

## **COORDINATING MEETING ON MORTALITY ESTIMATION**

**May 24-26, 2004**

**UNICEF House, 3 UN Plaza, New York, NY 10017. USA**

### **Monday, 24 May**

#### **I. WELCOME:**

Trevor Croft (UNICEF) welcomed participants. The purpose of the meeting is to get agreement on estimates and procedures for determining child mortality estimation and to set up a system to manage this over the year to come so there can be one common set of estimates.

People often asked why the UN has different estimates, and wonder about the relative quality of these data sets. It is unclear why the agencies disagree and this devalues the perception of the accuracy of information coming out from the UN by the user community. There is a need to develop a system through which the UN speaks with a single voice and produce estimates that agree. A process of coordination should be developed.

There is a need to think in structural terms about how to take this project of moving toward one estimate forward and how the agencies should do mortality estimates, statistics and, increasingly, causes of death. The goal is, to by end of meeting, have a mechanism to take this further. This kind of meeting has been held before, and we need to take it to the next level.

Often, we do not actually know what procedures are in place in the other agencies, and we make a lot of wrong assumptions around processes. This meeting will be useful to clarify these issues. Dissemination issues and access and when to different data bases are other areas to be discuss.

#### **II. PRESENTATIONS ON PROCEDURES OF MORTALITY ESTIMATION**

##### **1. World Health Organization (WHO)**

It is important that coordination be transparent, comparable, scientifically sound, replicable, involve a simple methodology that can be used at country level, and be seen as a non-zero sum game, and to this objectives WHO is trying to be more collaborative.

Each state is supposed to send WHO their vital registration (VR) data. If VR coverage is low, other sources (DHS, MICS, census) compensate for incomplete data and UNAIDS estimates are used to adjust for the HIV gaps.

WHO does not have a standardised choice of input data/weighting for interpretation except for a relatively strong preference for VR. Trends are fit by either extrapolation or eye-balling, and subjective judgement plays a role. Generally, WHO estimates fall between two extremes made by others.

There are issues with the estimated levels of child mortality for small islands/countries, CIS region and Sub-Saharan Africa with high HIV prevalence.

It was noted that the impact of HIV cannot be separated from mortality, as countries have also had economic problems, violent conflict and other causes of excess mortality. Other challenges for coordination include neonatal and peri-natal mortality levels.

Reporting is continuously updated, and the next round of estimations should be done before the summer. Regional reports due to be published next year.

WHO's country consultation process was initiated in response to the criticisms from the ranking of countries. The country is provided with q1/q5, cause of death, etc. (100 pages per country), however many countries don't have their own data to check WHO estimates against, and other problems emerge.

WHO is seeking to harmonize within WHO and to contribute and to have access to a large UN database (DEV info).

### **Discussion:**

This first round of discussion included a substantial number of points/topics and are presented here as bullet points. During the second day, these points were discussed on more detail.

- Levels are consistent except in the areas noted (CIS, Africa, Small Island states).
- The only way to make progress in country consultations would be to let the country number go in along with the UN estimate. Over time, once the best estimates are there and recognized as of good quality, the country-produced numbers will disappear or become less important. UN-PD tried this strategy, but with the MDGs the differences in estimates will continue to be an issue.
- One way to make estimates more standard is to publish meta data, information about the coverage, and data quality along with the estimate to add value. A qualification scheme (categories) might be developed and documented to make the reliability of data from a given country better known so that biases can be corrected.
- Users want harmonization (i.e. GAVI goes out to check on numbers). With objective criteria we can eyeball criteria on VR.

- Comparing the value attached to MICS and DHS seems to be complicated. DHS is considered the gold standard, and MICS does not include a full birth history. MICS is set up differently from DHS and is an easier-to-implement survey. Additional areas of inquiry cannot be added onto the MICS survey because of how it is carried out, and MICS does not offer the same technical capacity provided by DHS. There is a great deal of consistency between the two surveys, and where there is inconsistency it is important to look at the quality of implementation. The quality of a given DHS is a function of the organization involved at the country level. In some countries where other surveys have not been completed, it is important to decide whether or not you take the data.
- If we compare direct and indirect mortality estimates from the same survey we are going to get similar results, and if we look at MICS and DHS you rarely see clear differences. In some respects, if we are interested in time trends over 5-10 years ago we have good information, but no clear advantage in one direction or the other.
- The UNAIDS reference group met with UN-PD to assign model life tables to countries. It was suggested that one outcome might be to agree on cluster of countries in Sub-Saharan Africa. The first step was to make proper model life tables to ensure that no grave translation error was made. If you're interested in both IMR and U5MR, for AIDS you need finer graduations (orphans, MTCT).
- It is important to be consistent in presentations at the country level. There are 2 issues: 1) how to convey estimates/models to the country (who are attached to their own values) and 2) the need to undertake capacity building in the country and in the organizations. In UNICEF, country officers often lack capacity to talk about data and understand methodology. To address some of the issues that emerged in country consultations, WHO includes a disclaimer that numbers have gone through a consultation (not approval) process, which gets away from the problem of countries disagreeing with the numbers to some extent.
- One problem is to come up with a system-wide estimate without putting it into a projection or accounting framework for migration, fertility, etc. and how it fits into demographic evolution of the country. It was noted that this is not an issue for U5MR the way it is with adult mortality.
- What we measure well is fertility and child mortality. But we don't measure adult mortality well, and we should go with our strengths and accept these numbers.
- A good census should lead to the retrospective adjustment of the whole curve. There is a need to create a culture where such actions, and transparency, are the norm.

## **2. The World Bank:**

The World Bank uses the Hill/Jones approach (Green Book) of weighted regression using direct, indirect, census data, and all available surveys. Different estimates are done and best-fit regression is estimated and compared with UNICEF and WHO publications. We tend to find small differences with UNICEF and wonder why, and are more puzzled by large differences we don't understand, and then make judgments on what estimates to use.

Issues noted include how far to extrapolate (example: if latest survey estimate is referred to 1997, do we extend the regression line to the present (2004) or do we look at other estimates), how to explain procedure to others (economists, country counter-parts), how to incorporate new surveys/information (it is obvious that new data should be incorporated as available, but others think we should have a moratorium on new data to make our work more understandable and consistent). There is a need to determine why differences remain despite the use of the same methodology. The methodology is good at making sense at estimating between first and last survey, and less useful to extrapolate into the future.

Too much weight is given to the last point of the DHS in some cases. The previous DHS have shown direct estimates that are too low for the recent period.

Some rationale to explain why these subjective decisions were made needs to be clearly and transparently noted and a culture of including confidence notes should be fostered.

