SURVEY RESEARCH METHODS IN PUBLIC HEALTH

A survey is the systematic collection of people’s self-reported information at a particular point in time.

*Feuerstein, 1986, p. 65*

## KEY CONCEPTS

- Introduction
- Strengths of surveys
- Weaknesses of surveys
- Planning and conducting surveys
- Is the research question amenable to questionnaire or interview survey?
- What type of survey to use?
- Selecting respondents
- How many people should be included in a survey?
- Designing a survey instrument
- Survey fieldwork
- Self-completion questionnaires
- Telephone surveys
- Face-to-face surveys
- Response rates to surveys
- Analysis of survey results
- Conclusion

## INTRODUCTION

Surveys are the most widely used method of data collection in public health research, being used as part of evaluations, epidemiological designs, needs assessments and planning exercises. These surveys may be government initiated, such as the five-yearly Census or specific national health surveys, or conducted within universities or health departments for specific purposes. They can be used to collect data on occupational histories, obtain a snapshot view of a community’s health status to use as part of a needs assessment, assess the
level of participation in community activity or collect opinion data to inform decision making.

Interview surveys collect data orally. Questionnaire surveys collect data in a written form and are self-administered. We will consider surveys that collect structured or semi-structured data that are primarily destined for use in statistics, but may also include some qualitative data.

STRENGTHS OF SURVEYS

Surveys collect data in which the same variables are measured across units. Units can be individuals, households or health care settings. They produce a standard set of data for each unit that can be analysed using statistics to produce patterns within the data and to examine the relationships between the variables measured (Browne, 2005). Surveys are particularly suited to descriptive data that describes the extent of a phenomenon. The Census is a classic example, collecting factual data on age, marital status, religion, citizenship, country of birth, date of arrival in Australia, Aboriginality, languages spoken at home, educational level, number of live births (for women), income and employment. While some of these data may be sensitive (especially income), none of them are a matter of opinion. Some may be biased by recall (for example, age of leaving school or address five years ago) but the margins for error are relatively small.

Surveys are a relatively cheap means of collecting data, not requiring the detailed, time-consuming data collection and analysis of most of the qualitative methods. They can also, as a consequence, produce relatively quick results as the data are collected in preselected categories. They may also be more acceptable to the participants as they do not take up too much time. This is especially true of questionnaires, which people can complete at their own convenience. They are not dependent on an interviewer finding people at home. On the other hand, interviews mean that people can be encouraged to take part in a survey and allow clarification of the meaning of a question or any aspect of the interview schedule. Interviews can also deal with more complex issues and be longer than questionnaires. They also permit the possibility of recording spontaneous answers. Interviews usually obtain higher response rates, partly because of the personal contact, but also because they are more acceptable to people with low levels of literacy or who do not write English well. In Australia the provision of interviewers with a variety of language skills or interpreters is necessary to ensure that non-English-speaking people are included in surveys.

The easy administration of surveys means that they can be used with large numbers of respondents, which is especially useful when the aim of the research is to generalise to a particular population. For instance, the findings of a needs assessment may be more convincing if data relating to health service use are collected from a representative sample of the population.

WEAKNESSES OF SURVEYS
Surveys evolved within a social science that was modelled on the natural sciences, and were seen as a precise means of measuring social phenomena—the social world’s equivalent of the laboratory’s experiment. Yet surveys are very different from experiments, which offer researchers total control over the experiment’s environment. This control is not possible with surveys. Each person will answer in different circumstances and bring to the survey a different set of assumptions, history and values. In experiments, researchers can precisely control the composition of experimental and control groups and the independent variable in the study, which means they can be more certain about patterns of causality. Surveys simply do not have the same power to establish causality, but they can suggest correlations between variables. Consequently, the descriptive data they produce are most useful.

The types of data produced by surveys have also been criticised by researchers from within social science. Aggregation assumes that meanings are unproblematic and that words have uniform and agreed meanings that are not contingent on their context. Busfield and Paddon’s (1977, p. 99) reflection on their use of a survey to study fertility behaviour illustrates this problem. Respondents frequently stated their reason for their particular family size as ‘That’s all we can afford’. But when they analysed these seemingly similar responses in the context of individual interviews, they found that the phrase’s meaning varied considerably: ‘For some people it was a comment made only when serious financial difficulties were encountered, for others it was made when no financial problems were in sight either from a desire to maximise material standards of living or to plan for a better future or whatever.’

