

VITAL and HEALTH STATISTICS
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Needs for
National Studies of
Population Dynamics

**A Report of the United States National
Committee on Vital and Health Statistics**

An assessment of the types of studies needed in the field of population dynamics, the specific types of data needed to yield such studies, and the steps required to meet these needs most effectively.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
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FOREWORD

Marked changes continue with respect to the size, distribution, and composition of the Nation's population. This dynamic nature of the U.S. population is a consequence of varying patterns in family formation and dissolution, fertility, mortality, and migration.

The central purpose of this report, prepared under the auspices of the U.S. National Committee on Vital and Health Statistics, is to call attention to the "types of studies needed in the field of population dynamics, the specific types of data needed to yield such studies, and (to make) suggestions as to how such data might best be collected." Suggestions are made for systematically augmenting the usefulness of the existing data sources, and where most essential, certain new data sources are recommended.

Forrest E. Linder, Ph.D.
Chairman
U.S. National Committee on
Vital and Health Statistics

U.S. NATIONAL COMMITTEE ON VITAL AND HEALTH STATISTICS

Forrest E. Linder, Ph.D., Chairman
Professor, Department of Biostatistics
School of Public Health
University of North Carolina
Chapel Hill, North Carolina

Charles E. Lewis, M.D.
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Assistant Director of the Harvard Center
for Community Health and Medical Care
Boston, Massachusetts

Iwao M. Moriyama, Ph.D., Executive Secretary
Director, Office of Health Statistics Analysis
National Center for Health Statistics
Health Services and Mental Health Administration
Public Health Service*
Rockville, Maryland

Abraham M. Lilienfeld, M.D.
Professor and Chairman
Department of Chronic Diseases
School of Hygiene and Public Health
The Johns Hopkins University
Baltimore, Maryland

Donald J. Davids
Chief, Records and Statistics Section
Colorado State Department of Public Health
Denver, Colorado

Robert Parke, Jr.
Program Planning Officer
Bureau of the Census
U.S. Department of Commerce
Washington, D.C.

Kingsley Davis, Ph.D.
Director, International Population and
Urban Research
Professor of Sociology
University of California, Berkeley
Berkeley, California

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Health Officer
County of Orange Health Department
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William R. Gaffey, Ph.D.
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San Francisco, California

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School of Medicine
University of Washington
Seattle, Washington

Herbert E. Klarman, Ph.D.
Professor, Department of Environmental Medicine and
Community Health
Downstate Medical Center
State University of New York
Brooklyn, New York

Theodore D. Woolsey, ex officio
Director, National Center for Health Statistics
Health Services and Mental Health Administration
Public Health Service*
Rockville, Maryland

Paul Kotin, M.D.
Director, National Institute of Environmental Sciences
National Institutes of Health
Public Health Service*
Research Triangle Park, North Carolina

*Department of Health, Education, and Welfare

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SUBCOMMITTEE ON POPULATION DYNAMICS

Clyde V. Kiser, Ph.D., Chairman
Vice President for Technical Affairs
Milbank Memorial Fund
New York, New York

Oscar Harkavy, Ph.D.
Director
Population Program
Ford Foundation
New York, New York

John E. Patterson, Secretary
Chief, Natality Branch
Division of Vital Statistics
National Center for Health Statistics
Health Services and Mental Health Administration
Public Health Service*
Rockville, Maryland

I. M. Moriyama, Ph.D. ex officio
Executive Secretary,
National Committee on Vital and Health Statistics
National Center for Health Statistics
Health Services and Mental Administration
Public Health Service*
Rockville, Maryland

Donald J. Bogue, Ph.D.
Director, Community and Family Study Center
University of Chicago
Chicago, Illinois.

Robert Parke, Jr.
Program Planning Officer
Bureau of the Census
Department of Commerce
Washington, D.C.

Arthur A. Campbell
Deputy Director, Center for Population Research
National Institute of Child Health and Human
Development
National Institutes of Health*
Bethesda, Maryland

Robert G. Potter, Jr., Ph.D.
Professor
Department of Sociology and Anthropology
Brown University
Providence,
Rhode Island

Leslie Corsa, Jr., M.D.
Director, Center for Population Planning
School of Public Health
University of Michigan
Ann Arbor, Michigan

*Department of Health, Education, and Welfare

IN THIS REPORT a Subcommittee of the U.S. National Committee on Vital and Health Statistics presents its findings on the principal needs for improvement in the statistics on population dynamics for this country and offers proposals as to how these needs might best be met. Recommendations are made relating to statistics on marriage and divorce, fertility and family planning, migration, and mortality and morbidity, and to the role of these factors in the study of population dynamics. The relationships between census and vital statistics data are examined, and suggestions are made for improving these data in relation to each other. The Subcommittee also suggests some ways in which various agencies of the Federal government might contribute more effectively in the collection, improvement, analysis and dissemination of demographic data.

NEEDS FOR NATIONAL STUDIES OF POPULATION DYNAMICS

INTRODUCTION

As in other countries of the world the population of the United States is highly dynamic. It has undergone, and it is still experiencing, marked changes with respect to size, distribution, and composition. These changes are the consequences of past trends and differentials in fertility, mortality, and migration, the components of population change.

The Subcommittee on Population Dynamics was given the responsibility of "preparing a report on types of studies needed in the field of population dynamics, the specific types of data needed to yield such studies, and suggestions as to how such data might best be collected."

In preparing the present report the Subcommittee has endeavored to adhere entirely to the spirit, and in essential respect to the letter, of its charge. It was asked to "feel free to make recommendations regarding any phase of population dynamics [but to] consider the factors of reproductive behavior and the related variables to be its area of chief concern."

Accordingly, the first two of the four substantive divisions are devoted respectively to statistics on marriage and divorce, and on fertility and family planning. The section on marriage and divorce emphasizes the importance of including all States in the Marriage and Divorce Registration Area and discusses the possibilities of securing data from special surveys and the censuses until the use of the standard certificates of marriage and divorce are more widespread.

The section on fertility and family planning discusses needed natality statistics, needed studies of "intervening factors," (fecundity, reproductive norms and family planning practices) and the relation of the foregoing to factors such as race, religion, and socioeconomic status.

The next two substantive divisions are concerned with the remaining components of population change, migration, and mortality. That the space devoted to migration may be larger than that envisaged in the charge seems justified in view of the important relation of migration to changing size and composition of metropolitan populations in recent years. In the section on mortality, recommendations for future studies were deliberately restricted to those believed to have special relevance to population dynamics.

Finally, the "Overview" discusses the implications of the Subcommittee's findings for the collection and analysis of data by government agencies. It is hoped that this report will serve not only to point up needs for research in population dynamics but also to suggest some ways in which various agencies of the Government might contribute more effectively in the collection, improvement, analysis, and dissemination of demographic data.

STATISTICS NEEDED FOR THE SYSTEMATIC STUDY OF MARRIAGE AND DIVORCE

Introduction

The family performs many functions that are directly relevant to population dynamics. It is the primary institution into which children are born and prepared for adult life. It is the only social grouping that man usually takes with him when he moves. Because of the importance of this basic institution in shaping the growth and distribution of our population, statistics on family formation and dissolution are essential to an adequate understanding of the nature, determinants, and consequences of population dynamics. However, data now available are not sufficient to measure trends or differentials in various phenomena associated with the family. This section presents a description of the statistics needed for these purposes.

The Incidence of Family Formation and Dissolution

At present, statistics are not available on such elementary variables as the ages of brides and grooms and of divorcing partners for the country as a whole. The available data consist of total marriages and divorces for each State and a few variables such as age, race, and number of times married for the States in the Marriage and Divorce Registration Areas. Even

in some of these States, the reporting of certain characteristics is very poor.

In 1968, the Marriage Registration Area was comprised of 39 States and the District of Columbia and covered about 77 percent of all marriages. The Divorce Registration Area, however, consisted of only 26 States and covered only 56 percent of all divorces. A concerted effort should be made to include all States in the Marriage and Divorce Registration Areas, to improve reporting in certain States, and to encourage the adoption of the standard certificates of marriage and divorce. Only after these actions are taken will there be an adequate statistical base for the study of trends and differentials in marriage and divorce.

Meanwhile, some steps might be taken as interim measures to fill some of the gaps in our knowledge. One would be the development of a method of estimating current annual numbers of marriages for the entire United States, classified by age of bride and groom (showing single years of age), by race of bride and groom, and by whether or not the marriage is the first for the bride and groom. If similar estimates could also be prepared on the basis of fragmentary evidence available for the past 40 years, it would be possible to estimate cohort first marriage rates (that is, first marriage rates for groups of women called "cohorts," iden-

tified by the year of birth of the women included in them). These rates would be extremely useful in the study of trends in age at marriage and in relating trends in marriage and fertility rates. Such a set of estimates was prepared by the Scripps Foundation for Research in Population Problems for the period 1917-1960, but an updated and improved series could, and should, be developed.

The limited data now available could also be substantially improved by using smoothed population estimates, by age, in the computation of age-specific marriage rates. The Bureau of the Census and the National Center for Health Statistics (NCHS) should coordinate their efforts to base rates on population estimates that are free of the year-to-year variations caused solely by sampling error.

It would also be desirable to use current data to prepare attrition tables for cohorts of married men and women, by race, showing the effects of divorce and death of spouse on numbers of married couples, but the information needed to prepare such tables is probably fragmentary and too unreliable to make it possible.

