a typical week when in office		
Up to 35 hours	38	28
36 - 50 hours	39	63
More than 50 hours	23	9
Total	100	100
Median number of hours	40	40
Number of field visits days per month with LHWP		
None	2	0
1–7 days	8	19
More than 7 days	90	81
Total	100	100
Median number of days	12	10
Number of hours worked in a typical day when in field:		
Up to 6 hours	24	16
7–9 hours	37	55
More than 9 hours	39	28
Total	100	100
Median number of hours	8	8
Hours worked last week on LHWP:		
Up to 20 hours	24	13
21–35 hours	30	26
More than 35 hours	46	61
Total	100	100
Median number of hours	30	40
Percentage who receive any training/orientation session organised by LHWP in 2007–2008:	–	81

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.28 provides measures on LHW management at District Level. In FY 2007–2008, over two thirds of districts had an Annual Health Plan; and just a little over this proportion of districts had an LHWP-specific district plan of action. Of those districts that had an Annual Health Plan, 93 per cent mentioned the LHWP in this plan.

Most districts hold regular joint team meetings with the coordinators of the main Primary Health Care Programmes. Some 62 per cent of districts where LHWP operates undertake collaboration activities with NGOs and international organizations.

Finally, over a half of accounts supervisors reported using the computerised MIS system developed by the LHWP.

Table 2.28 LHW district-level management

Measure	Value (%)
Districts with annual district health plan for FY 2007–2008	69
Health plans where LHWP is mentioned (%)	93
Districts with District Plan of Action for LHWP	72.1
Districts with DHMT	88
Districts who hold regular joint team meetings with the coordinators of the main Primary Health Care Programmes in this district	96
Districts where LHWP undertake collaboration activities with an NGO or international organization	62
Districts with FPO in post	85
DPIU allocation of LHW positions	
DPIU able to fill its current allocation of LHW positions (%)	94
Districts using the computerized MIS system	56

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The DPIU provides support in terms of medical and equipment supply and logistics essential for LHWs to do their job effectively. Table 2.29 shows that all districts supply both office space and training space for the LHWP, and that almost all provide utilities and warehouses to store medicines. Over four fifths of districts had separate storage for drugs and contraceptives at DPIU and most had an enclosed storage space. However, only 18% met the criteria of a minimum of 5.5 sq. feet of storage space per LHW. DPIU gave supplies to around one quarter of the districts directly to LHS, without any intermediary stages involving the facilities.

In one out of every four districts, DPIU distributed medicines and contraceptives to facilities on a demand basis. The actual quantities to be supplied to different facilities were mainly determined by fixed amounts based on the number of LHWs. Around 69 per cent of districts are supplied with medicines and contraceptives based on this criteria. Fewer than one quarter of districts are supplied with the quantity of medicine and contraceptives they require based on medicine available in the LHW kit, according to the FLCF reports.

In terms of logistics, Table 2.29 also shows information on the transfer of medicine and contraceptives to the facility. Over half of the districts responded that the main means of transferring medicines and contraceptives to facilities was either by LHSs carrying the items from monthly meetings, or by private transport organized by DPIU. Only 2 per cent of districts transported medicines and contraceptives to facilities by public transport.

Table 2.29 Supply and logistics at district level

Measure	Value (%)
Districts that have provided the following for the LHWP (reported by EDO):	
Warehouse for the medicine	84
The official required storage space per LHW (minimum 5.5 sq feet / LHW)	18
Office space	100
Training space	100
Utilities (except telephone)	96
Other	21
DPIU distributing medicines/contraceptive to the facilities on demand basis:	25
DPIU determining the quantities to be supplied to different facilities:	
Fixed amount based on the number of LHWs	73
According to the medicine available in LHW kit according to FLCF report	23
Other	4
Method employed by DPIU for transfer of medicines and contraceptives to the facility:	
LHS carry from monthly meeting	54
Private transport organized by DPIU	54
Private transport organized by Facility	3
Public transport	2
Other	18
Average number of vehicles in a district	33.1

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.30 provides information on the management of non-performing LHWs by DCs. It shows that the most common definitions of a non-performing LHW given by District Coordinators were: not visiting households, not attending meetings, and not recording and updating the MIS. Only around one third of DCs associated performance scores of lower than 60 per cent for three months in a row with a non-performing LHW.

In terms of the response to non-performance, it is clear that DCs employ many different actions, including giving formal feedback, either directly or indirectly; providing additional training or closer supervision; or, in extreme cases, dismissal. Interestingly, over 40 per cent of DCs report reducing or delaying salary payments in response to non-performance. Such a tactic can be counter-productive, since it can lead to de-motivation and, in fact, Chapter 4 shows that, in districts where this occurs, LHW performance is lower.

Table 2.30 Management of non-performing LHWs by the District Coordinator (DC)

Measure	Value
DCs who define a non-performing LHW as follows (multiple definitions allowed) (%):	
Performance score lower than 60 per cent	43
Performance score lower than 60 per cent for 3 months in a row	37
Not visiting households	98
Not attending LHW monthly meetings	78
Not recording and updating MIS information	81

Measure	Value
Not working	60
Other	31
Average number of non-performing LHWs reported in April 2008 (per district)	14
DCs generally taking the following actions in case of a non-performing LHW (%):	
Discuss the case with the LHS	90
Discuss the case with other DPIU staff	41
Discuss the case with FPO or other PPIU staff	29
Discuss personally with LHW	73
Report the case to FPO or other PPIU staff	13
Send warning to LHW	78
Send an explanation notice to the LHW	80
Arrange that LHW receives closer supervision from LHS	52
Arrange that LHW receives on-the-job training from the LHS	13
Arrange that the LHW is sent back to the initial training	15
Arrange that LHW is sent to additional session of refresher training	30
Arrange that the LHW is sent to additional session of other training	9
Reduce or delay salary payment	42
Termination	92
Nothing	2
Other	5
DCs that expect the following cases to be reported on LHW at DPIU monthly meeting (%):	
Non-available LHW	59
Non-resident LHW	68
Non-working LHW	64
LHW not visiting HH	82
LHW not recording and updating MIS information	68
LHW not attending monthly meeting	62
Other	14
Districts with complaint register at DPIU (%)	64

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.8 Supplies, equipment and clinical support services

2.8.1 LHW medicines and materials and LHW stock and dispensing patterns

The interviewers recorded the medicines held in stock by the LHWs at the time of the survey. For items that were out of stock, interviewers asked how long the LHW had been out of stock. Table 2.31 shows that there remain serious problems with regard to medical supplies for LHWs. Although the proportion that had a given item in stock has increased for some items since 2000, it has declined for others. For example, the proportion of LHWs with Cotrimoxazole in stock had declined since the 3rd Evaluation; less than one third of LHWs had this item in stock.

There is no clear pattern of improvement, and many LHWs are still out of stock of important items. These figures do not simply reflect short-term problems: an appreciable number of LHWs have been out of stock for over three months. Averaging across all items, it seems

LHWs are more likely to have a given item in stock 2008, and much less likely to have been out of stock for over three months. When they occur, stock-outs are therefore continuing for a shorter period than in 2000. As in the 3rd Evaluation, expired stock is a much less common problem (tabulation not shown).

Table 2.31 LHW stock of medicines and other materials

Item	LHWs with item in stock (%)		LHWs out of stock for over 3 months (% of all)		Stock units
	2000	2008	2000	2008	
Paracetamol tablets	57	68	9	4	Strip pack
Paracetamol syrup	22	55	30	9	Bottle
Chloroquine tablets	67	44	10	14	Strip pack
Chloroquine syrup	25	42	36	13	Bottle
Mebendazole tablets	56	38	20	19	Strip pack
Piperazine syrup	59	50	15	10	Bottle
Oral rehydration salts[(2)]	2	59	95	4	Packet
Eye ointment	16	41	51	8	Tube
Cotrimoxazole syrup	43	31	20	14	Bottle
Vitamin B complex syrup	34	60	30	4	Bottle
Iron and folic acid tablets	63	66	16	10	Strip pack
Antiseptic lotion	27	40	50	10	Bottle
Benzyl benzoate	42	47	27	6	Bottle
Bandages (cotton)	18	58	70	7	Pack
Condoms	55	67	22	3	Piece
Injectables	–	24	–	16	
Oral contraceptive pills	73	78	11	1	Cycle
Mean (excl. injectables)	41	53	32	8.6	

Notes: (1) Corresponds to Table 7.1 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 2.32 shows the proportion of LHWs that have been out of stock for more than two months, a key Programme performance indicator. It confirms that, despite marginal improvements since 2000, there are still serious issues with the supply of medicines and other materials to the LHWs that must be addressed.

A comparison of the percentage of LHWs with stock-out for more than two months by province shows that Sindh has the largest problem in this area (see Annex C, Table C-12).

Table 2.32 LHWs with stock-out for more than two months

Item	2008 All LHWs
Paracetamol tablets	5
Paracetamol syrup	13
Chloroquine tablets	22
Chloroquine syrup	24
Mebendazole tablets	28
Piperazine syrup	16
Oral rehydration salts	11
Eye ointment	13
Cotrimoxazole syrup	21
Vitamin B complex syrup	5
Iron and folic acid tablets	16
Antiseptic lotion	14

Benzyl benzoate	9
Bandages (cotton)	10
Condoms	4
Injectables	22
Oral contraceptive pills	2

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.8.2 Dispensing patterns

LHWs were also asked about the amount of each medicine dispensed in the week preceding the survey. The average amounts dispensed in the specified units are shown in Table 2.33. As many LHWs do not have items in stock, average amounts dispensed are presented both across all LHWs and separately for those LHWs with the item in stock. It appears that all items are dispensed with reasonable frequency.

The average amount dispensed by LHWs has increased substantially for many items, and this must contribute to the out-of-stock situation, with the supply systems struggling to keep up with the increased dispersion rates. At some point in the future, the Programme might wish to consider implementing systems to audit the appropriateness of prescribing/dispensing practices to ensure resources are being used efficiently.

Table 2.33 Dispensing of medicines and supplies in the previous week

Item	Dispensing units	Mean amount dispensed last week: among all LHWs		Mean amount dispensed last week: among LHWs with medicine in stock	
		2000	2008	2000	2008
Paracetamol tablets	Tablet (500mg)	23.6	34.8	34.4	44.0
Paracetamol syrup	Teaspoon 5ml	8.2	42.0	23.8	59.1
Chloroquine tablets	Tablet (250mg)	8.9	7.8	11.1	14.0
Chloroquine syrup	Teaspoon 5ml	4.0	15.6	10.3	24.9
Mebendazole tablets	Tablet (100 mg)	3.7	6.6	6.2	12.4
Piperazine syrup	Teaspoon 5ml	8.4	9.7	10.5	15.8
Oral rehydration salts(1)	Packet	n/a	3.1	n/a	4.2
Eye ointment	Grams	1.9	6.2	6.9	12.5
Cotrimoxazole syrup	Teaspoon 5ml	13.3	16.1	17.8	35.0
Vitamin B complex syrup	Teaspoon 5ml	11.0	59.8	23.3	87.0
Iron and folic acid tablets	Tablet	72.0	102.1	120.7	147.8
Antiseptic lotion	Teaspoon 5ml	0.8	3.8	1.5	4.4
Benzyl benzoate	Teaspoon 5ml	3.7	15.3	4.7	21.4
Bandages (cotton)	Bandage	0.2	1.5	1.2	2.0
Condoms	Piece	9.8	20.1	15.6	25.3
Injectables		–	0.2	–	0.3
Oral contraceptive pills	Cycle	2.3	2.7	2.6	3.1

Notes: (1) Corresponds to Table 7.3 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.8.3 Equipment

Though most LHWs have the necessary equipment, only one third have a functional weighing scale. This means that many LHWs must be unable to provide adequate growth monitoring. This is a surprising finding in a country with such a high prevalence of childhood malnutrition.

It is also worrying that, although most LHWs have appropriate charts and other administrative materials, some 10 to 25 per cent are missing these basic items necessary to do their job.

While some indicators have improved since 2000, others, in particular the availability of weighing scales, appear to have deteriorated. It is clear that there remain serious problems in keeping LHWs supplied with all the necessary equipment. Tabulations by province reveal that Balochistan and Sindh have the largest problems of missing equipment (see Annex C, Table C-13).

Table 2.34 Presence of functional equipment and administrative materials

Item	Percentage of LHWs	
	2000	2008 All LHWs
Weighing scale	91	32
Thermometer	47	59
Torch	11	36
Scissors	75	73
Household register	95	97
Diary	86	96
New format	n/a	82
Old format	n/a	73
Manual	89	95
Current LHW manual	n/a	85
Refresher LHW manual	n/a	83
LHW manual – old version	n/a	65
Counselling Card manual (refresher)	n/a	83
Child Health refresher manual	n/a	88
Injectable contraceptive refresher manual	n/a	82
Revised MIS refresher manual	n/a	65
OBSI refresher manual	n/a	80
Blank growth monitoring cards	74	72
ARI case management charts (all 3)	91	90
Diarrhoea case management chart	87	89
Plastic cards	n/a	72
Family planning charts	n/a	89
Eye chart	n/a	78
Maternal health chart	n/a	89
Health house board	n/a	84
Blank referral slips	77	76

Notes: (1) Corresponds to Table 7.4 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.8.4 LHW Programme supplies at the health facility

LHWs are always attached to a local First Level Health Facility (FLCF). There are two main types:

- **Rural health centre (RHC)** – This is primarily a managerial and supply centre, manned by professional and mid-level health workers.
- **Basic health unit (BHU)** – This is a peripheral facility that will serve 5000–10,000 people over an area of 15-25 square miles. The staff comprises primarily mid-level personnel with other supporting personnel.

Staff members at the LHWs' health facilities were also interviewed about the Programme's supply situation, as it is often their responsibility to distribute supplies to LHWs.[11] Some 87 per cent of facilities reported a full distribution of medicines to LHWs in the preceding month, and just under one quarter of facilities reported a lack of at least one item in the preceding six months (Table 2.35). Basic Health Units were more likely to report supply problems than Rural Health Centres.

In the twelve months prior to the survey, vitamin B was, on average, out of stock at the FLCF for almost half a year; oral contraceptive pills, injectable contraceptives, chloroquine tablets, chloroquine syrup, ORS, cotrimoxazole and iron tablets were out of stock for one quarter to one third of the year. These supply problems accord with the lack of stock of many items recorded in the LHWs' medicine boxes.

Table 2.35 LHW programme supply of medicines, as reported at the health facility

Measure	Rural health centre	Basic health unit	All other facility types	All
FLCFs that reported that all required medicines were distributed to LHWs in the preceding month (%):	91	85	93	87
FLCFs reporting a lack of any LHW item in the preceding 6 months (%):	16	28	10	23
Mean number of months with insufficient supply in the last 6 months, for FLCFs reporting a lack of any item:				
Oral contraceptive pills	1.0	3.4	4.0	3.3
Condoms	2.1	3.1	4.0	3.0
Injectable Contraceptives	3.1	3.9	4.5	3.9
Chloroquine tablets	1.8	4.6	4.7	4.2
Chloroquine syrup	3.2	4.2	4.2	4.0
Oral rehydration solution	3.2	3.6	4.0	3.5
Cotrimoxazole	4.1	3.6	4.9	3.7
Iron tablets	4.0	3.2	3.2	3.3
Vitamin B complex	3.7	4.1	2.7	3.9

Notes: (1) Corresponds to Table 7.5 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

11 Some 4 per cent of respondents at the facilities indicated that the LHWs were supplied directly by the supervisor rather than by the facility.

2.8.5 Resources available for clinical support services at the health facility

The impact of LHWs on the health of their communities depends, in part, on receiving support from adequate referral facilities. Adequate publicly provided services that are free or affordable at the point of delivery are an important component of the LHWs' ability to improve community health.

Interviewers recorded information on staffing, services, equipment and supplies of the health facilities to which LHWs are attached; the same was recorded for health facilities serving unserved areas. Table 2.36 shows that both staff and supplies are lacking at the facilities that support the LHWs. On the day of survey, only 63 per cent of FLCFs had a doctor present. This is partly a consequence of doctors in post not appearing for work – only 85 per cent of facilities with a doctor in post had a doctor present at the time of the survey. However, it is mostly due to posts not being sanctioned or, more commonly, being sanctioned and not filled.

Most, but not all, facilities had at least one antibiotic and Chloroquine in stock. However, many of the important drugs for difficult births were unavailable in about 60 to 70 per cent of facilities. This includes Synometrin, an important drug for preventing post-delivery maternal haemorrhage, which was lacking in two thirds of facilities.

Equipment was more commonly available than pharmaceuticals, but many still lack basic items. Only 80 per cent of facilities possessed a functional refrigerator, essential for some vaccines such as that for measles. This means that almost one fifth of facilities cannot offer effective routine in-house vaccination services, as they lack this basic requirement. The lack of appropriate facilities often has serious implications for the ultimate effectiveness of the vaccination.

Although there has been an improvement since the 3rd Evaluation, overall, the resources available for clinical services to the patients referred by LHWs are a cause for concern, and would be expected to undermine the effectiveness of the LHWs' referral role, or, at least, her willingness to refer to her health facility.

Table 2.36 Resources for clinical services at health facilities

Measure	Rural health centre (%)	Basic health unit (%)	Other facility (%)	Total (%)
FLCFs where a doctor was present on the day of the survey	85	65	31	63
FLCFs with any doctor's post sanctioned and filled (male or female)	94	79	32	74
FLCFs with a female doctor's post sanctioned and filled	61	10	15	16
FLCFs with a doctor in post where at least one doctor was present during time of survey	91	83	97	85
FLCFs having in stock				
Intravenous rehydration drips	93	79	74	80
Cotrimoxazole	85	68	81	73
Other antibiotics	88	90	87	89
Sedative (for toxaemia)	46	40	37	40
Valium (for eclampsia)	79	28	25	34
Synometrin (for post-partum haemorrhage)	29	9	43	19

IUDs	46	52	51	51
Contraceptive injectables	47	47	55	48
Contraceptive pills	56	61	54	59
Condoms	61	59	44	56
Chloroquine tablets	77	78	72	76
Chloroquine syrup	55	61	63	61
ORS packets	84	70	61	69
Iron tablets (with or without Vitamin B)	75	81	63	76
FLCFs with functional				
Infant weighing scales	87	75	59	73
Blood pressure gauge	95	86	95	89
Steriliser	84	58	47	59
Oxygen	90	37	42	45
Refrigerator	89	86	56	80
FLCFs offering routine in-house vaccination services (%)	95	89	56	82

Notes: (1) Corresponds to Table 7.6 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

2.9 Key findings

2.9.1 Social and demographic characteristics of LHWs

The profile of LHWs has not changed significantly since the 3rd Evaluation. LHWs are largely young, married women. Nearly all LHWs have at least 8 years' education, though fewer than half are educated to matriculation level, which is the preferred level of education for the Programme. The vast majority meet Programme criteria for age, education and residence.

2.9.2 LHW knowledge and skills

LHWs' clinical knowledge has improved since 3rd Evaluation, but there is still a need for more improvement. The lack of knowledge in critical clinical domains should be cause of concern. There has been a noticeable improvement in their knowledge of the EPI vaccination schedule. However, while many gave correct answers to basic questions, an appreciable proportion gave incorrect answers in areas that are central to their work. Around one third failed to identify a number of life-threatening conditions. Only 9 per cent were able to state the correct doses of antibiotics or Chloroquine to be given. Answers to case-based questions showed only slight improvement. The composite knowledge score increased from 69 per cent in 2000 to 74 per cent in 2008, with little variation between rural and urban areas. The area with lowest score was Balochistan, some 10 percentage points lower than the national mean.

A number of factors were found to be significantly associated with higher knowledge levels, including factors relating to the LHWs themselves (experience, education, provision of training, married status), their supervisors (LHSs' knowledge score), as well as community- and district-level factors. These results have some clear policy implications for the Programme. Specifically, efforts should be made to:

- Retain experienced LHWs;
- Strive to ensure new LHW recruits have high levels of education. Since this is often at odds with efforts to increase coverage (remaining unserved areas tend to have fewer education women), this might require innovative approaches;

- Maintain and improve the frequency and quality of refresher training courses. Current training courses should be reviewed to ensure they focus on areas where LHW knowledge is weakest (for example, growth monitoring, diarrhoea treatment, pneumonia);
- Make efforts to monitor and maintain the LHWs' supervisors' knowledge levels. Section 2.5 shows that LHSs who are older, more experienced and received all the required training tend to have higher knowledge levels;
- Ensure all served health facilities have an individual with overall responsibility for overseeing LHWP activities, and that, within each district, regular meetings are held between these individuals and the DPIU.

2.9.3 LHW training and remuneration

Training continues to be carried out reliably for most LHWs. All LHWs have received the basic full-time 3-month training course, and 96 per cent have received at least some in-service training.

In relation to pay, there have been both negative and positive trends since the last survey: just over one fifth of the LHWs had been paid in the preceding month, compared with just under one third in 2000. On the other hand, less than one tenth of LHWs had not received their salary for four months or more, compared with 34 per cent in 2000. It is noteworthy that LHSs are much less likely than LHWs to suffer delays in payment, because the same payment system is used for both LHWs and LHSs. Further investigation of the reason of this discrepancy may indicate ways to improve the reliability of salary payment processes.

In addition, almost 11 per cent of LHWs receive less money in their salary than they expect, a reduction compared with 2000. Most of them (75 per cent) did not know the reason for this deduction.

2.9.4 LHW supervision and management

Overall, there has been an improvement in the level of supervision since the 3rd Evaluation. Although a modest fraction of LHWs had not seen their supervisor within the last 30 days; only 2.3 per cent said they did not have a supervisor at all, compared with 7 per cent in the 3rd Evaluation. However, the content of supervision has some flaws: only one third of LHWs reported that they were told their performance score during supervisions. Just under one quarter (24 per cent) were said to have scored under the minimum of 60 points for three consecutive months during the previous year. A variety of actions were undertaken in response, the most common being discussion with the LHW herself (87 per cent) and discussing the issue with the DC/ADC (74 per cent).

2.9.5 Social and demographic characteristics of LHSs

The LHSs employed by the programme in 2008 are appreciably older, more educated and more likely to be married than were the supervisors employed in 2000. A third of LHSs are in their twenties, although 0.4 per cent were below age 22 at the time of the survey. Most supervisors are well educated, with two thirds graduated or having post-graduate qualifications.

2.9.6 LHS workload and working patterns

On average, supervisors are working 24 days per month, a slight increase compared with 2000. Well over three quarters reported working a full month, and only 8 per cent worked for

14 days or fewer. LHSs currently supervise 23 LHWs on average (down from 27 in 2000). Accordingly, supervisory responsibilities have become better spread across supervisors, and distances to LHWs have reduced (from 27 km to the furthest LHW in 2000 to 23 km now). Despite a small reduction in the average number of visits to LHWs per month (from 31 to 30), the proportion of LHWs reporting at least one visit from their supervisor in the previous month has risen from 83 per cent in 2000 to 92 per cent in 2008. The LHSs, in turn, receive regular supervision, 93 per cent reported being supervised within the past month.

Overall trends are also positive in relation to supervisors' transport, particularly for access to vehicles (with an increase from 37 per cent to 60 per cent having full time access to a vehicle in the month preceding the survey). Furthermore, salary payments to supervisors have also seen a marked improvement since the last survey. About three quarters of supervisors had received a salary payment in the last month, and only 5 per cent of supervisors had waited for four or more months. Moreover, when salary payments have been received, only 6 per cent of supervisors did not receive the amount that was expected. This is lower than the corresponding proportion of LHWs.

Training of LHSs is being systematically conducted. Three quarters of supervisors have received all types of training that they are supposed to (although not necessarily for the full duration). However, in relation to the knowledge tests, although the LHSs performed slightly better than LHWs (78 per cent overall mean score, compared with 74 per cent), and had improved slightly over their score of 74 per cent in 2000, there are some worrying gaps in their knowledge (case-based knowledge in particular). Scores tended to rise with age, experience, and levels of training.

2.9.7 District-level management

The districts are providing intensive support for the LHWP – the EDO-Hs reports spending 8 days on average during the month; DCs are even more engaged, spending a median of 30 hours per week on supervision. The vast majority of district health plans include the LHWP (93 per cent).

All districts provide office space; in 84 per cent of districts, warehousing for the LHWP drugs and supplies is provided. The minimum required storage space per LHW (5.5 sq feet/LHW) is provided in 18 per cent of districts.

2.9.8 Supplies, equipment and clinical support services

Three areas of Programme support that are essential for LHWs to do their job effectively were assessed: medical supplies, equipment and clinical services provided by the health facilities. There are substantial problems in all three of these areas. The continuity of problems, compared with 2000, suggests that this is an area that needs renewed focus, both within the Programme and within the health system generally.

An examination of the medicines held in stock by LHWs shows that many are seriously undersupplied, although there has been a decline in proportion out of stock for two months or more. The most common item held in stock (oral contraceptives) was held in stock by only 79 per cent of LHWs, and many items were held by fewer than half of the interviewed LHWs. Many LHWs had been out of stock for over three months. Interviews at the LHWs' health facilities confirmed these supply problems, and showed that they were usually a consequence of non-receipt of the requested items from the DPIU.

LHWs were also found to lack some basic items of equipment: only one third have a functional weighing scale. The shortfalls and unpredictability of supplies put a serious stress on programme implementation and may jeopardize the programme's overall effectiveness.

3 Programme outputs

Chapter 3 presents analysis of the LHWP outputs, including:

- The coverage of different services provided by LHWs
- The number of household visits that LHWs make and how many clients they see
- How communities regard the work of the LHWs
- How much time the LHWs spend working, overall and on different activities
- How many preventive and promotive services they deliver (and to whom)
- The range and volume of curative services
- Reasons for consulting an LHW and payment for their services
- The role of the LHW in emergency and referral care
- The treatment that they provide for common illnesses.

3.1 LHW coverage

This initial section looks at the coverage of the LHW Programme. It presents information on the number of LHWs who are employed by the Programme, and on the number of households and individuals that are registered with them.

It also presents information on a number of measures of LHW activity. These include the number of household visits made by LHWs, the number of clients seen and the extent of community mobilisation. Much of the information is based on reports given by the LHWs themselves, although some is taken from the reports of households and community members. These are useful measures of the extent to which LHWs undertake some important components of their work.

3.1.1 Coverage of the LHW Programme

The number of individuals served is a fundamental measure of Programme coverage. This depends on the number of LHWs employed by the Programme, and the number of individuals each of them serves. In 2008, there were just under 90,000 LHWs nationwide. Since each of them is supposed to serve around 1,000 individuals, this gives a nominal served population of around 90 million individuals.

Through the various stages of sampling, the survey provided information on the coverage of the Programme. From the point of view of estimating Programme coverage, the important stages in the sampling process are as follows:[12]

- A sample of health facilities served by the LHWP was drawn from the Programme's MIS database.
- The survey teams then visited the sampled facilities and randomly selected two LHWs from the list of LHWs at the facility. The proportion of these selected LHWs who were interviewed can be calculated; the interviewers also recorded the reason for not interviewing selected but uninterviewed LHWs.
- The team recorded the total number of households registered with each of the LHWs interviewed. A sample of eight of these households was then visited. Information was recorded on households that were not interviewed, including the reason for not undertaking the interview. Extrapolated across all LHWs, this provides information on

12 Fuller details of the sampling scheme are given in the Annex.

the accuracy of the LHW registers. In addition, survey supervisors checked whether interviewed households – defined using the survey's definition of a household – had been registered more than once on the LHW's register.

- Finally, interviewed householders were asked about contact with the LHW. This included information on whether they knew the LHW, whether they knew they were registered with her, and about when she had last visited the household.

LHWs are supposed to serve a population of 1,000 individuals, or approximately 200 households. In practice, each LHW, on average, has 131 households registered, well below the guideline of 200. However, average household size is quite high (7.1 individuals), and the average number of individuals registered with each LHW is 919, closer to the Programme norm.

No sizable problem was found with LHWs registering non-existent households, or with multiple registration of households. Although 8 per cent of sampled households were not interviewed, this level was similar in the unserved areas and largely reflects short- and medium-term household migration. An analysis of reasons for not interviewing the sampled households suggests that fewer than 1 per cent of households on an LHW's register are non-existent. This figure is an average, of course, and so might be higher for particular LHWs.

While registered households were not generally found to be fictitious, some 6 per cent of the interviewed households did not know that they were registered by the LHW. This is considerably fewer than was found in 2000. We might therefore calculate an estimate of the average number of individuals 'effectively' registered – that is, who know the LHW and know they are registered.[13] This equates to 863 individuals per LHW, which is below the target population of 1000 per LHW.

Table 3.1 Information on the coverage of LHW programme

Measure	2000	2008 All LHWs
LHWs:		
Sampled LHWs who were interviewed (%)(3)	95	100
Households:		
Mean number of households registered	145	131
Mean number of individuals registered	980	919
Households sampled and interviewed (%)(3)	89	92
Interviewed households who knew they were registered (%)	83	94

Notes: (1) Corresponds to Table 1.1 in 3rd Evaluation. (2) Number of LHWs reported as employed by the FLCF as a percentage of the number of eligible LHWs expected at the sampled FLCFs from the database (both figures weighted). (3) Unweighted.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

There is a wide variation in the number of individuals and households served by different LHWs. Around two fifths of LHWs report having less than 900 individuals registered, and fewer than one fifth have 100 households or fewer registered (Table 3.2). There might be geographic reasons for some of these variations, these are discussed later the section.

13 This is done by multiplying the mean number of registered individuals by the proportion of households who knew that they were registered. It does not include an adjustment for non-interviewed households or multiple registration, which would lower the figure very slightly. Note that there are a number of reasons why households might say that they are not registered, including a decision by the household to refuse services from the LHW.

Nevertheless, it suggests that the current allocation of LHWs means that some are serving well under the target population, while others have higher numbers registered than is expected by the Programme.

Table 3.2 Distribution of the number of households and persons registered by LHWs

Measure	2000	2008 All LHWs
Number of households registered		
Up to 50	1	1
51–100	14	17
101–150	39	54
151–200	38	26
201–250	9	2
Total	100	100
Mean	145	131
Number of persons registered with the LHWs		
Up to 500	2	3
501–700	6	6
701–900	22	33
901–1100	50	47
1101–1300	14	10
More than 1300	6	2
Total	100	100
Mean	980	919

Notes: (1) Corresponds to Table 3.2 in 3rd Evaluation. (2) 2008.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.1.2 Household visits made and clients seen

LHWs were asked how many household visits they undertook in the week preceding the survey. The mean number of visits reported was 27, up slightly from 25 in 2000 (Table 3.3). At that rate – if LHWs were visiting all of their households – all the registered households should be visited, on average, in around 5 weeks. This is somewhat below the Programme norm, which suggests that households should be visited at least once per month. However, respondents in the household interviews were also asked about LHWs' visits, and their reports suggest a more complex picture. Some 85 per cent of households said that they had been visited by the LHW in the preceding three months. This suggests that there is a substantial proportion of households that are not receiving regular visits, despite being registered with the LHW; around 15 per cent of households seem to be omitted from the LHWs' visiting rounds.

There is also a wide spread in the number of household visits reported, with 19 per cent of LHWs reporting visiting ten households or fewer in the previous week. This represents a relatively low visitation rate; these LHWs would clearly not visit all of their registered households in one month.

Table 3.3 Number of household visits made during the preceding week

Measure	2000 (%)	2008 All LHWs (%)
Number of household visits:		
Up to 10	23.0	19.0
11–20	17.0	19.0
21–30	27.0	27.0
31–40	18.0	21.0
41–50	10.0	12.0
More than 50	5.0	3.0
Total	100.0	100.0
Mean number of household visits made	25.0	26.8

Notes: (1) Corresponds to Table 3.3 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The LHWs were also asked how many patients/clients they saw in the week preceding the survey. This specifically *included* individuals to whom they only gave advice. On average, LHWs reported seeing 22 individuals (Table 3.4). There is a wide variation in the number of clients seen. More than one quarter of LHWs reported seeing ten or fewer clients. While there are no explicit targets for the number of clients that a LHW should see in a week, this must surely represent under-utilisation of the service.

Table 3.4 Number of patients/clients seen during the preceding week

Measure	2008 All LHWs (%)
Number of patients/clients seen	
Up to 10	29
11–25	37
26–50	31
More than 50	3
Total	100
Mean number of patients/clients seen	21.8

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

However do LHWs not visit households with specific socioeconomic characteristics? Is there some kind of implicit targeting towards particular groups of clients? The 3rd Evaluation suggested that the LHWs were failing to serve the most disadvantaged households, the poorer of the poorest. Table 3.5 reports the main characteristics of households visited and not visited during the three months preceding the 2008 survey. Households that have not been visited in the last 3 months do tend to be slightly poorer (worse house conditions and lower literacy levels) and are in more remote locations. However, these differences statistically not significant. So we can conclude that there is not explicit targeting by the LHWs along these lines.

The only remarkable difference is that household sizes are significantly smaller for households that have not been recently visited by a LHW. This difference is mainly accounted for by number of children. For example, while 60 percent of recently visited households have at least one child aged 0-4, this is only true of 40 percent of the cases for non visited households. [2]

One possible interpretation of this is that the LHWs avoid serving households where there are less children, and less women in reproductive age, partly because they have fewer services to provide to these clients, and possibly because there are economies of scales in serving larger households.

Table 3.5 Characteristics of households not visited during the preceding three months

Measure	Not visited during the preceding 3 months	Visited during the preceding 3 months
Household demographics		
Size of the household	6.5***	7.4
Households with a female head of the household (%)	6.3	4.7
Age of the head of the household	48.9	47.9
Number of children 0–4	0.7***	1.0
Number of children 5–9	0.9***	1.1
Number of males 15-51	1.6**	1.7
Number of females 15-50	1.7***	1.8
Number of aged (older than 50)	0.8	0.8
Households without any child 0-4 (%)	63.3***	42.3
Households without any child 0-14 (%)	25.8***	13.9
Households without any woman 15-50 (%)	8.3**	4.4
Income and income poverty		
Real mean food and other consumption (Rs. per month) – expressed in 2008 prices (1)	2245	2184
Below relative poverty line (%)(2)	22.9	23.7
Facilities and utilities (%)		
Households with own house	9	9
Number of rooms	2.1	2.3
Households with dirt floor	49	44
Households with bad quality walls (bricks and mud, mud, iron sheets, wood, no walls)	43	39
Households with bad quality roofs (Straw, thatch or mud)	8	8
Households with good quality roofs (concrete or cement)	27	24
Households with any toilet	76	79
Households with a protected water supply	46	48
Households with an electricity connection	93	94
Households with a refrigerator	43	41
Households with a washing machine	51	50
Households with a motorbike	26	25

[2] A similar pattern emerges when comparing households that claim they are not registered or don't know the LHW at all, but appear on the LHWs registers, with the rest of served households.

Measure	Not visited during the preceding 3 months	Visited during the preceding 3 months
Households with a telephone connection	10	10
Households with a mobile phone	72	72
Literacy (%)		
Households whose head has ever been to school	57*	61
Households where the spouse of the head has ever been to school	24*	29
Distances to important locations (in minutes, one way only)		
Distance to the closest primary school	14.6	14.1
Distance to the closest shop/market	10.4	9.3
Distance to the closest BHU/RHC	36.5	35.5

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: (1) Significance Tests of the differences between served and unserved have been undertaken for all variables presented in this table. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. (2) Consumption per adult equivalent, standardized for geographical variation in prices faced (household weighted). (3) Relative poverty line set at two thirds of mean household consumption per adult equivalent (Rs. 1,462 /month).

It appears that health committees have become much more functional since 2000. Some 90 per cent of communities had a women's health committee, all of which report having met in the last six months. Village health committees (which are male) also appear to be more common and much more active than they were.

Table 3.6 Health committees (both male and female respondents)

Measure	2000 (%)	2008 All LHWs (%)
Communities have a village health committee	47	67
Communities with a health committee that has met in the last 6 months	35	82
Communities with a health committee that has undertaken any activity in the last 12 months	26	64
Communities have a women's health committee	55	90
Communities with a women's health committee that has met in the last 6 months	40	90
Communities with a women's health committee that has undertaken any activity in the last 12 months	38	80

Notes: (1) Corresponds to Table 3.5 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.2 LHW activities

3.2.1 Time spent working

LHWs were asked about their working time in the week preceding the survey. On average, they reported working for 5.8 days in the preceding week; nearly 80 per cent reported working for six or seven days, a larger proportion than in 2000. The main reasons given for not working a full week was that they were on leave or sick (Table 3.7). Note that the

proportion not working a full week due to sickness has risen substantially, whereas the proportion not working because they were taking leave has fallen. It is unclear why this is so.

