

The Demographic Challenge of Ageing Populations

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Population composition is determined by:

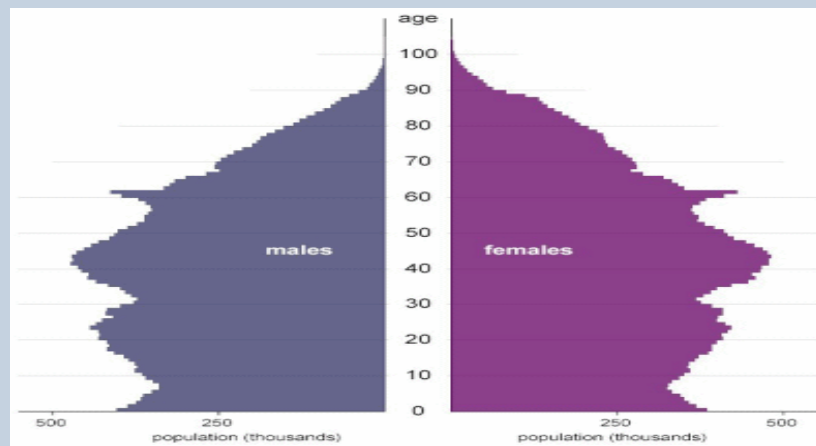
Levels of fertility
Levels of mortality
Levels of immigration and emigration



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The population of the United Kingdom



The demographic transition

- Robert Malthus (1766-1834), mathematician, Jesus College, Camb..
- 1798: *Essay on Population* – prophet of doom:

Two postulates:

1. *That food is necessary to the existence of man....*
2. *That the passion between the sexes is necessary, and will remain nearly in its present state...*

The demographic transition

- Malthus *Essay on Population*

Postulates implied that:

1. *The power of population is indefinitely greater than the power in the earth to produce subsistence for man...*
2. *Population, when unchecked, increases in a geometrical ratio (population doubles in 25 years). Subsistence increases only in an arithmetical ratio...*

Sustainability implies a strong and constantly operating check on population.

