

# National and subnational experience with estimating the extent and trend in completeness of registration of deaths in South Africa

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Analytical methods to evaluate the completeness and quality of birth registration

Session 4 of the UN Expert Group Meeting on the methodology and lessons learner to evaluate the completeness and quality of vital statistics data from civil registration

# Background

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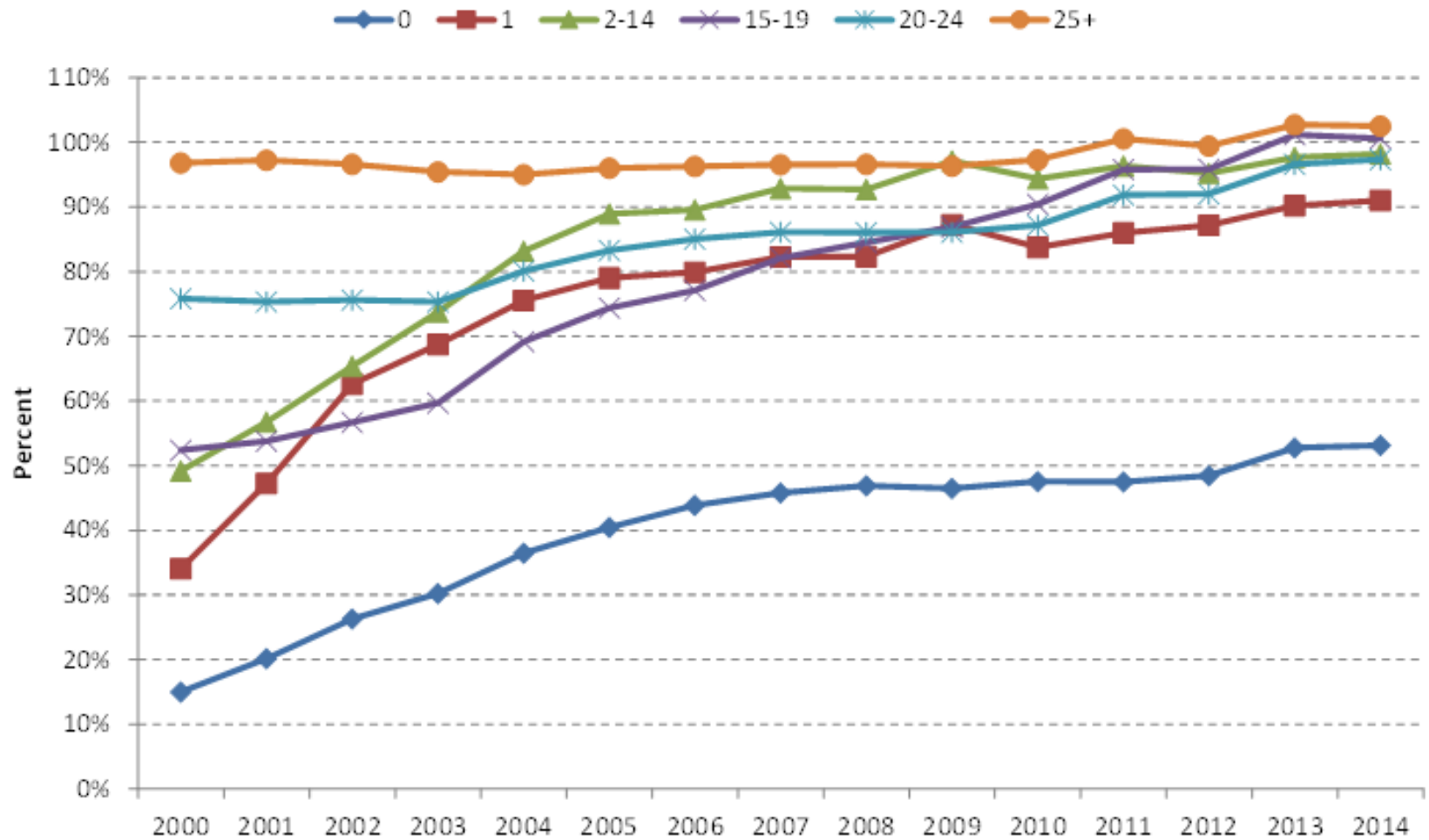
- Population 51.8 million in 2011
- VR data are incomplete – slightly more than 500,000 deaths in 2011
- Significant HIV/AIDS epidemic + significant treatment from 2004/5
- Surveys: DHS 1998 and 2003 (unsuccessful); GHS (limited information, Udjo 1997; 2005); 2007 Community Survey (not very reliable); HSRC 2012 (not publicly available)
- 3 post-apartheid censuses (1996, 2001 & 2011) not without problems (Moultrie & Dorrington 2004) – only 2001 and 2011 asked households to report on deaths
- Most recent reliable estimates of IMR & U5MR from 1998 DHS and 1996 census