On average, LHWs work for around 30 hours per week, according to their own reports, substantially above the average in 2000 of 20 hours (Table 3.8). Using a six-day working week, LHWs now work an average of 5 hours per day. While there are no specific Programme norms for the amount of time that an LHW should work, this is within the 5 hours per day that is informally suggested in the Programme. As might be expected, most time is spent visiting households (Table 3.9).

Once again, there is a wide variation in working hours between different LHWs. Nearly a tenth of LHWs reported working less than ten hours in the preceding week (Table 3.8), well below the 25 per cent that reported it in 2000. Almost 60 per cent of LHWs reported working 25 hours or more.

The modest average amount of time worked suggests that time limitations do not impose a restriction on LHWs' activities, or on the expansion of their duties. However, Section 4 will show that many LHWs are not providing adequate levels of service in this time.

Table 3.7 Days worked by LHWs in the week preceding the survey

Measure	2000 (%)	2008 All LHWs (%)
Number of days, LHW worked last week:		
Did not work at all	8	4
1–3 days	10	7
4–5 days	20	10
6–7 days	62	–
6 days	–	35
7 days	–	44
Total	100	100
Mean number of days worked last week	5	5.8
Reasons for not working a full week:[14]		
Taking leave	22	9
Sickness	17	32
Travelled out of village/mohallah	8	3
Work completed/not enough to do	7	1
Others	48	55
Total	100	100

Notes: (1) Corresponds to Table 3.6 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

14 Full week means 6 or 7 days

Table 3.8 Total time worked in the week preceding the survey

Measure	2000	2008 All LHWs
Total number of hours worked:		
0	8	4
1–4	5	2
5–9	12	4
10–14	18	10
15–19	13	10
20–24	14	12
25–35	21	25
More than 35	10	33
Total	100	100
Mean number of hours worked	20.1	29.5

Notes: (1) Corresponds to Table 3.7 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 3.9 Allocation of LHWs' working time by activity

Activity	Average hours per week
Household visits	14.0
Seeing patients at health house	1.5
Accompanying referral cases	0.8
Monthly meetings	1.4
MIS activities	3.3
Meeting with LHS individually	0.4
Meeting/working with health committees	0.4
Participation in NIDs	6.8
Training at monthly meeting	0.7
Political/administrative work	0.0
Any Other	0.1
Total	29.5

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.2.2 LHW Activities by place of residence

A selection of activity and administrative measures for urban and rural LHWs is shown in Table 3.10. Both areas show a decline in the average number of households registered. Working patterns appear to have deteriorated in urban areas but improved in rural areas since the 3rd Evaluation. Community reports also reflect this, although LHWs enjoy a similar level of respect in the two areas.

Table 3.10 Comparison of selected activity measures by place of residence

Measure	2000		2008 All LHWs	
	Urban	Rural	Urban	Rural
LHW and household reports:				
Mean number of households registered	152	143	141	129
LHWs with less than 900 persons registered (%)	16	24	28	45
LHWs with less than 700 persons registered (%)	n/a	n/a	5	10
Households reporting having been visited by the LHW in last three months (%)	74	72	85	85
Worked less than 15 hours (%)	40	44	25	19
Worked less than 5 days in preceding week (%)	34	38	20	15
Seeing less than 10 clients in preceding week (%)	18	24	22	20
Community reports:				
Know the LHW and know she is working as a LHW (%)	99	97	99	100
State that the LHW goes to visit households on most days of the week (%)	85	76	90	96
State that there have been improvements in health due to the LHW's work (%)	75	70	90	94
Say that LHWs are usually respected after becoming LHWs (%)	91	88	94	95

Notes: (1) Corresponds to Table 3.8 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.2.3 LHW participation in national immunisation days (NIDs)

The most important non-Programme activity undertaken by LHWs is involvement in the national immunisation days (NIDs). The NIDs are implemented as part of the international policy on polio eradication that has been adopted by the Government of Pakistan. The LHW's official role for NIDs is as a mobiliser and a vaccinator (providing polio drops).

As expected, working on NIDs is very common for LHWs. The amount of time spent on this additional activity is considerable, with an average of 9 days in the past three months representing over 10 per cent of the typical LHW's available working days. However, as is discussed later in the report, it does not appear that participation in NIDs has a negative impact on LHW Performance (see Section 4.2).

Table 3.11 Participation of LHWs in national immunization days

	2008 All LHWs
Mean hours spent working on NIDS last week	6.8
Mean hours spent on NIDs training last week	0.8
LHWs participated in NIDS during last 3 months (%)	81
LHWs who participated in NIDS in last 3 months who worked outside their catchment area for NIDS in the last round of NID/SNID (%)	60
Among the LHWs who participated in NIDS/SNIDS, mean number of days spent during last 3 months	9

	2008 All LHWs
Among the LHWs who participated in NIDS/SNIDS, received extra payment for participating in NIDS (%)	78
Mean amount received for participating in NIDs (PKRs)	1,289
LHWs received any amount from any NGO in last 3 months (%)	6
Mean amount received from NGO in the last 3 months	458

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.3 LHW outputs – preventive and promotive services

Lady Health Workers provide a range of services to the clients whom they serve. These include the provision of health education and health promotion – informing and motivating clients to improve their health status. They provide some preventive and simple curative health services. They also refer individuals to higher levels of the health system for a wider range of services.

In this section, information is presented on the preventive and promotive services provided by the LHWs to their most important target groups. Service levels are examined by place of residence (urban/rural) and by stratum. The provision of curative care is addressed in Section 3.4. This section presents information only on households that are registered with the LHWs. It answers the question: 'Do LHWs provide the services that they are supposed to?' It does not make any comparison with the unserved households. That comparison is addressed later in the report.

3.3.1 Delivery of services

Four important client groups are identified in Table 3.12. The client groups are: the household itself (as a unit); women who have had a birth in the past three years; currently married women aged 15–49; and children under 3 years of age. LHWs provide a range of promotive and preventive services to these groups. Table 3.12 shows the extent to which LHWs:

- Provide hygiene education on drinking water and sanitation
- Provide nutritional advice and growth monitoring
- Monitor and advise women on their health, and that of their babies, after birth
- Supply and refer women for family planning
- Motivate and educate women on family planning
- Promote and facilitate vaccination.

Table 3.12 shows the percentage of individuals in the client group who were supplied with the services by the LHW. The individuals are all members of the population served by the LHWs – that is, they are in the sample drawn from the LHWs' household register. Across the range of services and client groups covered by this table, it can be seen that:

- The level of provision varies with the type of service. Many services reach around half of eligible clients, but some have higher coverage: almost two thirds of households report that the LHW has undertaken hygiene promotion and vaccination promotion reaches three quarters of children under three years of age. In contrast, early visits to newborns (within 24 hours) and growth monitoring reach far fewer clients. LHWs continue to play an important role in family planning provision. Over half of users say

that they were supplied or referred by the LHW, and 74 per cent of pill and condom users obtained their last supply from the LHW.

- There have been some substantial improvements in the level of service delivery since the 3rd evaluation, particularly in the direct provision of family planning services, although there is less promotion to non-users. The coverage of most services has increased compared with 2000. There are a few exceptions, including growth monitoring. While there is clearly still a need to further increase the coverage of services, so that they reach all registered clients, having increased the coverage of services during a period of programme expansion should be recognised as a significant achievement.

3.3.2 Differences in service delivery by place of residence

On the whole, levels of service provision are very similar in urban and rural areas (Table 3.12). Rural areas show levels of provision at least as high as urban areas. Interestingly, LHWs are a more important source of family planning in urban areas than in rural areas.

Table 3.12 Preventive and promotive service delivery by place of residence

Measure	2000 (%)		2008 All LHWs (%)	
	Urban	Rural	Urban	Rural
Households registered with the LHW:				
Report that the LHW has ever talked to them about ways to improve the cleanliness of drinking water	44	45	66	62
Report that the LHW has ever talked to them about ways to improve hygiene and reduce diarrhoea	43	44	66	63
Report that the LHW has ever talked to them about HIV/AIDS			33	31
Women who had a birth in three years before survey (reporting on their last birth):				
Report that the LHW gave them advice on which foods to eat while pregnant	46	45	49	51
Report that the LHW came to see her and the baby within 24 hours	6	11	10	15
Report that the LHW came to see her and the baby within 7 days	33	39	46	46
Report that the LHW saw the baby within 7 days and weighed the baby(1)	11	15	17	15
Report that the LHW saw the baby within 7 days and gave advice on breastfeeding (1)	25	29	30	31
Report that the LHW gave her advice on family planning within 3 months of the birth	44	39	51	49
Report that they had a consultation with LHW during last pregnancy	–	–	6	7
Report that the LHW provided TT shots during last pregnancy	–	–	12	16
Mean number of TT shots received from LHW during last pregnancy	–	–	1.94	1.98
Report that the LHW provided TT shots before last pregnancy	–	–	10	6
Mean number of TT shots received from LHW before last pregnancy	–	–	2.30	2.81
Report that the LHW provided iron tablets during last pregnancy	–	–	21	23
Report that the LHW was present at the time of last birth	–	–	3	5
Report that the LHW attended the birth			1	1
Currently married women (aged 15–49):				

Measure	2000 (%)		2008 All LHWs (%)	
	Urban	Rural	Urban	Rural
Current users of modern contraceptives who were supplied by the LHW	20	19	49	38
Current users of modern contraceptives who were supplied or referred by the LHW	26	34	56	50
Current users of pills and condoms who were last supplied by the LHW	36	50	80	71
Non-users of modern contraceptives who have ever discussed family planning with the LHW	43	40	39	41
Non-users of modern contraceptives who have discussed family planning with the LHW within the last 6 months	27	25	18	22
Current users of modern contraceptive, who were not supplied or referred by the LHW, who have ever discussed family planning with her	42	45	34	42
Current users of modern contraceptive, who were not supplied or referred by the LHW, who have discussed family planning with her in last 6 months	28	27	14	14
Children under 3 years of age:				
Whose mothers say that the LHW talked to her about vaccinating the child	68	67	73.5	75
Whose mothers say that the LHW encouraged her to take the child for vaccination at the age when it was necessary	60	61	59.5	59
Whose mothers say that the LHW gave her advice on feeding the child	39	42	46.7	48
Whose mothers say that the LHW advised about best ways to breastfeed			42.9	47
Ever weighed by the LHW	26	28	21.2	21
Weighed by the LHW in the previous 3 months	11	10	10.6	11

Notes: (1) Corresponds to Table 4.2 in 3rd Evaluation (2) Denominator is all eligible births; LHWs present at birth (4 per cent of cases) are not included in numerator.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.4 LHW outputs – curative services

In addition to preventive and promotive services, LHWs are also meant to provide some curative services. They provide a first point of consultation for many patients, treating them where possible and referring them to health facilities where necessary.

This section looks at the provision of curative services and referral by LHWs. It uses information given by LHWs, their health facilities and the households they serve. It presents information only on the population served by the LHWs.

3.4.1 Consultation with the LHW

While the majority of individuals in the served population who are sick or injured do not see the LHW, LHWs are nevertheless an important source of consultation; overall, 17 per cent consulted the LHW if they consulted anyone at all (Table 3.13), a figure that has reduced compared with 2000 (19 per cent). Some 22 per cent of children under 5 years of age with respiratory infection in the previous 14 days consulted the LHW. In the case of diarrhoea, the level of consultation was slightly lower. Given that there are a number of other sources of care available, this level of use indicates some confidence in the LHW on the part of the households served. As would be expected, females are more likely than males to consult with the LHWs.

When the LHW is consulted, she usually provides the expected 'first contact' service: in most of the cases where the LHW was consulted for children under five with diarrhoea or respiratory infections, she was the first service provider consulted.

Table 3.13 Consultations with the LHW by sick individuals

Measure	2000 (%)	2008 All LHWs (%)
Individuals who were ill or injured in the previous 14days and who consulted any health provider:		
Who consulted the LHW – total	19	17
Who consulted the LHW – female	22	19
Who consulted the LHW – male	16	15
Individuals who were ill or injured in the previous 14 days and who consulted any health provider		
Who consulted the LHW first	–	9
Children under 5 years of age who were ill in the previous 14 days and who consulted any health provider:		
With diarrhoea who consulted the LHW	14	19
With respiratory infection who consulted the LHW	18	22
Children under 5 years of age who were ill in the previous 14 days and who consulted any health provider		
With diarrhoea who consulted the LHW first	–	11
With respiratory infection who consulted the LHW first	–	14
Children under 5 years of age who were ill in the previous 14 days and who consulted LHW		
Mothers reported that LHW gave advice about how to prevent diarrhoea in future	–	57[2]

Notes: (1) Corresponds to Table 5.1 in 3rd Evaluation. (2) This estimate is generated for a sample size of less than 150.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 3.14 Reason for not consulting the LHW: children under 5 years of age with diarrhoea

Reason	2000	2008 All LHWs
LHW not available/not helpful	37	22
LHW cannot treat diarrhoea	3	5
Lack/poor quality of medicines	10	13
Preferred consultation elsewhere	17	16
Consultation was not necessary	12	31
Other	21	13

Notes: (1) Corresponds to Table 5.2 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The main reason why LHWs were not consulted – for children under 5 years of age, at least – was that they felt that consultation was not necessary. One fifth felt that the LHW was not available or was not helpful (Table 3.14), a decline since 2000. When the lack of medicines is added to this, over one third of the reasons given for not taking up the service are due to factors that the Programme should be able to improve in order to increase the uptake of curative services.

A small proportion of LHWs appear to be charging a consultation fee to see sick children (Table 3.15). This is against Programme policy and should therefore be viewed as a non-performance issue. The only provision for which charges are permitted is for oral contraceptive pills and for condoms. Respondents stated that they paid the LHW in 9 per cent of consultations for diarrhoea.[15] Those LHWs who are charging for a consultation are charging above the level of a dispenser or compounder and below the fees reported for a private clinic. However, LHWs were charging well above the consultation fees reported for government clinics and hospitals.

Table 3.15 Payment for consultation for children with diarrhoea and respiratory infections by source of consultation

Source of consultation	Diarrhoea		Respiratory infections	
	Who paid[(1)] (%)	Mean amount paid (Rs.)	Who paid[(1)] (%)	Mean amount paid (Rs.)
LHW	9.0	90.0	0.0	-
Government hospital	48.0	10.0	42.0	5.0
Private clinic or hospital	93.0	100.0	93.0	100.0
Private practitioner	94.0	80.0	94.0	70.0
Dispenser/compounder	56.0	70.0	52.0	50.0
Hakeems/homeopath/other	50.0	50.0	44.0	20.0
Overall	71.0	80	66.0	80.0

Notes: (1) Corresponds to Table 5.3 in 3rd Evaluation (2) Payment for the consultation itself rather than for medicines or other related treatment costs (3) The estimates in this table are sometimes based on less than 50 cases.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.4.2 Consultation with the LHW by place of residence

LHWs' role in curative care is substantially larger in rural areas than in urban areas (Table 3.16). As was found in the 3rd Evaluation, this is particularly true for rural women and girls; around one fifth of females who had been ill consulted a LHW, if they consulted any care provider. It is interesting to note that the urban/rural differences are not so pronounced in the current survey, largely because LHWs have become a somewhat less important source of care in rural areas since 2000.

Table 3.16 Consultations with the LHW by sick individuals by place of residence

Measure	2000 (%)		2008 All LHWs (%)	
	Urban	Rural	Urban	Rural
Individuals who were ill or injured in the previous 14 days:				
Who consulted the LHW – total	11	22	14	18
Who consulted the LHW – female	14	25	16	20
Who consulted the LHW – male	8	19	12	16
Individuals who were ill or injured in the previous 14 days and who consulted any health provider				
Who consulted the LHW first	–	–	6	9

15 Some 4 per cent of women who received iron tablets from the LHW also reported paying for them.

Measure	2000 (%)		2008 All LHWs (%)	
	Urban	Rural	Urban	Rural
Children under 5 years of age who were ill in the previous 14 days and who consulted any health provider				
With diarrhoea who consulted the LHW	10	15	15[2]	20
With respiratory infection who consulted the LHW	12	19	16[2]	23
Children under 5 years of age who were ill in the previous 14 days and who consulted any health provider				
With diarrhoea who consulted the LHW first	–	–	3[2]	13
With respiratory infection who consulted the LHW first	–	–	9[2]	16
Children under 5 years of age who were ill in the previous 14 days and who consulted LHW				
Mothers reported that LHW gave advice about how to prevent diarrhoea in future	–	–	40[2]	60

Notes: (1) Corresponds to Table 5.4 in 3rd Evaluation. (2) These estimates are generated using a sample size of less than 150 cases.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.4.3 Types of cases seen by the LHW

LHWs were asked about the last client that they had seen prior to the interview – including all types of client, even a routine household visit. This information confirms that curative services are an important part of their workload (Table 3.17). Indeed, over half of the cases seen by LHWs are curative rather than preventive, although some caution is required in interpreting these figures, since it might be that the LHWs were more likely to report a client who was ill than to report the delivery of routine preventive services. Treating fever and diarrhoea were the most commonly reported activities (excluding 'other').[16]

Table 3.17 Distribution of type of case last seen, as reported by the LHW

Case	Percentage of cases	
	2000	2008 All LHWs
Routine visit – pregnancy (including TT)	2.8	3.0
Routine visit – family planning	10.6	6.9
Routine visit – for/immediately after birth	0.1	1.7
Routine visit – growth monitoring/nutritional advice	1.0	0.3
Routine visit – vaccination of children	0.3	0.0
Complication of pregnancy	1.0	3.0
Complication of delivery	0.8	0.3
Problems with family planning	2.2	2.1
Suspected malaria	4.2	2.8
Unspecified fever	19.4	21.9
Diarrhoea	6.4	10.9

16 Note that the 2008 'comparable LHWs' were found to be less likely to make routine family planning visits than 'all LHWs'. They were also more likely to make routine visits after deliveries. The relevant tabulations are presented in Annex C.

Case	Percentage of cases	
	2000	2008 All LHWs
Respiratory infection	15.6	8.6
Skin infection	1.2	4.2
Eye infection	4.7	8.3
Worms/parasites	1.3	2.0
Asthma	0.8	0.4
Anaemia	5.0	5.7
Injury/burn	3.1	5.5
TB dots	n/a	0.8
Other	19.7	11.4
Total	100.0	100.0

Notes: (1) Corresponds to Table 5.6 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Many LHWs are playing a role in the identification and referral of serious cases, as was found in the 3rd Evaluation, and around two thirds of LHWs had been consulted for an emergency (Table 3.18).[17] Complications of delivery and pregnancy, together with severe dehydration, were the most common.

However, the proportion that said that they had never seen an emergency case has increased. The explanation for this is unclear. It is possible that health-seeking behaviour has shifted towards the private sector.

Table 3.18 Distribution of last emergency case seen, as reported by the LHW

Case	Percentage of LHWs	
	2000	2008 All LHWs
Never seen an emergency case	24	36
Acute complication of pregnancy	8	8
Acute complication of delivery	17	11
Acute respiratory infection	9	5
Severe dehydration	8	10
Prolonged high fever/malaria	5	6
Serious injury/burn	8	5
Other	22	19
Total	100	100

Notes: (1) Corresponds to Table 5.7 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.4.4 Treatment and referral

Respondents in the household interviews were asked about the treatment and advice given to children with diarrhoea. The results suggest that LHWs show relatively good practice in the treatment of simple diarrhoea. Of all care providers, LHWs are the most likely to

17 LHWs were asked to report on the last emergency case seen – that is, the last case that they saw who required immediate referral to a health facility.

recommend oral rehydration solutions (both packet and home-made) and an increase in the provision of other liquids (Table 3.19). Together with private providers, they are the most likely to advocate continued feeding and breastfeeding (recommendations that would be applicable only to a proportion of the children).

It should be remembered that there was no clinical evaluation of cases, and there might have been differences in the type or severity of the cases seen by the different care providers. Section 2 also showed that LHWs' knowledge is variable when a wider range of health matters is considered. Nevertheless, the results are encouraging, and the contrast with other community-based providers is particularly striking: less than one fifth of the hakeems and homeopaths were reported to recommend any form of rehydration.

Table 3.19 Treatment and advice given for diarrhoea by source of consultation (children under five years) year 2008

Treatment or advice given	LHW	Govt hospital/ clinic	Private hospital/ clinic	Private practitioner	Dispenser/ compounder	Hakeem/ homeopath / others
Antibiotics or other medicine	81	96	97	99	100	70
ORS	90	75	67	34	43	21
Home-made sugar/ salt solution	13	6	3	3	0	11
Increase in other liquids	18	10	12	3	2	0
Increased/continued breastfeeding	5	2	0.1	3	4	0
Continued feeding (solid/semi solid food)	7	3	5	3	0	0
Drip (IV Saline)	0	14	33	9	4	15
Other treatment/ advice	2	5	4	3	11	40

Notes: (1) Corresponds to Table 5.8in 3rd Evaluation (2) Columns might sum to more than 100 as multiple responses were given. (3) Distributions of the following are based on fewer than 100 cases: LHW (78 cases); dispenser/compounder (84); hakeem/homeopath/other (25). (4) The most common answer given under 'other treatment/advice' for LHWs was 'advice on cleanliness'
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

LHWs are expected to treat many cases themselves; cases that they cannot treat are referred to health facilities. This is intended to channel serious cases to the facilities, while reducing the burden imposed on facilities by simple cases that can be treated in the community. Table 3.20 shows that nearly one third of the referred cases are sent to the LHW's FLCF, one third to another government health facility and one third to a private source of health care.

Table 3.20 Last referral case by LHW

	2008 All LHWs
Last case was referred to:	
LHW health facility	33
Government primary health facility (other than LHW)	9
Government hospital	26
Private hospital/clinic	32
Others	1
Total	100
LHWs filled referral slip (%)	42
LHW reported that patient went to facility (%)	85
Reason for not going to health facility:	
Lack of transport	7
Lack of money	12
No body to accompany/no permission	7
Went to another health provider instead	47
Died before going	8
Other	20
Total	100
LHWs accompanied the patient to health facility (%)	38
LHWs received feedback from health facility (%)	79

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

3.5 Key findings

3.5.1 LHW coverage

The LHW Programme has increased its scale substantially and, in 2008, there were just under 90,000 LHWs nationwide. Since each of them is supposed to serve around 1,000 individuals, this gives a nominal served population of around 90 million individuals. In practice, the survey found that the mean number of people registered per LHW was 919, a drop from 980 in 2000. Very few registered households were found to be non-existent (fewer than 1 per cent), while some 5 per cent of surveyed households were not aware of being registered. This represents an improvement over the 3rd Evaluation, which found that 13 per cent were unaware of being registered. The number of households per LHW shows considerable variation, with 18 per cent having fewer than 100 households, compared with the norm of 200 per LHW; 2 per cent have more than 200.

Reports on visits came from the LHW, from households and from community groups (men and women). LHWs report that they carry out an average of 27 household visits per week (slightly up from 25 in 2000), and that they see 22 individuals per week for consultations and/or advice. There is variation in performance, however, indicating quite a low level of utilisation for some LHWs. From the household perspective, 85 per cent report having had a visit from the LHW within the past three months, which indicates a substantial minority of registered households (15 per cent) that are not in regular contact with the LHW. Community group reports on LHW performance are all improved, relative to 2000, with the exception of making regular visits: some 30 per cent of LHW do not regularly visit married women, according to these group discussions.

3.5.2 LHW activities

There has been an increase in LHWs' reported time spent working since the last survey. In the current survey, 80 per cent of LHWs work 6–7 days per week, compared with 60 per cent in the 3rd Evaluation. Most LHWs now work 30 hours per week and an average of 5 hours per day: only one tenth work fewer than 10 hours per week, compared with one quarter in the 3rd Evaluation. Generally, there has also been an improvement in the level of activity by rural LHW since the last survey.

3.5.3 LHW outputs – preventive and promotive services

Many individuals in the population served by LHWs are being provided with preventive and promotive services. The level of provision varies with the type of service. Many services reach around half of eligible clients, but some have higher coverage: around two thirds of households report that the LHW has undertaken hygiene promotion, and vaccination promotion has reached three quarters of children under 3 years of age. In contrast, early visits to newborns (within 24 hours) and growth monitoring reach far fewer clients.

LHWs continue to play an important role in family planning provision. There have been some substantial improvements in the level of service delivery since the 3rd evaluation, particularly for family planning services, although promotion to non-users appears to have declined. While there is a need to further increase the coverage of services, so that they reach all registered clients, having increased the coverage of services during a period of programme expansion should be recognised as a significant achievement.

3.5.4 LHW outputs – curative care

LHWs are an important source of curative consultations for the population they serve: 17 per cent of all who consult for an illness report consulting the LHW, usually as the first contact point. The LHWs are particularly important for rural women, though the use of their services has declined in rural areas, and the gap between has narrowed since 2000. Many continue to see emergency cases.

For those who did not consult the LHW, the main reason given was that the consultation was not necessary (31 per cent), which compares favourably with the 2000 results, where the main factor was that the LHW was not available or helpful (37 per cent). It appears, however, that a small fraction of LHWs are charging for consultations: 9 per cent of consultations for diarrhoea were charged, according to households, and at a rate that exceeded all other providers other than private hospitals/clinics. This is against Programme policy and should be viewed as a non-performance issue.

While a clinical assessment of the treatment of patients by LHWs was not undertaken in this study, reports of their treatment of children with diarrhoea are encouraging. They compare particularly favourably with other community-based care providers such as hakeems and homeopaths.

Finally, it is clear that LHWs are generally providing the intended link between communities and the health facilities that serve them.

4 LHW performance

This section brings together information on LHW performance and on the Programme support services covered in the two previous chapters. Specifically, it looks at how service provision varies between LHWs. Are some LHWs providing services to all eligible individuals and other LHWs providing services to none? Or are all LHWs serving some of their clients? And do these levels of provision vary by type of service: do some LHWs provide one type of service to all members of one client group but fail to provide another type of service at all?

This chapter defines LHW performance in terms of the proportion of expected contacts actually being made. The quantity of expected contacts is essentially the number of registered individuals eligible to receive specific services from the LHW. The assessment of whether or not the contact is being made relies on reports from the served household members who are expected to have received each specific type of contact.

In other words, LHW performance is defined in terms of rates of service delivery, rather than volumes. This is consistent with the third evaluation. The rate with which LHWs deliver services to their registered households is within their control, and should be maximised from the perspectives of both impact and efficiency. However, the measure does not reflect the total volume of services provided by the LHW, since that will also depend on the number of households registered. That is discussed in Section 3, and has declined slightly since 2000.

The factors that explain variations in service delivery (contact) rates between LHWs are explored using regression analysis.

4.1 Measuring LHW performance

4.1.1 Construction of the LHW performance score

Households sampled from each LHW's register were asked about the provision of a range of services by the LHW. Information on each type of service was presented in Chapter 3. For each LHW, we construct a summary measure of LHW performance that covers a range of the preventive services that all LHWs are supposed to provide. This summary LHW performance score is exactly equivalent to that in the 3rd Evaluation. It includes five broad categories of preventive and promotive services in the areas of hygiene promotion, vaccination, family planning, pregnancy and birth, and child nutrition and growth. For each category, two tasks were selected.

The ten measures included in the performance score are:

- Number of households who report that the LHW talked about ways to improve cleanliness of water
- Number of households who report that the LHW talked about ways to improve hygiene
- Number of women aged 15–49, who are non users of modern contraceptives, who report that the LHW discussed family planning
- Number of women aged 15–49, who are users of modern contraceptives, who report that the LHW supplied them or referred them to a health centre
- Number of mothers who gave birth in last three years who report that the LHW gave advice on which foods to eat during pregnancy

- Number of mothers who gave birth in last three years who report that the LHW saw the mother at birth or within a week of the birth
- Number of children under 3 years of age whose mothers report that the LHW talked about vaccination
- Number of children under 3 years of age whose mothers report that the LHW encouraged vaccination of the child at appropriate ages
- Number of children under 3 years of age whose mothers report that the LHW gave advice on feeding the child
- Number of children under 3 years of age whose mothers report that the LHW weighed the child within the last three months

Most of these services are only relevant to particular groups. For example, in order to evaluate an LHW's performance on vaccination and weighing children under 3 years of age, we must sum the total number of children under 3 years of age in the sample interviewed for that LHW. This provides the denominator for the measure. The numerator is given by the number of those children whose mothers were informed about vaccination, that were encouraged to take their child for vaccination at an appropriate age, and the number of children that were weighed in the last three months.[18]

In this way, each LHW was evaluated on the basis of the people she should have served, which vary across the LHWs. The summary performance measure was constructed by summing the numerator and denominator in this manner across all of the services listed above. The final proportion was then expressed as a percentage. It was decided not to standardise for client group composition.

Curative services are excluded from this measure as they are carried out on demand and might therefore reflect a more complex range of factors than the promotive services listed above. Measures of activities, rather than services delivered, are also excluded. For example, the number of hours worked, numbers of households visited, and so on. This is partly because many of these measures are reported by the LHW herself, and therefore more likely to be biased, whereas the service delivery measures are reported by the households.

Table 4.1 gives the mean value of this performance measure for all LHWs and by urban/rural residence. On average, 52 per cent of expected services were provided to eligible individuals across all LHWs, a significant increase from 42 per cent in 2000. The improvement in mean performance score since 2000 is even higher when only comparable LHWs are taken into account (55 per cent overall). All improvements since 2000 are statistically significant. Average levels of performance are almost even across the rural and urban areas; the difference is marginal.

18 To illustrate, suppose there were 6 children below three years in the sample of households interviewed for a particular LHW. She weighed 2 in the last three months, and discussed vaccination for 5 and encouraged vaccination for 4. In other words, she was supposed to carry out 18 tasks (6 weighings + 6 discussions on vaccination + 6 encouragements of vaccinations). Out of the 18 she has performed 2 + 5 + 4 = 11. Hence, a simple score on these three tasks alone is 11/18.

Table 4.1 Mean LHW performance score, overall and by place of residence

Measure	Total	Urban	Rural
2000	42***	39***	43***
2008 (All LHW)	52	53	52
2008 (Comparable LHWs)	55	54	55

Notes: (1) All differences between 2000 and 2008 are statistically significant at the 1 per cent level (2) Corresponds to Table 8.1 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The performance score can be used to examine performance by stratum and region of residence. Table 4.2 shows that rural areas have a slightly larger proportion of LHWs that do not perform well. Although the variation is not very pronounced, AJK and NA, and NWFP have the highest levels of performance, while Sindh has the lowest. Almost 30 per cent of all LHWs in Sindh fall into the lowest performance quartile. However, the mean performance score has increased appreciably in all areas since the 3rd Evaluation, with the improvement most pronounced in Balochistan. All of these improvements except in AJK/NA are statistically significant.

Table 4.2 LHW performance score by stratum and urban/rural

Area/stratum	2000	2008 All LHWs
Rural	43	52***
Urban	39	53***
Punjab and ICT	42	53***
Sindh	40	50**
NWFP and FATA	47	53*
Balochistan	31	54***
AJK & NAs	52	58

Notes: (1) Significance Tests have been performed for the differences between the 2000 and 2008 scores. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. (2) Corresponds to Table 8.4 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

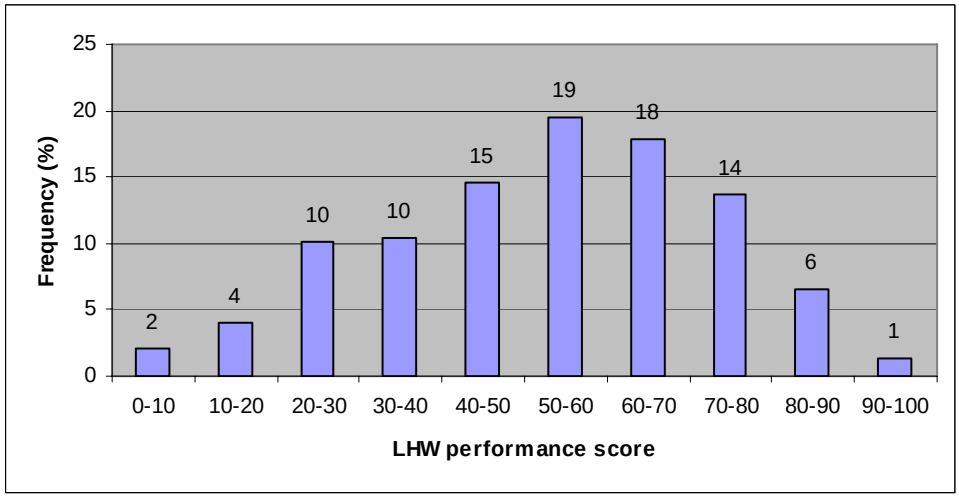
It is interesting to assess how LHW performance varies with the number of households registered: it might be expected that LHWs with very few registered households could deliver a much higher proportion of the services required of them, and vice versa, implying a negative relationship. In fact, it is found that that there is no such negative relationship.[19] In other words, LHW performance does not vary systematically with the number of households registered with the LHW.

4.1.2 Variations in LHW performance

Figures 4.1 and 4.2 show the distribution of LHW performance scores. There is clearly a wide spread in LHW performance, with some LHWs providing worryingly low rates of service delivery, particularly in rural areas.

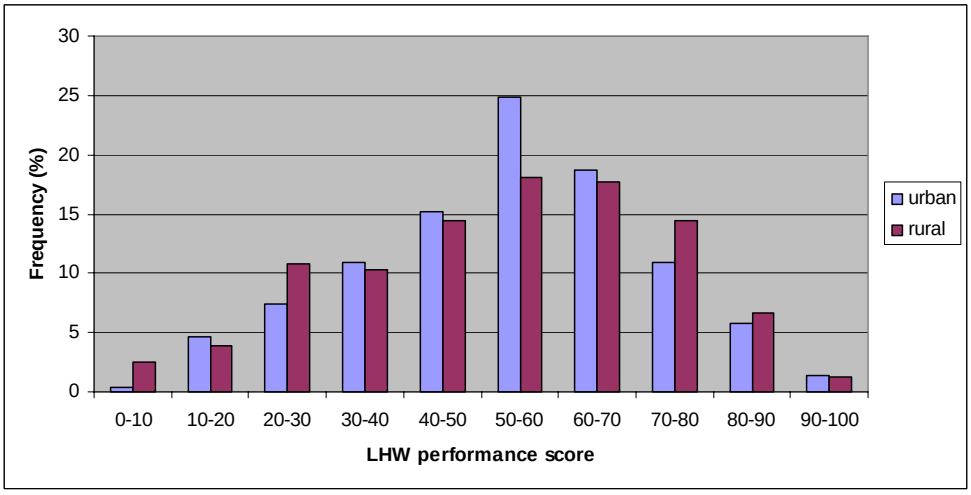
19 The correlation coefficient between the two variables is -0.0087.

Figure 4.1 Distribution of LHW performance score



Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Figure 4.2 Distribution of LHW performance score – by place of residence



Source: OPM LHWP 4th Independent Evaluation, Quantitive Survey Data (2008).

By defining quartiles of the performance score, which divide LHWs into four equally sized groups based on the distribution of the score, from the bottom 25 per cent to the top 25 per cent, Table 4.3 shows that LHWs who provide a low level of service overall also provide a low level of service for all individual services.

At one extreme, the best performing 25 per cent of LHWs cover at least 60 per cent of clients – and, often, well above this – for all services except growth monitoring. At the other extreme, the worst performing 25 per cent of LHWs provide services to less than one third of clients. The level of service provision by the LHWs that do not perform well represents serious under-utilisation of resources.

There is an unambiguous gulf between high and low LHW performance. Since this pattern applies consistently across all services, it is also clear that there is no 'specialisation', in the sense that some LHWs concentrate on one task at the expense of other tasks.[20] In keeping with the findings of the 3rd Evaluation, the low level of growth monitoring even in the high performing LHWs suggests that there remain quite distinctive problems in the provision of this service.[21]

Table 4.3 Levels of service provision by performance score quartile – for services included in the performance score

Measure	Lowest quartile (%)	2nd lowest quartile (%)	2nd best quartile (%)	Best quartile (%)
Mean summary performance score	25.9	48.6	62.7	77.8
Households who report that LHW talked about ways to improve cleanliness of water	33.0	62.0	74.0	87.0
Households who report that LHW talked about ways to improve hygiene	32.0	61.0	76.0	88.0
Women aged 15–49, who are non-users of modern contraceptives, who report that LHW discussed family planning	25.0	36.0	49.0	66.0
Women aged 15–49, who are users of modern contraceptives, who report that LHW supplied them or referred them to a health centre	27.0	44.0	47.0	61.0
Mothers who gave birth since 2004 who report that LHW gave advice on which foods to eat during pregnancy	17.0	40.0	65.0	79.0
Mothers who gave birth since 2004 who report that the LHW saw mother at birth or within a week	23.0	40.0	52.0	76.0
Children < 3 years of age whose mothers report that the LHW talked about vaccination	44.0	74.0	88.0	99.0
Children < 3 years of age whose mothers report that the LHW encouraged vaccination at the correct age	31.0	56.0	70.0	84.0
Children < 3 years of age whose mothers report that the LHW gave advice on feeding the child	17.0	41.0	61.0	81.0
Children < 3 years of age whose mothers report that the LHW weighed the child within the last three months	2.0	7.0	12.0	28.0

Notes: (1) Corresponds to Table 8.2 in 3rd Evaluation.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

20 While some correlation is built into the cross-tabulation in Table 4.3, the pattern is so strong across each service that the conclusions are unambiguous.