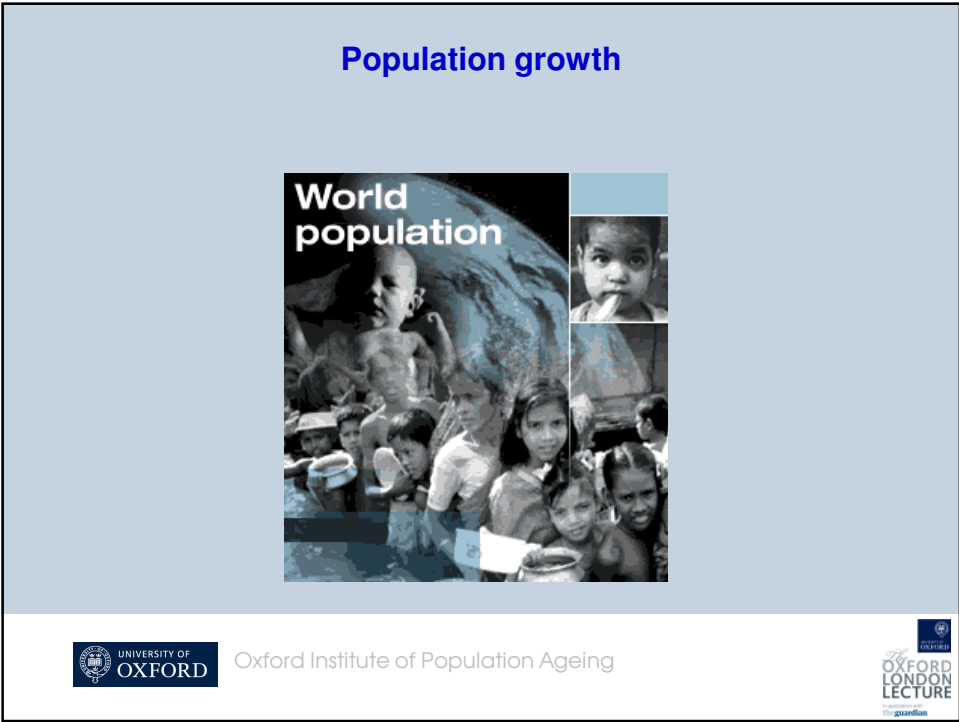
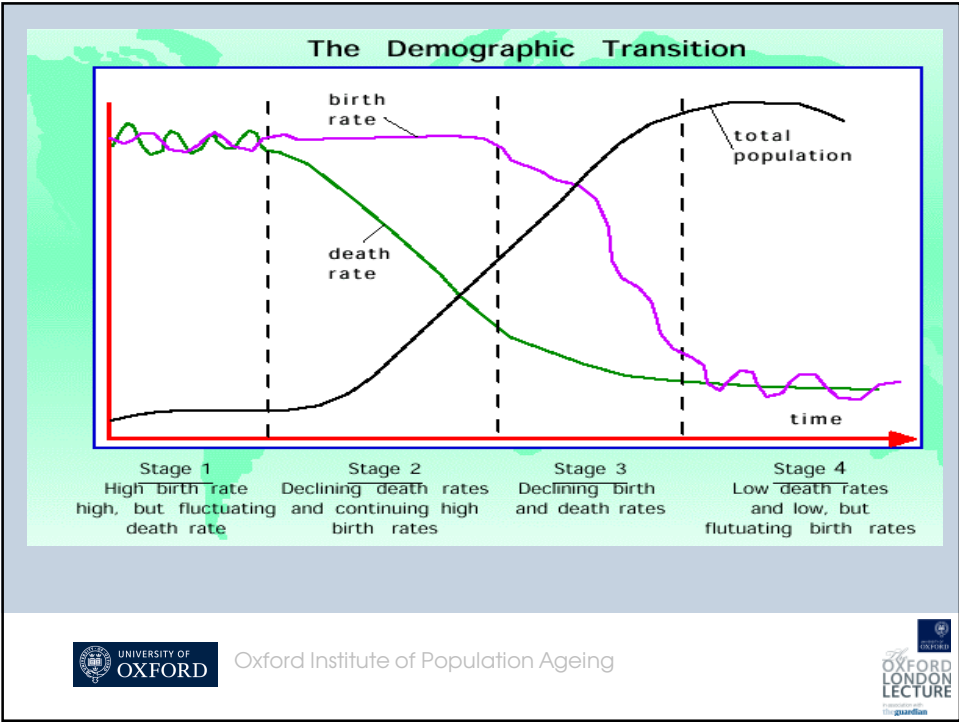
The demographic transition

- Malthus *Essay on Population*

The *controls* comprise *moral restraint, vice and/or misery*.

BUT Malthus saw restraint – delaying marriage – and not war, illness and famine as the driver of sustainability.

HOWEVER, his sustainability fears proved unfounded.



POPULATION DEVELOPMENT – the law of big numbers

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POPULATION DEVELOPMENT – the law of big numbers

Population doubling times:

1650 0.5 billion

1850 1.1 billion

1950 2.5 billion

1990 5.3 billion

2005 6.5 billion

2025 8.0 billion

2050 9.0 billion

UN World Population Prospects: The 2010 revision, medium variant



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POPULATION DEVELOPMENT – developed and developing world

The developed world:
low levels of fertility
high life expectancies
ageing and declining populations

The developing world:
Declining (or stalling?) levels of fertility
increasing life expectancies
Malthusian trap



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POPULATION DEVELOPMENT – developed and developing world

Millions	1950	2000	2005
World	2535	6115	6512
More developed	814	1195	1217
Less developed	1721	4920	5295
Africa	224	819	921
Asia	1411	3698	3937
Latin Am & Carib	168	521	557
Europe	548	727	729
North America	171	319	335
Oceania	13	31	34

UN World Population Prospects



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POPULATION DEVELOPMENT – ageing and growth

- Ageing accompanies the demographic transition:
 - the old world
 - Japan/Asia
 - South America
 - Africa
- Growth in the developing world is *natural*
- Growth in the old world is driven primarily by *migration*



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21st CENTURY POPULATION DEVELOPMENT – scenarios of growth

World Population Prospects 2010 Revision

Still the law of big (but stabilising) numbers
Fertility development projected in a probabilistic model with levels
fluctuating around 2.1 (globally it falls from around 2.5 today to 2.1
by 2050 and 2.0 by 2100)
Life expectancies increase from ca. 70 years in 2010 to 76 years in
2050 and 81 years in 2100 at global level (84/88/91 years in
Japan, 49/64/76 in Swaziland)
International migration remains high (based on past levels and
national policies) – will decline after 2050



