

# Registration of births, deaths and causes of death to inform public health policies

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# Outline

- Brief history of vital registration
- Use of vital statistics in demographic research
- Problems of VRS in developing countries
- Examples of use of VRS in LDC's
- Alternatives to formal VRS

# Concepts

- CRS: Civil registration system
  - Births, deaths, marriages, divorces
  - annulment, separation, adoption, legitimation, recognition
- VRS: Vital registration statistics
- CDS: Causes of deaths statistics

# History: outside Europe

- China: Household Registration System
  - Western Zhou dynasty (1100-771 BC)
  - Rediscovered in the 14th century
  - 1741: Baojia system (Qing Dynasty)
  - 1958: modern system
- Japan: 1872: Koseki system
- Korea: 1910
- Inca system= Quipu system

# History: European countries

- France:
  - 1406: Archbishop of Nantes (births)
  - 1539: Edit de Villers Cotterêt (births, deaths, marriages compulsory)
  - Revised in 1667, 1736, 1787
  - Secular after the Revolution: 1792, 1803
- England and Wales:
  - 1532: Bills of mortality; 1538 civil registration
  - 1837: VRS, complete after 1874

# Northern European countries

- Sweden: 1608; 1686 (compulsory)
- Norway: 1685
- Finland: 1628
- Denmark: 1639; 1646

# USA

- 1641: first attempt in Massachussets
- 1841: compulsory in Mass
- 1909: compulsory for 'registration states'
- 1930: complete for all USA

# Outside Europe

- 1839: Egypt (cholera)
- 1849: Indonesia
- 1850: India
- 1889: Philippines
- 19th century: Latin America



# Causes of death

- Early attempts in England (17th century)
- Major interest for public health in the 19th century
  - England and Wales (1838)
  - European countries
  - Overseas Europe
  - Japan and far eastern countries
  - Latin American countries

# Demographic research: Fertility

- European Fertility Project (Princeton)
  - Births and marriages
  - By detailed geographical region in Europe
  - Spread of the birth control in the 19th century and early 20th century.

# Demographic research: Mortality

- England and Wales (since 1838)
  - McKeown analysis, by cause of death
  - Selected diseases: smallpox, measles, whooping cough, tuberculosis, scarlet fever, diphtheria, pneumonia, diarrheal diseases etc.

# Demographic research: Mortality

- Mortality transition by cause of death
  - Samuel Preston analysis, by cause of death, for 176 life tables
  - Groups of causes of death: diarrheal diseases, pneumonia, bronchopneumonia, bronchitis, cardiovascular, cancers, early infancy, maternal, accident and violence etc.
  - Allows to document which causes contributed most to mortality decline

# VRS & CDS in developing countries

- Geographical coverage: not full
- Demographic completeness: not 100%
- Accuracy of information (ages, dates)
- Major problems with causes of death
  - Not certified by physician
  - Certificates not filled
  - When filled, inaccurate
  - Even when filled properly, not analyzed

# Estimation of completeness

- Comparison case by case (matching)
- Comparison with survey data
  - Assume survey better
  - Problem of sample size
- Indirect methods (adult deaths)
  - Depend on a model
  - Violation of hypotheses may lead to false estimates (stable population, constant under-registration by age)

# Use of VRS and CDS in LDC's

- Sri Lanka: malaria eradication
- Abidjan: HIV/AIDS
- Antananarivo: famine
- Morocco: change in cause of death structure

# Sri Lanka: 1946-1947

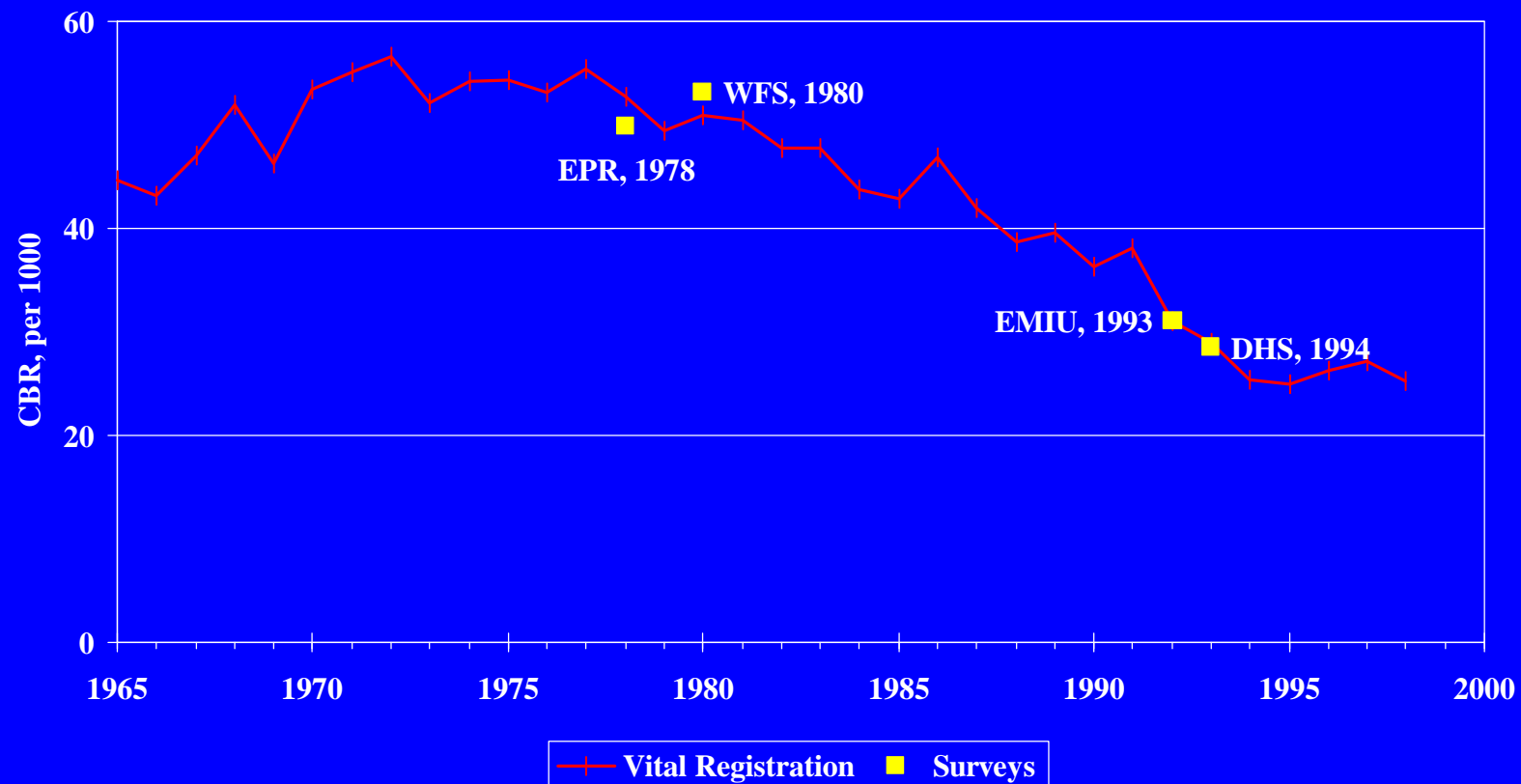
- Malaria highly prevalent prior to 1946
  - Various profiles by geographical areas
- Malaria eradication in 1946-1947
- Major mortality decline in same years.
  - Documented by district, compared by endemicity
  - Assess the net impact of malaria eradication on death rates (studies by Gray; Moryama; Fredericksen)



