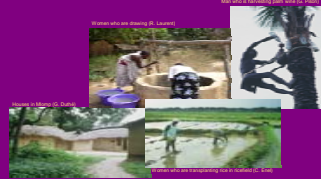# Long term effects of reproductive history on female and male mortality in a rural area of Senegal

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INTRODUCTION

Little is known on adult mortality in sub-Saharan Africa. Population ageing in this region raises new concerns about mortality structures and differentials. Demographic and surveillance system (DSS) sites provide data to study adult mortality in rural African populations. This study examines the relation between fertility and mortality of older adults of each sex, using data from the Mlomp DSS site, in rural Senegal.

FERTILITY AND HEALTH IN DEVELOPING COUNTRIES

Many effects of the reproductive history on female health

- Selection effect:
  - ✓ Women who give births are « healthier ». (+)
- Direct effect:
  - ✓ Maternal mortality (-) with well-known risk factors : age, birth intervals, number of pregnancies, multiple pregnancies, circumstances of the delivery (maternity clinic/at home)
- Indirect effects:
  - ✓ Maternal depletion syndrome (-)
  - ✓ Risks of fatal diseases: breast cancer (+), cardiovascular diseases (-)
  - ✓ Socioeconomic factors: socioeconomic status & health risks in large households (-), daily assistance of children / frequent visits to health services (+), old age support from adult children (+)

Long term effects of fertility on health for each sex

- Female : Selection effects (+) (-), Biological effects (+)(-), Socioeconomic effects (+)
- Male : Socioeconomic effects (+)

STUDY SETTING

Location	Mlomp in South West Senegal (Casamance)
Population	Rural Diola ethnic group, animist or Catholic 8,008 inhabitants in January 2005
Resources	Rice growing is the main local economic activity with seasonal migrations. Men migrate during the dry season (fishing/harvesting palm wine). Young women migrate before marriage in urban areas (domestic servant).
Health context	Relatively good local health system (since the 1960s) with a dispensary (immunization, malaria treatment…), and a maternity clinic (prenatal consultations, deliveries)
Fertility	Total fertility rate = 4.2 children per woman in 1985-2004 compared with 6.4 in rural Senegal in 2000-04 (DHS IV) Age at first birth is relatively old (23 years old on average) and births are spaced.
Nuptiality	Although monogamy, people can have multiple unions over the lifetime: (i) Consensual unions while single (ii) delayed first marriage (26 years old) (iii) possibility of remarriage after divorce or widowhood Women/Men can have children from different partners.
Mortality	Life expectancy at birth e_0 = 61 years in 1985-2004 (57 for males / 65 for females) Mortality before 5 $_5q_0$ = 0.100 compared with 0.160 in rural Senegal in 1995-2004 (DHS IV) Maternal mortality 283 p. 100,000 live births compared with 690 in Senegal in 2000 (estimates from WHO) Adult mortality $_{45}q_{15}$ = 0.309 for males and 0.165 for females relatively high for males & low for females compared to other DSS sites in rural Senegal.

MORTALITY DIFFERENTIALS AFTER THE REPRODUCTIVE LIFE

FEMALES - age group 45-59

Presentation of hazards ratio (95% CI) resulted from Cox models
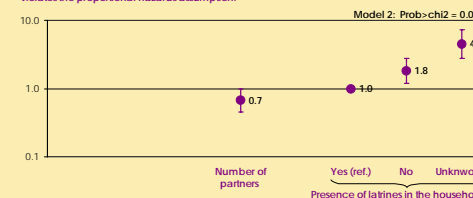Number of women = 881   Number of deaths = 41   Time at risk = 6812 person-years
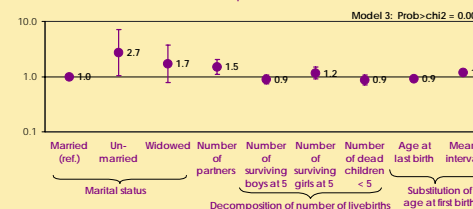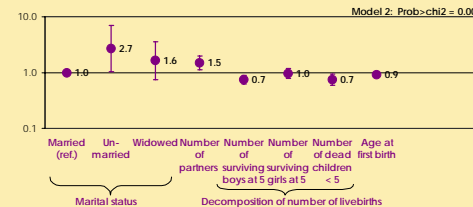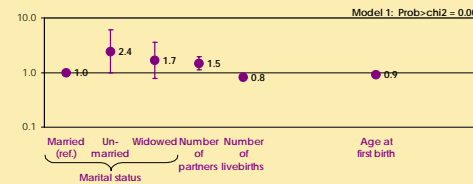
MALES – age group 50-64

Presentation of hazards ratio (95% CI) resulted from Cox models
Number of Men = 869   Number of deaths = 121   Time at risk = 6771 person-years

* violates the proportional hazards assumption.

DATA AND METHODS

- **Mlomp DSS site** — Initial census of locally delimited population in 1985 with a retrospective survey on women's union and reproductive histories. Annual demographic follow-up (births, deaths, migrations and unions).
- **Mortality data** — Mortality during the 20-year period 1985-2004. Women between ages 45 - or 1 year after the last delivery if it occurred older - and 60. Men between ages 50 - or at the birth date of the last child if it occurred older - and 65
- **Mortality analysis** — Levels: Duration model. Differentials: Cox proportional hazards models
- **Covariates description** —

  Female reproductive histories:
  Number of pregnancies (mean =7.5), live births (6.7), live born boys (3.4) and girls (3.3), number of deaths before age 5 (1.5), age at first (22.5) and last (38.9) deliveries and mean birth interval (2.6)

  Male reproductive histories:
  Number of live births (6.3), live born boys (3.2) and girls (3.1), number of deaths before age 5 (1.2), age at first (28.3) and last (43.9) births

  Marital status (time-varying covariate):
  At the end of the reproductive life, 76% of men and 79% of women were married, 3% and 7% were widowed, 21% and 14% in other status (divorced, single or unknown).

  Number of partners:
  1.4 on average per person (similar for women and men)

  Latrines in the household (information collected in 2004):
  46% have latrines in their household (41% don't, and 13% attrition)

RESULTS, LIMITATIONS AND PROSPECTS

Factors contributing to a lower female mortality after the reproductive life

- For women:
  - ✓ To have had many children:
    - Selection effect during the reproductive life,
    - "Healthy pregnant effect" of having a child late in the reproductive life,
    - More frequent visits to health services of women who have pregnancies and young children,
    - Protective effect of having boys.
  - ✓ To be married.
  - ✓ To have had few partners.
- For men:
  - ✓ To have had many partners.
  - ✓ To have latrines in the household:
    - as *proxy* of socioeconomic status.

Study limitations and prospects
- ✓ Need further socioeconomic characteristics.
- ✓ Data reliability of retrospective information for reproductive events.
- ✓ "Longer term" effects: certain diseases occur late in life (after age 60).
- ✓ Analysis of the causes of death.
- ✓ Comparative analysis in the 3 DSS in rural Senegal.

CONCLUSION

In the long term, the relation between fertility and health is complex with biological and socioeconomic factors which interplay. Comparing men and women in such analysis helps to distinguish social factors from biological ones. In Mlomp, according to a "healthy pregnant effect", the higher the number of children, especially boys, the lower the mortality risks for women after the end of the reproductive life. In a patriarchal system where women leave their family of origin to live with their husband's relatives after marriage, having sons is more beneficial for women in the old ages. For men, socioeconomic status seems to be the only significant determinant of mortality, without any impact of their reproductive history in old ages.