# Rapid mortality surveillance (RMS)

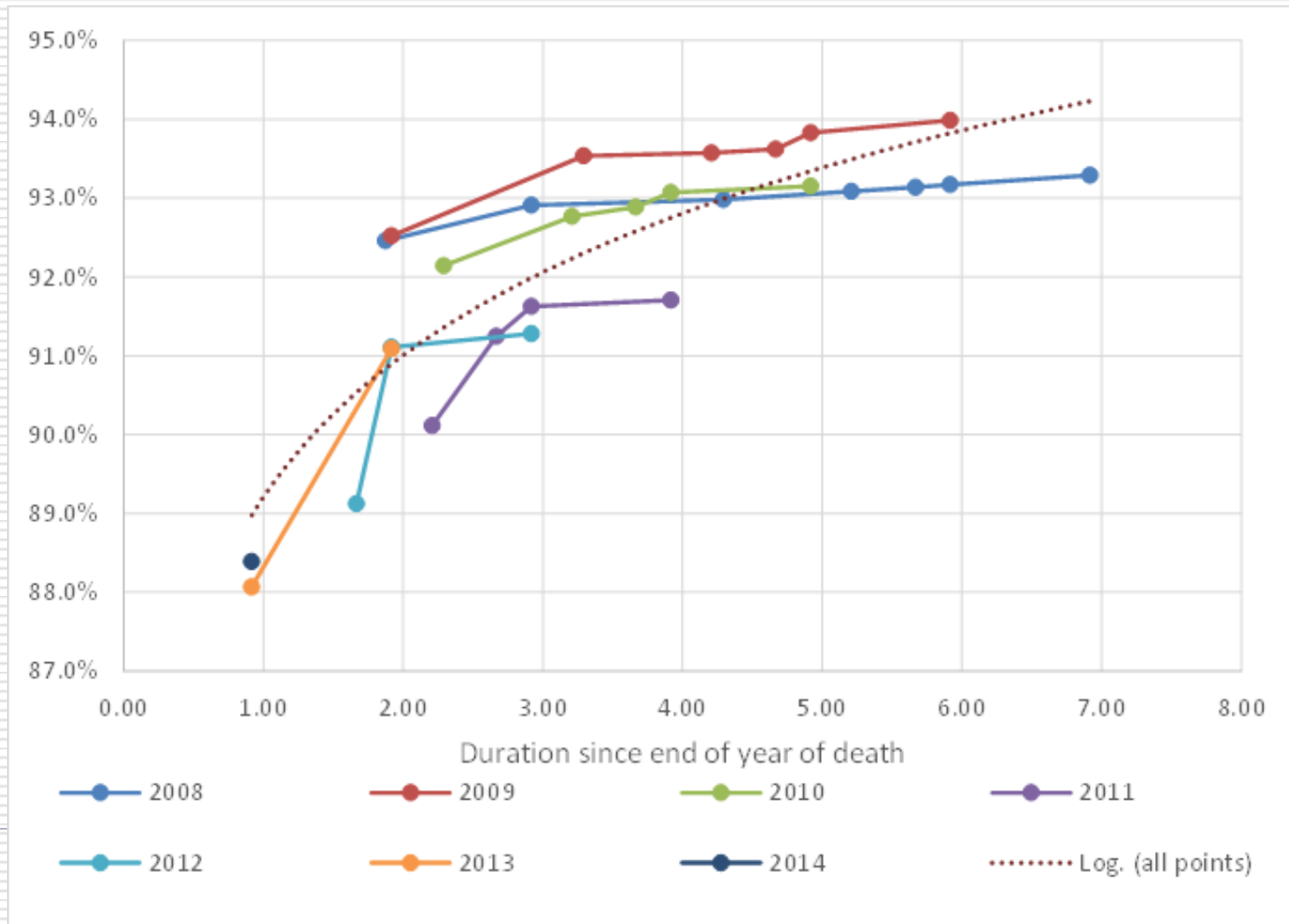
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- Hiatus in processing VR data while rising AIDS epidemic
- Population register (PR) comprising all registered births and adults with IDs
- RMS originally set up to 'prove' that people were dying of AIDS, and track the impact on mortality
- More recently tracking impact of interventions (ART)
- Extrapolate trend in PR vs VR → estimate future VR from PR
- Completeness of VR deaths 15+ from a trend in estimates of completeness in intercensal periods
- Completeness of VR deaths <5 was interpolated/extrapolated from estimates of infant and under-five mortality from census and survey data

