

**NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL
COMMISSION ON BEHAVIORAL AND SOCIAL SCIENCES AND EDUCATION
DIVISION ON SOCIAL AND ECONOMIC STUDIES
Committee on Population**

Proposal No. 98-CBASSE-115-03

PROPOSAL TO THE ROCKEFELLER FOUNDATION

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PANEL STUDY ON POPULATION PROJECTIONS

EXECUTIVE SUMMARY

The National Academy of Sciences' Commission on Behavioral and Social Sciences and Education proposes to convene a panel of experts to undertake a two-year study that will synthesize and extend the knowledge base for global population projections. The panel, which would operate under the auspices of the Academy's Committee on Population, would:

- Review the population projections of the past and present for accuracy, and accurate presentation of uncertainty, and recommend methodological changes as appropriate;
- Examine in detail the demographic assumptions that are being made explicitly and implicitly in the projections;
- Review the implications of research on fertility and mortality as a basis for the assumptions currently used in long-range projections; and,
- Develop a research agenda to help focus research in the population sciences on issues of concern to the population projection efforts of the United Nations and the U.S. Census Bureau.

DESCRIPTION

In a striking paradox, population projections are the demographic outputs most used by non-demographers and most neglected by population scientists. Non-demographers would be surprised at how few demographers actually work on projections, and at the lack of theoretical or even historical basis for the scenarios underlying the most commonly used

projections. The tasks of assessing plausibility of current estimates and choosing appropriate assumptions to use in population projections are left by default to the small projection staffs of the United Nations (U.N.) and the U.S. Census Bureau. They have neither the time nor the resources to evaluate adequately theory and research on the full range of fundamental assumptions needed to make a consistent set of population projections.

Long-range population projections require more systematic attention than has been awarded them in the past. A thoughtful review of methods, and an assessment of how recent research on fertility and mortality determinants could guide assumptions used for long-range projections, would be a service to those who produce as well as those who use them. For example, U.N. median projections for global population are built into almost all models used for forecasting greenhouse gas or pollutant emissions for international environment negotiations. Users of the projections typically do not realize that the median projections incorporate assumptions of very rapid fertility declines, followed by stability, for which there is only weak support in theory or recent history.

To take an example from health policy, a recent widely cited report of the World Health Organization entitled The Global Burden of Disease relies heavily both on predictions of changing mortality patterns and also on implicit assumptions about continued rapid fertility decline, which is built into the U.N. population projections that were used in the WHO/World Bank/Harvard models. Users of the projections typically do not realize that the median projections incorporate assumptions of very rapid fertility declines, followed by stability, for which there is only weak support in theory or recent history. The results are not all driven by demography, of course, but demography matters a great deal for health sector planning.

For a wider public, poorly understood changes in projections can affect the salience of global population issues. When the 1996 U.N. projections were released, the medium-variant projection for the year 2050 was smaller by 470 million persons than the medium-variant projection for that same year made in 1994. This was widely reported as evidence that population growth was not so big a problem as had been thought. The projected annual rate of growth over the whole period had in fact been changed only slightly to produce such a big difference in the expected size of the population in 2050. The fact that these medium-variant estimates were both in any case embedded in much wider bands of uncertainty, was understood by the producers of projections but not by most consumers.

The major global long-range projections currently differ in their assumptions about future decline in mortality rates, particularly in modeling the impact of the AIDS epidemic. But the medium projections tend to share some basic assumptions that need assessment in the light of current research, including:

- Rapid convergence of fertility rates to replacement levels in all countries, followed by stability (implying very rapid declines in many developing countries, and increases of fertility rates in developed countries);

- Slowing of improvement in mortality rates, and no convergence of life expectancy across countries;
- Equal rates of improvement of life expectancy among men and women in developing countries, despite the growing gap in the more developed countries.

