Review of General Population Surveys of Drug Abuse

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PREFACE

An important initial step in the planning of programs for any health-related condition is an epidemiological study, which can be used both to determine the extent and distribution of the condition within the population and to identify correlated factors as well as any subgroups at high risk. Very often this initial epidemiological work takes the form of a sample survey of the general population. In the field of drug abuse, there have been a number of such surveys completed, including many in developing countries. Drug abuse surveys already have been conducted, for example, in Canada, India, Iran, Mexico, Pakistan, Peru, Thailand, and the USA; and such surveys are under active consideration in other countries, as well.

The decision of whether to conduct a general population survey, which often arises in the course of implementing UN/WHO country programs on prevention and treatment of drug dependence, involves a number of considerations. Such surveys are expensive and technically complex, and perhaps should not be undertaken if less expensive and more simple data gathering approaches can provide the needed information. Further, in societies where drug use is illegal or stigmatized there are likely to be problems encountered in getting adequate representation and valid reporting from those most heavily involved with drugs.

In order to provide planners with information useful for deciding whether or not a general population survey is indicated, a critical review was conducted of the existing experiences with this epidemiological approach. In addition to summarizing most of the general population surveys that have been carried out to date in the field of drug abuse, the present report specifically reviews the various technical, administrative, and practical issues confronting decision makers who must determine whether or not this type of survey should be conducted. The report also provides a practical general guide for the scientific personnel responsible for implementing such surveys, particularly under conditions which may prevail in developing countries.

This report was developed as part of the WHO Research and Reporting Project on the Epidemiology of Drug Dependence. It is one in a series of reports completed under the project which provide guidelines and practical methodological tools for meeting the information needs of planners in countries with serious drug abuse problems—particularly planners in developing countries.
ACKNOWLEDGEMENTS

The initial draft of this report was reviewed at a meeting of collaborating investigators of the Research and Reporting Project on the Epidemiology of Drug Dependence held in Penang, Malaysia, at the University of Science, from 23 April to 5 May 1979. Among the participants were experts from seven countries who have had personal experience in the conduct of such surveys. Their contributions are gratefully acknowledged, particularly those of Dr A. Anumonye from Lagos, Nigeria; Dr B. Fozouni from Teheran, Iran; Dr U Khant from Rangoon, Burma; Miss M. E. Medina Mora from Mexico City, Mexico; Dr V. Navaratnam from Penang, Malaysia; Dr Chuchart Poonsiri and Dr Vichai Poshyachinda from Bangkok, Thailand; Dr R. G. Smart from Toronto, Canada; Dr Kusumanto Setyonegoro from Djakarta, Indonesia; Dr V. K. Varma from Chandigarh, India; and Mr K. A. Wadud from Islamabad, Pakistan. Also participating from WHO, Geneva, were Dr A. Arif, Responsible Officer for the Project, and Dr P. H. Hughes, the Project Manager. The first draft of the report also was critically reviewed by Dr I. Cisin from Washington, DC; Dr J. Elinson from New York City, USA; Mr J. E. Dowd of WHO, Geneva; Dr F. R. Jeri from Lima, Peru; and Dr I. Rootman from Ottawa, Canada. Information on other studies was provided by Dr D. P. Mohan from New Delhi, India. The second draft of this report was subsequently reviewed by Dr A. Arif, Dr P. H. Hughes and Dr N. Sartorius of WHO, Geneva. The constructive suggestions of these many reviewers is gratefully acknowledged, as is the financial support for this project by the United Nations Fund for Drug Abuse Control.
1. INTRODUCTION

1.1 Objectives and background

This report is intended to accomplish three major objectives: (1) to summarize much of the experience various countries have had to date with surveys of drug abuse in their general populations, (2) to summarize the issues and problems which should be considered by anyone contemplating to undertake such surveys, and (3) to communicate the collective wisdom of the investigators involved in many of the existing surveys to those who might be involved in future ones. The third objective was made possible by the World Health Organization's convening a working group comprised of a number of those investigators in Penang, Malaysia in April 1979 to share and discuss their experiences and knowledge. That working group was comprised of key collaborating investigators in WHO's Research and Reporting Project on the Epidemiology of Drug Dependence.

It should be stated clearly that it is not the assumption of the author or contributors that all countries (or other governmental units) should invest the effort and resources necessary to conduct general population surveys of drug abuse; and Section 6 at the end of this report will deal specifically with the issue of how to decide whether or not to launch such an undertaking. The contributors do feel, however, that in the right circumstances general population studies can be most useful and informative and that a number of those reviewed in this paper illustrate rather well the range of benefits which may be derived from them.

It may well be asked why a report is needed on population surveys specifically addressed to the subject of drug abuse. Several characteristics of the phenomenon of drug abuse complicate the normal process of conducting such surveys. First, the relatively small proportions of the population lost to the household survey—the most common form of general population survey—may be of particular relevance. If one is studying such phenomena as voting behavior, consumer behavior, or family planning practices—the types of subjects most often addressed in survey research—it may matter little that such segments of the population as the institutionalized or transients are omitted from the coverage. But in dealing with illicit phenomena such as drug use, some of these marginal segments may contain a significant proportion, indeed even a majority of the cases of interest. The second complicating factor in the drug area is the potential reluctance of respondents either to agree to be interviewed, or to provide candid responses if they do agree. A number of factors are deserving of special consideration: the illegality and stigmatization of drug use in the society, the degree to which apprehension and punishment are feared, the attitude of the populace toward the organization conducting the survey, receptiveness to the types of interviewers chosen, and so on. So the illicit character of drug abuse and the particular way in which it tends to be distributed in the general population both create difficulties requiring special consideration.

1.2 Preparation of this report

In advance of the meeting in Penang, investigators and officials from various parts of the world, known to have done work with general population surveys of drug abuse, were requested by WHO to provide relevant information and reports on such surveys in their countries. These studies were summarized in the first draft of this report.

At the meeting of investigators in Penang the first draft of the report was reviewed and the various issues it addressed were discussed at length in light of the experiences of the participating investigators. Additions, deletions, and revisions were suggested by the working group, as well as by the other reviewers, and the report was redrafted accordingly by the author.
1.3 Definition of general population survey

Since the subject of this report is the general population survey of drug use and abuse, it seems appropriate at the outset to define these terms. To "survey" is to collect data from or about a number of elements; and in this case the elements are the people who comprise some "general population." A general population refers to the citizenry who inhabit some given area, usually defined in terms of political or geographic boundaries. The area may be quite small in size and population, e.g., a village of a hundred people, or quite large, e.g., a nation of millions of people.

While a survey may gather data about inhabitants of all ages, the age range may also be restricted somewhat for either practical or theoretical reasons. When data are gathered directly from the inhabitants about themselves (as in an interview study) there is usually some lower age limit placed on eligible respondents. Thus, most general population surveys of drug use omit children under ten or twelve years of age. However, if drug use were considered a problem at lower ages, there is no reason necessarily to omit younger children from the domain of individuals about whom data are to be gathered.

Sometimes certain other relatively small segments of the population also are omitted from the survey, often for pragmatic reasons. For example, household surveys usually omit people living in institutions (e.g., college dormitories, military camps, jails, hospitals) and people without a regular place of residence (runaways, drifters, etc.). When such groups are omitted, it is important to remember that the results of the survey cannot be generalized to them. While most of the surveys reviewed here involved respondents reporting in personal interviews about their own drug use and attitudes, it is also possible to have one respondent provide information on other people; for example, to have one member of the household report on all others in that household. At least one study reviewed here illustrates this technique (Pakistan Narcotics Control Board, 1975).

The majority of surveys—especially those involving large populations—use a scientifically selected sample of respondents from which generalizations may be made about the larger population from which the sample was drawn. Most of the studies reviewed here are of this type, and are called "sample surveys." However, in relatively small populations, where a survey of the entire population may be technically and economically feasible, all eligible respondents may be included in the survey. Again, illustrations of both approaches will be described below.

A general population survey, then, involves the collection of data which characterizes all or nearly all people residing in a given area (e.g., village, city, state, country); and those data are collected from all people or a representative sample of all people residing in that area. The data are usually collected by means of a personal interview administered on site, although they could be gathered by self-administered questionnaires. The data the respondents provide may be descriptive of themselves and/or other people in that same population. Certain elements in the population may be defined out of the survey, such as children less than 12 years old or people in institutions or without permanent residence, in which case the results of the survey are not generalizable to those omitted segments.

In contrast to the general population survey, the "special population survey" focuses on some special subgroup within the general population—often a group defined in terms of its membership in or contact with some social institution. In the drug field special populations which have received the most systematic study are college students, secondary school students, members of the military forces, drug treatment clientele, and prison populations. (See Part II of the United Nations Manual on Drug Abuse Assessment for a discussion of special population surveys of such groups.) By definition, special population surveys miss major segments of the general population, even major segments of the same age groups, e.g., youth not in school or young adults not in military service.
2. THE VALUE OF GENERAL POPULATION SURVEYS

One might well ask why there is a need for population surveys of drug abuse. At the most general level, it is often because government officials and other policy-makers want information which such surveys can provide, or at least they think they can provide. They want to know how many people use some drugs or are dependent on them. They want to know what kinds of people the users are. They want to know if there is a problem, or if the problem is getting worse, or if there is a need for a new law, or more treatment programs, or prevention programs, or more strict enforcement of the law. Or, if one of these interventions has been implemented, they may want to know if it worked. These questions most often are what provides the impetus for such surveys.

The capacity of surveys to answer them will be discussed below. Two survey designs will be distinguished here, since their purposes tend to be somewhat different: the single cross-sectional survey and the repeated cross-sectional survey.

2.1 Uses for the single cross-sectional survey

The single cross-sectional survey provides descriptive information about a population at a given point in time. Usually the data from all respondents are gathered within a relatively short interval from a historical perspective (perhaps three months) and the results of the survey thus provide a kind of "snapshot" of things as they are at that point in history. Of course, insofar as respondents are able to provide retrospective information about their behaviors, attitudes, etc., in years past, it is also possible to reconstruct to some degree characteristics of the population for earlier times. If people can recall in which past years they used a particular drug, for instance, one can reconstruct a general population prevalence rate for that drug for those earlier years. For the most part, however, the emphasis of the single cross-sectional survey is on things as they are now. What, then, are the uses of such a survey design?

2.1.1 Problem identification and quantification

One of the most important uses of such surveys is to identify the existence (or demonstrate the non-existence) of a drug problem in the population. Through survey techniques it not only is possible to determine how large are the numbers of present (and past) users, but also to examine the intensity of their drug use and to measure the extent to which their use seems to be associated with impaired health, impaired social functioning, or antisocial behavior. Just knowing the magnitude of the potential problem is often very useful to determining whether social interventions (treatment, prevention, social persuasion, legislation, etc.) should be considered and, if so, what level of resources might be considered appropriate.

If a problem, which would otherwise be presumed to exist, is deemed not to exist, then resources which might otherwise have been addressed to it can be more fruitfully allocated elsewhere. If a problem is found to exist, there still remains the need to determine how localized it is and to develop a clearer understanding of the dynamics of the problem before meaningful intervention can be mounted, from which derives the next two purposes of such surveys.

2.1.2 Characterization of the users and abusers

To the extent that problem drug-using behavior can be localized to certain subgroups in the population, the consumer of the survey results not only gains the ability to target intervention efforts (say on adolescents not in school, if they turned out to be the most frequent abusers) but to begin to understand the dynamics as well. Many of the studies reviewed here have shown major differences in drug abuse associated with such factors as age, sex, social class, region of the country, type of community (e.g., urban-rural), general
health, and migratory pattern. And in the same populations different types of drugs may be abused by different segments of the population because of differences in accessibility, differences in the costs of the drugs, social acceptability among peers, and so on.

And since drugs sometimes are used in different degrees for different purposes, it may be the case that use is found among many groups but that intensive use—presumably the type of use which is most destructive—is relatively concentrated in some small segment of the population. In Mexico, for example, Leal and colleagues have found inhalant abuse to be particularly concentrated among the children who live on the streets of the large cities. Unfortunately, while this example illustrates how drug use may be concentrated in a subgroup, that particular subgroup happens to comprise a segment of the population which would be missed in a normal household sample-survey, since many of those youngsters have no permanent place of residence. Perhaps a more apt example comes from the work of Lal and Singh (undated), who distinguished two types of opium users in their rural survey in India—those who used only during the harvest season each year and then went through withdrawal and those who were habitual users year-round. Presumably the reasons for use by these two groups are different and the nature of any intervention aimed at changing their behavior would have to take that fact into account.

2.1.3 Assessment of possible causes and consequences

In addition to wanting to quantify and characterize the users of various drugs in the population, policy makers also want to know to what extent the various types of drug use have deleterious effects on the users themselves, as well as on the larger society. (They are usually less concerned about beneficial effects, although at times there may be some.) For the most part a cross-sectional survey only permits one to establish the degree of correlation between one factor, say opium use, and another, like health. When no association is found between the use of a drug and some other state or behavior, it seems rather unlikely that the drug use causes that state or behavior. Thus if opium smokers are found to be fully as healthy and hard-working as similar respondents who do not use opium, it would appear that opium use in this population does not affect health or work performance; and that may be a very useful piece of information. Conversely, if opium smoking is found to be associated with poor health and lack of productivity, and there are a substantial number of opium smokers in the population, there seems good reason for official concern.

It must be remembered, however, that the existence of an association does not prove the nature of the causation. Suwanwela and his colleagues (1977, 1978) in their study of tribal villages in Thailand found that opium smokers generally had a number of physical ailments. They also found, however, that a number of the opium addicts claimed that they initially developed an opium habit because they had physical ailments, i.e., they were self-medicating themselves. If this is true, then poor health may actually have caused the opium smoking, rather than vice versa; and, therefore, the most effective means of improving health and reducing opium addiction in the population might be to provide medication and treatment techniques other than the culturally accepted one of using opium.

In sum, a cross-sectional survey may permit one to just about rule out some factors either as possible causes or consequences of drug use (by showing an absence of any correlation), although this usually does not provide conclusive proof. Such a survey usually does not, however, allow the determination of causation from the existence of a correlation, partly because the temporal sequence of events remains to be determined.

Before leaving this subject, however, it should be mentioned that a survey can gather information on some factors which can readily be presumed to be contributory to drug use—factors such as availability, direct exposure to use, perceived social norms regarding use, and the respondent's own attitudes and beliefs regarding various drugs. While the addition of such topics proliferates the number of questions which must be asked in the survey, the results can often be very informative and helpful in the formulation of
social policy. And, of course, it is also possible to ask subjects or people close to the subjects what they think the causes and consequences of their drug-taking (or abstention) were, rather than simply trying to deduce the answers from statistical analysis. The Thai survey just discussed is an example of this approach. While respondents may not be aware of some reasons and/or consequences, and be mistaken about others, they still may provide some helpful insights into these issues.

2.2 Uses for repeated cross-sectional surveys

Since a single survey provides an assessment of conditions at one point in history, it follows that subsequent surveys can provide assessments of conditions at later points; and that from the results of those surveys in combination, the nature of the changes taking place in the interim may be imputed. Obviously, if the overall purpose of having repeated surveys is to assess change, then it is important to the extent possible that they reflect only real change, not changes due to artifacts in the methods of sampling or measurement. Thus, if a repeated cross-sectional survey approach is chosen, it is vital that those designing the second and subsequent surveys match the methodology of the earlier survey(s) as much as they can. That means matching the definition of the population under study, matching the design and procedures for drawing the sample, matching the field procedures used to collect the data, matching the questionnaire design and question wording, and matching the procedures for cleaning and tabulating the data. To the extent that any of these aspects are not duplicated, the comparability of the data gathered will be diminished.