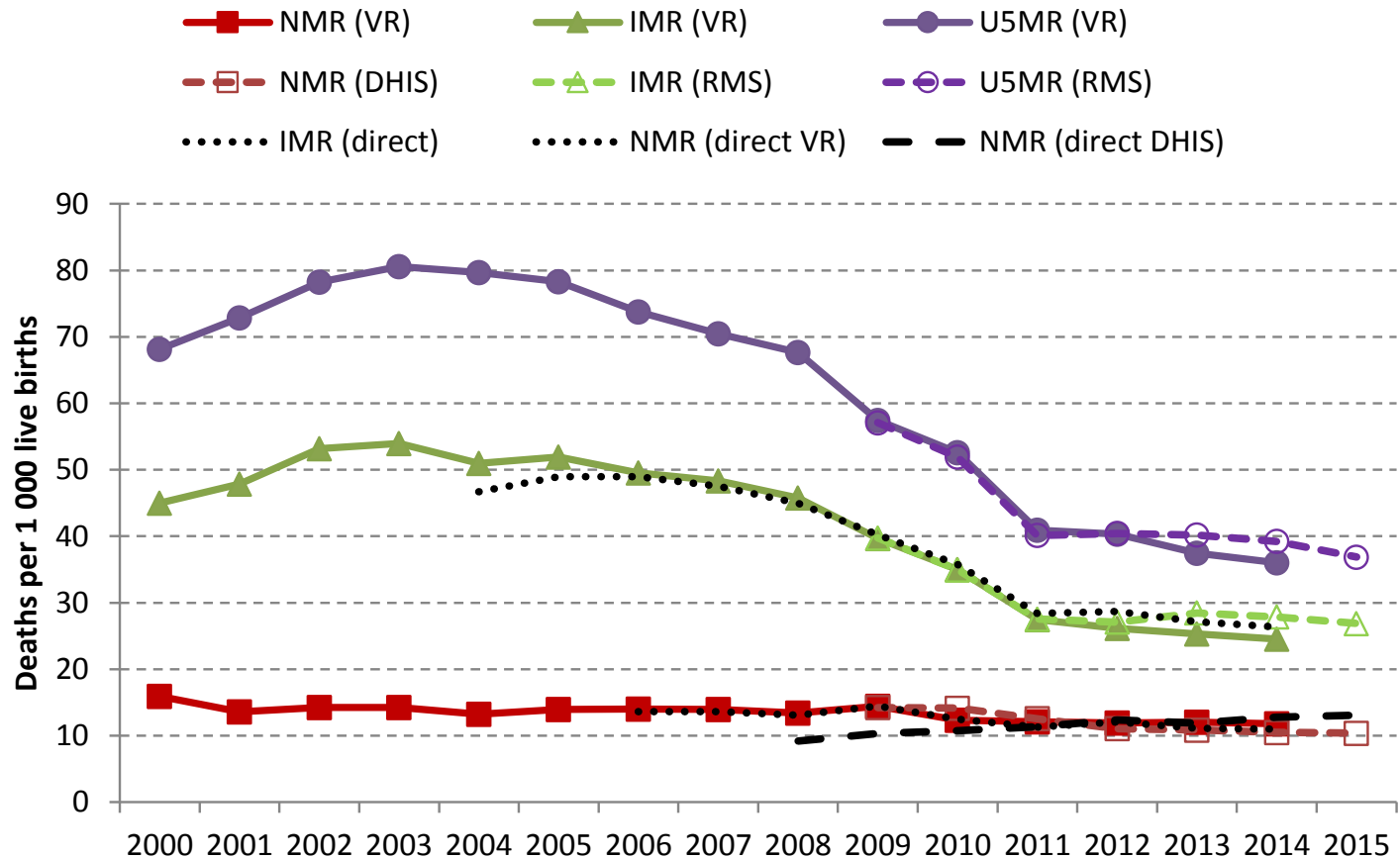
# PR deaths as a proportion of Stats SA deaths by age group, 2000-2014



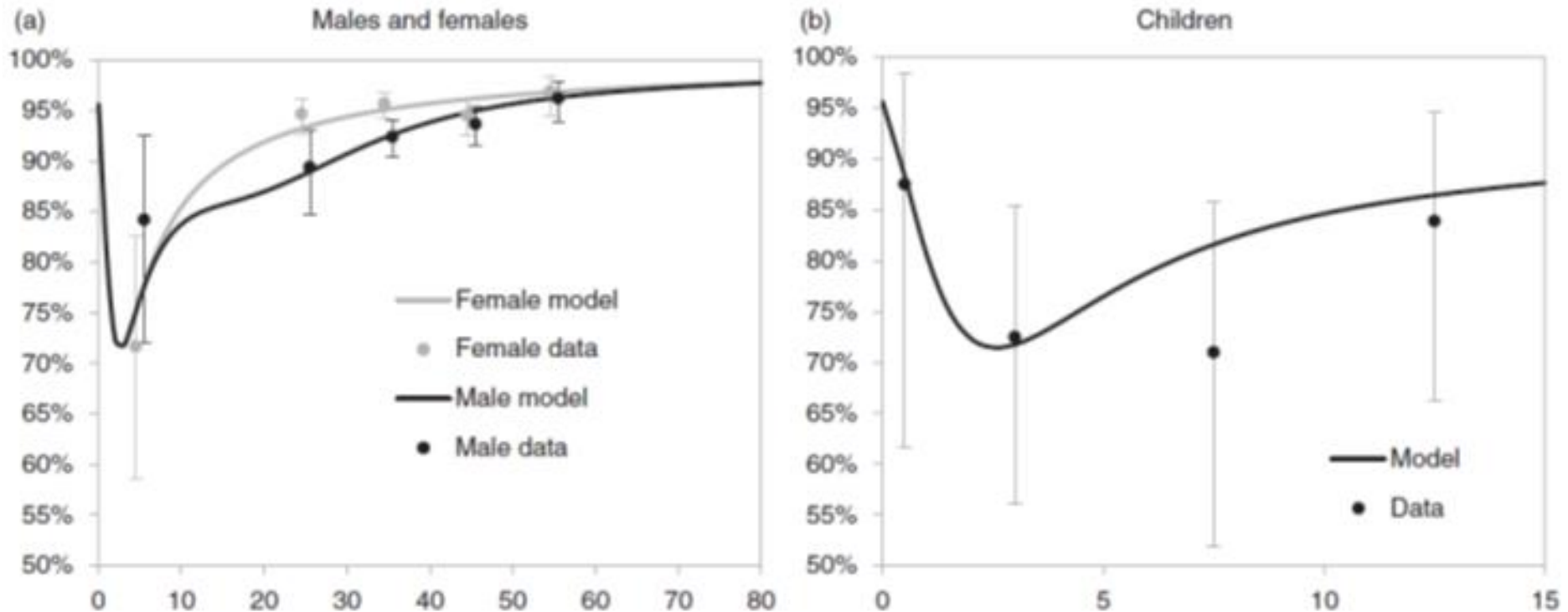
# Ratio of VR deaths to estimate of complete deaths (15+) by duration since year of death: 2008-2014