It would, however, be possible to estimate probabilities of divorce by duration of marriage on the basis of surveys such as the Survey of Economic Opportunity of 1967, and every advantage should be taken of such opportunities.

Until the standard certificates of marriage and divorce are in widespread use, it will be necessary to rely on data from surveys and censuses for information about socioeconomic differentials in marriage and divorce. At the present time, marriage and divorce registration data give very limited and fragmentary information on differentials by only one socioeconomic characteristic: race. In some States even this item is not reported. This is quite

inadequate for a satisfactory understanding of the reciprocal relationships between socioeconomic status and family formation and dissolution. It is true that educational attainment is now on the Standard Certificates of Marriage and Divorce or Annulment and is being added to the certificates of a few States. Until this item is more widely used in marriage and divorce reporting, however, efforts should be made to add questions to nationwide surveys that will give additional information about the incidence and age patterns of marriage and divorce in different socioeconomic groups.

A marriage followback survey would provide a great deal of data that is currently lacking.^a Such a survey can supply not only a great deal of needed information about the characteristics of the bride and groom, but also information that will be helpful in the analysis of trends in fertility. For example, a marriage followback survey could contain questions on the expected timing of the first birth and on the couple's current use of contraception. Useful as such a survey mechanism would be, it should not be considered as a substitute for a nationwide marriage registration system.

Followback surveys on divorces likewise could provide useful information. Such a survey program would undoubtedly be more difficult to administer than a marriage followback survey because the divorced partners would have different addresses and might be difficult to locate. However, a feasibility study of such a survey should be considered, to find out what kinds of information could be obtained. As a

^aA followback survey is one which uses a known event such as a birth, death, marriage, or divorce which is recorded on a legal document as the sampling frame and then goes back to the person who was the informant on the original document for additional information. Such a survey can also use other informants who may have knowledge of the event as sources for information.

minimum, there should be considerable information on the socioeconomic characteristics of the divorced partners and of their past fertility experience.

The Prevalence of Different Marital Status Groups

As noted above, data from censuses and surveys can provide a great deal of information about the incidence of marriage and divorce and of the age patterns of these phenomena in different socioeconomic groups. In addition, these census and survey mechanisms are the only ones that can provide reliable data on the prevalence of various marital status groups.

Efforts should be made to obtain more information on marital status categories than is now available from most survey sources. For example, it is evident that many men and women live as husband and wife but are not married. It would be very helpful in relating nationwide statistics on marital status to fertility if these statistics at least occasionally included a category "consensual union;" this category is now used in some statistics for Puerto Rico.

There is considerable interest in determining how many men and women in various age groups had been divorced at some previous time but are not currently classified as divorced. This information would provide a count of the ever-divorced similar to the count now available of the ever-married population.

Marital status histories obtained in nationwide surveys, such as the Current Population Survey, would provide a considerable body of valuable data, including information for large numbers of people on the ages at which first marriages occur and the timing of subsequent events. The items of information could include selected characteristics of each former spouse (for example, age, race, and education). Such

marital status histories could be used in connection with fertility histories of individuals, particularly women. They would make it possible to assess the interaction of marital status and fertility over relatively long periods of time. Marital status histories would also be valuable in supplying information on illegitimate births to currently married and formerly married women. The principal available source of data on illegitimate births—the birth certificate—indicates only whether or not the birth is legitimate or whether or not the mother is currently married. There is no information on the mother's marital history.

The Relationship of Marital Status to Fertility

One area about which a great deal of additional information is needed is the relationship of premarital pregnancy to marriage. In exploring this relationship in Detroit, William Pratt showed that a large portion of the color difference in illegitimate fertility could be explained by the different propensities of white and nonwhite girls to marry after becoming pregnant.¹ Although this study was extremely useful, it has never been repeated elsewhere. Birth records and marriage records could be matched in certain areas where the appropriate information is available.

Similar information could be developed for the nation as a whole, if there were a place on the birth record to record the date of marriage of the parents. This item, however, was specifically rejected in the process of drafting the 1968 Standard Certificate of Live Birth. Some information on the relationship between premarital pregnancy and marriage might be obtained from the Natality Follow-back Survey, although the sample would be very small for the group involved.

Another area about which little is known is the relationship of fertility to marital dissolution and remarriage. For example, it is not known whether remarriage tends to increase fertility because the newly married couple wants to have children of their own or whether the net effect is to reduce fertility by reducing the number of years that a woman spends with a husband during the reproductive years of life. Questions of this kind could be explored with the use of marital histories from surveys mentioned above.

There is still a great deal that is not known about the relationship of age at marriage to fertility. For example, there are no current statistics from the registration system on the average number of months between marriage and the first birth. The addition of date of marriage to the birth certificate would provide a basis for securing information on this but there appears to be no possibility of introducing this item on the standard certificate of birth in the near future. Again, marriage and fertility histories in surveys and on followback surveys of marriages and births must be relied on.

For studying all of the topics mentioned above, longitudinal surveys would be very useful. Such surveys might, for example, begin with groups of young people and interview them annually to record the succession of events that occur: marriage, birth, changes in residence, changes in jobs, etc. With the use of such studies we would be able to analyze the intricate relationships between marriage, fertility, geographic and social mobility, and a variety of other temporally related phenomena.

The Relationship of Marriage and Divorce to Migration

Marriage is very commonly accompanied by changes in residence of one or both partners. Often these changes in residence involve moves

over fairly long distances, and place both the husband and the wife in settings with which they may not be familiar.

Some information on the migrations involved in marriage may be obtained from tabulations of the State of birth of the bride and groom. Complete reliance on such data would be unwise, however, and considerable use should be made of survey information to obtain reliable data on the previous residences of the bride and groom.

The usefulness of marital status histories as well as fertility histories would be greatly enhanced by the addition of information on migration and social or occupational mobility. Changes in marital status are often accompanied by changes in socioeconomic status and by changes in residence. The collection of such information would make it possible to investigate a large number of hypotheses. For example, is divorce more or less common among those whose socioeconomic status is improving? Has divorce any relationship to migration from rural to urban areas?

As mentioned previously, longitudinal studies would be extremely useful in analyzing the relationships between changes in marital status and migration. The general subject of migration is discussed in some detail in a later section.

Sources of Data and Recommendations

In the preceding discussions we have described the usefulness of six different mechanisms for obtaining information on marriage and divorce. They are as follows:

1. The Marriage and Divorce Registration Areas, which should be completed as soon as possible.
2. The followback surveys of marriage and divorce records. The results of a pretest

of a marriage followback survey in North Carolina in 1968 were sufficiently encouraging to justify proceeding further with the feasibility study as soon as possible. The feasibility of a divorce followback survey should also be tested.

3. Household surveys (or censuses) to obtain current information on marital status and more detail on consensual unions.
4. Household surveys to obtain personal histories of marriage, divorce, fertility, and migration status. Such surveys could be conducted within the framework provided by the Current Population Survey.

5. Matching studies to bring together information appearing on various kinds of records.
6. Longitudinal surveys to study the temporal sequence of changes in marital status, fertility, employment, income, residence, and other socioeconomic variables.

Each of these data sources has its own advantages and limitations. All of them should be used where appropriate. However, the Subcommittee feels that the development and completion of the Marriage and Divorce Registration Areas and the encouragement of States to adopt the standard certificates of marriage and divorce should be given top priority at this time. Only these actions will provide an adequate base for the study of these phenomena in our society.

FERTILITY AND FAMILY PLANNING

Introduction

With U.S. mortality at existing low levels and with international migration not being a major factor since the 1930's, natality has become the primary factor in determining changes in the growth rate and age-sex composition of the Nation's population. Through the efforts of the Bureau of the Census and NCHS, a fairly adequate picture of U.S. natality is available for the present and recent past. However, more information on fertility determinants is essential both for a better understanding of the factors underlying existing fertility differentials within the national population as well as for an improved basis for predicting fertility 5, 10, or 20 years hence.

In fact, neither the Bureau of the Census nor NCHS [now] provides data on any of the

following three sets of factors affecting natality:

1. Fecundity—physiological capacity for childbearing,
2. Reproductive norms—values relating to size of family and spacing between children,
3. Family planning practices—mainly contraception, induced abortion, and sterilization on the side of restricting or postponing births and increased frequency or deliberate timing of coitus, artificial insemination, and other recourse to medical assistance on the side of augmenting birth chances.

These three sets of variables are perhaps the most immediate determinants of marital fertility. They interact to determine, within a large margin of chance variation, the fertility experience of the individual woman or the childbearing history of the couple. The reproductive career of a couple may be usefully divided into two main states: the stage of rapid, intentional childbearing and a subsequent period of exposure to the risk of excess fertility. The operation of the above three sets of factors are fundamentally qualified by nuptiality: marital status determines the legitimacy of childbearing and exposure to the risk of conception with all that that portends for fecundity, reproductive norms, and family planning practices, while age at marriage influences the ages coinciding with the period of intended childbearing and the length of the following period when excess fertility is risked. The influence of mortality is much less because its level is so low.

