

The Demographic Roots of Population Aging

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"Physiology of the Aging Process"
Prof. Paola Timiras, January 25, 2008

Population Aging

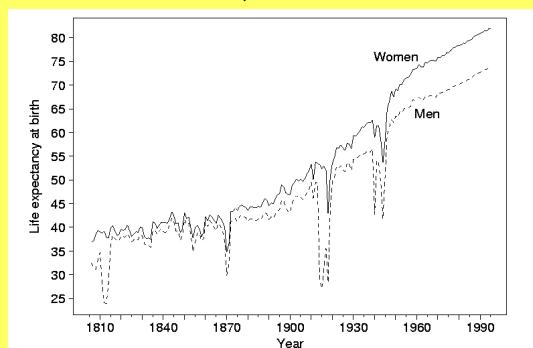
- Population aging means:
 - Increasing average age
 - Increasing share of elderly
 - Decreasing share of youth
- Population aging is caused by a process known as the Demographic Transition

Demographic Transition

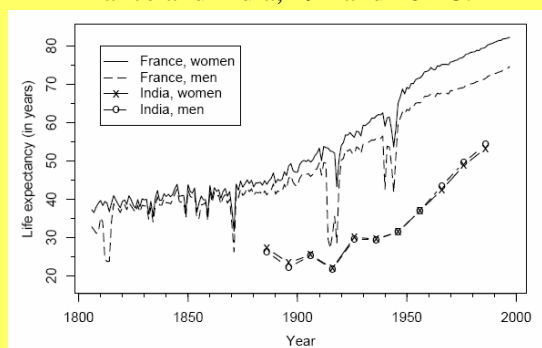
- Caused by two major historical trends:
 - Decline of mortality (longer life)
 - Decline of fertility (fewer children)
- Two major consequences of the DT:
 - Population growth
 - Population aging

Mortality Decline

Life Expectancy at Birth France, 1806-1995



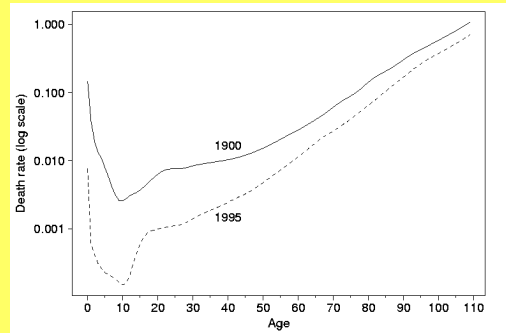
Life Expectancy at Birth France and India, 19th and 20th C.



Historical mortality levels

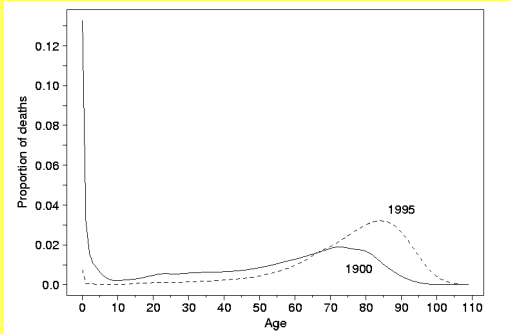
	Life expectancy at birth (in years)	Infant mortality rate (per 1000 live births)
Prehistoric	20-35	200-300
Sweden, 1750s	36	212
India, 1880s	25	230
U. S., 1900	48	133
France, 1950	66	52
Japan, 2004	82	3

Death Rates by Age, U.S., 1900 & 1995



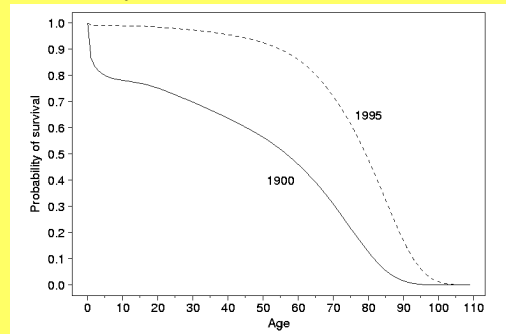
Source: Social Security Administration, United States.