## **3. United Nations-Population Division (UN-PD)**

UN-PD is working to make mortality estimation more transparent and consistent by using all estimates available at the time of production. All of the data is incorporated into a chart and eyeballed to reconstruct a demographic history of a country in an integrated manner. From the reconstructed history, an estimate of IMR and child mortality is determined, and required adjustments are made.

To adjust for HIV/AIDS, the background mortality is estimated based on trends from before the epidemic, although trends have also been affected by slightly increasing mortality due to factors such as the worsening situation in the country based on other factors. The epidemic is estimated using the UNAIDS model, and then projections are matched from 1980 to see whether the outcome incorporating background and HIV mortality fits well enough with other existing evidence. Current models of HIV/AIDS assume high additional mortality, but the epidemic affects only those with infected mothers and it also is assumed that HIV leads to decreased fertility. Additionally, the models assume no within country variation.

UN-PD's assumptions include:

- Relative impact of HIV is largest in low mortality conditions and smaller in high mortality conditions;

- Need to be prepared to look at impact of treatment, and whether we can report anything empirical on that;
- Dynamics of HIV/AIDS are not linear in time (can't estimate for more than 5 years);
- Excess mortality can rise dramatically in a short period of time.

Estimates might be improved by ensuring better integration of infant and child mortality in general mortality projection models, developing better mortality models for African countries and least developed countries, developing better models for projecting sex differentials in infant and child mortality vs. adult mortality, ensuring better integration of estimation of background mortality and excess mortality into estimation procedures, and the establishment of appropriate model life tables for groups of countries.

When comparing infant and child mortality from UNICEF, WHO and UN-PD big differences were identified, and in 2002 we tried to move closer to UNICEF's estimates, but for some countries do you go with q1 or q5? It was also difficult to match in AIDS countries.

Regarding the life tables, there is some need to look at our background mortality, and need to shift toward south, but not sure how relationship between q1 and q5 would be accurate in those cases.

WHO is trying to incorporate excessive deaths due to AIDS by using numbers from UNAIDS, as long as the base estimate is of good quality. Numbers are confirmed by comparing to the censuses, although the censuses were too unspecific to tell us much in many cases. The start of the epidemic was estimated to match the estimates in one case because of mismatched numbers.

### **3. United Nations Children's Fund (UNICEF)**

UNICEF does a lot of advocacy work, and therefore is in a different situation. The organization is moving into a programmatic approach rather than a project approach and as such a greater level of coordination and cooperation with other agencies is required. This coordination is also of importance in terms of monitoring and reporting on the different areas in which UNICEF is involved and in particular to those areas related to MDG goals and indicators. UNICEF for example is planning to start a twice a year publication to report on global, regional and country progress towards the MDGs.

There is a need for all agencies to present an integrated and consistent number to countries. In Mongolia for example, assessed mortality estimates were rejected by government officials, perhaps because there was parallel and split work between the political and technical people. However, for programmatic issues, many staff is using our best estimate rather than the government numbers.

The State of World's Children (SOWC) comes out annually, and the numbers are done in July. Unfortunately, people use SOWC numbers to make conclusions over time which is

problematic because often changes in the numbers are just reflecting better knowledge of the situation (levels of infant and child mortality doesn't change from year to year too much). In terms of mechanisms for data distribution, UNICEF attempts to make data available to other agencies and hopes to improve that by ensuring that countries will allow us and partners to use the data in a timely fashion.

Disparities are increasingly important in the context of the MDGs, and looking at mortality rates by wealth quintiles we see that mortality ratios are very high, especially when also disaggregated by sex.

There needs to be a review process for transparency, and any change needs to be documented.

For the indirect estimation and when deciding on the life table to be used at the country level, Gareth Jones have been using the graphing of 5q0 against 1q0 instead of the traditional 4q1 against 1q0. Often when using 4q1, countries may not be able to recognize this less used indicator, and the 1 to 4 has more variation in terms of the points and therefore more scatter. There is concern about the heaping at age one and we need to decide whether it is within reasonable bounds.

Estimation issues:

- identify those countries where you are comfortable with VR, and those that require other surveys
- VR (needs minimal estimation) – there is the question of smoothing (i.e. Iceland has huge differentiation and so you need to determine where to you stop with the smoothing?)
- Sample registration systems (minimal to extensive estimation) (India, China)
- Surveys and census (extensive estimation)

Agencies need to be more proactively obtaining data through existing surveys, and in countries where there is a lack of data, the agencies can go out and get data.

For the estimation methodology, the Green Book has worked well, but requires a review of how to adjust primary source data points and provide clear reasons for adjustments, address how to adjust for national coverage of the data, and better explain how IMR is derived from U5MR. The Green Book uses Coale-Demeny model life tables to obtain IMR estimates from U5MR and in retrospect and with more data available, the life table model used needs to change, especially because many countries (especially Africa) don't fit the model life tables. Additionally, there is a need to encourage countries to focus on U5MR as a better estimate rather than IMR. A rule for how best to smooth out the heaping at 1q0 is needed.

UNICEF utilizes specific weights for a survey source, be it direct or indirect, and while these weights can be changed, their interrelationships with the group remain the same. However, better datasets now exist, and so a re-examination of the weighting scheme might be required. In the case of the direct survey points, the most recent point has the

highest weight, rationalized on the basis of the most current recall, but for some countries the highest weight on the most recent point does not appear to be the most appropriate.

The frequency of updating estimates and the role of the review process was discussed. It was decided that the review process would cover only those countries with new data available, and that the timing of the review should consider publication deadlines. Data should be updated on a continuous basis.

Issues to be updated in the Green Book for version 2:

- HIV/AIDS
- U5MR vs. IMR
- Weighting
- Regression methods
- Smoothing
- Extrapolation

### **Discussion**

- There is a need for a shared system that all can access (web-based) that can be used to input data and ensure that all have same sources (i.e. through a wiki which would allow us to both see and add things). The database should include not just sources, but also information to allow users to have a clear idea about what people think about the weight of each data point, and where comments can be included for each data point if an individual knows something about it (anecdotal evidence, results of procedure, qualitative assessment of the data).

How is data currently kept?

