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The quality of immunization data from routine primary health care reports: a case from Nepal

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Reported high immunization coverage achieved in Nepal over the last ten years is expected to reduce child mortality in the country. The present study, carried out in a hill district in mid-west Nepal, aimed to assess the quality of immunization data in Nepal. The number of children who received different vaccines during one year was obtained from three sources: 1) the Immunization Register of three Primary Health Care Service Outlets (PHCSOs) where each immunized child is recorded; 2) monthly PHC Reports, which are based on the Immunization Register; 3) monthly DHO Reports, which are based on the above PHC Reports (the DHO reports are the source of official statistics). The number of children in the PHC Reports was higher than the number in the Immunization Registers for all vaccines. The number of immunizations in the DHO Reports was higher than the number in the PHC Reports for BCG, DPT, and measles; the number was lower for poliomyelitis. The overall number of immunizations was higher in the DHO Reports than in the Immunization Registers, by 31% for BCG, 44% for DPT, 155% for polio, and 71% for measles. We conclude that the official report overestimates the immunization coverage in the district. The immunization programme, therefore, might not result in the expected reduction of morbidity and mortality despite the investment in the programme and reported high coverage.

Introduction

Worldwide immunization coverage has improved considerably during the last decade. From the early 1980s to the early 1990s the reported coverage increased from under 20% to approximately 80%, and millions of deaths were estimated to have been avoided over this period (UNICEF 1994). Despite this, diseases that are preventable through immunization still remain one of the major public health problems in many developing countries. In 1993 a single disease among them, measles, claimed the lives of an estimated 1.2 million children and infected more than 45 million people; furthermore, poliomyelitis disabled an estimated 10 million (WHO 1995a). Although diseases that are preventable through immunization are declining in the South-East Asian Region, 100 000 cases of measles were reported from the region in 1993 (WHO 1995b).

According to official reports, Nepal, like many countries, has had tremendous success since its immunization programme was launched in 1977 (His Majesty's Government of Nepal (HMG/Nepal), 1991a). National immunization coverage in 1989 was reportedly as high as 95% for BCG, 80% for DPT and polio, and 69% for measles (HMG/Nepal 1993).[1] Although these figures have declined slightly in the subsequent years (HMG/Nepal 1995a), this achievement is viewed as an impressive accomplishment within social and human services in Nepal. The national figures seem, to a great extent, to satisfy the global targets of 80% and 90% coverage of all immunizations by the end of 1995 and 2000, respectively (UNICEF 1995). However, as a proper surveillance mechanism is lacking (WHO 1994a), the impact of immunization coverage on reducing morbidity and mortality in Nepal is not yet properly documented.

The official national figures on immunization coverage are based on routine reports from Primary Health Care Service Outlets (PHCSOs).[2] In Nepal