Distribution of Deaths, U.S., 1900 & 1995



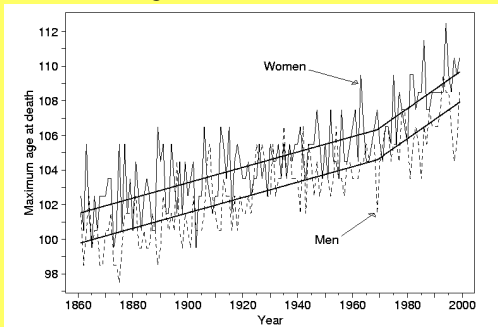
Source: Social Security Administration, United States.

Probability of Survival, U.S., 1900 & 1995



Source: Social Security Administration, United States.

Maximum Age at Death, Sweden, 1861-1999



Source: J.R. Wilmoth et al., *Science* 289: 2366-68, 2000.

Jeanne
Calment

1875-1997



Christian
Mortensen

1882-1998



Examiner / Katy Raddatz

Fertility Decline

Total fertility rate (births per woman) U.S. whites and blacks

Year	Whites	Blacks	Year	Whites	Blacks
1800	7.0	--	1910	3.4	4.4
1810	6.9	--	1920	3.2	3.5
1820	6.7	--	1930	2.5	2.8
1830	6.6	--	1940	2.2	2.8
1840	6.1	--	1950	3.0	4.0
1850	5.4	7.9	1960	3.5	4.1
1860	5.2	7.6	1970	2.4	3.1
1870	4.6	7.7	1980	1.7	2.3
1880	4.2	7.3	1990	2.0	2.6
1890	3.9	6.3	2000	2.1	2.2
1900	3.6	5.4			

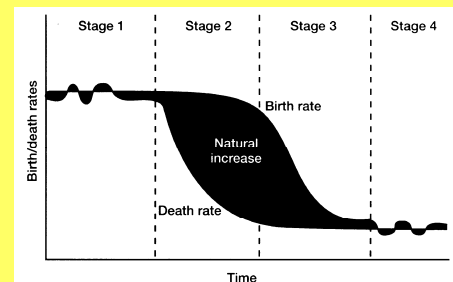
Fertility levels by race and ethnicity, United States 2000

Race/ethnicity	TFR
White	2.1
Asian/Pacific Islander	2.1
American Indian	2.1
Black	2.2
Hispanic	3.1
- Mexican	3.3
- Puerto Rican	2.6
- Cuban	1.9
Non-Hispanic white	1.9
Non-Hispanic black	2.3

Source: National Center for Health Statistics.

Demographic Transition

Classic stages of the demographic transition



Source: McFalls, 1998, p. 39.

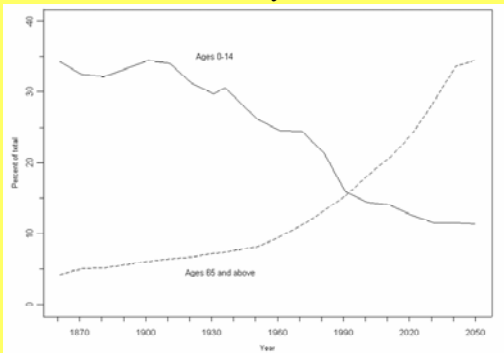
Life expectancy, TFRs, and growth rates for world regions, 2000-2005

Region	Life expectancy at birth	Total fertility rate	Rate of natural increase (percent)	Growth rate (percent)
World	65	2.6	1.2	1.2
Africa	49	5.0	2.3	2.2
Asia	67	2.5	1.2	1.2
Europe	74	1.4	-0.2	0.0
Latin America & Caribbean	72	2.5	1.6	1.4
North America	78	2.0	0.6	1.0
Oceania	74	2.3	1.0	1.3

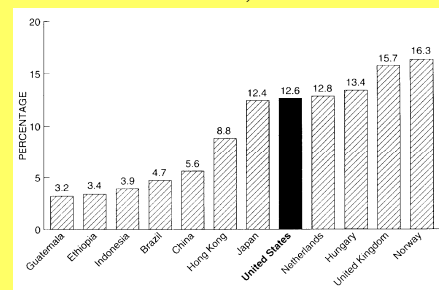
Source: United Nations, *World Population 2004* (wall chart).