21 The lack of knowledge, lack of scales and lack of growth cards identified in other parts of the report must all be part of the problem.

4.2 Explaining LHW performance

As for the analysis of the determinants of LHW knowledge scores, regressions methods were used to evaluate which factors show the strongest relationship with LHW performance, taking into account the effect of other variables.[22]

The LHW performance score was used as the dependent variable, with a wide range of factors that could have a possible effect on LHW performance and that were measured within the survey considered as possible explanatory factors. The potential explanatory factors can be split into various groups: LHW characteristics; the characteristics of the LHW's supervisor; the characteristics of the community served by the LHW; and district-level factors. A detailed list of the range of measures used as potential explanatory factors for the model can be found in Annex E.

Table 4.4 shows the coefficients and significance level for the preferred model specification. Coefficients show the impact of the explanatory factors of LHW performance, taking into account the effect of other factors. A factor with a positive coefficient is positively associated with LHW performance; the opposite being true of those with a negative sign.

Potential explanatory factors of LHW performance that were found to be statistically *insignificant* include:

4.2.1 Characteristics of the LHW

- LHW's age
- LHW's knowledge score
- Attendance at Counselling Cards, Child Health and/or OBSI refresher training courses and possession of the refresher training manuals
- Number of households registered with the LHW
- Number of days spent working on the NIDs
- Whether LHW worked on NIDs outside her catchment population
- LHW was previously a VBFPW, CHW or NCHD LHW
- LHW has not had a meeting with LHS within the last month
- LHW is resident in the village/mohalla that she serves
- LHW has another paid job
- Availability and stock-outs of key drugs/medical supplies
- Availability of key items of LHW equipment

4.2.2 Characteristics of LHW's supervisor

- LHW was informed of her performance score in last meeting with LHS
- LHW's LHS usually or always has access to a LHWP vehicle
- LHW's LHS is married and has used modern method of FP

22 Linear regression models were used. Initially a stepwise regression approach was taken to identify a preliminary set of key explanatory variables. This 'baseline' specification was then refined, with some explanatory variables re-specified and certain factors considered important *a priori* added back into the specification, and then tested back down to deliver a tight specification with a high R-squared value. Standard errors were estimated allowing for sample clustering by district (see Annex A for full details of the sampling methodology). The variables found to be significant in the final specification are robust in the sense that their coefficients remain significant and of the same sign when other variables are added or removed from the specification.

4.2.3 Characteristics of the community served by the LHW

- Distance from LHW's community to Tehsil capital
- Health provider nearby (<5km) with medicines usually available
- Health provider nearby (<5km) with FP services available
- Proportion of women aged 15–49 in LHW's catchment area who themselves make the decision (alone or jointly with husband) to consult someone if a child is sick
- Male literacy rate in LHW's catchment area
- Mean household consumption expenditure per adult equivalent in LHW's catchment area

4.2.4 District-level factors

- Proportion of time the EDO-H spends on LHWP activities
- DPIU reports that LHSs are expected to report on non-performing LHWs at the DPIU monthly meeting
- DC received LHWP training/orientation in FY 07-08.

The factors that *are* significantly associated with LHW performance at the 10 per cent level are summarized in the following Table 4.4.

Table 4.4 Factors associated with LHW performance

Explanatory variable	Regression results Regression Coefficient
LHW characteristics:	
LHW experience (months in post)	0.08***
Number of hours worked by LHW last week	0.18***
LHW worked 7 days in previous week	-5.71***
LHW attended Revised MIS Tools refresher training in past year	5.64***
LHW attended Injectable Contraceptives refresher training in past year	4.33**
Decisions over spending LHW earnings made by LHW herself or jointly with her spouse	-4.29*
LHW's household's main source of income is agriculture wage earnings or crop income	-12.01***
Number of children under 5 years of age	-3.29***
Characteristics of LHW's supervisor:	
LHW's LHS had a meeting with FPO in last 3 months and diary/work-plan was checked	10.76***
LHW had meeting with LHS in last month during which the LHS visited households with and without the LHW and recorded the LHW's performance score in her diary	6.39*
Characteristics of the community served by the LHW:	
Community has a Women's Health Committee	12.83***
Distance to district capital	1.61***
Female wage rate in LHWs community	-0.02**
Male wage rate in LHWs community	0.05***
District-level factors:	

Explanatory variable	Regression results
	Regression Coefficient
Size of LHWP in the district (total number of LHWs working in the district in June 2008)	-0.01***
Time EDO-H spends working on LHWP (%)	0.23**
Number of days DC usually spends in field per month	1.24***
Each facility has an individual with overall responsibility for LHWP	4.48**
Action normally taken in cases of non-performing LHWs: reduce or delay salary payment	-7.91***
LHS is expected to report on non-available LHWs at DPIU monthly meeting	4.47*
Programme priorities successfully communicated to the LHW[4]	4.07**
Constant	-3.82

Notes: (1) Corresponds to Table 8.7 in 3rd Evaluation. (2) R-squared = 0.3295; 553 observations. (3) Standard errors calculated allowing for clustering by district. (4) Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. (5) The degree to which Programme priorities were successfully communicated to the LHW was captured by asking the LHW for the three most important LHW activities. If all three activities named by the LHW match with three of the DPIU's top five priorities (as reported by the DC) then the LHW is judged to have had the LHWP's priorities successfully communicated to her.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The results show that LHWs who are more experienced tend to have higher performance scores: the performance score increases by 8.4 percentage points with every additional 10 years' experience. Perhaps unsurprisingly, service delivery rates also increase with the number of hours worked. There are concerns that some LHWs might be overburdened and working too many hours, and that this is having an adverse effect on their performance. In fact, it appears that working a high numbers of hours per week is not a problem.[23] However, not having at least one day off is a problem: LHWs that worked seven days during the previous week have significantly lower performance scores. This is consistent with reports of discontent amongst LHWs who have to work a seven-day week.

Performance scores are considerably lower amongst LHWs whose household's main source of income is an agricultural wage or crop earnings, suggesting that LHWs from poorer households will have lower performance levels. This is also suggested by the finding that LHWs serving communities with lower male wage rates have lower performance levels. LHWs with greater autonomy over how their earnings are used (decisions over earnings made by the LHW herself or together with her husband) display a higher performance level. Having young children (under 5 years of age) appears to reduce LHW service delivery rates, but not because of reduced hours worked since this is already controlled for. In other words, having young children does not necessarily make LHW work fewer hours, as might be expected given the time required for child care, but apparently makes them less effective in their level of service delivery.

MIS refresher training specifically appears to be an important determinant of LHW performance levels, perhaps because it focuses the LHWs on the services that they should be delivering and motivates them to deliver, as they perceive their performance is being monitored. Having attended Injectable Contraceptives refresher training in the past year also appears to be associated with higher LHW performance.

23 A dummy variable (which indicated whether LHWs are spending over 35 hours working per week or not) was included in the model but was not significant. The number of hours squared was also included. Although it did have a negative coefficient (indicating decreasing productivity with hours worked) it, too, was not significant.

In terms of the impact of LHS supervision and support, performance scores are higher amongst those LHWs who had a supervision visit from the LHS within the last month during which the LHS visited households, both with and without the LHW present, and rcorded the LHW's performance score in her diary. Although this result is not quite significant at the 95% level, taken together with evidence presented in the Management and Systems Reviews, it provides a strong indication that good quality supervision, in which households are visited, the checklist/diary is checked and the LHW's performance score is recorded, is positively associated with LHW performance.

Those LHWs with supervisors that had had a meeting with their FPO in the last three months in which their diary/work-plan was checked have higher performance levels. Furthermore, LHWs in districts where all served facilities have a specific individual with responsibility for overseeing LHWP activities also have higher performance scores.

LHWs serving communities that have a women's health committee have significantly higher performance. This might be capturing not only any positive support that women's health committees provide LHWs, but also the local social and cultural factors that simultaneously allow a women's health committee to operate and that are conducive to LHWs delivering high rates of service delivery.

In terms of district-level factors, the size of LHWP in the district, as measured by the total number of LHWs working, is negatively associated with LHW performance, presumably because performance management becomes harder the more LHWs there are to manage. However, DPIUs that are more involved in the Programme (as indicated by the proportion of time the EDO-H works on LHWP activities) have better performing LHWs. Finally, the performance management regime in the district is important. LHW performance scores are better in districts where LHSs are expected to report on non-available LHWs at the DPIU monthly meeting. Interestingly, sanctioning non-performing LHWs with salary deductions or delays does not seem to be an effective way of increasing their performance, perhaps because it is not constructive, in the sense that it does not attempt to understand and redress the cause of non-performance, and is therefore de-motivating.

The degree to which Programme priorities were successfully communicated to the LHW was captured by asking the LHW for the three most important LHW activities. If all three activities named by the LHW match with three of the DPIU's top five priorities (as reported by the DC) then the LHW is judged to have had the LHWP's priorities successfully communicated to her. Successful communication of Programme priorities is positively associated with LHW performance.

4.3 Key findings

An overall performance score was measured, based on the proportion of preventive and promotive services rendered to eligible clients. It shows progress relative to 2000, with the average score rising from 42 per cent to 53 per cent across all LHWs. Average levels of performance are almost the same in rural and urban areas.

Statistical analysis was used to identify a range of factors that help to explain variations in LHW performance, some of which are within the control of the programme and that therefore provides some clear policy implications. Specifically, efforts should be made to:

- Retain experienced LHWs;
- Ensure LHWs are working the full hours required of them – this requires adequate supervision support, but LHWs should not be working a seven-day week;

- Ensure that LHW supervisors are themselves regularly and effectively supervised by the FPO, and that performance monitoring tools such as the diaries and work-plans continue to be used;
- Encourage women's health committees to be established/maintained in all served areas;
- Maintain a focus on MIS reporting – in particular, making clear the services that the LHW should be providing, and that LHWs understand their performance in delivering these services is being monitored;
- Encourage DPIU's to instigate effective LHW performance management regimes with effective procedures for reporting and sanctioning LHW non-performance: punishing LHWs with salary deductions does not appear to be an effective response to non-performance, in contrast to providing additional training, ideally directed at the specific area of non-performance;
- Ensure all served health facilities have an individual with overall responsibility for overseeing LHWP activities.

It is important to note the specific, and rather narrow, definition of 'performance' that has been used for this analysis. It is the variations in the *rate* of service delivery, and the factors that help explain these, rather than the total *volume* of services that has been considered. The rate with which an LHW delivers services to these households is within her control and should be maximised from both an impact and an efficiency perspective. However, from the programme's perspective, the volume of services delivered and the efficiency with which they are delivered are also very important. Therefore, in addition to the policy implications listed, it is important that the Programme does not lose sight of the need to ensure that the number of households registered per LHW is appropriate (that is, ensure service volumes are sufficienty high) and does not vary too much (that is, ensure there are few very under- and over- worked LHWs), while recognising that different environments may impose constraints on what can realistically be expected. The definition of LHW performance also does not account for the quality of services being delivered, both in terms of the promotive and curative advice and treatment being given by LHWs, and also the extent and quality of the referral services available. We know from Chapter 2 that improvements can be made in both these aspects of service quality. Therefore, as for service volumes, it is important that efforts to ensure high rates of service delivery do not come at the expense of service quality – in particular, ensuring high levels of LHW knowledge and adequate availability of supplies and referral services.

5 Programme expansion and characteristics of beneficiaries

The LHWP has expanded considerably since the 3rd Evaluation was undertaken in 2000. In this section, we first examine the patterns of the Programme's expansion, as we analyse the changes in characteristics, over time, of health facilities attached to the Programme, and the changes in characteristics of the LHWs that have progressively joined the programme.

Information on general socioecomic characteristics of the served households is then presented, including information on trends since the previous survey. This is followed by a comparison of the main traits of served households as compared with the unserved households covered by the survey.

The analysis of Programme expansion that has taken place after the 3rd Evaluation has been undertaken using survey data collected for the 4th Evaluation in 2008. Although this information is sample based, descriptive statistics are representative of the whole population when adequately weighted. The precision of the estimates provided is definitely inferior to that which one would obtain if using census data from administrative sources. However, it provides a reliable overview of the proportion of different expansion categories amongst the population that is currently served by the LHWP.

In order to analyse the Programme's expansion, it is important to consider that this has occurred through the LHWP extending coverage to FLCFs previously not covered, as well as by increasing the number of households served in the catchment areas of FLCFs that were already served in 2000.

The households covered in the current evaluation can therefore be categorised into the following four groups:

- Households attached to 'new' FLCFs
- 'New' households in 'old' FLCFs
- 'Old' households in 'old' FLCFs
- Unserved households

'New' FLCFs are those that would not have been represented in the 3rd evaluation. The 3rd evaluation only covered FLCFs that had at least one LHW in post who had completed her task-based training before 31 December 1997. Therefore, in the current evaluation, any FLCF that did not have at least one such LHW in post before 31 December 1997 is defined as 'new', all other FLCFs are defined as 'old'.

As mentioned above, there has also been expansion within the catchment areas of 'old FLCFs. 'Old households in 'old' FLCFs are those that have been registered with an LHW since April 2001, which is when the fieldwork data collection for the 3rd Evaluation ended. All other households attached to 'old' FLCFs are defined as 'new' households in 'old' FLCFs.

Finally, LHWs can be categorised according to the time at which they completed their task-based training, distinguishing three groups: LHWs who finished their task-based training before 31 December 1997 and work in 'Old' FLCFs, LHWs who work in the same 'Old' FLCFs but finished their task-based training after 31 December 1997, and LHWs working in FLCFs where the programme started operating after December 1997.

5.1 Programme expansion – trends in the characteristics of FLCFs and households covered by the LHWP

5.1.1 FLCF characteristics and programme expansion

In more than half (59 per cent) of the FLCFs where the LHWP is currently operating, the Programme was already operational by December 1997, the remaining 41 per cent only coming into the Programme within the last 10 years. In rural areas, about one quarter of the existing health facilities are still not covered by the Programme. In order to appreciate fully the factors driving the expansion pattern, it is interesting to examine whether the characteristics of health facilities differ according to whether FLCFs were included at an early or late stage, and between served and unserved FLCFs in general.

Overall, although the differences are not striking, Table 5.1 suggests that, as the Programme expanded its coverage, it progressively moved towards less advantaged FLCFs. After 1997, the pattern of expansion has been towards BHUs, facilities with a smaller catchment population and in relatively more remote areas (see measures of distance indicators).

'Old' and 'new' FLCFs seem to be equally functional in some respects (for example, opening hours). However, newly reached facilities are, on average, less well equipped, have poorer stocks of medicines, and have fewer qualified medical staff. Not only is the average number of doctors in post lower (which could be due to the smaller catchment population), but also the efficiency in filling sanctioned posts is lower. This will be due, in part, to the differences in the type of facilities that comprise the two groups.

Table 5.1 Programme expansion – characteristics of FLCFs covered by the LHWP

Measure	Old FLCFs	New FLCFs	All FLCFs
Type of FLCFs			
Provincial/District hospital	4	1	3
Tehsil/civil hospital	5	7	6
Rural health centre	16	8	13
Basic health unit	52	80	65
Dispensary	12	2	8
Mother and Child health centre	8	1	5
DPIU	0	0	0
Others	1	0	1
Mean distance (in hours for one way) from FLCFs to:			
Provincial/district hospital	1.1	1.5	1.2
Tehsil hospital	0.6	1.0	0.8
BHU	0.3	0.2	0.2
District capital city centre	1.0	1.3	1.1
Mean number of hours FLCF is open for treatment of patients daily	*5.7*	*5.7*	5.7
Mean numbers of hours FLCF was open for treatment of patients last week	45	45	*45*
Average population served by FLCF	25,912	21,241	24,082

Measure	Old FLCFs	New FLCFs	All FLCFs
Mean number of doctors' post filled	1.4	0.9	1.2
Ratio of doctors' posts filled to doctors' posts sanctioned	0.8	0.7	0.8
Mean number of staff post filled	7.0	5.8	8.2
Ratio of staff's post filled to staff posts sanctioned	0.8	0.8	0.8
FLCFs having in stock (%)			
Intravenous rehydration drips	75	86	80
Cotrimoxazole	76	69	73
Other antibiotics	89	90	89
Sedative (for toxaemia)	40	41	40
Valium (for eclampsia)	41	24	34
Synometrin (for post-partum haemorrhage)	25	11	19
IUDs	54	47	51
Contraceptive injectables	53	43	48
Contraceptive pills	60	57	59
Condoms	62	47	56
Chloroquine tablets	85	63	76
Chloroquine syrup	64	56	61
ORS packets	72	66	69
Iron tablets (with or without Vitamin B)	81	70	73
FLCFs with functional (%)			
Infant weighing scales	75	71	73
Blood pressure gauge	93	85	89
Steriliser	58	60	59
Oxygen	51	37	45
Refrigerator	78	82	80
FLCFs offering routine in-house vaccination services (%)	79	86	82
FLCF provide 24 hours emergency services (%)	28	25	27

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 5.2 further confirms these lines of interpretation, as it compares FLCFs' characteristics between served and unserved facilities in rural areas. It shows that, compared with served FLCFs, unserved facilities are more likely to be dispensaries with a smaller catchment population and in remote areas. They have generally more limited medical staff, and general support staff. The availability of services in unserved FLCFs is lower than in served facilities as, on average, they are open for treatment only 30 hours per week. The levels of medical stock and equipment are also inferior to served FLCFs.[24] This will be due, at least in part, to being lower level facilities, in which services and equipment would be expected to be more limited.

24 These results must be read in light of potential non-response bias, as it did not prove possible to contact health facility staff for the interview in 20 unserved FLCFs. In the majority of these cases, the FLCF was not functional. These cases are not reported in Table 5.2, which suggests that the health facilities might be performing even less well in unserved areas than is shown here.

Table 5.2 FLCFs characteristics in rural areas – by served/unserved status

Measure	Served FLCFs	Unserved FLCFs
Type of FLCFs		
Rural health centre	14	2
Basic health unit	70	60
Dispensary	9	29
Mother and Child health centre	6	0
DPIU	1	
Others (Sub-health post)	0.3	9
Mean distance (in hours for one way) from FLCFs to:		
Provincial/district hospital	1.25	1.60
Tehsil hospital	0.77	1.22
BHU	0.22	0.55
District capital city centre	1.11	1.45
Mean number of hours FLCF is open for treatment of patients daily	*5.62*	*5.21*
Mean numbers of hours FLCF was open for treatment of patients last week	44.6	29.3
Average population served by FLCF	23,977	16,901
Mean number of doctors' post filled	1.22	0.94
Ratio of doctors' posts filled to doctors' posts sanctioned	0.75	0.64
Mean number of staff post filled	6.66	3.86
Ratio of staff's post filled to staff posts sanctioned	0.79	0.73
FLCFs having in stock (%)		
Intravenous rehydration drips	79	80
Cotrimoxazole	73	62
Other antibiotics	89	77
Sedative (for toxaemia)	36	27
Valium (for eclampsia)	33	30
Synometrin (for post-partum haemorrhage)	16	27
IUDs	48	27
Contraceptive injectables	45	29
Contraceptive pills	57	32
Condoms	57	33
Chloroquine tablets	75	53
Chloroquine syrup	60	52
ORS packets	71	62
Iron tablets (with or without vitamin B)	79	67
FLCFs with functional (%)		
Infant weighing scales	71	55
Blood pressure gauge	88	90
Steriliser	56	52
Oxygen	40	24
Refrigerator	80	56
FLCFs offering routine in-house vaccination services (%)	82	59
FLCFs provide 24 hours emergency services (%)	21	1

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: Information is missing for 20 FLCFs in unserved areas as it was not possible to contact staff at the facility.

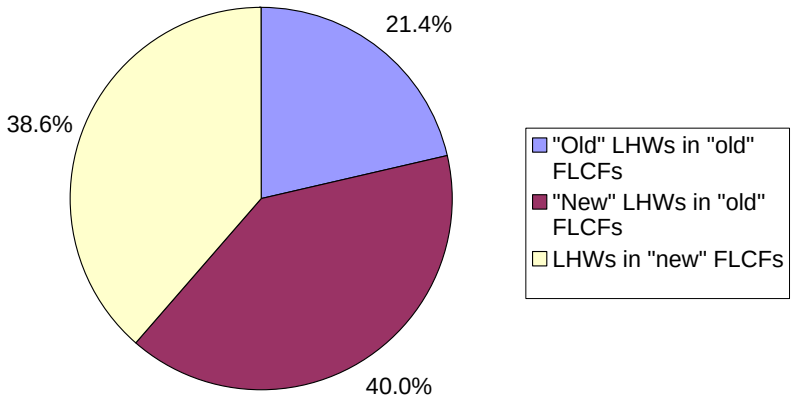
Overall, the picture emerging from Tables 5.1 and 5.2 is that, as the LHWP expands its services to a larger share of the rural population, it might face severe constraint in terms of the availability and the quality of the health supply at local health facilities. These limitations might hamper the effectiveness of the Programme, as the lack of local support from the FLCFs might prevent the Programme from exploiting the benefit of complementing community-based intervention with traditional facility-based health services.

5.1.2 LHW characteristics and programme expansion

A central dimension to consider while analyzing the patterns of expansion is that, as coverage increases, the Programme needs to extend and adapt its inputs in order to maintain the quality of the services provided to the beneficiaries. Here, we analyse the availability and characteristics of LHWs.

First, we consider the distribution of LHWs working in 2008 by FLCF expansion category. Figure 5.1 indicates that about 60 per cent of the LHWs who are currently working in the Programme serve in 'old' FLFCs, but three quarters of them finished their task-based training after December 1997. These 'new' LHWs in 'old' FLCFs are likely to belong to two main groups: some have possibly replaced LHWs that were previously working in 'old' FLCFs and have resigned, retired or moved to other locations; the others are LHWs that contributed to the expansion of the Programme within 'old' FLCFs, by serving new households and clients within the catchment area of an 'old' FLCF. Finally, almost 40 per cent of the LHWs who are currently working are attached to facilities where the Programme expanded after December 1997. The LHW breakdown corresponds with the relative proportion of 'new' and 'old' FLCFs.

Figure 5.1 LHW distribution by FLCF expansion category

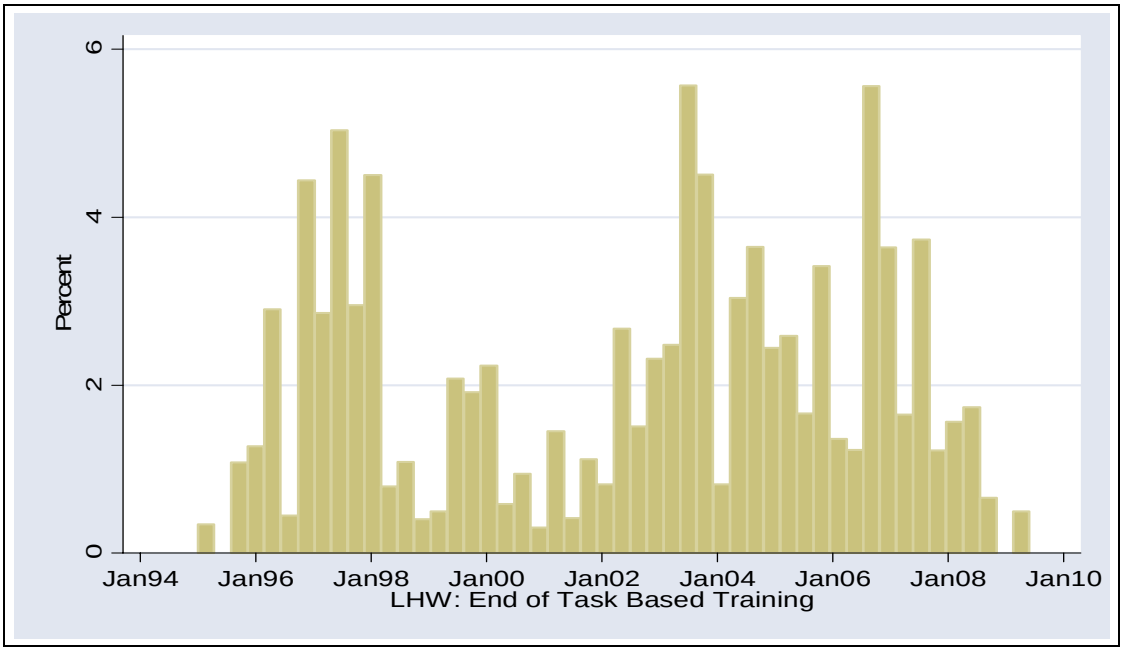


Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

We can also assess how the Programme's expansion has affected LHW recruiting and replacement by looking at the distribution of length of service amongst currently working LHWs. Figure 5.2 shows the distribution of the task-based training completion dates for all the LHWs interviewed in the 2008 survey. It refers only to LHWs who were in post at the time of the survey, and does not capture those who joined and left before the survey was

conducted. Figure 5.2 shows the increase in the number of LHWs serving in the Programme from 1996 onwards, with particular peaks in recruitment around 1997, 2003 and 2006.

Figure 5.2 Date LHW completed task-based training – frequency distribution



Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

From the perspective of the LHWP evaluation, it is important to examine whether the expansion pattern had any consequences for the operation of the Programme, particularly on the quality of the services provided to the households covered by the Programme. In Table 5.3, we examine whether the characteristics of recruited LHWs have changed as the Programme has expanded, and whether there was any difference depending on whether the expansion happened within or across FLCFs.

At a first glance, Table 5.3 suggests that the expansion patterns have been similar in 'old' FLCFs and 'new' FLCFs. However, 'new' LHWs, as a whole, differ in a number of important respects from 'old' LHWs. Several of these differences are due to the fact that the three groups are defined, in part, by length of service. As 'old' LHWs have worked continuously in the LHWP since before 1998, they are, on average, older than 'new' LHWs at the time of the interview in 2008 and, consequently, also more likely to be married currently.

Other differences might reflect a real change in the characteristics of recruited LHWs. 'New' LHWs were recruited when they were slightly older; they are more likely to be divorced/widows/separated; and they have more limited access to media (TV and radio). Table 5.3 also shows that 'new' LHWs are generally more likely to have intermediary level education than 'old' LHWs. This is possibly because 'old' LHWs were recruited at least 10 years ago, when the barriers to education for women might have been higher. As more and more women access education in Pakistan, the LHWP can more easily find new suitable LHWs to serve in the Programme.

Overall, the analysis of LHW characteristics shows that the Programme has been able to maintain many of the most important characteristics of newly recruited LHWs (such as the

level of education) during the period of programme expansion. However, as the Programme expands to even more remote and isolated areas, external factors (such as limited access to information and traditional cultural barriers) might be more likely to affect the characteristics of potential recruits.

Table 5.3 Programme expansion – LHWs characteristics

Characteristics	'Old' LHWs in 'old' FLCFs	'New' LHWs in 'old' FLCFs	LHWs in 'new' FLCFs
Mean age	37.0	31.5	30.5
Mean age when recruited	24.4	25.9	24.9
Marital status (%)			
Never married	11	30	32
Currently married	86	62	58
Widow/divorced/separated	4	8	10
Mean years LHW resided in the village/mohalla	24.5	21.9	20.1
Educational level (%)			
Less than 8 years	1	0	0
8 or 9 years	44	34	31
Matric (10–11 years)	44	43	48
Intermediate (12–13 years)	7	19	18
Graduate (14+ years)	4	5	4
Mean education level (0–5)	9.51	10.0	9.91
Other characteristics			
LHWs who listen to radio at least once a week (%)	24	20	23
LHWs who watch TV at least once a week (%)	80	67	54
LHWs with another paid job (%)	5	5	3
Married LHWs who have ever used modern family planning (%)	82	67	72
Mean total number of children desired			
For themselves (LHWs)	3.3	3.1	2.9
For women in village/mohalla	3.5	3.5	3.4

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

5.1.3 Distribution of served households and programme expansion

Figure 5.5 reports the distribution of households sampled in 2008 according to the date of their registration into the LHWP.[25]

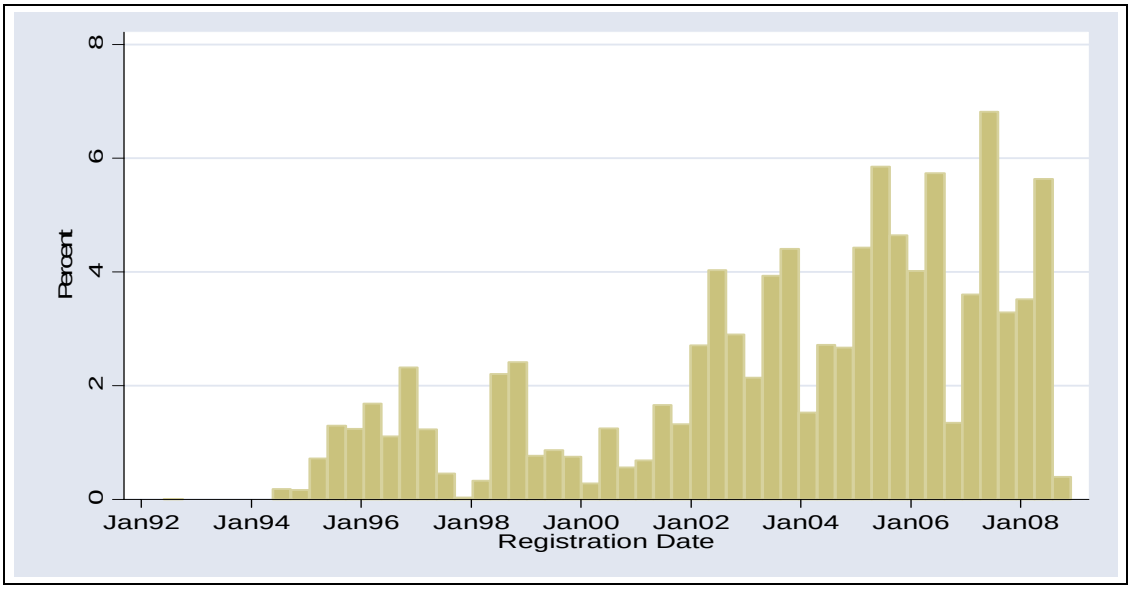
25 Here, we construct a measure of the time the household first ever registered with the LHWP in the past. This accounts for cases where a household was already registered with programme prior to being registered with the LHW current serving the household.

Although informative of the general trend, the figure should be interpreted with caution, as there is possibly a bias to over report households registered in the recent past. In fact those households who have been served for a longer time may find it harder to remember the exact date of registration. When the self reported registration date is missing, we use the official registration date recorded by the LHW who is currently serving the household. Therefore we fail to record any previous registration time with others LHWs. This may contribute to skewing the distribution to the right."

Again, when looking at this evidence, one should take into account that households that registered in the early days of the Programme are less likely to be captured in the 2008 survey, as a sizable fraction of those might have dropped out from the Programme. As such, Figure 5.3 provides a representation of the distribution of the currently served population, rather than the distribution of all members of the population that have ever registered in the Programme.

Despite these caveats, Figure 5.3 seems to show clearly the rate of expansion of household coverage that was relatively moderate between 1995 and 2001. Conversely, the number of newly enrolled households had increased dramatically since 2002, with remarkable peaks in 2005 and 2007.

Figure 5.3 Date of household registration into the LHWP – frequency distribution

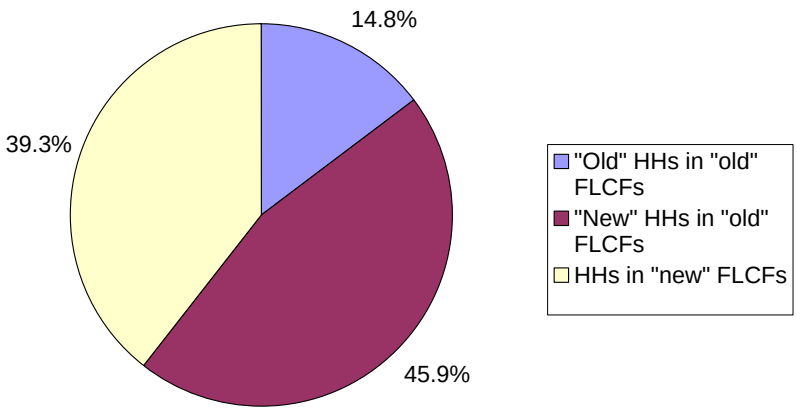


Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Figure 5.4 gives the breakdown of households served by the Programme in 2008, by FLCF expansion category. It confirms that there has been a substantial increase in household coverage (and replacement of drop-outs with new households) over time. Almost 85 per cent of current beneficiaries have registered in the Programme after April 2001.

Interestingly, the largest component of the coverage expansion has been the expansion within ‘old’ FLCFs. This suggests that, at the time of the 3rd Evaluation, served FLCF catchment areas were still substantially lacking cover. In parallel, the Programme has also reached households in ‘new’ FLCF catchment areas, representing 39 per cent of the current served population.

Figure 5.4 Distribution of served households by FLCF expansion category



Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

5.2 Socioeconomic indicators for households served by the LHWP

This section looks at the socioeconomic characteristics of served households. It assesses their socioeconomic status using a range of monetary and non-monetary measures. It also compares households in the present evaluation with those in the 3rd Evaluation. The reasons for this comparison are twofold.

First, it is interesting to draw out changes in the socioeconomic characteristics of the households as a result of the expansion of the LHW Programme. This addresses the issue of whether, following the expansion, the Programme is now serving a population that is more or less advantaged. Second, such comparison could help our understanding of changes in health outcomes since the 3rd evaluation. For example, improvement in the socioeconomic status of households could have a resultant impact on health status, an issue dealt with later in this report.[26]

5.2.1 Trends in the socioeconomic characteristics of served households, 2000-08

Table 5.4 sheds light on the changes in household socioeconomic characteristics since the 3rd Evaluation in 2000. It compares households in the 2000 survey with those in 2008, presenting 2008 information for all served households and for 'old' households.

26 With the exception of indicators on women's role in decision-making, the socioeconomic variables that we consider in this section are mainly medium- or long-term 'structural' characteristics of the households. We can assume that they are not affected by the Programme, and they should not reflect the effect of the LHWP.

Table 5.4 LHW areas

Measure	2000	2008		
		All HHs	'Old' HHs in 'old' FLCFs	All'New' HHs
General (%)				
Urban	26	21[4]	30	22
Income and income poverty				
Real median food and other consumption expenditure (Rupees per month) – expressed in 2000 prices[(1)]	1,019	1,235	1360	1221
Below relative poverty line [(2)]	25	23	21	24
Facilities and utilities (%)				
Households with any toilet	63	79[4]	81	81
Households with a protected water supply	83	88	89	88
Households with an electricity connection	86	94	95	93
Households with a telephone connection	12	10	11	11
Community characteristics (%)				
With a good road into village/mohalla	77	92	96	90
With mostly paved streets	57	65	69	63
With a sewerage or drainage system	68	69	72	67
Within 2 km of a mandi market	34	50	58	49
Within 2 km of a shop that sells basic medicines and FP items	83	83	88	82
Literacy (%)				
Adult women literate	32	43	42	44
Adult men literate	61	66	65	66
Media (%)				
Adult women ever listening to the radio	34	36	38	35
Adult men ever listening to the radio	45	42	46	41
Adult women ever watching television	59	73	78	73
Adult men ever watching television	65	76	79	76
Women's work, mobility and role in decision making(%)[(3)]				
Women who do work other than household work	23	13	16	13
Women who work away from home, of those who work	50	58	51	58
Women who can keep some or all of the money earned, of those who work	70	51	49	51
Women who approve of working outside the home	73	75	76	75
Women who went out of the village in the past month unaccompanied, of those who went outside the village	27	25	25	24
Women who can go alone to a clinic or hospital outside the village	42	37	31	37

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: (1) Consumption per adult equivalent inflation-adjusted, expressed in 2000 prices and standardized for geographical variation in prices faced (household weighted). (2) Relative poverty line set at two thirds of mean household consumption per adult equivalent (Rs. 774/month in 2000 and Rs. 1,462 /month in 2008). (3) Ever married women aged 15–49 years. (4) The apparent inconsistency with the disaggregated estimates in columns 3 and 4 is due to the fact that the FLCF expansion category of some households could not be defined due to missing data.

