

Reducing Attrition in Panel Studies in Developing Countries

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Abstract

In panel studies in developing countries attrition or loss to follow-up is mostly due to respondents moving. Attrition can cause bias if it is selective, and efforts should be made to track respondents. This can be costly and difficult as populations in developing countries are often highly mobile, infrastructure is poor, structures frequently change and formal address systems and population records rarely exist. In this paper, the experiences from panel studies in developing countries are reviewed in terms of the importance of attrition, the importance of tracking respondents on reducing attrition and then makes recommendations for setting up systems to track respondents in developing country settings. Tracking can reduce attrition by up to 45%, and is feasible if procedures are locally appropriate, well planned, involve the community, collect as much locating data as possible, criteria are explicit, tracking is done at regular intervals, and interviewers are well trained, supervised and motivated.

I. Introduction

In panel studies, respondents are lost when they die, decide to drop out of the study or when they are not relocated. In their review of important issues to consider in the design of panel studies in developing countries, Harpham et al (2002) identify the loss of individuals over time (attrition) as one of the greatest challenges. Much has been reported about attrition in developed countries, but literature from developing countries is scarce. The experiences from developed countries may not be relevant for developing countries, as the main reasons for attrition differ. In developed countries, attrition is mostly due to refusals which studies have found are often situational, for example because the interviewer called at a bad time (Singh 1995, Buck et al 2002), whilst in developing countries, attrition is mostly due to moves (Barros et al 1990, Kuate Defo 1992, Haaga et al 1994, Alderman et al 2001, Thomas et al 2000). This paper reviews the limited literature from developing countries and explores the importance of attrition, the importance of tracking respondents on reducing attrition and makes recommendations for setting up systems to track respondents in developing country settings.

2. Is attrition a problem?

Attrition in panel studies results in a diminishing number of study respondents. Because the loss of respondents is cumulative, what appears to be a small loss in each survey round can add up to a considerable loss over time. This loss of study respondents can reduce the statistical power of the study (through a reduction in sample size) and, if it is selective, can cause bias as the remaining sample may not be representative of the population it was originally selected from. In general, attrition in panel studies is regarded as problematic, but its actual importance varies depending on the study aims and the study population. For example, loss of respondents through moves can cause particularly large bias in studies which aim to explore transition and change linked to migration.

Four studies were located exploring the impact of attrition bias in panel studies in developing countries. In Cameroon (Kuate Defo 1992), the probability of children being lost through attrition was associated with the mother's marital status and mother's education level. However the attrition of 40% was not found to affect the outcome measure of infant mortality. In Malaysia (Haaga et al 1994), selective attrition of 30% meant that younger, better educated, urban and ethnic Chinese were under-represented in the sample, but it was concluded that meaningful analysis could be conducted for the outcome variables by re-weighting the sample and using other corrective statistical methods. In a Brazilian panel, attrition was 13%, but there was no marked variation in birth weight or income by whether follow up was successful or not (Barros et al 1990). In a review of three panel studies in Bolivia, Kenya and South Africa (Alderman 2001), attrition was 35%, 28% and 15% respectively, and was found to be associated with several background variables including education, age and assets and with outcome variables in some multivariate models. The general conclusion of the review was, however, that attrition was not a pervasive problem for obtaining consistent estimates of coefficients in any of the three sites, a further evaluation of the South African data drew similar conclusions (Maluccio 2000). These encouraging conclusions are similar to those from panel studies in developed countries (Fitzgerald et al 1998, Lillard & Pannis 1998, Zabel 1998, Ziliak et al 1998, Falaris and Peters

1998, Twisk and de Vente 2002). However, they must be interpreted with some caution as the studies are not conclusive and the results can not be used to justify relaxed efforts to reduce attrition, particularly in studies that explore transition and change. The four studies discussed above did find that some variables were associated with attrition and, as it is impossible to predict which and how many variables will be affected, efforts to limit attrition are important. Studies with high attrition should not, however, assume their results are invalid.