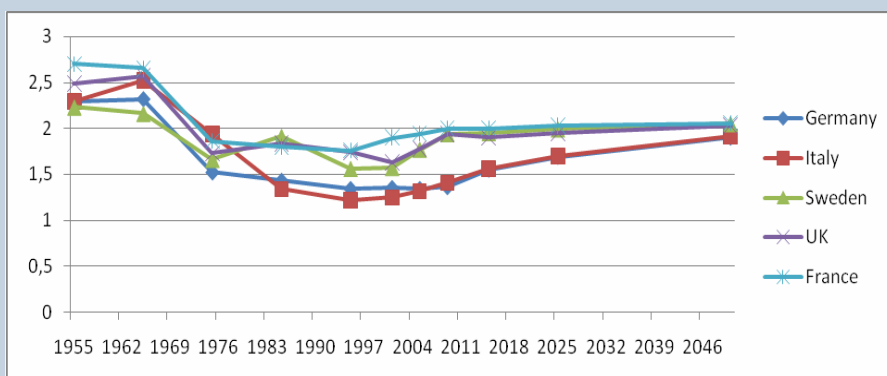
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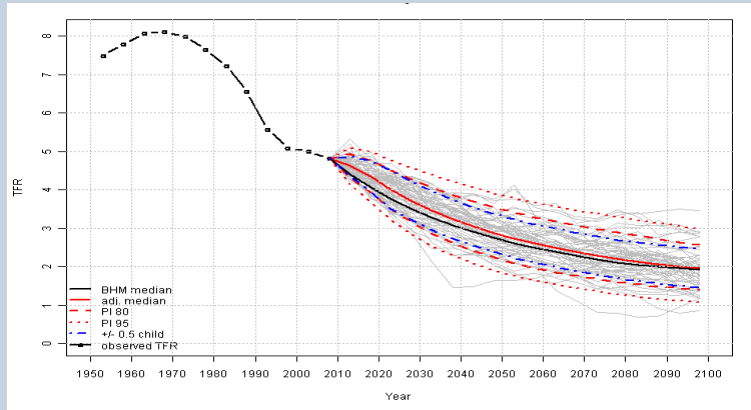
Fertility



III. 21st CENTURY POPULATION DEVELOPMENT - fertility



21st CENTURY POPULATION DEVELOPMENT – scenarios of growth. Realistic? The case of Kenya. Source: World Population Prospects 2010 Revision



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21st CENTURY POPULATION GROWTH – scenarios of growth

Billions	2010	2050		2100	
		Med	Con	Med	Con
World	6.9	9.3	10.9	10.1	26.8
More developed regions	1.2	1.3	1.2	1.3	1.1
Less developed regions	5.7	8.0	9.7	8.8	25.7
Africa	1.0	2.2	3.0	3.6	15.0
Asia	4.2	5.1	5.9	4.6	9.5
Latin Am & Carib	0.6	0.8	0.9	0.7	1.3
Europe	0.7	0.7	0.7	0.7	0.5
North America	0.3	0.4	0.4	0.5	0.5
Oceania	0.04	0.0	0.06	0.07	0.11

UN World Population Prospects, 2010 revision



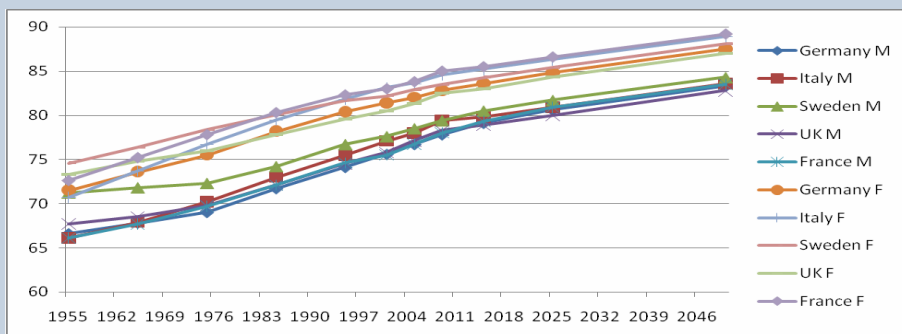
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Mortality