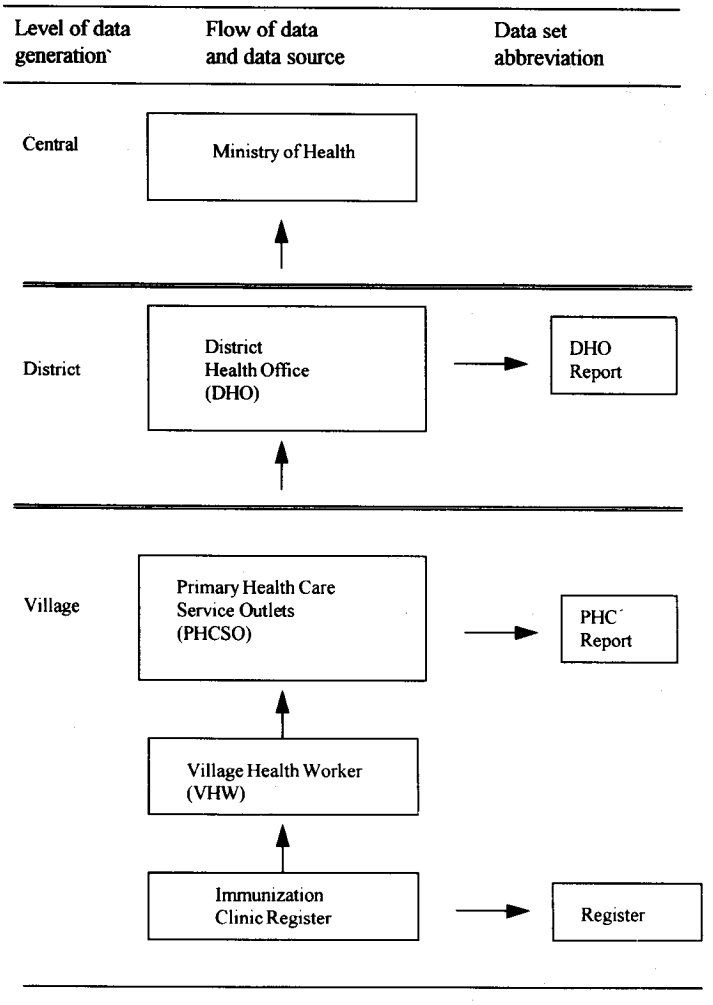

Figure 1. Flow of immunization data in the Nepalese health care information system and data sources of the study

these PHCSO are Sub Health Posts, Health Posts, and Primary Health Care Centres. At present there are more than 4000 Village Health Workers (VHW) based at the PHCSOs (HMG/Nepal 1995b). Each covers a specified geographical area with 4000–6000 inhabitants. Together with other services, the VHWs regularly provide immunization services through the outreach camps based in the Wards and static clinics.

Every month the VHWs compile the number of different immunizations given during the month and report to the District Health Office (DHO) through their respective PHCSO. After receiving immunization reports from all the PHCSOs and from the district hospital, the DHO categorizes the data by types of vaccines, and reports to the Ministry of Health (MOH) every month using a form supplied by the MOH. The MOH also receives immunization reports from the clinics based at the central hospitals in the capital. Based on this information the national average of immunization coverage is estimated (Figure 1). Since a quality control mechanism is not part of the system, these reports are accepted as true, and their accuracy is not questioned.

There are some indications of inaccuracy of national immunization coverage based on the reports from the PHCSOs and from the DHO. According to the

reports, 632 000 children below 12 months of age received BCG in 1989; the corresponding number was 610 000 in 1990 and 572 000 in 1991. However, a census report showed that the number of children below 12 months of age in 1991 was 565 000 (HMG/Nepal 1993). The number of children of this age was probably less in the previous years. If the reported immunization figures are applied to the population from census data, immunization coverage with BCG exceeds 100% in these years. Similar figures are found for all vaccine types in these years. These findings have indicated the need to assess the reliability of national immunization data.

The objective of the study was to assess the quality of national immunization data from Nepal.

Methods and materials

Setting

The study was carried out in the district of Jajarkot in the Mid-western region of Nepal. Jajarkot is a hilly district with no roads. The district is connected with other parts of the country through footpaths (trails) only. Access is also possible by air to and from the adjacent district, where the highway can be reached. At the time of the study there were 25 PHCSOs – 8 Health Posts, 16 Sub Health Posts, and 1 Primary Health Care Centre, staffed with Auxiliary Health Workers and mobile VHWs to provide primary health care services to an estimated population of 114 000 (HMG/Nepal 1995a). Sub Health Posts were introduced in Nepal in 1993 to provide primary health care at the Village Development Committee (VDC) level. Many of these Sub Health Posts in Jajarkot are newly established and many of them are not fully staffed. The distance from these PHCSOs to the district hospital ranges from three hours to two days walk, depending on the season of the year.

Data sources

Data were collected between November 1995 and February 1996 from three PHCSOs – two Health Posts and one Sub Health Post of the district. These PHCSOs, which are situated in adjacent VDCs, were selected for practical reasons.

Data collection was carried out from three sources at the different levels.

1. Immunization Registers: Every time a child is immunized in the outreach camps or in the PHCSO clinic the child is recorded in the Immunization Register by the VHW. Thus, the immunization register is the basic data source of the immunization status of the child population in the area. The Immunization Registers with the record of immunized children during one Nepali fiscal year 2051–2052 (July 1994–June 1995) were obtained from the VHWs and photocopied. The number of children who received a particular vaccine each month from each Ward of the PHCSO's catchment area was thus obtained.

2. PHC Reports: Every month the VHW categorizes different vaccines by types from the Immunization Register for the total area covered by the VHW, and reports to the DHO through their respective PHCSOs in special reporting forms provided by the DHO. The office copies of these report forms were obtained from the study PHCSOs for the same fiscal year and copied manually. This information constitutes the second set of data for the same period and the same population.