Aggregation means that a particular variable is rarely considered in the context of the respondent’s wider set of ideas and values. This means the pattern and structure of variables are not considered, and also assumes a uniformity in significance of variables that consideration of them in context will demonstrate does not exist.

Oakley (1981) has questioned the ethics and humanity of some traditional survey interviewing practices. Building on her experience of interviewing women about the process of becoming a mother, she recounts the standard advice given in survey methodology textbooks to interviewers who find respondents asking them questions. It was to say ‘I guess I haven’t thought enough about that to give a good answer right now’ or ‘It’s your opinion we are interested in, not mine’. Oakley (1981) asks how that advice would stand up when the questions asked by pregnant women are ‘Which hole does the baby come out of?’ or ‘Does an epidural ever paralyse women?’ Her interviewing style developed to become less objective and detached but rather based on empathy and friendship. She maintains that the women became more willing to discuss issues openly. Oakley’s critique of standard interviewing procedure has been widely quoted and supported and, together with other critiques, has led some social researchers to soften their interviewing approaches, and encouraged the use of more in-depth interviewing practices.

The limitations of surveys mean they are most suited to questions with a narrow range of meanings and to the collection of factual data. Busfield and Paddon (1977, p. 110) go so far as to say that when surveys are used for ‘explanatory rather than descriptive purposes, then the value of survey data diminishes almost totally’.

The generalisation of findings from surveys is often cited as one of their benefits. Typically, they are based on a randomly selected sample that is taken to be representative of the population from which it is drawn. However, the full benefits of generalisation can only be realised if the sample is indeed representative, and then only to the relevant population.
Public health research based on surveys of randomly selected samples of particular populations is often reported as if it can, by virtue of its randomness, be extrapolated to a more general population, but this rests on the assumption that the sampled population is representative of the more general population (Atkins and Jarrett, 1979, p. 97). In practice, error can affect random sampling, especially error in the original sampling frame, non-contact or refusal. Sampling frames may not replicate the real structure of the population because of deaths or people who have moved away, or because the sampling framework does not include all members of a community. For example, the electoral register is a fairly complete list of people in a population but it tends to under-represent young people and people from a non-English-speaking background as they are less likely to be eligible to vote. Most surveys suffer from non-response and refusals, and there is evidence that people are becoming less willing to cooperate (Browne, 2005). These factors all combine to undermine the generalisability of research based on surveys and need to be borne in mind when interpreting and using their results.

Most public health surveys are cross-sectional, based on some form of random sampling and analysed using cross-tabulation. McQueen (1993) criticises this form of survey for being static and not capturing the dynamic aspects of behaviour and attitude, especially in relation to time. He reports that the sum total of errors in a survey (non-response, coverage, sampling, interviewer, respondent, instrument) is rarely taken into account in assessing the value of survey research.

Results from surveys can be powerful but should not be used unquestioningly. The inaccuracies in the research process should be both reported and taken into account when interpreting the meaning of the survey results. Surveys are most powerful when used to collect factual data. Data that relate to social processes and attitudes are much harder to collect from surveys and are likely to be less reliable. Surveys can, however, be combined with other methods that are more suitable for studying social processes and attitudes and are an essential part of good public health practice. For example, surveys have frequently been used to help understand sexual behaviour and practices so as to plan and evaluate HIV prevention campaigns.

**PLANNING AND CONDUCTING SURVEYS**

Planning surveys involves a series of decisions about whether the survey methodology is appropriate, and what form is most suitable, given the available resources. The first decision to be made is a crucial one that is often not given sufficient attention in public health.

**IS THE RESEARCH QUESTION AMENABLE TO QUESTIONNAIRE OR INTERVIEW SURVEY?**

Consideration should be given to whether a survey is the best methodology to answer the research question. It takes time to design, implement and analyse. The first step is to check that the information required is not already available. Existing databases and routinely collected data may provide the necessary answers. Census data, for example, provides considerable demographic information.
A survey may be suitable for collecting factual information and straightforward behavioural data. If there are existing scales, which have been used and tested on other populations and which measure the phenomenon of interest, then a survey may be more attractive. For instance, there are a number of scales that measure self-perceived health status (Bowling, 2005), such as the Nottingham Health Profile (Hunt et al., 1986) and the SF36 (Ware et al., 1994) or specific instruments for disease states (Bowling, 1995). More complex issues concerning attitudes and feeling, which need to be viewed holistically, may mean a survey is not the answer. Sometimes it is preferable to combine a survey with other methods of research. For instance, community health needs assessment research on carers was illuminated by survey research reporting the extent of people caring for others in a community (Kalucy and Baum, 1992), whereas the experience of caring was best derived from detailed interviews (McColl, 1985).