The analysis of household characteristics by expansion category suggests that:

- The expansion has focused more in rural areas, as less than a quarter of households registered after 2000 reside in urban zones.
- 'New' households appear to be more disadvantaged households served before 2000. This reflects mainly in their lower levels of consumption. Conversely, literacy levels and wage rates are equally distributed across expansion areas in this regard.
- 'New' households are relatively more isolated, both in a geographical sense (access to paved roads, distance to mandi markets and shops), and in terms of access to media. 'Old' households also enjoy a better community infrastructure.
- This suggests that the Programme has managed to expand into areas that are a little more disadvantaged, on average, than the areas served in 2000.

A comparison with the national Demographic and Health Survey shows that the served population is more rural than the national population, in line with the LHWP policy of targeting rural areas. However, served households often still have better socioeconomic indicators than the national population as a whole.

Looking at the trends in socioeconomic characteristics between 2000 and 2008 for the served population, it can be seen that:

- The served households in the current survey are less urban. One fifth of households in 2008 are urban compared to one quarter in 2000. This is a reflection of the fact that the Programme's expansion strategy has been targeted at rural areas. This is in line with some of the recommendations made in the 3rd Evaluation.
- The monetary measures show that households in 2008 also have lower levels of income poverty.
- Indicators on household facilities and utilities have also improved since 2000. Notably, the percentage of households with a toilet has risen from 63 per cent to 79 per cent. Similar improvements can be seen for water supply and electricity connection.
- Literacy levels also show an improvement. The figure for adult women that are literate has increased from 32 per cent in the 3rd Evaluation to 43 per cent in 2008; the figure for adult men that are literate has also increased from 61 per cent to 66 per cent, respectively. Household exposure to media also follows a similar trend.
- However, some of indicators on female mobility and participation in decision-making and community characteristics show an opposite trend. For example, fewer women in 2008 undertake work other than household work; 13 per cent compared with nearly one quarter in 2000.
- The improvements in some of the socioeconomic measures between the two surveys seem considerable, and raise some questions about whether the 2008 survey might have been undertaken in more advantaged areas.

5.3 Comparison of socioeconomic indicators between served and unserved households in rural areas

In this section, we analyse the main socioeconomic indicators for served and unserved households in rural areas. The served population emerges as more advantaged than the unserved population surveyed in unserved areas according to practically every measure

presented in Tables 5.5 to 5.7.[27] In general, the non-monetary measures, especially the measures on household facilities and utilities, show more pronounced differences in the two groups of households than the monetary measures.

Tables 5.5 to 5.7 show that:

- Served households are more likely to be headed by women. The average age of the head of household is also slightly higher for served households, and served households are more likely to have their main source of income coming from salaried work.
- Served households are more likely to own their dwelling, and have better quality housing than unserved households. Less than half of served households have poor quality walls compared with over three quarters in the unserved areas.
- Served households are more likely to have toilets, a protected water supply and connection to electricity. Similarly, they are twice as likely to own a refrigerator, a washing machine and a vehicle, and have a telephone connection in their house.
- Served households are more likely to be literate. Over one third of women in these households are literate, compared with only around one fifth in the unserved area. Similarly, nearly two thirds of adult men are literate; this compares with just over a half in unserved areas.
- With regard to media exposure, both adult men and women in unserved areas are more likely to listen to the radio, although the figure for those watching television is higher for both sexes in served households. This is not a surprising outcome, given that television reflects a higher level of socioeconomic status than the radio.
- Measures on participation and mobility show some inconsistencies. Although in unserved areas a higher proportion of women work outside the home, unserved households are more likely to disapprove of this. Here, one might suggest that a different mix of pull and push factors affect a woman's decision to work.[28]
- Served households generally live closer to public services such as schools and shops, and have better quality roads. Nearly two thirds of roads in LHW areas are paved, compared with around one fifth in unserved areas. Less than half the households in LHW areas dump garbage anywhere, compared with three quarters in unserved areas
- Finally, the wage rates in served areas are higher. The mean daily wage rate of an average unskilled man in served area is 68 Rs. more than in the unserved areas.

27 Note that our sample of unserved households is not representative of the whole unserved population in rural areas, as the sample framework was constructed in unserved FLCFs only. There is a residual of unserved households that live in served FLCFs, but these have not been considered in the study, and we estimate that this is a minor proportion of the overall unserved population. For the sake of simplicity, we refer to unserved households in unserved FLCFs as unserved households in the text.

28 This hypothesis is fully explored in the 'LHW Study on Socioeconomic Benefit and Experiences' report, also undertaken as part of the 4th Evaluation.

Table 5.5 Comparison of socioeconomic measures between served and unserved households in rural areas (1)

Measure	2008	
	Served households	Unserved areas
Household demographics		
Size of the household	7.2	7.6
Households with a female head of the household (%)	5	3
Age of the head of the household	48	47
Number of children 0–4	1.0*	1.3
Number of children 5–9	1.1**	1.3
Number of aged (older than 50)	0.8	0.8
Household labour supply		
Number of household members working	1.6	1.6
Number of female household members working	0.2	0.2
Households whose main source of income is salaried work (%)	29	27
Income and income poverty		
Real mean food and other consumption (Rs. per month) – expressed in 2008 prices (1)	2,183	2,190
Below relative poverty line (%)(2)	24	30
Facilities and utilities (%)		
Households with own house	93	88
Number of rooms	2.2	2.1
Households with dirt floor	53***	80
Households with bad quality walls (bricks and mud, mud, iron sheets, wood, no walls)	48***	78
Households with bad quality roofs (Straw, thatch or mud)	10	12
Households with good quality roofs (concrete or cement)	19***	6
Households with any toilet	74**	54
Households with a protected water supply	87***	58
Households with an electricity connection	92**	76
Households with a refrigerator	37***	16
Households with a washing machine	42***	19
Households with a motorbike	22**	14
Households with a telephone connection	8**	3
Households with a mobile phone	69**	53

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: (1) Significance Tests of the differences between served and unserved have been undertaken for all variables presented in this table. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. (2) Consumption per adult equivalent, standardized for geographical variation in prices faced (household weighted). (3) Relative poverty line set at two thirds of mean household consumption per adult equivalent (Rs. 1,462 /month).

Table 5.6 Comparison of socioeconomic measures between served and unserved households in rural areas (2)

Measure	2008	
	Served households	Unserved areas
Literacy (%)		
Adult women literate	39***	22
Adult men literate	63***	52
Households whose head has ever been to school	59**	50
Households where the spouse of the head has ever been to school	23***	12
Media (%)		
Adult women ever listening to the radio	38**	47
Adult men ever listening to the radio	44**	58
Adult women ever watching television	69***	43
Adult men ever watching television	72***	48
Women's work, mobility and role in decision making (%)[(2)]		
Women who do work other than household work	13	14
Who work away from home, of those who work	56***	31
Who can keep some or all of the money earned, of those who work	51	59
Women who approve of working outside the home	76*	68
Who went out the village in past month unaccompanied, of those who went outside village	21*	15
Who can go alone to clinic or hospital outside village	34***	17
Distances to important locations (in minutes, one way only)		
Distance to the closest primary school	15**	23
Distance to the closest shop/market	10**	18
Distance to the closest BHU/RHC	40**	57
Distance to the LHW house	16	n/a

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: (1) Significance Tests of the differences have been undertaken for all variables presented in this table. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. (2) Denominator is ever married women aged 15-49 years.

Table 5.7 Comparison of socioeconomic measures between served and unserved households in rural areas (3)

Measure	2008	
	Served households	Unserved areas
Community characteristics [(1)]		
Households living in a community:		
% with a good road into village/mohalla	89**	72
% with mostly paved streets	59***	18
% within 2 km of a mandi market	31***	12
% within 2 km of a shop that sells basic medicines and FP items	64***	43

Measure	2008	
	Served households	Unserved areas
% within 2 km of the thesil capital	18	12
% within 2 km of the district capital	12	10
% dump garbage 'anywhere'	51**	72
% with a sewerage or drainage system	62***	25
% with medical emergency transport (at daytime)	93*	83
Mean daily wage (unskilled man, Rs.)[3]	227**	159
Mean daily wage (unskilled woman, Rs.)[3]	100***	27
Mean daily wage (unskilled child under 14 years, Rs.)[3]	52***	14

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: (1) Average community characteristics are calculated at the household disaggregated level. (2) Significance Tests of the differences have been undertaken for all variables presented in this table. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. (3) Mean daily wage rates are expressed in nominal terms at 2008 prices and have not been adjusted for geographical variation in prices faced.

5.4 Key findings

5.4.1 Programme expansion

The LHWP has expanded substantially since the 3rd Evaluation, both in terms of served FCLFs, LHWs hired and households reached. At the time of the survey data collection in 2008, more than 85 per cent of the served households had been registered into the LHWP after April 2001. The biggest proportion of this coverage expansion has happened within the catchment area of 'old' health facilities that had been already served by the LHWP at the time of the 3rd Evaluation. Still, since then, the Programme has also expanded substantially in 'new' health facilities, which now represent 60 per cent of currently served FLCFs and which cover 40 per cent of current beneficiaries.

Unserved and newly served FLCFs are generally more remote, smaller, more poorly equipped and less well staffed compared with 'old' FLCFs. This might pose challenges for the operation of the Programme, especially as synergies with the health facility are found to be critical for the LHW performance.

Conversely, the LHWP has managed to maintain the standard of education of the LHWs, as it recruited an increasing number of new LHWs to serve a larger population and replace drop-outs. If anything, the education level of LHWs has increased with time, reflecting general trends in women's access to education. Further expansion to more remote areas might present greater challenges, however.

5.4.2 5.4.2 Status of households served by the LHWP

Generally, the socioeconomic status of served households has improved substantially since 2000, though some indicators (such as the proportion of women undertaking work other than housework, and the proportion of women able to go alone to facilities outside their village) have diminished. The apparent changes seem sufficiently large to warrant questions concerning the comparability of the populations covered.

Served households remain more advantaged than the national population, as was found in the 3rd Evaluation. As was suggested then, the better socioeconomic status of the served

households is as a result of the selection criteria of the Programme, which tends to place LHWs in more advantaged populations. This still needs to be addressed. However, the decrease in the proportion of urban households in the current evaluation shows that the programme has adhered to the recommendation of the 3rd Evaluation in steering service provision towards rural areas.

The comparison of 'new' against 'old' served households also suggests that the Programme has managed to expand into somewhat more disadvantaged areas. 'Old' households are more urban, tend to have lower levels of income poverty, better household facilities and greater exposure to media. Community infrastructure is better. However, literacy levels and wage rates are similar.

5.4.3 Comparison of served and unserved households in rural areas

This chapter has shown that the programme is still tending to serve more advantaged groups, when comparing them with the unserved population in rural areas. LHW households are more likely to be salaried, to own their house, to have better facilities at home, and to be literate. They also live in areas with higher wage rates and with better infrastructure.

This is probably because the Programme is based in areas that have functional health facilities, and these areas tend to be generally better off. It is also due, at least in part, to recruitment criteria that demand relatively educated women. These women will be more likely to come from more advantaged areas, so the households that they serve will tend to be more advantaged. Although, until now, the Programme has managed to maintain the educational standards, this might become difficult when trying to reach poorer and marginalized communities in rural areas.

6 Health related indicators of households served by LHW Programme

This chapter examines the health indicators of the households that are currently served by the LHWP. It starts by presenting a set of health indicators for the population served by the Programme and looking at trends in key indicators since the 3rd Evaluation. It then presents greater detail for the 2008 survey.

In this section, we sometimes present information for two groups of households for the 2008 survey. One group is 'all households', which represents the entire population of households that were being served by the LHWP at the time of the survey. The second group is 'old' households in 'old' FLCFs, the households that have more comparable characteristics to those that were being served in during the 2000 survey. When considering this disaggregation, one should take into account that these households have been exposed to the LHWP continuously since at least 2000, which, besides suggesting that they have little mobility, is also expected to have had some effect on their health indicators. The comparison of the two groups is sometimes instructive, although the broad conclusions are often similar, whichever group is considered.

6.1 Trends in health knowledge and behaviour in served households, 2000–2008

The survey collected information on a wide range of health indicators in a comparable manner to the 2000 survey. This permits an assessment of trends for the served population over that period. It should be remembered that differences between the 2000 and 2008 served populations reflect a number of factors, in addition to any changes that might be attributed to the Programme. They include any general, countrywide changes that are happening in the population as a whole and the expansion of the LHWP to serve new households, which might have different characteristics from those that were already being served. Changes in the population covered between the two surveys due to security constraints could also introduce differences. While assessing trends in key indicators in the served population is an essential element of monitoring the Programme, the issue of whether the Programme has had an *impact* on those indicators is addressed in Section 7.

6.1.1 Trends in target indicators

The LHWP PC-1 for 2003–2008 identifies a number of targets for key indicators. They include infant and maternal mortality, the CPR, immunisation (EPI, TT), exclusive breastfeeding and skilled attendance at delivery. Targets and trends in these key indicators, excluding mortality, are presented in Table 6.1. Because the targets are sometimes broken down by urban/rural category, estimates are also presented by urban/rural category in Table 6.1, although the disaggregated estimates should be treated with greater caution, as the sample size is smaller in urban areas.

The comparison between the two surveys suggests a substantial improvement in a number of the LHWP target indicators. All the differences between the 2000 and 2008 surveys shown in this Table 6.1 are statistically significant. The improvements in tetanus toxoid coverage (five or more doses) and attended deliveries are considerable, with increases from 14 to 31 per cent and 27 to 48 per cent coverage, respectively. The proportion of children fully immunised has increased from 57 to 68 per cent. Measures of exclusive breastfeeding also

appear to have improved.[29] However, the improvement in the contraceptive prevalence rate is very small, only 1 percentage point, and is not statistically significant.

It is clear that the improvements, even when they are substantial, are often not as large as had been intended in the PC-1, even over the longer period of 2000 to 2008 (see section 1.1). The actual improvements are of considerable importance to the health of the population, however, and the Programme might wish to consider what would be realistic levels of change for these indicators when developing the next PC-1.

Table 6.1 Trends in target indicators in the served population, 2000–2008

Measure	Whole pop			Rural			Urban		
	2000	2008	Target	2000	2008	Target	2000	2008	Target
Immunisation:									
Children aged 12 to 35 months fully vaccinated (based on recall and record) (%)	57***	68	n/a	56***	64	80	60***	81	90
Antenatal care and delivery (last birth, in last three years)									
Who have at least five tetanus toxoid injections in life (%)	14***	31	40	13***	28	n/a	17**	40	n/a
Births attended by doctor, nurse or LHV (%)	27***	48	n/a	20***	43	30	51**	67	80
Family planning (Currently married women aged 15-49)									
Using any method of contraception (CPR) (%)	33	34	n/a	30	31	42	41	42	58
Children exclusively breastfed until 6 months (% of children age 6-35 months, based on recall)	7***	26	50	8***	28	n/a	5***	19	n/a

Notes: Estimates for 2008 are for all served households. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

29 Note that this change is surprising, since no positive impact of the LHWP is found on exclusive breastfeeding (see section 7). It might be simply a consequence of expansion of the Programme into populations that are more rural and poor, which tend to have better breastfeeding indicators.

6.1.2 Other trends

Table 6.2 compares trends in other key health knowledge and behaviours in served areas between 2000 and 2008.[30]

Comparing health knowledge and behaviour in the 3rd Evaluation to the current evaluation, we find that:

- Since the 3rd Evaluation, there has been a 6 per cent decrease in the number of mothers with children under five years of age who know at least one way to prevent diarrhoea. However, there has been an increase of 3 percentage points in the number of mothers of under-fives who know how to prepare ORS and understand what it is for.
- With regard to antenatal care and delivery, there has been notable improvement in the percentage of women who had at least one antenatal consultation at a health facility, rising from 58 per cent in 2000 to 76 per cent in 2008. The percentage having five or more antenatal consultations has nearly doubled since the last evaluation. The proportion taking iron tablets during pregnancy has also increased substantially.
- Although changes in the CPR have been very small, attitudes appear to have changed more: the percentage of current users of modern contraceptive methods who think that Islam approves of family planning has increased from 46 to 59 per cent.
- There has been no improvement in the use of child growth monitoring services, and a fall of 4 percentage points in the proportion of children ever weighed.
- There has been an improvement of 15 percentage points in the proportion of 0-5 months olds being exclusively breastfed, consistent with improvements in the other breastfeeding measure presented in Table 6.1. However, there is no such improvement when examining only the 2008 households most comparable with the 2000 survey, suggesting that changes in this indicator might be largely due to the expansion of the programme into more rural areas.[31]
- There has been in a decline in the proportion of children aged 0–5 years having diarrhoea during the two weeks prior to the survey, but also a decline in the proportion of children who are given more liquids to drink when ill with diarrhoea or respiratory infections.
- The proportion of women who had given birth in the preceding three years that reported at least one antenatal consultation at a health facility increased from 58 to 76 per cent. However, less than one third had five or more antenatal consultations at a health facility. Similarly, 64 per cent of women had at least two tetanus toxoid injections, compared with 51 per cent in 2000 (and compared with 53 per cent in the national population in 2006/07).[32]

30 We distinguish between 'All HHs' and 'Old HHs'. The latter group often shows better levels of health knowledge and behaviour, notably for antenatal care. That having been said, a birth is less likely to be attended by doctors, nurses, or LHV in the comparable 'Old HH' group.

31 Although note that the estimate for these 'comparable' households is based only 83 observations.

32 Pakistan Demographic Health Survey (2006–2007): based on women aged 15–49 who had a live birth in the five years preceding the survey.

Table 6.2 Trends in other health measures in served households, 2000–2008

Measure	2000	2008	
		All HHs	'Old' HHs in 'old' FLCFs
Knowledge (%)			
Mothers of children<five who know at least one way to prevent diarrhoea	66	60	66
Mothers of children< five who know how to prepare ORS (and what it is for)	73	76	79
Antenatal care and delivery (%)			
(Women who had a birth since 2004 reporting on their last birth):			
Who had at least one antenatal consultation at a health facility	58	76	81
Who had five or more antenatal consultation at a health facility	16	29	30
Who had nine or more antenatal consultations at a health facility	7	10	8
Who had at least two tetanus toxoid injections in the last pregnancy	51	64	68
Who took iron tablets during last pregnancy	43	50	58
Family planning (%)			
(Currently married women aged 15–49)			
Using any method of contraception (CPR)	33	34	33
Mean total number of children desired (for herself)	4.7	4.6	4.6
Non-users of modern contraceptives who think that Islam approves of family planning	37	44	45
Current users of modern contraceptive methods who think that Islam approves of family planning	46	59	60
Breastfeeding and weaning (%)			
Children under 3 years ever breastfed	98	99	95
Children under 6 months old being exclusively breastfed (1)	34	49	32
Growth monitoring and nutrition (%)			
Children under 3 years ever weighed by any health worker	38	34	41
Children under 3 years weighed by any health worker in the previous 3 months	15	16	22
Prevalence of common illness in children under 5			
Who had diarrhoea in the two weeks before the survey	22	15	15
With diarrhoea given more liquids to drink (2)	33	24	25
With diarrhoea given ORS (2)	47	50	52
With respiratory infections given more liquids to drink (2)	70	53	58

Notes: (1) Percentage of children age 0-5 months at the time of the survey given only breast milk; given no other liquids, nor any food (excludes prelactils); (2) Children aged 2 to 4 years.
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

6.2 Additional health knowledge and behaviour measures for served household

Tables 6.3 to 6.5 present indicators for served households that were collected only for the 2008 survey. It can be seen from Table 6.3 that:

- Almost all currently married (aged between 15–45) in served households know three or more modern methods of contraception. Some 52 per cent have used contraception and 43 per cent of users are supplied by the LHW.
- Some 44 per cent of women gave birth in a health facility; 72 per cent of newborns were examined within 24 hours of birth.
- Less than one tenth of households clean water before drinking – some 9 per cent, the same as the national population as a whole. Only three out of every 20 households have a proper arrangement for garbage disposal, and over one third dump their garbage anywhere.

Table 6.3 Health knowledge and practices in sanitation and maternal health in LHW areas

Measure	2008
	All HHs
Knowledge	
Women (currently married women of 15–49 years of age) know at least one modern method of contraception (%)	99
Women (currently married women of 15–49 years of age) know three or more modern methods of contraception (%)	97
Mean number of modern method of contraception known by women (currently married women of 15–49 years of age)	3
Sanitation Practices	
Households who clean water before drinking (%)	9
Households who have proper arrangement of garbage disposal (%)	11
Households who dump garbage anywhere (%)	38
Women who wash hands with soap before preparing food (%)	72
Antenatal care and delivery	
(Women who had a birth since 2004 reporting on their last birth):	
Who had at least four antenatal consultation at a health facility	40
Mean number of antenatal consultations at a health facility	3
Births attended by TBA (dai) (%)	41
Births attended by family members/neighbour (%)	9
Births delivered at health facility (Institutional deliveries) (%)	44
Newborns examined within 24 hours of birth (%)	71
Newborns examined within 3 days of birth (%)	72
Newborns who were born at home, nothing was applied at cord (%)	32
Family planning	
(Currently married women aged 15–49)	
Know source to obtain method of contraception (%)	90
Have ever used any method of contraception (%)	52
Using any modern 'reversible' method of contraception (%)	17
Current users of modern method of contraception received regular medical attendance for the method woman uses, if required by the method (%)	15
Uses the method that is supplied by the LHW (%)	43

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 6.4 shows that nearly all children under 3 years of age have been breastfed. Over one quarter of mothers begin breastfeeding within half an hour of birth, and two thirds begin breastfeeding within four hours of birth.

Around 98 per cent of children aged 12–35 months have been vaccinated, although some 4–5 per cent of children have not received the required BCG or polio vaccination within the specified schedule (Table 6.4). An additional nutritional module included in the household questionnaire for the 4th Evaluation provided insights on the quality of the diet for children 1–5 years of age. Of children aged 1–5 years, one in 20 is reported as having missed a basic meal in the week prior to the survey. Children served by the LHWP eat food items rich in proteins (such as poultry, fish, or meat) on average less than two days per week, vegetables and fruit between two and three days per week, and dairy products almost on a daily basis.

Table 6.4 Health practices in child health and nutrition in LHW areas

Measure	2008 All HHs
Breastfeeding and weaning	
Children under 3 years ever breastfed (%)	98
Children whose mother began breastfeeding within half an hour of birth (%)	28
Children whose mother began breastfeeding within 4 hours of birth (%)	65
Months of breastfeeding	12
Months of exclusive breastfeeding (no liquids)	4
Months of exclusive breastfeeding (no solid or semisolid food)	6
Months of exclusive breastfeeding (no liquids, no solid or semi-solid food)	3
Immunisation:	
Children aged 12–35 months had ever been vaccinated (%)	98
Children aged 12–35 months had BCG before age 12 months (%)	95
Children aged 12–35 months had three or more time polio drops before age 12 months (%)	96
Growth Monitoring and Nutrition	
Children (1–5 years) NEVER missed a basic meal during last week prior to survey (%)	96
Children (1–5 years) ate following food at least once during last week prior to survey (%)	
Meat	46
Poultry	51
Fish	11
Eggs	43
Fresh fruits	76
Vegetables	90
Milk or other diary products	80
Mean number of days children (1–5 years) ate following food during last week prior to survey	
Meat	0.8
Poultry	0.8
Fish	0.2
Eggs	1
Fresh fruits	3
Vegetables	4
Milk or other diary products	5
Mean number of food types eaten by children (1–5 years) during last week prior to survey	4

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table 6.5 shows health practices in illness treatment in LHW areas. It illustrates that:

- 86 per cent of the population who had an illness or injury consulted a health provider. People had to stop their normal activities for an average of three days whilst they had a health problem.
- Four fifths of children under 5 years of age who had diarrhoea consulted a health provider; the episode lasted an average of seven days. A similar proportion of children with ARI consulted a health provider; the average reported duration was shorter, at four days.

Table 6.5 Health practices in illness treatment in LHW areas

Measure	2008 All HHs
Prevalence and treatment of common illnesses	
Population had any illness of injury during last 14 days prior to survey (%)	22
Mean number of days had to leave normal activities due to health problem	3
Population who had illness/injury consulted any health provider (%)	86
Children (under 5 years) (%):	
Who had diarrhoea: Mean number of days child suffered from diarrhoea	7
Who had diarrhoea and consulted any health provider	83
Who had diarrhoea and were referred to any health facility	40
Who had ARI in the two weeks before the survey	18
Who had ARI: Mean number of days child suffered from ARI	4
Who had ARI and consulted any health provider	84
Who had ARI and were referred to any health facility	38

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

6.3 Key findings

Household knowledge and health seeking behaviour were analysed in comparison with the 3rd Evaluation findings. Most indicators have improved for the served population since 2000. The Programme's target indicators – including tetanus toxoid and childhood vaccination coverage and skilled attendance at births – have generally improved, many quite substantially. However, surprisingly, there has been no significant change in the CPR. The improvements in the other target indicators are not as large as was planned in the PC-1, although this might be argued to reflect over-ambitious targets in that document.

Considering other indicators, there is an increased awareness amongst mothers of how to prepare ORS, a substantial increase in those receiving at least one antenatal consultation, and taking iron tablets during pregnancy, and an apparent reduction in the incidence of diarrhoea in children. However, some areas have stagnated or even decreased: knowledge by mothers on how to prevent diarrhoea has reduced, growth monitoring indicators show no improvement or a decline and there has been a decline in the proportion of sick children who are given more fluids to drink. Given the importance of childhood diarrhoeal diseases, ARI and malnutrition to the overall burden of disease in Pakistan, these are areas of concern.

The seeking of care amongst served households is high – 86 per cent sought treatment for their most recent illness. However, in relation to the national average, as indicated by the

most recent DHS, the served households are not performing better in relation to some health promotion behaviours. For example, less than one tenth of households clean water before drinking.

It should be remembered that the trends in the served population will reflect many factors, including wider changes in the population as a whole that are unrelated to the Programme and changes in the population served by the LHWP between the two surveys. They do not necessarily say anything about the impact of the programme on the health measures. That issue is addressed in the following chapter.

7 Programme impact

Implementing a rigorous evaluation of the impacts of the LHWP is a challenging task. The main difficulty lies in establishing a credible causal link between observed changes in relevant outcomes and the Programme itself. While the Programme has direct control over the quality of inputs and the delivery of outputs, outcome and impact dynamics are beyond its exclusive responsibility.

In Chapter 6, we showed that in recent years a positive trend has occurred in many of the outcomes of interest for the Programme. But how many of these changes are due to the work of the LHWs themselves, and how many to other factors, such as the evolution of the social, cultural and economic environment? The purpose of our rigorous impact evaluation consists in identifying and measuring changes in relevant outcomes that can be directly attributed to the LHWP, rather than to other external actors or factors, or to individual characteristics that are independent from the intervention.

This chapter starts by comparing health characteristics of households served by the LHWP to those that living in unserved areas. This comparison is undertaken for rural households only, because there are no urban unserved households in the 2008 sample. Direct comparisons are informative of the state of health indicators in served and unserved areas, but should be interpreted with care. As served FCLFs and beneficiary households were not randomly selected by the LHWP, and no baseline information was gathered on health status prior to the Programme's implementation, observed differences cannot be attributed to the Programme.

In the rest of the chapter, we use different analytical approaches to try to overcome these limitations, by adjusting for the factors that might confound the comparison between the two populations. We apply a set of complementary approaches and compare results across methods. In addition, we look at whether the impact varies according to the type of household benefiting (poor or not) – 'impact heterogeneity', and analyze the effects of LHWs' knowledge and performance on the Programme's impacts.

7.1 Health related indicators in served and unserved areas

This section compares the population served by the LHW programme with the unserved areas on a number of health related measures. All the measures are target areas of intervention for the LHW programme; it is therefore expected that LHW programme will have had an impact on all of the broad areas that these measures represent.

A number of important primary health care measures are presented in the tables that follow. The indicators are divided into three groups: indicators of perinatal care and family planning are presented in Table 7.1; Table 7.2 presents information on illness treatment and selected health outcomes; while Table 7.3 presents information on child health. Almost all measures presented are better in served areas than unserved areas. Indicators of antenatal care and family planning, in particular, show a large difference between the two areas.

Table 7.1 shows that served households are more likely to have the recommended number of antenatal consultations (4 or more) than in unserved areas; 36 per cent compared to 23 per cent, respectively. Nearly two thirds of women in served areas had at least two tetanus toxoid injections compared with around one third in unserved areas and, finally, almost half the women in served areas took iron tablets during their previous pregnancy compared with less than one third in unserved areas.

Table 7.1 Comparison of antenatal care and family planning measures in served and unserved areas (rural areas)

Measure	2008	
	Served HHs	Unserved Areas
Antenatal care and delivery (%)		
(Women who had a birth in 3 years before survey reporting on their last birth):		
Who had at least one antenatal consultation at a health facility	74***	53
Who had at least four antenatal consultation at a health facility	36**	23
Who had five or more antenatal consultation at a health facility	26***	14
Who had nine or more antenatal consultations at a health facility	8**	4
Number of antenatal consultations at a health facility	3	2
Who had at least two tetanus toxoid injections in the last pregnancy	61***	30
Who have at least five tetanus toxoid injections in life (offering life-time protection)	28***	13
Who took iron tablets during last pregnancy	49**	32
Births attended by doctor, nurse or LHV	43***	27
Births attended by TBA (dai)	45+	44
Births attended by family members/neighbour	11+	29
Births delivered at health facility (Institutional deliveries)	39**	26
Newborns examined within 24 hours of birth	67***	45
Newborns examined within 3 days of birth	68***	47
Newborns who were born at home, nothing was applied at cord	32**	25
Family planning (%)		
(Currently married women aged 15–49)		
Know source to obtain method of contraception	89***	77
Have ever used any method of contraception	49***	28
Using any method of contraception (CPR)	31***	15
Using any modern method of contraception	25***	10
Using any modern 'reversible' method of contraception	16***	6
Current users of modern method of contraception received regular medical attendance for the method woman uses, if required by the method	16	22
Uses the method that is supplied by the LHW	54	n/a
Mean total number of children desired (for herself)	4.6	4.9
Mean total number of children desired (for women in village/mohalla)	3.8***	4.1
Who think that Islam approves of family planning (%)	48	41

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: Significance Tests of the differences have been undertaken for all variables presented in this table, with the exception of proportion of births attended by TBA and proportion of births attended by family members/neighbour, which are denoted with a '+' . Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

Table 7.1 also shows, with respect to family planning measures, that half the women in served households have used some method of contraception compared with less than one third in unserved areas. Over one quarter of women in served households use a modern method of contraception compared with one tenth in unserved areas.

Table 7.2 Comparison of sanitation practices, illness treatment and selected health outcomes in served and unserved areas (rural areas)

Measure	2008	
	Served HHs	Unserved Areas
Sanitation practices		
% households who treat water before drinking	6	6
% households who have proper arrangement of garbage disposal	10*	4
% households who dump garbage anywhere	42***	64
% women who wash hands with soap before preparing food	70**	58
Prevalence and treatment of common illnesses		
% of population had any illness of injury during last 14 days prior to survey	22	23
Mean number of days had to leave normal activities due to health problem	3.5	3.6
% of population who had illness/injury consulted any health provider	85	83
Children (under 5 years) (%):		
Who had diarrhoea in the two weeks before the survey	16	18
Mean number of days child suffered from diarrhoea	4.6	4.3
Who had diarrhoea consulted any health provider	83	84
Who had diarrhoea were referred to any health facility	38	45
With diarrhoea given more liquids to drink[3]	25	21
With diarrhoea given ORS [3]	47	44
Mothers of children five who know at least one way to prevent diarrhoea	57**	47
Mothers of children five who know how to prepare ORS (and what it is for)	74	71
Who had ARI in the two weeks before the survey	18	17
Mean number of days child suffered from ARI	4.5	4.3
Who had ARI and consulted any health provider	83	83
Who had ARI and were referred to any health facility	36	41
With respiratory infections given more liquids to drink[3]	52	55

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: Significance Tests of the differences have been undertaken for all variables presented in the table. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

Table 7.2 compares sanitation practices, illness treatment, and selected health outcomes in the two areas. Overall, the sanitation practices of the served household are better than in the unserved areas. Served households are twice as likely to have a proper arrangement of garbage disposal compared with unserved areas and, accordingly, a lower percentage of people in served areas dump garbage 'anywhere'. Over two thirds of women in served areas reported washing their hands with soap before preparing food, compared with just over half in unserved areas. Table 7.2 also shows that, more children (47 per cent) are likely to be given ORS in served areas than in unserved areas (44 per cent), and that more mothers in the served areas know how to prepare ORS than in unserved areas.

Children in the served areas are more likely to have been vaccinated than those in the unserved areas (Table 7.3). Some 64 per cent of children aged 12–35 months in served households are fully vaccinated compared with 46 per cent in the unserved areas. Finally, some 5 to 6 per cent of children aged 12–35 months have not had the recommended BCG or

polio drops before 12 months of age in served households, compared with some 12 to 14 per cent in unserved areas.

However, there are some exceptions to the general pattern where the served population does not enjoy an advantage. In particular, quite of a few of the breastfeeding indicators are better in unserved areas (Table 7.3), in particular exclusive breastfeeding (although the unserved estimate is based on less than 150 observations). It is quite likely that better breastfeeding behaviour – and, particularly, exclusive breastfeeding – is positively associated either with particular cultural factors in relatively more remote communities, or with poorer economic status. Moreover, children under five years of age who had diarrhoea and ARI are more likely to visit a health facility in unserved areas, although this might, in part, reflect treatment by the LHWs themselves in the served areas (Table 7.2).

Table 7.3 Comparison of health practices in child health and nutrition in served and unserved areas (rural areas)

Measure	2008	
	Served HHs	Unserved Areas
Breastfeeding and weaning		
Children under 3 years ever breastfed (%)	98	97
Children whose mother began breastfeeding within half an hour of birth (%)	28	30
Children whose mother began breastfeeding within 4 hours of birth (%)	63	61
Months of breastfeeding	12.1*	12.8
Months of exclusive breastfeeding (no liquids) (2)	3.8**	5.1
Months of exclusive breastfeeding (no solid or semi-solid food)	6.0*	6.5
Months of exclusive breastfeeding (no liquids, no solid or semi-solid food) (2)	3.4**	4.3
Children under 6 months old being exclusively breastfed (%)	49***	82[2]
Immunisation (%):		
Children aged 12 to 35 months had ever been vaccinated	99*	91
Children aged 12 to 35 months fully vaccinated (based on recall and record)	64**	46
Children aged 12 to 35 months had BCG before age 12 months	94*	86
Children aged 12 to 35 months had three or more time polio drops before age 12 months	95	89
Growth monitoring and nutrition (%)		
Children under 3 years ever weighed by any health worker	31	16
Children under 3 years weighed by any health worker in the previous 3 months	15	9
Children (1–5 years) NEVER missed a basic meal during last week prior to survey	96	95
Children (1–5 years) ate following food at least once during last week prior to survey		
Meat	42	37
Poultry	50*	39
Fish	11	10
Eggs	41	34
Fresh fruits	74**	62
Vegetables	91	89
Milk or other dairy products	80**	71
Mean number of days children (1–5 years) ate following food during last week prior to survey		

Measure	2008	
	Served HHs	Unserved Areas
Meat	0.8	0.6
Poultry	0.8	0.6
Fish	0.2	0.2
Eggs	1.1	1.0
Fresh fruits	2.8	2.7
Vegetables	3.8	3.8
Milk or other diary products	4.8**	4.2
Mean number of food items eaten by children (1–5 years) during last week prior to survey	4.0**	3.4

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: (1) Significance Tests of the differences have been undertaken for all variables presented in the table. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. (2) Estimate calculated with less than 150 cases.

7.2 Programme Impact: comparison between served and unserved households

7.2.1 Method

We distinguish three main categories of indicators for the impact analysis: health knowledge and attitudes, health practices, and health outcomes. Health outcomes might change in the long run as a consequence of the modification of health practices, and health practices will, in turn, be shaped by health knowledge and attitudes. Our analysis of health outcomes is limited to child morbidity.[33]

In order to obtain reliable estimates of the impact of the LHWP, we have to take into account the differences between households in served and unserved locations, many of which were presented in Section 5. We do this by using two statistical methods: multivariate regression analysis, and Propensity Score matching. An outline of the technical details of these methods is given in Annex F.