3. DHO Reports: Having received the immunization reports from all the PHCSOs in the district, the DHO categorizes them by types of vaccines for the district and reports to the MOH. The office copies of these reports from the fiscal year (i.e. Nepali years 2051–2052) are the third data set.

Thus, three sets of data, based on the same data source and the same population, were obtained from three different administrative levels. These three sets of data were then compared, and the consistency between them assessed.

PHC reports include BCG, DPT 1st, 2nd, and 3rd doses, Polio 1st, 2nd, and 3rd doses, and measles vaccines. But the DHO reports to the MOH include only completed vaccination, i.e. BCG, DPT 3rd dose, polio 3rd dose, and measles. Therefore, only these completed numbers were analyzed, since the DPT 1 and 2 doses and polio 1 and 2 doses could not be compared with the DHO Reports.

For the sake of anonymity PHCSOs are coded as 1, 2 and 3.

Results

Number of children who received vaccines as estimated from different sources

The numbers of all vaccine types were different in the three sets of data (Table 1). The number of all

Table 1. Number of children receiving immunizations as estimated from different sources

Sources	Vaccines			
	BCG	DPT	Polio	Measles
Register	312	233	132	397
PHC Report	358	318	362	587
DHO Report	410	337	337	680

Table 2. Number of children receiving immunizations as estimated from different sources for three Primary Health Care Service Outlets

Sources	PHCSO 1	PHCSO 2	PHCSO 3
BCG			
Register	138	104	70
PHC Report	184	101	73
DHO Report	164	119	127
DPT			
Register	103	46	84
PHC Report	141	55	122
DHO Report	124	67	146
Polio			
Register	103	24	5
PHC Report	141	99	122
DHO Report	124	67	146
Measles			
Register	177	96	124
PHC Report	266	148	173
DHO Report	223	183	274

vaccine types reported from the PHCSOs was higher than the number of vaccines in the Immunization Register. The difference between these two sources ranged from 15% for BCG to 174% for polio.

Similarly, a difference was also seen between the number of vaccines in the PHC reports and the DHO reports. The number of vaccines in the DHO reports for BCG, DPT, and measles was higher than the numbers in the PHC report, whereas the number for polio was lower in the DHO report than in the PHC report. The number of BCG in the DHO reports was approximately one third higher than the number in the Immunization Register. The differences for the

Table 3. Number of children receiving immunizations based on different sources per month

Sources	Number of vaccines per month												
	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Total
BCG													
Register	17	0	55	0	13	32	58	13	29	0	29	66	312
PHC Report	40	0	42	0	14	35	71	13	53	0	46	44	358
DHO Report	60	31	67	20	33	32	30	13	53	0	46	25	410
DPT													
Register	27	40	27	0	12	2	34	3	43	0	26	19	233
PHC Report	28	46	36	0	16	12	39	19	46	10	34	32	318
DHO Report	77	58	49	15	29	16	0	19	40	0	17	17	337
Polio													
Register	22	16	13	0	12	2	18	0	22	0	6	21	132
PHC Report	48	46	36	14	26	12	39	19	46	10	34	32	362
DHO Report	77	58	49	15	29	16	0	19	40	0	17	17	337
Measles													
Register	36	0	49	0	18	46	64	22	45	0	27	90	397
PHC Report	61	0	50	0	30	65	122	32	99	0	71	57	587
DHO Report	136	38	83	12	85	64	58	0	76	0	71	57	680

other vaccines reported were even higher; up to 155% for polio.

The average difference of all vaccines between the Immunization Register and PHC report was 51.3%, whereas the difference between the DHO Report and the PHC Report was 8.5%; the cumulative difference between the immunization register and the DHO report was 64.2%.

Number of children receiving vaccines estimated from different sources in different PHCSOs

The analysis comparing the three PHCSOs showed that inaccuracy was widespread, since the number of immunizations was different between different sources in all the studied PHCSOs (Table 2).

For all the vaccine types, the numbers found were higher in the PHC report than in the Immunization Register for all three PHCSOs. As an exception, in one of the PHCSOs the number of BCG vaccines was lower in the PHC report than in the Immunization Register by 2.8%. The largest difference between the PHC Report and the Immunization Register was observed for polio in PHCSO 3.