# Abidjan 1973-1995

- Vital registration since 1907 for Europeans and since 1925 for Africans
- High coverage for births
- Low coverage for child deaths, and declining
- High coverage for adult deaths, better for men

# Birth rates from vital registration and surveys, Abidjan



# Estimates of completeness

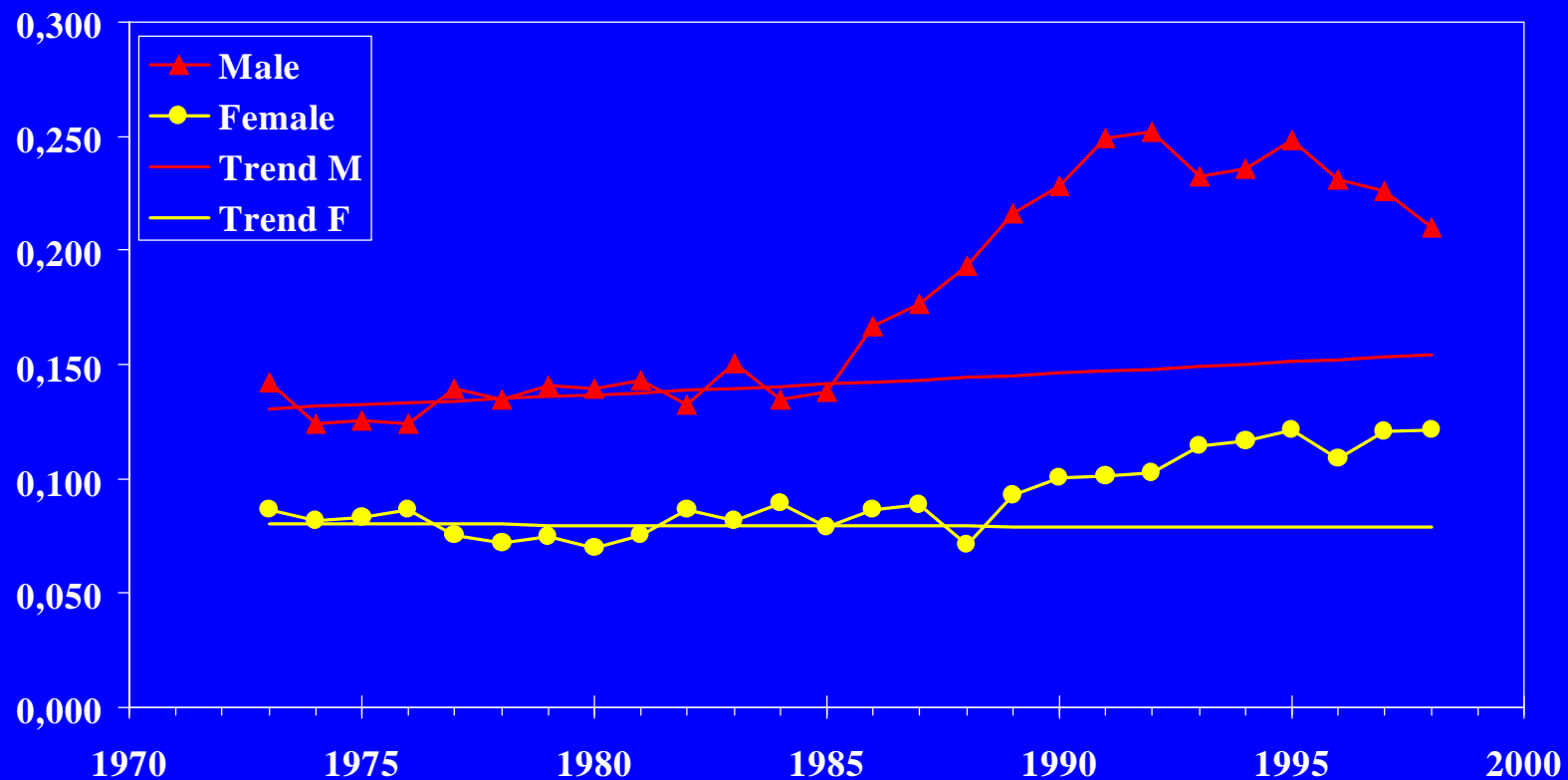
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Census	Male deaths (age 15+)	Female deaths (age 15+)
C-1975	97%	81%
C-1988	> 100%	95%