Surveys are appealing because they yield a set of statistics that suggests the legitimacy of traditional science. But surveys are usually fairly crude instruments that rarely give more than partial insight to the complexity of public health issues and the interconnected influences on them.

WHAT TYPE OF SURVEY TO USE?

There are three types of survey:

- internet or mailed self-completion questionnaires
- telephone interview surveys
- face-to-face interview surveys.

Each type has specific strengths, discussed at length in research methods textbooks (Sarantakos, 2005; Dillman et al., 2014). Internet and mail surveys are cheaper to conduct but generally cannot be used to collect more complex information. They are usually not acceptable to people with low literacy levels. Telephone surveys are increasingly popular as they are cheaper than face-to-face interviews and may be perceived as less intrusive. Bias can be introduced by not everyone having a telephone, and the absence of complete listing for mobile phones. Face-to-face interviews generally result in a higher response rate, probably because they require less motivation for completion and people are more likely to agree to be interviewed when personally approached. This form of interview also allows the researcher to exert more control, and the interviews can be longer. All the above factors need to be taken into account when deciding what form of survey to use.

SELECTING RESPONDENTS

If you want to know how a pot of food tastes, take a spoonful. You don’t need to eat the whole pot!

Feuerstein, 1986, p. 69
It is rare that a survey will include a total population, except in a census or survey of all people involved in a health promotion initiative. Surveys in public health typically involve some form of sampling. When populations are large, surveying the whole population is impractical, expensive and unnecessary. There are two types of sampling—random or probability sampling and non-probability sampling. Surveys of the type we are discussing in this section are almost always based on random sampling.

Simple random sampling relies on identifying a sampling frame—a list of people in the group the research is focused on. This may be a community based on geography, or with a particular characteristic. The accuracy of the sampling frame determines how well the final sample represents the group of interest. Common methods used in Australia are the electoral roll, telephone books or recruitment by door-to-door survey (the most accurate method). The likely bias from the other two is described by Smith et al. (1997).

A variety of methods is available to select the sample from the sampling frame: lottery, which involves putting numbers representing each person in the sampling frame in a hat and picking out the required sample size; using a random numbers table; or, if the information is available, selecting people at random according to their randomly selected birth date. Random samples can be stratified when you want to ensure that your final sample contains sufficient numbers of particular groups of the population.

Another popular method is cluster sampling. Here you randomly select a setting from which you randomly select individuals. For instance, in a survey of attitudes to general practice, you could randomly select general practices from the Yellow Pages and then select your respondents from the patients of the practices in your random sample.

Dillman et al. (2014) list a number of other methods for selecting samples. The likely biases stemming from the choice of sampling method should be noted when findings are reported.

**HOW MANY PEOPLE SHOULD BE INCLUDED IN A SURVEY?**

The main purpose of a random survey is to provide data that will be representative of the sampled population so that generalisations can be made to the total population. Most public health researchers will refer to a statistician to calculate the required sample size, taking into account the confidence level, population size, expected results and type of analysis to be done. A practical guide to determining sample size in health studies has been published by WHO (Lwanga and Lemeshow, 1991). Statisticians will be able to estimate what size population would be required for your survey if you assume a 60 per cent response rate, 95 per cent level of confidence and a 5 per cent error range. The crucial issue to understand in talking with statisticians is that their assurances are estimates based on probability, not absolute truth, and that by adjusting the size of a sample the error range can alter.

Analysis of survey data according to different subgroups in a total sample (for instance, according to particular income levels) requires ensuring that the subgroups are of sufficient size to allow generalisations. Part of the process of estimating sample size is estimating the non-response rate to the survey—those people who refuse to answer the survey or cannot be contacted for one reason or another. Obviously, the non-response rate should be kept as low as possible. Three mailouts for mailed surveys (which generally have a lower rate than face-to-face or telephone surveys) can increase the response rate considerably (Dillman, 1983).
There is increasing concern among social researchers that response rates to surveys are declining. This probably reflects greater concerns with privacy and also competition with market research companies.