Despite the lower number reported from the DHO in some vaccines, numbers of all vaccine types were higher in the DHO report than in the Immunization Register in all studied PHCSOs; the largest difference was in PHCSO 3 for polio (Table 2).

Number of children receiving vaccines per month

The monthly analysis of different data sources revealed differences in the number of vaccines between the sources for most of the months in the year. Differences were found for all vaccine types.

While in most months the number of vaccines was higher in the PHC report than in the Immunization Register, in some months the PHC report had a lower number of vaccines. PHCSOs reported that vaccines were administered to the DHO even in the months when no child was entered into the register, meaning that vaccination was not carried out in those months.

Similar differences were also observed between the PHC reports and DHO reports (Table 3).

Discussion

Although many NGOs are operating in Nepal, no organizations other than the PHCSOs were carrying out immunization for children in the study area. This means that the Immunization Registers in the PHCSO should provide the actual number of different immunizations given to the children in the study area, if all immunizations were entered into the Immunization Register by the VHW. Errors in the registered data may arise due to incorrect data entry or non-entry of available data (Sørensen et al. 1996). A high degree of correctness in the Immunization Register can be expected because: 1) the Immunization Register is filled in by the VHW on the spot at the time of immunization; failure to enter immunized children into the register is therefore unlikely; 2) there are few variables to be recorded and problems of diagnosis, misclassification or coding, as in morbidity records, do not arise, and incorrect data entry is therefore less likely; 3) the Immunization Register is a book filled in continuously and lasting for a year or longer. Since the children receiving immunization are entered with serial numbers, missing pages are easily recognized. Therefore, the Immunization Register provides a relatively valid status of immunization coverage in the study area.

The findings of the present study that the numbers of all types of immunizations in the PHC report were higher than in the Immunization Register, suggest that the PHC report is erroneous and overestimates the immunization coverage in the study population. This difference was observed for all types of vaccines and in most months of the year, indicating systematic erroneous reporting by the PHCSOs.

Since the PHC reports are the only source of data for the DHO report, the number of vaccines in the reports should be identical. Therefore, a difference in number between the PHC report and DHO report suggests that there are errors in the reporting from the district. The numbers of all vaccine types, except polio, were higher in the DHO report, indicating a tendency to overestimate by the district.

The analysis per month revealed that PHCSOs reported the number of immunized children even in the months where no children were entered into the Immunization Register. Similarly, the DHO reported the number of immunizations for months when no report was received from the PHCSOs, further supporting the theory of overreporting from both levels. The overestimation from the PHCSOs could be explained by several factors.

Each PHCSO is given targets by the DHO to achieve a certain level of immunization coverage for the coming fiscal year. It is the VHW's task to meet these targets, and the evaluation of performance of VHWs and PHCSOs is largely based on measurable achievements such as immunization coverage goals.[3] When these goals are not met in practice, it might lead to overreporting. The monthly analysis of the registers indicated that immunization of the children was irregular over the year. This could be due to 1) irregular supply of vaccines, 2) absence of personnel in these PHCSOs, or 3) immunization not being carried out despite the supply of vaccines. Whatever the reason, irregular vaccination could be one of the factors that would be an obstacle to achieving the immunization targets.

Reporting by PHCSOs in the months when no children were immunized may arise in a situation when the vaccines were supplied from the DHO and no child was immunized, but the PHCSO had to report to the DHO to justify the receipt of the vaccines. This obviously leads to a temptation to overreport and thus to overestimating in the aggregated numbers.

Further, errors in the PHC report might be added due to low motivation of the PHCSO personnel due to lack of feedback, no concern for quality of information, and no cross-checking mechanism. Moreover, VHWs spend a significant amount of time (several days every month) preparing the reports to the DHO. Failure to comply with the timely reporting demanded by the DHO might even affect the payment of salary. As these reports are hardly used at the PHCSO level,

the reporting to the DHO is seen as a useless burden, and hence the staff may not be concerned about the accuracy of the report (Aitken 1994).

A similar consideration could be true for the DHO. The DHO does not plan for the district based on the local data. On the contrary, the DHO is given targets from the MOH that may not reflect realities. These targets could be achieved in optimal conditions of health manpower and other facilities that do not exist in the district. Nevertheless, the DHO will be assessed by the MOH on the ability to meet these targets. This situation can explain the overestimation of the number of immunizations in the district report when meeting these targets is difficult in practice. Furthermore, frequent transfer and temporary posting of health workers and inadequate facilities might have made it even more difficult to meet the targets. Thus overreporting could be a strategy to satisfy higher institutions. This is the situation in many other remote hilly and mountainous districts in Nepal. Therefore, errors in reporting from the PHCSO to the district and from the district to the MOH are likely to exist in other districts.