Three reasons may be cited for systematic information on the above three sets of intervening factors:

1. A better understanding is needed of the origins, present status, and likely persistence of the current decline in national fertility and of present differentials in fertility among major social groups. Fecundity in the United States is generally high and relatively unchanging. The practice of family limitation is effective in most social groups and the long-run trend is for it to improve among those groups where its current practice is weakest. The relatively lower level of effectiveness of contraception, when practiced for

spacing purposes, may be interpreted as a tolerance for a rather close spacing of births and could change rapidly in those groups characterized by effective family limitation if an interest in wider birth spacing develops.

The most unpredictable and changeable component, as past rapid changes in U.S. fertility indicate (especially the "birth boom" of the late 40's and the unexpectedly steep decline of the 60's) is reproductive norms. Along with marriage values, what couples want in the way of family size and birth spacing has become the most strategic element in the determination of fertility patterns. The future impact of the unexpectedly steep decline of U.S. fertility during the last ten years, apart from changes in age-sex composition and in marriage patterns, will depend significantly on whether there develops a preference for either wider spacing of children or for smaller families. With fecundity differentials a secondary factor, the persistence of existing fertility differentials among major social strata will depend heavily on what happens to present contrasts in desired family size and preferred birth intervals and to present differences in ability to control fertility.

2. If the birth rate has such a fundamental influence on changes of the size and age-sex composition of the U.S. population as well as upon changes in the sizes and compositions of its major subdivisions, it is obviously critical for planning purposes to be able to predict as well as possible the fertility trends of the near future and the corresponding differentials among the main social groups. Existing natality statistics describe fairly adequately the present and

immediate past, but leave open the problem of predicting the future fertility of women still unmarried or in an early stage of family building. Of value as a supplement to natality statistics in projection work are the women's own forecasts—both short run expectations (births to be expected in next 5 years) as well as anticipated ultimate additions to family size. With reference to specific groups, it is important to have accompanying data on fecundity impairments and family planning practices, since in particular groups the respondents are unlikely to have as many births as they expect or to restrict births to the limit anticipated.

3. An increasing concern of the government, besides number of births, is the environment in which the children are raised. The couples least able to provide favorable environments for their children are often the couples least able to limit their fertility to the number of children desired. It has become part of national policy to help such couples achieve voluntary control over their fertility. Official statistics on parity^b provide a broad indication of the problem of excess fertility. However, direct data on the relationship of desired to attained family size provides a far more precise indication and documents directly the fact that large families are often not wanted. Such information is indispensable for gauging the magnitude of the excess fertility problem and the extent to which existing

^bParity refers to the number of children a woman has borne.

local family planning services are succeeding.

Natality Statistics

Measures of incidence

In a dynamic society, with rapidly changing age and sex composition, the crude birth rate (number of birth per 1,000 total population) is of complex meaning. More informative are standardized birth rates^c and birth rates by 5-year age groups. But changes in these rates reflect changes in nuptiality as well as changes in legitimate and illegitimate fertility. More precise and easily interpreted are birth rates by age and marital status.

For documenting current trends and differentials, the basic data are period birth rates which are measures that relate to limited periods of time, usually one year. However, these are affected not only by the final parities of contributing marriage cohorts, but the time patterns of childbearing. For purposes of understanding current trends and differentials as influenced by intervening factors and nuptiality, it is useful to have fertility measured in cohort terms. Cohort fertility measures are designed to follow the fertility of groups of women as they proceed through the childbearing years of life. The groups to which the latter rates relate are called "cohorts" and are identified by the year of birth of the women included in them. One would like to be able to isolate cohort trends in completed family size and in childspacing. But pure measures of fertility "quantity" and "tempo"^d (to use

^cStandardized birth rates are birth rates adjusted for differences in age composition of the population.

^d"Quantity" refers to the completed fertility of women. "Tempo" refers to the observed time pattern of birth rates.

Norman Ryder's terms)² are hardly available until the cohort has completed its childbearing.

Differences among cohorts with respect to age-specific birth rates may derive from nuptiality contrasts as well as from fertility differences. Easier to interpret for that reason are trends in duration-specific rates, preferably within an age at marriage classification. Another powerful set of cohort rates are age-parity specific birth rates giving a direct control over age, though not over interval since last birth. To obtain the latter, one may pass, data permitting, to parity-progression probabilities (i.e., proportions of women of parity X who go to the next parity within a stipulated duration, again preferably within an age, or age at marriage, classification). Strictly speaking, changes in any of these rates from one cohort to another are mirroring trends both in eventual family size and childspacing. However, as in the case of period rates, if the women contributing experience are not at the end of their childbearing, the above indices delineate only experience from birth (or marriage) up to the reporting date and do not, of course, measure later childbearing. This circumstance poses an awkward problem for projection work because the greatest interest for this purpose is the future fertility of women just beginning their childbearing for whom one has the least recorded experience.

Data on closed birth intervals (either intervals between successive births or intervals from marriage to births of a specified order) appear to offer a pure measure of childspacing. However, subject to truncation effects, they can lead to difficulties of inference about trends in birth spacing when measured for cohorts still in the process of childbearing. The shorter the time from initial birth (or marriage) to recording date, the stronger is the selection for brief birth intervals. Hence an apparent shortening of birth

intervals as one moves from earlier to later cohorts may reflect only an intensification of truncation effect. Birth intervals are more useful for analyzing the completed fertility of women or the fertility of women well into the second half of their reproductive period than that of women still in the period of rapid family-building.

Measures of cumulative fertility

The principal measure of cumulative fertility is number of children ever born, that is, current parity or final parity depending on whether the woman has completed her childbearing or not. This measure is more meaningful when made age-specific, but still reflects nuptiality patterns as well as cumulative illegitimate and legitimate births. Less complicated to interpret are duration-specific totals of children ever born (with duration usually taken from first marriage), or as a still more refined index, children ever born for given durations of marriage within a classification of age at marriage. Even these ideal data are not pure indicators of eventual family size, affected as they are by childspacing patterns, unless, of course, the women contributing to the experience have reached the end of their reproductive period. Like incidence data, these measures of cumulative fertility summarize the history of the woman only up to the reporting date and give no direct indication of what will happen later in the reproductive period.

Intervening Factors

Fecundity

The fecundity of most U.S. wives is adequate to permit them to have all the children they want. Early first marriage, the desire for families of moderate size, and avoid-

ance of long intervals between intended births, make it possible for most wives to complete their desired childbearing at ages young enough (usually before age 30) to escape the problem of fecundity impairments. More liable to secondary sterility and health conditions deterring further childbearing are women who by virtue of late marriage, long birth intervals, or numerous children wanted, allow their intentional childbearing to extend well into the 30's.

With the infrequency of serious reproductive pathology during the period of rapid childbearing and with the childless family so out of fashion, the proportion of ultimately childless families is reaching low levels and may go as low as 6-8 percent.³ Among couples having at least one child, the proportion who are prevented from having all the children they want because of secondary sterility or deterrent health conditions is under 20 percent according to an estimate based upon 1960 data.⁴

The high prevalence of normal fecundity during the first half of the reproductive period in virtually all social strata of U.S. society makes fecundity a negligible factor in group differences in fertility. An absence of fecundity impairments operates to increase the accuracy of short-run and long-run birth expectations. Given normal fecundity, one source of uncertainty in respondent forecasts is removed, though leaving other uncertainties of fertility intention and control.

The effective level of fecundity in the U.S. is not likely to change markedly in the near future, [always] barring a substantial increase in marriage age or a trend toward longer birth intervals. Advances in reproductive medicine and increased use of these medical resources by the public do not necessarily lead to a simple effect of raising fecundity. While more fecundity impairments are being corrected, more health conditions are being identified as contra-indications to further childbearing.

Reproductive norms

Owing to the generally high level of fecundity during periods of desired childbearing, together with the effective family limitation of a large majority of couples, child-spacing and family size norms acquire extraordinary importance. Continued investigation of family size attitudes and values is well justified. Measures of desired, ideal, intended, and expected family sizes yield results that are highly correlated but far from identical. There is a tendency for women to desire or idealize slightly larger families than they feel it prudent to have. Expected family size differs from intended family size whenever problems of fecundity or birth limitation are anticipated. Also worth study are the dimensions of explicitness, spouse consensus, and stability over time. Spacing preferences, which may tend to be less explicit and less stable than family size preferences, have received much less study, a state of affairs hardly justified when it is considered that since World War II childspacing changes have been ascribed a larger role in the movement of period birth rates than changes in final parity,⁵ and every indication points to this superior significance continuing.

Given the influence and changeability of reproductive norms, especially those relating to childspacing, it is clear that population projections based wholly on birth statistics and their extrapolation are likely to remain unsatisfactory. The idea of incorporating respondent forecasts has great appeal for that reason. On the basis of comparisons made possible by the 1955 and 1960 Growth of American Families Studies (GAF), mean births expected during the next 5 years have come close enough to births actually experienced during these 5-year intervals to win some partisans to this approach. Error at the level of subgroups has been substantial, of course, but at the aggregate level agreement has been fairly good as a result of the

balancing effect of unanticipated subfecundity and failures of birth restriction. Whether this balance will be upset in the future by improved birth control or by a tendency to seek longer postponements of pregnancy is a matter for future empirical investigation. To date there is insufficient experience to assess properly the utility of respondent predictions of eventual family size, especially in the case of respondents interviewed early in their reproductive careers.