# RMS NNR, IMR & U5MR vs other methods/data



# Some observations about the assumption of constant completeness by age



# Some observations about the assumption of constant completeness by age

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- Also, urban completeness  $>$  rural completeness and age distribution differs in the two areas  $\rightarrow$  violation of assumption
- With deaths reported by households
  - Where there are many one or two-person households  $\rightarrow$  under-reporting of deaths at the old ages (particularly for women?)
  - For young adults the opposite might happen – a death being reported by more than one household

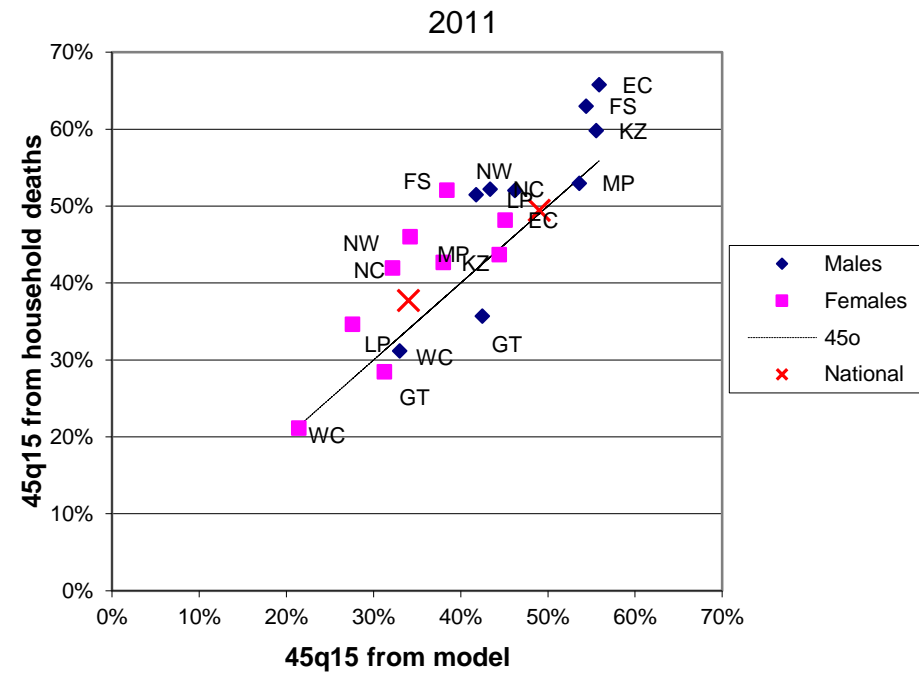
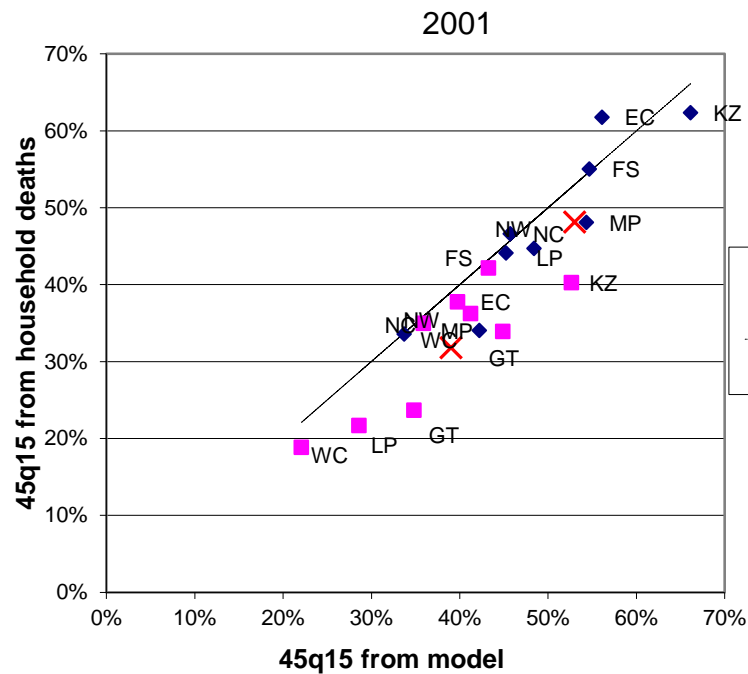