However, no explanation has been found for the different extents of overestimation for different vaccine types. The extent of overestimation could possibly be affected by the number of vaccines actually entered into the Immunization Registers. This can be seen in the example of polio vaccine, which had the lowest number in the Immunization Registers and the highest overestimation from the PHCSOs. A similar association was found in PHCSO 1 where the highest number of vaccines in the register was found among the PHCSOs with the lowest difference in the number of vaccines between Immunization Register and the PHC Report. However, this is not obvious for other PHCSOs and other vaccine types.

In a district with practical difficulties due to geographical location and with a poor infrastructure, immunization is indeed a very difficult task both for the managers and for the health workers. Apart from this, motivation and attitudes to immunization among the people play an important role in the acceptance of vaccination (Nichter 1995) that ultimately affects the immunization coverage in the population. In the district of Jajarkot, with a low literacy rate and a low level of knowledge on immunization (Onta et al. unpublished), a low level of motivation is expected, making the immunization programme more difficult.

A more direct approach in assessing the immunization programme could be the measurement of the morbidity and mortality of diseases that are preventable by immunization. However, similar errors were observed in morbidity reporting from these PHCSOs (Karkee et al. unpublished), indicating that erroneous reporting of health service information might be a general phenomenon at this level. Inaccuracy in reporting of immunization performance could therefore be part of widespread errors in health information reporting.

The role of accurate information in making rational decisions is unequestionable. The World Health Organization has recognized the importance of health information in the management of primary health care, and has developed different guidelines to help the member countries to establish national health information systems (WHO 1990; 1994b).

There has been growing concern about the reliability of health information based on the reports from the service facilities. Several efforts have been made to develop appropriate health information systems to generate accurate statistics from the service provision levels (Suva 1986; Robey and Lee 1990; Husein et al. 1993). However, inaccurate reporting from the service facilities is observed in many countries. Errors in reporting found in Uganda were primarily attributed to lack of supervision and feedback from health workers, and inadequate incentives among the health workers (Hansen 1995). Similar situations have been reported from Zambia (Freund and Kalumba 1986), Portugal (Abrantes 1987), Bangladesh (Larsen and Mitra 1992), and India (Kumar 1993; Balraj et al. 1993). Inaccurate and unreliable recording and reporting of health service information might prevail in many developing countries that face similar obstacles.

Conclusion

Immunization coverage in the district of Jajarkot, Nepal, is exaggerated by overreporting from the Primary Health Care Service Outlets, as well as from the District Health Office. Overreporting from these levels might be attributable to centralized planning that ignores the local conditions, and to the top down imposition of targets. Lack of proper supervision and feedback might have further contributed to foster inaccurate reporting. Periodical population-based surveys to estimate the immunization status are costly

and time consuming. Therefore, routine reporting remains the major source of information for the planning and management of immunization programmes.

The nationwide PHC service network has great potential to generate and provide accurate and timely information, but the results of the present study indicate a need for a serious review of the immunization reporting process, at both the PHC level and the district level, in order to make the information reliable. The false assurance of a high coverage derived by the overstated reports cannot result in the planned reduction of morbidity and mortality of diseases that are preventable through immunization. Failure to control these diseases will further hinder a trust-building process among people, which in turn may obstruct the success of an entire immunization programme in the country. Improvement in reporting can be made through decentralized planning, realistic target-setting at local level, rational human resource management, and improvement of facilities with adequate supervision.

Endnotes

[1] The vaccines given under the Expanded Programme on Immunization (EPI) are BCG (Bacillus Calmette-Guerin) against tuberculosis, DPT (Diphtheria, Pertussis, and Tetanus), poliomyelitis and measles.

[2] In Nepal, primary health care is provided through Sub Health Posts (SHP), Health Posts (HP), and Primary Health Care Centres (PHCC). SHPs are based at the Village Development Committee (VDC) level and should be staffed by 1 Auxilliary Health Worker (AHW) and 1 Maternal and Child Health Worker. HPs cover 4–6 VDCs and should be staffed by 2 AHWs and 1–2 nurse midwives. PHCCs, based at the electorate constituency, are supposed to be staffed by a medical doctor, 3–4 AHWs and 3 nurse midwives, and should have emergency admission facilities.