To date there are relatively few repeated-survey designs in the drug field. The major ones are those reviewed below by Abelsohn, Fishburne, and Cisin, 1977; Fejer and Smart, 1975; Johnston, Bachman, and O'Malley, 1977, 1979a, 1979b; and Gallup, 1972, 1973, 1974. But the promise they hold suggests that there will be more in the future. Sometimes the sponsoring agency or investigator of a cross-sectional survey does not plan any further repetitions at the time of the first survey, but at a later date develops an interest in the degree to which conditions have changed. Therefore, it seems likely that some of the single cross-sectional surveys reviewed in this paper will provide the basis for a repeated cross-sectional design in the future. Some of the purposes to which they may be put are discussed below.

2.2.1 Assessing the direction and rate of change in drug use

Presumably one of the most important questions addressed in all surveys subsequent to the first one is whether various types of drug use have changed and, if so, in what direction and at what speed. As is discussed at length in Section 5.1, if sampling has been used in the surveys, allowances have to be made in the estimates of drug use from each survey for the possibility that those estimates contain some "sampling error." Similarly, some portion of the change or difference in drug use between two points in time may also be an artifact of sampling error. However, estimates can be made of the possible role of sampling error; and, if the observed changes in use are large enough and the samples are of reasonable size, there will be little doubt that the changes are real. Further, to the extent that a consistent trend shows up across three or more surveys, one is particularly assured that a real trend is being detected.

Insofar as change in use can be measured and reported, then, those who use the surveys will be able to detect the emergence of new drug problems as well as to detect the worsening or amelioration of existing ones. Repeated surveys by Johnston, Bachman, and O'Malley (1977, 1979a), for example, detected the rapid emergence of daily or nearly-daily marihuana use among late adolescents in the United States. They were able to demonstrate that such use had nearly doubled in the three-year period 1975 to 1978 (going from 6% to 11%), a finding which has served to focus considerable attention by policy makers and the public on this potentially worrisome problem.
2.2.2 Changes in the characteristics of users

Just as overall usage levels may change, so may the characteristics of the groups using various drugs, and the reasons for their use. Keeping track of such changes gives the government agencies and other institutions dealing with drug use the information necessary for them to retarget their efforts to the changing segments of the population in need of attention. Of course, there may be other information systems (such as reports from treatment agencies, courts, or youth agencies) which can provide the same information and perhaps provide it faster; but to the extent that a shift in the user groups is taking place in a way which has not yet brought it to the attention of social agencies, the repeated survey technique can prove helpful in detecting and quantifying that shift.

2.2.3 Changes in contributing factors

It is very likely will be useful to policy makers to know not only whether use of various drugs has been changing but to know something about whether various factors likely to influence use may be responsible for the change. While surveys have clear limitations in their ability to measure contributory factors, there are some, already discussed above under 2.1.3, which can be monitored. For example, any of the following might explain a change in the drug using behavior of the population: increased availability of the drug, heightened familiarity with a drug, increased exposure to use or users, less social stigmatization or legal sanctioning for use, less fear of harmful consequences to the user's physical or mental health, or increased belief in the possible benefits of use. It is possible, by repeating questions dealing with these subjects in the sequential surveys, to determine whether these possible contributing factors have been changing and, therefore, might account for observed changes in actual use. Again, it is difficult to separate cause and effect here, since increased use may actually be what caused, say, decreased social stigmatization or greater familiarity with the drug; or more complex yet, the causation may go in both directions. But such information can be very helpful in painting a more complete and detailed picture of the change which is taking place. Because the few repeated survey designs in the drug field which are now in existence are relatively new, it has not yet been determined whether changes in such contributing factors as these can be used as leading indicators of subsequent changes in use. It is clear, however, that their inclusion in the surveys has proven helpful in understanding what has happened. To take one example, when marijuana use rose among American adolescents in the mid-1970s it seems quite clear that it was not due to a change in the availability of the drug, since the proportion of the age group reporting it as available remained virtually constant over the same interval (Johnston et al., 1977, 1979a). However, during that same period adolescents reported that they, their peers, and (to a lesser extent) their parents became more accepting of experimental or occasional use of marijuana. Thus on the surface, at least, it appears that changes in social norms, and not a change in availability, may account for the continuing changes in use observed to take place.

2.2.4 Impact of planned interventions or historical events

Any monitoring system which continuously takes measurements on some dimension like drug use has the capacity to show the status of conditions before and after some event which has a potential impact on a population. Thus the repeated survey design might intentionally be used to measure drug use before and after some planned intervention—for example, increased police enforcement, new treatment programs, a concerted prevention effort—and thus to provide data on that intervention's effectiveness. This, of course, requires some prior planning and lead-time in relation to the intervention effort, which often proves easier to accomplish in theory than in practice. Nevertheless, the very real potential is there. More likely, perhaps, is that a survey series already has begun when some planned or unplanned event or program takes place—let us say a change in the laws regarding the use of a drug—and the surveys serendipitously provide "before" and "after" measures for assessing the impact.
This type of information can be very valuable to policy makers, of course, for the obvious reasons. An intervention may be found to have no effect or to have compounded the previous problem in which case it might be dropped. Or it may prove an unqualified success in one population—perhaps in one city or region—and thus be considered for application in others. Or, it might prove successful in abating drug use among some subgroups but not seem to address the problems of others. All such findings can be instructive for future policy decisions.

One cautionary note must be sounded, however. As with any experiment in which the effect of some event or intervention is to be assessed, some indication is needed of what would have happened in the absence of that event or intervention. This is the obvious logic for having a control group in planned experiments. In the real world, creating such control groups may prove difficult or impossible; thus one must seek less than perfect but still reasonable ways to make inferences about what would have happened in the absence of the intervention. Different approaches exist (e.g., Campbell and Stanley, 1964), which are too lengthy to be described here. However, a few points may be worth mentioning.

First, if drug use has been rather stable in a population for some time and then a change in use occurs in close time proximity to the intervention, it seems more likely that the change could be attributed to the intervention than if drug use was already in a state of flux. Similarly, if little else is changing which might also cause a change in drug use around the time of the intervention, there is less possibility that an observed change in use may be due to other factors. Second, if the intervention only affects one city or state in a country—take for example a change in a state law—then perhaps other states with similar populations and histories of drug use can be used as rough control groups to assess what would have happened in the states undergoing legal changes had those changes not been instituted. Third, if an intervention like changing the law appeared to have similar results in different populations under different historical circumstances, the ability to attribute those results to the intervention is increased substantially.

3. A REVIEW OF SURVEYS IN EIGHT COUNTRIES

In this section the experiences of eight different countries which have had one or more general population surveys dealing with drugs are reviewed. These countries—Canada, India, Iran, Mexico, Pakistan, Peru, Thailand, and the United States—were selected in part because they represent a range of research problems and experiences, and in part because their cumulative experience represents a large part of all of the general population survey work which has been undertaken in the drug field to date.

The populations which have been surveyed in the work under review here range from small, isolated villages to large metropolitan districts to the citizenry of an entire nation. As will be seen the purposes of these surveys varied considerably as did the methods of investigation. For example, some were surveys devoted completely to drug use while in others the drug segment was included in a survey on other subjects, and some were based on random samples while others questioned all inhabitants of the population. As a group, these studies illustrate rather well the full range of objectives, potentials, and problems which are associated with such work, and in the next section the various elements which go to make up the general population survey are reviewed in light of these experiences.

One brief note on technical terms is in order. The extent of drug use in a population is usually defined in terms of "period prevalence"—that is, the proportion of the population who took the drug once or more during some defined time period. One such period often used is the individual's lifetime; so, "lifetime prevalence" refers to the proportion who ever used the drug in their lifetime. "Annual prevalence" refers to the proportion who used it at all during a given twelve month period, and so on.
## TABLE 1
### GENERAL POPULATION SURVEYS OF DRUG USE
#### Tabular Description of Studies

<table>
<thead>
<tr>
<th>Country</th>
<th>Year(s) of Survey(s)</th>
<th>Authors and Sponsoring Institution</th>
<th>Population Surveyed</th>
<th>Sample Type</th>
<th>Data Used to Draw Sample</th>
<th>No. of Subjects</th>
<th>Response Rate</th>
<th>Type of Instrument</th>
<th>Special Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>1970</td>
<td>C.M. Lamphier and S. Phillips (LeDain Commission)</td>
<td>General Household Population aged 18 and over, National</td>
<td>Stratified Random</td>
<td>Census</td>
<td>2 800</td>
<td>82%</td>
<td>Personal Interviews</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>1978</td>
<td>I. Rootman (NMUD)</td>
<td>General Household Population aged 18 and over, National</td>
<td>Quota Probability</td>
<td>Census</td>
<td>1 057</td>
<td>Not Applicable</td>
<td>Personal Interview</td>
<td>Questions on cannabis use included as part of a Gallup multipurpose survey.</td>
</tr>
<tr>
<td>Canada</td>
<td>1971</td>
<td>R. Smart and D. Fejer (ARF)</td>
<td>General Household Population aged 18 and over, City of Toronto</td>
<td>Stratified Random</td>
<td>Census</td>
<td>1 200</td>
<td>70%</td>
<td>Personal Interview</td>
<td>Included questions on 6 classes of drugs, including alcohol and tobacco.</td>
</tr>
<tr>
<td>Canada</td>
<td>1974</td>
<td>R. Smart and M. Gillies and M. Goodstadt (ARF)</td>
<td>General Household Population aged 18 and over, Ontario Province</td>
<td>Stratified Random</td>
<td>Census</td>
<td>1 078</td>
<td>70%</td>
<td>Personal Interview</td>
<td>Included questions on 6 classes of drugs, including alcohol and tobacco.</td>
</tr>
<tr>
<td>Canada</td>
<td>1976</td>
<td>R. Smart and M. Goodstadt (ARF)</td>
<td>General Household Population aged 18 and over, Ontario Province</td>
<td>Quota Probability</td>
<td>Census</td>
<td>1 015</td>
<td>Not Applicable</td>
<td>Personal Interview</td>
<td>Questions on alcohol and 4 other drug classes included as part of a Gallup multipurpose survey.</td>
</tr>
</tbody>
</table>
### TABLE 1
GENERAL POPULATION SURVEYS OF DRUG USE
Tabular Description of Studies
(continued)