7.2.2 Regression models

Regression models relate the health outcome to a broad range of explanatory variables, and assess whether differences between the served and unserved populations remain once we have controlled for observable differences. The models are based on a basic set of control variables that broadly reflect the characteristics reported in Tables 5.5, 5.6 and 5.7. They cover nine dimensions: household demographics, age and education of the head of the household and his spouse, labour supply, quality of the house, household assets, distances from the households to strategic locations, community distance from strategic locations, community socioeconomic status, and health district management performance. We also include provincial indicator variables in order to capture provincial-level fixed effects.

We estimate a separate regression model for each outcome of interest, using alternative specifications for different groups of indicators.[34] The models are estimated on the pooled data of served and unserved households/individuals.

33 The analysis of mortality and fertility rates was not undertaken, in accordance with the agreed scope of the study.

34 We use seven alternative specifications. They differ because the set of controls varies from the basic specification according to the type of observation that we focus on (All Households, Ever married women, Currently married women, Women who have

7.2.3 Propensity Score matching

Propensity Score matching (PSM) is a technique that allows a much sharper comparison between served and unserved populations. It has some advantages over the regression approach. First, the comparison between served and unserved populations is restricted to a sub-set of 'highly comparable' observations. Second, the impact estimates take into account heterogeneity: the impact is estimated comparing every served observation with a small sub-set of unserved 'fully comparable' observations. The degree of 'comparability' is determined by the probability of being enrolled in the LHWP, or the 'Propensity Score', which, in turn, is a function of a complete set of observable characteristics. As the implementation of the PSM technique is statistically somewhat cumbersome, we apply this method for a sub-set of outcome indicators.

We consider as served households all those that are registered with an LHW in a served community. We purposefully disregard their real treatment status – for instance, whether they have been ever visited by the LHW. This provides our most reliable estimate of the LHWP impact, which corresponds to its overall average effect in served communities.[35] It should be noted that both methods only account for the selection bias based on observable characteristics. If served and unserved observations present some pre-Programme differences due to unobservable characteristics, the results obtained with these two methods might not reflect the true impact. Note also that impact evaluation only applies to rural households, since there was no control sample in urban areas.

We report a simple means comparison between served and unserved areas for the outcome of interest in the first column of the results tables. The second column shows our estimate of the Programme's effect on the outcome of interest according to the multivariate regression model.[36] The third column reports the estimated Programme's effect resulting from the Propensity Score matching (PSM) method.[37]

We report both significant and non-significant coefficients, because we consider that it is important to show whether the LHWP has no effect on any expected outcomes. In the case of the regression models, for the sake of simplicity we have decided to limit our presentation in the main report to the coefficients indicating the Programme's effect.

The coefficients should be interpreted as follows:

- If the outcome is dichotomous (1-0) and expressed in percentage terms, coefficients indicate the change in the probability that the outcome is positive. As an example, take the first indicator in Table 7.1 (percentage of mothers of children 5 years old who know at least one way to prevent diarrhoea). The first column indicates that mothers in served areas are, on average, 10 percentage points more likely to know at least one way to prevent diarrhoea. The second and the third columns indicate the

given birth during the previous 3 years, Children who have been sick from ARI and ADI during the previous 15 days, children younger than 3 years old, Children between 1 and 5 years old).

35 We obtain a 'diluted' but reliable version of the 'real' effect that one would achieve if all registered households and all eligible individuals received all the services to which they are entitled under the LHWP (the 'Intent-to-treat' effect, in technical terms). The advantage of this approach is that it overcomes some of the drawbacks arising from the existence of (self-) selection bias at the household/individual level.

36 We also implemented regression models only on the common support determined by the PSM technique. The results are, overall, consistent with those of the simple regressions.

37 We present marginal coefficients when the outcome is binary. All standard errors are estimated taking into account the clustered structured of the data at the FLCF level. Given the semi-parametric nature of the PSM technique, standard errors are estimated with a bootstrap procedure (250 replications). All estimates take into account sample weights.

estimated effect of the LHWP on the probability that mothers know how to prevent diarrhoea. The regression method indicates that the Programme would have increased this figure by 8.9 percentage points (the other 2 percentage points of the raw means comparison are attributable to different characteristics between served and unserved populations). The PSM method indicates that the effect would be an increase of 7.1 percentage points.

- If the outcome is continuous, the coefficients indicate the absolute change in the outcome value. For instance, take the first continuous indicator in Table 7.1 (Number of modern method of contraception known by women). The first column indicates that mothers in served areas know, on average, 0.12 more methods than mothers in unserved areas. The regression method (the second column) indicates that the Programme would have to increase the number of modern methods known, on average, by 0.086. The PSM method indicates that the effect would be an increase of 0.068 in the number of known methods.

7.2.4 Results

The results of this first strand of impact analysis offer a generally positive view of the LHWP, accompanied with some specific concerns in some of the domains of service delivery. While the effect of the Programme is relatively mild in the area of health knowledge and sanitation practices, its points of strength appear to be in the domains of family planning, antenatal care and immunisation. We also find some evidence that the LHWP is reducing the fertility desires expressed by women of reproductive age. However, there is very little effect on breastfeeding behaviours. There is no evidence of any significant effect on child ADI and ARI morbidity.

We analyze these results in turn in the next sections.[38] It is important to note that, while the estimated impacts are generally consistent with the positive or negative trends of health-related outcomes in served areas as identified in Chaper 6, there are some discrepancies, the main case being that of contraceptive use. Where there are discrepancies of this sort, it is possible that it is because the LHWP expanded to relatively more disadvantaged areas between 2000 and 2008, which initially had a lower CPR. [39]

7.2.5 Impact on health knowledge and attitudes

In Table 7.4 we report a summary of the Programme's impact on health knowledge and attitudes. Our estimates indicate that some impact has been achieved both in the area of diarrhoea prevention and the awareness of contraception methods. Respondents in served households are 9 percentage points more likely to know at least one method of preventing diarrhoea. And, on a scale from 1 to 3 indicating the number of known contraceptive methods, women of reproductive age score, on average, 0.06 more highly than comparable women in unserved areas – a small, though statistically significant, difference.

38 Before that, it is worth noting some general methodological points. First, there is a great deal of coincidence in the impact indications provided by the regression and PSM models – both in terms of significance, and of magnitude of the estimated effects. Second, as expected, taking into account observable differences drastically reduces the size of the effects that would be estimated by raw means comparisons.

39 On average the CPR indicator will deteriorate, but this may still conceal a positive impact of the programme, if the indicator has improved both in 'old' and 'new' areas because of the programme. By defining an appropriate comparison group that takes into account the differences between the two populations, the analysis would then show the real impact of the Programme. Alternatively, it is also possible that the impact analysis captures an effect that the Programme achieved before 2000, since we compare all served with unserved households who have never been exposed to the LHWP. Finally an alternative explanation would be that the indicator would have fallen in the absence of the Programme, although this seems unlikely in the case of the CPR.

The same cannot be said for the knowledge of correct ORS preparation, where the LHWP does not seem to have a significantly positive effect on knowledge – a result that causes concern since more than 20 per cent of respondents in served areas do not know how to prepare ORS.[40]

Table 7.4 Impact on health knowledge and attitudes (average effect in served communities)

Measure	Simple Difference	Multivariate Regression	Propensity Score Matching
Knowledge			
Proportion of mothers of children under five who know at least one way to prevent diarrhea	0.0958*	0.111**	0.090*
Proportion of mothers of children under five who know how to prepare ORS (and what it is for)	0.0259	0.0522	0.028
Number of modern method of contraception known by women (currently married women of 15-49 years of age)	0.112***	0.0691*	0.060*
Attitudes			
Mean number of children wanted in total	-0.192	0.0258	-0.006
Belief on the optimal number of children	-0.300***	-0.0738	-0.233***
Proportion who think that Islam approves of family planning	0.0883*	0.0639	0.090*

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM Standard Errors are estimated with a bootrstap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

Our analysis suggests that the LHWP might be contributing to reducing desired fertility amongst served women of reproductive age. While there is no evident effect on the number of desired children by the respondents, we find evidence of a negative impact on the optimal number of children thought suitable for other women in the community. We believe that this second indicator is more reliable, as the former is partly dependent on the actual number of children. All else being equal, in served areas respondents claim that a woman should have, on average, 0.2 children fewer than is reported in unserved areas. We also find that the LHWP might promote a vision of Islam more compatible with family planning.

7.2.6 Impact on health practices in sanitation and maternal health

In Table 7.5, we report the estimated effects of the LHWP on a broad range of health practices in the domains of sanitation and maternal health.

When comparing served and unserved households, there is no significant impact of the LHWP in the main sanitation and hygiene practice indicators that were covered in the survey. Considering that only 6 per cent of the served households clean water before drinking and only 12 per cent of them put in place a proper arrangement for garbage disposal, this is clearly a missed opportunity for the Programme. Modifying households' behaviours that are

40 The indicator on ORS knowledge is affected by a significant number of missing observations. We believe that the reason for the bad quality of the information could be that interviewers did not always have an ORS packet to show to respondents. The results and analysis of this indicator have therefore to be taken with caution.

known to have huge beneficial effect on health, but are not under the direct control of the LHWs, might be a challenging task for the LHWP. However, further results (see Section 7.5) show that changes in sanitation practices can take place for the best-performing LHWs and this might be an area where the Programme could have greater impact if performance as a whole is improved.[41]

Table 7.5 Impact on health practices in sanitation and maternal health (average effect in served communities)

Measure	Simple Difference	Multivariate Regression	Propensity Score Matching
Sanitation Practices			
Proportion of households who clean water before drinking	-0.00473	0.00410	0.000
Proportion of households who have proper arrangement of garbage disposal	0.0577***	0.0261*	-0.020
Proportion of households who dump garbage anywhere	-0.221***	-0.168***	0.035
Proportion of women who wash hands with soap before preparing food	0.110**	0.0773	0.067
Antenatal care and delivery			
(Women who had a birth since 2004 reporting on their last birth):			
Proportion who had at least one antenatal consultation at a health facility	0.195***	0.0798	0.071
Proportion who had five or more antenatal consultation at a health facility	0.114***	0.0599**	0.019
Proportion who had nine or more antenatal consultations at a health facility	0.0381**	0.00758	--
Number of antenatal consultations at a health facility	0.941***	0.233	-0.038
Proportion who had at least two tetanus toxoid injection in the last pregnancy	0.302***	0.220***	0.129***
Proportion who have at least five tetanus toxoid injection in life (offering life-time protection)	0.153***	0.0726**	0.072*
Proportion who took iron tablets during last pregnancy	0.164***	0.123**	0.076
Proportion of births attended by doctor, nurse or LHV	0.146***	-0.0181	-0.017
Proportion of births attended by TBA (dai)	0.231***	0.0948**	'--
Proportion of births delivered at health facility (Institutional deliveries)	0.120**	-0.00940	-0.020
Proportion of newborns examined within 24 hours of birth	0.213***	0.0988*	0.149***
Proportion of newborns never visited	-0.216***	-0.0840*	'--
Family Planning			
(Currently married women aged 15-49)			
Proportion who know source to obtain method of contraception	0.122***	0.103***	0.096***
Proportion who have ever used any method of contraception	0.201***	0.0765*	0.061

41 Other hygiene education interventions in Pakistan have been conducted at levels similar to the LHWP, working with households in communities, which have shown promising results (see for instance Nanan et al. 'Evaluation of a Water, Sanitation and Hygiene Education Intervention on Diarrhoea in Northern Pakistan', Bulletin, WHO (2003), 81: 160–5). This suggests that the impact of the LHWP on health and sanitation issues could be larger, if it became more of a priority for the Programme.

Measure	Simple Difference	Multivariate Regression	Propensity Score Matching
Proportion who are using any method of contraception (CPR)	0.157***	0.0498	0.084***
Proportion who are using any modern method of contraception	0.147***	0.0719**	0.108***
Proportion who are using any modern 'reversible' method of contraception	0.0934***	0.0525***	0.054***

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM Standard Errors are estimated with a bootstrap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

Antenatal care is one of the areas of focus of the LHWP – and, indeed, one of its strengths in terms of achieved impacts. Our results show that, for the fact of being served by the Programme, women that have given birth at least once since 2004 are 13 percentage points more likely to have received at least two tetanus toxoid injections during their last pregnancy, and 7 percentage points more likely to have received five injections. However, we do not find evidence that the LHWP is increasing the use of iron tablets amongst pregnant women, after controlling for differences between the populations. In the next section, we will show that the LHWP achieves substantial effects in this area only when beneficiary women belong to a poor socioeconomic stratum.

The picture is also mixed for antenatal consultations. The 3rd Evaluation found a positive effect of the Programme on the probability that pregnant woman had at least one antenatal consultation at a health facility (although only significant at 10 per cent). This round's data do not fully confirm this finding: although the sign is positive, and indicates an increase of about 7 percentage points, the PSM estimate does not pass the significance test. We will show below that some effect on antenatal care is likely to be achieved by highly performing LHWs.

We also find that the LHWP has a positive effect on the probability that newborns' health is checked within 24 hours. This increases by more than 15 percentage points in served areas, with regard to comparable unserved areas.

Finally, although the Programme aims at improving the quality of birth attendance, as it is reflected by one of the targets in the PC-1, when we look at the average served households, we do not find any significant effect either on increased institutional deliveries or on trained birth attendance.

Positive findings on family planning are consistent with those that emerged from the 3rd Evaluation. This notwithstanding, they must be read with caution. Amongst the services provided by the LHWs, the advice and provision of family planning methods is substantially based on an 'on demand' system, and is therefore the most likely to be subject to self-selection processes. Households living in served areas that, for any reason, are not interested in family planning might simply not be registered by the LHW as FP clients. They would therefore not be sampled as served households, but they might differ from served households on a number of domains, many of them potentially unobservable.[42]

42 On the contrary, control households are sampled from households' lists that should reflect the universe in the community, including households that are contrary or not interested in FP. Therefore, when comparing served and unserved households, the counterfactual assumption might be violated, and our estimates of the programme's effect might be upward biased.

With this caveat in mind, family planning results are, overall, positive. Currently married women aged 15–49 years, are 10 percentage points more likely to know where to obtain a method of contraception if they are served. And, more importantly, we find a consistent positive LHWP effect on the current use of contraceptive methods, modern contraceptives methods and, especially, modern 'reversible contraceptive' methods. The three estimates are highly significant (1 per cent level) and suggest and indicate an increase in the probability of using contraceptives of the magnitude of 8.4 percentage points for any contraceptives, 10.8 percentage points for modern contraceptives, and 5.4 percentage points for reversible contraceptives.

Some further analysis, based on the intensity of exposure to the LHWP, indicates that despite self-selection issues at the household level, the Programme still has a decisive effect on the use of family planning methods.

In an attempt to better interpret these results, it is important to observe that the magnitude of the impact on the use of any type of contraceptives (CPR) is lower than that on the use of modern methods. This suggests that part of the results achieved by the LHWs actually consists in convincing FP clients who already used contraceptive methods to switch to modern methods. It indicates the existence of a substitution effect besides the expansion of the CPR basis. This hypothesis is supported by the results of the regression methods, which yield significant estimates for modern and reversible FP methods, but not for any contraceptive method, and might also provide an explanation of the disappointing low CPR trends that have been mentioned in Chapter 6. The point requires further investigation.

Finally, we do not find any significant effect of the Programme on the probability of having ever used contraceptive methods. This might be because the indicator reflects pre-Programme (historical) differences.[43]

7.2.7 Impact on health practices in child health

In Table 7.6, we report the impact estimates for a set of indicators in the domain of health practices in child health.

As we have already anticipated, the impact analysis shows that breastfeeding should be one of the areas of major concern for the LHWP, as the Programme does not show any positive impact on this – either in terms of exclusive breastfeeding, or in length of breastfeeding. Most signs are even negative in this section, suggesting that the guidelines for LHWs' action in this field have an adverse effect, perhaps because they are not sufficiently clear.[44] Our analysis of the effect of LHWs' performance and knowledge on the Programme's effects supports this hypothesis (Section 7.5).

43 In this case, the value of the PSM technique can be fully appreciated. The pre-Programme difference of 20 percentage points showing from a simple means comparison is fully accounted for and balanced (in terms of value and significance) by the matching procedure.

44 It is also possible that the models do not fully control for other differences between served and unserved households that tend to favour better breastfeeding practices in the unserved group.

Table 7.6 Impact on health practices in child health (average effect in served communities)

Measure	Simple Difference	Multivariate Regression	Propensity Score Matching
Breastfeeding and weaning			
Proportion of children under 3 years ever breastfed	0.00994	0.0110*	0.016
Proportion of children whose mother began breastfeeding within half an hour of birth	-0.0444	0.00401	-0.054
Proportion of children whose mother began breastfeeding within 4 hours of birth	0.0226	0.0935*	-0.084*
Months of breastfeeding	-0.722*	0.0807	-0.134
Months of exclusive breastfeeding (no liquids, no solids)	-0.877**	0.0837	-0.256
Proportion of children exclusively breastfed until 6 months of age (2)	-0.111***	0.012	-0.047
Immunisation			
Proportion of children aged 12 to 35 months had ever been vaccinated	0.0570*	0.0197**	0.066***
Proportion of children aged 12 to 35 months fully vaccinated (based on recall and record)	0.174**	0.127**	0.158***
Proportion of children aged 12 to 35 months had BCG before age 12 months	0.0876**	0.0549*	0.049
Proportion of children aged 12 to 35 months had three or more time polio drops before age 12 months	0.0364	0.0335	0.064
Growth Monitoring			
Proportion of children under 3 years ever weighed by any health worker	0.138**	0.0979**	0.077*
Proportion of children under 3 years weighed by any health worker in the previous 3 months	0.0545	0.0442	0.049

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).Notes: (1) Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM Standard Errors are estimated with a bootstrap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

A better impact performance emerges from the analysis of indicators in the domain of immunisation. In fact, served children aged 12–35 months are 7 percentage points more likely to have ever been vaccinated compared with matched children in unserved areas. They are also almost 16 percentage points more likely to be fully vaccinated.

In line with the 3rd Evaluation results, we also find indications that served children are more likely to undertake vaccination in a timely manner (both for BCG and polio). The coefficient magnitudes coincide between the PSM and the regression estimates (5 to 6 percentage points increase), although the significance levels differ.

The analysis shows that served children younger than 3 years old are roughly 8 percentage points more likely to have been weighed by a health worker. However, this might partly reflect the effect accrued by the Programme in the past, possibly when the equipment limitation outlined in Section 2.4.3 was not so severe. Timely, and therefore periodic, weighing has not increased, as children in served areas are no more likely to have been weighed during the three months prior to the survey, compared with homologous children in

unserved locations. The Programme is not currently providing effective growth monitoring services on a sufficient scale, as was shown by the low proportion of children who have been weighed, presented in Chapter 3.

For the interpretation of the LHWP impacts on health practice outcomes, it is important to note that many of these indicators are related to service use. In most cases, the LHWs play an important direct role in the provision of these services. We know this because householders were asked about the source of the service that they used.

In the population served by LHWs, they supplied 40 per cent of modern contraceptive users and 53 per cent of pills, condoms, and injectable contraceptives users (Table 7.7). Almost half the women (45 per cent) registered with the LHW who took iron tablets during their most recent pregnancy were supplied by her with these tablets. Children in LHW areas who had been weighed in the previous three months were also most likely to have been weighed by the LHW herself (54 per cent), although it should be noted that the proportion of all children weighed by the LHW was low (11 per cent, see Chapter 3).

This direct contribution of the LHW to the provision of services has to be borne in mind when interpreting the results of the impact analysis**.**

Table 7.7 LHWs as direct suppliers of services

Measure	Percentage
Currently married women aged 15–49 using modern family planning methods who were supplied by the LHW	40
Currently married women aged 15–49 using condoms, pills or injectable contraceptive who were last supplied by the LHW	53
Pregnant women who took iron tablets during the last pregnancy who were supplied by the LHW	45
Children under three weighed in the previous 3 months who were weighed by the LHW	54

Note: Estimates are for the population served by LHWs (that is, for the sample of households drawn from the register).

7.2.8 Impact on health outcomes

We do not find any effect of the Programme on the incidence of ARI and ADI amongst children below 5 years old. The incidence of these diseases reflects multiple factors, many of which are difficult for the Programme to influence. However, more effective interventions in hygiene and sanitation education (see above) might be expected to contribute to reducing the incidence of diarrhoeal disease, in particular.

7.3 Variation in impact according to socioeconomic stratum

7.3.1 Methodology

In this section, we examine whether the LHWP has different effects on the health knowledge, attitudes, practices and outcomes of the beneficiaries depending on their socioeconomic status. Addressing the issue of heterogeneous impacts is particularly relevant for a programme such as the LHWP, given its universal provision in served areas. As our previous

analysis shows (Chapter 5), there is, in fact, a great deal of variation in the characteristics of treated households/individuals amongst the served population.

The question of whether relatively poorer households receive different benefits from the LHWs, compared with those who are relatively better off, is therefore crucial. We use consumption quintiles as an overall indicator of the socioeconomic wellbeing of served and unserved households. We split our sample into two groups: subgroup 1 comprises households in served and unserved areas that fall in the first and second (lower) consumption quintiles, while households falling in the fourth and fifth (higher) quintiles comprise subgroup 2.

Using the PSM technique, we undertake the same impact analysis described in the previous section separately for each of these two subgroups. The matching procedure between served and unserved households/individuals is now performed only within every sub-group. In such a way, we ensure that served observations are matched and compared with unserved observations that fall in the same range of the household consumption distribution. The matching procedure becomes much more accurate, as served and unserved are more homogeneous.

We use the same set of specifications and parameters discussed in the previous section. Full details of the participation functions, distribution of Propensity Scores and likeness of the matched samples for the two subgroups are available on demand.

7.3.2 Results

Detailed results of the analysis of differential effects by consumption quintiles groups are reported in Annex G.

At a first glance, they confirm the overall picture of the LHW's performance impact that emerged from the previous section. However, in a number of respects, we find that the LHWP has differential effects on beneficiaries according to the consumption quintiles to which they belong. Impacts are generally much stronger for households in the first and second (poorer) quintiles of the consumption distribution, and milder for relatively better-off households.

The impacts on health knowledge, however – particularly diarrhoea treatment – seem to be concentrated in better-off households, while poorer households struggle to acquire new capacities for illness management, possibly due to their lower levels of education. Conversely, we find greater effects on the desire of women in poorer households to have smaller families.

Our estimates also suggest that the LHWP effects on maternal health practice are more concentrated on women from poorer households. Almost all impact estimates show double figure magnitudes and are extremely significant for this group, including antenatal consultations, use of iron tablets, tetanus toxoid injections and neo-natal check-ups. A possible interpretation of these results is that, while for extremely poor households supply-side constraints are mainly hampering access to new maternal health practices, demand-side barriers come into play for relatively better-off women (that is, cultural resistance). And it is, indeed, easier for the LHWP to overcome supply-side restrictions, rather than breaking demand-side barriers. The only area where better-off households seem to extract any gains from the LHWP in the domain of antenatal care and delivery is institutional deliveries and skilled birth assistance.

The analysis of differential impacts in the domain of family planning provides some interesting insights. The impact on the use of contraceptive methods is stronger for women belonging to the 4th and 5th consumption quintile, both in terms of magnitude and significance. LHWP succeeds in substituting FP methods amongst better-off couples, by providing incentives for the use of reversible and modern ones. However, the increase in the CPR is not significant for this group, indicating that the LHWs might, basically, be working on demand for this client target group. Conversely, the LHWP achieves some modest but significant expansion of the CPR for couples from poorer households. The poorest women tend to be receptive to the use of modern contraceptive methods in general, but much less specifically to the reversible methods.[45]

Finally, the Programme's effects on health practices in child heath are also mainly concentrated on children belonging to the poorest households of the served population. While we still do not find any significant effect on breastfeeding and weaning behaviour, immunisation and even growth monitoring results are striking for children in the first and second consumption quintiles. The fact that results are so limited for children belonging to relatively better-off households suggests that these households might be accessing services such as vaccination and growth monitoring from other sources (for instance, at the health facility).[46]

In line with overall findings, and possibly because it is affected by many factors outside the ambit of the LHW, we do not find evidence of effect on diarrhoea and respiratory infection incidence in children for any of the consumption sub-groups.

7.4 Determinants of Programme's impact: LHW knowledge and performance

7.4.1 Methodology

So far our analysis has focused on the average effect of the Programme as a whole. In this section, we try to determine how variations in the characteristics of the LHWs themselves affect health outcomes. For the sake of simplicity, we focus our attention on two measures of the overall performance of the LHWP: the LHW knowledge score, and the LHW performance score.[47]

In order to do so, we restrict our observations to served households only. Using a multivariate regression strategy, we try to determine if, all else being equal, the fact of receiving services from a relatively more knowledgeable or better performing LHW positively affects health knowledge, practices, and outcomes.[48]

In order to capture the second order effects of the relationship between LHW knowledge/LHW performance and outcomes fully, we estimate two independent

45 Again, these results might be driven by the fact that the demand for contraceptive methods is different across the socioeconomic strata. They could also reflect stock and supply problems (particularly of contraceptive pills and condoms) that might affect the LHWP when it operates in relatively poorer areas.

46 Conversely, these findings might also indicate that the LHWs are actually privileging worse-off children in their action.

47 As we have seen (Section 4.3), the performance score is associated with many other dimensions of programme effectiveness: the district management schemes, LHS supervision, and so on. The same is true for the LHW Knowledge Score, especially insofar as the efficiency of the training process is concerned. By looking at the effect of LHW performance and knowledge on final outcomes, we are therefore able to acquire a sense of how the overall Programme performance affects final results.

48 Our models include the same set of controls that have been previously discussed.

specifications. In the first specification (the first and third column in the next section's tables) we include an indication on whether the LHW Knowledge Score/LHW Performance Score is above the median of the distribution of the scores for all LHWs. In the second specification, we include a set of dichotomous variables for every quartile of the distribution of the LHW score.[49] We only report in the tables (see second and fourth columns in the next section's tables) the coefficients that indicate LHWs at the top of the distribution.

We estimate the effect of LHW knowledge and LHW performance separately. We have also run an analysis of the two joint effects. The results generally hold.

Two important points are worth noting. First, the models do not include any other Programme characteristics than LHW knowledge and performance. Therefore, the effect of any Programme characteristic that is correlated with these two indicators will be reflected in the coefficient of interest. Second, three components of the LHW performance score actually have a direct association with some of the outcomes of interest. This will be taken into account in the interpretation of the results.[50]

As we have pointed out previously, when we compare households that receive services from LHWs with different levels of performance or knowledge, the risk of incurring selection biases due to unobservable factors increases. The characteristics of the LHWs, in fact, are not randomly allocated across served households. On the contrary, the better performing and more knowledgeable LHWs are more likely to be found in communities where women's educational standards are higher, or in districts where the health systems are more efficient, and therefore the LHWP systems are more efficient. Our identification strategy assumes that, by controlling for differences that are observable, we are re-establishing the ground of comparability. As there could be other unobservable factors for which we are not accounting, the results have to be taken with some caution.

7.4.2 Results

Our results indicate that LHW performance does have a remarkably positive effect on most of the health practice indicators considered in the study. LHWs in the top distribution of the performance score often make an additional difference in terms of several Programme impacts.

The effect of the Knowledge Score is more concentrated, particularly in the case of health knowledge outcomes and the proper treatment of basic illnesses. Still, it is interesting to see that households served by relatively more knowledgeable LHWs are more likely to put in place types of health practices (that is, timely vaccination) that we consider 'knowledge-intensive'. Expert advice proves effective in modifying behaviours and, again, the fact that LHWs have a Knowledge Score well above the standard does make a difference.

Overall, our findings indicate that positive Programme impacts are the results of a combination of good performance (that is, the more extensive provision of services that are supposed to be provided) and knowledge. By working along both lines, the Programme is likely to make significant improvement to its overall impact effectiveness. The joint importance of performance and knowledge also suggests that factors positively affecting

49 We exclude the dummy on the first quartile for the estimation.

50 The fourth, sixth and ninth components of the performance index coincide directly with health practice outcomes. In the other cases, the LHW performance components normally indicate the fact that the LHW has provided the correct advice or training, while the outcomes reflect the actual degree to which advice has been absorbed (converted into knowledge and actual behavioural change).

both scores (for instance, efficient programme management systems at district-level) are a crucial success factor.

The case of health knowledge outcomes is an explanatory case of this general finding (Table 7.8). While our results suggest that the main effects on knowledge are concentrated on the treatment of diarrhoea, we find that both LHW knowledge and LHW performance matter in the consolidation of households' awareness in this respect. The fact that LHW performance is above the median contributes to an increase of 15 percentage points in the probability that mothers know at least one way to prevent diarrhoea. This is likely to reflect LHWs' more constant engagement in household visits and their propensity to train the clients according to the LHWP manuals. But, intuitively, it is the LHW's knowledge itself that is transferred to the clients. That is why we find that served mothers are 13 percentage points more likely to know how to treat diarrhoea, when their LHW's knowledge is above the median.

Table 7.8 Effect of LHW's knowledge and performance on health knowledge and attitudes

Measure	Multivariate Regression			
	LHW Performance		LHW Knowledge	
	above median	4th quartile (versus 1st)	above median	4th quartile (versus 1st)
Knowledge				
% of mothers of children five who know at least one way to prevent diarrhea	0.150***	0.226***	0.132***	0.155***
% of mothers of children five who know how to prepare ORS	0.007	-0.012	0.010	-0.032
Number of modern method of contraception known by women (currently married women of 15-49 years of age)	-0.003	0.004	0.014	0.002
Attitudes				
Mean number of children wanted in total	-0.121*	-0.146	0.027	0.028
Belief on the optimal number of children	-0.059	-0.059	-0.004	0.008
% who think that Islam approves of family planning	0.076**	0.152***	-0.014	-0.024

Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM Standard Errors are estimated with a bootrstap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

The effect of performance and knowledge on fertility attitudes is smaller. The only significant difference that we can identify has to do with the cultural perception about the relationship between Islam and family planning. We find that women in households served by high-performing LHWs are 8 per cent more likely to think that Islam approves of family planning; no other effects are significant.

The findings in the domain of health practices in sanitation confirm the difficulty of modifying behaviours in this field (Table 7.9). While several components of the performance score refer to the fact that the LHW provides advice on hygiene and sanitation to the households, only top performers manage to have a significantly positive effect on these practices.

The most striking case is garbage disposal. Receiving a visit from a LHW in the top quartile of performance, rather than in the bottom quartile, contributes to reducing the proportion of households that dump their garbage 'anywhere' by more than 19 percentage points. Knowledge seems to be an equally important triggering factor here. There are even some signs that top performers manage convince mothers to wash their hands with soap before preparing food, an indicator that showed no apparent effect in the previous comparison of served and unserved households.

Table 7.9 Effect of LHW's knowledge and performance on health practices in sanitation and maternal health

Measure	Multivariate Regression			
	LHW Performance		LHW Knowledge	
	above median	4th quartile (versus 1st)	above median	4th quartile (versus 1st)
Sanitation Practices				
% households who clean water before drinking	0.007	0.027*	-0.005	-0.002
% households who have proper arrangement of garbage disposal	0.022	0.055**	0.005	0.029
% households who dump garbage anywhere	-0.102**	-0.193***	-0.079**	-0.137***
% women who wash hands with soap before preparing food	0.043	0.091**	0.016	0.051
Antenatal care and delivery				
(Women who had a birth since 2004 reporting on their last birth):				
% who had at least one antenatal consultation at a health facility	0.084***	0.109***	-0.016	0.056
% who had five or more antenatal consultation at a health facility	0.056	0.115***	-0.021	0.038
% who had at least two tetanus toxoid injection in the last pregnancy	0.128***	0.258***	0.047	0.080
% who have at least five tetanus toxoid injection in life	0.070**	0.156**	0.066**	0.124***
% who took iron tablets during last pregnancy	0.133***	0.248***	-0.054	0.003
% of births attended by doctor, nurse or LHV	0.026	0.111**	0.035	0.112**
% of births attended by a TBA	0.136***	0.193***	0.026	0.008
% of births delivered at health facility (Institutional deliveries)	0.036	0.108**	0.050	0.114**
% of newborns examined within 24 hours of birth	0.141***	0.192***	0.007	-0.016
Family Planning				
(Currently married women aged 15-49)				
% know source to obtain method of contraception	0.019	0.036***	0.012	0.021
% have ever used any method of contraception	0.051	0.065	0.049	0.115***
% using any method of contraception (CPR)	0.020	0.046	0.040*	0.047
% using any modern method of contraception	0.032	0.072**	0.059***	0.075**
% using any modern 'reversible' method of contraception	0.044***	0.087***	0.035**	0.056**

Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM Standard Errors are estimated with a bootstrap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

In terms of antenatal care and deliveries, the association between LHW performance and outcomes is striking. Pregnant woman served by high-performing LHWs are more likely to undertake antenatal consultation at the health centre (and more than once, when the LHW is a top performer), and receive tetanus toxoid injections and iron tablets. Although part of

these results might be due to some sort of spurious correlation, the magnitude of the effects is remarkable, particularly for top performers when they are compared with LHWs in the bottom quartile of performance (above the range of 20 percentage points for the last two measures).

Top performers also seem to have a positive effect on some indicators relating to health practices at delivery, a result that we had not identified in the comparison with unserved households. Particularly, our findings suggest that they might be encouraging institutional deliveries (although, again, this result must be taken with caution because of concerns of spurious correlation) or the presence of a TBA at birth.

Insofar as the Knowledge Score is concerned, it is interesting to notice that pregnant women served by a knowledgeable LHW are 10 percentage points more likely to have received five tetanus toxoid injections, which offers them full-life protection. This is, indeed, a case of knowledge-intensive health practice. However, overall higher levels of knowledge are less significantly related to outcomes.

The analysis of family planning outcomes shows that knowledge and performance are important determinants of the LHWP's effectiveness, particularly for the use of reversible contraceptives,[51] and particularly when LHWs fall in the top distribution of both indicators.[52] The most knowledgeable LHWs manage to have an additional effect on the likelihood of having ever used any method of contraception, meaning that they seem to be expanding the use of family planning method to couples that had never used such methods before.

It is noteworthy that in this and subsequent tables the effect of being a high-performing LHW is more commonly significant than being in the top quartile for knowledge. This suggests that the programme should focus its efforts particularly on improving LHW performance levels.

Table 7.10 Effect of LHW's knowledge and performance on health practices in child health

Measure	Multivariate Regression			
	LHW Performance		LHW Knowledge	
	above median	4th quartile (versus 1st)	above median	4th quartile (versus 1st)
Breastfeeding and weaning				
% of children under 3 years ever breastfed	-0.001	-0.007	-0.003*	-0.001
% of children whose mother began breastfeeding within half an hour of birth	0.098***	0.204***	0.000	-0.011
% of children whose mother began breastfeeding within 4 hours of birth	0.139***	0.228***	0.047	0.041
Months of breastfeeding	-0.183	-0.241	-0.787**	-0.965**
Months of exclusive breastfeeding (no liquids, no solids)	0.102	0.133	-0.087	-0.358
% of children exclusively breastfed until 6 months of age	0.053	0.093	-0.025	-0.043
Immunisation				
% of children aged 12 to 35 months had ever been vaccinated	0.001	0.000	0.000	0.001
% of children aged 12 to 35 months fully vaccinated	0.122***	0.209***	-0.005	0.074
% of children aged 12 to 35 months had BCG before age 12 months	0.035***	0.035***	0.008	0.019**

51 The positive effect of LHW performance on the use of reversible methods might also reflect stock management and stock availability strengths in districts/FLCFs where the LHWs are usually better performers.
52 In the interpretation of the results, it must be take into account that the provision of modern contraceptive measures, or referral to a health centre for modern contraception, is a component of the performance score.

Measure	Multivariate Regression			
	LHW Performance		LHW Knowledge	
	above median	4th quartile (versus 1st)	above median	4th quartile (versus 1st)
% of children aged 12 to 35 months had three or more time polio drops before age 12 months	0.012	-0.007	0.016	-0.014
Growth Monitoring				
% of children under 3 years ever weighed by any health worker	0.239***	0.353***	-0.003	0.063
% of children under 3 years weighed by any health worker in the previous 3 months	0.161***	0.261***	0.008	0.072

Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM Standard Errors are estimated with a bootrstap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

The analysis of the effects of knowledge and performance on breastfeeding practices is multifaceted. We find that in households served by an LHW performing above the median, children under 3 years old are more likely to start being breastfed in a timely manner. All else being equal, top performers seem to obtain that this happens before 4 hours from birth for 23 per cent more of the children, compared with LHWs at the bottom of the distribution. Conversely, we find some consistent evidence that, in households served by more knowledgeable LHWs, breastfeeding is less likely and the duration of breastfeeding is shorter. This result suggests that there might be some problems in the interpretation or the clarity of the message provided to LHWs in manuals and training events. Our results are consistent with the general finding that the LHWP has no effect on breastfeeding (and, if any, a negative one).