One mobile Village Health Worker (VHW) is posted in each of these Primary Health Care Service Outlets (PHCSO). The VHW provides immunization, family planning, and other services through outreach programmes.

[3] Information obtained through letters from the Health Post to the Village Health Worker.

References

Abrantes AV. 1987. Helping front-line Health workers to take decisions. *World health Forum* **8**(4): 420–1.

Aitken JM. 1994. Voices from the inside: managing district health services in Nepal. *International Journal of Health Planning and Management* **9**: 309–40.

Balraj V, Mukundan S, Samuel R, John TJ. 1993. Factors affecting immunization coverage levels in a district of India. *International Journal of Epidemiology* **22**: 1146–53.

Burstrom B, Aaby P, Mutie DM. 1995. Validity of measles mortality data using hospital register and community survey. *International Journal of Epidemiology* **24**: 625–9.

Freund PJ, Kalumba K. 1986. Information for health development. *World Health Forum* **7**(2): 185–90.

Hansen ABE. 1995. Cost-sharing initiatives in Tororo District: A study of user-charges for Health services in Uganda. Child health and Development Centre, Makerere University, Uganda; Department of Epidemiology and Social Medicine, University of Aarhus, Denmark.

His Majesty's Government of Nepal. 1991a. *A strategy for health and nutrition of women and children in Nepal 1992–1997.* Kathmandu: His Majesty's Government of Nepal/UNICEF (draft version).

His Majesty's Government of Nepal. 1991b. *National Health Policy 1991.* Kathmandu: Ministry of Health.

His Majesty's Government of Nepal. 1993. *Statistical Year Book 1993.* Kathmandu: National Planning Commission Secretariat, Central Bureau of Statistics.

His Majesty's Government of Nepal. 1995a. *Statistical Year Book 1995.* Kathmandu: National Planning Commission Secretariat, Central Bureau of Statistics.

His Majesty's Government of Nepal. 1995b. *Health Information Bulletin.* Kathmandu: Ministry of Health, vol. 9: 42.

Husein K, Adeyi O, Bryant J, Cara NB. 1993. Developing a primary health care management information system that supports the pursuit of equity, effectiveness and affordability. *Social Science and Medicine* **36**(5): 585–96.

Karkee SB, Onta SR, Gyldmark M, Hansen EH. (unpublished). Quantification of the need for the drugs: can data quality criteria be met in a developing country?

Kumar R. 1993. Streamlined records benefit maternal and child health care. *World Health Forum* **14**(3): 305–7.

Larsen A, Mitra SN. 1992. Usage of oral rehydration solution (ORS): a critical assessment of utilization rate. *Health Policy and Planning* **7**(3): 251–7.

Nichter M. 1995. Vaccination in the Third World: a consideration of community demand. *Social Science and Medicine* **41**(5): 617–32.

Onta SR, Sabroe S, Hansen EH. (unpublished). Knowledge of people about immunization and its predictor.

Robey JM, Lee SH. 1990. Information system development in support of national health programme monitoring and evaluation: the case of the Philippines. *World Health Statistics Quarterly* **42**: 37–43.

Sørensen HT, Sabroe S, Olsen J. 1996. A framework for evaluation of secondary data sources for epidemiological research. *International Journal of Epidemiology* **25**(2): 435–42.

Suva EE. 1986. Gathering information for health. *World Health Forum* **7**(4): 340–4.

WHO. 1990. The role of research and information systems in decision-making for the development of human resources for health. *WHO technical report series no 802.* Geneva: World Health Organization.

WHO. 1994a. *International review of the EPI in Nepal.* World Health Organization, SEA/EPI/94.

WHO. 1994b. Information support system for new public health action at district level. *WHO technical report series no 845.* Geneva: World Health Organization.

WHO. 1995a. *Bridging the gaps – report of the Director-General.* Geneva: World Health Organization.

WHO. 1995b. *Health situation in the South-East Asia Region 1991–1993.* New Delhi: World Health Organization, Regional Office for South East Asia.

UNICEF. 1994. *The state of the world's children 1994.* New York: Oxford University Press.

UNICEF. 1995. *The state of the world's children 1995.* New York: Oxford University Press.

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