The approach of using respondent forecasts faces a number of serious problems that call for further study and methodological innovation.⁶ First is a technical problem arising because respondent forecasts relate to cohort fertility while the aim is to project period fertility. A second problem is that expectations about final family size change over time, more often than not increasing as the couples age. Third, one is especially interested in the attitudes and predictions of the youngest cohorts entering child-bearing age, but the only representatives available—if the fertility survey is restricted to married women—are the cohort members marrying early whose reproductive intentions and expectations may not be representative of the total cohort. Still more serious, as the national fertility surveys have been designed thus far, they do not collect forecasts from young women not yet married. An important challenge to future research is the development and exploitation for projection purposes of periodic data on the childspacing and family size ideals and preferences of these young unmarried women.

Family planning practices

Generally favorable attitudes toward, and a wide practice of, family planning exist in the United States. The typical wife and husband do not try to delay their first born; unless they suspect subfecundity they practice contra-

ception for spacing purposes but casually, thereby allowing a rather close spacing of desired births; thereafter through some combination of contraception, abortion, or sterilization they manage to hold family size to its intended limit. According to the 1960 GAF Study only 17 percent of the sample reported excess fertility.⁷ However, this excess fertility falls very unevenly among social groups with the result that differential ability to control fertility is a basic factor in group differences of fertility.

U.S. couples place primary reliance on contraception both when spacing and limiting family size. The 1965 National Fertility Survey has documented a dramatic shift in the composition of contraceptive methods used. By 1965, among married women under age 45 in the United States, 26 percent had used the contraceptive pill at some time and 15 percent were still using the pill at the time of the survey.⁸ It is obviously of great practical interest to be able to follow this rise of modern contraception and its displacement of more traditional methods as well as to investigate the impact of these newer methods on the ability of couples to control their fertility, especially in groups hitherto characterized by ineffective contraception. It may turn out that in the coming decade modern contraception will exercise only rather minor effects on final family size because of the present effectiveness of family limitation among most social groups, although in the process it may obviate some induced abortion and sterilization. Perhaps the larger contribution of modern contraception to the decline of period fertility will be through its facilitation of longer birth intervals.

Along with contraception and abortion, sterilization constitutes a basic means of family limitation in the U.S. By 1960, one of six wives at ages 35-39 in the GAF Study of that year reported either a remedial or a family-planning

operation, and the incidence of vasectomies had increased during 1955-60 period. Continuing information is needed on the trends and social differentials of both types of sterilizing operation as well as inquiry into the attitudes of physicians and patients toward them.

The long periods of exposure to the risk of excess fertility combined with fallible contraception and only a sizable minority of couples resorting to sterilization would lead one to expect more excess fertility than is reported. This discrepancy can be accounted for in part by the resort to the practice of illegal abortion. Accurate statistics on the incidence of abortion do not currently exist. Yet without this information as it applies both to the unmarried and married population, our knowledge of fertility control in the United States remains seriously incomplete.

Relationship to Background Variables

One may think of background factors as not acting directly upon fertility, but indirectly through intervening factors as qualified by nuptiality. Fertility differentials appear to be shrinking with two notable exceptions: religion and race. Fertility contrasts among religious groups appear to reflect primarily differences in desired family size and to a lesser degree factors such as birth spacing or effectiveness of family limitation. Shrinking of the differential by religion may depend, then, on a movement of Catholic and Protestant preferences to the smaller family norm of the Jewish group. In contrast, the fertility differential between whites and Negroes has depended primarily on an unequal success in the control of fertility. Especially if persons of Southern farm background are excluded from the comparison, whites and Negroes within comparable socioeconomic classes appear to have fairly similar fertility and fertility values. For both races, as

one goes toward the bottom of the educational scale, one finds less effective family limitation and an increasing problem of excess fertility. In general, then, excluding the religious differential, differences in fertility in the U.S. are importantly a function of differences in excess fertility, reflecting unequal success in the control of fertility. It is of obvious practical importance to know the extent and distribution of this involuntary surplus natality and so far as possible to know [it] in advance in the form of respondent reports that future births are expected to exceed desired births barring unforeseen preventive action.

One cause of less effective family limitation among the poor and poorly educated has been low availability of contraceptive methods and information. During recent years local, State, and federal government resources have increasingly been used to equalize availability and use of effective contraceptive methods by including it as part of medical care for the poor. It is important to know what effect these programs are having in reducing excess fertility of the poor.

Sources of Data

Health Statistics From The Center

As the agency responsible for producing the Nation's basic natality statistics, NCHS publishes annual frequencies of births for the Nation, states, and local areas, as well as birth data by a number of background characteristics and well-chosen sets of period and cohort fertility rates. However, the nature and scope of this information has been limited by the content of the Certificate of Live Birth.

Questions on date of last live birth and last fetal death as well as education of father and mother were added to the 1968 revision of the U.S. Standard Certificate of Live Birth. A

question on date of mother's first marriage was *not* added.⁹ In 1968, questions on date of last live birth and last fetal death were on the certificates of 35 States. The questions on the educational attainment of the father and mother were on the certificates of 36 States.

To obtain more information on the incidence and prevalence of excess fertility, a question is being added to the Natality Followback Survey to ascertain whether the most recent child was wanted. This may be regarded as a particularly important question at the present time because it will be useful in evaluating at the national level the effects of massive contraceptive service programs. A small pretest of this question in the District of Columbia indicated that women were willing to answer this question; 17 percent of the respondents said that they had not wanted another child at any time, and 36 percent said that they wanted another child, but not right away. The fact that 53 percent of the respondents were willing to give negative answers is regarded as encouraging evidence that the question will elicit meaningful replies. However, it is recognized that more methodological research will have to be done to aid in the interpretation of this and other information obtained from the Natality Followback Survey.

It is further recommended that 2 series of cohort fertility rates be maintained, i.e., one for birth cohorts and one for marriage cohorts. As noted already, birth cohort fertility is influenced both by marriage rates as well as fertility rates. Marriage cohort fertility indicates the fertility trends for married women by duration of marriage. It is desirable to have this information separately for major racial groups.

Proposed National Survey of Family Growth

The main vehicle for collecting information about the three sets of intervening factors

(fecundity, reproductive norms, and family planning practices), their interactions, and their relationships to natality, nuptiality, and selected background factors, is properly a federally supported series of interview surveys, each based on a national probability sample of women in the reproductive ages. The feasibility and value of such surveys has been decisively demonstrated by three previous national fertility surveys undertaken in 1955, 1960, and 1965. These surveys have included information about the following topics:

- (a) Marital history: Dates of each marriage, divorce, separation, and death of spouse;
- (b) Pregnancy history: date of each birth and fetal death;
- (c) Physiological ability to bear children: whether any obvious fecundity problems have ever been noted, whether a doctor was seen about them, what he said the trouble was, whether either spouse had an operation that prevents procreation, what the operation was, and why it was performed;
- (d) Attitudes toward number of children; whether or not the last child was wanted, how many unwanted children were born, how many children the husband and wife would prefer to have;
- (e) Birth expectations: how many additional children the wife expects to have and when she expects to have them;
- (f) Attitudes toward limiting family size;
- (g) Use of contraception: which methods have been used, whether they have been used regularly and successfully; if

no methods were used, does the couple expect to begin, when they will begin, and why have they not yet begun;

- (h) Socioeconomic status: religion, educational attainment, color; wife's labor-force status, occupation, and income; husband's occupation and income; characteristics of the neighborhood in which the couple live.

In future surveys, such as the proposed National Survey of Family Growth, it is desirable that sample size be at least 10,000 in order to secure adequate numbers of respondents in strategic groups (e.g., race-age-education groups). Oversampling will be needed to assure useful numbers specifically in those groups expected to show excess fertility or rapid changes with respect to marriage or fertility patterns. It is recommended that the interview surveys continue to be of the cross-sectional type, with interviewing confined to a limited period, thereby providing a design well suited to the production of prevalence data. The interval between surveys should be reduced to two years if possible. A desirable supplement would be a program of reinterviews with selected subsamples of the total sample. Two possibilities for this longitudinal feature are the following:

Select a sample of young women and reinterview them every two years as they proceed through the period of rapid family growth. With the short recall spans involved in such interviews, it will be possible to get more accurate information on such topics as fetal mortality, changes in childbearing plans and expectations, changes in methods of contraception and success in using them, how changes in the couple's economic circumstances affect family growth, and many other subjects.

Select a sample of older women and reinterview them every two years as they proceed through the period of exposure to the risk of excess fertility. An important question one might investigate with the aid of such reinterviews is the manner in which couples are affected by the birth of unwanted children, using the wife's attitude toward family size in the base interview as the independent variable. This makes it possible, in other words, to avoid the *post hoc* rationalization of a failure in family planning.

Special Techniques

The biggest gap in knowledge about family planning practices is the role of induced abortion, most of which is currently illegal. Nothing precise is known about the incidence or prevalence of induced abortion or variation among major social groups. Interview surveys have not produced useful incidence data, though they have generated worthwhile data about trends in attitudes towards abortion. It remains an open question whether the mail survey techniques will be able to generate more useful incidence data. A radically new approach may be necessary. A methodology that merits close watching is the randomized response technique which, though still in an early stage of testing, retains promise. The technique was designed to eliminate evasive answer bias when questions of a sensitive nature are asked. The procedure is called "randomized response" because the respondent selects a question on a probability basis from two or more questions without revealing to the interviewer which question has been chosen.¹⁰ Meanwhile, efforts would be increased to require registration of all fetal deaths and to determine the frequency of abortions (and sterilizations) performed in the

Nation's hospitals through such means as the National Hospital Discharge Survey. One use of such data will be to facilitate evaluation of new abortion legislation enacted in several States.