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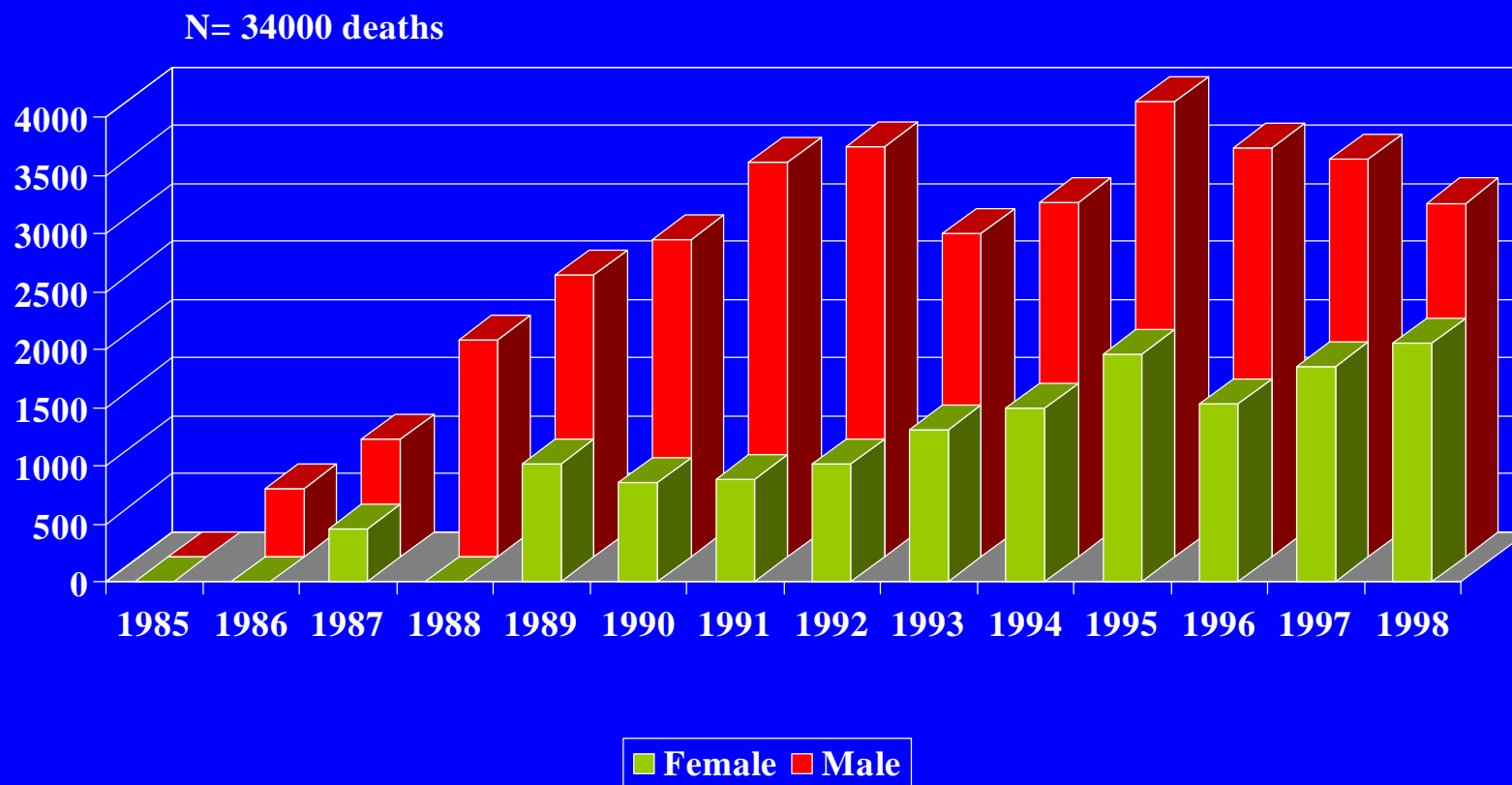
*Source: Garenne et al. 1994*