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<tr>
<th>Country</th>
<th>Year(s) of Survey(s)</th>
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<th>Sample Type</th>
<th>Data Used to Draw Sample</th>
<th>No. of Subjects</th>
<th>Response Rate</th>
<th>Type of Instrument</th>
<th>Special Notes</th>
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<tbody>
<tr>
<td>Canada</td>
<td>1977</td>
<td>R. Smart (ARF)</td>
<td>General Household Population aged 18 and over, Ontario Province</td>
<td>Quota Probability</td>
<td>Census</td>
<td>1059</td>
<td>Not Applicable</td>
<td>Personal Interview</td>
<td>Questions on alcohol and other drug classes included as part of a Gallup multipurpose survey.</td>
</tr>
<tr>
<td>Canada</td>
<td>1978</td>
<td>M. Goodstadt and R. Smart (ARF)</td>
<td>General Household Population aged 18 and over, plus adolescents aged 15-18; Durham region of Ontario</td>
<td>Stratified Random</td>
<td>Census</td>
<td>1007</td>
<td>69%</td>
<td>Personal Interview</td>
<td>Both instruments contained questions from the WHO student questionnaire regarding ten illicitly used drugs. The adult interview was longer since it dealt at length with alcohol use.</td>
</tr>
<tr>
<td>India</td>
<td>1962-63</td>
<td>Dube &amp; Handa (ARF)</td>
<td>General Population Agra region</td>
<td>Whole community surveyed</td>
<td>Census Enumeration</td>
<td>16725</td>
<td>100%</td>
<td>Interview</td>
<td>This was a mental morbidity survey which includes specific information on drug use and if so type and frequencies.</td>
</tr>
<tr>
<td>India</td>
<td>1975</td>
<td>Lal and Singh</td>
<td>Household Population in a village, aged 10 and over</td>
<td>Random Enumerated Sample of households from Nat'l Malaria Eradication Program</td>
<td></td>
<td>497</td>
<td>Not Stated</td>
<td>Personal Interview</td>
<td>Senior researcher did his own interviewing.</td>
</tr>
<tr>
<td>Country</td>
<td>Year(s) of Survey(s)</td>
<td>Authors and Sponsoring Institution</td>
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<tr>
<td>India</td>
<td>1976</td>
<td>Mohan and colleagues Dept. of Social Welfare</td>
<td>Household population 15 yrs and over of 24 villages in 3 districts of Punjab</td>
<td>Random Census and Punjab Dev Dept. Data (1276 households)</td>
<td>3 600</td>
<td>91%</td>
<td>Randomly Selected Interview (Precoded)</td>
<td>Included information on many illicit and licit drugs, including alcohol and tobacco.</td>
<td></td>
</tr>
<tr>
<td>Iran</td>
<td>1976</td>
<td>Alemi and Naraghi</td>
<td>Household Pop. all ages, one district</td>
<td>Random Not given</td>
<td>3 300</td>
<td>Not given</td>
<td>Interview</td>
<td>A socio-medical survey.</td>
<td></td>
</tr>
<tr>
<td>Iran</td>
<td>1976</td>
<td>Siassi and Fozouni NISRD</td>
<td>Household Pop. 15 yrs and over in 2 cities and 3 other areas</td>
<td>Stratified Clustered Random</td>
<td>Census</td>
<td>3 470</td>
<td>92%</td>
<td>Interview &amp; Urine Sample &amp; Observation</td>
<td>Interview covered a range of drugs. Urine tests for opiates only.</td>
</tr>
<tr>
<td>Mexico</td>
<td>1974</td>
<td>Medina-Mora M.E. and Centro Mexicano de Estudios en Farmacodependencia CEMEF</td>
<td>Household survey population 14 years and over, Mexico, D.F.</td>
<td>Stratified Random Census</td>
<td>2 798</td>
<td>90%</td>
<td>Interview Schedule</td>
<td>Included information about 15 drugs (of Medical and non Medical use) and alcohol.</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>1974</td>
<td>Medina-Mora M. and cols CEMEF</td>
<td>Household population 14 years and over, La Paz, B.C.</td>
<td>Stratified Random Census</td>
<td>444</td>
<td>88%</td>
<td>Interview Schedule</td>
<td>Included information about 15 drugs (of Medical and non Medical use) and alcohol.</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>1975</td>
<td>De la Parra, C.A. and Cols.</td>
<td>Household population 14 years and over, San Luis Potosi, S.L.P.</td>
<td>Stratified Random Census (See Above)</td>
<td>624</td>
<td>89%</td>
<td>Interview Schedule</td>
<td>Included information about 15 drugs and alcohol.</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>Year(s) of Survey(s)</td>
<td>Authors and Sponsoring Institution</td>
<td>Population Surveyed</td>
<td>Sample Type</td>
<td>Data Used to Draw Sample</td>
<td>No. of Subjects</td>
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<tr>
<td>Mexico</td>
<td>1976</td>
<td>De la Parra, C. A. and cols. CEMEF</td>
<td>Household survey population 14 years and over, Puebla, Pue.</td>
<td>Stratified Random</td>
<td>Census Data Encuesta Nacional de Hogares</td>
<td>666</td>
<td>88%</td>
<td>Interview Schedule</td>
<td>Included information about 15 drugs (of medical and non medical use) and alcohol.</td>
</tr>
<tr>
<td>Mexico</td>
<td>1976</td>
<td>Natera, R.G. and cols. CEMEF</td>
<td>Household survey population 14 years and over, Monterrey, N.L.</td>
<td>Stratified Random</td>
<td>Census Data Encuesta Nacional de Hogares (800 households)</td>
<td>2,057</td>
<td>90%</td>
<td>Interview Schedule</td>
<td>Included information about 15 drugs (of medical and non medical use) and alcohol.</td>
</tr>
<tr>
<td>Mexico</td>
<td>1978</td>
<td>Terroba, G.G. and cols. Centro Mexicano de Estudios en Mental (CEMESAM)</td>
<td>Household survey population 14 years and over, Mexicali, B.C.</td>
<td>Stratified Random</td>
<td>Census Data Encuesta Nacional de Hogares</td>
<td>684</td>
<td>83%</td>
<td>Interview Schedule</td>
<td>Included information about 15 drugs (of medical and non medical use) and alcohol.</td>
</tr>
<tr>
<td>Mexico</td>
<td>1978</td>
<td>De la Parra, C.A. and cols. (CEMESAM)</td>
<td>Household survey inhabitants of a suburban community (all ages)</td>
<td>Stratified Random</td>
<td>Census Data Encuesta Nacional de Hogares</td>
<td>543</td>
<td>90%</td>
<td>Interview Schedule</td>
<td>Included information about knowledge, opinion and actual use of a community Mental Health service. It included 3 items about prevalence of drugs of non medical use and 3 items about alcohol use.</td>
</tr>
<tr>
<td>Country</td>
<td>Year(s) of Survey(s)</td>
<td>Authors and Sponsoring Institution</td>
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<tr>
<td>Mexico</td>
<td>1978</td>
<td>Terroba, G. and cols. CEMESAM</td>
<td>Household survey inhabitants of a suburban community (12 years and over)</td>
<td>Stratified Random</td>
<td>Census/Encuesta Nacional de Hogares</td>
<td>863</td>
<td>85%</td>
<td>Interview Schedule</td>
<td>Includes information about 11 drugs (of medical and non medical use) and alcohol. Includes a subsample of non-student youth population undertaken in collaboration with WHO.</td>
</tr>
<tr>
<td>Mexico</td>
<td>1978</td>
<td>Calderon, G. and cols. WHO-Clinica San Rafael CEMESAM</td>
<td>Household survey inhabitants of an urban and of a rural community (15 years and over)</td>
<td>Random</td>
<td>Census/Encuesta Nacional de Hogares</td>
<td>354 urban, 273 rural</td>
<td>92.8%, 89.1%</td>
<td>Interview Schedule</td>
<td>Included information about the prevalence and patterns of alcohol use and the community response toward this problem (project undertaken in collaboration with WHO).</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1975</td>
<td>Pakistan Narcotics Control Board</td>
<td>Household Population of Buner</td>
<td>Two stage sampling: &quot;Purposive sampling&quot; for the 1st stage and &quot;Systematic Sampling&quot; for the 2nd stage. &quot;List of Villages&quot; for 1st stage and &quot;List of Households in the selected villages&quot; for the 2nd stage.</td>
<td>'List of Villages' Households</td>
<td>1178 Households</td>
<td>100%</td>
<td>Personal interview with the help of a questionnaire</td>
<td>This was a socio-economic survey with the following objectives: a) Investigation of the socio-economic conditions; b) Estimation of acreage under Poppy cultivation and other crops; c) Estimation of the extent of addiction.</td>
</tr>
<tr>
<td>Country</td>
<td>Year(s) of Survey(s)</td>
<td>Authors and Sponsoring Institution</td>
<td>Population Surveyed</td>
<td>Sample Type</td>
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<tr>
<td>Thailand</td>
<td>1976-77</td>
<td>C. Suwanwela and colls. (WHO/UN/Thai Programme for Drug Abuse Control) Chulalongkorn Univ.</td>
<td>General Population of 7 Rural Villages</td>
<td>Survey of total community</td>
<td>---</td>
<td>828</td>
<td>Not given</td>
<td>Interview of Head of Household regarding all members</td>
<td>Included intensive interviewing of identified opium users and medical examinations and treatment in the villages.</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>1970's</td>
<td>Various commercial firms (for state gov'ts)</td>
<td>Household population aged 12 and over, various states</td>
<td>Stratified Random Census</td>
<td>Usually 1,000-2,000</td>
<td>Varying</td>
<td>interview</td>
<td>State sponsored surveys of drug use within the state.</td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td>1971</td>
<td>Abelson Nat'l Commission on Drug Abuse</td>
<td>Household population, adults aged 18 and over, youth aged 12 to 17; Continental United States</td>
<td>Stratified Random Census</td>
<td>2,400 adults 800 youths</td>
<td>69%</td>
<td>Interview (with answer sheets for drug use)</td>
<td>Primarily about marijuana.</td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td>1972</td>
<td>Abelson, Cohan, Schray, and Rappeport; Nat'l Commission on Drug Abuse</td>
<td>Household population, adults aged 18 and over, youth aged 12 to 17; Continental United States</td>
<td>Stratified Random Census</td>
<td>2,400 adults 900 youths</td>
<td>60%</td>
<td>Interview (with answer sheets for drug use)</td>
<td>Covered a range of licit and illicit drugs.</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td>Year(s) of Survey(s)</td>
<td>Authors and Sponsoring Institution</td>
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<tr>
<td>U.S.A.</td>
<td>1974</td>
<td>Cisin, Abelson and Atkinson; NIDA</td>
<td>Household population, adults aged 18 and over, youth aged 12 to 17; Continental United States</td>
<td>Stratified Random</td>
<td>Census</td>
<td>3,100 adults 950 youths</td>
<td>Interview (with answer sheets for drug use)</td>
<td>Covered a range of licit illicit drugs.</td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td>1976</td>
<td>Cisin, Abelson and Fishburne; NIDA</td>
<td>Household population, adults aged 18 and over, youth aged 12 to 17; Continental United States</td>
<td>Stratified Random</td>
<td>Census</td>
<td>2,600 adults 1,000 youths</td>
<td>Interview (with answer sheets for drug use)</td>
<td>Covered a range of licit and illicit drugs.</td>
<td></td>
</tr>
<tr>
<td>U.S.A.</td>
<td>1977</td>
<td>Cisin, Abelson and Fishburne; NIDA</td>
<td>Household population, adults aged 18 and over, youth aged 12 to 17; Continental United States</td>
<td>Stratified Random</td>
<td>Census</td>
<td>3,300 adults 1,300 youths</td>
<td>Interview (with answer sheets for drug use)</td>
<td>Covered a range of licit and illicit drugs.</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE I

**GENERAL POPULATION SURVEYS OF DRUG USE**

Tabular Description of Studies (continued)

<table>
<thead>
<tr>
<th>Country</th>
<th>Year(s) of Survey(s)</th>
<th>Authors and Sponsoring Institution</th>
<th>Population Surveyed</th>
<th>Sample Type</th>
<th>Data Used to Draw Sample</th>
<th>No. of Subjects</th>
<th>Response Rate</th>
<th>Type of Instrument</th>
<th>Special Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.A.</td>
<td>1975 1976 1977 1978 1979</td>
<td>Johnston, Bachman, and O'Malley; NIDA</td>
<td>High school seniors and graduates from prior classes since 1975 (covers 80-85% of each birth cohort)</td>
<td>Stratified random clustered in 125 schools</td>
<td>U.S. office of Education Enumeration of Schools</td>
<td>15 000-18 000 seniors/yr 2 500 from each previous class</td>
<td>80% 80-85%</td>
<td>Self-administered questionnaires</td>
<td>Covered a range of licit and illicit drugs plus extensive information on other behaviors, values, and lifestyle orientations.</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>1969 1972 1973</td>
<td>Gallup Poll</td>
<td>Household population aged 18 and over; nationwide</td>
<td>Quota probability</td>
<td>Census</td>
<td>c. 1200</td>
<td>Not Applicable</td>
<td>Interview</td>
<td>Question on marihuana use included on three Gallup multipurpose surveys.</td>
</tr>
</tbody>
</table>

ARF: Addiction Research Foundation, Toronto, Canada.
CEMEF: Centro Mexicano de Estudios en Farmacodependencia.
CEMESAM: Centro Mexicano de Estudios en Salud Mental.
NIDA: National Institute on Drug Abuse (USA).
NMUO: Non-Medical Use of Drugs Directorate [Canada].
3.1 Canadian surveys

A number of general population surveys have been conducted over the years in Canada, some by academic institutions, some by governmental or quasi-governmental agencies, and some by commercial polling firms as part of their omnibus surveys (i.e., surveys covering several unrelated topics). The most comprehensive general population survey was conducted by Lanphier and Phillips (1971) for the federally established Commission of Inquiry into the Non-Medical Use of Drugs, also known as the LeDain Commission (LeDain, et al., 1972). The LeDain Commission was established to recommend national policy for the prevention, treatment, and control of drug abuse. The survey, which was based on a nationwide household sample of persons aged 12 and over, was conducted by the Commission to assess the extent and nature of drug use in the general population of Canada. Using census data for the sample frame, the investigators first selected sampling units (i.e., segments of the population) containing around 200 households. Within each such unit interviewers carefully listed all households, from which specific ones were sampled on a systematic random basis so that each household had an equal probability of being drawn. Among the members of each household sampled, one person aged 12 or over was randomly selected to be interviewed by a trained interviewer. In all there were some 2,800 respondents interviewed in as many households by an interviewing staff of some 300 persons. A response rate of 82% was obtained.

The interviews were long and relatively complex to administer, since they contained a number of condensed answer formats and instructions for skipping non-users around detailed drug questions. They were administered in both of the major languages in Canada, English and French. A range of issues related to drug use were covered, including awareness of the various drugs, beliefs about their effects, personal acquaintance with users, knowledge of the drugs, sources of information about drugs, age at first use, and self-reported reasons for use.

The results showed that a relatively small proportion of the overall population (3.8%) had had any experience with marihuana, LSD, or "speed". Younger age groups, however, had substantially higher lifetime prevalence rates (e.g., 16% among those aged 12 to 19), because of the relatively recent rise in the popularity of these drugs in Canada. Substantially larger proportions of the population had used the various psychoactive drugs which can be manufactured and sold legally (at least under prescription) in Canada. Codeine had been used by 39% (18% without ever having had a prescription), sedatives by 35% (11% without prescription), and so on. Lengthy and detailed analyses have been reported from this survey (Lanphier and Phillips, 1971; LeDain, et al., 1972) and the data have been put into a machine-readable data archive for secondary analysis by other investigators.

While there have been other nationwide general population surveys in Canada of smoking (as part of an annual labor force survey, see Dept. of National Health and Welfare, 1977), of alcohol use (MacGregor, 1978), and of prescription drug use (Pool, 1977), the only nationwide survey of illicit drug use since the LeDain Commission Study is one conducted in 1978 for the Non-Medical Use of Drugs Directorate as part of a Gallup omnibus survey. It dealt exclusively with the use of marihuana and hashish in the household population of Canada. This survey was done by the Gallup commercial polling firm as part of an omnibus survey. Since under the "quota sampling" technique used, substitute respondents from the same area may be used to replace respondents who are not readily available to be interviewed, response rates are not relevant; that is, all sampling slots are filled, though not necessarily by the original target respondents.

The 1978 Gallup Survey yielded national usage estimates for cannabis which were substantially higher than those from the LeDain Commission's 1970 survey (Rootman, 1979). In 1978 lifetime prevalence was 17%. Annual period prevalence was 9.7% among those 18 and older versus 3.6% in the 1970 estimate. While there were a number of methodological differences in these two surveys which should make one cautious about precise comparisons, it is unlikely that methodological artifacts alone could account for an increase of this magnitude. Obviously, some real change had taken place over the
seven year interval. Buckner (1978) reports efforts by the Non-Medical Use of Drugs Directorate (NMUD) to project future cannabis use in the Canadian population based on the results of these surveys, using among other things the knowledge that substantial generational differences exist in experiences with marihuana. Presumably some population shifts in use will occur simply through the natural process of generational replacement.

Most of the other general population surveys conducted on Canadian populations have been done by Smart and his colleagues at the Addiction Research Foundation. Five such studies are listed in Table 1. While not national in scope, all of these have been large-scale sample survey studies of large population bases. All have used census data for sampling, all have involved around 1,000 adults aged 18 and over, and response rates have generally run about 70%. The earliest (reported in Smart and Fejer, 1973) was a 1971 sample survey of the adult population in the city of Toronto, and which dealt with the use of six classes of drugs. The next three studies were conducted in 1974 (Fejer and Smart, 1975) and in 1976 and 1977 (Smart and Blair, 1978; Smart and Goodstadt, 1978); and all were based on the entire population of Ontario Province, of which Toronto is a part. Trends in use for the inhabitants of the city of Toronto between 1971 and 1974 were estimated and reported by Fejer and Smart (1975), who extracted the Toronto respondents from the larger 1974 Ontario sample. Although the second Toronto sample was quite small (only 347 cases) the investigators found a statistically significant decrease in stimulant use and increase in tranquilizer use, findings which proved consistent with those from other types of data sources.

The 1976 and 1977 Ontario surveys by this team utilized Gallup omnibus surveys using quota sampling. (An omnibus survey is one which is comprised of research on various unrelated topics.) Because of these and other changes in methods, the investigators did not make comparisons with the 1974 survey results for the same population, which did not use quota sampling; but they did examine trends on the two comparable surveys, 1976 and 1977 (see Smart and Blair, 1978). This time an increase in stimulant use was reported as well as an increase in marihuana use. The use of "sleeping pills," tranquilizers, and alcohol all remained quite steady over that one year interval.

The Canadian experience with general population surveys illustrates both the capacity of such surveys to assess drug use trends in the population as well as the importance of holding constant the methodology—that is, the sampling procedures, interviewing procedures, and questionnaire content—in order to enable such comparisons.

3.2 Indian surveys

A comprehensive 1977 report by the Committee on Drug Abuse in India (appointed by India's Ministry of Health and Family Welfare) summarized the epidemiological studies of drug use then available in that country. Those dealing with drugs other than alcohol are relatively few. Several studies concerned primarily with the epidemiology of mental illness included questions on alcohol, but only a few of these have dealt with the use of other drugs (see Table 1). For example, Elnagar, Maitra, and Rao (1971) reported from one such study of a rural population in West Bengal State a prevalence rate of 1.3% being "alcohol or drug addicts." The other mental morbidity survey cited which dealt with drugs other than alcohol was one conducted in 1962-1963 by Dube and Handa (1971) in the Agra region. This was not a sample survey since the entire population of 16,725 people in the area was surveyed. These investigators found very low proportions of the population to be "habitual users" of any drug (other than nicotine). Overall, they classified 2.3% as habitual users and of these 39% used alcohol, 18% used bhang (cannabis), and 23% used other drugs or multiple drugs. Like many of the mental morbidity studies, the emphasis in this study was on the habitual user or "addict"; statistics for simple period prevalence rates were not reported.
The Indian government report referred to above cites three studies which specifically intended to address the use of drugs other than alcohol in the general population of particular areas. One such study by Lal and Singh (undated) was a household survey of a village in the State of Punjab. Houses were sampled from an enumeration done earlier for the National Malaria Eradication Programme. Subjects over 9 years old were interviewed by one of the professional investigators. They reported a lifetime prevalence in this population of 30% for use of any of the following drugs for non-medical reasons: alcohol, cannabis, barbiturates, opium, amphetamines, or cocaine. Practically all (29%) who had ever used were still using to some degree. The most widely used drugs were alcohol (26% current prevalence), opium (19%), barbiturates (6%), and cannabis (2%). Some 40% were tobacco users. No users of amphetamines, cocaine, or other dependence-producing drugs were found.

Another study of a general population in the State of Punjab by Deb and referred to in the government report (page 9) is stated to have found "that 54.3% of the urban sample and 40.4% of the rural sample abused synthetic drugs such as methaqualone and LSD." (Because these rates appear exceptionally high, one wonders whether the population surveyed was not a fairly atypical rural population.) The third general population survey cited in that report, by Mohan and co-workers, was also in the State of Punjab, in twenty-four villages located in three districts. Like Lal and Singh, this research team is reported to have found relatively high levels of alcohol use (lifetime prevalence of 58% for males though only 2% for females) and opium (6% for males and 1% for females) but very low prevalence rates for cannabis, LSD, and the various psychotherapeutic drugs. The sample size for this study was 3,600; the response rate was 91% (personal communication).