Special efforts should also be made to evaluate the effectiveness of public family planning services in the U.S. in terms such as proportion of the poor who are served, use effectiveness of contraception, and cost per unwanted birth prevented. Some useful information can be obtained from service records but most will probably have to come from household interview surveys of, e.g., low income populations, followup of women terminating pregnancy in public hospital facilities, and followup of families utilizing contraception in public programs.

Recommendations

1. It is recommended that a series of birth cohort fertility rates be maintained separately for major racial groups as well as a series of marriage cohort fertility rates.
2. It remains desirable to add to the U.S. Standard Certificate of Live Birth a question on date of mother's first marriage.
3. The main vehicle for collecting information about the national popula-

tion's fecundity, reproductive norms, and family planning practices, and the relation of these factors to natality; nuptiality, and selected background factors is properly a federally supported series of national interview surveys. A desirable supplement of each survey would be a program of reinterviews with selected subsamples of the total sample.

4. Special efforts should be made to evaluate the effectiveness of public family planning services in the U.S. in terms such as proportion of the poor who are served, use effectiveness of program contraception, and cost per unwanted birth prevented.
5. Efforts should be increased to require registration of all fetal deaths and to determine the frequency of abortions and sterilizations performed in the Nation's hospitals through such means as the National Hospital Discharge Survey.
6. High priority should be given to designing and testing new methodologies for deriving more useful data on the incidence of induced abortion, presently the weakest link in our knowledge of family planning practices in the United States.

MIGRATION

Introduction

The Growing Relative Importance of Migration as a Component of Population Dynamics

At all levels of analysis, the migration component is of growing importance in the study of population dynamics. Internal migration is of especial importance. Death and birth

rates are tending to become more homogeneous: between regions, between urban and rural areas, and between socioeconomic strata. Were it not for internal migration, there would be increasing similarity in rates of growth in various parts of the nation. However, equal growth rates are not the case. The phenomena of rural depopulation, westward movement, and

rapid urbanization and metropolitanization are well known contradictions of this. However, these classic patterns also have changed during the 1960's under the shifting tides of migration. Some individual metropolitan areas now are experiencing zero or negative growth because of net out-migration, while others are continuing to grow moderately rapidly. Internal migration flows now seem to be even more selective of place than ever before.

The Growing Importance of Migration as a Component of Population Composition

Within a nation there is a great deal of diversity in composition of the population. Some areas have a predominance of white collar families, while others have large masses of operatives and laborers. Some have large concentrations of Negroes while others are all white. Some are high income areas while others are pockets of poverty. Migration, and absence of migration, are major factors in creating these distinctive concentrations, in maintaining them, and in dissolving them. The mechanism is selective migration, or differential migration—the tendency for some segments of the population to be more migratory than others. For example, migration has transferred many thousands of persons from the depressed rural areas of Appalachia and the Old Cotton Belt (both white and Negro) into northern industrial centers, where unemployment rates have been low and where they could enter the labor force and improve their lot in life. This selective migration has probably done as much to dissolve poverty as all of the anti-poverty programs combined. The fact that a large proportion of these masses were deposited in deteriorating areas of central cities has created, in turn, a new set of problems. The rapid growth of suburbs, the break-up of old ethnic colonies such as the

Italian and Polish neighborhoods in cities; the rapid growth of the Mountain, West, and Southwest regions; the exodus of farmers for cities; the abandonment of the coal fields by miners displaced by automation are all examples of selective migration.

That migration is selective has long been known: that modern technology tends to heighten its selectivity is less appreciated. Even less recognized is that there is comparatively little stability in this selectivity; it is highly volatile. During some decades selectivity may follow one pattern, whereas only a decade or so later it may follow the reverse pattern. Perhaps the only consistent principles are that the young and the better educated are called upon to make their adjustment by migration more often than are the old and the less well educated. But there are differentials by sex, race, ethnicity, occupation, income, marital status, urban-rural residence, region of residence, and other traits. The usual procedure for studying selectivity of migration and its impact upon composition is to compute the rates for each category of a trait or variable, and to note whether or not there is significant deviation from the average rate of migration. To the extent that the rates for particular categories deviate from the general rate, there is evidence of differential migration. The volume of migrants in excess or deficit of what would have been expected had the general migration rate prevailed is a measure of the impact upon population composition.

Such studies of differential migration may be carried out from three points of view: (a) from the point of view of the communities from which the migrants depart; (b) from the point of view of the communities to which the migrants go; and (c) that of studying the composition of streams of migrants flowing between

particular pairs of places. The latter is less common but no less informative and important—especially in cases of massive streams.

Relationship of Migration to Current National Problems

Demographers have been accustomed to think of migration primarily in terms of population dynamics and its impact upon growth. They have tended to overlook the “human side” of migration. Most change of residence is born from disequilibrium, and represents a human being or a family in search of a solution to a problem or set of problems. All of the great social problems which confront the nation today have a migration component.

Poverty.—The incomes or employability of many low-income persons, can be improved by encouraging them to migrate elsewhere. The operators of submarginal farms, residents of small rural towns being strangled by new transportation systems that speed customers to regional shopping and service centers, residents of metropolitan areas where the factories are obsolescent from producing products for which there is declining demand, residents of communities where automation is cutting employment opportunities—all may escape poverty by migrating to a more promising site.

Urban problems.—The “urban crisis” of today has a very large migration component. The slums of the big city are “ports of entry” for low income migrants arriving from rural areas and depressed areas. They settle in the worst neighborhoods, the worst jobs, and are exploited with least protection from the law. Such migrants, compressed into a mass where they can communicate their discontent, develop resentment and political unrest.

Racial integration.—Segregation is widely regarded as a social problem, to be remedied by residential integration. This implies, of course, some form of residential mobility. A wider regional distribution of minority groups, a more balanced distribution between central city and suburbs, and a more even distribution within individual communities are the mechanisms by which integration can be achieved.

Social maladjustment.—Mental disorders, family disorganization, illegitimacy, delinquency, crime, and the complete breakdown of “law and order” have been linked to ghetto areas of high mobility, where social ties are weak and institutional controls are ineffective or nonexistent. Thus, the attraction into our cities of the rural poor and their concentration into slums has led to a situation of social disorganization and maladjustment.

Summary.—Like mortality and fertility, migration is a demographic process that operates continuously—both to preserve and to change existing growth and distributional patterns. Much migration represents the routine adjustment of persons to changes in status as they pass through the life cycle or “normal” movement required for the economy to remain in balance. Other migration arises from fundamental imbalances and is either a result or a factor in many of our current national problems. Migration studies may be expected to constitute an important challenge in the field of population dynamics between 1970 and 2000. They will be responsible for explaining much of what will be happening to population growth and distribution. There is need for fresh research, with new hypotheses, new models, and refined multivariate analytic techniques.

The Factors That Influence Migration

Migration is a complex phenomenon, involving both an origin and a destination. It is best comprehended in terms of models. One of the most popular is the "push-pull" model, which claims that the factors inducing migration are a combination of negative forces of expulsion and positive forces of attraction. Another model has emphasized "intervening opportunities" between the place of origin and the destination. Everett Lee has synthesized these two into an overall theory that portrays migration as an interaction among forces of attraction and repulsion both at the origin and destination and with intervening factors that function to impede or discourage movement. All of these models incorporate factors or variables which have been shown to have an empirical relation to migration. One important activity for the future is to identify and operationally define these variables more precisely, and to generate valid data for each. In this way, the models that are constructed may be more realistic and more capable of rigorous testing.

Demographic factors

Where birth rates are high and death rates are low, each oncoming generation causes the labor force to grow. If the communities in which the new labor force recruits have grown up are unable to provide employment, migration is the only alternative. Under conditions of zero population growth, the labor force recruits would exactly replace those retiring from the labor force. The "replacement ratio," or the ratio of the new generation of labor force to the old, is a measure of the demographic pressure to migrate (assuming static economic conditions). In the past, this has been a strong force stimulating out-migration from rural areas, from

the South, and from other regions of high natural increase. As birth rates decline, the pressure of this demographic factor may be expected to diminish.

Environmental Factors

Particular environments are attractive because of the natural amenities they provide. Thus, Florida, California, and Arizona have attracted large numbers of migrants because of their mild climate. The old industrial metropolises of the East and North Central regions have been depleted by the massive exodus to suburbs and newer metropolises where there is less grime, pollution, and congestion. These environmental amenities seem to become more important as technology provides greater locational flexibility for the various types of industries which comprise the economy.

Economic Factors

All studies of the "motives for migration" give top priority to the economic incentives—the search for employment, for better employment, for higher income, for greater security. Sometimes the community of origin is in a state of economic stagnation, as in the deforested areas of upper New England and the Upper Great Lakes areas, the Appalachian territory, the Midwest agricultural region, or the Old Plantation areas of the South. Areas where new industries are being established or old ones are growing attract migrants. The exact nature of this attraction—how it is sensed by the migrant, what varieties of workers are attracted, and over what distances—is as yet inadequately explored.