**DESIGNING A SURVEY INSTRUMENT**

Survey instruments have to be carefully designed if they are to be useful. There are many pitfalls for the unwary and few shortcuts that can be taken, no matter how experienced the researcher. New researchers underestimate the care, attention and time needed to produce a useful interview schedule or questionnaire, which should be carefully planned, piloted and revised. A broad guide to designing questions is given here. More detailed guides are given in Sarantakos (2005) and the South Australian Community Health Research Unit (1991).

The design process involves the ordering and content of questions, and, for mailed surveys, the design of the questionnaire. The order of questions is important. Sensitive questions should be left until later in the survey so people are not discouraged from continuing. Layout is important for all surveys, but particularly so for mailed questionnaires. However, a clear and easy-to-follow layout also helps interviewers conduct good interviews. The South Australian Community Health Research Unit (1991, pp. 143–4) recommends the following guidelines for designing self-administered questionnaires:

- Use a plain easy-to-read typeface.
- Leave lots of space between questions so the questionnaire does not look cramped, but has an open, airy look.
- Consider including cartoons that may help keep the respondent interested in the form, especially when the questionnaire is long and time-consuming.
- Do not precode the questions as these may make the questionnaire appear intimidating.

Interviewers need to have as many aids as possible to make the process smooth. In face-to-face interviews, cards detailing the options that people can choose are useful. In telephone surveys, the questions must not be overly complicated or respondents will find the interview difficult to follow. One means of overcoming this is to mail a copy of the questionnaire to the respondent and then conduct the interview a day or two later. This way the respondents can have the interview schedule in front of them.

Questions asked in public health surveys may be factual, behavioural or attitudinal. Factual questions are generally the simplest, but they still have to be designed very carefully. For example, the question ‘How many children do you have?’ sounds straightforward but it can be interpreted in a variety of ways: how many children are living in the household, regardless of whether they are adopted, fostered or natural; how many children the person completing the form has ever had, regardless of the age of the children or whether they are living in the household; how many children the person currently defines as children (and this would vary according to when the person defines childhood as finishing). If all the information available is a number in a box, there is no way of knowing how the person interpreted the question, and it would be difficult to make sense of the answers. To provide useful information, the question needs to be more precisely worded, exactly how depending on the purpose of the information. To estimate lifelong female fertility, a question such as that included in the 1996 Census: ‘For each female, how many babies has she ever had?’
(include only live births)’ would be necessary. If, however, the question wanted to determine how many children were currently living in the household, it would need to read ‘How many children under 16 are living in your household?’

Public health has become increasingly concerned with inequities in health status and the conditions that produce health. It is therefore often important for public health researchers to use surveys to gain a picture of the pattern of inequities within the population with which they are concerned. Measuring social class or socioeconomic status is surprisingly difficult (see discussion in Travers and Richardson, 1993, chapter 1).

The complexities of designing behavioural and attitudinal questions are much greater than is the case with factual questions. People may not accurately recall their behaviour. In nutrition surveys, for instance, it is very difficult for researchers to obtain an accurate picture of people’s food intake from a question or interview survey. ‘Food diaries’ are more effective, even though they require a considerable commitment from respondents. People may not want to disclose particular behaviours. Surveys of safe sex practices may find that the extent of unsafe sex is underestimated as people are reluctant to admit to it. Asking people to report on things retrospectively or prospectively generally produces unreliable data.

Attitudes deal with abstract concepts and are difficult to measure. Psychologists have invested considerable energy in the accurate measurement of attitudes and many scales have been developed and tested. When designing a survey, check whether an existing set of questions that have been tested can be used. This could save much time and effort and provide more accurate and useful data.