These Indian studies serve to illustrate several variations on the most typical type of general population survey. In at least one, the sampling data were not based on a government census but rather on an enumeration created earlier for other research purposes, while in another no sample frame was developed since the total population was studied. While some reported period prevalence rates for the population, others concentrated more on the extreme user—addicts or habitual users. Finally, a number of these surveys combined alcohol use with the use of other drugs in the reported results. This approach—while not intrinsically unsound—does make comparison of results with other studies extremely difficult, and thus illustrates the value of having a common methodology across studies.

3.3 Iranian surveys

In 1976 a large-scale household survey on mental illness, mental retardation, alcohol use, and drug abuse was conducted by the National Iranian Society for Rehabilitation of the Disabled (NISRD). A large sample of nearly 1400 cases was drawn among those aged fifteen and over in Tehran and a sample of about the same size containing the complete population, was taken in Peykan City. Smaller samples were drawn in Hormozgan Province (N=397), Hormoz Island (N=74), and Quasemabad village (N=279) where the complete population was surveyed. Clustered random stratified probability samples were drawn from national census data in Tehran and Hormozgan Province. (See Section 5.1.3 for a description of clustered and stratified sampling.)

While the interviews obviously covered a range of topics, they included a special sequence on the use of alcohol, inhalants, amphetamines, barbiturates, minor tranquilizers, and opiates. The investigators collected urine samples from nearly all (96%) of those who completed interviews, and the response rate for interviews was approximately 92% for those aged fifteen and over who were sampled (Fozouni, 1979). Respondents were told that the urine specimens were for diabetes research, and respondents with positive indications were, in fact, notified and referred to nearby health centers. The urines also were tested for signs of opiate use by means of paper chromatography. In Tehran and Peykan City the proportions of opiate-positive urines ran around 2.5%. In Hormozgan Province and Hormoz Island they were considerably higher (Fozouni, 1979). In addition to using self-report of drug use and urinalysis, the investigators had interviewers indicate whether they suspected respondents to be opiate users.
The interviewers used in this research were all college graduates. Preparatory to actual fieldwork, all received three months of training and gained practice with the drug questions by completing at least ten interviews with known drug addicts at several clinics.

This survey illustrates a number of points which will be made in more detail below. First, it is possible to combine a drug survey with surveys of other subjects, both to reduce costs and derive some methodological benefits. Second, multiple methods for measuring drug use can be used to test and improve the validity of the self-report data; and third, considerable attention can and should be paid to the selection and training of interviewers in studies of this type.

Another Iranian study, reported by Aleimi and Naraghi (1978), was based on a 1976 socio-medical survey of a random sample of 3300 people of all ages in a rural district of Gilan Province. They report a rate of 6.9% dependent on opium in that population, based on the survey, compared with a rate of 1.1% based on official registers. They concluded from their survey that official data may seriously underestimate the size of the problem—in this case by a factor of over six times—and that rural addicts tend to be very much underrepresented in the detoxification centers, possibly because of their inaccessibility. From a sampling perspective, it is interesting to note that they selected the particular district as having a population "typical" of the larger province (it was thus a purposive or judgemental sample of one) and then randomly sampled households within that district.

3.4 Mexican surveys

Since 1974 there have been at least nine general population surveys in Mexico which contained questions about drug use. (See the listing in Table 1.) Of these, one (Calderon et al., 1978) was exclusively about alcohol use and another (Parra et al., 1978) was primarily about the use of community mental health services, although it did contain a few items about drug use. The other seven, however, had as their major objective the study of drug use and abuse. Virtually all were household interview surveys based on random stratified samples of households drawn from census data in a multi-stage sampling procedure. The population of interest generally included all inhabitants 14 years of age or older. While none of these studies were national in scope, all dealt with sizeable geographic areas such as major cities or suburban communities. The resulting response rates on all of these surveys are reported to be quite high, ranging from 83% to 93%; while sample sizes generally ranged from 500 to 1000 cases (with the exception of one large survey of Mexico City directed by Medina-Mora, et al. in 1974, and which had 2800 respondents).

A complex and extensive interview schedule, written in Spanish, has been developed by the investigators at CEMESAM for administration by trained interviewers. It contains complex branching or "skip" instructions to permit the selective administration of particular questionnaire segments to only those who actually have used various of the drugs. Series of questions which are routinely asked for each class of drugs are laid out in a grid format in which the questions (and their answer alternatives) comprise the rows, while the various drug classes comprise the columns. This format reduces the physical length of the interview schedule, which has psychological benefits for both the interviewer and the interviewee. It does, however, require a fairly high skill level on the part of the interviewers.

Medina Mora (1979) in a paper reviewing the procedures used in most of the general population surveys of drug abuse in Mexico, emphasized the importance which they placed on the selection and close supervision of interviewers. For fieldwork done outside of Mexico City, where CEMESAM—the government agency charged with drug research—is located, field supervisors were hired locally, sometimes at a drug-treatment center. Although the selection and training of local interviewers both were carried out by a central office supervisor, the local supervisor was responsible for overseeing the ongoing fieldwork and for occasional re-interviews which were used to check the quality of the
original interview. The central office supervisor, having already spent two weeks training the local interviewers, continued to visit the local offices on a weekly basis during the data collection period. The quality of interviewer work also was checked by examining the interviews for internal consistency among the various answers which should have had logical connections.

In a 1978 paper summarizing the results of five of Mexico's general population surveys, Medina-Mora shows that there were substantial differences among five cities in the observed prevalence rates for each of the drugs studied. Use of at least some of the drugs was found to be highly related to age, e.g., marihuana use is most concentrated among the 18 to 24 year olds. The proportions of the population reporting fairly recent use of each of the following classes of drugs was generally quite low: codeine, heroin, other narcotics, barbiturates, other sedatives, amphetamines, other stimulants, inhalants, hallucinogens, and marihuana. For example, in the Mexico city survey, none of these classes of drugs had a prevalence of recent use of over 5% and most were under 1%. From a policy perspective, these results suggest that illicit drug use is not nearly as widespread in the Mexican population as it is in some neighboring countries (e.g., the United States and Canada) and therefore probably not in need of treatment and rehabilitation efforts on a scale comparable to those developed in those neighboring countries.

The Mexican experience also illustrates one approach to developing national data on drug abuse using survey methodology. Rather than going immediately to a full-scale national study, the government agencies involved started first with city and regional studies. The procedures could then be developed and revised in an area close to the researchers before being tried in more remote locations.

3.5 Pakistani surveys

In 1975 the Pakistan Narcotics Control Board undertook a household survey of six villages in the region of Buner (Pakistan Narcotics Control Board, 1975). These villages in Buner, which contain a total of 357 villages ranging in population size from 6 to about 4000, were purposively chosen to represent varying degrees of poppy cultivation and opium addiction. This study, entitled "A Socioeconomic Survey of Buner," was intended to examine the role of poppy cultivation in the livelihood of the people and the likely prospects for crop substitution as a means of reducing opium production in the area. It was carried out as a preliminary step in the planning of an integrated rural development program for the region in collaboration with UNFDAC and other UN agencies such as WHO.

In each village an enumeration (listing) of households was first completed and one-half were then selected at random for inclusion in the survey. Within households the individual interviewed was either the landowner or, in the absence of a landowner, the head of the family. Interviewers were instructed to avoid non-response even if it took up to five visits (in contrast to the quota sampling technique mentioned earlier), and the resulting response rate is reported to be 100% for the 1178 households sampled. The interviewing staff for the most part was inexperienced at this type of work and, due to the time schedule for the survey, had to be trained rapidly. In fact, the overall time schedule from preplanning to completion of the report was only four months.

Because of the emphasis of the study on the economics of the family and particularly the role of crops, much of the long interview schedule was addressed to such matters. There was, however, a section concerning the use of opium, charas, and other narcotics by the respondent, his own parents, and other family members. Based on the results from these questions, addiction was described by the investigators as "negligible" in all villages except one, Kuria; and Kuria originally was included in the purposive sample because it was assumed to have the highest level of addiction in Buner. In Kuria, 52 "hard core opium addicts" were identified out of a sample of 425, or about 12% of the sample. Only 8 other addicts were identified in the remaining five villages combined. The investigators found in general a disapproval of opium use and cultivation among the people.
The Pakistan study illustrates several interesting variations in design. First, it involved a coordinated study of several disparate general populations (villages) which in turn were intended to constitute a sampling of situations in a larger region. Second, it used a random sample of landowners/heads of households to provide data on other members of the population as well as on themselves. Third, it illustrates how a cadre of interviewers can be hired and trained for the specific survey at hand and how, in the absence of census data, they can be used to develop the basic information needed for drawing a sample. (It should be noted that the cooperation of village leaders is likely to be very important to such an undertaking.) Finally, it illustrates how a drug abuse segment can be integrated into a survey which deals with other subjects and still yield valuable information.

3.6 Peruvian survey

A household sample survey of a probability sample of 2500 households in the city of Lima was recently completed by Jeri, Carbajal, Sanchez, and Bravo (1979). This survey, which was jointly sponsored by the United Nations Fund for Drug Abuse Control and the WHO/Pan American Health Organization, covered the age range from twelve to forty-five. In this case the investigators found access to good sampling information and trained sampling statisticians in the national Ministry of Labor; and the investigators report that interviews were successfully administered to 94% of the intended respondents in this large, metropolitan population. Young males were oversampled in this study because they were judged to be among those at highest risk for coca paste use, which was a central concern of the research.

While the use of cocaine paste (sulfate) was a subject of particular interest in the research, the interviews also encompassed a range of other licitly and illicitly used drugs, including alcohol and tobacco. As of this writing, no results from this survey have yet been released. The longer term research strategy here is to build upon this initial survey conducted in the capital city, by conducting subsequent surveys in smaller communities and rural areas. What is learned from this first experience can then be used to improve the design and procedures used in the later surveys, as was done in Mexico.

3.7 Thai surveys

A coordinated set of general population surveys also was conducted in seven rural villages in Thailand, which covered medical conditions, drug use, and other aspects of village life (Suwanwela, et al., 1977, 1978). These surveys were conducted by the WHO collaborating center at the Chulalongkorn University as part of the UN/Thai country program for drug abuse prevention, treatment, and control. They present a marked contrast to many of the others summarized in this paper in that the populations not only were rural, but were isolated, remote, and difficult to reach by ordinary means of transportation. In fact, in some areas research teams had to reach these villages by helicopter. In such circumstances, the research team obviously was highly visible and its presence and activities (including medical examination and treatment) constituted a major intervention into the daily life of the population. This degree of intervention may have been a necessary quid pro quo for the cooperation of the villagers with the research effort.

These were not sample surveys, but "census surveys," in that a complete enumeration of the village population was made in each case, since the villages were small; but the selected villages were intended to be in a way representative of the many hill tribes in the other villages in that opium producing region of Thailand. Not all villagers were interviewed personally; but, like the Buner study, the head of each household was interviewed and asked to provide systematic information on all other members of the household. Individuals identified as opium users by this means were further interviewed in depth about their use of the drug. In addition, extensive medical information was gathered on many of the villagers by members of the skilled medical team conducting the surveys. In essence, these were relatively small-scale, highly
intensive surveys. In all, data was gathered from 184 households in the seven villages, containing 828 persons over 10 years of age. The number of people identified as opium addicts was 97 or nearly 12%, though this percent varied substantially from village to village. The investigators found the data from heads of households concerning drug use in the household to be quite accurate when checked against other sources of information. The investigators point out, however, that the village prevalence rates could be affected dramatically by the number of able-bodied villagers who were away from the village during the survey period because they were working elsewhere.

One important non-survey source of information on drug use was a test of urines, which was developed by this team of investigators. Filter papers were used to absorb a small quantity of a subject's urine for later extraction at the university laboratory in Bangkok, where the opium content is then assessed using the Radio-Immuno Assay method. Because this method is extremely sensitive and requires only a small amount of urine to detect drugs, it eliminates the need for transporting specimen bottles over poor roads and in hot weather.

The intensity of the data collection effort plus the further study of identified users resulted in a rich set of information about the history and self-reported reasons for use by the opium addicts. This much detail on such subjects is usually not gathered in general population surveys, though such surveys clearly have the potential for identifying cases for further study. While concluding from their work that "systematic epidemiological survey of opium use in rural opium producing communities appears to be feasible" (Suwanwela, et al., 1977, p. 6), the investigators also note that in these areas opium use does not carry a major social stigma; therefore, concealment of use is less likely to be a problem for the researcher than it might be in communities which feel otherwise about drug use. It should also be noted that the health survey component of these studies provided information relevant to the design of primary health care programs to meet the special needs of those villages.

3.8 United States surveys

The history of studies of drug abuse in the general population of the United States has been similar in a number of ways to the experience of Canada. Many such studies have been done and by a variety of organizations. While virtually all such work has received its support from the federal or state governments, most has actually been conducted either by academic institutions, commercial polling organizations, or some combination of the two.

The very rapid rise in the popularity of marihuana and, to a lesser extent, other psychoactive drugs among youth in the U.S. during the late 1960s and early 1970s led to great public concern and attention being paid to the problem. There was a sudden proliferation of small surveys in specific schools, colleges, or towns, and those with the most alarming results immediately received the greatest media coverage. As a result, a need developed for more representative and scientifically conducted surveys to accurately assess the actual size and nature of this new problem. Individual states, which bear most of the governmental responsibility for drug treatment and prevention, were encouraged by the federal government to do representative sample surveys of their adolescent and adult populations. Many states launched surveys using commercial polling organizations, which already had the personnel and technology to conduct such surveys and which were very cost competitive in bidding for the contracts. These surveys tended to vary substantially in scientific quality and most have not reached the published literature.

The more important development was the launching of a series of nationwide household surveys of the population of the United States aged 12 and over. The first of these was initiated by the Presidentially-appointed National Commission on Marihuana and Drug Abuse, formed in 1970 to assess the drug abuse problem and advise the federal government on appropriate response. This survey, conducted in 1971 by Response Analysis Corporation, focused entirely on marihuana use (as well as related attitudes and experiences), since marihuana was to be the subject of the first major report of the
Commission (National Commission on Marihuana and Drug Abuse, 1972). In the second survey (1972) a number of other psychoactive drugs were included: hallucinogens, inhalants, cocaine, heroin, stimulants, sedatives, and tranquilizers. (By the third survey "other opiates" was added to the list.) The National Commission conducted the first two such nationwide household surveys and completed its final report in 1972 (National Commission on Marihuana and Drug Abuse, 1973). The series was continued then by the National Institute on Drug Abuse (NIDA), and to date there have been five surveys (1971, 1972, 1974, 1976, and 1977), with biannual surveys planned for the indefinite future. The field work for all of them has been done by the same firm, Response Analysis Corporation, and the last three have had as principal investigator Dr. Ira Cinin of George Washington University.¹

The sample sizes were relatively large for such research, ranging from 2400 to 3300 adults, plus an additional 800 to 1300 youth. Youth and young adults were intentionally oversampled (that is, included in the sample in disproportionate numbers) to increase the accuracy of estimation for these important segments. Their data then were given proportionally lower weights in calculating the national estimates to correct for their overrepresentation in the sample. Even with these large samples, however, relatively few current users of many of the rarer drugs were captured in the sample for study. Extensive efforts were made to attain high completion rates—sometimes as many as 20 visits by an interviewer to get a single respondent—and in 1977 the response rates were 81% for adults and 83% for youth.