Social and Psychological Factors

Some migrants change residence because they are searching for better schooling for their

children. Others move to accompany a husband or father. Racial discrimination, political oppression, or religious intolerance can drive people from a community in search of more tolerable social conditions. The varied and more exciting social life of a large metropolis, the boring inactivity of the small town may both stimulate movement of youth.

Other forces are more purely psychological or even psychiatric. Persons who are maladjusted or neurotic may tend to leave a community to escape the situation in which their anxieties have developed. Divorce can cause persons to wish to change residence, as can other uncomfortable social situations involving relatives, friends, or work associates.

Still other factors may involve health or morals. Persons in rural areas or in areas of limited medical services who become seriously ill may migrate to areas where these services are more freely available. Persons who have committed crimes are highly migratory, as are those whose family life has been disrupted by death of a spouse or parent.

Although it is recognized that all of these social and psychological factors affect migration, the magnitude of their impact has not been well measured. Often they are not dominant forces that "trigger" migration, but supplementary forces that abet movement and help determine the particular community chosen as destination. They can be fitted into migration models only crudely and with difficulty.

Sources of Data

Vital Statistics

For the study of population dynamics, vital statistics can provide excellent estimates of net migration. By use of the simple bookkeeping equation, the natural increase component (births minus deaths) is subtracted from total

intercensal increase, as measured by two censuses. The residual may be accepted as a reasonable estimate of net migration, provided the censuses are reasonably and equally accurate and vital events are registered with near completeness. Estimates of net migration have been prepared using this procedure for each county in the Nation for the 1950-60 decade. By combining these estimates, net migration figures are derivable for every metropolitan area, every nonmetropolitan subregion, and of course for every State and region. Using the same procedure, net migration estimates for particular major cities (such as central cities of all metropolitan areas) have been prepared. Thus, data are available to generate estimates of the net migration component of population growth for almost any community or major residence group within the United States.

Census Data

Thanks to a long-range and foresighted program of data development, the U.S. Census provides to American demographers the most detailed and most comprehensive body of migration data of any nation in the world. Beginning with the 1940 census, the Bureau of the Census has collected, as a part of each decennial census, data concerning the place of residence at some previous date (one year or five years) of a major cross-section of the population. This information has been cross-tabulated with all of the array of characteristics collected for migrant and nonmigrant persons, with the result that great masses of data have been made available concerning the flows of internal migration among the various regions and the characteristics of these migrants, both with respect to the community from which they departed and the communities at which they arrived. This has been supplemented by

tabulation of State-of-birth data, which provides an indirect procedure for measuring migration flows.

Another migration estimation technique, the census-survival-ratio technique, permits the estimation of net intercensal migration by age-sex-color for States, regions, counties, or other units of area for which data are tabulated by these variables.

As an integral part of the Current Population Survey, an annual measurement of migration during the preceding year has been made each year since 1947. This time series of migration yields information concerning changes in characteristics of migrants as well as changes in volume of movement.

When all five of the procedures described above are exploited to their utmost, the quantity of migration information that is available for the United States as a whole and for each major part is truly impressive. There are:

Net migration:

- (a) The vital statistics "bookkeeping equation."
- (b) The census-survival-ratio estimates by age-sex-color.

Gross migration:

- (c) The census tabulation of residence X years ago.
- (d) The State-of-birth tabulations.
- (e) The Current Population Survey annual tabulations.

When these resources are used to reveal the maximum of information about the selectivity of migration of particular subgroups, the potential for the study of migration selectivity is equally favorable. Until a few years ago, full

advantage of these opportunities could not be made because of the tremendous volume of computations required. With modern electronic computers this problem is resolvable. As a result, there is no major barrier to a burgeoning of research on the phenomenon of the migration component of population dynamics, using census data.

National Surveys

National censuses are able to include only a single (or perhaps two) questions pertaining to residence at some previous time, in order to measure migration. Considerations of cost and the competition of other items for a place on the census schedules preclude detailed data collection. However, national sample surveys can be undertaken that will provide all of the rich detail needed for carrying out many of the studies suggested above. Among such possibilities are:

- (a) A simple census-type question concerning residence five years ago, placed on special-subject surveys in order that migration may be related to all other items of data collected in that survey.
- (b) A complete migration history, from birth to date of interview.
- (c) Assessment of conditions that preceded each move.
- (d) Motives given by the migrant for making each move—both for leaving and for choosing a particular destination.
- (e) Problems encountered by the migrant at the destination, unmet needs, and the impact of the migration upon him.

- (f) Eventual adjustment of migrants, net benefits of migration, and contrasts of migrants who have lived five, ten, or more years in a community, with nonmigrants of the same age.

National Registers

Many nations of the world maintain continuous population registers. Every migrating person is required to register his departure and his arrival at the new community. Some of these registers are administered by civil authorities and some by police or military authorities. In Scandinavia and The Netherlands these registers are maintained with such accuracy that they can be tabulated to provide highly precise data on migration. Although the possibilities for such population registers in the United States are quite remote, there are some registers that can be tabulated to yield highly useful migration data. Among these are the Social Security Register, policy holders of insurance companies, certain large registers established to make longitudinal studies (such as research projects to study the effect of smoking upon health), rationing registers, city directories, telephone listings, and others. As yet, these resources have scarcely been tapped for the study of migration.

Migration Questions That Need To Be Studied

It is not possible in this brief document to provide an inventory of all the research that needs to be done on the migration component of population dynamics. It is appropriate, however, to identify general areas that promise to be especially meritorious of research attention.

A. Explanation for the volume and characteristics of the flow of migrants from one region to another, and for changes in both volume and characteristics.

For example, it has been claimed that the northward flow of Negro mi-

grants is much smaller in the 1960-70 decade than in the 1950-60 decade and the characteristics of these migrants are different. Is this true? If so, what is the explanation? What changes of this type have taken place with respect to the flow from each region to every other region? Have some of these flows become larger during the past decade? If so, why?

B. Explanation for the volume and characteristics of the flow of migrants from one metropolitan area to another, and for changes in the volume and characteristics of intermetropolitan migration.

By 1970, about three-fourths of the population will be found living within standard metropolitan areas. During the present decade, the exodus of population from rural to urban areas is a minor part of all migration. By far the greatest volume of movement is intermetropolitan. Is this merely aimless movement, made for purely personal reasons, or does it have a deeper economic and demographic significance? What are the characteristics of these migrants, and what forces seem to explain the movement of persons of each type?

C. Full exploration of the interrelationship between migration and each of the other basic demographic processes.

Fertility

Mortality

Nuptiality^e

Socioeconomic mobility

^eSee earlier discussion of needed data on the relationship of marriage and divorce to migration.

It has been hypothesized that migrants tend to marry at an earlier age than nonmigrants, because they have no family to provide social support. It has been hypothesized that migrants coming from high fertility populations cling to high fertility behavior long after they have become identified with a low fertility population. It has been hypothesized that migrants are more sickly and more prone to mental disorders than nonmigrants: one should expect higher death rates if this is true. It has been hypothesized that migration is closely linked to changes of socioeconomic status: to promotion to a new and more prestigious position, or fall from a higher to a lower position. Substantial increases or decreases in income are said to stimulate migration, as does prolonged unemployment, change of industry of employment, or attaining a higher level of education. As yet these interrelationships among the components of population dynamics are not well understood, and we have little general theory to explain them.

The 1970 census will provide much data, previously unavailable, with which to carry out such studies.

D. The manner in which migration occurs:

The act of migration may take place in a variety of ways:

- (a) An entire family may move as a unit.

- (b) A single person may leave home to attend college and then seek employment upon graduation.
- (c) A person may go to a different community to obtain work, and then send for his dependents when he has established himself economically.
- (d) A single person may go to a different community, find employment there, and not be followed by other family members.

Little is known of the relative frequency of each of these patterns of movement, and of the conditions surrounding each.

E. What is the net long-term effect of migration upon the migrant and his family?

In what percentage of cases does migration produce a net gain? How many years must elapse before the gain outweighs the cost? How frequently do migrants fail, and are forced to move on to another place or return to their place of origin? What factors are associated with success and with failure? What is the net gain or loss, both to the sending and the receiving community from migration?

F. How intense is selective migration and how and why is selectivity changing?

The selectivity of migration by age, sex, race, ethnicity, educational attainment, occupation, and other characteristics needs not only to be measured for

the nation as a whole, but also needs to benefit from comparative studies of the flows between regions, from temporal comparisons to measure change, and from analytical studies seeking to explain both differences between regions and over time.

C. A few "key" questions on migration should be made a part of national sample surveys sponsored by the Department of Health, Education, and Welfare and the Bureau of the Census.

In most cases this can be a single question concerning place of residence "X" years ago (1-5 years ago). For example, this question should be made a routine part of interviews following up samples of births, deaths, and marriages and special surveys conducted for the anti-poverty or other special programs.

D. A special effort needs to be made to assemble data for variables that explain migration streams and migration selectivity.

Migration behavior will remain forever unexplained if all energies are devoted solely to measuring movement and calculating migration rates. Data must be assembled for variables that permit the testing of theories accounting for movement—this will require not only the variables that measure static conditions of individual communities but also changes in the social and economic conditions of these communities or changes in the relative position of these places in the total national system.

E. Special programs need to be developed to process migration data by computer for analysis and interpretation by particular consumers.