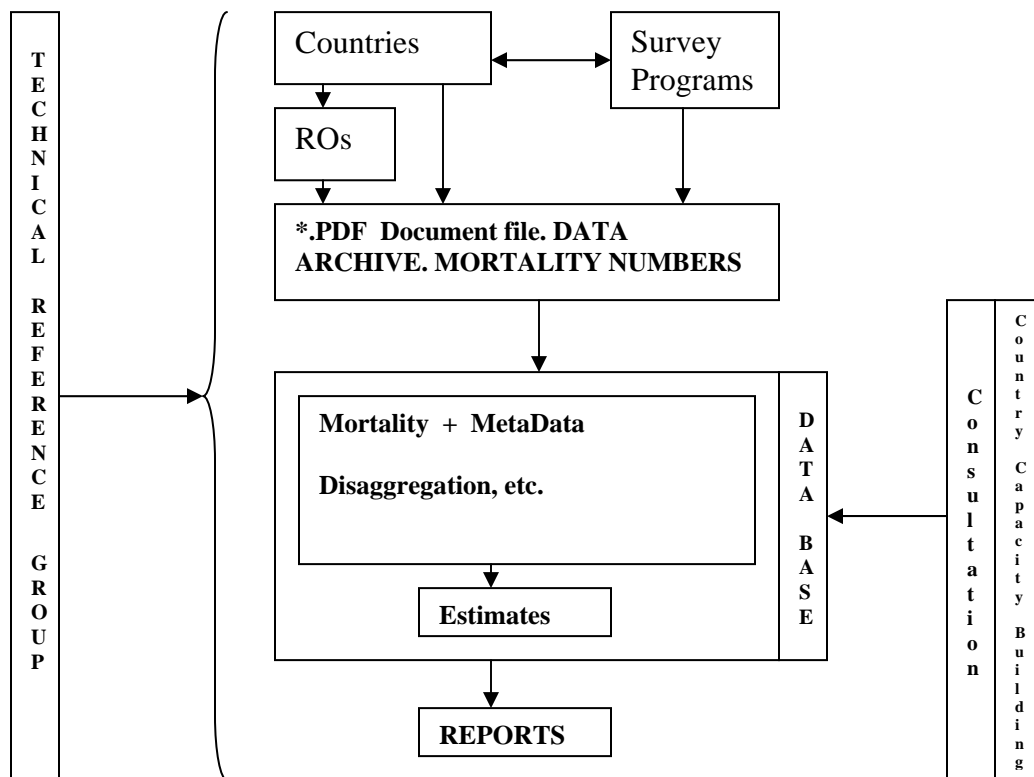
UNICEF uses the CRING (Country Response on Indicators for the Goals) system where countries provide data every year on basic indicators and copy documents, send to UNICEF where they are put into a PDF online. Other times UNICEF receives data that you run a 5q0 on from DHS. Some data comes in Excel, in SPSS, etc. Putting it all onto a common database is useful, but it is not all in the same kind of file.

UN-PD has a system pre-electronic age that works: for each data estimated we have 2 sets of documentation (long and short notes). Short notes are published (on the web) and long note, where demographer writes up the method employed and whether it was sufficient, is kept internally. UN-PD's attempt at a database structure was a big disaster, but our way of adding opinions has worked well.

WHO takes the data from UNICEF and UN-PD and puts it into Excel files by country to be shown in graphs. There is also one data file that merges information that can also be updated, but there is no systematic trace of the updating.

- A marginal error, or rule of thumb, for a given sample size to allow for the interpretation of graphs should be developed.
- There is a need for an implementation method that can easily be put into the various systems and that could be a central reference (i.e. Green Book) which allows users to enter in text/comments on why the fit looks like it does.
- It was decided to have an underlying database that can be in both Excel and STATA. It should include textual comments on data points and the choice of model used. The database should also include information on sample design and coverage which is important in many places and makes a difference. It would be good for capacity building to link it to the software that they would use to make the estimates. It will be easier to do capacity building in countries if we work together to train them on using the package. Capacity building should be considered an on-going project.

The proposed data base should include four basic components:



1. A document database comprised of PDF files of all reports and publications containing relevant mortality data, sorted by country and using ISO country codes;
  2. A data archive which allows access to the raw data for analysis, including survey data and VR data, and possibly linking to existing databases such as the DHS data archive or the WHO VR database;
  3. A database including all empirical mortality data, whether directly reported by the country or derived from analysis. The database contains metadata that includes information about source and quality and disaggregation by sex, wealth and geographical location;
  4. The database with empirical data will be used on an ongoing basis to produce national (and disaggregated) estimates of child mortality levels and trends using agreed upon methodology based on an improved version of the currently available UN “Green Book” method. The different agencies and specific country will review and provide inputs in the estimates. Estimates will be updated in the database on a quarterly basis and the estimation method will be documented and available.  
The proposal will be brought to the Health Metrics Network for funds.
- It was noted that joint reports rarely work because of competing agency priorities and funds. It will be important to keep the coordination mechanism as informal and technical as possible.
  - A constant updating process with revisions online would be required. There should be a pre-publication stage where the group decides on an estimate. It would be a big hit upfront but after that the database would only need updating as new information becomes available, or quarterly to include new discussions, decisions, and conversations. The review process would need to happen before the information is visible to the outside world, and be documented for the outside world. When new data comes in, an email alert will go out and then new estimates can be determined. To have agreement, at least one person from each agency needs to take responsibility to new estimates.
  - Where differences occur, the issue should be brought to the reference group, and the reasons for the final decision should be documented. If there is agreement that there is a big range around the estimates, that might resolve some of the differences. The ability to explain the basis of how the estimate is determined in consultation with the reference group will assist the country consultation process and create more consistency.
  - One complicating factor is excess causes (such as HIV) and the rapid impact they have. It might be easier if the estimates did not include this extra impact of HIV/AIDS.

- There was discussion about whether or not to include articles in the database. It was noted that while articles can be retrieved through other databases, this can be time consuming. It would be important to keep tight control over what articles are included to ensure that it does not become a data-dump.
- It was agreed that data for 5 countries would be entered into a prototype database to see how it would work. (Zimbabwe, Egypt, Pakistan, Tajikistan, Peru) UNICEF will have a consultant begin the process, and the other agencies will send their data.
- There are good demographers in Russia, but less capacity in other former Soviet republics. It might make sense to hold a meeting of the CIS countries to discuss estimates, get useful feedback, and reach out to technical expertise without being pulled into government and politics. Sub-regional groups have worked well for HIV/AIDS, and follow up can occur with the individual countries. Such a meeting/training might piggyback onto the upcoming MICS trainings. People can be trained as trainers over the course of giving the workshops, which allows more people able to provide support.
- In terms of quality, it would be good to know the confidence rating for each line, but this takes time. Tony Turner had worked out something for MICS on sampling error based on sample size, and it might be useful to do something like this. Sampling errors calculated for DHS and MICS can be calculated for estimates obtained using the indirect method. It may be possible to see estimates of sampling errors with the Jack Knife method, but still takes time. A simple rule of thumb is needed.
- It would be interesting to see what the sampling error would be around the lines to see if the lines overlap in their areas, to what extent, etc. by taking 10 surveys of different sizes, running them and seeing if anything comes out of it. For each manifestation in the Jack Knife method you would estimate a series of 5q0s and look at replications of clusters for the whole sample, and look at distribution across results. Trevor and Ken will discuss this and run it over a series of data sets with various sample sizes.