As might be expected, the initial emphasis of this work was on quantifying the problem of drug use and abuse at that point in history (i.e., 1971-1972) and in gaining a better understanding of subgroup differences, prevailing attitudes about use and about legal controls of use, motives for use, and the etiology of use. However, since the phenomenon of illicit drug use was changing rapidly during this historical period, the importance of the subsequent surveys rested more on their capacity to detect the direction, rate, and nature of the changes taking place in various kinds of use and related attitudes. So, for example, the most recent report from the series (Abelson, Fishburne, and Cinin, 1977), shows that from 1971 to 1977 active marihuana use was rising rapidly among teenagers and (to a lesser extent) among adults under age 35. The dramatic differences in marihuana experience related to age (lifetime prevalence of about 60% for 18-25 year-olds vs. 7% for those over 35 in 1977) obviously means that the drug using characteristics of the population are likely to change due to generational replacement alone. Emphasis in this series also has moved toward distinguishing degrees of involvement with the drugs rather than simply giving simple period-prevalence counts. Such distinctions are particularly important in a population where a substantial proportion of the "users" are very occasional users or have simply experimented once or twice, as is the case in the North American population.

Regarding the data of heroin use to derive from this survey (as well as from the other U.S. surveys described here), it is a generally accepted fact among policy-makers and researchers that the heroin use estimates are unrealistically low. Two explanations are most commonly offered: first, that heroin users are more likely to be lost from the samples either because they do not have a permanent place of residence and/or tend to avoid being interviewed, and second, because use of heroin is less likely to be admitted given the legal and social stigma attached to it in the society. Thus, while survey data are of some use—mostly in assessing trends in heroin use—considerable reliance must be put on other sources of information to estimate the size and nature of the heroin problem.

Another national series, entitled Monitoring the Future (Johnston, Bachman, and O'Malley, 1977, 1979a, 1979b) falls into a gray zone between being a special population versus a general population study. It deals with a narrow age range (18 to 29) and contains only young people who complete high school. But, because 80% to 85% of recent birth

cohorts complete high school, this series of surveys also provides a relatively good monitoring of what is happening in this age segment of the general population. Nationally representative samples of seniors in high school have been surveyed in school annually since 1975, with sample sizes ranging from 15,000 to 18,000 seniors per year. Subsamples of each senior class have then been surveyed longitudinally on an annual or biannual basis by mail for 6 years after their graduation. Response rates for both senior year and follow-up surveys range around 80%.

The use of self-administered questionnaires, given simultaneously to large groups of people in school, yields very low costs per respondent and thus the possibility of very large numbers of cases. The large number of cases, in turn, results in the inclusion of sizeable samples of users of even the rare drugs. They also permit more accurate estimation of use and changes in use across years, as well as the possibility of having more questions (since a larger number of questions are divided among multiple forms of the questionnaire and those forms are then given randomly to sub-samples of the very large sample). Obviously, the self-administered-questionnaire technique is only appropriate if all respondents are literate, which rules it out as a viable technique for surveying most general populations.

This series complements the national household series in that it provides a more detailed characterization of young users of many of the rarer drugs and in that it can encompass a much larger number of variables, by using multiple questionnaire forms. The longitudinal data also will contain some data on segments of the 18 to 24 year-old group which are by definition not contained in a household sample—namely, those in military installations, college dormitories, and other institutional settings. However, this type of school study contributes to knowledge about use in the general population only in proportion to the fraction of each birth cohort which is still in school at the grade level surveyed. Like the household survey series, the greatest value of this series likely lies in its ability to detect and quantify trends; for just as the household sample misses certain segments of the population who are disproportionately drug users (drifters, the institutionalized, etc.) so does a school survey (drop-outs and absentees). With both types of surveys prevalence estimates are likely to be underestimates; but the change estimates, on the other hand, should be relatively valid as long as comparable segments of the population remain in the sector (universe) being sampled across time.

The evolution of these two national series has helped planners at the national level to assess the changes taking place in drug use. Because methods and procedures are held constant over time in each series, planners know that changes in reported drug use are not due to changes in survey methods or to a change in the definition of the population under study. Since many local studies now are modeled after these national ones (including the use of many of the same questions), it has become much more possible to compare and integrate findings across studies. This institutes an improvement over an earlier era where there were as many different methods as there were studies.

Finally, there has been one other series of surveys conducted by the Gallup firm (1972, 1973, 1974) in which some questions about marijuana use have been included in a Gallup omnibus survey on repeated occasions. These surveys, like the Gallup surveys in Canada, are intended to be nationally representative of the adult population 18 and older. They do use quota sampling, however, which some feel reduces accuracy as well as cost. But again the biasing effects, whatever they may be, seem more likely to have an impact on cross-sectional (static) estimates than on change estimates since those biases are likely to be similar at both time points being compared.
4. ADMINISTRATIVE CONSIDERATIONS FOR THE PLANNING OF DRUG ABUSE SURVEYS

Some of the problems to be encountered in general population drug abuse surveys of the kind we have reviewed here are generic to survey research, regardless of subject area, while some are more specific to the drug field. Further the problems to be considered and dealt with vary from country to country, depending on a variety of factors such as the existence and accessibility of accurate census data for sampling, the availability of experienced survey research organizations to conduct the survey, the literacy of the population, their familiarity with surveys, their distrust of strangers or outsiders, the legal and social status of drug use in the community, and so on. In this section and in Section 5, the major elements involved in planning and conducting a general population survey are described and discussed individually. Part of what will be presented is basic information about survey research methodology—information which should be known to anyone planning to conduct a survey in any subject area. The other part derives from what has been learned by a number of investigators in the drug field who have tried specifically to address survey research methodology to general population studies of drug abuse. The policy maker who must decide whether or not to launch such a study should have at least a general familiarity with the technical issues involved here, while the people charged with actually conducting such a survey obviously should be familiar with them at a more detailed level.

4.1 The purposes and planning of the research

Obviously, an important requirement for any good research undertaking is that the sponsors and investigators have in mind the purposes they wish to accomplish before making specific decisions about research design and procedures. Most of the studies reviewed here were conducted with government sponsorship and for a number, a detailed research proposal had to be submitted before funding was approved. Such a procedure has the clear advantage that the objectives and rationale for the study must be spelled out in writing, and the proposed research design's appropriateness for accomplishing those objectives must be demonstrated convincingly. With or without the mechanism of a formal proposal, however, a detailed listing of the objectives in advance of the research can prove highly valuable. Among other things it provides an opportunity for the interested parties to discuss how realistic and attainable some of the objectives they may have in mind are, and whether the survey being planned has a reasonable chance of accomplishing them.

Having the objectives in mind before designing the study also will influence a number of subsequent decisions about design. Whether to draw a sample, how large a sample to draw, whether to disproportionately sample certain subgroups of particular interest in the population, whether to go into drug usage experiences in depth—all of these are decisions which will be affected by the purposes of the study.

4.2 Possible linkage with surveys on other subjects

One important early decision to be made in the planning phase concerns whether to do a survey totally addressed to drug abuse or whether to combine a drug portion with portions about other subjects. Recall that some of the studies reporting on drug use in India were primarily studies of mental morbidity or alcohol use. This provides one model for gathering information on drug abuse in a general population at relatively low cost, and it is sometimes referred to as "piggybacking", i.e., the drug survey being carried along on the back of another survey. The limitations of this approach are: (a) that only a limited segment of the interview can be addressed to drugs, thus limiting the relevant information which may be gathered; (b) the research design, which presumably was created for other purposes, may or may not be ideal for a study of drug abuse; (c) coordination between more collaborators is likely to be required; (d) having drug use questions in the same interview with questions on the main subject of the survey may have a detrimental effect
on respondents' answers to one or another segment; and (e) the control over the quality of the survey rests mostly in the hands of others. There are, however, some clear benefits to piggybacking. It costs considerably less, since adding a drug portion does not add any sampling or field costs to the main survey. Further, the drug investigators do not have to have quite as much technical survey expertise, since others will draw the samples, train the interviewers, and do the field work. If the main study deals with a closely related subject, like alcohol abuse, there is certainly more likely to be compatibility in purposes, design, and content; in fact, there are likely to be some benefits derived by having both types of information on the same subject.

A variation on this theme is to have the survey comprised of coequal segments on different subjects. In other words, investigators dealing with two or more) different research subjects collaborate from the outset in the design of the study, building of data collection instruments, and so on. The major difference here is that the drug segment is now a full partner in instrumentation, design, etc. Generally, such an arrangement will cost more for those sponsoring the drug segment but may be worth it. Most of the limitations listed above for the piggyback approach still pertain, but to a lesser degree.

A third variation on this multi-purpose-study approach is illustrated by the 1976 and 1977 surveys by Smart and Goodstadt, and the 1978 survey by Rootman reviewed earlier in this report. These investigators placed drug use segments into "omnibus surveys"—that is, general purpose surveys which are established for the purpose of selling the total interview time in segments to investigators from various fields. Usually commercial polling firms run such surveys for profit; and when available in a country, they do provide an alternate mechanism for conducting general population surveys of drug use. Users are advised to evaluate the adequacy of the methodology, of course, and just about all of the problems mentioned for the piggyback arrangement pertains under this arrangement as well. In a sense, all of the participants in an omnibus survey are piggybacking on a general purpose vehicle.

4.3 Selecting an organization to conduct the research

As the various surveys reviewed earlier in this report illustrate, drug use surveys have actually been conducted by a variety of organizations: governmental agencies like the Pakistan Narcotics Control Board or Mexico's CEMESAM; quasi-governmental agencies like Canada's Addiction Research Foundation; commercial firms like the Gallup organization in Canada and the US; medical teams as in the case of the Thai village surveys; academic institutions like the University of Michigan in the case of the US youth surveys; and commercial firms in collaboration with academic institutions (e.g., Ableson et al., 1977). In nearly all cases the financial sponsorship for the research has been governmental in origin, a fact which seems likely to remain true. However, the mechanism by which the government-sponsored project was carried out has varied, and it seems worthwhile to review here briefly the issues pertaining to the choice of the best mechanism.

4.3.1 Effects on respondent cooperation

Perhaps one of the most important concerns to be weighed is whether different types of organizations will have differential success in gaining respondent cooperation and honesty. Clearly the legal and social implications of drug use in the population to be studied are critical to respondents' willingness to be open about such subjects. The more danger of legal retribution or official ostracism the respondent feels, the more likely he or she is to be distrustful of government officials. Thus, to the extent such conditions pertain, more benefit is to be derived from using an organization which is seen as independent from officialdom. Usually, universities or medical units would be viewed as relatively independent organizations and their representatives viewed as people who could be trusted with confidences. Quasi-governmental units established for drug research and/or treatment may or may not evoke as much trust, depending on the specific
circumstances. But, clearly, attaining the trust and honesty of the respondents must be an absolutely central objective if the results of the survey are to be of any use at all, and it may even be that in some populations no method can be devised to elicit sufficient honesty about such behaviors to make the survey worthwhile.

Aside from candor, general respondent cooperation might or might not be something which can be assumed. In most of the studies reviewed here nothing was given to the respondent in return for his or her cooperation. In the survey of the Thai villages, however, a full medical team entered the village and provided free medical services to those inhabitants who wanted them; and in that case, at least, the investigators felt that providing something in "exchange" was important to the conduct of the study. And in the portion of the survey of young adults by Johnston et al. (1977, 1979) in which questionnaires were sent through the mail, advance payment to the respondents dramatically increased the response rate (roughly from 65% to 85%). If incentives are required for respondent cooperation, and particularly if they are to be given in the form of services like medical care, this may well have some bearing on the choice of the organization and/or interviewers used to carry out the survey.

4.3.2 Technical resources

There are, of course, other factors to consider in selecting an appropriate organization to conduct such a study. The organization's research experience and technical resources are certainly among them. If there already exists a unit experienced in the conduct of general population surveys, there are clear advantages to making use of that expertise. If they are already experienced in drug research, so much the better, but if not their general knowledge of the scientific methods of survey research are of obvious value. Such organizations might be private firms, academic units such as research institutes, or government agencies such as the census bureau or the ministry of health. The outside organization might be used either to conduct the survey in its entirety, if investigators more knowledgeable in the drug field are not available; or they might be used simply to carry out the sampling and field work to the specifications of researchers located elsewhere, who actually design the research and interpret the results.

If an experienced survey research organization is not available, or deemed not desirable for some reason, it is possible to build a research team to conduct a general population survey. Obviously, if the survey is of a large scale, such as a national survey, this can be a sizeable undertaking; but if confined to one community or a region of limited size, the number of interviewers needed may be quite limited; and perhaps not that much travel may be required, even if they all live in one location. There also will be considerable need for technical expertise and experienced judgement particularly in the areas of research design, sampling, interviewer training, and data analyses—but it may be possible to obtain the help of experienced survey scientists at various stages in the research process through inter-agency loan arrangements or through private consultation. As will be discussed below, other governmental agencies and/or academics working in other subject areas may have skills and resources which could be of great help in carrying out a general population survey of drug abuse.

4.3.3 Ability to influence policy

In discussing the factors which ought to be taken into account in assigning priorities to research projects in the mental health field, Sartorius (1977) argues that one important consideration should be the likelihood that some social action will follow from the research. The organization chosen to conduct the research, or at least the way that organization is connected to the relevant agencies of government, may well affect the likelihood that the results will be utilized. At a minimum, channels of communication should be established early between the research unit and the agencies or other policy makers who should be influenced by the results. A further step would be to involve the latter in the specification of the research questions to be addressed, or even in the design of the research project intended to address them—in other words, to increase their early
involvement and investment in the research. Still a further step is to have the relevant government agency itself be responsible for conducting the research, if such a solution makes sense in relation to the other criteria discussed above. In many cases it will not, however, making one of the other solutions more appropriate. In any case, the productivity of the research is likely to be enhanced considerably by a very early consideration of the means by which it will feed into the policy making process and by an early, purposeful effort to improve the linkages with the relevant policy makers.

4.4 Sampling resources available

4.4.1 Data available

If the size of the population being studied is large enough that sampling is required in order to conduct a representative survey, then an important first step is to determine the source of the data which will be needed for sampling. Since the technical aspects of sampling are discussed later, under Section 5.1, the topic will not be reviewed here except to point out that a body of information about the population to be studied is needed to draw a sample. The information could be a list of the names and addresses of all of the citizens in the population, or of all of the households. Or a starting point might be summary information on the number of people in various geographically defined segments of the population. In any case, information is needed which will permit the creation of a sampling procedure in which all individuals in the population eligible to be in the survey will have some known probability (greater than zero) of being selected into the sample.

Most of the surveys reviewed here used census data which had been gathered by an agency of government for various purposes, and which was sufficiently up-to-date to constitute a fairly accurate inventory of the population. When census data are available, they are likely to be the best resource for a sample survey. However, there may be problems even with census data available. Some census data may be quite old and, therefore, out of date in areas where there is considerable mobility in the population. Or the national census data maps may not prove detailed enough, particularly in sectors where there are dense slums, many squatters, or temporary dwellings.

When census data are not available on the population of interest, alternate sources of information must be sought. The 1975 study by Lal and Singh of a village population in India exemplifies one approach. They used an enumeration of households which previously had been developed as part of the national malaria eradication program. It is certainly advantageous to search for adequate data which might already exist before taking the trouble to develop original data on a population for sampling purposes. Government agencies or universities doing research studies may already have developed a sampling frame for the area—perhaps for a fertility survey or a health or nutrition survey. Government agencies and academic institutions dealing with such issues are an obvious first place to make inquiries. It is also possible that local officials in the area would know whether any sample surveys had been carried out there in the past, so they provide yet another source of leads.

If no existing information base can be found from which an adequate sampling frame can be developed, then it falls to the researchers to develop the information themselves. Wadud and his collaborators did this in the Pakistani villages studied in their 1975 survey, discussed earlier. Field workers on the research team went through each village and made a systematic enumeration of all households, from which a random sample of households was then selected for study. The individuals in the sampled households were then enumerated at the time of the interview.