Much publication resource can be wasted in publishing hundreds or thousands of copies of very detailed tabulations which have only a single use.

Migration tabulations tend to be very voluminous. Once tabulated, they

Recommendations

A. An organized effort needs to be made to take advantage of available but unused migration data.

Great masses of vital statistics and census data remain inadequately exploited. Massive tabulations from the 1940, 1950, and 1960 census have yet to be fully analysed and interpreted. The vital statistics method of estimating net migration has not been extended to its limits. Special tabulations from the census tapes of the 1960 census can be made to produce even more detailed cross-tabulations. Many of the data are buried in annual reports, special publications, and computer tapes and need to be assembled. For example, the annual survey of migration conducted by the Census Bureau as a part of its reports on the labor force can be accumulated for several years to make more detailed cross tabulations than could be made available for any single year.

B. Questions on migration should be made an integral part of the proposed National Survey of Family Growth.

To the extent permitted by the budget and interview time, data should be collected concerning all of the questions raised in this section.

are only raw data for computing rates. Many of the important studies that need to be done require that a special tabulation be made and recorded on computer tape so that one researcher may analyse it and report the findings as a research study. Arrangements need to be made

whereby this can be done for all series of migration data:

- Decennial censuses
- Current Population Survey
- National demographic surveys
- Other special surveys

ROLE OF MORTALITY AND MORBIDITY IN POPULATION DYNAMICS

Introduction

In the dynamics of population change, fertility adds to population growth whereas the effect of mortality is to limit the size of the population. The impact of mortality on the population composition of a country may be seen in dramatic form when one views the population pyramid of a country after being directly involved in a major war. The loss of young males during a war is reflected in the population pyramid for years afterwards until the cohort becomes extinct.

In the developing countries, the population loss through death is considerable. In these countries, the infant and child populations are the hardest hit by death. In countries where sizable reductions in mortality have been achieved, population change has resulted not only from the immediate effects of saving of lives, but from the extension of the childbearing period of the female population.

In the United States, the death rate has now reached a relatively low level. Further decline may be expected, but mortality in the general population is no longer a significant component of change in population growth in this country. Perhaps less known and less understood is the role of fetal mortality in population growth and as influencing the fertility pattern.

In the discussion to follow, there will be outlined briefly the gaps in the presently available data on mortality needed for the measurement of population growth.

Component of Population Change

The annual depletion of the population due to deaths in the United States amounts to about 1.8 millions. This figure may be contrasted with the 3.6 million births occurring annually which results in a natural population increase of about 1.8 million per year.

The major demographic characteristics (i.e., age, race, and sex) of decedents are generally known. Periodically, more detail is available such as marital status and occupation. (Occupational mortality data was tabulated on a 100 percent basis in 1950 and on a 25 percent sample in 1960.)

National life tables are published annually, and those for States at decennial intervals. These life tables have been useful in mortality projections for future population estimates. However, because of the changing mortality trends, research on suitable methods of mortality projection is needed.

Generally speaking, the available mortality data are adequate for most purposes that require measures of attrition of the population. The data are generally satisfactory, but im-

provement is needed in the quality of certain data. At the present time, the reporting of marital status and of age of decedent, particularly of nonwhites in the older ages, is suspect.

Completed Fertility

The childbearing period may terminate because of biologic reasons, or it may terminate prematurely through death. In the years past, even the act of childbirth posed a serious threat to the life of the mother. Today, deaths from complications of pregnancy, childbirth and the puerperium number only about 1000 per year in the United States. Insofar as other causes of death are concerned, the total mortality of all females between the ages of 15 and 45 years numbers fewer than 50,000 per year. Not all of these women would have borne a child even if they had completed the childbearing period. Therefore, the effect of death on the female population in the childbearing ages is numerically fairly insignificant.

In certain cultures, widowhood is equivalent to completed fertility. In the United States, remarriage of widows may, and frequently does, take place. According to data for 1960, it may be estimated that deaths of married males 15 to 45 years create some 48,000 widows annually. A relatively large proportion of these widows will remarry. A smaller proportion will continue to bear children.

The precise effect of mortality on fertility through termination of childbearing capabilities is not known. However, the number of births that would have otherwise occurred had it not been for the death of one or more of the marital partners must be small relative to the annual total. Even on an absolute basis, such a number cannot be very large.

Early Pregnancy Terminations

The present measurements of fertility are based upon the number of babies born alive. They exclude pregnancies terminated by abortions, spontaneous and induced. It has been estimated¹¹ that the frequency of induced abortion in the United States could be as low as 200,000 and as high as 1.2 million per year depending on the assumptions made and on the assessment of possible biases in the various data series used in the estimate. The number of fetal deaths has been estimated¹² to be in the neighborhood of 500,000 per year. (How much overlap there is between the estimates of frequency of abortions and of fetal deaths is not known.) Fewer than 100,000 fetal deaths are actually registered annually. Part of this discrepancy between the estimated occurrence and the number registered is due to the legal requirements of most States which do not require the registration of dead fetuses of less than 20 weeks of gestation. However, even in other States a large proportion of fetal deaths go unregistered.

To gain a better understanding of fertility patterns, more needs to be known about the magnitude and nature of the pregnancy wastage problem. This problem may be viewed from two points of view, namely, the product of conception (dead fetus and embryo), and the delivery of the product (miscarriage and abortion). Very little is known of either aspect. Insofar as the fetus and embryo are concerned, an estimate of their numbers and distribution by sex and gestation age are needed. With regard to pregnancy terminations, what proportion result in miscarriages? In abortions? What proportion of induced abortions are criminal abortions? What proportion are induced for

medical reasons, or for family limitation purposes?

Health and Migration

Health, or rather ill-health, as a motivating factor in migration is well-recognized, but very little quantitative data are available on the subject. In the years past when tuberculosis was a major public health problem, mortality data showed heavy migration of those with tuberculosis to States like Arizona, Colorado and New Mexico. With the large decline in tuberculosis mortality, population movement for treatment of specific diseases is not as clear. However, there still appears to be a flow of population to Florida, California and Arizona for retirement purposes. Part of this migratory movement must be health related.

Health Consequences of Population Change

The nature of health problems and services will depend to a large extent on the characteristics of the population of an area. For example, in a young population, the major problems are likely to be obstetrical and pediatric in nature. In a community of elderly people, geriatric cases will predominate coupled with demands

for nursing services. In a young community, the mortality will be low and in an aging population the mortality will tend to be high. These are some of the consequences of population change.

Recommendations

1. Pregnancy wastage is a problem of considerable, but unknown, magnitude which may significantly affect fertility patterns. Research is needed to develop methods to determine the magnitude of this problem.
2. Through the use of hospital data, the present level of miscarriages and abortions should be estimated. For induced abortions, an attempt should be made to estimate the number of criminal abortions.
3. Because of incompleteness of fetal death registration, relatively little is known about the distribution of fetal deaths by period of gestation. Studies of cohorts of pregnant women should be undertaken so that pregnancy outcomes and the age and sex distribution of fetal deaths can be determined.

OVERVIEW

The Subcommittee has reviewed what seem to be the principal needs for improvement in the statistics on population dynamics for this country. It has offered proposals as to how these needs might best be met. Starting with the data that are available, the Subcommittee has sought to indicate ways of improving existing data sources and to recommend certain new data sources.

The main finding of the Subcommittee's review is that, although there are many sources

of data in population dynamics in the United States, there is no continuing data-collection mechanism that has the measurement of family growth as its principal concern. The Census data, the general-purpose demographic surveys conducted by the government, and the data developed from records of birth, death, marriage, and divorce have continued to improve, and the Subcommittee has devoted much attention to ways in which these resources should be further exploited. Nonetheless, these sources,

designed as they are for many uses, do not lend themselves to the intensive study of a number of topics of special concern. This is especially true with regard to the statistics which are needed in order to understand what is happening to the birth rate in the United States.

It is past time for the establishment by the Federal Government of a National Survey of Family Growth, repeated at regular intervals, to provide information on fecundity, reproductive norms, and family planning practices, their interrelations, and their relations to natality, nuptiality, and selected background factors. The importance of the topics to be covered in such a survey is indicated by the broad and burgeoning Federal emphasis on population and family planning, and by the dominating role which fluctuating birth rates have played in the population growth in the United States in recent years. In this connection the Subcommittee concurs emphatically in the recent recommendation by the President's Committee on Population and Family Planning (November 1968):

That the National Center for Health Statistics be given funds to establish a continuing survey of family growth in the United States in order to determine trends in childbearing patterns and factors affecting the American birth rate.

Such a survey would represent a vital step forward in achieving the three-fold objectives set forth in the chapter on Fertility and Family Planning, which are: To understand the current decline in American fertility and of present differentials in the fertility of major social groups, to anticipate the course of these trends in the near future, and to assess the success of Federal programs aimed at aiding couples who

wish to achieve voluntary control of their family size.

The feasibility and usefulness of a continuing survey of family growth have been amply demonstrated by several private studies of a similar nature which, however, lack the scale, frequency, and continuity that are needed. The development and maintenance of frequent surveys on this topic are clearly a matter of Federal interest and, given the unique Federal competence in the conduct of repetitive, large-scale statistical programs, this is clearly a Federal responsibility.