These basic choices about appropriate assumptions to use in population projections are left by default to the small projection staffs of the United Nations and the U.S. Census Bureau. These staffs have neither the time nor the resources to conduct new research or fully evaluate theory and research on the full range of fundamental assumptions needed to make a consistent set of population projections. Therefore, a thoughtful review of the methods and assumptions used in population projections would be a service to these staffs as well as to the projection-using public.

This is a proposal to engage the best population researchers with the best population projection staffs in the review of the current assumptions and methods that underlie recent population projections. Listed below are six of the many scientific questions that the panel might address. Additional issues will no doubt be raised by the staff of the United Nations and Bureau of the Census, and by the members of the proposed panel.

Will Total Fertility Rates (TFRs) converge by 2050?

Ronald Lee, recent chair of the Committee on Population, has pointed out that "current population forecasts ... assume that populations are even now converging.... If... population convergence to stationarity has been inferred from some version of transition theory, such as modern socioeconomic fertility models, then ...the forecasts rest on unexamined assumptions."¹ The U.N. and Census Bureau both assume that total fertility rates in the next 55 years will converge to 2.1 children per woman. In 1950-55 the TFR for the least developed countries was 6.5 or a little over twice the rate of the developed countries. By 1995 the fertility rates have declined in virtually every country, but the divergence between the most and the least developed countries had increased 50%. What is likely to happen in the future that will make rates converge, quickly, on replacement level?

Why would TFRs of developed countries increase 30% in the near future?

Fertility rates for developed countries in 1990-95 are below replacement: in Western Europe, on average, it is estimated to be 1.5 children per woman. Nine countries are below

¹ Ronald Lee, "Long-Run Global Population Forecasts: A Critical Appraisal," Population and Development Review, 1992.

1.5. Below replacement fertility is not a passing phase. In general, Western Europe has had fertility below replacement for 20 years; Northern and Southern European fertility has been below replacement for 15 years, although several European countries have also seen increases in their fertility rates recently. What will be the causes of sustained increases in MDC fertility rates in the 21st Century?

Is a TFR of 2.1 the right point of convergence?

Almost no country in the U.N. estimates falls to replacement and then stays there. Most countries have fertility rates of 2.1 only for a few years. In 1990-95 the U.N. projected that fifty countries had less than 2.1; 158 were above. And in that period U.N. staff estimated that only five countries had a total fertility rate of 2.1. It was a curious group: North Korea, Moldova, Malta, Macedonia, Guadeloupe, and New Zealand. It is hard to think of what they all have in common except for their fertility rate. Perhaps fertility rates in all of the countries will converge to 2.1. But it is at least as likely that the differences in economies, cultures and histories of the 214 countries in the world will result in long-term differences in fertility rates. Careful research might be able to give some indication of whether convergence or diversity in future fertility rates is most likely.

If fertility rates converge, why don't mortality rates?

The factors that are associated with the decreases in total fertility rates around the world are similar to the factors that are correlated with increases in life expectancy. They include increases in education, public health care, gender equality, and income. Assumptions made by both the U.N. and the Census Bureau assume a convergence in total fertility rates, but continued dispersion of life expectancies by 2050. The U.N. assumes that the gap in life expectancy between developed and developing countries, which is 43% in 1995-2000, will decrease by 2050. But there will still be a 9-year gap between life expectancy in the developed countries and that of the least developed countries, which requires a justification based on theory and empirical work.

Why are increases in life expectancy assumed to slow?

There is now a lively debate about the future trends in improvements in life expectancy. James Vaupel and others suggest that there is no reason that the improvements will end in the next 50 years. Jay Olshansky and others have suggested that there is likely to be an asymptote in improvements of life expectancy, but it is considerably beyond where the U.N. projects life expectancy for developed countries in 2050 (81.0 years).