3. What can we do to reduce attrition?

Most studies recognise that attrition is an important problem and make efforts to reduce it. In developed countries, this often involves trying to reduce refusals but in developing countries it mostly involves dealing with respondents who move. There are three main ways of dealing with respondents who move: 1. They can be excluded from the sample, 2. They can be replaced and 3. They can be tracked. Which of these three strategies is appropriate depends on the aim of the study, but in most cases tracking respondents is the most desirable strategy for minimising bias.

Keeping track of cohort members over time involves considerable effort, particularly in developing countries where mobility is high and researchers face logistical problems such as poor infrastructure, structures frequently changing, a lack of formal address systems and limited population records. Some studies make great efforts to track panel members, whilst others perform no tracking at all. Table 1 shows attrition and the impact of tracking on attrition for a number of large cohort studies (>1000 respondents followed for at least 2 years) conducted in developing countries. As Table 1 shows, tracking does not eliminate all attrition but it can significantly reduce it. Studies with no tracking had between 10 and 20% attrition per year compared to only 1 to 7.5% for those with tracking. The number of people located by tracking, and who would have otherwise been lost, ranged from 5 to 45%.

TABLE 1: TOTAL ATTRITION AT END POINT OF SURVEY

Study	Reference	Survey length (years)	% Attrition per year	% Attrition at end of survey	% study respondents found through tracking
IFORD Yaounde Survey (Cameroon 1978-1980)	Kuate Defo 1992	2	20	40	No tracking
Bolivia (1996-1999)	Cited in Alderman et al 2001	3	11.7	35	No tracking
Peru (LSMS) (1985-1990)	World Bank 1993	5	10	50 ¹	No tracking
1982 Birth Cohort Study in Pelotas (Brazil 1982-1987)	Barros et al 1990	2	7.5	13 ²	45
Birth to Ten (South Africa 1990-present)	Richter & De Wet (forth coming)	8	3.8	30 ³	Unavailable
Cebu longitudinal health and nutrition survey (Philippines 1983-present)	Glewwe et al 1999	8	3.6	29 ⁴	Unavailable
South Africa KIDS/PSLSD (KwaZulu-Natal 1993-1998)	May et al 2000	5	3	15	5
Malaysian family life study (1977-1989)	Haaga et al 1994	12	2.5	30	37
China health and nutrition survey (1989-1993)	Cited in Thomas et al 2000	4	2.3	9	Unavailable
Indonesia family life study (1993-present)	Thomas et al 2000	5	1	5 ⁵	19
Vietnamese Longitudinal Study (1995-present)	VLS web page	36	1	3	Unavailable

1 As households were replaced, the attrition figures refer to the number of households that had to be replaced, i.e. houses not occupied by the same family, unoccupied or demolished. It does not include refusals

2 Figures refer to 1984

3 Figures refer to 1998

4 Figures refer to 1991

5 Figures refer to 1995

7 Figures refer to 1997

4. Tracking lessons for developing countries

This section uses lessons learnt from previous large-scale panel studies in developing countries (outlined in table 2) to describe some of the basic principles of tracking. Generally, the success of tracking is linked to population mobility, resource and infrastructure availability, study length, tracking procedures, time between contact and interviewer motivation.