As for the effects on other areas of child health practices, high-performing and especially top-performing LHWs do make a difference in terms of full and timely immunisation, as well as growth monitoring and timely growth monitoring. The striking magnitude of the coefficients must be read in light of two issues. First, timely growth monitoring enters the performance score directly as one of its components. Second, both growth monitoring and vaccination are heavily reliant on stock and FLCF support factors. It is like that the performance score is partly capturing these side effects, as better performing LHWs are likely to pertain to better equipped and more functional FLCFs.

Even so, we find that children attended by a top performing LHW are 21 percentage points more likely to be fully vaccinated and 35 percentage points more likely to have been weighed by a health worker, compared with children attended by an LHW in the first quartile of performance. As we had previously noted, the LHW Knowledge Score positively affects the timely vaccination of children in the case of BCG, although little else.

Table 7.11 Effect of LHW's knowledge and performance on health practices in basic illness treatment

Measure	Multivariate Regression			
	LHW Performance		LHW Knowledge	
	above median	4th quartile (versus 1st)	above median	4th quartile (versus 1st)
Prevalence and treatment of common illnesses (children under 5 years)				
who had diarrhoea consulted any health provider	0.006	0.011	-0.023	-0.063
who had diarrhoea consulted at or were referred to any health facility	-0.049	0.029	-0.172**	-0.157*
with diarrhoea given more liquids to drink[3]	0.006	0.057	0.071*	0.113
with diarrhoea given ORS [3]	0.055	0.119	-0.122	-0.082
who had ARI consulted any health provider	0.013	0.023	-0.012	-0.014
who had ARI consulted at or were referred to any health facility	0.003	0.040	-0.023	-0.008
with respiratory infections given more liquids to drink[3]	0.285***	0.289***	0.065	0.048

Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM Standard Errors are estimated with a bootstrap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent.

Finally, in Table 7.11 we report our estimates for the effect of LHW's knowledge and performance on the treatment of basic illnesses.

The case of diarrhoea treatment shows a very interesting pattern. In households served by a relatively more knowledgeable LHW, parents are more likely to provide children younger than 5 years old with more liquids to drink for the treatment of cased of diarrhoea. They are also 17 percentage points less likely to consult someone at (or be referred to) the health facility.

These findings suggest two hypotheses: first, when households have the correct knowledge, they are less dependent on health services in general. Second, there is actually a substitution effect between staff at the health facility and the LHW, when she is sufficiently knowledgeable. This is, indeed, one of the strongest arguments in favour of the community health model.[53]

7.5 Key findings

The analysis in this section has assessed whether the programme has had an impact on key health indicators. It has found that it appears to have done so for a number of them. It should be noted that it is always possible that there are additional, unmeasured confounding factors that might negate this finding if they were controlled for, although the analysis took all possible steps to try to deal with that concern.

7.5.1 Health related indicators in served and unserved areas

In the first section, this chapter compares health related measures between served and unserved households. The limitations on interpreting differences between the two as a measure of the impact of the Programme have been outlined (given that area selection was non-random). The analysis has shown that the served population has better health related indicators in nearly all the measures, particularly antenatal care, family planning, supervised

53 The fact that LHW knowledge has no effect on the use of ORS is somewhat puzzling. The indicator on ORS knowledge is affected by a significant number of missing observations. We believe that the reason for the bad quality of the information could be that interviewers did not always have an ORS packet to show to respondents. The results and analysis of this indicator have therefore to be taken with particular caution.

deliveries and immunisation. However, some indicators buck the trend: there are higher proportions using health facilities for diarrhoeal disease and acute respiratory infection in unserved households, as well as higher levels of exclusive breastfeeding. The former might reflect the effect of treatment services provided by the LHWs in served areas.

These differences are encouraging, and it is possible that they are partly due to the effect of the Programme. However, it is also possible that the differences are due to *other* differences between the served and unserved areas. We already know that served areas are more advantaged than the unserved areas on many socioeconomic indicators. The differences in health related measures might, therefore, simply be a consequence of these socioeconomic differences. This issue was addressed in the following sections.

7.5.2 Programme impact – comparison of served and unserved areas

In this section, we used two main techniques to achieve more reliable assessment of the impact of the LHWP. In general, there is agreement between the results obtained from the regression analysis and the Propensity Score matching approach.

The results suggest that the LHWP has had a positive impact, particularly in relation to family planning (with comparable served households 11 percentage points more likely to be using a modern FP method), antenatal care (13 percentage points more likely to have had TT), neo-natal check-ups (15 percentage points more likely to have occurred within the first 24 hours from birth), immunisation (children under 3 years old 15 percentage points more likely to be fully immunised), and, to a lesser extent, growth monitoring. These effects are likely to be linked directly to LHW activities, as the LHW is a main provider – providing, for example, 60 per cent of pills and condoms.

On the other hand, the impact on health knowledge and sanitation has been weak; there is no evidence of a positive effect on breastfeeding (there is even a negative relationship), no evidence of an increase in skilled attendance at delivery, and no evidence at all on the incidence of ADI and ARI in children. Some of these areas appear to be more difficult to change.

7.5.3 Variations in impact by household socioeconomic status

By dividing served and unserved households into quintiles, based on consumption, this section was able to analyse the differential impact of the LHWP. In general, the analysis found that the Programme's effects are concentrated on poorer households, including in relation to desired fertility, maternal health practices, immunisation and growth monitoring. On the contrary, changes in family planning behaviour are more evident for relatively better-off women.

7.5.4 Effects of LHW knowledge and performance

Analysing outcomes for served households according to the LHW performance and knowledge scores reveals the extent to which individual LHW characteristics determine the effectiveness of the LHWP. The findings here are strong and positive, suggesting that a better-performing and more knowledgeable LHW can have a positive impact, even on areas that appeared to be resistant to change, such as improved hygiene (hand-washing), sanitation (improved disposal of garbage), delivery practices and the treatment of basic illnesses, as well as the areas where overall LHWP performance has shown to be stronger (such as antenatal care, vaccination and FP). Of the two LHW characteristics, higher performance levels were more likely to be associated with a positive impact.

8 Conclusions

This evaluation has focused on changes that have occurred since 2000, when the previous independent Programme evaluation took place. Understanding the changes that have occurred during this intervening period is particularly important, because the Programme has expanded significantly during this time. The survey has shown that the Programme has expanded to serve populations that are somewhat more disadvantaged, on average, than they were serving at the time of the last evaluation. This is, in itself, an important achievement. However, the population that remains unserved is significantly more disadvantaged still, and efforts must be made to cover those areas. The differences between the populations assessed in the two evaluations must be taken into account in the interpretation of the trends presented.

In terms of LHWP service delivery, LHWs are working harder than they were in 2000. They report an average of 30 hours per week of work, compared with 20 in 2000. They are providing many services to a higher proportion of their clients than they were in 2000, for a wide range of services, as measured by a summary performance measure. However, the use of their curative services by adults appears to have declined slightly. The survey also found an average of 131 households registered per LHW, compared with 145 in 2000, meaning that the total volume of services provided per LHW might not have increased quite as much as has the performance measure. There is significant variation across provinces in the number of households registered, with only 86 households per LHW in Balochistan compared with 150 in Punjab/ICT. The mean LHW performance score, which measures the success with which the LHW is delivering all the services required of her, given the size and demographic breakdown of her registered population, has increased from 42 to 52. There remains a substantial group of under-performing LHWs, however.

There has been an improvement in the level of supervision of LHWs – some 78 per cent had had a supervision meeting in the preceding month. A similar proportion of LHWs reported that their supervisors used a checklist in the last supervision meeting. LHSs have, on average, fewer LHWs to supervise than in 2000, making proper supervision easier. They have better access to transport, although a significant number still have no access to a programme vehicle or have not received all the POL that they are due. LHSs are themselves better supervised by the Programme, with 93 per cent reporting a supervision meeting in the previous month. There have been some changes in the timeliness of payments to LHWs: compared with 2000, far fewer waited over three months to be paid, although it appears that a smaller proportion had also been paid in the previous month.

There has also been some improvement in LHWs' level of clinical knowledge compared with the 3rd evaluation in 2000. The average score has increased from 69 to 74. There have been improvements in all provinces. Improvements have not been uniform, with knowledge improving in some topic areas but not in others. A minority of LHWs continue to lack basic clinical knowledge. The LHW Supervisors have also seen an improvement in their average level of knowledge, from 74 to 78. Education, effective training and supervision, and good district management practices are important factors in determining LHW levels of knowledge.

While these results suggest that improvements have been made in terms of the coverage and quality of LHW service delivery, there are continuing problems with stock-outs, with many LHWs out of stock of key medicines at the time of the survey. Significant proportions had been out of stock of certain items for more than two months. There are also still substantial proportions missing basic equipment.

Many of these overall findings are also observed in the provinces and the federally administered territories, although less can be said with certainty at that level because of smaller sample sizes and, in some places, differences in the population covered by the sample. All areas show an improvement in LHW knowledge scores. The largest increase is in NWFP, although that might have been affected by difficulties in accessing some insecure areas in the 2008 survey. All areas also show an improvement in LHWs' average performance levels, with particularly large improvements in Balochistan, from a previously low level. Improvements in supervisions levels have not been so uniform, with variation in trends by province. Stock-outs of medical supplies are a particular problem in Sindh. LHWs in Balochistan and Sindh are the most likely to lack equipment and administrative materials.

The comparison between the two surveys shows a substantial improvement in a number of the LHWP target health indicators. The improvements in tetanus toxoid coverage (five or more doses) and attended deliveries are particularly large, with increases from 14 to 31 per cent and 27 to 48 per cent coverage, respectively. The proportion of children fully immunised has increased from 57 to 68 per cent. Measures of exclusive breastfeeding have also improved, although the impact analysis does not find any evidence for a Programme impact on breastfeeding. The improvement in the contraceptive prevalence rate is very small (1 percentage point) and not statistically significant. It is clear that the improvements, even when they are substantial, are not usually as large as had been intended in the most recent PC-1, even over the longer period of 2000 to 2008. These improvements have taken place as the Programme expanded to cover more disadvantaged populations, however, and are no doubt of considerable importance to the health of the population. The Programme might want to consider what would be realistic levels of change for these indicators when developing the next PC-1.

It is clear that the improvements over time in these health indicators cannot be attributed to the LHWP programme alone, because many changes have occurred over this period – not least, economic growth. Also, these indicators are influenced by many types of health service provision, not simply the community health services provided by the LHWP. To assess the direct impact of the programme, a more appropriate starting point is to compare health outcomes between the population served by the LHWP and those not served. In fact, the served population has substantially better health status measures than the unserved population for almost all measures, with the exception of some indicators on breastfeeding and weaning. However, these differences are not necessarily due to the Programme, since the unserved population is disadvantaged in many other ways.

To achieve reliable estimates of the Programme's direct impact, taking into account the differences between the served and unserved populations, it was necessary to use statistical modelling techniques. Two main impact evaluation approaches were used: multivariate regressions, and Propensity Score matching (PSM). Both approaches adjust for observable differences between served and unserved areas, and so more reliably disentangle the impact of the LHWP. It should be noted, however, that it is never possible to be sure that all such factors have been fully controlled for. In general, there is agreement between the two approaches.

The results of the impact analysis suggest that the LHWP has had a substantial positive impact on a number of health indicators. There is evidence of an impact on: family planning (with served households 11 percentage points more likely to be using a modern family planning method); [54] antenatal care (13 percentage points more likely to have had tetanus

54 Although it appears counterintuitive, it is possible for the programme to have had a significant impact on the use of modern family planning methods even though the CPR has not improved between the two surveys. For example, the programme may

toxoid vaccination); neo-natal check-ups (15 percentage points more likely to have occurred within the first 24 hours from birth); and immunisation (children under 3 years old are 15 percentage points more likely to be fully immunised).

Some of these effects are likely to be linked directly to LHW activities, as the LHW is a main provider – providing, for example, 60 per cent of pills and condoms.

On the other hand, the impact on health knowledge and sanitation has been weak. There is no evidence of a positive effect on breastfeeding (if anything, the relationship appears to be negative), no evidence of an increase in skilled attendance at delivery, limited effects on growth monitoring, and no evidence at all on diarrhoea and ARI incidence in children. Some of these areas present more intractable behavioural issues, although it was found that high-performing LHWs had an impact on a number of them, suggesting there is scope for improvements if performance can be strengthened and LHWs are given sufficient support.

The variations in Programme impact between poorer and better-off households were also analysed. In general, this analysis found that effects were more pronounced in poorer households – particularly in relation to desired fertility, maternal health practices, immunisation and growth monitoring. However, knowledge-based interventions, such as treatment of diarrhoeal diseases, had greater impact amongst better-off households. No effect was found on the incidence of child diarrhoea and respiratory infections.

The evaluation focused on two factors that potentially drive Programme impact: high rates of service delivery, and higher levels of LHW knowledge. The former was measured through the LHW performance score. This score is constructed by determining the unique service requirements of each household and assessing the LHW's success in delivering these services. The quality of service delivery was captured through the LHW Knowledge Score, a composite measure of knowledge that is constructed by assigning points for specific questions that LHWs answered correctly

Analysing the effect of these two factors – the rate and quality of service delivery – on Programme impact reveals the extent to which individual LHW characteristics determine the effectiveness of the LHWP. The findings here are often strong and positive, suggesting that a more knowledgeable and better-performing LHW will have a stronger positive health impact on ANC, vaccination, and the treatment of basic illnesses. High performance levels are particularly important. Furthermore, a highly active and knowledgeable LHW appears to have a positive impact even on behaviours on which the programme, as a whole, is having no impact, such as hand-washing (improved hygiene), waste disposal, and delivery practices. These results suggest that, by increasing the rate of LHW service provision and knowledge, Programme impact can be improved, often in areas with the potential for a large public health benefit.

Regression analysis was used to identify the factors associated with variations in LHW performance. The analysis identified a range of factors that help to explain these variations, some of which are within the control of the LHWP and which therefore imply some clear policy implications. Specifically, efforts should be made to:

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have expanded into areas of initially lower CPR and caused an increase there, or the impact finding may be due to a shift from traditional to modern methods.

Retain experienced LHWs;

- Ensure LHWs are working the full hours required of them, but are not working a seven-day week;
- Ensure that LHW supervisors are themselves regularly and effectively supervised by the FPO and that performance monitoring tools such as the diaries and work-plans continue to be used;
- Encourage active women's health committees to be established/maintained in all served areas;
- Maintain a focus on MIS reporting – in particular, making clear the services that the LHW should be providing, and that LHWs understand their performance in delivering these services is being monitored;
- Encourage DPIUs to set up effective LHW performance management regimes with procedures for reporting and sanctioning LHW non-performance; and
- Ensure all served health facilities have a designated individual with overall responsibility for overseeing LHWP activities.

Similar analysis was also undertaken to identify the factors associated with high levels of LHW knowledge. These results also have clear policy implications for the Programme:

- Ensure new LHW recruits have high levels of education wherever possible;
- Maintain and improve the frequency, focus and quality of refresher training courses;
- Target training efforts to strengthen knowledge in areas where it is found to be insufficient (i.e. weakest dimensions of the knowledge score); and
- Ensure all served health facilities have an individual with overall responsibility for overseeing LHWP activities, and that, within each district, regular meetings are held between these individuals and the DPIU.

By taking these measures to increase LHW performance and knowledge, the Programme should be able to increase its impact. However, in doing so, it is important that it does not lose sight of other key factors that will influence the Programme's impact – in particular, the provision of adequate supplies, equipment and clinical referral services. The 2008 survey has shown that there are ongoing problems in these areas that need to be addressed.

In summary, it is clear that the LHWP has effectively managed its expansion without undermining its impact. This is a considerable achievement. Some key factors that have enabled this, and which must be a continued focus for the programme, are LHW supervision and performance management, and effective district-level management. Looking forward, as the LHWP matures it should begin to consider issues of efficiency more systematically, maximising health impact given a fixed level of financial inputs. It should identify areas that have the potential for substantial health benefits that have not yet been properly realised. It should consider the combination of inputs and of services that can be expected to maximise the impact on health outcomes.

Annexes

Annex A Sampling methodology

A.1 Sample strategy

The survey collected information on a sample of LHWs, on the households that they serve and on a sample of unserved households for comparison with the served households. Altogether, 554 LHWs and 5,752 households were interviewed. The supervisors of sampled LHWs were also interviewed. In addition, the survey collected information from the health facilities to which the LHWs are attached and from their communities.

Table A.1 shows how many served and unserved FLCFs, LHWs and households were sampled in all the districts covered by the survey.[55] LHWs were included in the sample if they had completed their initial three months' training.[56]

Table A.1 Sample strategy

Number of districts selected	60
Served FLCFs per district	5
LHWs per FLCF	2
Households per LHW	8
Households per served FLCF	16
Unserved FLCFs per district	1 or 2
Catchment segments per unserved FLCF	1
Households per unserved FLCF	16

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

In the first stage of sampling, 60 out of 133 districts were selected to be covered by the survey. The sample used five geographic strata: Punjab, Sindh, NWFP, Balochistan and AJK and FANA. Adequate coverage of urban areas was imposed by sampling with certainty ten districts containing main cities (Rawalpindi, Lahore, Faisalabad, Multan, Karachi, Hyderabad, Sukkur, Peshawar, Quetta, Muzaffarabad).

Districts assessed to be too insecure for fieldwork to be conducted safely were excluded from selection. In this way, nine of the 133 districts in existence in Pakistan in April 2008 were excluded from the sample frame due to insecurity: two in North West Frontier Province (NWFP) and all seven in the Federally Administered Tribal Areas (FATA).

In addition, after the district sample was drawn, three of the selected NWFP districts were dropped, also due to insecurity. The final number of districts covered by the evaluation is therefore 57.

Table A.2 shows the number of districts selected for the evaluation by province.

55 Served areas receive services from the LHWP and unserved areas do not.

56 Note; this is a key difference from the design of the 3rd Evaluation, where only LHWs with at least three years' experience were covered by the Programme.

Table A.2 Number of districts covered by the evaluation by province

District	Total number of districts (April 2008)	Excluded from evaluation due to insecurity	Selection for the evaluation
Punjab and ICT	36	–	19
Sindh	23	–	12
NWFP	24	2	12
Balochistan	29	–	10
AJK/FANA	14	–	7
FATA	7	7	–
Total	133	9	60

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

It should be noted that, after the sample had been drawn, it was subsequently discovered that the district sample frame that was used to draw the sample had been incomplete. The district sample frame, derived from the served FLCF and LHW lists provided by the LHWP-MIS unit, only contained 118 districts, whereas there were actually 133 districts in Pakistan in April 2008 when the sample frame was constructed. Thus, 15 districts were missing from the sample frame. The problem is most acute for Balochistan, since 11 of the 15 'missed' districts are in Balochistan.

Whether or not this incomplete sample frame causes the evaluation results to be biased depends principally on the degree to which the 'missed' Balochistan districts are systematically different to the rest of Balochistan, and how much Balochistan affects the overall national estimates. With regard to the first issue, analysis of the PSLM 2004–2005 survey data (not presented in the report) suggests that the missed districts do display some systematic differences, although these missed districts do not weigh very heavily in the overall Balochistan estimates (that is, their combined population is small). Furthermore, by comparing national estimates of key evaluation indicators with and without Balochistan included (not presented in the report), it can be shown that changes to Balochistan observations do not have much impact on the overall estimates. This is because of the relative distribution of population across the provinces, which means Balochistan observations weigh much less heavily in the national estimates.

Overall this implies that, whilst some care should be taken in interpreting provincial-level trends for Balochistan, the overall national results and the provincial oriented estimates for the other provinces are reliable.

Table A.3 shows the intended sample breakdown by sampling units and provinces/regions.

Table A.3 Intended sample breakdown

Sampling units	Punjab and ICT	Sindh	NWFP and FATA	Balochistan	AJK/ FANA	Overall
Districts	19	12	12	10	7	60
Served FLCFs	95	60	60	50	35	300
LHWs	190	120	120	100	70	600
Unserved FLCFs	24	24	20	18	14	100
Served households	1,520	960	960	800	560	4,800
Unserved households	384	384	320	288	224	1,600
Total households	1,904	1,344	1,280	1,088	784	6,400

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

A.2 Definition of sampling units and description of sampling stages

A.2.1 First Level Care Facilities (FLCFs)

An FLCF is defined as a health facility that has joined, or could potentially join, the LHWP.

One of the objectives of this survey is to assess key differences between served areas and unserved areas. The survey was therefore designed to cover served FLCFs and unserved FLCFs. A served FLCF was defined as being one where the LHWP databases report the presence of LHWs in April 2008.

In each of the sampled districts, five served FLCFs and one or two unserved FLCFs, were randomly sampled.[57]

Served FLCFs were sampled from the list of all FLCFs covered by the LHWP across the country. This was done in the following manner:

- **Panel sub-set**: If the first Evaluation Survey visited any FLCFs in the district, one of them was chosen with equal probability
- **Non-panel sub-set**: The remaining four (or five) FLCFs were selected with probability proportional to size (*PPS*), using as a measure of size (*MoS*) the number of LHWs in the LHWP databases as of April 2008.

Because the served FLCFs were selected with probability proportionate to size (PPS), some served FLCF clusters (with relatively high numbers of LHWs) were 'double' sampled – this is a standard feature of PPS sampling. This happened in six cases, five in Balochistan and one in FANA.[58]

The sampling of unserved FLCFs was more complicated. Initially the National Health Management Information system (HMIS) cell was visited and the database of all FLCFs was obtained. It was compared with the data of the Lady Health Worker-Management Information system (LHW-MIS). During this exercise, it became apparent that there was a problem in matching the facility identity codes and that it was not possible to get a reliable national list of

57 In the 40 districts with the greater number of unserved FLCFs an additional FLCF was sampled.

58 In these cases, four rather than two LHWs were interviewed, so the total LHW, LHS and served household samples were not reduced.

all unserved health facilities (FLCFs). Therefore, an alternative approach had to be taken whereby unserved FLCFs were identified only for the sampled districts with the help of District Coordinators of the Programme. In this way, a consolidated list of all unserved FLCFs in the 60 evaluation districts was collated.

The 100 unserved FLCFs to be covered by the evaluation were then sampled randomly from the list of unserved FLCFs (1–2 per district). There is a slight risk that District Coordinators might have provided an incomplete list of unserved facilities, which might introduce some bias (of unknown nature) into the unserved FLCF sample. However, the lists obtained from the District Coordinators were by far the most reliable option available. While the aim was to select at least one unserved FLCF, there were 10 districts that did not have any (6 in Punjab, 1 in Sindh, 2 in NWFP, and 1 in ICT).

In each sampled FLCF, the appropriate medical staff members were interviewed. The FLCF interview covered: FLCF staffing and opening times, LHWs and their training, facility supplies and equipment, and type of cases seen.

A.2.2 Lady Health Workers (LHWs)

For each served FLCF, all eligible LHWs – that is, those who had completed their initial three months' core training – were listed. From this list, two LHWs were randomly sampled for interview. In six instances, more than two LHWs were sampled due to the large size of the FLCF in accordance with PPS (proportion to population sample). The LHW questionnaire covered: general information on the LHW, recruitment and training, population served, recent work, cases and referrals, remuneration, supplies, supervision and support, knowledge and skills.

A.2.3 Lady Health Supervisors (LHSs)

The supervisor of every sampled LHW was interviewed. The LHS interview covered: general information on the LHS, information on their LHWs, recent work, vehicles and transport, recruitment and training, their supervision, remuneration, knowledge and skills.

A.2.4 Households

The household selection process varied between served and unserved areas. In served areas, for every sampled LHW, eight households were sampled from her list of registered households (16 households per served FLCF). The 'served' population is therefore defined as all those households registered with an LHW who had completed her initial three months' core training.

To sample households in unserved areas (the 'unserved' population), the following process was implemented:

- For each sampled unserved FLCF, the person in-charge of the health facility was consulted to assist the field teams in dividing the FLCF catchment area into small territorial segments.
- The segmentation was designed so as to mimic the partition of the area into the territories of 'virtual LHWs'.[59]

59 The instructions on the relevant sampling form read as follows: 'Ask the individual responsible for the health facility how he would divide his coverage area into segments if the facility were to join the LHW Programme. All households in the area would have to be served, and the segments should have between 50 and 200 households. Exclude any segments that might be already covered by a LHW from a neighbouring facility. After completing the segmentation, contact the survey evaluation survey

- Fieldworkers communicated the segmentation to the survey supervisor who selected one of the segments with probability proportion to size (PPS), using the estimated number of households as the measure of size (MoS).
- In each sampled segment, all households were systematically listed (100 segments in total), and 16 households were sampled for interview from this list.
- Household listing for unserved areas was carried out prior to the implementation of the main survey fieldwork, between 20 May and 15 June 2008.

Segmentation is needed because even small FLCFs might be too large to list completely. The challenges are to do it exhaustively and to ensure that the chosen segment is, indeed, selected randomly. Entrusting the later to fieldworkers entails the risk of biases, because they can easily load the die in favour of the most convenient segments.

For both served and unserved households, random sampling was performed in the field, using specially designed forms prepared with a computer program that ensures that each form has a different random permutation.

The household interview covered: information about all household members (household roster); housing, water, sanitation and assets; information on children under 3 years old; information on one woman in the household aged 15–49 who had ever been married; information on illness in children under 5 years old; food consumption, expenditure and income.

Note that the definitions of served and unserved populations do not define a proper partition of the total population of Pakistan into two non-overlapping, collectively exhaustive portions. This is because:

- Certain LHWs might conceivably be based in a served FLCF and operate in the normative catchment area of an unserved FLCF.
- Some households in the catchment area of a served FLCF might not be visited by any LHW.

Households in situation (1) are dealt with during the implementation of the final sampling stages of unserved households (segments attached to unserved FLCFs that are being served by an LHW are excluded).

The exclusion of households in situation (2) from the scope of our study is a deliberate decision based on both analytical and practical grounds.

- Analytically, these households would confuse the comparison between the treatment and control groups, because they result from a large variety of somewhat contradictory factors (such as self-selection, exclusion, or insufficient local supply of LHWs), and because they are likely to be affected by the presence of LHWs in their neighbourhood, even if they are not visited by them.
- Practically, these households would be extremely difficult to identify, because many of them will not be clustered in identifiable territories but, rather, scattered amidst their served neighbours.

In any case these households are not expected to be numerous, as a result of the near-saturation achieved by the Programme in the communities served by LHWs.

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headquarters and ask your supervisor to randomly select the segment to be listed. Flag this segment with a tick in the last column.'

A.2.5 Communities

Separate group interviews, for men and for women, were conducted in the communities of the sampled LHWs. These groups included at least one member of the health committees. A separate community interview was conducted for each LHW unless two LHWs served different households in the same village or mohalla, and the two areas they served were not more than 1 km apart. In these instances, a single community questionnaire was filled in, although information on the work of each LHW was recorded separately within it. In unserved areas, one community interview was conducted per unserved FLCF. The community questionnaire covered: agro-ecology and infrastructure, access to facilities and wages, retail prices, availability and quality of health care services, Health committees, Women's health committees and LHWs services.

A.2.6 DPIU

In every sampled district, the District Programme Implementation Unit (DPIU) was visited and the DHO/EDO-H and District Coordinator were interviewed. The DPIU questionnaire covered: information on the DHO/EDO-H, District Health Office staffing details, general and LHWP-specific information on the district; information on the District Coordinator, management of LHWs and LHSs, logistics and supplies.

A.3 Districts and FLCF clusters dropped from the sample due to insecurity

Due to a high degree of insecurity in NWFP, three of the 12 sampled districts (Lakki, Karak and Dir Lower) together with two served and two unserved FLCF clusters in Malakand district were dropped from the survey. More details of the specific challenges faced by the field teams are provided in Annex B.

In addition, in one of the sampled districts in Balochistan (Jhal Magsi) all of the LHWs in the district had been terminated. As a result, the field team could only complete the survey in unserved areas and with the DPIU.

Some sampled unserved FLCFs were found to be served; these FLCFs were dropped and replaced, where possible, with another randomly selected unserved FLCF from the same district. Conversely, FCLFs clusters (served and unserved) that were dropped due to insecurity were not replaced, because substituting them would have been likely to introduce sampling bias. In total, 52 FLCF clusters were dropped, with 17 being replaced, resulting in a net loss of 9 per cent. Table A.4 summarises how many FLCF clusters were dropped from the sample, and the number of replacements made.

Table A.4 Summary of dropped FLCF clusters

	Served	Unserved	Total
Sampled	294[1]	100	394
Dropped because area was insecure (not replaced)	17	9	26
Dropped because not found or found to be served/unserved	9	17	26
... of which how many were replaced?	3[2]	14	17
Total FLCF clusters surveyed	271	88	359

Notes: (1) Because served FLCF clusters were sampled with probability proportion to size (number of LHWs) six were double sampled, and therefore the total number sampled was 294 rather than 300. (2) Strictly these were not replacements. Due to an error in the HMIS, the five FCLFs in district Chilas did not exist. Instead the three served FCLFs found to exist in this district were all surveyed instead. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

Table A.5 shows the intended sample breakdown adjusted for the dropped FLCF clusters.

Table A.5 Adjusted intended sample breakdown – excluding dropped FLCF clusters

Sampling units	Punjab and ICT	Sindh	NWFP and FATA	Balochistan	AJK/ FANA	Overall
Districts	19	12	9	10	7	57
Served FLCFs	95	60	43	41	35	271
LHWs	190	120	86	90	66	552
Unserved FLCFs	23	22	12	17	14	88
Served households	1,520	960	688	720	528	4,416
Unserved households	368	352	192	272	224	1,408
Total households	1,888	1,312	880	992	752	5,824

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

A.4 Losses and replacement of surveyed sampling units

For reasons beyond the control of the field teams, it is not always possible to conduct successful interviews in all the sampled households. Therefore, some extra households were sampled as potential replacements. In served areas, in addition to the eight sampled households, three replacement (back-up) households were selected per LHW. Similarly, in unserved areas, in addition to the 16 sampled households, five additional replacement households were selected per unserved FLCF. The replacement of households was closely monitored.

Table A.6 summarises the number of replacements and losses.

Table A.6 Interview losses and replacements

	FLCF interviews			LHW interviews	LHS interviews	Household interviews			Community interviews		
	Served	Unserved	Total			Served	Unserved	Total	Served	Unserved	Total
Number to be interviewed	271	88	359	552	317	4,416	1,408	5,824	488	88	576
Losses	4	20	24	0	19	335	122	457	2	2	4
(% of no. sampled)	1	23	7	0	n/a	8	9	8	n/a	n/a	n/a
Replacements	n/a	n/a	n/a		n/a	297	88	385	n/a	n/a	n/a
(% of no. sampled)	n/a	n/a	n/a	0	n/a	7	6	7	n/a	n/a	n/a
Total interviews (excl. contacts resulting in no interview; incl. incomplete interviews)	267	68	335	554	298	4,378	1,374	5,752	486	86	572
(% of no. to be interviewed)	99	77	93	100	n/a	99	98	99	n/a	n/a	n/a
Original intended sample size	300	100	400	600	n/a	4,800	1,600	6,400	n/a	n/a	n/a
Actual sample as % of original intended sample size	89	68	84	92	n/a	91	86	90	n/a	n/a	n/a

Notes: **Loss** = any household that was sampled but not interviewed for whatever reason (some losses might be replaced, some might not); **Replacement** = any household interviewed as a replacement in place of a 'lost' household; **Total interviews** = this is the total number of interviews that were undertaken (that is, does not include losses but does include replacements).
Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

A.5 Final sample

Taking into account the dropped FLCF clusters, and the loss and replacement of surveyed sampling units, Table A.7 summarises the final sample sizes by province for each surveyed unit.

Table A.7 Final sample sizes – by surveyed unit and province

Units	Punjab and ICT	Sindh	NWFP and FATA	Balochistan	AJK/ FANA	Overall
Districts	19	12	9	10	7	57
Served FLCFs (approx. 5 per district)	94	59	42	40	32	267
LHWs(1–2 per served FLCF)	189	119	86	90	70	554
LHSs (1–2 per served FLCF)	96	73	45	45	39	298
Unserved FLCFs (1–2 per district)	22	12	10	11	13	68
Served households (8 per LHW)	1,503	943	671	715	546	4,378
Unserved households (16 per unserved FLCF)	361	352	182	263	216	1,374
Total households	1,864	1,295	853	978	762	5,752
Served communities (approx. 1 per LHW)	115	112	61	88	70	486
Unserved communities (1 per FLCF)	23	20	12	17	14	86
Total communities	178	132	73	105	84	572

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

A.6 Calculation of survey weights

To obtain unbiased estimates from the samples, the analysis is undertaken using weights (or raising factors) equal to the inverse of the selection probability of each unit.

The selection probabilities of the various items observed by the Evaluation Survey are as follows:

Districts	(Formula 1)
Served FLCFs	(Formula 2a)
LHWs	(Formula 3a)
Served households	(Formula 4a)
Unserved FLCFs	(Formula 2b)
Unserved households	(Formula 4b)

Formula 1

Probability of selecting district *hd* in stratum *h*

$$p_{hd} = \begin{cases} 1 & if\ self-selected \\ n_h / N_h & otherwise \end{cases}$$

n_h Number of non-self-selected districts sampled in stratum *h*

N_h Total number of non-self-selected districts in stratum *h*

Formula 2a

Probability of selecting served FLCF *hdf* in district *hd* of stratum *h*

$$p_{hdf} \cong p_{hd} \frac{5n_{hdf}}{N_{hd}}$$

p_{hd}	Probability of selecting district *hd* (Formula 1)
n_{hdf}	Number of LHWs in FLCF *hdf* (as per the LHWP databases)
N_{hd}	Total number of LHWs in district *hd* (as per the LHWP databases)

Note that Formula 2a is exact in the districts without any panel FLCFs, but only approximate in the districts where a panel was selected. An exact formula would be very difficult to elaborate in theory, and virtually impossible to compute in practice but, since, in the First Evaluation Survey, the FLCFs were also selected with *PPS* and, since panel FLCFs are a small proportion of the total, this is a very good approximation.

Formula 3a

Probability of selecting LHW *hdfi* in FLCF *hdf* in district *hd* of stratum *h*

$$p_{hdfi} = p_{hdf} \frac{l_{hdf}}{L_{hdf}}$$

p_{hdfi}	Probability of selecting FLCF *hdf* (Formula 2a)
l_{hdf}	Number of LHWs selected in FLCF *hdf* (nominally 2)
L_{hdf}	Total number of LHWs in FLCF *hdf* (as observed in the field)

Formula 4a

Probability of selecting household *hdfij* of LHW *hdfi* in FLCF *hdf* in district *hd* of stratum *h*

$$p_{hdfij} = p_{hdfi} \frac{m_{hdfi}}{M_{hdfi}}$$

p_{hdfi}	Probability of selecting LHW *hdfi* (Formula 3a)
m_{hdf}	Number of households selected from the register of LHW *hdfi* (nominally 9)
M_{hdf}	Total number of households in the register of LHW *hdfi*

Formula 2b

Probability of selecting unserved FLCF *hdf* in district *hd* of stratum *h*

$$p_{hdf} = p_{hd} \frac{\tilde{n}_{hd}}{\tilde{N}_{hd}}$$

p_{hd}	Probability of selecting district *hd* (Formula 1)
$\tilde{n}_{hd}$	Number of unserved FLCFs selected in district *hd* (1 or 2)
$\tilde{N}_{hd}$	Total number of unserved FLCFs in district *hd*

Formula 4b

Probability of selecting household *hdfij* in segment *hdfi* of unserved FLCF *hdf* of district *hd* of stratum *h*

$$p_{hdfij} = p_{hdf} \frac{s_{hdfi}}{S_{hdf}} \frac{m_{hdfi}}{M_{hdfi}}$$

p_{hdf}	Probability of selecting FLCF *hdf* (Formula 2b)
s_{hdfi}	Number of households in segment *hdfi* (as estimated at the time of segmentation)
S_{hdf}	Total number of households in the catchment area of FLCF *hdf* (as estimated at the time of segmentation)
m_{hdfi}	Number of households selected in segment *hdfi* (nominally 16)
M_{hdfi}	Total number of households listed in segment *hdfi*

Annex B Field procedures and data quality

B.1 Fieldwork operations

B.1.1 Field team structure

In total, there were 13 field teams: four in Punjab and AJK; three in Sindh; three for NWFP and FANA; and three in Balochistan. Each field team comprised: one male logistic coordinator; one female supervisor; and two female interviewers.