# Estimating of mortality of sub-national areal populations

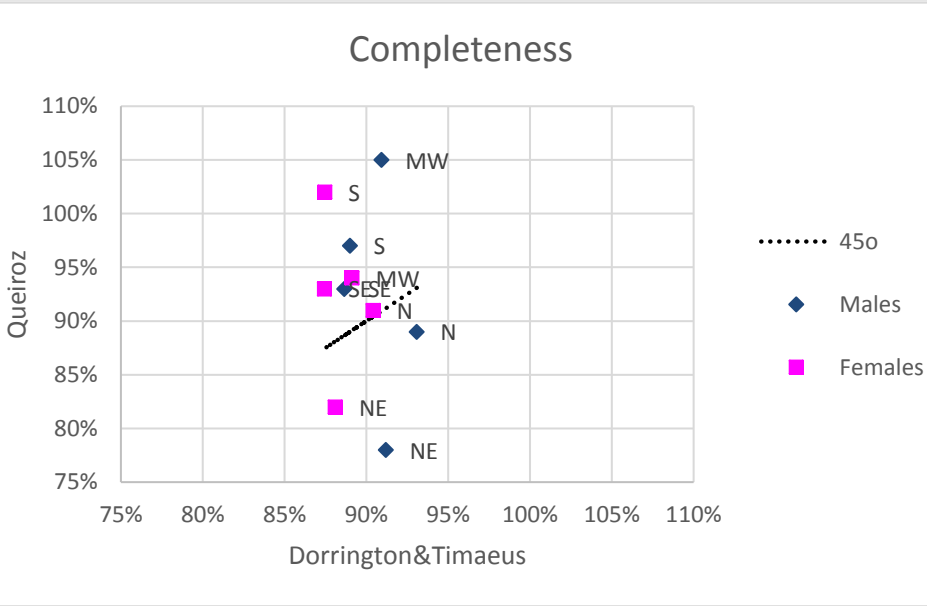
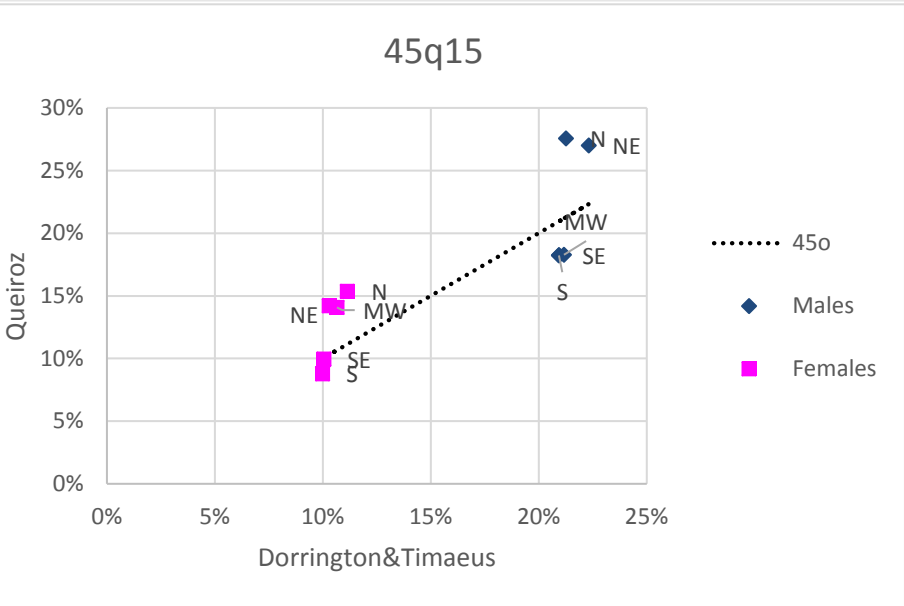
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- A challenge since
  - VR data – lack of correspondence between place of death and place of usual residence (which is usually not captured) and need reliable estimates of sub-national migration
  - Household deaths – often violate the assumption of constant completeness by age and are for a short period creating uncertainty about the estimates
- Thus Dorrington and Timaeus (2015) suggest combining the two sources, by
  - using VR to estimate the true numbers of deaths nationally by age for each sex (and possibly other divisions that could affect reporting of household data)
  - Assuming all households by sex (and other divisions) are equally likely to report the deaths at each age