TABLE 2: OUTLINE OF PANEL STUDIES IN DEVELOPING COUNTRIES THAT HAVE TRACKED RESPONDENTS

Study name and reference	Study design	Tracking procedure
<p>Malaysian Family Life Study (1977-1989)</p> <p>Haaga et al 1994</p>	<p>The panel consisted of 1262 ever married women resident in peninsular Malaysia, aged less than 50 in 1976. The women were interviewed between 1976-77. One follow up round was conducted 12 years later. Data collection collected includes: demography, fertility events/desires, education, time allocation, income and intergenerational transfers.</p>	<p>Follow up not planned, thus tracking relied solely on the addresses from the 1977 questionnaires. Three teams covered different regions, they started in remote areas and finished in the cities where rural migrants were likely to have gone. The teams visited the recorded address, if the respondent was no longer there they tried to get the new address, the best informants were neighbours and the current tenants of the property. Village headmen, postmen, employers & shop-owners were also useful. The teams regularly sent lists of names & locations of movers to relevant team, thus tracking was countrywide.</p>
<p>1982 Birth Cohort Study in Pelotas (Brazil 1982-1987)</p> <p>Barros et al 1990</p>	<p>The panel consisted of all children resident and born in hospitals in the Pelotas urban area in 1982 (n=6011). Three follow up rounds were conducted at 1, 2 and 4 years. Data collected includes: mortality, morbidity, growth & development & health care utilisation.</p>	<p>Addresses were obtained from the mothers' at the hospital. In the first follow up interviewers visited the recorded addresses, if the respondent was not located relatives, employers and credit sections of department stores were used to try and locate them. Children were not tracked outside the study area. For the second and third rounds a census of Pelotas was conducted and records matched, for children who were not located this way the method for round one was followed. A mass media campaign proceeded each follow up. Special permission was obtained to look at adoption records to trace adopted children.</p>
<p>Cebu Longitudinal Health and Nutrition Survey (Philippines 1983-present)</p> <p>CLHN 1989</p>	<p>The panel consisted of a sample of 2600 women pregnant between 1983-1984 and resident in the Cebu metropolitan area. 14 interviews were conducted in the first 2 years and three follow-up rounds were conducted at 8, 11 and 15 years. Data collected includes: feeding practices, health, demographic, socio-economic characteristics and time allocation.</p>	<p>No information located except that respondents were traced within the study areas but long distance migrants were excluded.</p>
<p>CEP-CPC Study of Social Change in Nang Rong (Thailand 1984-present)</p> <p>CEP-CPC Nang Rong Project website and Migrant follow up handbook</p>	<p>Census of 51 villages in Nang Rong (n=42,219) conducted in 1984. The census was repeated in 1994 and out migrants from 22 villages tracked. Data collected includes: migration processes, fertility and contraceptive behaviour and life choices.</p>	<p>Local migrants were located through census. Out migrants from 22 villages (n=2380 of which 1781 were located) were tracked. Interviewers tried to find the migrants new address when they were working in the study area. Once data collection in the study area was completed interviewers tracked the migrants if they had moved to Bangkok, Buriram town or the eastern seaboard. The interviewers made several attempts to locate the respondent and recorded details about each attempt, they were encouraged to use their ingenuity in their tracking attempts and utilised family, friends and employers. When they located migrants they asked each migrant if they knew about any other migrants from Nang Rong living in their location.</p>

TABLE 2: OUTLINE OF PANEL STUDIES IN DEVELOPING COUNTRIES THAT HAVE TRACKED RESPONDENTS

Study name and reference	Study design	Tracking procedure
China health and nutrition survey (1989-1993) Thomas et al 2000 and CSHN 1999	The panel consisted of 3795 households selected from 9 provinces. Three follow-up rounds were conducted at 2, 4 and 8 years. Data collected include: time allocation, economic activities, health care utilisation, nutrition and health.	No information located except that respondents were traced within the study areas but long distance migrants were excluded.
Birth to Ten (South Africa 1990-present) Richter & De Wet (forth coming), De Wet personal communication and Richter et al 1995	The panel consists of all children born and resident in Johannesburg-Soweto during a seven week period in 1990 (n=3275). Six follow up rounds were conducted at 6 months, 1, 2, 4, 5 and 7/8 years. Data collected includes: prenatal risk-factors, mortality, morbidity, growth	and development, pollution and child care. Contact addresses were collected at each round. Follow up contacts began with a phone call, home visit, inquiries among the neighbours, letters left at home and further inquiries among the contact addresses, these activities were done by a designated tracer. Between rounds contact was maintained by tangible reminders (e.g stickers, newsletters, radio reports, birthday parties for the children). A toll free number was installed to enable families to contact the project.
Indonesia Family Life Study (1993-present) Thomas et al 2000	The panel consisted of a sample of 7224 households from 13 provinces (urban areas over sampled). Two follow up rounds were conducted at 4 and 5 years. Data collected includes: demographic data, consumption, employment, health status, service utilisation and income.	Relocation sheet filled out for each subject containing relevant detailed information from the first interview. Interviewers returned to the 1993 houses, if no household member was located interviewers tried to obtain information about their location from neighbors, relatives, friends, employers and local community leaders. Local movers (1/2 an hour by public transport) were then traced during main data collection, far movers were traced in a separate, centrally co-ordinated, exercise with bonuses for interviewers for every subject traced. Moves outside the 13 study provinces were excluded.
South Africa KIDS/PSLSD (KwaZulu-Natal 1993-1998) May et al 2000	The panel consisted of a sample of 1393 households in KwaZulu-natal in 1993. One follow up round was conducted 5 years later. Data collected includes: health demographics, household environment, expenditure, employment and income.	Interviewers went to the original location of the 1993 house. If they learnt the household had moved they sought the new address from other family members, schools, employers etc. If a new address was found and was sufficiently detailed at the end of the interview round the interviewers followed the household.
Vietnamese Longitudinal Study (1995-present) VLS web page	The panel consists of a sample of 1855 households from 10 communes in Nam Ha and Ninh Binh provinces in 1995, three follow up rounds were conducted at 1, 2 and 3 years. Data collected include: social and economic activities and demographic behaviour.	No information located