On the first day of fieldwork in each district, the team introduced themselves to the DPIU and met the DC. The team then went to the first selected FLCF and met the officer in-charge of the facility and whomsoever was responsible for the LHW Programme (served FLCFs only).

In addition, in each province there was a provincial coordinator to provide general logistical support and quality unserved oversight, and to administer the district questionnaire.

For each sampled served FLCF, the planned fieldwork schedule and responsibilities for each team member are summarised in Table B.1.

Table B.1 Fieldwork schedule per served FLCF

	Male coordinator	Female supervisor	Female interviewers
Day 1	Selection of LHWs Accompany interviewers and supervisor to the sampled households	Selection of households (first LHW) Interview with first LHW Interview with first LHS Quality checks (of completed household questionnaires) Conduct community questionnaire (first LHW)	Conduct household interviews (first LHW)
Day 2	Accompany interviewers and supervisor to the sampled households Conduct the community interview (second LHW) Conduct the FLCF interview	Selection of households (second LHW) Interview with second LHW Interview with second LHS Quality checks (of completed household questionnaires) Conduct community questionnaire (first LHW)	Conduct household interviews (second LHW)

For each sampled unserved FLCF, the planned fieldwork schedule and responsibilities for each team member are summarised in Table B.2.

Table B.2 Fieldwork schedule per unserved FLCF

	Male coordinator	Female supervisor	Female interviewers
Day 1	Accompany interviewers and supervisor to the sampled households Conduct the community interview	Selection of households from listings Quality checks (of completed household questionnaires)	Conduct household interviews
Day 2	Accompany interviewers and supervisor to the sampled households Conduct FLCF interview	Quality checks (of completed household questionnaires)	Conduct household interviews Revisit households to follow-up for corrections (if required)

B.1.2 Field team training

Intensive training, covering all six questionnaires, was conducted in Islamabad. Team supervisors received a fortnight's training on the LHS and LHW questionnaires, followed by a fortnight's training, along with the female interviewers, on the household questionnaire. Provincial logistics coordinators along with male team members received a fortnight's training on the FLCF and community questionnaires. In addition, the provincial logistics coordinators received a further four days' training on the district questionnaire.

Each training day followed a similar pattern.

- In the morning session, the trainer made a presentation on a section of questionnaire by using an overhead projector/multimedia. The trainer explained the background/objective(s) of each questionnaire, explained the terms used in the questionnaire, and provided clarification in response to questions. The trainer also explained how to ask the question and how to record the answer.
- In the early afternoon session, experienced group leaders led smaller groups of trainees in order to provide more supportive coaching and training. Each group had representatives from each province (stratum). The group leader ensured that everyone had the opportunity to seek clarification from the morning session.
- A further session was then held of the whole group to discuss any areas of confusion with clarification being provided by the trainer.
- In the evening, trainees were divided into smaller teams on the basis of province and language. Facilitated by a team leader (supervisors), questionnaires were discussed in their local languages, ensuring that trainees could ask each question in their local language while preserving the exact meaning. These practice sessions were observed by OPM senior staff.
- At the end of each day, trainees were asked to provide feedback on the sessions and identify where improvement was needed. Group leaders also provided feedback on the sessions they led and on the participation level and competence of trainees.
- Over the course of the training, practice sessions were held in the field.

B.1.3 Quality control

In-field quality control procedures

Each team was supervised by an experienced female supervisor, responsible for the quality of information collected by the field team. In addition, there were regular monitoring visits by senior team members.

The quality control process in the field involved checking the completed questionnaires, and interview observation.

- Most questionnaires were checked for completeness and consistency in the field before the team left the FLCF, and prior to their being sent to Islamabad for data editing. This process ensured that identified errors could be corrected by returning to the household if necessary. It also gave the supervisors an opportunity to identify whether particular interviewers had higher levels of losses and refusal. If the supervisor became concerned, she would ensure that she carried out some quality control interviews in that interviewer's households. The supervisor also made sure the questionnaire skip routines were being followed, that information in the questionnaire was consistent, and that the interview was appropriately using 'don't know' codes. The supervisor kept an eye out for lazy interviewers.
- In addition, the supervisor regularly observed all of her interviewers in the field. This enabled her to check the quality of the interviews and identify any questions that required clarification. It also helped supervisor to assess whether interviewers were following proper procedures during the interviews, such as being sufficiently polite to interviewees.

Where problems were identified, the supervisor not only informed the particular interviewer but also the other field teams through the survey manager. This is because it is rarely the case that only one interviewer will have misunderstood a particular question.

Post-fieldwork quality control

On arrival at the Islamabad office, the questionnaires were checked by a team of data editors. Mistakes (if any) were immediately conveyed to the relevant field team by telephone.

Once the questionnaires had been through the process of data editing, they were then entered by data entry operators. The data entry program had very strong quality control features, such as range, skip, fill and consistency checks, which not only improves the quality of data by minimizing data entry errors, but also identifies those mistakes or errors that can be overlooked by human eyes. Since data entry was taking place simultaneously with fieldwork, mistakes identified at the data entry stage were immediately conveyed to the field team concerned.

Since the data is double-entered and cross-checked, all data entry errors are identified and corrected.

B.2 Fieldwork implementation

B.2.1 Data collection timeframe

The fieldwork started in the third week of July and lasted until early November 2008. The timeframe for the full data collection process, from fieldwork preparation to completion of the data entry, is summarised in Table B.3.

Table B.3 Timeframe for the fieldwork preparation, implementation and data entry

Activity	Dates
Pre-testing of revised questionnaire	7 June–14 June 2008
Selection of field staff (household listers, female supervisors, female interviewers, and so on)	10 May–5 June 2008
Training and household listing in unserved areas	15 May–15 June 2008
Training of data collection teams	15 June–14 July 2008
LHWs and LHS	15 June–25 June
Household questionnaire	26 June–10 July
FLCF, Community, District	26 June–13 July
Sampling and field procedures	26 June–30 June
Fieldwork	21 July 21–early November 2008
Data entry and processing	15 July–30 December 2008

B.2.2 Losses and replacements

The process for the replacement of non-interviewed sampled households was strictly unserved led. If the dwelling were not found, or the dwelling were found but the selected household members were no longer resident there, then an initial check was made to ensure there had been no mistake in recording the address (on the LHW household register, or the household listing sheet in unserved areas), or that the household had, in fact, recently moved to a new dwelling. If the selected household was resident at another dwelling within the same village/mohalla and was still being served by the LHW, then it was interviewed.

If the dwelling where the household was supposed to reside could not be found (even with the help of the LHW or other well-informed community members), or if it was found destroyed or completely unoccupied and the household was not resident elsewhere in the village, or if team believed that the household did not exist, then clearly the household could not be interviewed. In such cases, the household was replaced with one of the replacement households after approval from the survey manager.

In cases where the dwelling was found but had a different household resident in it, and the actual selected household was not found to be resident elsewhere in the village, then, provided the household that was found in that dwelling was also registered with the LHW, the non-sampled household was interviewed instead.

If the non-sampled household found in the dwelling was not registered with the LHW, then the sampled household was replaced. In cases where the dwelling was found, but the selected household that used to be resident there had now permanently moved outside the village/mohalla, the sampled household was replaced.

If the dwelling were found and the selected household was usually resident there but happened not to be present at the time of the survey, and was not expected to return while the field team was present in the area, then the household was replaced.

If the selected household were found but refused to be interviewed, this household was not replaced, and was counted as a loss.

B.2.3 Challenges faced

Law and order

The law and order situation in two provinces in particular, NWFP and Balochistan, was not good. While the security situation all over NWFP is bad, the districts bordering with FATA were particularly affected, and four out of the 12 sampled NWFP districts were amongst these and had to be dropped, or only partially completed.

In Balochistan, the situation was also bad in some of the districts. There is an ongoing army operation targeting some particular tribes, especially the Bughti tribe and, as a result, the general situation is tense. One of the field teams attempted to go to one of the affected districts but had to pull out because of clashes between the army and local tribes. A curfew was imposed and the field team was asked to leave the district immediately. However, the field team was able to return and complete the required fieldwork once the security situation had improved.

Community opposition

In NWFP, some female team members faced opposition from communities opposed to females working. This was especially in Pashtu speaking households. In many cases, the communities refused to cooperate, or even subjected them to verbal abuse. In one instance, where community elders opposed the female field team members working, young children blocked the road and started throwing stones at the team.

Terrain

Difficult terrain was also a challenge, particularly in AJK, FANA, and five districts of NWFP. Since these were mountainous areas with bad roads and with many communities located far up in the mountains and high valleys, the field teams often had to travels hours in a vehicle and then, for the last part of the journey, on foot. After reaching the community, the field team members then had to spend substantial time walking from one household to another, as the households were generally very disbursed. In Balochistan, where the population is very scattered, long distances between districts together with no road between these districts, was also an issue. On average, field teams had to travel 14 hours from one district to another. The longest journey was between Quetta and Turbat, which took more than 24 hours.

Non-availability of health staff

Health staff at a number of sampled FLCFs were either unavailable or came very late to the FLCF, causing delays in the start of fieldwork in those FLCF clusters. As the survey progressed, the team made efforts in some FLCFs to contact the key FLCF health staff at their homes in advance, and made special requests for them to come to the FLCF to help. In a number of cases the person in charge of the FLCF – and, in some instances, even the person in charge of the District, refused to cooperate. The process of gaining cooperation wasted many field team days.

Polio campaigns

During the four months of survey fieldwork, four polio campaigns were implemented (almost one per month). During these campaigns, all FLCF health staff, LHWs and LHSs in each district were required to stop their normal activities so that they could assist in the campaign. The campaigns took, on average, one week of the LHWs' and LHSs' time. During these campaigns, neither the LHS nor the LHW were available for interviews. The field teams did their best to utilise this time by implementing the fieldwork in unserved areas, but this was not always possible.

Bogus registration of households on LHW registers

In some of the areas, the field teams had to waste considerable time trying to locate sampled households listed on the LHW register that were found to be bogus. Such cases were, however, very small (0.04 per cent of the total sample).

Finding LHWs

Sometimes it was difficult to find sampled LHWs for interview and, consequently, also household sampling. Some LHWs tried to hide themselves from the field team in order to avoid being interviewed and evaluated. The impression of the field teams was that LHWs were doing this to avoid being evaluated. Such cases were also very small in number (0.53 per cent of the total sample).

Language

With a large number of different regional languages and dialects being spoken in Pakistan in specific districts, the field team sometimes had to use interpreters; for example, in FANA (Skardu, Chilas and in some clusters in Gilgit).

Problems identifying unserved areas

Although the listing team did its best to make sure that the selected segments that were listed were unserved – for example, by working closely with the FLCF in charge or other knowledgeable persons at the FLCF, as well as community members of the selected segment – about 6 per cent of the areas initially identified as unserved were revealed to be served at the time of the survey.

Similarly, there were 10 districts of the total 57 in which the fieldwork was carried out that had no unserved FLCF (6 in Punjab, 1 in Sindh, 2 in NWFP and 1 in ICT).

Annex C Additional tables

C.1 Disaggregation by province – selected tables

Table C.1 Supervision

Measure	Punjab	Sindh	NWFP	Balochistan	AJK/NA	Overall
Distribution of time since LHW last had a supervision meeting with their supervisor						
30 days	83.8	77.9	81.1	50..5	49.8	78.5
31–60 days	11.6	14.8	10.8	18.3	22.0	13.1
More than 60 days	2.6	5.3	4.6	17.5	16.2	5.1
Never had a meeting	0.0	2.0	0.0	4.9	4.0	0.9
No supervisor	2.0	0.0	3.4	8.5	8.0	2.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table C.2 Percent of LHWs with stock-out for more than two months

Item	Punjab	Sindh	NWFP	Balochistan	AJK/NA
Paracetamol tablets	2.6	9.5	5.1	2.5	2.0
Paracetamol syrup	13.2	17.0	14.2	3.4	0.0
Chloroquine tablets	14.0	37.0	41.2	5.1	25.8
Chloroquine syrup	28.1	22.5	25.0	5.3	4.7
Mebendazole tablets	29.6	41.1	15.4	8.2	16.0
Piperazine syrup	17.8	14.5	14.7	9.7	21.7
Oral rehydration salts	14.3	8.7	5.8	6.2	0.0
Eye ointment	16.3	16.6	3.2	6.2	0.0
Cotrimoxazole syrup	28.4	11.4	23.2	8.3	1.4
Vitamin B complex syrup	4.3	10.5	3.9	3.0	0.0
Iron and folic acid tablets	8.4	38.6	17.8	2.1	6.1
Antiseptic lotion	15.7	17.0	8.6	10.0	4.8
Benzyl benzoate	8.1	15.0	5.1	9.1	6.3
Bandages (cotton)	10.2	12.7	7.7	8.1	9.4
Condoms	0.9	8.5	4.9	7.5	2.2
Injectables	17.6	39.8	15.0	18.2	40.8
Oral contraceptive cills	0.1	7.1	2.1	2.3	0.0
Average	13.5	18.7	12.0	6.6	8.0

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.3 Presence of functional equipment and administrative materials

Item	Punjab	Sindh	NWFP	Balochistan	AJK/NA	Overall
Weighing scale	39.0	22.6	30.4	10.5	33.6	31.7
Thermometer	72.4	43.0	47.0	24.4	81.0	58.8
Torch	40.7	31.5	32.9	22.6	47.4	36.3
Scissors	86.3	54.4	72.6	40.6	77.9	73.3
Household register	96.8	98.0	100.0	83.9	98.4	96.6
Diary (new or old)	98.6	95.6	97.7	78.3	99.7	96.2
New format	79.8	70.9	89.4	50.8	93.9	77.4
Old format	46.8	86.6	63.7	56.6	44.0	58.9
Manual (current or old)	96.8	97.0	96.8	69.8	100.0	95.0
Current LHW manual	87.4	81.7	92.6	64.9	88.4	85.1
Refresher LHW manual	88.2	73.1	94.9	57.8	82.4	83.3
LHW manual – old version	56.2	83.8	69.3	59.8	64.4	64.9
Blank growth monitoring cards	76.4	62.4	88.2	42.1	68.6	72.1
ARI case management charts (all 3)	96.5	82.3	96.0	54.1	91.1	89.8
Diarrhoea case management chart	94.5	82.5	97.3	60.5	90.1	89.4
Plastic cards	79.2	55.1	91.9	48.2	56.6	72.3
Family planning charts	95.6	81.3	96.4	63.0	88.1	89.3
Eye chart	80.3	68.4	92.2	60.7	74.3	77.5
Maternal health chart	94.4	80.7	99.1	61.7	91.0	89.3
Health house board	84.3	78.5	91.9	86.4	75.6	83.8
Blank referral slips	80.1	56.6	97.3	68.6	66.8	75.8
Average	79.5	70.8	82.7	56.3	76.6	75.8

Notes: (1) Corresponds to Table 7.4 in 3rd Evaluation. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey (2008).

C.2 Comparison of all and comparable LHWs, 2008 survey

Table C.4 LHW characteristics

Characteristics	2008 All LHWs	2008 Comparable LHWs
Age distribution (%)		
15–19	1.1	0.2
20–24	12.8	7.2
25–29	25.2	22.9
30–34	27.2	31.4
35–39	15.5	17.3
40–44	9.3	9.8
45+	8.8	11.2
Mean age	32.4	33.8
Mean age when recruited	25.3	25.3

Characteristics	2008 All LHWs	2008 Comparable LHWs
Marital status (%)		
Never married	25.9	21.0
Currently married	65.6	71.4
Widow/divorced/separated	8.5	7.7
Years LHW has resided in village/mohalla (%)		
0–2	3.6	3.2
3–4	5.2	4.2
5–20	31.1	32.1
More than 20	8.4	10.2
Since birth	51.7	50.4
Mean years resided	21.78	22.6
Educational level (%)		
Less than 8 years	0.7	1.0
8 or 9 years	35.5	34.2
Matriculated (10–11 years)	44.4	47.2
Intermediate (12–13 years)	15.4	13.9
Graduate (14+ years)	4.0	3.7
Mean education Level (1-5)	9.94	9.81
% with class certificate seen and confirmed	76.7	76.9
Other characteristics		
% of LHWs who listen to radio at least once a week	21.6	22.0
% of LHWs who watch TV at least once a week	64.5	66.5
% of LHWs with another paid job	4.2	4.2
% of married LHWs who have ever used modern family planning	72.3	73.0
% of LHWs have access to mobile phone	74.8	75.0
% of LHWS share mobile phone with someone	71.2	70.0
% of LHWs share mobile phone with husband	45.3	51.0
% of LHWs share mobile phone with other family members	53.0	47.0
% of LHWs share mobile phone with other	1.8	2.0
Mean total number of children desired:		
• For themselves (LHWs)	3.1	3.2
• For women in village/mohalla	3.5	3.5

Notes: (1) Corresponds to Table 2.1 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.5 Percentage of LHWs giving correct answers: selected general health questions

Measure	2008 All LHWs	2008 Comparable LHWs
Contraindications for the contraceptive pill		
% LHW giving at least one correct answer	98.2	98.3
% LHW giving three or more correct answers	54.8	58.4
Contraindications for the Injectable contraceptive	97.1	97.0
% LHW giving at least one correct answer	51.0	53.9
% LHW giving three or more correct answers		
Contraindications for the IUD		
% LHW giving at least one correct answer	97.4	87.5
% LHW giving three or more correct answers	10.5	10.9
Breastfeeding and nutrition		
% LHW stating that mothers should start breastfeeding within 4 hours of birth	97.4	97.5
% LHW stating that weaning foods should be introduced at the age of 4–6 months	82.2	84.4
% of LHW stating that breastfeeding should be initiated immediately/within 30 minutes of birth	82.7	82.3
% of LHW stating that exclusive breastfeeding should continue until 6 months	92.7	92.3
% of LHW stating that semi-solid food should start at 6 months	93.0	92.8
EPI vaccination schedule		
% LHW who could name all four vaccines (BCG, DPT, Polio, Measles)	93.5	94.3
% LHW identifying all four vaccines and giving correct number of doses	91.4	92.0
% LHW identifying all four vaccines and giving the number of doses and correct ages for each dose	72.4	76.4
Diarrhoea		
% LHW giving at least one correct answer to mother of child with diarrhoea and mild dehydration, if lacking packets of ORS	99.5	99.5
% LHW giving three or more correct answers to mother of child with diarrhoea and mild dehydration, if lacking packets of ORS	57.2	59.8
% LHW responding with SSS solution/rice water, give fluids or continue feeding	98.5	98.2
% LHW giving at least one correct answer to mother of a child that will not take ORS	88.6	90.1
% LHW giving three correct answers to mother of child that will not take ORS	20.9	21.7
% LHW able to give at least one correct response on how to prevent diarrhoea	98.4	98.6
% LHW able to give three or more correct responses on how to prevent diarrhoea	66.7	67.2
Malaria		
% LHW giving correct answer on how malaria is caught	98.6	99.2
% LHW giving Chloroquine	73.0	75.4
% LHW referring immediately or if the child does not improve	77.0	77.0

Measure	2008 All LHWs	2008 Comparable LHWs
% LHW giving correct dose of Chloroquine for a child referred to health facility	9.2	10.0
HIV		
% LHW giving at least one correct response on how HIV is transmitted	93.3	94.0
% LHW giving three or more correct responses on how HIV is transmitted	76.8	80.2
TB		
% LHW giving at least one correct response on how to suspect a TB patient	100.0	100
% LHW giving three or more correct responses on how to suspect a TB patient	90.5	91.2

Notes: (1) Corresponds to Table 2.2 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.6 Percentage of LHWs giving correct answers: case-based questions

Measure	2008-All LHWs	2008-Comparable LHWs
Growth monitoring card		
Case 1: Normal to moderate malnutrition		
% LHW giving correct weight of child	50.1	54.5
% LHW saying that the child is normal or moderately malnourished	86.0	87.4
% LHW stating that the child is growing adequately	70.9	70.3
% LHW correctly stating that referral is not necessary	74.1	73.8
Case 2: Severely malnourished		
% LHW giving correct weight of child	57.9	60.8
% LHW saying that the child is severely malnourished	36.5	39.2
% LHW stating that the child is failing to gain weight	34.7	34.6
% LHW correctly stating that referral is necessary	62.3	64.4
% LHW requesting information about eating and feeding practices	83.0	85.4
% LHW requesting information about recent illnesses	57.7	59.5
% LHW requesting information about eating and feeding practices and recent illnesses	53.7	55.7
Diarrhoea/dehydration management		
Case 1: Some dehydration		
% LHW stating that the child has some dehydration	73.0	72.1
% LHW stating that the child should be rehydrated (ORS or SSS)	82.0	82.0
% LHW stating that the child should be breastfed more often	80.8	80.4
% LHW stating that the child should be rehydrated (ORS/SSS) or breastfed more often	95.7	96.0
% LHW stating that the child should be brought back soon for reassessment	1.3	1.5

Measure	2008-All LHWs	2008-Comparable LHWs
% LHW stating that the parents should seek help soon if the child does not improve	8.6	7.8
% LHW correctly stating that referral is not necessary	30.5	30.7
Case 2: Severe dehydration		
% LHW stating that the child is severely dehydrated	63.6	60.4
% LHW stating that the child should be rehydrated (ORS or SSS) or breastfed more often	86.8	86.4
% LHW stating that the child should be rehydrated (ORS or SSS) or breastfed more often and referred to a health centre	79.7	78.2
% LHW stating that the child should be referred to a health centre	92.6	91.8
Respiratory infections		
Case 1: Severe pneumonia		
% LHW identifying severe/very severe pneumonia	63.1	63.1
% LHW stating that the child should be referred to a health centre	91.7	92.0
% LHW stating that the child should be given antibiotics	86.7	88.6
% LHW stating that the child should be given a single dose of antibiotics and referred	75.6	76.3
Case 2: Pneumonia		
% LHW identifying pneumonia	20.3	21.5
% LHW stating that they would give antibiotics	88.2	88.8
% LHW stating that the child should be given fluids or breastfed more often	58.2	57.9
% LHW stating that the child should be watched for danger signs	7.9	8.5
% LHW stating that they would give a full course of Cotrimoxazole (of *all* LHWs)	67.1	66.8
% LHW stating correct dose and duration of Cotrimoxazole course (of those who would give a full course)	24.3	24.3
Pregnancy		
Case 1: Anaemia		
% LHW identifying anaemia	97.0	96.9
% LHW stating that they would examine the patient's conjunctiva/eye for anaemia	91.8	90.9
% LHW stating that they would examine the patient's conjunctiva/eye for anaemia, ask about the patient's diet and ask about recent illnesses	24.0	22.5
% LHW stating that they would give iron tablets (Fefan)	87.4	87.9
% LHW stating that they would advise the patient to eat an iron-rich diet	79.8	81.1
% LHW stating that they would advise the patient to avoid heavy work and to rest	19.0	18.5
Case 2: Pre-eclampsia		
% LHW stating that they would refer to a health centre and that it would be urgent	73.2	71.5

Notes: (1) Corresponds to Table 2.3 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.7 Mean LHW knowledge score by stratum

Stratum	2008 All LHWs	2008 Comparable LHWs
Punjab and ICT	73	74.5
Sindh	74	75.0
NWFP and FATA	78	77.8
Balochistan	64	64.7
AJK and Northern Areas	77	78.2
Mean knowledge score	**74**	**74.3**

Notes: (1) Corresponds to Table 2.4 in 3rd Evaluation. (2) For year 2000; estimates for Balochistan and AJK/NA are based on less than 100 observations - 67 and 68 LHWs respectively. (3) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.8 Training of LHWs

Measure	2008 All LHWs	200 Comparable LHWs
Proportion of LHWs who received initial (basic) training	99.8	99.7
Duration of initial training		
Less than two months	0.0	0.0
Two months	0.0	0.0
Three months	94.2	96.7
More than three months	5.8	3.2
Total	100.0	100
Mean number of months of initial training	3.1	3.1
Training was imparted by:[(1)]		
Medical doctor (male)	87.5	88.8
Medical doctor (female)	18.3	19.5
Lady health visitor	67.4	66.3
Dispenser	24.5	25.8
Male medical health technician	16.9	17.8
Female medical health technician	4.5	5.4
Others	7.5	6.6
LHW training was given by any female trainers	81.5	

Notes: (1) Corresponds to Table 6.1in 3rd Evaluation. (2) LHWs listed all staff members who gave training and the panel sums to over 100 per cent because of multiple responses. (3) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.9 Percentage of LHWs with stock-out for more than two months

Item	2008 All LHWs	2008 Comparable LHWs
Paracetamol tablets	4.5	5.5
Paracetamol syrup	12.9	12.7
Chloroquine tablets	22.2	24.6
Chloroquine syrup	23.8	23.5
Mebendazole tablets	28.4	26.7
Piperazine syrup	16.2	17.7
Oral rehydration salts	10.8	8.3
Eye ointment	13.2	15.2
Cotrimoxazole syrup	21.2	20.3
Vitamin B complex syrup	5.4	5.7
Iron and folic acid tablets	16.0	15.7
Antiseptic lotion	14.2	14.5
Benzyl benzoate	9.3	8.3
Bandages (cotton)	10.4	12.5
Condoms	3.7	4.9
Injectables	21.6	24.9
Oral contraceptive pills	2.2	2.6

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.10 Supervision and pay of LHWs

Measure	2008 All LHWs	2008 Comparable LHWs
Percentage of LHWs who met their supervisor during the previous		
30 days	84.2	85.1
31–60 days	9.9	10.2
More than 60 days	3.4	2.6
No supervisor	2.5	2.1
Total	100.0	100.0
Distribution of time since LHW last had a supervision meeting with their supervisor		
30 days	78.4	77.6
31–60 days	13.1	14.4
More than 60 days	5.1	4.7
Never had a meeting	0.9	1.2
No supervisor	2.5	2.1
Total	100.0	100.0
Percentage of LHWs who have had a supervision meeting in the village served (of those who had a meeting in the last 60 days)	90.2	89.7
-Of meetings held in the village served, % where supervisor visited some of the served households with the LHW	58.7	58.7
-Of meetings held in the village served, % where supervisor visited some of the served households without the LHW	38.5	41.7
Percentage of LHWs who have had a monthly meeting at the health facility within		
Previous 30 days	91.3	90.0
31–60 days	6.6	7.8

Measure	2008 All LHWs	2008 Comparable LHWs
More than 60 days	1.7	1.6
Never attended	0.4	0.5
Total	100.0	100
Percentage of LHW who had produced and could show a work plan for the current month		
Produced	85.9	85.5
Produced and seen	83.5	82.6
Percentage of LHW who had produced and could show a report for the previous month		
Produced	97.7	98.8
Produced and seen	89.3	90.3
Distribution of time since LHW last received her salary		
Within the previous month (last 31 days)	21.4	19.3
32 to 62 days ago	46.9	45.0
63 to 93 days ago	21.8	24.5
Over 94 days ago	9.9	11.5
Percentage receiving less salary than expected	10.8	8.5

Notes: (1) Corresponds to Table 6.2 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.11 Use of supervisor checklist and performance score

	2008 All LHWs	2008 Comparable LHWs
% LHWs mentioned that LHS used checklist during her meeting with LHS	77.9	78.0
LHW was informed about her performance score:		
By writing in diary	27.6	26.0
Verbally	11.3	12.0
No	61.1	62.0
Performance score of LHWs		
Below 60	7.1	7.3
61–79	44.9	40.3
80 and more	48.0	52.4
Total	100.0	100
% LHWs reported their score was ever registered by LHS during Jan. to Jun. 2008	30.7	28.0
% LHWs reported that they had ever been told by LHS that their score was low (<60%)	4.7	5.0

Notes: (1) Corresponds to Table 6.2 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.12 Distribution of the number of households and persons registered by LHWs

Measure	2008 All LHWs	2008 Comparable LHWs
Number of households registered		
Up to 50	0.8	0.6
51–100	17.0	20.0
101–150	54.3	50.7
151–200	25.8	25.7
201–250	2.1	2.9
Total	100	100
Mean	131	131
Number of persons registered with the LHWs		
Up to 500	2.9	3.3
501–700	6.2	6.6
701–900	32.7	32.0
901–1100	46.6	46.1
1101–1300	10.0	10.8
More than 1300	1.5	1.2
Total	100	100
Number of persons registered with the LHWs (alternative disaggregation)		
Up to 700	8.7	79.6
701–900	32.9	32.2
901–1000	22.5	21.2
1001–1100	24.4	25.0
1101–1200	6.0	6.0
1201–1300	4.0	4.8
More than 1300	1.5	1.2
Total	100	100
Mean	919	916

Notes: (1) Corresponds to Table 3.2 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.13 Number of household visits made during the preceding week

Measure	2008 All LHWs	2008 Comparable LHWs
Number of household visits (%)		
Up to 10	19.3	20.9
11–20	18.7	20.7
21–30	26.6	24.0
31–40	20.8	21.5
41–50	11.5	9.6
More than 50	3.1	3.2
Total	100	100
Mean number of household visits made	26.8	26.3

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008). Notes: (1) Corresponds to Table 3.3 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before September 31st 2005.

Table C.14 Number of patients/clients seen during the preceding week

Measure	2008 All LHWs	2008 Comparable LHWs
Number of patients/clients seen (%)		
Up to 10	28.7	27.9
11–25	37.4	34.7
26–50	30.9	34.0
More than 50	2.9	3.4
Total	100.0	100.0
Mean number of patients/clients seen	21.8	22.68

Notes: (1) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.15 Days worked by LHWs in the week preceding the survey

Measure	2008 All LHWs	2008 Comparable LHWs
Number of days, LHW worked last week (%)		
Did not work at all	4.4	4.7
1–3 days	6.7	7.8
4–5 days	10.1	9.6
6 days	34.9	35.0
7 days	43.9	43.0
Total	100.0	100
Mean number of days worked last week	5.8	5.7
Reasons for not working a full week (%)*		
Taking leave	8.9	9.2
Sickness	31.7	31.4
Travelled out of village/mohallah	3.1	2.9
Work completed /not enough to do	1.0	1.8
Others	55.0	54.7
Total	100.0	100.0

Notes: (1) Corresponds to Table 3.6 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. * = 'Full week' means 6 or 7 days. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.16 Total time worked in the week preceding the survey

Measure	2008 All LHWs	2008 Comparable LHWs
Total number of hours worked		
0	4.4	4.7
1–4	2.0	2.6
5–9	4.3	5.4
10–14	9.6	10.0
15–19	9.9	10.5
20–24	11.9	13.5
25–35	24.9	21.8
More than 35	33.0	31.6
Total	100.0	100.0
Mean number of hours worked	29.5	28.2

Notes: (1) Corresponds to Table 3.7 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.17 Comparison of selected activity measures by place of residence

Measure	2008 All LHWs		2008 Comparable LHWs	
	Urban	Rural	Urban	Rural
LHW and household reports				
Mean number of households registered	141	129	144	126
% of LHWs with less than 900 persons registered	28.3	45.2	27.1	46.7
% of LHWs with less than 700 persons registered	4.8	9.6	3.9	11.4
% of households reporting having been visited by the LHW in last three months	85.0	85.4	84.8	83.9
% worked less than 15 hours	24.6	19.2	24.4	22.0
% worked less than 5 days in preceding week	19.7	14.9	20.7	16.6
% seeing less than 10 clients in preceding week	22.1	19.8	19.6	19.3
Community reports				
% that know the LHW and know she is working as a LHW	99.2	100	99.1	100
% that state that the LHW goes to visit households on most days of the week	90.1	96.3	90.2	95.6
% that state that there have been improvements in health due to the LHW's work	90.0	94.1	92.8	93.9
% that say that LHWs are usually respected after becoming LHWs	94.4	95.0	94.1	94.4

Notes: (1) Corresponds to Table 3.8 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.18 Participation of LHWs in national immunization days

	2008 All LHWs	2008 Comparable LHWs
Mean hours spent working on NIDS last week	7.1	6.8
Mean hours spent on NIDs training last week	0.8	0.5
% LHWs participated in NIDS during previous 3 months	81.3	81.5
%LHWs who worked outside their catchment area for NIDS	59.9	57.9
Mean number of days spent on NIDS during last 3 months	9.1	8.9
%LHWs received extra payment for participating in NIDS	78.7	80.0
Mean amount received for participating in NIDs (PKRs)	1,288	1,298
%LHWs received any amount from any NGO	5.8	6.5
Mean amount received from NGO	458	446

Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.19 Preventive and promotive service delivery by LHWs

Measure	2008 All LHWs	2008 Comparable LHWs
Households registered with the LHW		
% who report that the LHW has ever talked to them about ways to improve the cleanliness of drinking water	63.1	65.9
% who report that the LHW has ever talked to them about ways to improve hygiene and reduce diarrhoea	63.9	67.4
% who report that the LHW has ever talked to them about HIV/AIDS	31.6	33.2
Women who had given birth within 3 years of survey (reporting on their last birth)		
% who report that the LHW gave them advice on which foods to eat while pregnant	50.2	52.3
% who report that the LHW came to see her and the baby within 24 hours	13.6	14.7
% who report that the LHW came to see her and the baby within 7 days	46.0	47.9
% who report that the LHW saw the baby within 7 days and weighed the baby [(1)]	15.6	17.3
% who report that the LHW saw the baby within 7 days and gave advice on breastfeeding [(1)]	31.1	32.3
% who report that the LHW gave her advice on family planning within 3 months of the birth	49.8	51.3
% who report that they had a consultation with LHW during last pregnancy	6.9	6.9
% who report that the LHW provided TT shots during last pregnancy	14.7	16.0
Mean number of TT shots received from LHW during last pregnancy	1.97	1.98
% who report that the LHW provided TT shots before last pregnancy	71	8.2
Mean number of TT shots received from LHW before last pregnancy	2.66	2.74
% who report that the LHW provided iron tablets during last pregnancy	22.4	23.5
% who report that the LHW was present at the time of last birth	4.4	5.4
% who report that the LHW attended the birth	0.6	0.6
Currently married women (aged 15–49)		

Measure	2008 All LHWs	2008 Comparable LHWs
% of current users of modern contraceptives who were supplied by the LHW	40.5	43.4
% of current users of modern contraceptives who were supplied or referred by the LHW	51.9	57.9
% of current users of pills and condoms who were last supplied by the LHW	73.8	75.6
% of non-users of modern contraceptives who have ever discussed family planning with the LHW	40.8	42.4
% of non-users of modern contraceptives who have discussed family planning with the LHW within the last 6 months	21.1	20.5
% of current users of modern contraceptive, who were not supplied or referred by the LHW, who have ever discussed family planning with her	39.9	46.2
% of current users of modern contraceptive, who were not supplied or referred by the LHW, who have discussed family planning with her in last 6 months	14.3	14.1
Children under age 3 years		
% who have a health card provided by the LHW	17.3	19.7
% whose mothers say that the LHW talked to her about vaccinating the child	74.7	77.3
% whose mothers say that the LHW encouraged her to take the child for vaccination at the age when it was necessary	58.8	61.0
% whose mothers say that the LHW gave her advice on feeding the child	47.7	51.6
% whose mothers say that the LHW advised about best ways to breastfeed	46.0	47.9
% ever weighed by the LHW	20.7	23.0
% weighed by the LHW in the previous 3 months	11.2	12.6

Notes: (1) Corresponds to Table 4.1 in 3rd Evaluation (2) Denominator is all eligible births, LHWs present at birth (4 per cent of cases) are not included in numerator (3) 2008-Comparable LHWs are defined as LHWs who assumed the post since 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.20 Consultations with the LHW by sick individuals

Measure	2008 All LHWs	2008 Comparable LHWs
Individuals who were ill or injured in the previous 14 days and who consulted any health provider		
% who consulted the LHW – total	17.2	17.6
% who consulted the LHW – female	19.2	20.1
% who consulted the LHW – male	15.0	15.0
Individuals who were ill or injured in the previous 14 days and who consulted any health provider		
% who consulted the LHW first	8.6	8.6
Children under 5 who were ill in the previous 14 days and who consulted any health provider		
% with diarrhoea who consulted the LHW	18.7	19.0
% with respiratory infection who consulted the LHW	21.6	22.0
Children under 5 who were ill in the previous 14 days and who consulted any health provider		

Measure	2008 All LHWs	2008 Comparable LHWs
% with diarrhoea who consulted the LHW first	10.7	9.4
% with respiratory infection who consulted the LHW first	14.3	15.1
Children under 5 who were ill in the previous 14 days and who consulted LHW		
% mothers reported that LHW gave advice about how to prevent diarrhoea in future	56.9	56.4

Notes: (1) Corresponds to Table 5.1 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.21 Reason for not consulting the LHW: children under 5 years old with diarrhoea