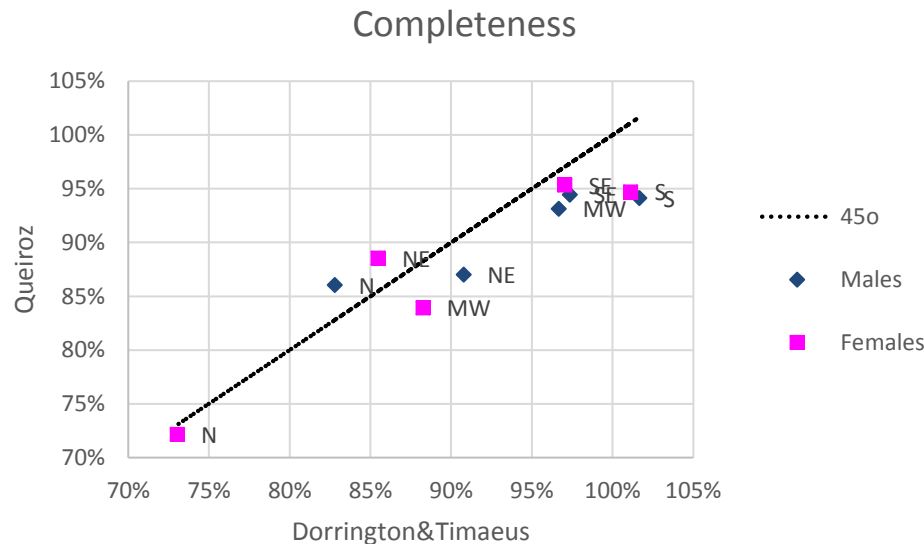
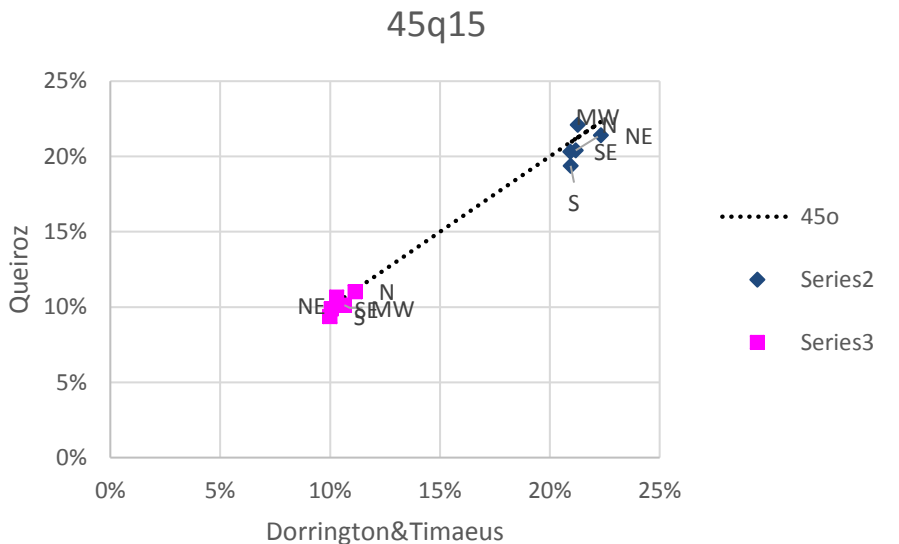
# SA: $_{45}q_{15}$ vs projection model estimates