Even if a study were using existing census or other data, an investigator would be wise to seek the advice of a trained sampling statistician (by mail, if necessary) before finalizing a sampling plan. But, if a new sample frame must be developed because sufficient data do not exist, such professional help is even more useful.
4.4.2 **Technical expertise**

An investigative team may have a substantial amount of sampling expertise in its membership or may try to develop that expertise. (A number of helpful books on sampling and research design are cited in Section 5.1 on Sampling.) However, more often than not the skills of professional sampling statisticians are needed; and, in fact, most of the surveys reviewed earlier made use of such experts in the sampling phase of the research. Not only can they help to avoid technical flaws in the sampling design, they also may improve the cost efficiency of the design considerably. For the more complex designs, which deal with a large population base and the use of stratified samples, the help of professional sampling statisticians is a virtual necessity; but even for simpler designs, such help can prove invaluable.

People with statistical training may be located in a number of places. In the government, there are likely to be sampling statisticians in agencies dealing with the census, with federal planning, with fertility or population control, with health (and particularly with epidemiology), with labor, and perhaps even with education. In universities, such skills may be found in the departments of statistics or mathematics, biostatistics or public health, psychology, population studies or demography, to name a few. Research institutes utilizing survey research methodology are also likely to have resident statisticians, as are commercial survey research firms.

Once a competent source of statistical expertise is located, however, the jobs of the primary investigators is not over. They will need to take an active part in communicating the purposes and design of the study to the sampling experts, as well as the financial, staff, technical, and time constraints under which the study must be conducted. They should not accept a sampling design unquestioningly but should be sure that they understand the logic behind it, be sure they are convinced that it will allow them to meet their research objectives, and be sure it will generate a sample of respondents which can be surveyed in a reasonably economic manner. Sampling statisticians obviously vary in skill, relevant experience, and motivation; so it is ultimately up to the primary investigators to determine whether they are satisfied with the sampling design. If in doubt, they can always solicit additional opinions.

4.5 **Field staff resources available**

The term field staff refers to the team of interviewers or data collectors who will actually gather the data for the study. It also includes any staff charged with supervising them.

4.5.1 **Utilizing existing systems**

The largest survey organizations in some countries have permanent staffs of trained interviewers, sometimes numbering in the hundreds, who reside in the various communities in which they will be collecting data. They also have field supervisors who help to hire, train, and continuously supervise the field interviewers in their regions. Obviously, there are considerable advantages to using such a professional staff when it is available, unless the types of interviewers they hire are considered inappropriate for some reason for the particular survey in question. The interviewers are already screened and trained, which saves time and money, and their interviewing experience may well contribute to the quality of the interviews they conduct. Therefore, the first logical step in planning the field operation for a general population survey of much size is to consider whether an existing field staff might be used—perhaps one in a government agency, academic research institute, or in a commercial firm.
4.5.2 Selecting and/or building a field staff

If an outside field staff cannot be located, then an interviewing team must be selected and trained specifically for the survey. (Wadud describes his own experience doing this in the Pakistan Narcotics Control Boards' 1975 report on the survey of Buner.) First, the number and location of the interviewers who will be needed must be determined. Then a search must be made for individuals possessing the characteristics judged to be desirable both for working on a scientific research project and for establishing rapport with the respondent population. The technical aspects of the work will require certain levels of education, reading and writing proficiency, ability to follow instructions, work efficiency, general sense of responsibility, and the ability to work independently. Establishing respondent rapport may also depend on such factors as age, sex, racial or tribal affiliation, religion, social class, clothing and grooming habits, and so on. A drug study is likely to have particular need for careful selection of its interviewers because of the particular importance of eliciting cooperation and candor from respondents; so even when working with a pre-existing field staff, such considerations should be taken into account when selecting the particular interviewers for the study. In one developing country, for example, the research team had what they described as a "bad experience" in using the field staff of a market research firm, because the skills and characteristics of the firm's interviewers—who were older women for the most part—were not appropriate for effectively conducting a drug survey.

If the survey is large enough that it spans various regions, and if there is a lot of regional variation in customs, culture, and language, then the use of interviewers who come from these same regions is likely advisable. In some cultures—particularly Latin and Middle Eastern—investigators also have found that it is very important to have interviewers of the same sex as the respondent, particularly for female respondents.

Types of people to consider for the interviewing staff include the following: university students (particularly those in the social sciences); health workers (used successfully in the Thai and Pakistani studies cited earlier); social workers or social work students (used successfully in Mexico and Pakistan); and perhaps educated people in volunteer corps, if they exist. Other groups of people who are in close contact with the population and have trusted relationships (e.g., workers in the housing development agency in Thailand) might also be considered, although their being an integral part of the community might be judged more a hindrance than a help, depending on the circumstances. Sometimes, of course, the most appropriate field personnel will still have some formidable problems to overcome in bridging the cultural and/or language barriers between them and the study population. For example, in the conducting the rural surveys in Thailand, Suwanwila and Poshyachinda though experienced medical researchers, did not speak the special languages of the hill tribe villagers; and the sociocultural patterns in these populations were quite different from those of the lowland Thais. In order to overcome these barriers, the investigators lived in the villages for a week or more on several different occasions and frequently stayed overnight in order to establish acceptance and trust, to understand the sociocultural environment and the problems of the villagers, and to get a better picture of the role of opium use and production in the life of the hill tribe people.

4.6 Cost estimation and timetable

Clearly a critical part of the planning process is to develop realistic estimates of the costs and time required to complete the survey. Many of the investigators involved in the studies reviewed here found that they tended to underestimate both cost and time, which is not an uncommon experience in survey research. One way to try to avoid such difficulties is to be as explicit as possible about the steps needed to complete the survey and as realistic as possible about the time and resources needed to complete each step.
Figure 1
Flowchart of a Typical Study

Planning of general research design
Hiring core staff

Development of Interview
Pre-test of interview

Development of Field Procedures

Hiring and training interviewers

Designing the sample
Securing data for sampling
Drawing the sample

Pilot test of interview and field procedure
Revision of interview and field procedures

Data Collection in the Field

Cleaning and editing interviews
Keypunching data onto cards
Building computer files
Analyzing the data
Writing the report
Dissemination and utilization of results
4.6.1 Timetable

Figure 1 presents the major steps likely to be involved in a typical general population survey, and organizes them in a way which shows their sequential interdependence. It shows for example, that interview development, field procedures development, and the sampling process all may be proceeding simultaneously, if sufficient research manpower is available. However, the actual data collection may not start until all three of those sequences are complete.

A pilot test of the completed interview and field procedures is usually conducted before the data collection is formally launched. This provides a low-risk way to determine how well they work, by applying them to a limited number of respondents who are not in the main sample. A number of difficulties are likely to be encountered in the pilot test, so time must be allowed for possible revision of the interview and field procedures. Among the problems commonly found are: the interview taking too long to complete, respondents having difficulty in understanding some questions or in being able to answer others, and problems in gaining or maintaining the cooperation of respondents. Thus the pilot test has proven to be an important part of the process, even if the interview, or parts of it, have been tried out on a few respondents at the research offices in a "pre-test" phase. It further provides an opportunity to see whether the interviewers can carry out their instructions for contacting households, sampling from among the members of the household (if relevant), and conducting the interview.

One other factor which may influence the timetable is the feasibility of carrying out the interviewing process during different parts of the year. In a rural population, for example, the cultivation season and harvest season would probably be bad times for conducting a survey. Holiday seasons and vacation times may also be problematic, if many people leave their place of residence or are simply less willing to be interviewed. So, it obviously is important to consider such factors in planning when the survey actually will be conducted.

How long it will take to complete the data collection may also depend on when and how long the optimal periods are for finding respondents at home during the week. In some countries, the non-work hours (early morning, evening, and weekends) are the best times to get respondents. It will be necessary to consider the work and general life patterns of the population before adopting an interviewing plan, and the interviewing timetable may be influenced considerably by these factors. Time must also be allowed for interviewers "calling back" to get respondents who previously were not at home. The maximum number of call-backs for a single respondent is usually determined in advance and communicated explicitly to the interviewers to prevent their wasting an unreasonable amount of time trying to locate a single individual. In some remote rural populations it may be necessary to have the interviewers actually enter and live in the village during an intense data-collection period, as was done in the Thai village survey. Even in that study, Suwanwela and his colleagues (1977, 1978) found that most subjects worked in the fields from early morning until dark, leaving only a few evening hours available for interviewing.

In any case, adequate time can be estimated for each of the steps which will comprise the study, making allowances for some unanticipated problems, and then the time to complete the entire chain of events can be calculated by summing across those elements.

4.6.2 Cost factors

There is really no general purpose cost estimate which fits all general population drug abuse studies, not only because the size and complexity of the studies are so varying, but because the costs of such factors as labor, computer time, and sampling fluctuate so much from country to country. To illustrate, the field costs per completed interview were estimated to range from $80-$100 U.S. in a Canadian household survey, to $20-$30 U.S in
a Mexican household survey to around $10 U.S. in the Pakistan household survey in Buner. In most developing countries the costs would be likely to tend toward the lower half of that range.

Usually the personnel costs are the largest single component of the budget. Travel can be a substantial item as well, if much interviewer travel is required to reach the respondents. If consultants or subcontractors are used (for example, in sampling, field coding, keypunching, interview design, or analysis) they also will contribute to costs. And computer costs, printing costs, clerical costs, and office space must be figured in, as well as any costs which might be associated with getting the information needed for sampling.

Investigators trying to do cost estimates often segregate the field costs (interviewer time and travel costs) from the other costs, since they are often most easily estimated on a per-responder basis. In fact, having the per-responder marginal cost is useful in determining the intended sample size for the study, a topic discussed below in Section 5.1.4.

5. METHODOLOGICAL CONSIDERATIONS IN THE PLANNING OF DRUG ABUSE SURVEYS

In this section the methodological issues of sampling, interview construction, field procedures, the reliability and validity of measurement, and data analysis techniques will all be considered in the light of existing knowledge in the survey research field generally and the experiences of drug researchers specifically. The treatment given here to these complex subjects will be limited. The reader wishing to delve further into these topics is referred to several reference works dealing with general survey research methodology: Babbie, 1973; Moser and Kalton, 1972; Selzitz, Wrightsman and Cook, 1976; and Warwick and Lininger, 1975. Other references dealing with some of the special topics discussed below, will be referenced in the appropriate sections which follow.

5.1 Sampling procedures

Some aspects of sampling have been discussed already in Section 4.4, Sampling Resources Available. The central issues are determining whether sampling is needed and (assuming that it is) determining what type of data are available for sampling purposes and how to go about drawing a sample from them. The sampling plan must be tailored to the objectives of the research.

5.1.1 Representativeness

The major purpose for drawing a sample is efficiency: if a population is large enough, it is either not practical or perhaps not even possible to survey everyone in it. Question answers from a scientifically selected sample of the people comprising the universe can provide quite accurate estimates of the answers which would be derived if all members of the universe were included in the survey. This is because scientific sampling yields samples of people who on the average are highly representative of the composition of the entire population. Proportions of the sample having various characteristics (e.g., being male, married, a drug user, etc.) should closely approximate the proportions of the entire population which have those same characteristics. Scientific sampling procedures are designed to achieve such representativeness, as will be illustrated in a moment, and sampling statistics permit the estimation of the accuracy of the statistics generated from a sample. To take one illustration, Abelson, Fishburne, and Cisin (1977) used a household sample of 3,300 people representative of a population of 145 million adults living in households in the United States. Sampling statistics indicate that their estimates of lifetime prevalence for the various drugs, based on this limited sample, are almost certain to be within 2% of the figure they would have gotten had they surveyed the entire population. For the more rare drugs, they are almost certain that their estimates are within 1% of the population value (Abelson, Fishburne, and Cisin, 1977, p. 20). Thus, the
very small proportion of the population which was drawn in this sample was highly representative of the overall population.

If properly drawn, even a very small sample is unbiased—that is, over many occasions of drawing such samples, their estimates of proportions should average out to equal those proportions which actually exist in the entire population. However, any one sample can yield estimates which deviate from the true population values simply due to chance or random occurrences. The larger the sample, the less the deviation which is likely to occur. But as the sample gets larger and larger, each additional case adds less and less to the accuracy of the estimates. With such diminishing returns, at some point the additional accuracy from a few more respondents is not worth the additional cost of including them.

5.1.2 Definition of the target population or universe

The first step in sampling is to describe explicitly the population of people who are to be investigated and to whom the investigators want to be able to generalize the results of the study—also called the "universe". Some of the surveys reviewed earlier would have universe definitions such as the following: "all people 18 years of age or older living in a household in the Province of Ontario," or "all inhabitants of the village 10 years of age or older." As discussed in the opening section of this report, nearly all general population surveys exclude some of the inhabitants of the area under study—on the basis of age, institutionalization, homelessness, or whatever. If the method of sampling most readily available (say the household sample) excludes some segment deemed to be of particular importance, an alternative method (say a birth record sample) may be considered. But it simply may be that, for practical reasons, important segments of the population either have to be missed completely or reached through separate, special studies aimed specifically at them. If certain classes of drug users, e.g., heroin users or youthful inhalant abusers, tend not to have permanent places of residence, they almost certainly will be underrepresented in a household sample. The importance of such groups to the objectives of the research should be considered explicitly before a decision is made to proceed with a household sample.

It should be noted that, if a household sample is to be drawn, the concept of a "household" or dwelling unit should be defined carefully in advance and used consistently by all interviewers. This has proven a source of difficulty in some studies, particularly developing countries where dwelling structures are so varied and often shared by more than one family. In Mexico, for example, two different approaches have been used: one is to define family units following the criteria of common food supply and preparation, while the other is to randomly select individuals from segments or groups of houses in a block (Medina Mora, 1979).

5.1.3 Stratification, oversampling, and clustered sampling

The simplest type of sample involves an enumeration of all individuals in the universe and the selection of the required number of cases from the enumeration by means of a random procedure in which every individual has exactly the same probability of being drawn as every other individual. This is called simple random sampling, and may be used in relatively small populations like a village of less than 1000 people. However, in larger populations (and even in some smaller ones) the population often is segmented or stratified along various dimensions before sampling takes place, and the sampling is then carried out separately for each segment. The population might be stratified (divided into subgroups) on the basis of size of community, region of the country, and so on. When census data are used, such strata are used to simplify and improve the sample selection process. For instance, if the universe is a national population in which 25% of the population is known to live in each of four regions in the country, then the sampling statisticians will draw separate, equal-sized samples for each region. If in one region a third of the population lives in cities of 100 000 or larger, then one-third of the cases in that region will be drawn separately from the population in these larger cities. Thus, the sampling is conducted in
such a way that each of the strata defined on the various stratification dimensions (region and community size, in this example) is represented in the resulting sample in exactly the same proportion as it occurs in the actual population. This procedure, which was used in a number of the studies reviewed earlier, including all of the nationwide studies in the U.S. and Canada, improves the accuracy or representativeness of the sample.

Stratified sampling can be used for another purpose in addition to that of achieving accurate proportional representation along chosen dimensions. It can be used to select a disproportionate number of cases in subgroups considered of particular importance and for whom an insufficient number of cases would turn up with normal sampling. The report of the national study by Abelson, Fishburne, and Cisin (1977) (which provides a detailed description of a stratified sampling procedure) illustrates an example of such disproportionate sampling. Since illicit drug use was known to be concentrated among adolescents and young adults, the investigators substantially oversampled those segments of the population. This gave them more accurate estimates of drug use for those important age groups and also gave them a larger number of active drug users in their total sample of respondents. When calculating the overall drug use estimates for the total population, they gave proportionately less weight to the answers of respondents in the oversampled strata to correct for their disproportionate representation. Such procedures have been used in many other large scale surveys for much the same reasons as they were used in this one.