Reason	2008 All LHWs	2008 Comparable LHWs
LHW not available/not helpful	22.0	22.2
LHW cannot treat diarrhoea	5.2	5.2
Lack/poor quality of medicines	13.0	12.9
Preferred consultation elsewhere	16.1	16.0
Consultation was not necessary	31.0	31.2
Other	12.6	12.5

Notes: (1) Corresponds to Table 5.2 in 3rd Evaluation. (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.22 Consultations with the LHW by sick individuals by place of residence

Measure	2008 All LHWs		2008 Comparable LHWs	
	Urban	Rural	Urban	Rural
Individuals who were ill or injured in the previous 14 days				
% who consulted the LHW – total	14.3	18.0	14.	18.0
% who consulted the LHW – female	16.1	20.1	16.1	20.0
% who consulted the LHW – male	12.2	15.7	12.2	15.7
Individuals who were ill or injured in the previous 14 days and who consulted any health provider				
% who consulted the LHW first	6.1	9.3	6.1	9.3
Children under 5 years old who were ill in the previous 14 days and who consulted any health provider				
% with diarrhoea who consulted the LHW	14.8	19.8	14.8	19.8
% with respiratory infection who consulted the LHW	15.6	23.4	15.6	23.4
Children under 5 years old who were ill in the previous 14 days and who consulted any health provider				
% with diarrhoea who consulted the LHW first	2.8	12.9	2.8	12.9
% with respiratory infection who consulted the LHW first	8.9	15.9	8.9	15.9

Measure	2008 All LHWs		2008 Comparable LHWs	
	Urban	Rural	Urban	Rural
Children under 5 years old who were ill in the previous 14 days and who consulted LHW				
% mothers reported that LHW gave advice about how to prevent diarrhoea in future	39.6	60.2	41.4	60.5

Notes: (1) Corresponds to Table 5.4 in 3rd Evaluation (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. *Source*: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.23 Distribution of type of case last seen, as reported by the LHW

Case	Percentage of cases	
	2008 All LHWs	2008 Comparable LHWs
Routine visit – pregnancy (including TT)	3.0	2.8
Routine visit – family planning	6.9	2.2
Routine visit – for/immediately after birth	1.7	8.3
Routine visit – growth monitoring/nutritional advice	0.3	0.4
Routine visit – vaccination of children	0.0	0.0
Complication of pregnancy	3.0	3.7
Complication of delivery	0.3	0.2
Problems with family planning	2.1	2.0
Suspected malaria	2.8	2.9
Unspecified fever	21.9	21.1
Diarrhoea	10.9	10.1
Respiratory infection	8.6	10.2
Skin infection	4.2	4.0
Eye infection	8.3	7.9
Worms/parasites	2.0	2.0
Asthma	0.4	0.5
Anaemia	5.7	6.6
Injury/burn	5.5	4.0
TB dots	0.8	0.3
Other	11.4	10.6
Total	100.0	100.0

Notes: (1) Corresponds to Table 5.6 in 3rd Evaluation (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. *Source*: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.24 Distribution of last emergency case seen, as reported by the LHW

Case	Percentage of LHWs	
	2008 All LHWs	2008 Comparable LHWs
Never seen an emergency case	35.5	28.9
Acute complication of pregnancy	8.1	8.2
Acute complication of delivery	11.3	14.4
Acute respiratory infection	5.4	6.2
Severe dehydration	10.0	10.0
Prolonged high fever/ malaria	5.7	6.3
Serious injury/burn	5.3	6.1
Other	18.8	19.9
Total	100.0	100

Notes: (1) Corresponds to Table 5.7 in 3rd Evaluation (2) 2008-Comparable LHWs are defined as LHWs who finished task-based training before 31 September 2005. *Source*: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Table C.25 Last referral case by LHW

	2008 All LHWs	2008 Comparable LHWs
Last case was referred to:		
LHW health facility	32.9	30.1
Government primary health facility (other than LHW)	8.5	5.9
Government hospital	25.8	28.6
Private hospital/clinic	32.4	35.2
Others	0.5	0.2
Total	100	100
% LHWs filled referral slip	41.6	42.9
%LHW reported that patient went to facility	84.8	87.4
Reason for not going to health facility	7.3	
Lack of transport	11.5	3.2
Lack of money	6.6	11.4
Nobody to accompany/no permission	46.7	5.3
Went to another health provider instead	8.1	42.3
Died before going	19.8	11.0
Other	100	27.5
Total	37.9	100
%LHWs accompanied the patient to health facility	79.2	36.3
%LHWs received feedback from health facility	79.3	76.4

Annex D LHW knowledge score

D.1 Construction of LHW knowledge scores

Table D.1 Scoring for general knowledge section of the knowledge test

Question	Answer	Points
Contraindications for oral contraceptive pill	One correct answer	1
	Three or more correct answers	1
Contraindications for injectable contraceptives	One correct answer	1
	Three or more correct answers	1
Contraindications for IUD	One correct answer	1
	Three or more correct answers	1
How soon after birth should a mother start breast- feeding her baby?	One point if response is less than 4 hours after birth	1
At what age should a mother begin to introduce semi-solid foods into her baby's diet?	One point for 4 to 6 months, or 4, 5 or 6 months.	1
Can you name the vaccine and dose for:	One point for each correct answer	
BCG?		1
DPT?		1
Polio?		1
Measles?		1
Can you name the correct age for doses of:	One point for each correct answer	
BCG?		1
DPT?		1
Polio?		1
Measles?		1
How would you advise a mother of child with diarrhoea and mild dehydration if you did not have ORS?	One point for any one correct answer	1
	One point for three or more correct answers	1
What advice if child will not take ORS?	One point for any one correct answer	1
What advice to prevent diarrhoea?	One point for any one correct answer	1
	One point for three or more correct answers	1
How is malaria caught?	One point for correct answer	1
What treatment and advice for a two-year old child with symptoms of malaria?	One point if Chloroquine given	1
	One point if paracetamol given or advice to reduce child's temperature	1
	One point for 'refer to health facility immediately- or if no improvement'	1
Name correct dose of Chloroquine for a child referred to health facility	One point for correct dose (1 teaspoon-one time)	1

Question	Answer	Points
How is HIV/AIDS transmitted?	One point for any one correct answer	1
How to identify TB patient?	One point for any one correct answer	1
Total possible points for General Knowledge Section		**28**

Table D.2 Scoring for case-based section of the knowledge test

Question	Answer	Points
Growth monitoring		
Case 1:		
How much did the child weigh at four months?	One point for 4.1–4.7 kilograms	1
According to the card, what is the child's nutritional status now?	One point for 'normal'	1
What does the card show about the child's growth over the last four months?	One point for stating that the child was gaining weight/growing adequately	1
Case 2:		
How much did the child weigh at four months?	One point for 3.7 to 4.2 kilograms	1
According to the card, what is the child's nutritional status now?	One point for severely malnourished	1
What does the card show about the child's growth over the last four months?	One point for stating that the child was failing to gain weight	1
What extra information would you request if any?	One point if requested information about eating and feeding practices	1
	One point if requested information about recent illnesses	1
Would this child need to be referred to a health facility?	One point for 'Yes'	1
Diarrhoea		
Case 1:		
What is the degree of dehydration of the child?	One point for some dehydration	1
What treatment and advice would you give?	One point for rehydration (ORS or SSS) or breastfeed more often.	1
	One point if they advise to bring the child back for reassessment soon or to seek help if the child does not improve.	1
Case 2:		
What is the degree of dehydration of the child?	One point for severe dehydration	1

Question	Answer	Points
What treatment and advice would you give?	One point for rehydration (ORS or SSS) or breastfeed more often	1
	One point for referral to the health centre	1
Respiratory infections		
Case 1:		
Does the child have a simple cough or cold, pneumonia or severe pneumonia?	One point for severe pneumonia	1
Would this child need to be referred to a health facility?	One point for 'yes	1
What treatment and/or advice would you give?	One point for cotrimoxazole/antibiotics	1
Case 2:		
Does the child have a simple cough or cold, pneumonia or severe pneumonia?	One point for pneumonia	1
What treatment and/or advice would you give?	One point for cotrimoxazole/antibiotics	1
	One point for giving fluids/continuing breastfeeding	1
Pregnancy		
Case 1:		
What is the woman's problem?	One point for 'anaemia'	1
What kind of examination is required and what extra information would you request?	One point for examine conjunctiva or ask about eating habits or recent illnesses	1
What treatment and advice would you give?	One point for 'Fefan' or 'eating more iron-rich foods'	1
Case 2:		
What treatment or advice would you give?	One point for referral to health centre	1
Would this referral be urgent?	One point for 'yes'	1
Total possible points for case-based section		**27**

D.2 Case histories presented to LHWs and LHSs

The following case histories were presented to the LHWs and LHSs during their interview. They were asked a series of questions about each case.

D.2.1 Diarrhoea

I will now describe two cases of children with diarrhoea to you. Please USE the diarrhoea/dehydration management charts to help you and for each case, please tell me:

- What degree of dehydration the child is suffering from?
- What treatment and advice you would give?

Case 1: Hammad

An infant boy of 2 months old, he weighs 3.4 kg and his temperature is 37^{o}C. He is breastfeeding four to five times in 24 hours and also takes diluted cow's milk in a bottle twice per day. He has had diarrhoea for two days, there is no blood or mucus. He has passed urine six times in the last 24 hours. He is restless and irritable. His eyes are somewhat sunken. A skin pinch goes back slowly.

Case 2: Rani

An infant girl of 4 months old, she weighs 4.5 kg and her temperature is 37^{o}C. She is breastfeeding occasionally and also taking milk in a bottle: half-diluted cow's milk four times per day. She has had diarrhoea for three days; there is no blood or mucus. She has passed urine three times in the last 24 hours. She is lethargic, restless, irritable and sometimes drowsy. Her eyes are sunken. A skin pinch goes back very slowly.

D.2.2 Respiratory infections

I will now describe two cases of children with respiratory infections to you. Please use the ARI management charts and for each case, please tell me:

- How severe the case is?
- Whether the child should be referred or treated by yourself?
- How the child should be treated?

Case 1:

An infant girl aged 4 months. She has had a cough for seven days. Her respiratory rate is 55 per minute. Her temperature is 39^{o}C/102^{o}F. For the past six hours, she has refused to breastfeed or to take other fluids.

Case 2:

An infant boy aged 5 months. He has had a cough for seven days. He has a respiratory rate of 60-per-minute. His temperature is 37^{o}C/98^{o}F. He is breastfeeding and taking other fluids. He does not show chest indrawing and is not drowsy.

D.2.3 Pregnancy

I will now describe two cases of pregnant women who could come to see you. I will ask you a number of questions about each case. Do not use the Programme Manual to answer these questions.

Case 1:

A 20-year-old woman. She is pregnant for the third time. Four months ago, she had a miscarriage. She has felt dizzy and tired for the last five weeks, and has felt weak and unable to work for a number of weeks. Her last menstrual period was three months ago.

Case 2:

A 32-year-old woman who is pregnant with her fourth pregnancy. She is in the eighth month of pregnancy. For the past four days, she has had a severe headache and swelling of her face and legs. For the past 3 days she has felt dizzy. Since her last antenatal check up one week ago, she has gained 1.8 kg in weight.

Annex E Modelling LHW performance and knowledge

E.1 LHW performance regressions

A wide range of factors that could have a possible effect on LHW performance, and that was measured within the survey, was used as possible explanatory factors. These can be split into various groups: LHW-level factors (including characteristics of the LHW's community and served households), LHS-level factors, and district-level factors.

For all of the dependent variables, various steps were taken before conducting the regression:

- Checking for outliers: cases with improbably high values were set to missing.
- Missing values were replaced, where adequate, either by the mean or median value, or a zero, depending on the particular cases. If neither procedure were appropriate, the regression procedure would drop the case. In fact, just one out of 554 cases was dropped for this reason.
- Assessment of simple binary relationships: summary measures of *a priori* key factors variable were tabulated against performance quartile (not presented in the report).
- Household and individual-level variables were averaged across all households served by the LHW (as a mean or proportion). Variables relating to the sampled eligible woman were weighted by the number of eligible women per household.

The specific explanatory factors considered for the model included:

E.1.1 LHW-level factors

- LHW characteristics
  - Age
  - Time resident in village
  - Education
  - Household size
  - Household's main source of income
  - Language (same language as LHS?)
  - Marital status
  - Number children under 5 years old
  - Family planning practices
  - Mobile phone access
  - Exposure to television and radio
  - Unserved of LHW earnings
  - Views on women's fertility desires, working practices and independence

- Programme-related factors
  - Knowledge and experience of LHW and training received
    - Service duration
    - Previous job (ever held and, if so, type)
    - Training (initial full-time, task-based, refresher and on-the-job)
    - Knowledge score
    - Worked solely in current catchment area
  - Work load
    - Number of households registered (and average people per household)

  - Inaccessible households
  - Number of days/hours worked in previous week
  - Participation in NIDS
- Supervision and performance management
  - Same home spoken language as LHW?
  - Time since last meeting with supervisor, length of meeting, location, whether checklist used, in-field, (as reported by LHW)
  - Performance scores (and action taken in cases of non-performance)
  - Meetings at health centre
  - Meetings with DC/ADC/FPO
- Salary payment to LHW
  - Full amount received
  - Payment late
- Supply of medicine and equipment
  - Drugs and stationery supply
  - Stock of medicines (16 different sorts of medication)
  - Supply of equipment (12 different sorts of equipment)
- Other factors
  - LHW holds second job
  - EPI vaccinator serves LHW's catchment area

- Characteristics of LHW's catchment population
  - Households
    - Mobility, female independence
    - Literacy (male and female)
    - Consumption (proportion of food in overall consumption, per adult equivalent consumption)
    - Exposure to television and radio
    - Access to a mobile phone
    - Availability of clean water source and toilet
  - Community
    - Rural/urban status
    - Health services available
      - Proximity to health facilities
      - Availability of any doctor, female doctors, medicines, family planning methods at nearby health facilities (<5 km)

E.1.2 LHS-level factors

- LHS characteristics
  - Age
  - Time resident in village
  - Education
  - Household size
  - Household's main source of income
  - Language spoken
  - Marital status
  - Number children under 5 years old
  - Family planning practices
  - Mobile phone access
  - Unserved of LHS earnings
  - Views on women's fertility desires, working practices and independence

- Programme-related factors
  - Transport
    - Availability of supervisor vehicle
    - Availability of budget for petrol, oil and lubricants
  - Salary payment to supervisor
    - Full amount received
    - Payment late
  - Knowledge and experience of supervisor and training received
    - Knowledge score
    - Duration of core training (months)
    - Location of core training (facility type)
    - Previous job (ever held and, if so, type)
  - Work load
    - Number of LHWs supervised
    - Distance LHS lives from FLCF
    - Distance LHS lives from farthest LHW
    - Days spent on official work last month
    - Number of LHW visits made last month
    - Number of FLCF visits made last month
    - Number of LHW monthly meetings attended
    - Hours spent visiting and supervising LHWs in their communities
    - Hours spent visiting FLCFs (individual LHW meetings)
    - Participation in NIDS in last 3 months
  - DPIU and supervision of LHSs
    - Days since last DPIU meeting
    - Complaint register in use at DPIU
    - LHS used by
    - Feedback normally received from DPIU staff
    - Supervision of the LHS (DC/ADC/FPO)

E.1.3 District-level factors

- Education level and degree of involvement in LHWP-related activities of EDO-H/DC/ADC/FPO
- Interactions between LHWP and wider district-level health services and management: District Health Plan and Management Team, PHCP meetings and NGO activities and links to LHWP
- Vehicle availability and extent of in-field supervision and support being provided by DPIU
- Supply and logistics

E.2 LHW knowledge regressions

The same factors were considered for the LHW knowledge regressions with the exception of those that did not make sense as meaningful explanatory factors for LHW knowledge scores, which included:

- Supply of drugs and equipment
- Supply of alternative health services in the community
- Some LHW activity information (for example, number of households registered, and so on)
- DPIU information.

Annex F Impact modelling details and specifications

This annex provides a detailed outline of the overall modelling approach used.

F.1 Approach

The unserved households/individuals are a good comparison group to establish the impact of the programme only insofar as they represent a 'counterfactual' of the served individuals; that is, if their condition mimics the condition of the served individual, with the exception of the intervention. However, our previous analysis indicates that several structural differences exist between households living in served and unserved FLCFs (see Section 6). This scenario imposes severe limitations on what we may infer from a simple means comparison of outcomes across served and unserved areas. The encountered outcome differences are very likely to reflect pre-existing or structural differences in household characteristics, rather than the Programme's impact itself.[60] In particular, as the served population is, in many respects, better off than the unserved population, simple means comparisons would lead to upward biased estimates of the Programme's impacts.[61]

In order to obtain more reliable estimates of the LHWP effects, we have to take into account the structural differences between households in served and unserved locations. We do this by using two statistical methods: multivariate regression analysis, and Propensity Score matching.

F.1.1 Regression models

With multivariate regression models we relate outcomes to a broad range of explanatory variables in a parametric way. We determine if, once controlled for observable differences, an outcome gap persists between served and unserved locations.

Our regression models are based on a basic set of control variables that broadly reflect the characteristics reported in Tables 5.5, 5.6 and 5.7. They cover nine dimensions: household demographics, age and education of the head of the household and his spouse, labour supply, quality of the house, household assets, distances from the households to strategic locations, community distance from strategic locations, community socioeconomic status, and health district management performance. We also include provincial indicator variables in order to capture provincial-level fixed effects.

We estimate a separate regression model for each outcome of interest, using alternative specifications for different groups of indicators.[62] The models are estimated on the pooled data of served and unserved households/individuals. They include a dummy variable that is 1 for observations in served locations and 0 for observations in unserved locations. This dummy will capture the effect of the Programme. Full details of the specifications can be found in Annex F.

[60] It is extremely unlikely that these differences are the result of the LHWP itself, as the set of variables is well outside the domain of influence on the programme.

[61] Higher education, wealth and better access to health facilities may explain a significant portion of the positive differences in many of the indicators of health knowledge, practices and outcomes.

[62] We use seven alternative specifications. They differ because the set of controls varies from the basic specification according to the type of observation that we focus on (All Households, Ever married women, currently married women, women who have given birth during the previous three years, children who have been sick of ARI and ADI during the previous 15 days, children younger than 3 years old, children between 1 and 5 years old).

F.1.2 Propensity Score matching

The Propensity Score matching (PSM) is a semi-parametric technique of analysis that allows a much sharper comparison between served and unserved observations (households or individuals).

With respect to the regression approach, this method represents an improvement along two main lines. First, the comparison between served and unserved populations is restricted to a sub-set of 'highly comparable' observations.[63] Second, the impact estimates take into account the heterogeneity of households/individuals: the impact is not estimated comparing a group of served beneficiaries/households with a group of unserved beneficiaries/households (as the regression methods do) but, rather, by comparing every served observation with a small sub-set of unserved 'fully comparable' observations (the 'matched' controls).[64]

The degree of 'comparability' of one observation to another is determined by the probability of being enrolled in the LHWP, or the 'Propensity Score', which, in turn, is a function of a complete set of observable characteristics. The application of the PSM technique allows regaining 'ex post' a minimum degree of comparability between served and unserved households, so that LHWP impact estimates can be more reliable.[65]

A full discussion on the PSM methodology, the quality of the matching and used specifications is presented in Annex F. As the implementation of the PSM technique is statistically rather cumbersome, we apply this method for a sub-set of outcome indicators.

F.1.3 Selection of observables

While the application of regression models and the PSM technique is a relevant step forward in the direction of providing a reliable estimate of the Programme's impact, it must be noted that these approaches are not exempt from drawbacks. First and foremost, both methods only account for the selection bias based on observable characteristics. If served and unserved observations present some pre-Programme differences due also to unobservable characteristics, the results obtained with these two methods will not reflect the true impact.

There are two crucial elements determining the comparability of served and unserved populations on the ground of unobservables: the selection process of FLCFs (and communities within FLCFs) into the LHWP, and the selection process of households/individuals into the Programme within served FLCFs. Both these processes are determined by a complex set of non-intelligible factors: political pressure, LHW effort, social networks, self-selection, and so on.

We are not in a position to control for unobservable sources of biases at the level of the selection of FLCFs (and communities within FLCFs) into the LHWP. However, as registration rates within the catchment area of a working LHW are close to 100 per cent, this minimizes

[63] The so-called 'common support'.

[64] In its simplest version the PSM technique associates every served observation (*i*) with the most 'similar' unserved observation (*j*), calculate the difference in their outcomes and takes it as the impact for the observation *i*. In this case the total impact is given by the average of the pair-wise differences over all the served households. And vice versa for unserved observations. We use a rather more sophisticated matching technique, known with the name of kernel matching.

[65] As the implementation of the PSM technique is statistically rather cumbersome, we apply this method for a subset of outcome indicators.

the risk of the existence of major selection bias due to unobservables at the household level.[66]

We consider served households all those that are registered with a LHW in a served community.[67] We consider as served individuals all those who fulfil the age eligibility criteria for specific services. We purposefully disregard their real treatment status (for instance, the fact that they know they are registered or know the LHW, that they have been ever visited and the fact that they have actually received the relevant services).[68] This provides our most reliable estimate of the LHWP impact, which corresponds to its overall average effect in served communities (rather than on served households or individuals).[69]

Indeed, the fact of having actually been served; the length of exposure to the Programme; and the experience, knowledge and performance of the LHWs are important determinants of Programme's effect. But the comparison with the unserved population becomes increasingly complicated. We try to address some of these issues in Section 7.4, focusing only on the served population.

F.1.4 Additional information on the basic multivariate regressions

We estimate a separate regression model for every outcome, but we organize the models in seven groups, with common specifications (Table E.1). Each group applies to a different sub-set of the population, therefore a different sub-set of the sample, according to the specificities of outcomes. We complement the basic control specification with extra variables to match the modelling needs of every group. However, it is important to specify that we do not develop a specific model for every outcome.

[66] Note that, here, we refer to coverage rates in the catchment areas of an LHW, rather than to the catchment area of an FLCF. In accordance with our analysis of the patterns of expansion in the past, we allow coverage to be lower than 100 per cent in the area of served FLCFs. However, the sample is only representative of households officially registered with an LHW in a served community. Here, we expect coverage rates to be close to 100 per cent, and non-compliance to be minimal. Couples registered for Family Planning services are probably the most problematic in this respect, as it is a specific rather than 'on demand' based type of service, and couples that are not interested, and not eligible for other services, might not be registered by the LHW. Therefore, we treat FP indicators with special caution.

[67] Conversely, for the sample of unserved households we drop few cases in which the households had been previously registered with a LHW.

[68] In particular, we include in the analysis households that do not know that they are registered with an LHW, do not know the LHW at all, or have never been visited. Altogether, these groups do not represent more than 5 per cent of the sample of served households. We have also estimated an additional specification excluding these categories and our findings hold.

[69] We get a 'diluted' but reliable version of the 'real' effect that one would obtain if all registered households and all eligible individuals received all services to which they are entitled under the LHWP (the 'Intent-to-treat' effect, in technical terms). The advantage of this approach is that it overcomes some of the drawbacks arising from the existence of (self-)selection bias at the household/individual level.

Table F.1 Common specifications of model groups

	Type of observations	Outcomes	Set of controls	Number of observations	
				Served	Unserved
Group 1	All households		Basic specification		
Group 2	Ever married women		Basic specification + characteristics of the responding woman		
Group 3	Currently married women				
Group 4	Women who have given birth during the last 3 years				
Group 5	Last children who have been sick of ARI and ADI during the last 15 days		Basic specification + characteristics of the mother + age and sex of the child		
Group 6	All children younger than 3 years old				
Group 7	All children between 1 and 5 years old				

We have decided to leave out indicators on women's empowerment and access to media, as these might be endogenously determined by the LHWP itself. We have also excluded the demographic characteristics that refer to children younger than 15 years old, as this variable might reflect an effect of the Programme on family planning.

Also we have not included variables at the FLCF level, as FLCF information is missing for several FLCFs, and this would have significantly reduced the number of usable observations. The community questionnaire provides substitute information for characterizing the environment.

Our regression models are estimated using a standard OLS approach when the outcome variable is continuous or discrete, while we use a Probit model for dichotomous variables (presenting marginal coefficients).

F.1.5 Additional information on the PSM technique

The procedure for the estimation of the PSM develops in two steps. In a first step, the probability of participating in the Programme (Propensity Score) is estimated on the basis of observable characteristics for served and unserved population in a pooled way. This probability will serve as an indicator for the comparability of served and unserved observations. In a second stage, served and unserved observations are matched according to their Propensity Score, and a weighted average of the difference in their outcomes is calculated.

We estimate a different Propensity Score and undertake a separate matching procedure for every Group mentioned in Table E.1. The function of participation is estimated using a Probit model using the relevant set of control variables.

Table E.2 shows the estimated coefficients for the participation function that we obtain when we use the basic control specification on all households.

Table F.2 Function of participation – basic specification

	Coefficient and Significance Level
Household Demographics	
Size of the household	-0.017
Female head of the household	0.077
Age of the head of the household	0.003
Spouse in the household	0.027
Age of the spouse	0.003
Number of adults (15-20)	0.004
Number of aged (older than 51)	-0.066
Literacy	
Head has ever been to school	0.016
Head Radio	-0.017
Head TV	0.073
Spouse has ever been to school	0.157
Spouse Radio	0.062
Spouse TV	-0.042
Household Labour Supply	
Number of household members working	-0.023
Number of female household members working	0.150
Main source of income is salaried work	0.177
Facilities and utilities	
Own house	0.427
Number of rooms	0.023
Dirt floor	-0.036
Bad quality walls (bricks and mud, mud, iron sheets, wood, no walls)	-0.140
Medium roof quality (iron sheets)	-0.288
Bad roof quality (wood or planks)	-0.235
Very bad roof quality (straw, thatch or mud)	-0.077
No toilet	-0.081
Protected water supply	0.191
No electricity connection	0.112
Telephone	-0.004
Refrigerator	-0.081
Washing machine	0.165
Radio	-0.094
TV	0.054
No TV coverage	-0.392
Mobile phone	-0.065
Motorcycle	0.019
Distances to Strategic Locations	
Distance to the closest primary school	-0.003
Distance to the closest shop/market	0.004
Distance to the closest BHU/RHC	-0.001

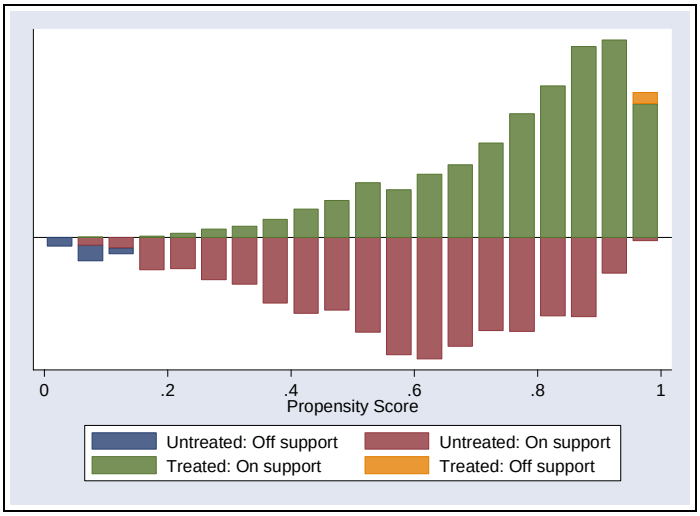
	Coefficient and Significance Level
Community characteristics	
Bad road into village / mohalla	-0.323
Mostly unpaved streets	0.063
Distance to the closest shop selling basic medicines and FP items	-0.194
Distance to the thesil capital	-0.131
Distance to the district capital	0.141
Dump garbage “anywhere”	-0.124
Sewerage or drainage system	-0.018
Medical emergency transport (at daytime)	0.457
Daily wage (unskilled man)	0.002
Daily wage (unskilled woman)	0.003
Daily wage (unskilled child under 14 years)	-0.003
DHO characteristics	
District health plan in place	-0.316
District health management team in place	-0.218
District assembly revised district health plan	0.220
Regular health team meetings	0.115
Stratum	
Sindh	0.361
NWFP	0.525
Balochistan	0.376
AJK - FANA	0.633

Notes: Probit estimation. All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Overall, the model is explaining a reasonable fraction of the variance of the probability of being served by the Programme (the pseudo R^2 is rather high, at 0.175). Significant coefficients indicate the main characteristics explaining – positively or negatively – households’ enrolment in the Programme. While household demographic characteristics do not affect participation in the LHWP, better socioeconomic indicators and accessibility, both at the household and at the community level, are the main factors explaining enrolment in the Programme.

In Figure F.1, we report the distribution of the estimated Propensity Score for served and unserved households according to this base specification. As is to be expected, Propensity Scores are slightly more skewed on the right-hand side for served households compared with unserved ones. This means that the estimated probability of participation in the LHWP is higher for households that are actually served by the Programme. However, there is still enough variation in both distributions. What the PSM technique does is to compare served and unserved households that pertain to bins around the same point in Propensity Score distribution.

Figure F.1 Distribution of the Propensity Score – basic specification: served and unserved population



Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Coloured in orange and blue, Figure F.1 also shows the households that will be dropped from the analysis because they fall out of the common support (they are not comparable to any other household in the distribution).

Full details on the Propensity Score estimations for every indicator in every specification group are available on demand. The quality of the fit is satisfactory for all cases, except for the indicators referring to the treatment of ARI and ADI, as there are too few observations to undertake the PSM technique.

The application of the PSM technique allows regaining, 'ex post', a minimum degree of comparability between served and unserved households, so that LHWP health impact estimates can be more reliable. This can be verified by looking at how structural characteristics are balanced between served and unserved observations before and after the matching process.

We can conclude that served and unserved households appear definitely more comparable after the matching procedure. Overall, the mean of the selection bias across the 61 variables that comprise the participation function dropped from 18.4 to 6.5, and its standard deviation from 12.7 to 6.2. In particular, the selection bias is reduced significantly for a number of characteristics that are highly unbalanced between the two groups, and also potentially correlated with relevant outcomes (for instance, own house, wall quality, TV coverage and several distance measures). This notwithstanding, the difference between served and unserved households continues to be highly significant for many variables, even after the matching.

Annex G Socioeconomic impacts

The results of the analysis of differential effects by consumption quintiles groups are reported in Tables F.1, F.2 and F.3.

The impacts on health knowledge, particularly the treatment of diarrhoea, seem to be concentrated on better-off households, while relatively poorer households struggle to acquire new capacities for illness management, possibly due to their lower levels of education. Conversely, we find a significant effect on the desire to reduce family size only for woman belonging to households whose consumption level falls in the first or the second quintile of the distribution.

Table G.1 Impact on health knowledge and attitudes (by consumption quintiles)

Measure	Propensity Score Matching	
	Quintiles 1-2	Quintiles 4-5
Knowledge		
% of mothers of children five who know at least one way to prevent diarrhea	0.011	0.171***
% of mothers of children five who know how to prepare ORS (and what it is for)	0.003	0.051
Number of modern method of contraception known by women (currently married women of 15-49 years of age)	0.083	0.009
Attitudes		
Mean number of children wanted in total	-0.112	-0.121
Belief on the optimal number of children	-0.152	-0.255
% who think that Islam approves of family planning	0.192**	0.110*

Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM SE are estimated with a bootstrap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. *Source*: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

Our estimates suggest that maternal health practice effects are more concentrated on women that are worse-off from a socioeconomic standpoint. The estimated impact on the probability to have at least two tetanus toxoid injections rises to 26 percentage points for women in the first and second consumption quintiles, while it is around 13 percentage points for relatively better-off women. The same patterns emerge for the use of iron tablets during pregnancy (where the effect is at least 13 percentage points higher for worse-off women), prenatal consultations (where the difference is in the range of 10 percentage points) and the probability that newborns' health is checked within 24 hours from birth (where the differential is roughly 9 percentage points).

This said, it must be noted that, institutional deliveries, trained birth attendance and neonatal health check-ups, the size of the effects are still remarkable for women in the fourth and fifth quintile.

Table G.2 Impact on health practices in sanitation and maternal health (by consumption quintiles)

Measure	Propensity Score Matching	
	Quintiles 1-2	Quintiles 4-5
Sanitation Practices		
% households who clean water before drinking	-0.074**	0.017
% households who have proper arrangement of garbage disposal	-0.052	-0.025
% households who dump garbage anywhere	0.058	0.026
% women who wash hands with soap before preparing food	0.124	0.076
Antenatal care and delivery		
(Women who had a birth since 2004 reporting on their last birth):		
% who had at least one antenatal consultation at a health facility	0.210***	0.113
% who had five or more antenatal consultation at a health facility	0.097**	0.047
Number of antenatal consultations at a health facility	0.984***	0.293
% who had at least two tetanus toxoid injection in the last pregnancy	0.262***	0.130
% who have at least five tetanus toxoid injection in life	0.128**	0.133
% who took iron tablets during last pregnancy	0.203***	0.075
% of births attended by doctor, nurse or LHV	0.022	0.192*
% of births delivered at health facility (institutional deliveries)	0.028	0.164**
% of newborns examined within 24 hours of birth	0.252***	0.163*
Family Planning		
(Currently married women aged 15-49)		
% know source to obtain method of contraception	0.122***	0.079*
% have ever used any method of contraception	0.087	0.052
% using any method of contraception (CPR)	0.096*	0.082
% using any modern method of contraception	0.086	0.114***
% using any modern 'reversible' method of contraception	0.027	0.085***

Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM SE are estimated with a bootrstap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The estimated effect on access to contraceptive methods (percentage of women in reproductive age that know a source from which to obtain contraceptive methods) seems to be spread amongst socioeconomic categories, and is even slightly bigger for worse-off women (12.2 percentage points effect). On the contrary, the impact on the current use of contraceptive methods is stronger for women belonging to the fourth and fifth consumption quintiles, both in terms of magnitude and significance. Our estimates suggests that the effect on better-off women is between 3 and 6 percentage points higher, when we consider the current use of modern methods and modern 'reversible' methods. Conversely, the effect of the LHWP on CPR, or the use of any form of family planning method seems to be stronger for worse off households. This pattern suggests two hypotheses. First, poorer couples tend to be receptive to the use of modern contraceptive methods in general (we estimate a remarkable increase of 10 percentage point), but not specifically the reversible methods. Second, as a response to the Programme, FP clients belonging to the fourth and fifth consumption quintile tend to substitute traditional contraceptive methods with modern and reversible ones.

Table G.3 Impact on health practices in child health (by consumption quintiles)

Measure	Propensity Score Matching	
	Quintiles 1-2	Quintiles 4-5
Breastfeeding and weaning		
% of children under 3 years ever breastfed	0.001	0.003
% of children whose mother began breastfeeding within half an hour of birth	-0.118	-0.034
% of children whose mother began breastfeeding within 4 hours of birth	-0.164***	-0.101
Months of breastfeeding	-0.308	-0.906
Months of exclusive breastfeeding (no liquids, no solids)	-0.185	-0.129
% of children exclusively breastfed until 6 months of age	-0.069	0.002
Immunisation		
% of children aged 12 to 35 months had ever been vaccinated	0.098**	-0.000
% of children aged 12 to 35 months fully vaccinated (based on recall and record)	0.216**	-0.047
% of children aged 12 to 35 months had BCG before age 12 months	0.135**	-0.010
% of children aged 12 to 35 months had three or more time polio drops before age 12 months	0.082	-0.038
Growth Monitoring		
% of children under 3 years ever weighed by any health worker	0.153***	0.016
% of children under 3 years weighed by any health worker in the previous 3 months	0.063*	0.024

Notes: Coefficients in every line and every column come from a separate estimation. We present marginal coefficients for binary outcomes. Standard errors are clustered at the FLCF level. PSM SE are estimated with a bootstrap procedure (250 replications). All estimates take into account sample weights. Significance levels are indicated using the following notation: * 10 per cent, ** 5 per cent and *** 1 per cent. Source: OPM LHWP 4th Independent Evaluation, Quantitative Survey Data (2008).

The estimates reported in Table G.3 indicate that the programme effects on health practices in child heath are mainly concentrated on children belonging to the poorest stratum of the served population. While we still do not find any significant effect on breastfeeding and weaning behaviour, immunization and growth monitoring results are striking for children in the first and second consumption quintile.

We estimate that served children at the bottom of the consumption distribution are 22 percentage points more likely to be vaccinated than children from a similar economic background in unserved areas. They are also almost 13.5 percentage points more likely to receive BCG vaccination in a timely manner. In terms of growth monitoring, we estimate a positive effect of the programme of, respectively, 15 and 6 percentage points in the probability of having been ever weighed by a health worker and having been weighed in the last 3 months.

Finally, we find no evidence of effect on child morbidity for any of the consumption quintile sub-groups.