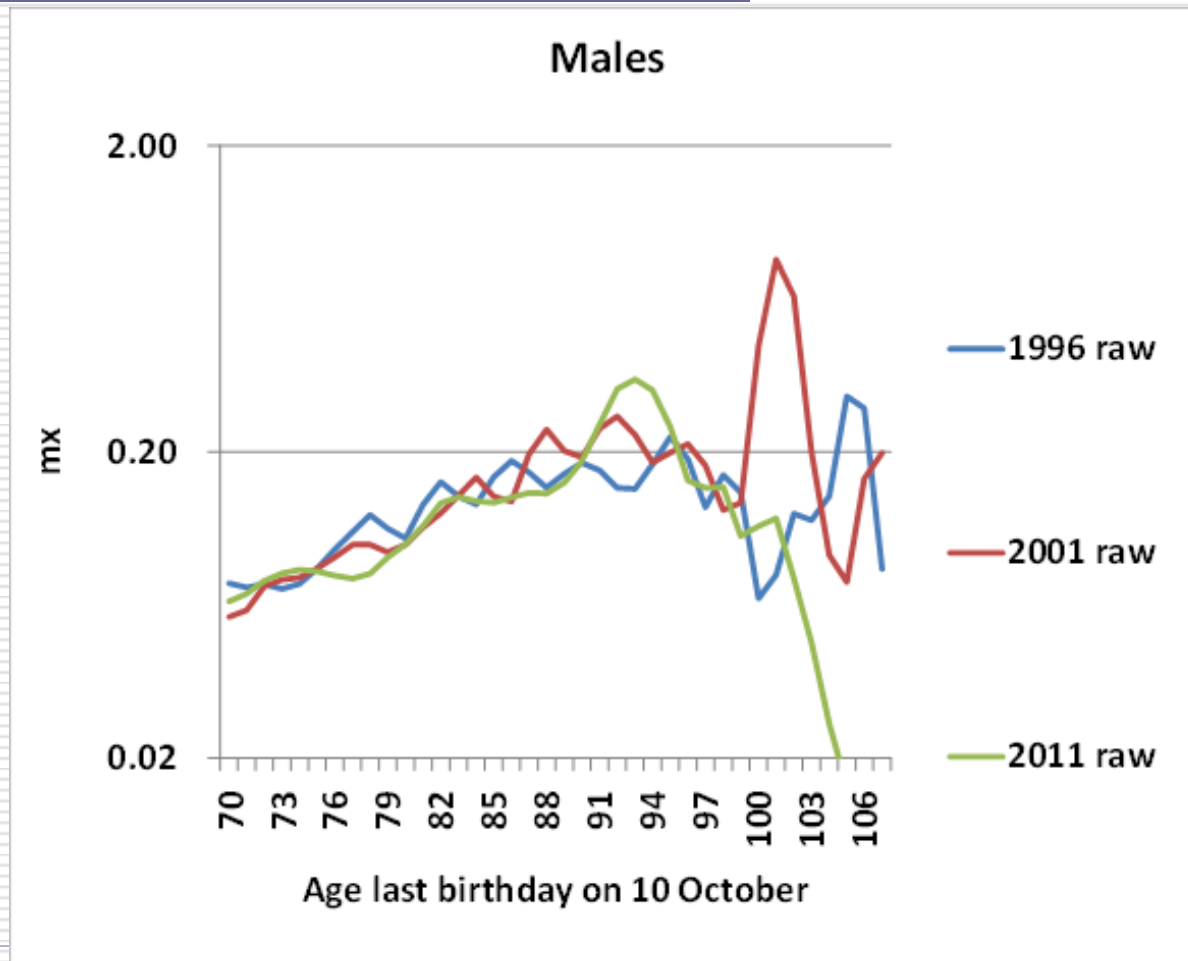
# Brazil: vs household deaths alone



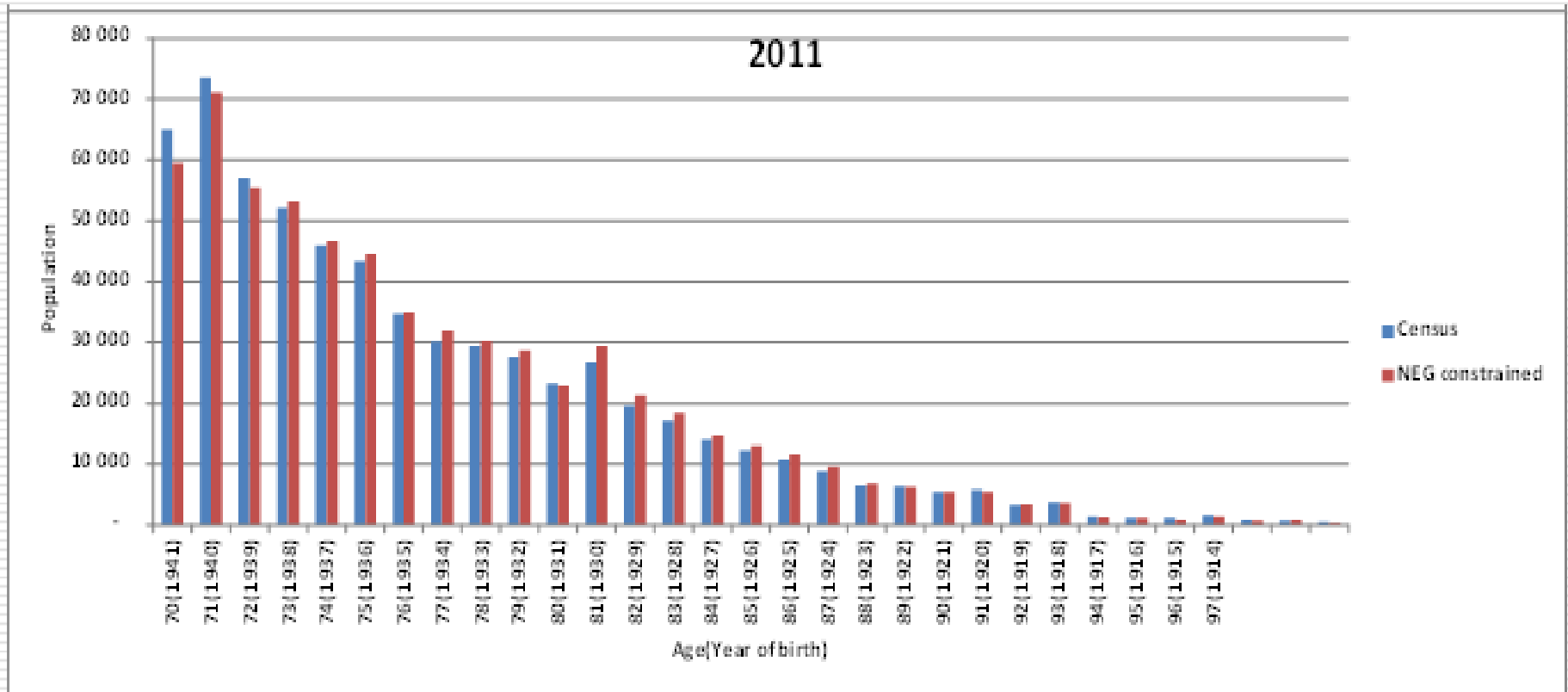
# Brazil: vs VR data alone



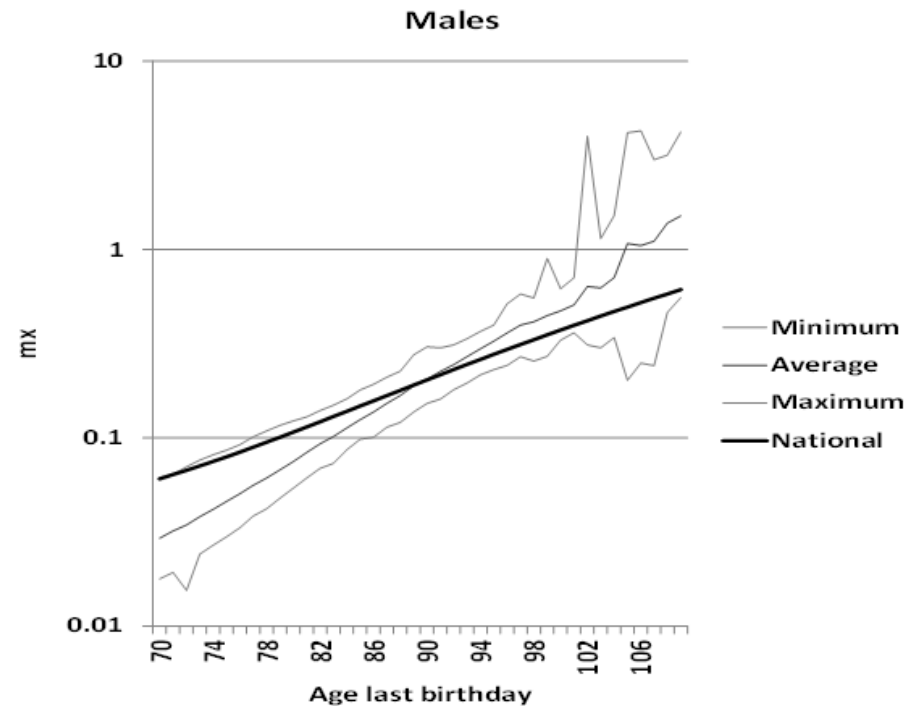
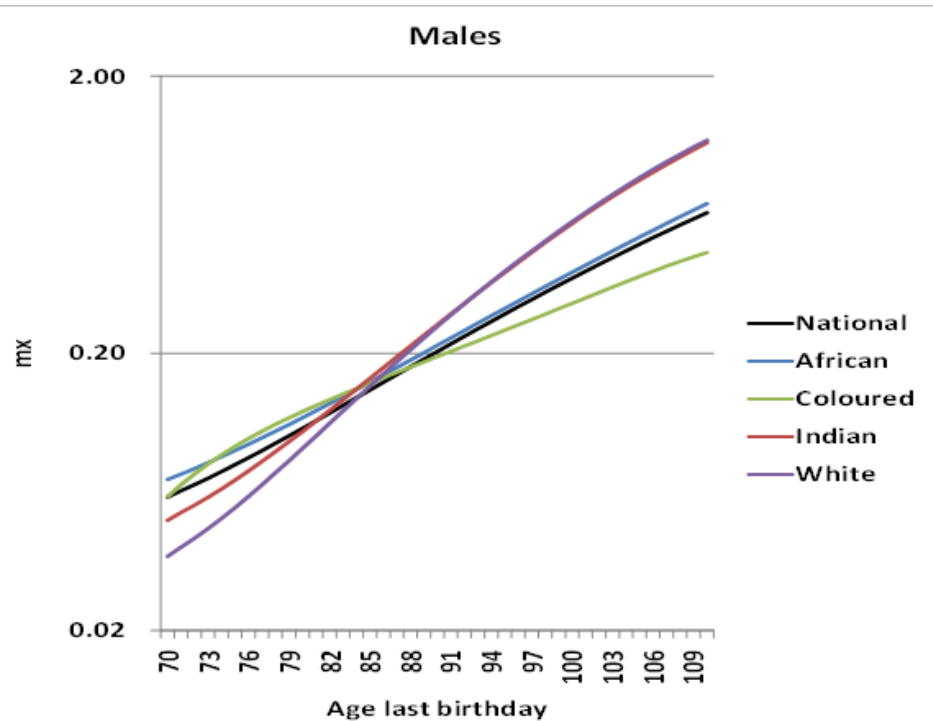
# Estimating mortality at advanced ages



# NEG vs census: males 2011



# Mortality by population group and vs HMD average and range



# Discussion

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- RMS
  - Even an incomplete population register can be useful
  - **Consistency of trend over time as important than attempting to increase completeness or release data more rapidly at the expense of seriously disrupting a well-established trend**
  - When completeness high direct estimates of IMR are not too inaccurate
- Assumption of constant completeness by age
  - Only true above age 30 in South Africa
  - Likely to be a problem in significantly heterogeneous populations (e.g. urban vs rural)
  - Household deaths likely to be problematic unless stable multigenerational families



# Discussion

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- Sub-national populations
  - Method is promising, but no gold standard to check
  - Works better if can identify factors linked to whether households report deaths
  
- Mortality at old ages
  - Age problems (year of birth heaping) can be entrenched in the official data, limiting usefulness of NEG methods
  - NEG-GAM has potential but may not eliminate the age exaggeration in the death data (particularly if incentives to exaggerate age)