Large scale survey samples usually have one other important feature which distinguishes them from simple random samples. It is the selection of clusters of respondents—that is, groups who live in geographical proximity to one another. The reason for using this procedure is a pragmatic one: There are considerable cost efficiencies in the final sampling and in the interviewing stages in having respondents clustered by town or city. Without an attempt to assure clustering during sampling, one might end up with one or two respondents in each of 1000 different communities around the country; and it obviously would cost a great deal in travel expense and interviewer time to get interviewers out to all of those communities. But with clustered sampling, it is possible to limit the sample locations to perhaps 80 or 100 geographical areas of limited size, such as counties or districts or cities. If done correctly, rather little accuracy is lost in the survey estimates for the country as a whole, though this may not be intuitively obvious. A great deal of cost efficiency is gained, however, since now interviewers need only get to (or, more likely, be hired in) 80 or 100 locations. In fact, major survey organizations usually maintain a set of such geographic areas (called Primary Sampling Units or PSU’s) in which they conduct all of their nationwide surveys and in which they have permanent interviewing staffs. Taken as a whole, the population in the set of PSU’s should be highly representative of the larger population of the country, even though it may contain only a small fraction of the total population. In a sense, it already is a sample, though still too large a one for a survey. The PSU’s themselves have already been drawn using a stratified sampling technique in which region of the country, size of community, and other important demographic factors have been carefully controlled. When a particular national study is to be done, the specific sample (of perhaps 2,000 people) is drawn from within that set of PSU’s.

5.1.4 Numbers of cases required

The studies reviewed in Table 1 provide a wide range of sample sizes, and there is no one best answer to how many respondents to include in a survey (See Kish, 1967). Accuracy of the survey estimates tend to rise as a function of sample size and the proportion of the population contained in the sample. When the sample is likely to be an insignificant proportion of the population, as in national studies or studies of large cities, from 1,000 to 3,000 cases have typically been included. The more accuracy that is sought in the estimates derived from the survey, and particularly the more that accuracy is required in subgroup estimates, the larger the sample that is needed. Determining appropriate sample size is one of the problems on which the assistance of a professional sampling statistician can be of particular help.
A stratified random sample may give good prevalence estimates for most types of drug use, and it may yield enough users of a number of drugs to permit in-depth analysis. However, certain drugs will have a very low prevalence and will yield too few cases in a probability sample to allow such users to be characterized very accurately. A method recommended by some investigators for increasing the number of users—in addition to oversampling strata of the population deemed to be at high risk of—is called "snowballing." It involves asking those respondents in the main sample who say they are users to identify other users, who subsequently can be located and given the same interview even though they were not in the study sample. These additional cases should not be considered part of the random sample and should not be used in population estimates, but they may be useful in more specialized analyses of users. One should keep in mind, however, that any biases in the types of users captured in the original sample may still exist in the "snowball" sample, since users are likely to identify other users similar to themselves.

5.1.5 Other sources of information on sampling

For a relatively brief introduction to sampling see Babbie (1973, Chapters 5 and 6); Moser and Kalton (1972, Chapters 4 through 7); or Warwick and Lininger (1975, Chapters 4 and 5). For a more in-depth treatment, see Kish (1967) or O'Muircheartaigh and Payne (1977).

5.2 Data collection instruments

5.2.1 Alternative types of instruments

Nearly all of the studies of general populations in the drug field have used the personal interview, in which an interviewer meets face-to-face with the respondent and asks questions from a structured interview schedule. The respondent's oral response is then recorded by the interviewer on the schedule. Since the major alternative to the interview, the self-administered questionnaire, requires reading proficiency on the part of the respondent, it is really not appropriate for most general populations. Even countries with the highest literacy rates have some proportion of the population who cannot read, or who do so with great difficulty. Thus the alternatives relating to the choice of an appropriate data collection instrument are really only variations on the personal interview procedure.

One variation is to conduct the interview over the phone rather than in person. Such an alternative is only realistic to consider in the most industrialized countries in which widespread and reliable phone systems exist. Phone surveys are carried out rather regularly in a number of such countries, using random-digit dialing as the sampling technique; however, to date no survey in the drug abuse field has used the phone interview, and this may be for good reason. First, there are real sampling limitations to the procedure because of the households which do not have phones and, second, it is questionable whether sufficient cooperation, trust, and privacy can be established in a phone interview to deal with potentially sensitive information like personal drug use.

Another variation on the personal interview was developed because of the sensitivity of the information being collected. Abelsohn, Fishburne, and Cisin (1977) have used answer sheets which the respondent fills out himself to record his answers about personal drug use, after the interviewer reads each question out loud. The purpose of this procedure is to allow the respondent privacy in giving his answers—not only privacy from the interviewer but from anyone else in the household who may be listening. After completing the answer sheets, the respondent seals them in an envelope which he can either hand to the interviewer (who promises not to open it) or mail immediately to the research headquarters. The procedure seems to work rather well, though it must be pointed out that the population being interviewed is on the whole quite literate. It seems doubtful that such a procedure could be used successfully with totally illiterate respondents; and
this is unfortunate, since obtaining privacy in the household—particularly for youthful respondents—often is difficult.

If respondents are unable to read an answer sheet, certain other alternatives might be considered for assuring the privacy of their answers to sensitive questions. One technique is to have a second interviewer along to distract other people in the dwelling by asking them questions at the same time the main interview is being conducted. Another is to have the respondent give non-verbal answers to the questions, such as pointing to one of two colored cards (say, a green card to indicate a "yes" answer and a red card to indicate a "no").

5.2.2 The selection of interview content

The proper content for an interview obviously derives from the objectives of the research, as well as the types of drug use and social conditions known to exist in the population under study. Certain general components are to be found in nearly all general population studies of drug abuse: one being a section on the demographic and family background characteristics of the respondent, and another being a section on the respondent's own use of various drugs. However, even within these common sections the choice of variables, as well as the specific questions with which to measure them, varies from study to study. Nehemkis, Macari, and Lettieri (1976) compiled a great many measures of the same variables which had been used in North American studies of drug abuse, and two committees have been formed in the U.S. to make recommendations concerning the standardization of measures in drug surveys (Elinson and Nurco, 1975; Rittenhouse, 1978). Still, despite such efforts it remains likely that variation in measures will continue to exist, because of (1) different research purposes and designs dictating different measures, (2) different populations requiring somewhat different measures, and (3) different personal preferences on the part of research investigators. When there is no compelling reason to deviate from measures which seem to be evolving as standard, however, there may be some real advantages to using them. For one, using them increases comparability across studies and thus one's ability to meaningfully compare results. For another, there is a good chance that considerable thought and experience has gone into the choice of standard measures. Reviewing the two committee reports just mentioned is recommended for those who have the time and access to them. Also recommended is a review of the questionnaire measures (which could be adapted to interview format) which recently were developed by an international WHO working group for use in a wide range of countries (Smart et al., 1980).

The United Nations Manual on Drug Abuse Assessment (1980, Part II) also contains a model interview schedule for drug abuse research, though as yet it has not been pilot tested. And, of course, all of the surveys reviewed in Table I used interview instruments which may be available from the relevant investigators or agencies.

In addition to demographic, background, and drug use variables, drug use surveys have incorporated a host of other classes of variables. For example, variables relating to many of the hypothesized consequences of drug use have been included in one or another study measures of such things as antisocial behavior, work performance, academic performance, functioning in family and other social roles, social alienation, physical health, and mental health. Naturally, measures of a wide range of hypothesized social determinants of use have also been included—for example, exposure to use, availability of the drugs, drug using behaviors of family and friends, and membership in sub-environments (such as work, school, college, and military). Many psychological determinants also have been included: attitudes and beliefs about drug use and drug users, affective states, lifestyle orientations, and so on.

A clear limitation on content is the total time which an interview can take. Most interviews do not last much over an hour, and for some populations that may prove too long. Given that a number of different drugs are investigated in most studies of drug
abuse, the section dealing directly with use and related issues (frequency, quantity, route of administration, age at first use) may take a substantial portion of the interview. Thus an investigator must be rather selective in choosing additional variables having to do with causes, correlates, and consequences.

5.2.3 Procedures for developing the interview

The proper development of an interview schedule takes a considerable amount of time and care. This is partly true because the exact wording of questions can substantially influence the nature and usefulness of the answers. Each question must be examined to determine (a) whether it asks the question one wants to be asking, (b) whether it will be confusing to the respondent, and (c) whether it will elicit answers of a sort that will be most useful. Sometimes the answer alternatives are built right into the question, such as "Would you say that smoking opium is a good thing to do, a bad thing to do, or neither?" This can help the respondent to answer along the correct dimensions and according to any prespecified alternatives judged to be useful.

The sequence of questions within the interview also can be important to the results. If drug use is a socially disapproved behavior in the population, investigators usually begin with less sensitive material to help build rapport first. If there is one set of questions which, if answered before another set, might influence the answers to the latter, then these two sets probably should not be placed in that order.

As already been discussed, it is very important to try out (or pre-test) the instrument during its development to see what actually occurs when the questions are asked of live respondents. After answering, they can be questioned about what they understood each question to be asking, whether there were terms which were unfamiliar or confusing in the questions, and what they meant to communicate by their answers. A full-dress pilot test on a selected set of respondents (who are not part of the main sample) also is likely to prove very useful for the refinement of the instrument, as well as for the refinement of the field procedures. The answers to open-ended questions can be coded (to see if the answers being elicited are of a useful sort and can be meaningfully coded) and the time to complete the entire instrument can be checked. The pilot test quite commonly indicates a need to shorten the interview.

Some formatting alternatives in the layout of the questionnaire will allow it to be written on fewer pages, which may have the advantage of not discouraging the respondent with the sheer size of the interview. One such alternative, which has been used with mixed results, is to combine onto a single page the questions which are repeated for each class of drugs being studied. The series of questions is written only once, with the name of the drug left blank in each question: for example, "Have you ever used _____?"; "How old were you when you first used _____?"; "Have you used any _____ in the last month?"; and so on. For each drug, the answers to these questions are written sequentially in a single column, one answer column having been assigned to each drug. The questions are only written out once, instead of repeatedly, usually in the left-hand column. While perhaps better for the respondent and more conserving of paper, this "grid" format is considerably more complex and demanding for interviewers to use; thus, investigators from some developing countries recommend against its use.

Before finalizing the format for the interview, the investigator is also well-advised to consider how the answer information is to be put into numerical form for analyses, after the interviews are filled out. Is the layout such that coders or keypunch operators can move quickly and with little chance for confusion? Can the card and column locations assigned to each answer be specified in advance and printed right into the questionnaire? If so, this will save time later and reduce the error rate considerably. If some other organization is going to code (or directly keypunch) the answers into numerical format, representatives of that organization should get to review the interview format before it is finalized to be sure that they can work efficiently with it.
The detailed procedures for designing an interview are too complex to be dealt with at more length here; therefore the reader is referred to several texts which deal with these issues. See Chapter 7 of Babbie (1973), Chapters 13 and 14 of Moser and Kalton (1972); Chapters 6, 9, 12, and Appendix B of Sellitz, Wrightsman, and Cook (1976); or Chapter 6 of Warwick and Lininger (1973).

5.2.4 Honesty in self-reports of drug use

The issue of honesty in reporting drug use was discussed at some length by the experienced investigators at the WHO Malaysia meeting. Investigators from some countries questioned whether it would even be possible for them to get high levels of honesty in their populations, or in some sub-populations in their countries. The importance of the particular research agency and types of interviewers being used was stressed by many, as were the rigor with which drug laws are being enforced, the severity of the penalties or other consequences of exposure, and the general social stigmatization attached to drug use. Since many of these factors vary from community to community within a country, it was observed that levels of honesty may show similar variation within countries. Probably the most vital issue for respondents is the credibility of the assurances of confidentiality given by the researchers. Investigators from a number of countries felt that medical personnel and, in some cases, local officials would evoke the greatest trust; in others academic researchers would be trusted. Few felt that official representatives of a regional or national government were in the best position to evoke candor from respondents about illegal behavior.

In some countries, such as the United States, special laws have been enacted permitting drug researchers to protect the confidentiality of the data they gather, even from government agencies and courts. It was the opinion of the investigators that such a law may well facilitate drug research in other countries.

5.2.5 Reliability and validity

Two essential characteristics of any measurement procedure are their reliability and validity. Validity refers to the degree to which a procedure (e.g., a question in a particular survey) measures what it is purported to measure. Reliability, a necessary but not sufficient condition for validity, refers to the extent to which the procedure can yield comparable results on repeated occasions of measurement when the real phenomenon being measured has not changed. The measurement procedure must be reliable to be valid, but it can be reliable without being valid—in other words, it can be reliably or consistently invalid.

Survey information may be invalid for a number of reasons, including poor understanding of the questions, poor recall on the part of respondents, unintentional distortion caused by the way the questions or answers are presented, or intentional distortions. Because of the legal status of drug use in many countries, the validity issue which has been of most concern to drug investigators has been the deliberate understatement or denial of drug use. Understatement, if it occurs, may also occur differentially for different drugs.

While reviews of the literature on the validity and reliability of self-reported drug use are encouraging (Smart, 1973; Whitehead and Smart, 1972), it is important to remember that most of the studies reviewed were on North American populations. Validity and reliability may be high in one population yet very low in another, using exactly the same measures and procedures. Therefore, it is desirable that these characteristics of the measures be tested out in the population of relevance. Reliability may be tested by checking for logical consistency among multiple measures of the same variable. Sometimes this is done by looking at the "internal consistency" of multiple items in the same questionnaire. However, since drug use questions are seldom repeated in questionnaires, it is more likely to involve readministering questions to some sample of
respondents after enough time has elapsed that they would be unlikely to remember the answers they gave on the first administration. Validity may be checked by seeing whether other sources give information about the subjects which is consistent with what they said about themselves. For example, drug use information about a set of interviewees might be gathered from official sources (e.g., police and treatment program records) or from informants likely to be knowledgeable (e.g., friends, acquaintances, family members). It must be remembered, however, that the other sources may not provide completely valid data either.

Other information may be gathered from the respondent by a physical examination (for needle marks, for example) or by the interviewer rating the candor with which the respondent seemed to be answering. Urine samples may also be requested, an important technique which is discussed separately in the next section.

Another approach sometimes suggested to check the validity of the overall population estimates rather then the validity of individual's answers. This can be done by using an "intensive case finding" method in a population of limited size, if such a method can be found which would yield a complete enumeration of users of a particular drug. The prevalence rate yielded by the intensive case finding method can then be compared to that yielded by the sample survey. Naturally, the definitions of "drug use" or "drug user" would have to be the same under the two methods for any comparisons to be meaningful. Usually intensive case finding leads to chronic and known users, whereas general population surveys (which may or may not capture such users) tend to get other types of users as well.

A completely different type of approach to checking for validity is to test for what is called "construct validity." Do the variables in question (in this case, drug use variables) relate in consistent and predicted ways with other variables which are known, or strongly hypothesized, to be related to them? If so, this is evidence of construct validity. For example, if knowledgeable observers believe that males and older people in its population smoke opium more than others, then a confirmation of their hypothesis by the survey results constitutes some evidence of construct validity for the survey.

Whatever approach may be viable in the particular circumstances, it is deemed highly advisable for investigators in the drug field to attempt to ascertain the validity and reliability of their drug use measures for their particular populations. And the more that drug use is a socially and officially sanctioned activity, the more this holds true. Obviously, every effort should be made in advance to maximize the validity of the measures (a) thoughtful choice of the survey organization, (b) careful selection of interviewers, (c) careful development of the interview procedure and interview structure, (d) careful development of the specific questions on drug use, and (e) careful pretesting of the interview format and questions to be sure that the questions are clear and understandable to respondents. But it is still important to test the overall effectiveness of these efforts in some type of validity/reliability study, and preferably before undertaking an expensive, full-scale survey of a large sample.