# Trends in adult mortality, age 25-49 Abidjan 1973-1998



# Deaths attributable to HIV/AIDS

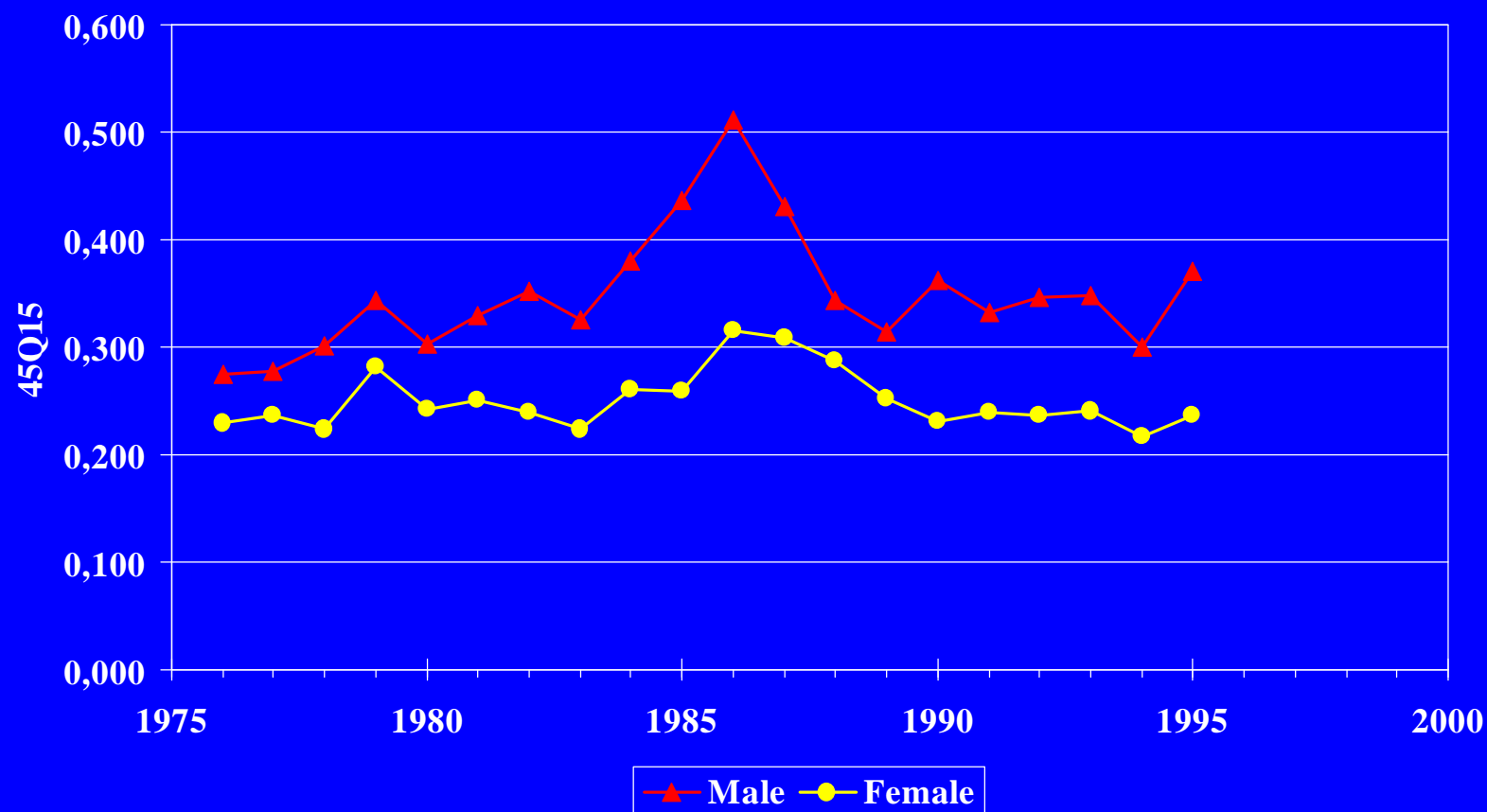
## Abidjan 1985-1998



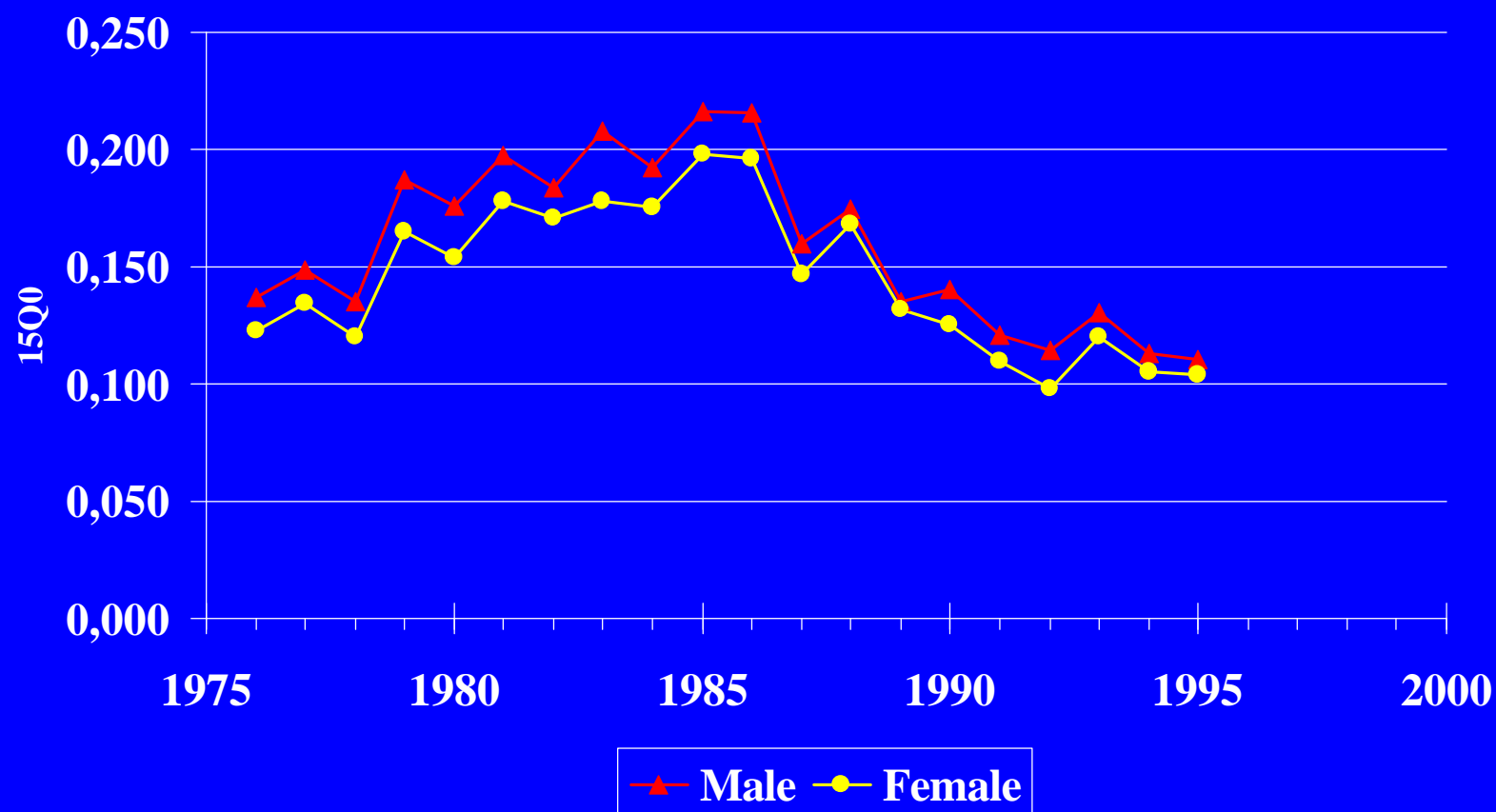
# Antananarivo

- Civil registration in Madagascar started in 1850 (plague)
- Maintained a good system in cities
- Antananarivo: 1976-1995
- Causes of death: almost complete, and reliable