A central concern of public health is obtaining measures of people’s health status so that the distribution of health in a population can be studied in detail. The discussion in chapter 1 highlighted the complexity of defining and measuring health, but it is now widely accepted that health concerns more aspects of life than simply the absence of disease. Individuals’ health status is affected by many social, economic and environmental factors, and many scales have been developed to measure health aspects through survey research. Bowling (2005) reviews many of these, categorising them as:

- measures of functional ability (for example, the Index of Activities of Daily Living, the Quality of Well-being Scale)
- broader measures of health status (for example, the Sickness Impact Profile, the Nottingham Health Profile, the Rand Health Insurance Study Batteries)
- measures of psychological well-being (for example, the General Health Questionnaire, Hospital Anxiety and Depression Scale, the Symptoms of Anxiety and Depression Scale)
- measures of social networks and social support (for example, the Social Support Questionnaire, the Revised UCLA Loneliness Scale, the Family Relationship Index)
- measures of life satisfaction and morale (for example, the Delighted–Terrible Faces Scale, the Self-esteem Scale).

These scales can be used as part of a health needs assessment exercise (especially to compare the health of different populations or subgroups within a population) or to evaluate the effectiveness of a particular clinical or health education intervention. Bowling’s (2005) review covers 53 instruments. The researcher needs to decide which, if any, will be appropriate for the particular purpose. Each has its own strengths and weaknesses, which
have to be assessed in terms of the aims of particular research. If one is suitable to help answer the research question, the great advantage is that the scale and its questions have been previously validated and proved to be reliable. When using these scales it is important to remember that, however well they have been tested and validated, the data they yield will only ever be an approximation of health, social support, functional ability or whatever other construct they set out to measure.

Questions asked can be either open-ended or closed-ended. Closed-ended questions contain a list of answers from which the respondents are instructed to pick one or more. Types of closed-ended questions are shown in box 8.1.

**BOX 8.1 EXAMPLES OF CLOSED-ENDED QUESTIONS**

Simple yes or no
- Have you ever used Anytown Community Health Centre? Yes No

A multiple-choice question where the respondent is asked to choose one answer
- How often do you have a pap smear test for cancer?
  - More than once a year
  - Once a year
  - Every two years
  - Every three years
  - Every four years
  - Every five years or less often
  - Never
  - Not sure what a pap smear is

A multiple-choice format that allows multiple responses
- Which of the following services have you used at the Anytown Community Health Centre in the past 12 months? Please tick one or more boxes
  - General practitioner
  - Podiatrist
  - Nutritionist
  - Counselling service
  - Health education group activity
  - Community development service

Likert scales, which require respondents to rate the extent to which they agree with a statement on a verbal-numerical scale
- How safe for your children is the area where you live? Please circle the appropriate number.
- 1 2 3 4 5
  - Very safe
  - Safe
  - Neither safe nor unsafe
  - Unsafe
  - Very unsafe

Open-ended questions are ones that ask the respondents to reply in their own words. In mailed surveys the quality of the answers will depend on the time the people devote to the questionnaire and their literacy level. An example is: ‘What characteristics make a good general practitioner?’ Answers could vary from one word such as ‘competence’ or ‘patience’
to a few words, ‘good listening skills’ or ‘the ability to empathise with me’, to a paragraph
detailing the person’s experience with GPs. Open-ended questions work best in interviews
as the respondents can be encouraged to be more forthcoming if they initially do not have
much to say, thus producing more detailed data. Direct quotes from respondents are helpful
in bringing statistical data to life.

The aim of question construction should be to make the questions as clear and
unambiguous as possible. Common problems are:

• leading questions that bias the respondent in a particular direction—for example: ‘Have
the cutbacks in health services made it more difficult for people in this community to
get access to the hospital?’
• double-barrelled questions that treat two or more separate pieces of information
together—for example: ‘Does your environmental health office have a procedure for
dealing with food safety and air pollution?’
• jargon that may not be familiar to people in the survey—for example: ‘Does your local
government have an integrated plan for managing environmental sustainability?’
• double negatives that will confuse people—for example: ‘Would you rather not use a
condom when having sex?’

It is essential that a new questionnaire or interview schedule be piloted. It is useful to do
this first with friends and colleagues to iron out any obvious faults, and then with a group as
close as possible to the main sample. If many errors are discovered, the survey should be
piloted again.

Designing effective and meaningful survey instruments takes time and practice, but it is
a skill that will be useful to most public health practitioners and researchers. Knowing how
to design a survey means being able to assess the value of others’ questionnaires and
interview schedules.