### **Acquisition and Quality**

- Sampling and other errors would need to be included in the internal notes and then it would be necessary to determine how to interpret the uncertainty into the estimate. The quality of input and the quality of output would also need to be considered, and the quality of input might affect the weighting.
- Good metadata is needed. It is necessary to know what concept is being implemented in the country, what procedure is being used, whether it is compatible with national definitions, the level of implementation, the coverage of the survey, and the sample size.

- The potential is there to put integrate confidence measures, but how to weight is very subjective (0.8 vs. 0.6 – what’s the difference?). When the choices are either 0 or 1, it is clear-cut, but graduations make the weight more subjective and it is important to be conscious of when and how to do it and to document weights well. Defending weights becomes very difficult.
- In VR the neo-natal/postnatal split is a key indicator for quality and is a good discriminator for quality. The quality of VR has no gold standards for assessment, and tends to be based on whether they match with surveys/how they compare.
- There is a need to work toward a culture where sharing of data is standard. DHS has been good on this, and it might be the case with Health Metrics Network. UNICEF has put MICS data sets up on the website ([www.childinfo.org](http://www.childinfo.org)). We should educate our own Country Offices to put data in the public domain as condition of funding. We need to promote culture of sharing data.

**Tuesday, 25 May****I. Ken Hill: Indirect Estimation of Child Mortality by Time Since First Birth**

- According to the Brass indirect estimation procedure, the age of mother provides a control for average exposure time of children to risk of death. Young women have the shortest exposure time and the most recent reference period, but are selected for low SES and high risk of child death. Therefore, instead of tabulating children born and children dying by age of mother, it may be better to tabulate by time since first birth. There would be less SES selection, although there still is some parity selectivity. When the 2000 round of MICS was planned, it was considered to include age of first birth to compare results with those from age of mother to do indirect estimation.
- The method was developed from Hutterite data (group of high fertility immigrants on Canadian-US border) with adjustment for controlled fertility that followed idea of Coale-Demeny model life tables.
- There is reasonable agreement between estimates, with the most recent indirect estimate a bit low, although the application needs checking for accuracy. A comparison of indirect estimates from first birth to age has not yet been undertaken, and it would be interesting to do that. The results are good enough to continue to include the age since first birth question on the MICS.
- The above method could be included as good check on the data and reinforcement of estimates, and could be done with DHS data as well.
- The modeling of the relationship between 5q0 and proportion dead was determined by average number of children born and time since first birth groups which determines distribution of the births in the preceding time-space. If fertility is changing rapidly, it will be distorted.
- For the coming round of MICS there was discussion regarding whether to include birth histories or stay with indirect approach, and it was decided to stay with the indirect method, resulting in estimates put back in time.
- Shifting parity affects the estimate in that as fertility changes, fertility will shift more toward first birth and it will affect the first group and affect the p1/p2 ratio. The p1/p2 and p2/p3 ratios relate to the actual distribution of the births for 20-24 by making the distribution look younger and will lead you to overestimate mortality from the older women. But this method may be less affected than the tabulation by age and should be thought about more.

## **II. David Bishai: Time Series Estimates** (he will send around a paper)

- One example of a time series is the Dow-Jones index which trends up and down and it is affected by various actors/events, but underneath it represents some value of the companies' ability to produce goods in the future. Similarly, the forces of mortality drive the mortality trend which also experiences shocks (HIV, economic downturn, development in child health), and so we need to model the persistence of the shocks. We would like to be able to predict mortality and understand right-hand side variables and to do that we need to have a clear process of the residual.
- Starting with the  $-Y = At + Et$  equation we can think of right-hand side variables (GDP, etc) but to test the hypotheses of right-hand side variables a t statistic is needed and the error term must equally distributed, and cannot assume they are independent.
- Any stationary time series can be fully represented as an infinite sum of moving average and autoregressive terms. If all the autoregressive terms and moving averages are understood, then there is a whole time series that can be used to build a model and test hypotheses. A moving average depends on prior innovation, and every attempt to estimate a moving average depends on what's happened before, and how much of the prior shock is included in the mortality time series. IMR depends on last year's shock and infant mortality. IMR can depend partially on last years IM and 2 years ago IM. The final left over residual is normal can be used to test hypotheses, and remove bias that is blocking the ability to estimate the coefficient.

To apply Wold Theorem:

1. Make sure Y is "stationary"
  2. Identify the best number of AR and MA terms that minimize Akaike information or Schwarz criterion
  3. Forecast based on optimal ARIMA model
  4. Include covariates and obtain unbiased estimates of covariates only if ARIMA terms are correctly specified
- Obstacles include the issue that some time series have more than one observation per period or have gaps or that outside information on the contribution and accuracy of various series interferes.

### **Discussion**

- One problem discussed is that the modeling approach has to assume constant context where the rules are relatively consistent (for example, the same shock 10 years later will produce the same type of changes). In such cases it is necessary to do a regime shift, and check hypotheses, how it shifted, and sometimes produce

model that based on theoretical knowledge. Using an epidemiological model could provide a second best estimate to test against regime shift.

- The Cambodia example shows how critical appriori knowledge. First do your set, and then look for the outliers, and set outliers to zero, which will shift the line. But Cambodia has its history and you need to remember that history (killing fields, Vietnam invasion).
- There are some thoughts that the most recent data point would be the most accurate because people remember better, but this doesn't seem to be the case. The problem might not be with the model, but with the weighting scheme. The starting point should be to start with equal weights for all points until there is a reason to change a point's weight.
- This approach cannot take away the need to weigh observations – one solution would be to not weigh them. Under the previous weighting scheme, given the number of surveys available, it is possible to forecast/extrapolate only a couple of years into the future.
- Time trends that are not directly observed have been established and triangulated and at least show a trend based on 5-year averages. To obtain a longer time trend in this manner would change the outcome of the model. Using 5-year averages, you can't see inter-period dynamics that exist.
- It was decided that David should explore his time series model for 5 countries (Zimbabwe, Peru, Egypt, Indonesia, Uganda, and India), and see what he gets and if it is working. To facilitate this work, UNICEF will produce single-year estimates from DHS data and averages for U5MR (*already sent to David and Ken and for a greater number of countries*).
- No weights will be used in the initial exploration and the next step would be to use the rule of thumb for sample size. It is important to keep it simple so that countries can do it themselves. Single year estimates should be for calendar years so that indirect estimates can be integrated more easily, and addressing breaks in the context and regime shifts will occur in future stages.