5.2.6 Urine testing

Still another approach to validating the answers of a respondent concerning his current use of drugs is through urinalysis. This approach has been used most frequently in research dealing with opiate use. The technology now exists to detect in the urine many drugs or their byproducts for some time interval after use, and the Thai village study illustrated this approach (Suwanwela et al., 1978) as did the Iranian survey. Like most other methods, this one also has its limitations. One is that the identifiable metabolites of most drugs remain in the body for only a limited period after administration; another is that laboratories conducting urinalysis vary considerably in the reliability of their own test results. A different type of problem relates to the likely impact on respondents of requesting a urine sample. In both the Thai and Iranian surveys, the urines were collected as part of a health component of the survey. Without such a rationale, requesting a urine sample would seem a strange and inappropriate request in most populations.
5.3 Field procedures

The role of field staff in enumerating households in sampling areas, and in enumerating family members within households, has already been discussed, as has their critical role in the interviewing itself. In Section 4.5.2 we also discussed the selection of the individuals for the role of interviewer.

The training and supervision of interviewers is also a very important step in the development of the field staff. A discussion of this process would be too detailed for a report such as this, but the reader wishing to learn more about the dynamics of the interviewing process and the importance of interviewer behavior is referred to Kain and Cannell (1957) and Gorden (1969). A general training manual for interviewers is available from the University of Michigan's Survey Research Center (Survey Research Center, 1975), although similar manuals may be available from nearby survey research organizations, as well.

It is important to realize that even with very careful selection in the hiring of interviewers, it is likely that some will prove unable or unwilling to do a reliable and competent job. Therefore, it is highly advisable to build in quality control checks on the work being done by interviewers at each stage (i.e., enumerating households, enumerating family members, and conducting the interviews) both to be certain that the work is actually being completed and is being done correctly. Unfortunately, the possibility exists that a few interviewers among those newly hired will fill out (or "fake") some interviews themselves, rather than actually collecting the data. It is essential to identify such people early and replace them. Other interviewers may simply be making honest mistakes which can be corrected with further training. Probably the most common way of checking the quality of interviewer performance, other than examining the interview protocols they submit, is to have a second person go out into the field to determine if their assigned work was performed correctly. A sample of each interviewer's listing and interviewing assignments can and should be checked in this manner, and interviewers should be told in advance that this will be a standard procedure.

Also, interviewers need rather explicit instructions on how to handle certain tasks. For example, they usually are given pre-established procedures for selecting a respondent from among the various members of a sampled household, and their sampling procedure will vary depending on the number of people (and perhaps the age of the people) in the household. They also need explicit instructions for determining who is not to be interviewed (i.e., people who are senile, ill, mentally deficient, drunk, or high on drugs); and, as mentioned earlier, they need instructions concerning the amount of effort and/or money to spend trying to locate any given respondent.

5.4 Data preparation and data processing

Countries and research installations within countries differ substantially in the data handling resources available to them. Some have no machine systems available at all and thus must resort to hand tabulating the results or using manually sorted McBee punch cards. Some have machine card sorters for use with keypunched cards. These are a big improvement over manual systems, but are still slow and cumbersome compared to electronic data processors, and have the further disadvantage that the cards can be lost or damaged or may degenerate with time. Fortunately, many developing countries now have acquired computer capabilities, which means not only that analyses can be done with more efficiency and less human error, but also that far more complex analyses are open to the researcher. Getting access to these computers is another matter, however, and some drug investigators have found that it takes some time to get analysis runs completed, given the various agencies competing for the scarce computer time.

The packages of computer programs available for analyses will vary from facility to facility. The two most widely used program packages in the social sciences are SPSS and OSIRIS, so if either of these is available, it should provide a good starting point.
Exactly how the information on the interviews will be put into machine-readable form depends both on the format of the interview and the technology available at the facility. If the answer alternatives for each question have been prespecified and given numerical identification right in the interview schedule (i.e., they are "pre-coded"), it may be possible to have keypunchers work directly from the interview schedule. If, as is more common, the answers have not yet been put into numerically coded categories, then the intermediate step of coding must take place. This means that for each question the researchers must decide upon a set of mutually exclusive answer categories into which they want the answers to that question to be coded (or collapsed). Code numbers must also be assigned for the absence of responses. Once a set of codes is developed and pre-tested, people must be trained to code the answers on each interview schedule into the proper numerical coding categories. In essence, the coders must translate verbal information into meaningful numerical information so that it can be manipulated by a computer or card sorter. To assure accuracy in this important step in the process, researchers routinely have some or all of a coder's work "check-coded" by another coder. Differences are then discussed and resolved.

Entering numerical information into the computer can be accomplished using direct data entry terminals (usually only available at the most sophisticated facilities) or, more commonly, by keypunching cards, either from the code sheets produced by the coders or from the interview schedule if the answers were pre-coded.

5.5 Data analysis and extrapolation

A good portion of the published reports from the general population surveys reviewed earlier were comprised of rather straightforward descriptive information. Therefore, the analyses associated with such surveys need not be terribly complex.

Usually of primary interest is the prevalence and incidence of use in the general population for each of the various drugs under study. Then, usage levels among important subgroups (usually defined in terms of background and demographic variables) are of interest. Many reports do not go beyond this point, and these basic univariate and bivariate distributions are among the easiest statistical analysis techniques available. (See Hays, 1973; Loether and McTavish, 1974(a); or Weinberg, 1974; or just about any elementary statistics text.) Of slightly greater difficulty is calculating the confidence intervals around any given estimate—the intervals which take into account the amount by which the estimates may be off due to sampling error. (See Section 5.1 for a discussion of sampling error.) However, the procedures for doing these calculations are also contained in almost all elementary statistics texts.

Inferential statistics, used to make inferences about causes, effects, and degrees of association are more complex and, therefore, require more statistical sophistication. A number of texts which deal with these subjects are available (e.g., Hays, 1973; Loether and McTavish, 1974(b); Weinberg, 1974) and one volume is even specific in its application of such techniques to drug research data (Bentler, Lettieri, and Austin, 1976).

Analyses involving tests of reliability and validity may also be somewhat complex, so it is advantageous to have either a statistically trained member of the staff or a consultant available to help on these analyses, as well as on the original research design which led to them.

In sum, while surveys of the type discussed in this report certainly may make use of very sophisticated analysis techniques, much of what is of value in them may be derived from rather simple analyses. Even for simple analyses, however, it is helpful to have some formal statistical training represented on the staff, though the level of that training may not need be as great as is first imagined.
6. DECIDING WHETHER TO CONDUCT A SURVEY

Naturally, the question of whether to undertake such a survey comes down to a weighing of the costs which are likely to be associated with it against the benefits likely to be derived. Some of the factors which influence costs and benefits will be discussed separately below.

6.1 Factors influencing the costs

If costs are thought of in terms of other programs foregone in order to allocate scarce resources to the survey, then presumably the cost is greater to developing countries than to others. But, if drug abuse is seen as a source of other social problems and in need of concentrated attention, then the cost may be justified. Also, it is likely that in developing countries the cost of one of the major resources needed for the survey, labor, will be less, although skilled labor of the particular type needed may be in short supply. As stated earlier at the meeting of investigators in Malaysia, rough estimates of the field cost per respondent ran from a low of $10 U.S. in the Pakistan Survey of Buner, to $20-$30 U.S. in Mexican surveys, to $80-$100 U.S. in Canadian surveys—a very wide range, certainly explainable in considerable part by differences in labor costs.

Also, the cost of the survey will be more or less depending on the extent to which a new organization must be built to carry out the work. If an existing survey unit with sampling statisticians and a trained field staff can be utilized, the undertaking is considerably easier—at least in the case of a large-scale survey. Also, if adequate sampling information already exists in the form of census or other data, that can also make a substantial difference if the population of interest is very large. (It obviously makes rather little difference in a village of a few hundred people.)

The nature of the population to be studied also can affect costs significantly. If the population is remote from the field staff, then travel costs can mount rapidly. If respondents are likely to be difficult to locate, and thus require several trips by the interviewer to attain a successful interview, that also contributes to costs. And, if respondents must be compensated in some way for their cooperation, it can make a sizeable difference.

As stated earlier in Section 4.2, the cost of doing a drug survey is reduced considerably to the extent that there are other paying components. The least expensive alternative is to "piggyback" a set of drug questions on to another survey which would be taking place anyway. However, there are also a number of drawbacks, most of which were covered in the earlier discussion. It was the opinion of many investigators at the Malaysia meeting that for many developing countries a shared survey was the only practical alternative for studying drug use in the general population.

6.2 Factors influencing the benefits

First, to the extent that no problem is believed to exist in a population, nor is one believed likely to emerge in the near future, there is presumably rather little benefit to be derived from doing a survey on drug use. Conversely, to the extent there seems to be a problem emerging or already existing, the greater the potential payoff from gaining a better understanding of it. Knowing the size and severity of the problem is useful for decisions about the allocation of resources, while being able to localize the problem in particular segments of the population can help to increase the effectiveness of intervention efforts by permitting them to be aimed at those most in need. And knowing something about the etiology of drug use may help in the planning of more effective prevention efforts. So the extent and severity of the problem believed to exist is one factor to be considered in calculating potential payoffs.
Also to be considered is whether alternate information systems exist or could be
developed which would generate much of the needed information at less cost or more
usefully. Other publications from WHO and the UN (Rootman and Hughes, 1980; UN
Manual on Drug Abuse Assessment, Part 1, 1980) deal with alternative methods of
systematically gathering data on drug abuse in the population. Examples of such systems
are case reporting systems, information systems based on drug-treatment program
records, or information systems from social service agencies or health care agencies.
Most of those generate data from users who have come to the attention of social agencies,
which may leave a substantial portion unidentified; and this is more so in some countries
than in others. Still another approach, in settings where drug users are judged to be
underrepresented in a general household sample or to be unlikely to respond honestly if
interviewed, is to use intensive case finding techniques, which may utilize third parties as
informants.

Another important consideration is whether the survey can be conducted
successfully. If the population is unlikely to cooperate with or confide in researchers, no
matter who they are or what institution they represent, then valid data probably cannot be
obtained through the survey method. And, even if honesty can be obtained, if the
information needed to draw a reasonably representative sample is not available and cannot
be developed specifically for the study, then it is unlikely that results can be secured
which are generalizable to a large population. Finally, even if cooperation is forthcoming
and a good sample can be drawn, to the extent that the defined population excludes most
of the cases of interest (say, because serious drug users tend to be homeless or in
institutions), the value of the overall study is reduced.

6.3 The comparison of costs and benefits

Certainly the final decision about whether to proceed with a general population
survey is a matter which must be judged by those close to the situation. An effort has
been made here to enumerate the major factors which should be taken into account. How
they should be weighed in any particular instance depends on their relative importance to
the interested parties.

One closing point having to do with the ratio between the costs of the survey and the
benefits to be derived. Sample surveys of very large populations—say, an entire
nation—are often not much more expensive than sample surveys of smaller, but still
sizeable populations, such as the population of a large city, state, or region. This is so
because, beyond a certain population size (perhaps 5000 inhabitants) the size of the sample
needed for a particular level of accuracy in the estimates, remains fairly constant. In
other words, the sample size would be about the same for a national survey as for one of a
state or region. Usually having estimates for the nation as a whole is of considerably
more social benefit than having estimates only for a given state or region. Thus, while the
benefits of a survey of a given size may be increased substantially by making it nationwide
in scope, its cost may increase rather little. Before launching a large-scale sample survey,
then, policy-makers are well advised to determine whether they could increase their ratio
of benefits to costs by having the study encompass a larger population, e.g., a state
instead of a city, or a nation instead of a state. It may be, of course, that costs would
increase as much or more than benefits, making it inadvisable to enlarge the scope of the
study. For example, if it would be necessary to build and maintain a nationwide staff of
interviewers, because none exists, then the costs may be much higher for a national study
(not because more total interviewers would be needed, necessarily, but because the costs
of hiring, training, and supervising a geographically dispersed set of people may be much
greater). Similarly, if the information needed for sampling is better or more accessible
for a smaller population than for a larger one, the sampling costs may be substantially
greater for a study of the larger population. But the main point is that the commonly
made assumption—that a survey of a larger population will be considerably more
expensive than a large-scale survey of a much smaller population—should be examined
carefully. It may prove unfounded.
7. SPECIAL CONSIDERATIONS FOR DEVELOPING COUNTRIES

Throughout this report emphasis has been given to the conditions and considerations which should be taken into account in developing countries. Nevertheless, it may be useful to bring them together and briefly review them at this point. Probably the most obvious and important problem in developing countries, and the one which bears most on both the feasibility and desirability of conducting general population surveys, is the scarcity of particular resources. Obviously, in light of the many urgent goals and programs in these countries, the advisability of allocating money and skilled personnel to a survey must be weighted carefully. There may, in fact, simply be an absence or critical shortage of certain necessary skilled professionals such as sampling statisticians, social scientists trained in survey research methodology, people with the appropriate background and motivation to interview, and so on. Various technical resources may be difficult to access as well—things such as printing equipment, keypunching equipment, and computers.

There is also a good chance that certain organizational supports may be lacking, such as an existing system for drawing national samples (or even the census data from which to draw them) or a standing staff of interviewers (or at least of interviewing supervisors). Without these systems in place, the task will be more formidable.

There are also certain problems in the data collection stage which are more likely to be encountered in developing countries. Where there are very poor or very transient populations, the types of dwellings encountered may make it harder both to define a household and to select a sample of households. Also the census data are likely to become outdated more quickly under such conditions, and it may be harder from aerial photographs and the like to segment the population for sampling.

Crowded and small dwellings also make it harder to establish privacy for the interview, not only from other members of the family, but from others in the neighborhood. In fact, Dr Poshyachinda and his colleagues found in doing a survey of a slum area of Bangkok that a respondent would be noticed by neighbors and embarrassed if the interviewer was holding an interview schedule and writing while questioning the respondent. They were forced to have interviewers memorize the questions and simply take a few notes on a small card during the course of the interview, after which they filled in the interview schedule from memory. And in some countries it is contrary to cultural norms for women to be interviewed by a man, or perhaps by a stranger of either sex. When such a situation exists, it may be necessary to rely on a single family member to act as a reporter concerning the situation and behaviors of others in the family.

People who are transient or not living in any identifiable household (e.g., living on the street, in vacant buildings, and such) will be missed in any household survey unless supplementary sampling procedures are instituted. To the extent that this is where the drug problems of greatest concern are likely to lie, an important segment of the population has been lost from the study.

In rural areas, such as those studied in some of the Thai, Indian, and Pakistani surveys, somewhat different types of problems may pertain. Since many villages are small, there may be no need for sampling within the village, but a sample of villages representative of a larger region may be desired. Clearly if the survey is to succeed, the cooperation of the village leaders in such situations will be required, and other special procedures may be needed as well, such as having a local person as a guide and facilitator of rapport with the villagers. As in the Thai village survey, it may also prove necessary to have the research team remain among the villagers for a period of time to learn the culture, develop trust, and even provide some services of value to the village.

1Since there is likely to be more attention paid to previously isolated and inaccessible regions of many developing countries as international efforts increase in drug abuse prevention, treatment, and control, WHO convened a special meeting of experts from such countries in 1979 (WHO, 1979).
All of these are concerns which decision makers in developing countries, in particular, should take into account before deciding whether and how to design a study of drug abuse for the general population. The purpose of reciting this rather long list of cautions is not necessarily to discourage the use of this approach, but to assure that a decision to proceed will be an informed one and that the research design adopted will anticipate some of the problems likely to be encountered. It may be informative to know that at the Malaysia meeting, at which these issues were discussed, investigators from several developing countries stated that if they had to select just one information-gathering technique from the various ones which might be used for assessing drug abuse, they would choose the general population survey for their own countries. They did not assume that the same decision was best for all developing countries, but for their own countries they concluded that it was.


Calderon, G., et al. "Community Responses to Alcohol Related Problems" (part of a collaborative international research project in progress), CEMESAM, San Rafael Mental Health Center, Mexico, ongoing.


Sartorius, N. Priorities for research likely to contribute to better provision of mental health care. Social Psychiatry, 12, 1977, 171-184.