SURVEY FIELDWORK

The larger the survey to be conducted, the more complicated the fieldwork. A survey used to
evaluate a health education group attended by 50 people could simply be handed out and
collected by the health worker or a colleague. If, however, the survey is intended for a random
sample of a large population, more thought should be given to its organisation.

SELF-COMPLETION QUESTIONNAIRES

Self-completion questionnaires used to be mailed but are now often internet based using
software such as Survey Monkey. Mailed questionnaires should be mailed with a stamped
addressed envelope and a covering letter that serves to motivate the respondents to complete
the questionnaire. If the survey is to be conducted over the internet then a covering email
substitutes for the letter. This should stress the importance of the survey and the respondent’s
cooperation (even if they do not believe they are qualified to answer all the questions), detail
how the respondent may benefit from the research, estimate how long it will take to complete,
explain how the respondents were selected, give reassurances about confidentiality, detail the ethical clearance for the research, explain how the research will be reported back, express your appreciation and give a contact person to answer queries. Any factors that might be anticipated to affect responses should be addressed in the covering letter or email.

Dillman et al. (2014) recommend sending a reminder to non-respondents after two to three weeks, and another copy of the questionnaire a few weeks later. This method has yielded response rates of 70–75 per cent in general population samples. However, there is a general trend for declining responses to surveys—see discussion of response rates below.

**TELEPHONE SURVEYS**

Telephone surveys have increased in popularity because they are cheaper and less intrusive than face-to-face surveys although the increase in telemarketing has seen people become less tolerant of interruptions by phone. McQueen (1993) describes computer-assisted telephone interviews (CATI) in which the interviewer reads the question to the respondent from the screen and records the response straight into the computer. The computer can draw the sample, choose the telephone number and dial the respondent through a self-dial system. This technology offers obvious benefits in streamlining the survey process and reducing costs. McQueen (1993) also suggests that this technique can improve the validity and reliability of surveys for public health purposes by making possible techniques such as continuously collected data.

**FACE-TO-FACE SURVEYS**

Face-to-face surveys require interviewers who are sufficiently trained to ensure they ask questions in a consistent way. Survey textbooks used to advocate a neutral and ‘objective’ stance, but it is now accepted that people are more likely to give honest answers and open up to someone with whom they can empathise. If the survey is being done in people’s homes, it may help to send out introductory letters a few days earlier or to telephone beforehand to book the interview. Safety protocols need to be introduced for solo interviewers visiting private homes.

**RESPONSE RATES TO SURVEYS**

The response rate to a survey is an important aspect of assessing the quality of the information from the survey. This is calculated by determining how many people of those eligible to respond to the survey did so. A higher response rate means the survey is more representative of the population it is conducted in. When non-random methods are used to select the survey sample it is obviously not possible to ascertain such an accurate response rate because the characteristics of the whole population are not known. This is often the case when there is no listing of a particular group of people who are being surveyed. For example, it would be hard to find a listing of all population health planners and a survey of them is likely to be non-random.

There is increasing evidence that responses to surveys are dropping (Galea and Tracey, 2007) and this has led to questioning of whether response rate is necessarily the only way to
judge study quality and validity. It has been suggested that ‘participation rates’ may be more appropriate (Morton et al., 2012). These include (Morton et al., 2012):

- a description of the eligible study population and how they were contacted (to ascertain external validity)
- the cooperation rate (the number of completed interviews from those who were able to be contacted)
- the refusal rate (those who refused at some point to complete the interview process after some contact was made).

Dillman et al. (2014, pp. 56–93) contains an excellent chapter on encouraging a higher response rate.

SURVEYS IN ABORIGINAL COMMUNITIES

As noted in the section on ethics in chapter 6, there are now agreed guidelines for conducting research in Aboriginal communities. Donovan and Spark (1997) suggest that using face-to-face interviews is likely to be the most effective method in Aboriginal communities, particularly remote ones. They propose a series of guidelines that have the aim of ensuring that ‘interviewing of Aboriginal respondents is done with maximum sensitivity to Aboriginal cultural difference and with minimum discomfort to the respondents’ (p. 90). In summary they advise:

- direct questioning is inconsistent with Aboriginal culture
- information gathering is an exchange process for Aboriginal people
- the concept of privacy is important in Aboriginal culture
- use of an appropriate language, as English will not be the first language for most Aboriginal people in remote areas
- concepts of numeracy, intensity and specificity are different in Aboriginal and Western cultures
- concepts of, and attitudes towards, time are different in Aboriginal cultures
- interpersonal interaction styles are different
- appropriate interaction with the Aboriginal community as a whole is crucial
- Aboriginal communities fluctuate considerably, and this needs to be taken into account in sampling.