# Trends in adult mortality (age 15-59), Antananarivo 1976-1995

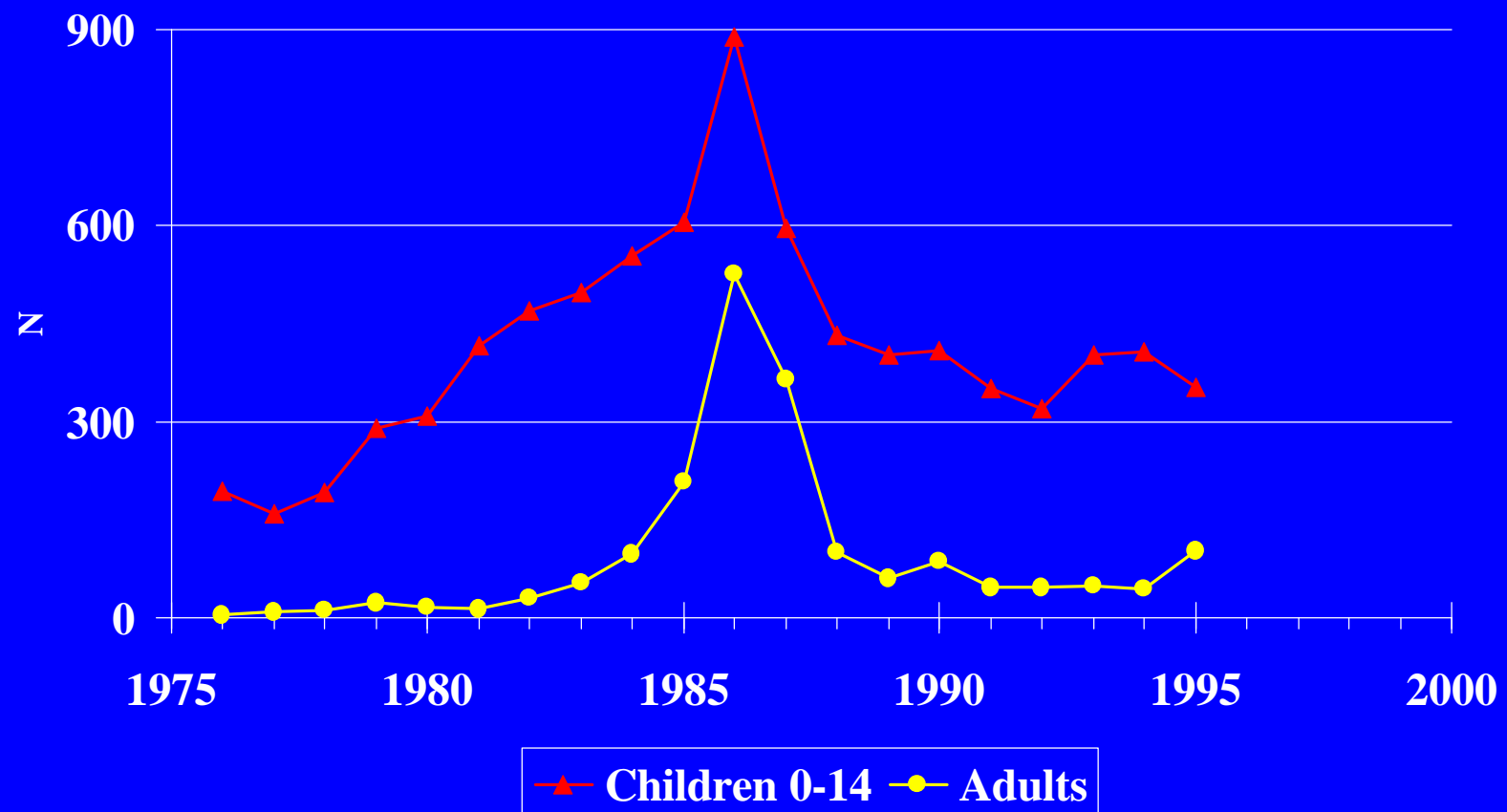


# Trends in child mortality (age 0-14), Antananarivo 1976-1995

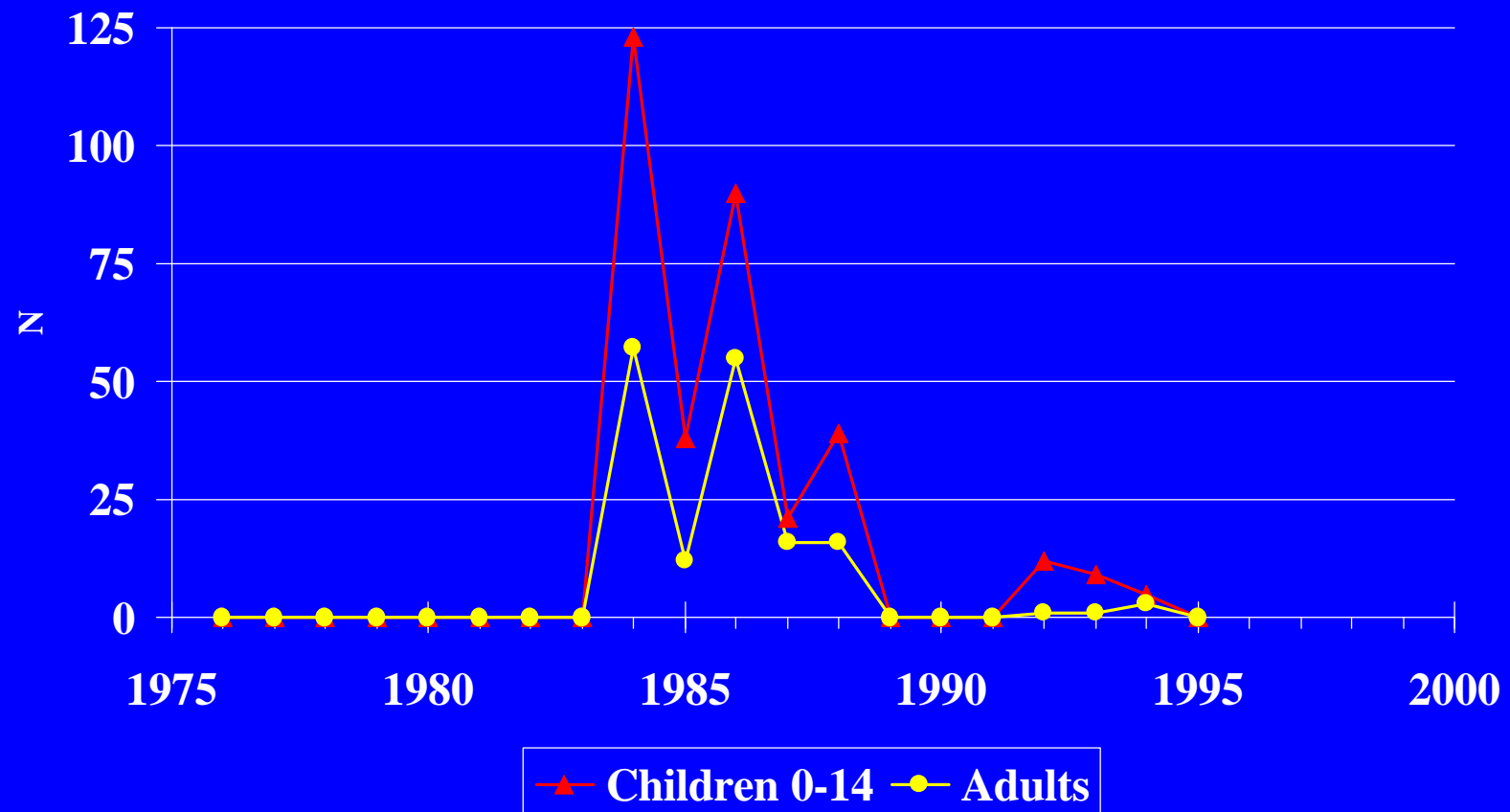




# Trends in deaths from malnutrition, Antananarivo 1976-1995



# Trends in deaths from alveolitis of jaw, Antananarivo 1976-1995



# Alternative strategies

- SRS: sample registration system
- DSS: demographic surveillance system
- VA: verbal autopsies

# Sample registration system

- Instead of a full coverage, vital registration system in a representative sample of the population
- Instead of people's initiative, home visits as for a survey
- Works in India since 1964
  - Mix of routine recording and independent checks every 6 months
- Allows dual record systems

# Demographic surveillance systems (population observatories)

- Small scale population (20.000 to 200.000)
- In-depth prospective study
  - Full registration of vital events
  - Full registration of migrations
  - Allows sophisticated research
- Many sites in the world (Asia, Africa)
  - In-depth network