There are several lessons that can be learnt about tracking in developing countries from the studies outlined in Table 2. First, studies must consider all of the different options for tracking and use those that are locally appropriate. Second, protocols need to include rules and tracking limits. Third, the shorter the gap between contacts the better. Fourth, respondents should feel part of the study, and fifth, choice, training, supervision and motivation of interviewers are essential to consider.

4.1 Studies must consider all of the different options for tracking and use those that are locally appropriate

A tracking protocol that is feasible and effective in one country may not be appropriate in others because of differences in geography, infrastructure and mobility. Mobility can differ both in quantity and destination: In the Indonesian and Malaysian Family Life Studies (Thomas et al 2000, Haaga et al 1994) attrition was highest in urban areas where residents were more transient. In contrast, in the KwaZulu-Natal Income Dynamics Study, attrition was highest in rural areas because of the high migration between rural and urban areas (Alderman et al 2001). In the Malaysian study, the tracking protocol utilized the fact that the destination of rural migrants was predictable by starting the follow-up rounds in rural areas and working towards urban areas. This facilitated tracking as the interviewers were moving in the same direction as most of the rural migrants (Haaga et al 1994).

Infrastructure varies greatly between developing countries. The Birth to Ten setting (urban South Africa) has the advantage of good infrastructure and the majority of study respondents have access to a phone, and thus tracking respondents by telephone was feasible (De Wet personal communication). In the Indonesian Family Life Study, only 20% of households could provide a telephone number at which they could be contacted (Thomas et al 2000). For such settings, other more appropriate means of contact must be used. In some settings, there are no formal address systems (e.g. urban slums or remote rural dwellings), and in such cases, it can be

difficult for interviewers to relocate the respondent's house. Relocation can be facilitated by drawing maps as in the Malaysian Family Life Survey (Haaga et al 1994), by using Geographic Positioning Systems to obtain coordinates as in the Young Lives Study in Peru (Lanata personal communication) or by recording detailed descriptions of permanent land marks and directions to the house.

Infrastructure, resources, stability and mobility also vary within countries and tracking protocols need to take this into account, for example they may need to be different in rural and urban areas. Panel studies can reduce attrition by identifying areas with high mobility or with special tracking needs (e.g. communities where people do not know each other's movements, such as those that are not closely-knit). Once these areas are identified, special tracking arrangements can be made, such as more frequent visits by interviewers or employing a community member to help with tracking. In both the Malaysian and Indonesian Family Life Studies, shantytowns were a problem area for tracking as the redevelopment or demolition of shanty towns eliminated entire clusters (Haaga et al 1994, Thomas et al 2000). Where demolition is frequent, studies could make checks on redevelopment and demolition plans and visit the study respondents prior to their removal. Other examples of highly transient respondents or places where communities are not closely knit include people living in government staff quarters, agricultural estate workers (Haaga et al 1994) and people living in areas around training schools, universities or markets (Thomas et al 2000).