While the U.N. assumes that life expectancy will continue to increase through 2050, it assumes that it will increase slower than it has in the recent past. This reduction in

assumed life expectancies is the combined result of integrating information about the death toll of the AIDS epidemic around the world and the decline in life expectancies in Eastern Europe and the former Soviet Union. But the result of the slowing of the increase in life expectancy is that life expectancy in developed countries will be 81.0 in 2045-50. This is only one year more than Japan's life expectancy today. In developing countries, it will be 75.8 in 2045-50 which is one year above Cuba's today. Are these assumptions for the next 50 years too modest given that they have already virtually been achieved in some countries in the world?

Will gender gaps in life expectancy continue indefinitely to be much smaller in developing countries than they are in developed countries?

Currently the U.N. projections assume that the gender gap in life expectancy is assumed to persist in developed countries at more than twice the level as the developing countries. For the developed countries, the gender gap in life expectancy is estimated to be 7.6 years in 1990-1995. By 2045-50 it shrinks slightly to 6.0 years. For the least developed countries the gap grows from 2.1 years to 3.6. But when the life expectancy at birth in what are now developed countries was at the level of the least developed countries in 2050 the gap was twice the projected gap for the developing countries. There will certainly be differences in health profiles by 2050 between the least developed countries and the MDCs historically. One question is whether it is reasonable to assume that at similar levels of life expectancy we would expect the future gender gap to be half as large as the historical one.

These are just a few of the assumptions that need to be explicated or justified. Where there is no compelling empirical evidence or theoretical basis for key assumptions, they need to be made more salient in the research agenda for population sciences. Some of the relationships among the various explicit assumptions produce implicit outcomes; these may not be wrong, but they should not go unexamined. Where important assumptions have particular ramifications, these can be demonstrated using various "if ... then" scenarios.

PROPOSED ACTIVITY

This project will draw on the best population researchers to review the current assumptions and methods that underlie current population projections. Increasing the involvement of the best researchers with the development of projections would improve the assumptions used, and therefore, the projections themselves. A panel of experts operating under the auspices of the National Research Council's Committee on Population will:

- Review the population projections of the past and present for accuracy, and accurate presentation of uncertainty, and recommend methodological changes as appropriate;

- Examine in detail the demographic assumptions that are being made explicitly and implicitly in the projections;
- Review the implications of research on fertility and mortality as a basis for the assumptions currently used in long-range projections; and
- Develop a research agenda to help focus research in the population sciences on issues of concern to the population projection efforts of the U.N. and the U.S. Census Bureau.

Experts would be drawn from demography, anthropology, economics, biostatistics and epidemiology. Panel members would also consult with the projection staffs of the U.N. and the U.S. Census Bureau, to learn which assumptions give them the greatest concern and where they would like more research and advice.

The panel would meet six times over a two year period. It would hold at least one workshop with outside experts to hear from a range of both researchers and practitioners. It would widely circulate its report to a broad range of experts and non-experts.

The final product of the study will be a report of direct interest to a broad array of planners and social scientists. Copies of the publication will be distributed free of charge to the Committee's mailing list of approximately 300 national and international libraries, scholars, and policymakers interested in population issues. Staff will present the study's main findings to sponsors. Short abstracts and publication announcements will be disseminated through print and electronic newsletters. Finally, the volume will be available for purchase through National Academy Press.

THE NATIONAL ACADEMY OF SCIENCES' COMMITTEE ON POPULATION

The National Academy of Sciences (NAS) is a private, nonprofit society of distinguished scholars, dedicated to the advancement of science and technology and to their use for the general welfare. Under the authority granted by a charter from Congress in 1863, the Academy "shall, whenever called upon by any department of the Government, investigate, examine, experiment, and report upon any subject of science or art." The National Research Council (NRC), organized under the same charter in 1916, is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering.

The Committee on Population was established by the National Research Council in 1983 to bring the knowledge and methods of the population sciences to bear on major issues of science and public policy. The committee's work includes both basic studies of fertility, health and mortality, and migration; as well as more applied studies aimed at improving

programs for the public health and welfare in the United States and developing countries. The committee also fosters communication among researchers in different disciplines and countries and policy makers in government, international agencies, and private organizations. The work of the committee is made possible by funding from several government agencies and private foundations.