Although the birth rate is the main dynamic factor affecting the size of the Nation's population, migration within the country is mainly responsible for the changing concentration of population in geographic areas. In the concern for population and family planning, it is easy to overlook this fact, and to underestimate the degree to which the Nation's population problems are local problems resulting from imbalances in the distribution of population in relation to the distribution of jobs, housing, transportation, public facilities and the like. The movements of people from the South to the North and West, from farms to towns and cities, from nonmetropolitan to metropolitan areas, and from cities to suburbs, have been detailed in an abundance of excellent statistics from the Bureau of the Census. However, the understanding of this movement, the conditions giving rise to it, and the problems that it poses for the sending as well as the receiving communities, presupposes an investment in compilation and analysis of the data which have been collected and in some additional data collection which is not yet in sight, and which ought to be made.

The Subcommittee's recommendations include other proposals for the establishment of new sources of demographic statistics, such as

sample surveys of marriages and divorces to supplement the information on the marriage and divorce certificates. In addition, the Subcommittee has made recommendations for continued efforts to extend and improve the existing demographic statistical systems, for example, the further extension of the Marriage and Divorce Registration Areas and the registration of fetal deaths. Other recommendations are for greater utilization of existing data-collection mechanisms for population dynamics uses, such as the inclusion on a regular basis of such items as questions on migration and on marriage and divorce, and utilization of the Hospital Discharge Survey to collect information on abortions. There are also recommendations for greater exploitation of basic data already collected, for example, the preparation of tabulations relating the size and composition of migration streams to changing characteristics of the communities involved, and the preparation of marriage- and birth-cohort fertility data for major racial groups. Still other recommendations call for the pursuit of methodological innovations, such as the use of randomized response techniques in the collection of data on abortion or other sensitive matters.

The foregoing recommendations have been concerned with the *substance* of the information which is produced. There are, in addition, several issues involving the *form* in which the information is made available. The usefulness of all the efforts being made in this area, as well as those which have been recommended, depends on how readily the results can be utilized to produce knowledge. It appears to the Subcommittee that in certain important respects the output of the statistical agencies needs improvement when seen in this light. The agencies have shown themselves capable of producing, and the users have shown themselves capable of assimilating a far more varied output than is repre-

ented by the statistics that are regularly published. It is the sense of the Subcommittee that the agencies should push forward in two ways: (1) to give increasing emphasis to analytical uses in designing their statistical output, and (2) to give increasing emphasis to the production of public-use samples (that is, basic data tapes for use outside the agencies) and other data tapes which provide for the exercise of maximum flexibility, speed, and ingenuity by the analyst while at the same time preserving the confidentiality of individual records.

Improvements in the usefulness of statistics for analytical purposes require improvements in the ways in which the data are handled and presented. This implies, at a minimum, the production of more satisfactory denominators for calculating annual birth, marriage, and divorce rates by characteristics of the population. This could be accomplished by the routine preparation of averages based on several surveys rather than limiting the tabulations to a single survey.

On another level, the Subcommittee believes the statistical agencies should devote more effort to the production of analytical statistics such as those yielded by various kinds of models. Such analytical statistics are commonplace in some areas of official demographic statistics; they are in only preliminary developmental stages in others. For example, the National Center for Health Statistics and its predecessor agencies have published annual life tables as a routine matter for the past three decades. Nowadays nobody would consider it adequate if the agency responsible were simply to publish death rates, let alone tabulations of death records. The regular publication of life tables has had the result that life-table measures are now widely understood and universally used as a standard means for expressing the force of mortality.

Although an abstract and sophisticated analytical model now provides the common terms for the communication of information on mortality, this is not true for some of the other topics covered in population dynamics. For these topics, the agencies should be encouraged to give more systematic effort in directions where they have already shown initiative. For example, the marriage model which Donald Akers developed at the Bureau of the Census can serve as a potent tool for analyzing and expressing changes in marriage rates, proportions marrying, age at marriage, annual number of marriages, and the relationships of these to the changing population of marriageable age.¹³ In addition, a Monte Carlo demographic simulation model (an interaction model) is being developed by the Research Triangle Institute and the University of North Carolina under the auspices of the National Center for Health Statistics. Efforts such as these should be multiplied, and the results should be incorporated in the regular publication program of the agencies as early as possible.

The general point in what the Subcommittee is asking is that the agencies devote more attention to presenting the information they collect in maximally usable form. By virtue of the potentiality of their electronic equipment and the knowledge of their staffs, these agencies are in a position to supply information that will contribute to demographic knowledge much more readily than at present. The users of statistics need, and are ready to receive, data that are processed to a more advanced state than is now common. Furthermore, experience has shown that the demand for more refined statistics will expand when such statistics are produced on a regular basis.

The Subcommittee's view of the role of the statistical agencies extends also to the substantive analysis of the data which they

publish. The talents of the agency staffs would justify, and the public understanding of population dynamics would benefit from, more activity of this kind. Their closeness to the data puts these professionals in a unique position to produce informed descriptions and analyses of what is taking place in the population. The Subcommittee does not advocate interpretation on controversial questions or issues of policy. However, the sensitivity of certain staffs to the data needs and their interest in improving the data depend to a significant degree on the extent to which the agency staffs use the data. Furthermore, the development of the recommended analytical statistics presupposes a level of systematic in-house research not as yet achieved, or likely to be achieved unless more staff time is freed from the preoccupation with day-to-day problems of data production. Systematic agency support for substantive staff research and analysis will benefit the data, the ability of the agencies to attract and retain talent, and public knowledge in the population dynamics field. As an example of such analytical activities, the National Center for Health Statistics and the Bureau of the Census should be encouraged to cooperate in the preparation of a decennial report on population dynamics.

At the same time that the Subcommittee encourages greater analytical activity by the agencies, it also sees ways in which the agencies can do more to facilitate analysis by others. An example is the release of public-use samples and of summary tapes. The Bureau of the Census pioneered the development of public-use samples with its 1/1,000 sample of the 1960 Census results. This resource has been widely used. The tapes (or cards) were processed in advance of distribution so as to avoid any possibility of identification of individual persons, thus observing the confidentiality provisions governing the collection of the data. With appropriate safe-

guards, the Bureau of the Census has made tapes of certain current surveys available to selected Federal agencies for their research. The release of information in this form permits maximum flexibility to the researcher and greatly reduces the time required to conduct research than is the case with special tabulations obtained on order from the statistical agencies. The principle of public-use samples should be extended to other key surveys including the proposed National Survey of Family Growth to which the Subcommittee has given the highest priority, and to the vital statistics. A public-use sample of birth records should be released for each year. In doing this, the agencies will have to develop tape formatting and documentation of a kind that has not been required for their internal use of the tapes, but is necessary in order to facilitate the use of the data in this form by outsiders.

The Bureau of the Census is preparing to supply orders for a wide variety of summary tapes from the 1970 Census. These are tapes which show the statistics in standard tabulation detail for areas that are too small and too numerous for publication of the full detail in the regular census volumes. The provision of statistics in this form permits the user to recombine areas in nearly any form he desires. A large demand for such tapes from the census is anticipated. The Subcommittee urges the National Center for Health Statistics to explore the desirability and feasibility of distributing the vital statistics on summary tapes. These tapes would have a number of uses, such as measurement of geographical concentrations of high order births, illegitimate births, etc. Since many uses of the information in summary tape form are for local areas, consideration should be given to presenting such data for 100-percent samples of births, marriages, and divorces in order to improve the reliability of the data at

the local level. However, the presentation of 100-percent data should not be done at the risk of delay in publication of the vital statistics. Indeed, a concerted effort should be made to improve the timeliness of both reporting and publication.

The implementation of the recommendations presented in this report requires further improvement of coordination between the agencies involved. To this end, the Subcommittee recommends to the Directors of the National Center for Health Statistics and the Bureau of the Census that they consider expanding the functions of the Joint Census-NCHS Committee on Fertility to include all of population dynamics and that they consider having this committee report to the office of the Director of each agency. Substantial agenda for such a committee are implicit in the recommendations in this report. An early item of business might be the decennial report on population dynamics mentioned above.

The Subcommittee commends to the agencies the great potential for coordination and stimulation of demographic research within the Government that is represented by the program of the new Center for Population Research of the National Institute for Child Health and Human Development. The establishment of the Center, and its announced program, augur most favorably for the future development of the field of population dynamics in the Federal Government, given the necessary cooperation.

The Subcommittee is aware of the current "invasion of privacy" issue as it related to Federal statistical activity. It recognizes the legitimacy of the public concern over electronic eavesdropping, misuse of credit information, and similar real invasions of privacy where individual information, supplied without knowledge or supplied innocently for another purpose, has been misused to the detriment of the

individual. However, such concerns are misdirected when they are directed to the Bureau of the Census and the National Center for Health Statistics, whose programs have been discussed in this report. These agencies collect information from the public under an absolute bond of confidentiality, for well-established public purposes. The information can be used for statistical purposes only, and the information on individuals cannot be seen by any person other than a sworn agent of the organization which collected it, under strict legal penalties for violation. The Subcommittee knows of no case

in which this confidentiality has been broken by either the Bureau of the Census or the National Center for Health Statistics, and it has confidence in the intent and ability of these agencies to maintain this principle.

The statistics which these agencies produce, and those additional statistics which have been recommended, are essential to the needs of our society. Indeed, this entire report is the Subcommittee's testimony to its view that a substantial public interest is at stake in the improvement and expansion of the programs under discussion.

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