### **III. Specific issues and Discussion**

The rest of the second day was devoted to the discussion and analysis of more specific identified issues to define course of action. They were discussed as follows:

#### **1. Estimation Methodology**

- One method is to extrapolate a trend forward and then adjust for additional deaths using estimates for UNAIDS. The estimates should be consistent with UNAIDS prevalence rates, but there are concerns about the sampling error and how to project the U5MR, for example, to 110 in 2002 when it was 66 in 1995. Both the MICS and the census data were extrapolated backward which caught an upward trend and adding UNAIDS deaths to that will lead to over-estimation. Using the trend from before AIDS and extrapolating that to get background mortality and compare to more recent numbers and extrapolation was one way to address this concern, but it does not cover for other shocks.
- For indirect estimates, survivor selection bias is a concern and some say it affects 1% for direct estimates 0-4 years before the survey. What is the effect of survivor selection bias on mothers' reports of the survival of their children? Only if all the women who are HIV+ have died by the time of the survey will there be no effect on the indirect estimate.
- There is the impression that UNAIDS keeps revising prevalence estimations downwards (in most countries). In general the estimates are not changing that much. UNAIDS does not use mortality data to do their estimates, but instead uses prevalence levels of positive women, transmission, and survival time. Thus, if prevalence is 9% in pregnant women, it is expected that 3% of the children born will have HIV with 60% of them that eventually die. This indicates that 1.8% of the children ever born die due to AIDS in a country where the rate of infection among pregnant women is 9%. Background mortality is then subtracted. Since most transmission occurs at time of birth (2/3), the children die at ages 0-5. Breast feeding transmission happens in first 2 months, and then a few at around 9 months. This gives us an estimate of the number deaths under 5. UNAIDS has empirically observed info from surveys, which are somewhat affected by survivor bias, and then UNAIDS has to talk about underlying mortality without knowing what the mortality is.
- Given the UNAIDS method, demographers in 10 years will want to know how much Naviraprime is going out and what the impact has been. So far coverage is low and therefore less of a concern, and in 2003 estimates coverage of PMTCT programmes (# women participating) was included with respect to the programmes reduction of probability of transmission by 50%. In the future, there will be a whole historical record of assumptions about coverage to work with. UNICEF wants to document big programmes as successful and donors want to see how many children are saved, and this might be a problem. PETFAR is

rolling out and will demand the documentation and want to really do M&E and so it will be easy to say how many women received treatment.

- On the indirect estimation techniques for HIV/AIDS, it is clear that this method leads to underestimating because it correlates the deaths of women and children. MICS3 will measure mortality indirectly and will try to look at DHS for high prevalence countries or do a birth history as part of the MICS3. The bias is only appreciated in about 7 countries because prevalence is not that high, especially since the probability of women giving birth drops dramatically. Adjustments can be made for those countries with prevalence above 10%, and where prevalence levels have not changed there should not be a change in mortality levels. There is no need to make adjustments in the model for direct estimates 0-4. One implication might be to use direct estimates, and include a guideline for those countries with prevalence over 10% that you would adjust for. It might lead to overestimation in those cases, but at least there should be a scientific reason and the need for adjustment in most cases is removed.
- The UNAIDS death numbers might be less useful than how their development of methodology explains how to assess the bias. Basha Zaba says that the method only works for countries that have already hit peak prevalence. A simulation exercise that moves at real time through the epidemic might be useful to determine when the peak has been hit. The way UNAIDS does estimates and curve fitting there is a bias and there needs to be several points before we let the epidemic turn over, and so they are always going to be 2 or 3 years behind because of the choice to be conservative.
- To have numbers to support all these statements in the media we need multi-variate simulation where you assume prevalence and get a sense of how to adjust direct and indirect estimates to a certain situation. Neff will produce the curves in terms of prevalence for pregnant women and mortality in kids and can provide yearly AIDS mortality curves for U5. The use of the Monte Carlo method was discussed, and Nick Graston and Rob (?) will be contacted regarding running this method.

## **2. Proposal**

6 or 7 countries will be run for indirect estimates that would be applicable to any country with high enough AIDS prevalence. For indirect estimates based on older women it would be useful to know what the bias is. There is a need to consider UNAIDS figures and account for the extrapolation and see how the data relates to it. To utilize information for Monte Carlo, the group will see what the person doing it needs for parameters and indicators to allow us to move from estimates in the past to estimates out of the sample, and for that we want the deaths. One could also eyeball 5q0 of AIDS and 5q0 without AIDS to see the relative difference, which might be feedback to the modeling done with the AIDS model. The underlying assumption of continuing decline and trends are not really suggesting that, and it's easier to identify countries with

relatively lower prevalence. The study will be reviewed in 3 months, and until then no adjustments will be made, and the data will be gathered to quickly make the adjustments required based on the findings.

### **3. U5MR vs. IMR vs. Neonatal**

- The group agreed to continue looking at U5MR as the starting point. Heaping is seen at age one. When looking at all the DHSs and the relationship between IM and U5M for q1 on IMR and IMR squared with regional dummies, the results suggested some systematic effect of the time before the survey that went the opposite way expected: the relationship was that IMR went up relative to the 4q1s as you go back in time.
- Is there any way to look at relationships between different countries with different causes of deaths and so different age patterns? Bob Black's work on cause specific deaths includes an implied age structure and if countries were grouped by their underlying causes of death, could we take all the DHS, WHS and look at relationships between U5MR, IMR and try to model it and see what we get? Perhaps. By doing estimates over time, we can see what drops out and get age surveys that way.
- Gareth has the data from Lancet article on 42 countries for causes of death. Ken will ask Bob Black if a similar exercise could be done for 1980.
- Moving averages might account for the need to deepen the memory of the model by changing the past as the future changes.

### **4. Weights**

- It was agreed that the highest weight should not be given to the 0-4 data point, but it is unclear how else to weight. It might be advisable not to weight points differently for simplicity and transparency (0 or 1 weights only).
- It is very important to keep weighting simple. The assumption is that whatever the quality is, there is always an under-estimation on the direct estimate. For now, the most recent point should not be given a higher weight.

### **5. Smoothing across vital registration (VR)**

KinJi (WHO) will generate the rule for smoothing.

### **6. Extrapolation**

- The group agreed to keep current methods until the time-series study is completed.

- The problem of countries that have not had a recent study for many years (i.e. Congo) was discussed. Ideas to address the problem included extrapolating using a country with similar conflict conditions where a study had been performed, but participants were uncertain whether this will work.
- Another problem discussed was the CIS countries and determining how to project and extrapolate backwards while taking into account regime shift.
- There are only a few countries where differences are significant, and these countries will be brought to the reference group to determine a compromise. The review process will need to be established, and in that process common decisions about how to extrapolate from specific countries will be made.