The Committee on Population, and its predecessor the Committee on Population and Demography, have reviewed and synthesized the best demographic research on issues of scientific and policy importance for the last twenty years. A large part of the committee's work in recent years has been concerned with major issues in international population policy. The committee has published reports that have guided efforts to improve public policy debate by integrating science.

Members of the Committee and the panels it organizes, and scholars who participate in workshops and expert meetings, serve as volunteers. They are chosen for their special expertise and with regard for appropriate balance. The current chair of the Committee is Professor Jane Menken of the University of Colorado. The Committee's work is supported by staff members of the National Research Council's Commission on Behavioral and Social Sciences and Education.

The current proposal builds well on several strands of the Committee's work in recent years. Specifically, the Committee has undertaken a number of projects aimed at furthering our understanding of the ongoing fertility transition in developing countries and the likely progress of the AIDS epidemic, two of the key areas of uncertainty when studying projections. The Committee is currently producing a series of workshop reports on issues essential to improving our understanding of modern fertility decline in the developing world. Reports in this series will cover (a) the relationship between infant and child mortality decline and fertility decline (report just released entitled: *From Death to Birth: Mortality Decline and Reproductive Change*); (b) the relationship between rising education and falling fertility; (c) adolescent reproductive behavior; and (d) diffusion and the role of social processes in fertility transition. And, in 1996, the Committee published a major report on social science research priorities for dealing with the AIDS epidemic in Sub-Saharan Africa.

STAFFING

Barney Cohen, Director of the Committee on Population, is the responsible NRC staff officer for this project. His doctoral degree is in Demography from the University of California at Berkeley and he has directed projects for the Academy on AIDS in Africa, Demographic Transition in Developing Countries, and Adolescent Reproductive Behavior in Developing Countries in addition to his work on domestic population issues (see attached c.v.). Dr. Cohen will have oversight, assisted by a Research Associate and a Project Assistant to be named. The Panel's work will also be supported by financial, administrative, editorial, and other NRC specialists as required.

FUNDING

The Committee on Population is seeking funding from several sources for this study. We anticipate that one-third of this money will come from the Committee on Population's general grants from USAID, the William and Flora Hewlett Foundation, and the Andrew W. Mellon Foundation together with an additional grant from the Mellon Foundation. We are requesting \$250,000 (\$125,000 each year for 2 years) from the Rockefeller Foundation and the David and Lucile Packard Foundation.

PUBLIC INFORMATION ABOUT THE PROJECT

The NRC will post on its web site (<http://www.nas.edu>) a brief description of the project, as well as committee appointments with short biographies of the members, meeting notices, and other pertinent information, to afford the public greater knowledge of our activities, and an opportunity to make comments.

The web site will also include an ongoing record of compliance to the requirements of Section 15 of the Federal Advisory Committee Act of 1997, and a certification of compliance will be provided when the study is completed.

The Academy has developed interim policies and procedures to implement the Federal Advisory Committee Act, 5 U.S.C. section 1 et seq. (FACA), as amended by the Federal Advisory Committee Amendments Act of 1997, H.R. 2977, signed into law on December 17, 1997 (FACA Amendments). The FACA Amendments exempted the Academy from most of the requirements of FACA, but added a new Section 15 that includes certain requirements regarding public access and conflicts of interest that are applicable to agreements under which the Academy, using a committee, provides advice or recommendations to a Federal agency. In accordance with Section 15 of FACA, the Academy shall deliver along with its final report to federal sponsors a certification by the Responsible Staff Officer that the policies and procedures of the National Academy of Sciences that implement Section 15 of FACA have been complied with in connection with the performance of the contract /grant/cooperative agreement.