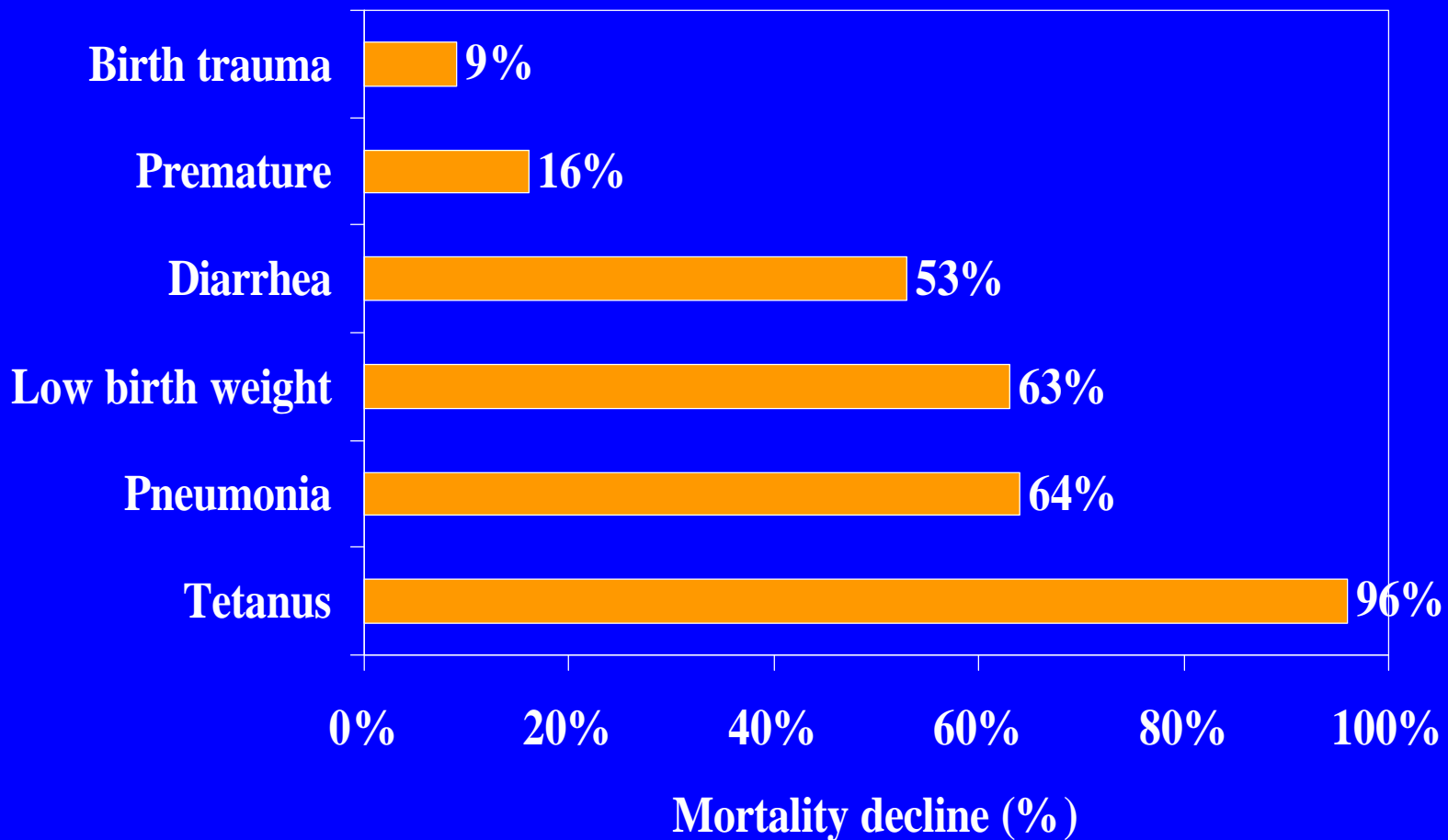
# Verbal autopsies

- Alternative to cause of death registration when deaths occur mostly at home
- Principle: home visits and interview on signs, symptoms, disease history, treatment
- Several ways of doing it:
  - In-depth interview by physician
  - Questionnaire (structured, semi-structured)
- Pioneered: population observatories
- Application: national populations

# Morocco studies on verbal autopsies among children

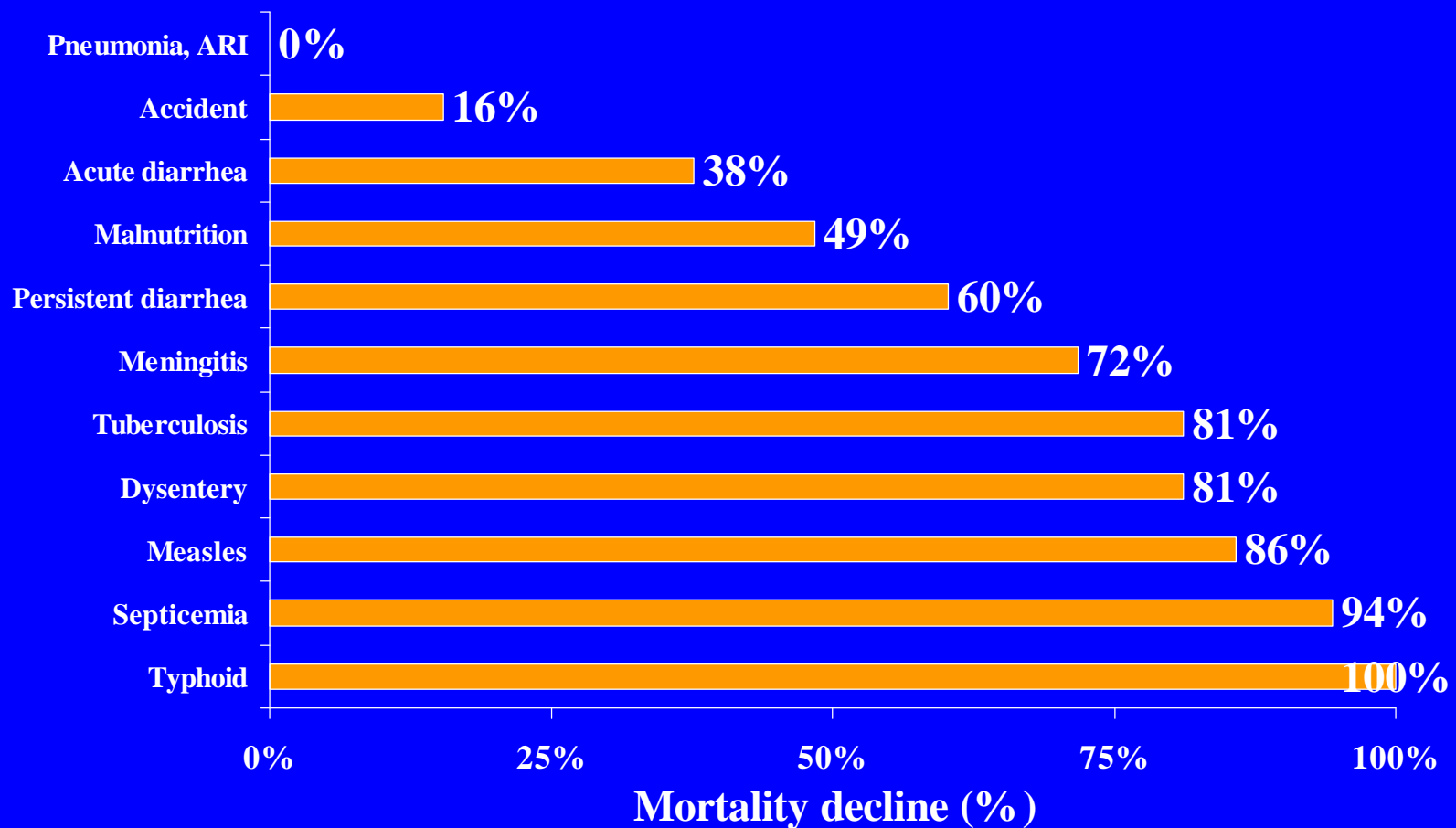
- First study in 1987, on a representative sample of deaths of children age 0-4
- Second study in 1997, on a quasi-representative sample of deaths of children (slightly truncated)
- Allows to evaluate the impact of specific interventions