## **7. Publication and deadline**

- The timing and publication deadlines for the organizations were discussed and it was decided that the group would meet twice a year to coordinate estimates. It was suggested that a line should be added to publications that the published figure reflects a consensus on a certain date, but to check to website/database for most recent estimates, although some considered this to be too formal. It will be important to document why numbers might change, and when.
- Access the database was discussed. It was agreed that it should be in the public domain, and constantly updated as new data is available so that organizations can access the latest data when they need it. Each agency would designate somebody to update the estimates and review them.
- The database should have the format of a template with parameters. The format will fit the Green Book and will be modeled along the lines of ChildInfo. It will need initial investment, and then can either have a junior person do it and be supervised or the group members will maintain it. It will be an iterative process, and will take a lot of time and money resources upfront to establish a complete set of estimates that can then be updated.
- Establishing the technical reference group will also be important in the near-term. One thing that might be relevant to the reference group would be the causes of death work. Perhaps the WHO mortality/causes group should be reconstituted and have that reference group meet in October. UNICEF and WHO are committed to this project. UN-PD will have a new section working on mortality and so more resources might be available. The World Bank strongly supports the efforts to harmonize data but contributions are unclear at this point. The Bank plans take cues from UNICEF and WHO.

## **8. Causes of death**

- Estimates of disease-specific mortality exist and there is increasing demand for such data. Some diseases are really difficult, and a huge amount of work has been done in this area.
- UNICEF and WHO are more interested in cause of death than UN-PD and the WB, and so they will discuss, and if it is appropriate after the rest of the project is up and running, incorporating cause can be discussed further.

## **9. Gender and disparities**

- The group agreed to take sex-disaggregation and gender under consideration. DHS allows for the sex-disaggregation of all indicators and it is possible to do indirect estimation by sex. A lot of the techniques under the estimation methodology would apply to doing gender. Gender parameters will be built into the database at this time.
- It was noted that when looking at the difference between male:female over time in the DHS there was lots of variation with the implication that the difference between them was growing bigger over time, which is very concerning. By including the data in the database we can decide what to do with it later, but this trend might have programme implications if it's heading in the wrong direction.
- Wealth quintiles and geographic disparities might be beyond the initial efforts, as they are 10 year averages. UNICEF and the WB will discuss wealth quintiles separately.

## **10. CIS + Romania:**

It was proposed that a regional workshop be organized involving people from the countries. Innocenti has been working on this. The shortage of trained demographers in the CIS, and people with survey experience was noted, as well as the concern that some countries will be adverse to having Russian demographers.

## **11. Small Island and Countries**

The main problem is access to data, and the head of the demographic unit at the South Pacific Commission might be a good source as they have been performing censuses (Thomas to contact). The data, once obtained, will require smoothing and gap filling. It was noted that the efforts put in should be proportionate to their relevance.

## **12. Training and capacity building**

- Capacity building involves more than just running a model. It must be determined who the participants will be (Ministry of Health? Statistical Office?). It will be important that the people trained are the people who will be doing the

work, and not the chief of the section. Participants should be invited to do estimations on the whole database for that country.

- Capacity building might be piggybacked onto the MICS in some regions if planning occurs far enough in advance.
- Capacity building should focus on the time-series method where possible, but both methods will be used depending on what is needed and available in the country until more data is collected.

### **13. Dissemination**

- It was suggested that a website be established that reflects current state of agreement as it occurs – for example, in immunization puts up the coverage by year, but also includes data from surveys, routine data, and text on why estimates are what they are, and people find it useful.
- The question of what is public and what is private was discussed. It was agreed that mortality and metadata and estimates should be up on the public site, and that there might be a link to where the data can be found, rather than the data itself. Additionally, there might be a section for internal documents that can be shared among a small group. In the end, the user could reconstruct the estimates. The depth of the public/private line might be adjusted as the project grows.
- It was decided that the database would use the ISO country codes (3 character code (but sometimes 4)) in the database. If a country changes then it gets a new code (i.e. Reunification of Germany), but if it just changes name (same entity) then it gets the same numerical code.
- It was agreed that the decisions about dissemination would need to be discussed further once the database was developed. At the minimum, the time-series should be posted and update as required.

#### **IV. Timeline and Commitments for 2004**

July:	Prototype for database developed (UNICEF) HIV Monte Carlo Completed (if Nick agrees, Neff to inquire)
August:	U5MR split into IMR and Neonatal Model (Ken) Time-series model (David)
September:	Database up and running (UNICEF)
October:	Initial Round of Review
November:	Review Meeting to determine consensus
December:	Estimates available

#### **IV. Individual Tasks**

Thomas:

- Contact Commission of the South Pacific Community regarding access to data.
- Contact Russian experts.

Kinji:

- Access Pacific Island dataset, Western-pacific regional office
- CIS training
- Develop smoothing rule

Ken:

- Conduct cross national examination of age patterns of U5MR, IMR and neonatal using WHS/DHS

Trevor and Ken:

- Examination of confidence intervals on indirect estimates

Trevor:

- Development of database with consultant
- Provide single year data for David (U5MR and IMR from DHS data) this weekend for 5/6 countries
- Get estimates from RHS from CDC (include birth history) – indirect and direct estimates with basic data for indirect

Gareth:

- Populate the database including documentation
- Put together estimates and metadata

- Circulate note on gender disparities

Ed:

- Provide LSMS with mortality modules

Ties:

- Taking proposal to Health Metrics Board Meeting in June

## **DAY 3: Wednesday, 26 May**

### **Coordination of Adult Mortality Estimates**

The objectives for the coordination of adult mortality estimates are more modest because the field is farther from having common methodology for adult mortality, modeling trends and thinking about age patterns, than is the case for child mortality. This is an exploratory meeting to see if there are areas where progress can be made toward coordination in the future.

#### **1. Data and Methods**

- The gold standard method is to have complete VR and periodic censuses to allow for the calculation of age specific mortality rates without having to estimate. However, this is not possible in most of the world.
  1. Second best is to have fairly complete VR with fairly regular censuses and apply death distribution methods with deaths by age to population by age (synthetic extinct generation approach, and growth balance approach).
  2. Third favorite is to encourage countries to include questions on deaths in a time period with ages and come up with adjusted estimates, but this does not provide as much information on trends over time.
  3. The next best method is to collect sibling histories using the age of living siblings and age/year of death of dead siblings to calculate age-specific mortality rates. However this method tends to under estimate, and DHS collects data only for ages 15-49, and so there is little information on mortality over 60.
  4. Another option is to include census questions on the survival of parents, although this brings concerns regarding the accuracy of information, the systematic tendency to under-report, particularly for young children whose guardians may not report that they are not original parents. Especially for children under 5 there may be positive selection for survival of parents. This is an indirect method that gives averages and the ability to make assumptions about the ages of the parents using models. This might be an area where minor changes to data collection procedures by changing questions (doing a parent history) that would provide info on exposure time to plug into death distribution methods and have some ability for assessment.
  5. Other, less desirable options include cohort survival between censuses using survivorship ratios (although this method is sensitive to age exaggeration estimates and leads to hopelessly low rates), and surveillance

systems and laboratories (which vary in terms of quality, and suffer from questions of representation and extent of extrapolation).