One of the best ways to identify mobile groups and other tracking problem areas is to conduct formative research before the start of the study. This should include working with the community to explore how people are commonly identified in that community and the best tracking approach. Formative research can also be used to identify any tracking or linking information (such as names, addresses and dates of birth) that may be reported incorrectly or inconsistently by respondents. The Pelotas study (Barros et al 1990) enrolled children at birth in

hospitals, and found that follow up rounds were hindered because some mothers had given false social security numbers and incorrect dates of birth for their children. This made linking respondents between rounds difficult. It was in the mothers' interest to do this, as their social security number determined the quality of care they received at the hospital and to avoid fines for the late registration of births. In South Africa, names can be spelt using two spelling systems, and, as a result, in the Birth to Ten study linking children between rounds on the data base was difficult because names were not recorded consistently using one spelling system (Anderson and Richter 1994). In both of these examples, well-conducted, formative research could have prevented these problems, as could have issuing each respondent with a unique ID card and number.

The need for context specific tracking protocols is illustrated by those drawn up for a new multi-site panel study called 'Young Lives'. This study aims to explore what happens to children born into poverty and will collect panel data on 8000 children from four developing countries. Each of the four countries (India, Ethiopia, Peru and Vietnam) used the same principals to produce their tracking protocol, but has ended up with unique and individual tailored protocols; reflecting their unique and individual contexts.

Although tracking protocols must be context specific, there are some general 'rules' that should be applied in all settings. Most importantly, the more information you can collect about the respondent the better. A good strategy is to try and identify a network of people associated with the respondent. These people can be invaluable when trying to locate respondents as they are most likely to know of their new location, they can also be tracked themselves if the entire household has moved. It is useful in most settings to record the full names of all adult members of the house, the name of the children (checking their relationship to the adults in the household and that the surname is the same), the names and addresses of external family members and other people who respondents think will know their whereabouts (e.g. boyfriends/girlfriends).

All this must be done accurately and completely for formal names and names people are known by in the community. In Peru, initial experiences from the Young Lives study (Lanata personal communication) have been that recording formal contact addresses is difficult; respondents often describe how to get to the contact address (e.g. 'take the yellow bus from the corner by the bakery and then get off at the drug store'), but can not say exactly where the address is. Studies in such settings need to make sure they can utilize these informal directions.

It can also be useful to record other information about the respondent and their network such as place of work, ethnicity, date of birth, place of origin, the location of any property owned and whether they have any plans to move in the future. In the Indonesian Family Life Study (Thomas et al 2000), a relocation sheet was produced for each respondent, which was updated at each round and issued to the relevant interviewer. The sheet contained data on the household, the name of a person who may know how to contact the respondent, economic and demographic information such as employment, place of birth, all of the places the respondent had lived and the names of their family. Collecting information about the respondent and their networks can generate a lot of data, and plans need to be made for the handling of all the tracking information gathered. If a respondent has no network, they may be difficult to track and special tracking arrangements should be made.

As well as collecting information about the respondent and their networks, studies should explore who else would be useful locating resources in their setting. Whilst formal registration and documentation systems are rare in many developing countries, they can be a useful resource in some settings. For example, the Young Lives Study in Vietnam is able to track respondents using the commune registration systems (Tuan personal communication). The following may be a useful source of addresses (if available) of those who have moved: birth, marriage or medical records, health or welfare registers, city or municipal records, voter or census lists, phone books or postal records, land titles, tax or driving license records, school or church records, prison or

labour union records, organisation membership lists. In the Pelotas study (Barros et al 1990) credit records of department stores were successfully used to locate respondents and in the Malaysian Family Life Study electricity meter readers were useful in relocating households (Haaga et al 1994). The Nang Rong project (CEP-CPC Study) uses the located movers themselves as a tracking resource in a method they call 'snow balling'. They anticipate that migrants from the same village in the same destination will know one another, thus once the interviewer locates a respondent through tracking they ask them if they know of any one else from the study site living in their location.