Miller and Rainow (1997) also stress sensitivity when conducting surveys in Aboriginal communities. They suggest that ‘ethical surveys’ involve the researchers being prepared to meet immediate needs. If conducting a survey of older people, you should be prepared to collect firewood, or provide a plumber to fix broken toilets in a survey of sanitation. Research budgets should allow for this.

ANALYSIS OF SURVEY RESULTS

The analysis of quantitative data involves setting up a coding guide, coding the collected information, putting it into a computer file and then analysing it. There are numerous statistical packages to assist the analysis of survey information (especially useful is the Epi-Info package produced by the US Centers for Disease Control and Prevention).
Much of the factual data collected can be analysed by using descriptive statistics such as frequencies and percentages (just over half the sample \((n = 1012, 52\text{ per cent})\) had used a community health centre in the past year), and means (on average the women \((n = 1102)\) in the sample made 3.2 visits to their GP each year).

More complex statistical tests require a statistician, but there are many tests to determine whether differences between subgroups in any population are statistically significant and which determine which variables are exerting most influence (Dean, 1993). When interpreting quantitative analysis, bear in mind the limitations of statistical inference (Morrison and Henkel, 1970; Eversley, 1978; Atkins and Jarrett, 1979; Miles and Evans, 1979). Survey data analysis provides correlation data, not causative data. For instance, you might be able to say that lower levels of household income are correlated with poorer reported health status as measured by the Nottingham Health Profile, which does not mean that low income causes the poor health status. To make this claim you need to develop a theory that explains why the correlation is likely to be causative, drawing on existing theory and other research findings. Researchers often confuse statistical association with substantive importance or causation.

Critics also point out that statistical tests assume random selection of survey respondents. In most public health surveys, non-response reduces the power of statistical tests, and precludes this being true. In the wider debate about the relative value and contribution of quantitative and qualitative research, the power of quantitative research rests on assumptions that are usually not realised in practice.

There is little doubt about the benefits of survey research, especially in relation to factual data, but there are many sources of error. The demographer Eversley (1978) warned against aiming for increasing complexity in statistical modelling as a means of overcoming the limitations of statistical analysis of survey data. He claimed (p. 299):

The search for purity is, in fact, a quest for scientific sterility. The answers obtained from the use of refined models may, in some abstract sense, be truth, but they are neither real nor useful and they are probably not even true, if by that we mean that they must have some use in helping us to understand a current situation or make some future provision.

Dean et al. (1993) discuss the burgeoning of public health data collection made possible by the advent of high-speed computers and survey techniques such as CATI and Survey Monkey. They suggest the value this has brought to our understanding may not be very great because so many data are never thoroughly analysed, and that the computer substitutes (inadequately) for theorising and creative thinking. They acknowledge that statistical modelling techniques for analysing survey data can now examine multiple variables at one time, and so offer better mechanisms for studying interrelationships.

Multivariate analysis enables researchers to assess more than one study factor and allow adjustments for the influence of other study factors (confounders). An overview of multivariable statistical analysis is given in Büttner and Muller (2011, pp. 462–70).

**CONCLUSION**

Surveys have a valuable role in public health, but they tend to be overused and often stretched beyond their competence. They are most suited to the collection of factual and straightforward behavioural data. Combined with the various qualitative methods, they can be a powerful part of the public health researcher’s tool kit.
CRITICAL REFLECTION QUESTIONS

8.1 Why do you think response rates to surveys have dropped consistently over the last 40 years?
8.2 What measures do you think researchers can take to increase response rates to surveys?
8.3 Why do you think surveys are better at describing rather than explaining public health problems?

Recommended reading
For more detailed discussion of sampling techniques see Sarantakos (2005), chapter 7.
Dillman et al. (2014) Internet, phone, mail and mixed-mode surveys: The tailored design method An excellent guide to all aspects of survey design and execution.

Useful website
For an example of a program to create web-based surveys, see www.surveymonkey.com