- It was decided to develop a catalogue for estimation procedures that explains why certain methods should and should not be used in specific cases, and what the short comings are. This could be an iterative process that one person starts and others add to.
- It was proposed that World Health Data be used instead of DHS because it has data for all ages, not just 15-49.
- Accounting for migration was discussed. A paper evaluating trends in Malawi applied standard indirect methods and led to incredibly high life expectancies. Empirical approach to try and match censuses, but there is a need to account for migration, which really does change the picture.
- It was noted that there is no gold standard on how to estimate adult mortality and WHO and UN-PD are the agencies responsible for this. If information can be shared so that the same data is used, this would be a useful starting point. While there is not much agreement on methodology, a continuing evaluation of what methods to use would be another area to discuss. It was decided that this level of harmonization is the goal, and that agencies need to meet often enough to share access to data.
- It was noted that adult mortality is less visible than child mortality, and so the numbers are less scrutinized and lower priority to management.

## **2. UN-PD Presentation**

- UN-PD uses a data estimation approach driven by data availability and data quality, using methods as they fit, or using estimations done elsewhere and plugging them into our system. They develop a recent estimate, but in adult mortality there is a 5-8 year time lag to come up with recent point estimates, and so most of what is reported is a projection. Estimates and projections include the impact of HIV and other significant shocks such as genocide, earthquakes, etc. The estimates integrate the UNAIDS epidemiological model.
- UN-PD is extending model life tables and moving forward to higher levels of life expectancy, leading to shifted life tables. The age format of existing model life tables and empirical life tables was extended to 100 years of age, and levels of life expectancy of 92.5 years. UNP-D's database is available on request.
- For countries with good VR, the latest life table are used as much as possible, and are refitted if they are suspicious. Then the tables are plugged into the system and adjusted for child and infant mortality or the life tables are sometimes spliced to address other problems. Projections are made by moving observed mortality

patterns toward an underlying model life table, borrowing from the model life table the rates of change. The model used is established based on past history of the country and checked against the projection done on full data set. This method tends to come very close.

- For poor data countries, most estimates are derived from IM/CM estimates and a reality check is performed on assumed mortality patterns by matching projections to successive censuses, although this is not possible where there is not a census. In those cases, there is the need to shift back to at least 1980, but sometimes 1950 which loses some precision. The choice of underlying MLT is critical, but not easy to justify.
- The Modeling Mortality Dynamics Project has been initiated to be able to project age-specific mortality and has started creating a project database (ProSurvival) using the Lee/Carter projection methods (at least at the outset) (long range projection) and projection models to implement into on-going exercises. The objectives of MMD are to gather as much information in a repeatable way as possible into databases similar to the Berkley database focused on adult mortality. The database is for internal use, but UN-PD invites the group to visit and it might be distributed in the future. The goal of the database is better data integration, more accessible storage and retrieval of cross-national time series of mortality data by sex and age including the HMD, DYB and UN-PD, DHS/MICS/LSMS/IRHS, WHO 2001, etc. MLTs will be included and not combined with empirical data. The database will internally be able to compare across data sources and will include of metadata. The database will also facilitate the goal of better forecasting to improve mortality projections over the whole age range and for longer periods (50 years or more). There is a need to improve monitoring of sex-differentials of life expectancy by age and better forecasting of sex differentials. There is also a need to ensure that the system of projecting remains plausible between countries and will need to account for interactions between countries.

Progress to date:

- Three-tier applications hardware is set up, user interface;
  - Data imported from HMD and DYB;
  - Data evaluation for age pattern, sex ratio and shape;
  - Data retrieval and visualization for time series and age patterns;
  - Mortality forecasting by Lee-Carter method.
- On-going work is underway to import more data and sources, evaluate the quality of data, test the system, and re-evaluate Tuljapurkar paper in Nature to check for accuracy.
  - There was discussion on the need for some methods for countries where there is not much information. The need to think about what methods and patterns of thought are needed to be recreating the past in a consistent way to add robustness

to recent estimates was noted. Structurally, international migration is increasingly important to UN, and UN-PD is in the process of having a section to deal with mortality.

- It was proposed that there be a similar system for adult mortality as was established for child mortality to share information. A coordination group might be established, but should be separate from child mortality group for now, although the may be merged in the future.
- UN-PD will share their database structure with UNICEF to coordinate with the development of the child mortality database.

### **3. WHO Presentation**

- WHO's direction and administration have shifted toward more collaboration in estimates and sharing of data.
- The gold standard of adult mortality data is VR, and more than half of countries have it as a primary data source – 70 are considered complete. But even for a country with a child mortality problem, the trend is more stable for adult mortality and so the VR can be used although the need to assess completeness of number of death by age and sex and range of completeness is important to consider. Other sources used include censuses, SRS, partial VR, and surveys.
- The World Health Survey (WHS) is conducted in 70 countries and includes the adult mortality module in 47 countries. The module includes sibling questions to determine adult mortality and efforts are made to capture recall bias.
- In countries with adult mortality information, WHS is compared to VR. WHS death rates are consistently lower than VR. One way to fix this might be to try the birth balance assessment and calculate out deaths given age specific mortality rates by applying growth balance and then comparing the results to VR numbers. In low fertility populations it is important to be careful not to overemphasize sibling sampling expansion. WHS sample size is smaller than DHS (1000 to 5000).
- WHS data will be made available soon. It needs to be cleaned, analyzed, and shared with countries before it is put on the web.
- One of the problems is that growth balance might not be applicable because of deaths by age that are more similar to the age distribution in the population due to AIDS deaths in the younger ages. Out-migration may cause similar problems.
- WHO uses a modified Brass logit equation where there is a life table. The starting point is the set of life tables available from the WHO mortality database and

choice of standard is to capture the mean of the life tables and the equation shows that for each pair of I5 and I60 there is one life table attached. For 5q0 up to 300 it's all in the same ballpark and when you go above 5q0=300 there is more divergence. There is still a need to include AIDS into the modified logit system.

#### **4. World Bank Presentation**

- The World Bank does not have a work programme on adult mortality. For demographic estimates the Bank uses WHO life tables rather than UN-PD because they found that there is a better fit with the empirical life table.
- The life table is calculated to produce consistent estimates of mortality. A spreadsheet model adjusts for HIV/AIDS and projects future prevalence and translates into added mortality.