Whoever the appropriate tracking contacts are, respondents should be informed as part of the consent procedure at the start of the study that they will be tracked and who may be contacted for this purpose. Without this information the respondent and the tracking contacts may be surprised, suspicious and upset by the tracking efforts. Tact and discretion must be used in tracking especially when the respondent has left the study area because of difficult circumstances such as owing money.

It is also important not to assume that respondents lost in one round are lost for all future rounds. In some settings, circular migration is common and respondents return to the community. In the Birth to Ten Study (Richter and De Wet forthcoming), between one third and a half of all cases lost in one round were found in the Johannesburg-Soweto metropolis in later rounds and interviewed again. Similarly, in the Indonesian Family Life Study (Thomson et al 2000), 60% of households that were lost in the first follow-up round were relocated in the second round. In the Cebu health and nutrition study (CLHN 1989), 8% of women classified as 'lost' were later found at their original address.

It is best to start tracking with the simplest and cheapest tracking options, which will locate the most respondents. Studies should, however, consider all of the tracking options. What sounds expensive or unfeasible at first may save time and money in the long run. The Pelotas study

successfully relocated respondents by performing the huge task of conducting a census of the 68,590 households in urban Pelotas (Barros et al 1990), and in the Birth to Ten study mobile phones were given to some respondents, so they could be easily contacted (De Wet personal communication).

The timing of tracking is important; households should be visited when respondents are most likely to be home and tracking should be conducted in the most appropriate season. Seasons associated with difficult weather conditions and when seasonal migration is occurring should be avoided.

4.2 Tracking protocols need to include rules and tracking limits

Some respondents can not be tracked and for others, tracking will be exceedingly costly. The cost of tracking increases dramatically for hard-to-reach cases. In the Indonesian Family Life Study (Thomas et al 2000), tracking outside the local enumeration areas cost 20% more than local tracking.

Generally the studies reviewed tracked respondents within their study areas. The studies that covered whole regions or the entire country had the advantage of having a network of interviewers in several locations and could track respondents who moved from one study area to another. Studies need to set criteria and limits on the time, money and resources they will put aside for tracking.

When deciding the tracking limits, studies need to consider where people move. In the Indonesian Family Life Study (Thomas et al 2000), 40% of respondents found by tracking were located within their study area and 60% had moved to another study area. In the Malaysian Family Life Study, 28% of respondents found by tracking were located in the same district, 4% in a different district in the same state and 5% in different states (Haaga et al 1994). In the

Pelotas study (Barros et al 1990) and the Cebu study (CLHN 1989), 6% and 27% of their respective respondents moved outside the study area (the metropolitan limits in both cases).

If resources allow, tracking outside the study area should be considered but with a time or distance limit. The Indonesian Family Life Study (Thomson et al 2000) set a limit for local tracking of half an hour by public transport. Regional and national studies should consider tracking respondents who move to other study areas. This requires that studies make provisions for handling information gathered, keeping information updated and getting it to those who need it. A successful approach in several national studies (Haaga et al 1994, Thomson et al 2000) has been to have a central 'tracking shop'. In the Indonesian Family Life Study (Thomson et al 2000), tracking was divided into two distinct phases:

1. Local tracking: This was defined as tracking people who could be reached by interviewers from the study area by public transport in half an hour.
2. Tracking phase: Details of respondents who had moved further away were sent to the study's central office who assigned their tracking to interviewers in the relevant areas once the main phase of fieldwork was completed. Each interviewer then planned the most efficient visit route. The interviewers reported to the central office several times a week, where they were informed which respondents they should prioritise and when tracking should end. This centrally co-ordinated tracking allowed better planning and a more efficient use of time and personnel. This was important, as respondents who had moved far away needed effort and organisation to track.

4.3 The shorter the gap between contacts the better

Tracking respondents who have moved becomes more difficult the longer the length of time that has elapsed since the move. Contacting respondents at regular intervals allows records to be regularly updated and respondents to be tracked as quickly as possible after they have moved. These contacts can either be survey rounds themselves, or contacts solely for tracking purposes.

