

# Living to 100 and Beyond: Survival at Advanced Ages

## Session 7: Mortality at Oldest Ages Session – Part I

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All three papers in this Session deal in one way or another with databases useful for investigating the Oldest Old population. Two of the papers make intensive use of microdatabases that allow manipulation and verification of individual records.

1) Let's begin with the paper by Ken Faig. This is an extremely well-sourced paper. One thing I like about it is that it vindicates our practice at the Census Bureau of producing population projections in different variants as parameters such as life expectancy take on different values (e.g. low, medium, high mortality). Drawing on no less authoritative a source than The Bible, Faig's paper starts off with three alternative values of human life expectancy, namely 120, 100, and 70-80 years. I'm grateful for this citation, which may prove valuable in fielding questions from the religious right about our projections, and will try to keep it in mind.

Most of the paper is devoted to illustrating how the Social Security Administration's Public Use Master Death File can be used as a resource to investigate mortality at late age and to evaluate the quality of the underlying data. Looking at these data arranged by age and birth cohort, Faig shows that disproportionate shares of the oldest deaths (ages 115 and older) are contributed by the earliest birth cohorts. This is implausible, because it implies that survivorship into late age has trended downwards rather than upwards, and casts doubt on the accuracy of reporting of age at death in the early birth cohorts. In taking this view, Mr. Faig clearly doesn't accept the (unobserved heterogeneity) argument that mortality decline at younger ages leads to increasing frailty among the pool of survivors, who end up surviving to less advanced ages overall. The paper also deals with approaches to using historical Census archives and the problems involved with these data.

Elsewhere in the paper, Faig raises the alarming spectre of an "emerging explosion in the predominantly frail centenarian population". Frailty here is taken axiomatically as an attribute of the centenarian population in general and not related to any heterogeneity argument. In any case, the "spectre" is consistent with some of the concerns raised in Anna Rappaport's opening address to this seminar.

Finally, Faig's paper goes to considerable lengths demonstrating the spuriousness of various claims of persons attaining ages over 122 years. While I don't disagree with this discussion, I think it stands as a separate topic in its own right.

2) The paper by Bert Kestenbaum and Renee Ferguson provides a very concise and professional account of how to improve the quality of the information on oldage mortality at our disposal in administrative databases by careful selection of records and by combining sources as well as obtaining supplemental information from other agencies. Being engaged in similar analyses of some of the same data sources at the Census Bureau, I have some idea of how arduous the task facing Kestenbaum and Ferguson

really was – enough to grasp that I can't really picture how much labor this analysis actually took. Suffice it to say that this paper reports a meticulous and almost Herculean effort on the part of the investigators in checking administrative records on supercentenarians. The paper is full of brilliant ideas, such as imputing death to persons ages 90 and older as of 1990 who exhibited complete lack of utilization of Medicare services during the 1990s, but *only* if they registered no other event during this period (e.g. change of address), and *only* if they were not in an HMO at the time. This gives you a flavor of the kind of care taken by the investigators in editing the databases.

The fruits of these repeated efforts are exhibited in the form of successive schedules of life table probabilities of dying ( $q_x$ ) that become more and more regular (for instance, increasing in magnitude with successive advances in age) with the application of each additional edit. The best results are obtained by excluding Medicare beneficiaries for whom a third party is paying their premiums, (a group with below-average socioeconomic status). Unfortunately, this intervention still does not remove every indelicacy in the schedule of probabilities of dying, but it vastly improves the schedule's plausibility.

The one point in this paper I dispute is its last sentence: I don't think the authors overestimated mortality by the aggressiveness of their editing. I think we would all like to see what obtains as they keep it up. I know I do, anyway.

3) Turning to the paper by Gallop on the United Kingdom, the first thing that I want to comment on is that its inclusion in this session clearly illustrates the advantage of a comparative international perspective. We Americans are used to thinking of the US as a large, heterogeneous country, with all sorts of resultant problems, including statistical ones. This paper indicates that the mortality statistics of the United Kingdom apparently suffer more from lack of standardization between the constituent states that make up the UK.

I'm impressed by this paper's clear, concise, and thorough review of a century's worth of procedures to graduate and close out official decennial life tables. Needless to say, some of the procedures seem arbitrary, and even on occasion bizarre, but the writeup itself is highly informative.

Gallop's paper does discuss existing administrative databases, especially the one maintained by the Department of Work and Pensions. Unfortunately, it appears that the quality of this database is highly suspect, indicating huge increases in numbers of centenarians which vastly exceed what is implied by a simple log of the Queen's messages formally sent to UK subjects who attain their 100<sup>th</sup> birthday. Taking the latter as a benchmark (and I don't propose to challenge the authority of the British Monarch on this matter), the implication is that the Department of Work and Pensions' database grossly overstates longevity.

The paper dwells a lot on a historical database of aggregate mortality indicators developed applying a methodology derived by Kannisto and Thatcher. The United

Kingdom falls into the group of countries fitting Thatcher's logistic formulation of old age mortality. The paper makes the valid point that this database would be an asset in national mortality projections. However, there do appear to be difficulties in reconciling the population estimates derived from the database with official estimates. The implications of these discrepancies are not clear, and the paper concludes that we should wait for the results of the Census taken in 2001 for clarification. In any case, the bottom line is that the Kannisto-Thatcher methodology offers a promising solution to the unreliability problems encountered in oldage mortality data for the United Kingdom, yielding such comforting results as declining age-specific death rates over time, which have been less consistently visible under earlier approaches. To me, the fact that the Kannisto-Thatcher methodology has been developed on an international database represents a "plus" in comparison to the more ad hoc approaches seen in earlier life tables.