Implications and costs of UN fertility scenarios and of meeting unmet need

Background

The United Nation's three TFR (Total Fertility Rate) scenarios are the fertility projections most widely used by demographers and non-demographers alike. However, these TFR projections are based on historical trends (with the Low and High variants 0.5 below and above, respectively, the Medium variant TFR), with little analysis of what the concomitant family planning programs might look like or cost. This study provides such an analysis, looking at the implied changes in contraceptive use that would be required to achieve the UN fertility rates. We have also created a fourth "Unmet Need" scenario in which current unmet need for family planning is assumed to be met in a specific time period (defined regionally), after which contraceptive use continues increasing at the same pace. The four population projections, based on the four different fertility scenarios, can be used to compare the fertility patterns and contraceptive behavior, as well as the costs of the family planning programs.

Methodology & Data

Four national population projections were prepared for each of 99 developing countries with a population over one million (China was excluded from the analysis because it is not considered to have any unmet need for family planning). All projections used UN Medium Variant mortality projections, UN age distributions of fertility, and UN 2005 baseline populations. The three UN fertility scenarios take as a base the UN Low, Medium, and High TFR projections, and calculate the implied annual CPRs (Contraceptive Prevalence Rate). The fourth Unmet Need scenario takes as a base an assumed annual CPR (see below), and calculates the implied annual TFRs. All projections are for the period 2005-2050, and were prepared using the Spectrum suite of models. Spectrum utilizes Bongaarts' Proximate Determinants of Fertility framework, which uses contraceptive use and other Proximate Determinants to determine fertility rates, as was done with our Unmet Need scenario. However, it is also possible to reverse the Proximate Determinates framework to calculate contraceptive use by holding constant the other Proximate Determinants and assuming a given set of TFRs; this method was employed in the three UN scenarios.

The other Proximate Determinants of Fertility (other than CPR) were assumed to be the same in all four scenarios, although some varied with time. Data were taken from recent DHS where available; when not available, DHS data from a comparable peer country were used. Infertility rates and Postpartum Insusceptibility were assumed to remain constant throughout the projection period. The percentage of WRA (Women of Reproductive Age) in union and the contraceptive method mix varied with time. The future percentage of WRA in union was modeled as dependent on female education. First, we established a relationship between percentage of WRA in union and WRA having completed primary and secondary education (with a dummy variable for countries in the Transition region) based on DHS data. We then used this observed relationship to project percentage of WRA in union based on IIASA's GET (Global Education Trend) projections of future female primary and secondary school

completion rates. The average 45-year decrease in percentage of WRA in union for the 99 countries was 6.34 percentage points. Contraceptive method mix was projected to shift from traditional to modern methods at the same rate as has been historically observed, using regional averages. Specific method mix within all modern methods was assumed to remain constant, even as modern method's share of all contraceptive use increased. The average 45-year increase in the share of all contraceptive use attributable to modern methods for the 99 countries was 15.97 percentage points.

National family planning program costs were estimated by multiplying the method-specific CYPs (Couple Years Protection) for each projection by regional, method-specific cost-per-CYP estimates. The regional cost-per-CYP estimates are from a recent and extensive literature review of 61 articles and studies encompassing 555 data points. Total annual costs were then aggregated across all methods.

Findings

As of December 2009, final analyses are still being completed, yet initial results show noteworthy findings. The completion UN Low and High scenarios projections in January 2010 will provide even richer insight and cross-comparison with the Unmet Need scenario. The Unmet Need scenario, perhaps unsurprisingly, begins to diverge most significantly from the UN scenarios after approximately a generation, or around the period 2025-2030. This is due to population momentum and the multiplicative effects of early decrease in fertility, which decrease the size of future WRA populations; thus early family planning has a far greater impact on population size in future generations than it does on population size in the first 20 years.

Results varied by region. The African Unmet Need scenario does not differ significantly from the UN Medium scenario (in terms of TFR and population growth rate) until the end of the projection period, implying that the African Medium Variant TFRs may actually reflect an optimistic trajectory for increases in contraceptive use, and that the African Low Variant TFRs may not be feasible. 11 of the 42 African countries modeled had a *higher CPR in the UN Medium scenario than in the Unmet Need scenario*, again calling into question the UN Low scenario, which we expect to imply CPRs *much higher* than even the scenario of meeting unmet need. By 2050, the UN Medium scenario produces an African growth rate of approximately 1.36%, as compared to the 1% growth rate produced by the African Unmet Need scenario. ANE (Asia & Near East) UN Medium and Unmet Need scenarios begin to diverge noticeably after 2025, reaching CPRs of 64.4% and 76%, respectively, by 2050, though both scenarios produce an annual growth rate of less than 0.5% in 2050. The difference between the Unmet Need and UN Medium scenarios is greatest in the LAC (Latin America & the Caribbean), with the Unmet Need scenario producing far lower TFRs and a smaller population than the UN Medium scenario. Final-year CPRs differ by nearly 20 percentage points in LAC, suggesting that the UN Medium Variant implies a far less aggressive family planning program than is implied by the African UN Medium Variant TFR; when viewed in terms of meeting unmet need for family planning, the African UN Medium scenario is far more optimistic than is the LAC UN Medium scenario. Completion of the UN Low and UN High projections in the coming month, as well as

more detailed analysis of all four scenarios, will provide an even richer understanding of the implications of each scenario and of regional variations.

Overall, the Unmet Need scenario represents an additional investment of approximately 14.934 billion dollars in family planning programs in all 99 countries for the 45-year period, as compared to the cost of the family planning programs implied by the UN Medium scenario. The Unmet Need scenario implies a more expensive family planning program than the UN Medium scenario in all regions but Africa. The African Unmet Need scenario is *cheaper* than the African UN Medium scenario by 983 million dollars because of the 11 African countries with *higher* CPRs in the UN Medium scenario than in the Unmet Need scenario; these countries would need a larger family planning program to achieve the UN Medium variant TFRs than they would to meet current unmet need in the next 25 years.

Contribution to Analysis of Future Fertility Trends, Family Planning Programs, and Other Sectors

This study will provide a valuable analysis in assessing the implications, feasibility, and costs of achieving the three UN fertility scenarios. The Unmet Need scenario is a valuable comparison point because its approach is based on current contraceptive use and desired fertility, rather than observed historical fertility trends. Comparing the CPRs, TFRs, costs, and populations produced by the four different scenarios across regions is useful because it highlights the variation in the family planning programs implied by the UN scenarios. Furthermore, this study can be used in analyses of other sectors affected by family planning programs. It is already being used in an analysis of the cost-effectiveness of meeting unmet need via family planning programs to mitigate carbon emissions. It could be used for similar analyses in other sectors, such as using family planning and meeting unmet need as a cost-effective way to reduce future educational expenditures.