4.4 Respondents should feel part of the study

Respondents who feel part of the study are more likely to make an effort to inform the project they have moved or leave an address with neighbours. A good respondent-study relationship can be encouraged by keeping respondents informed about the study and about tracking, and by using tangible reminders such as radio publicity (Barros et al 1990), stickers, fridge magnets, newsletters, birthday cards, toll-free numbers and change of address cards (Richter and De Wet forthcoming). The Birth to Ten Study managed to create a real sense of ownership among respondents, and recommends producing simple materials for respondents such as 'study passports' with a photograph and ID number (De Wet personal communication).

4.5 Choice, training, supervision and motivation of interviewers

Studies have found that a careful choice of interviewer is essential to ensure successful tracking (Thomas et al 2000, De Wet personal communication). The Indonesian family life study (Thomas et al 2000) found that success in tracking was associated with interviewer quality (as measured by mathematics scores and salary in their previous job) and contact with the supervisor.

Interviewers should have certain personal characteristics: enthusiasm, flexibility e.g. in scheduling appointments, ingenuity and perseverance are all-important. Tracking is made easier if interviewers know the community, as this will help them locate households and appropriate tracking contacts. It is also desirable to use the same interviewers in each survey round, as they are familiar with the study area and it helps foster a good relationship between the interviewers and the respondents.

Studies need to equip interviewers with all the skills they need for successful tracking.

Interviewers must be well trained, motivated and supported and their workload kept realistic.

Interviewer training should include techniques of tracking and the legal and ethical implications

of tracking (these will vary depending on the context). The Nang Rong project (CEP-CPC Study) provides excellent instructions in their field manual for tracking out-migrants; they clearly describe the process (see box 1) and record information about each interviewer's attempts to try and find the migrant.

**BOX 1: AN EXAMPLE OF GOOD INSTRUCTIONS FOR
INTERVIEWERS REGARDING TRACKING TAKEN FROM THE
NANG RONG PROJECT 'MIGRANT FOLLOW UP FIELD
MANUALS' (CEP-CPC STUDY)**

DEFINITION OF A TRACKING ATTEMPT

"The best way to think about an attempt is to imagine the attempt as one path where there are a series of clues leading to an interview with a migrant. Each clue would be linked to the next. If the path or trail of clues does not lead to the location of the migrant and a new set of clues is needed then this would be the beginning of a new attempt.

For example, an interviewer may have information from a respondent at the migrant's origin house in Nang Rong. That information may be that the migrant works in factory A in Bangkok. Then the interviewer finds the telephone number for factory A, calls factory A, talks to a personnel manager, and then the personnel manager tells the interviewer the migrant's home address and telephone number. The interviewer calls the home telephone number and talks to the migrant, makes a date for the interview and conducts the interview. This would be considered one attempt, which uses a number of different ways to locate the migrant.

Thinking about the above example, if the telephone number is a wrong number and then the interviewer goes to the home address and cannot find the migrant and must return to factory A to find someone else to ask for better directions this would be the end of the first attempt and the beginning of the second attempt.

Sometimes an attempt will take only one day's time and sometimes an attempt will take several days' time. So, remember that an attempt is a series of linked clues that brings the interviewer closer to finding the migrant."

Facilitating communication between interviewers can be both motivational and an opportunity for interviewers to learn from each other and should be encouraged. Methods of motivation used in the Indonesian Family Life Study (Thomas et al 2000) include interviewers working in pairs when tracking respondents who had moved far afield and giving rewards per respondent located.

5. Conclusion

Tracking in panel studies in developing countries can significantly reduce attrition. Attrition can cause a reduction in sample size and potentially causes bias. Tracking in developing countries can be difficult because populations are highly mobile and infrastructures are often poor. We have shown, however, that several panel studies in developing countries have had good follow up rates as a result of tracking respondents. Although tracking procedures need to be context specific, there is much to learn from these studies. Studies must consider all of the different options for tracking and use those which are locally appropriate, have a well defined tracking protocol with the rules and limits of tracking, make the gap between respondent contact as short as possible, make respondents feel part of the study and select, train, supervise and motivate the interviewers well.

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