Population Aging

Proportion of population aged 0-15 versus 65+, Italy 1861-2050

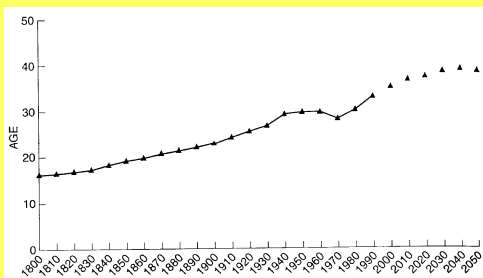


Percent of population aged 65+, selected countries, 1990



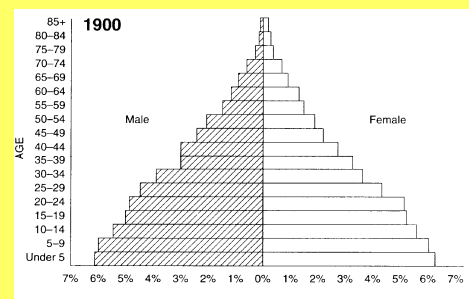
Source: J. Treas and R. Torrecilha, in R. Farley (ed.), 1995, Vol. 2, p. 54

Median age of the U.S. population, 1800-2050 (actual and projected)



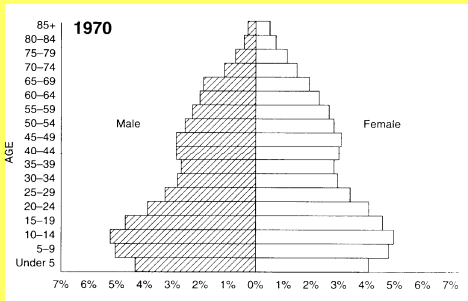
Source: J. Treas and R. Torrecilha, in R. Farley (ed.), 1995, Vol. 2, p. 50

Population pyramid, U.S. 1900



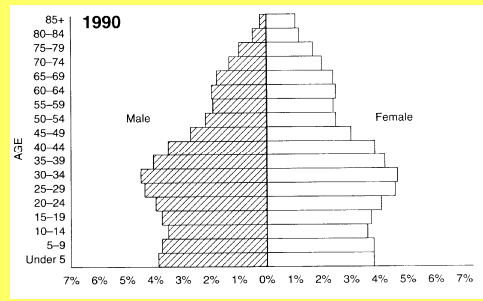
Source: J. Treas and R. Torrecilha, in R. Farley (ed.), 1995, Vol. 2, p. 52

Population pyramid, U.S. 1970



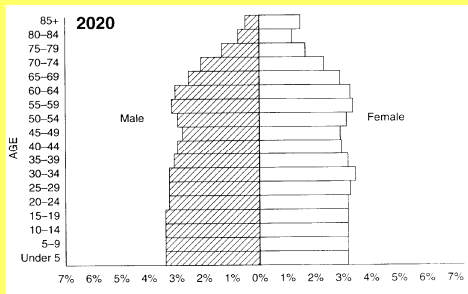
Source: J. Treas and R. Torrecilha, in R. Farley (ed.), 1995, Vol. 2, p. 52

Population pyramid, U.S. 1990



Source: J. Treas and R. Torrecilha, in R. Farley (ed.), 1995, Vol. 2, p. 53

Population pyramid, U.S. 2020



Source: J. Treas and R. Torrecilha, in R. Farley (ed.), 1995, Vol. 2, p. 53

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