#### **5. Adult Mortality in Developing Countries Project**

- The Adult Mortality in Developing Countries Project is part of Chris Murrey's Global Burden of Disease in Aging Populations 2000 project. It relies on evaluation and adjustment of information on deaths by age (VR, sample VRR census), trying to use growth balance and synthetic extinct generation models to adjust for census coverage change and to estimate adult death coverage. The project includes 27 countries representing 67% of LDC populations.
- Both GB and SEG worked well with good data. GB is more sensitive to age-misreporting, and SEG is more sensitive to change in reporting of deaths by censuses. The project compared the reported distribution of deaths/age in VR and the census. A third strategy used applied GGB to estimate change in coverage, which is robust to all sorts of errors other than migration (which it sees as change in coverage), adjust for age errors, and then apply SEG and adjust. The process seemed to work.
- The female downward trend is faster than for the males, and by the 1990s, the bottom for males doesn't overlap with top for females.

#### **6. Discussion**

- There is an agreed standard indicator of adult mortality for ages 15 to 60, but this window is increasing less relevant, and there is need to increasingly concentrate on mean age at death to account for increasing life span. One option would be to look at 15q60.

- It was noted that the organizations would like to follow the same strategy for adult mortality as for child mortality: a common database that is maintained and includes methodology of estimation. It was decided to have parallel but separate development for the time being but with similar structures to make easier to merge them in the future. The group was also interested in developing an evaluation sheet of methods.
- The latest UN manual (11) is published and available, and UN-PD is considering making it available in a more interactive way on the web. It would be interesting to have modules for each method and include a spreadsheet for users. This would facilitate updating and would encourage users to apply the agreed upon method, making it more available and move more toward consistency.
- The UN-PD database will be used to compile all of the information on adult mortality. Participants will send data to UN-PD so that the big parameters for the database are consistent for the most recent period and to minimize deviations. A meeting will be held in December to establish a consistent dataset including the impact of HIV/AIDS, and a methodology meeting will be held at to discuss the evaluation sheet for indirect and other methods. UN-PD will lead on these meetings.
- The issues of access and firewalls were discussed. UN-PD will consult with their IT people. There might be institutional problems to make it available. The need to keep it practical and start sharing data with email alerts and spreadsheets for the time being to meet the needs for the 2004 revision.
- It was decided to hold the child and adult estimation meetings at the same time, in November.

## **7. Maternal Mortality**

- UNICEF-WHO-UNFPA have produced estimates for 1990, 1995, 2000, but these are not comparable as a time-series estimate. However, the WB is under pressure to have time-series data because it is an MDG indicator, and would like to discuss the plausibility of getting more comparable estimates for 1990 and 2000 or 2005.
- In the countries with no data, the regulation model was used, but the models differ across the years. One option would be to redo the estimates from 1990 using the same model that was used in 2000, or to do 1995 and 2000 in the same way.
- In many cases either there is no trend data for maternal mortality or people have taken individual estimates and made them into trends (which makes us unhappy). The question is how to come up with trend estimates that produce valid trends worth showing.

- The 1995 model was used, but it does not sufficiently address AIDS mortality. The results were plausible, but the 2000 model would be preferred. The issue is with specification of the model for 1990 and if it is possible to use the same coefficients, or whether the model should be re-estimated from the 1990 data. The independent models give a trend worldwide and regionally, but using 3 separate models give strange patterns and big up and downs especially at the higher levels. For the countries with data for 2000 but not 1990 (or vice versa) then there are other problems.
- To be consistent, you need to redo the envelope as well (the 2002 revision and alter the envelope to get some results).
- It was suggested that model be re-estimated using the pooled data, estimate coefficients, fix coefficients that don't change over time, apply those, apply proportion maternal to the envelope, and crank it out. UN-PD has done something similar with AIDS and without AIDS envelopes. The decision was made that people with AIDS, whether pregnant or not, cannot die of maternal mortality, although this can be complicated if the sampling is a sisterhood sample.
- The WB is interested in working on this collaboratively. Ken will provide the database and the WB can run the model to provide a useful guide. The Bank plans to report country by country, and will lead on cranking numbers and the group will review the results at the November meeting.
- The agreed process was to pool the data sets with proportion maternal (empirical) and re-estimate the model and assume that it reflects reality 1990-2000. The results will be expressed as proportion as AIDS-free deaths, and the AIDS free envelope from UN-PD, and calculate out MMR. The trends, including rate of decline/proportion change will be reported. The magical 2000 estimates will be provided, and the trends will be reported to give some sense of magnitude, although they do not necessarily fit together. The trend might also be reported as annual percentage change and recent estimates from 2000, and state that it is mostly affected by fertility and trained attendance.

## **8. Incorporating AIDS Deaths into Estimates**

- The UN standard way to incorporate AIDS deaths into estimates is to incorporate the epidemiological model based on estimated prevalence to a country level. The advantage of this system is that the estimate is produced in consultation with the country. The bigger problem might be getting the right background mortality. This is a procedure that can be followed, repeated, and will not change for the foreseeable future for the UN system. The only change on the horizon is how to adjust the whole curve for urban-rural discrepancies.
- There is a need for some handles to manipulate parameters to simulate intervention strategies. Soon it will be important to be able to estimate how many

deaths were prevented. Changing the survivorship function overtime will be necessary depending on how treatment goes.

- In the next round of HIV estimates, UNAIDS will provide intervals and so there will be room to play within the estimates. It is possible to do triangulations to show that there is some doubt on the high prevalence.
- One of the biggest challenges of estimating adult mortality is migration, because most methods assume no migration.

## **9. Main Action Points and Conclusions**

- There is some degree of consensus that achieving harmonized estimates is possible in the medium-term, although work on adult mortality is not as far along as work on child mortality. There are clear ways to start the process, specifically the UN-PD database and initially the other agencies will send estimates to UN-PD to be installed (format sent is not important). Efforts will be made to ensure that data coordination gets underway in the next few weeks.
- Ultimately the adult and child mortality databases might be merged, and so should be structured to allow this in the future when this process of collaboration can continue.
- All shared data is intended to be a group repository/resource. Intended for the public and will be on website. It is uncertain whether all of the data can be made public. If there were some common template/format that would be helpful.
- Methodological coordination has a way to go, but the group will start by trying to reach agreement by late this year on as many countries as possible, and hold a harmonization meeting to piggyback onto the late November meeting.
- There is interest in the potential of sibling histories and death distribution methods, and a consensus that questions by age and sex should be recommended in countries that lack VR. UN-PD will pursue idea of putting the Manual and spreadsheets on-line. The evaluation of methods to give guidelines to users on what to use for what, and what the biases are will be initiated by UN-PD.
- In Maternal Mortality, the group should try and produce trend estimates in line with the Bank, re-estimating the model and revising the process to ensure that the 1990-2000 comparison is valid. The Bank will lead and results will be discussed at the November meeting. A prior round of discussion to ensure that all are comfortable with this plan will occur as soon as possible (Carla, Tessa, UNFPA).
- Ken will provide adult mortality spreadsheet for database to Hania and WHO.

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