# Change in neonatal mortality for selected causes, Morocco 1987-1996

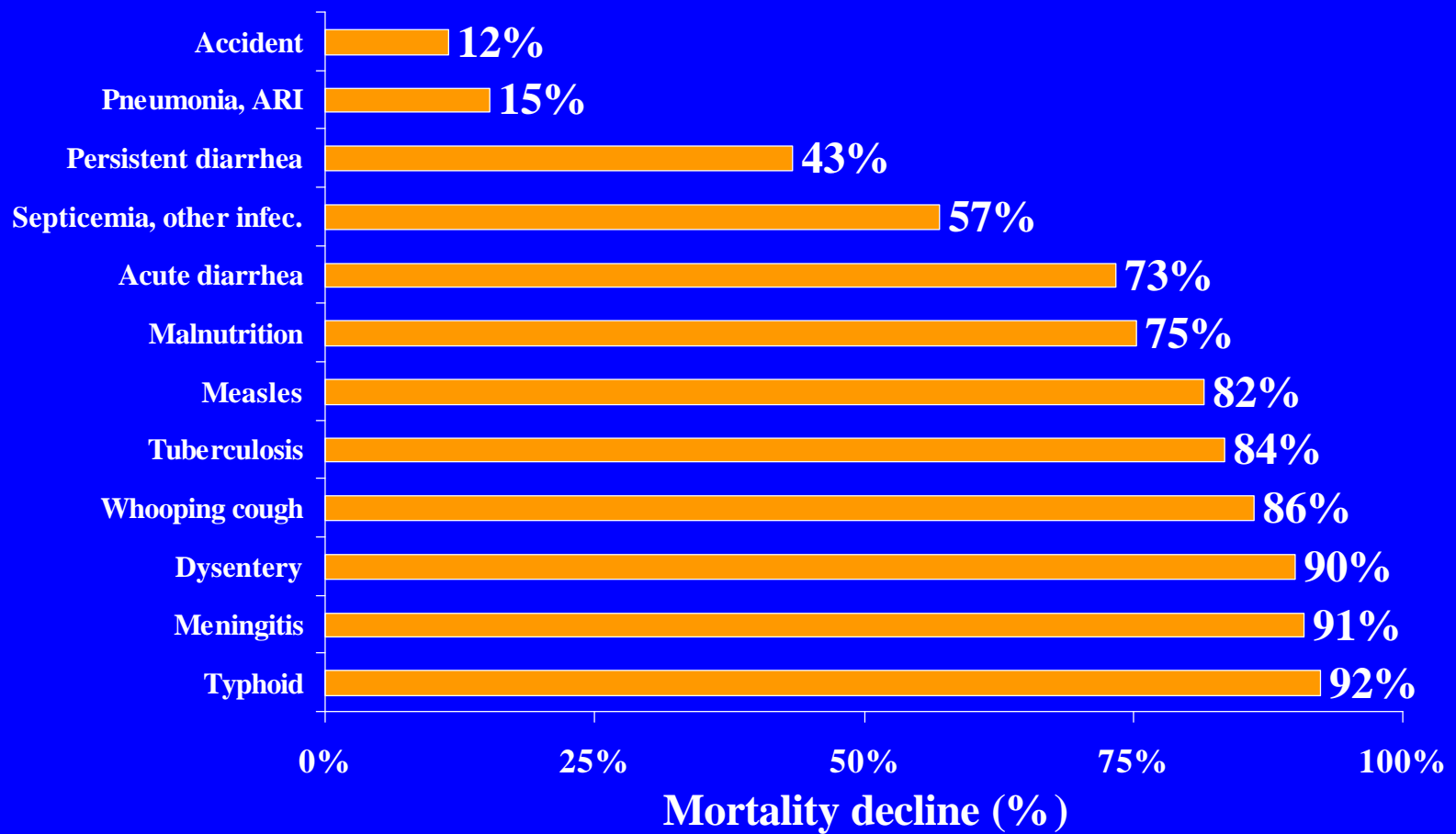




# Change in post-neonatal mortality for selected causes, Morocco 1987-1996



# Change in child mortality (1-4) for selected causes, Morocco 1987-1996



# Conclusion

- Even when deficient, VRS and CDS can be used to inform health professionals
- Some VRS are much better than usually thought
- When strong deficiencies, alternative strategies can be put in place (SRS, DSS, VA)
- Urgent need to improve reporting of vital events, and to show that this is useful for health planning