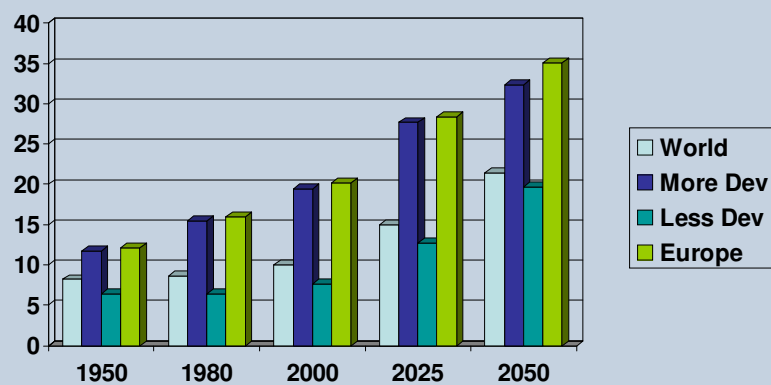
III. 21st CENTURY POPULATION DEVELOPMENT – mortality; life expectancy



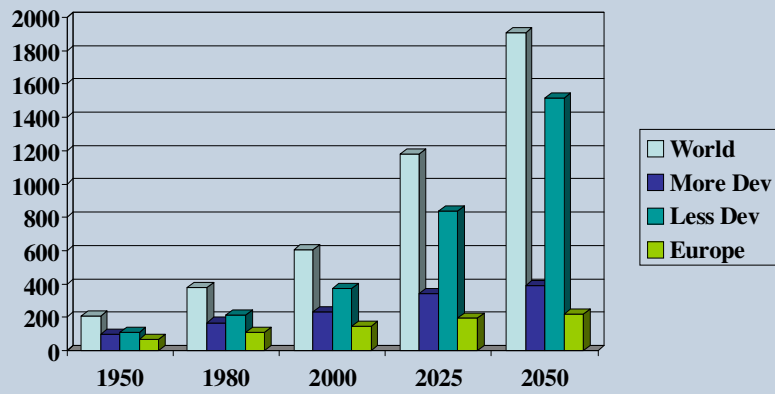
Ageing



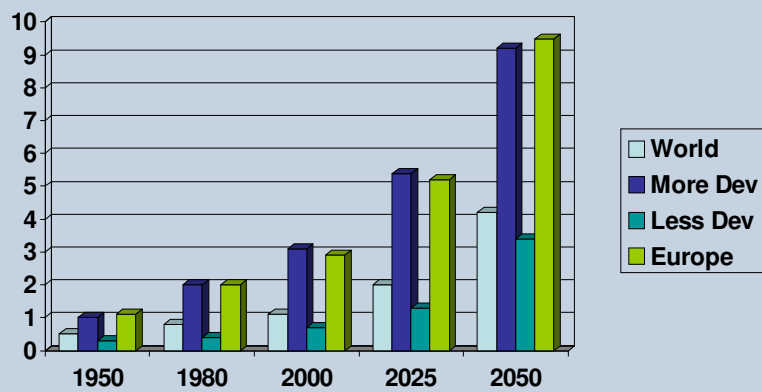
21st CENTURY POPULATION DEVELOPMENT – global ageing: proportion aged 60+



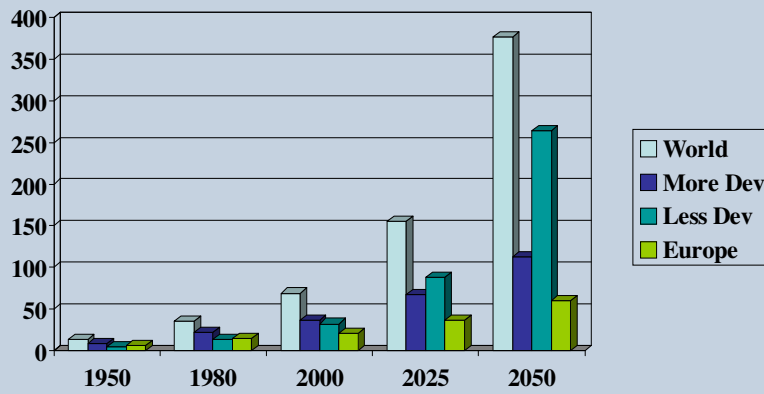
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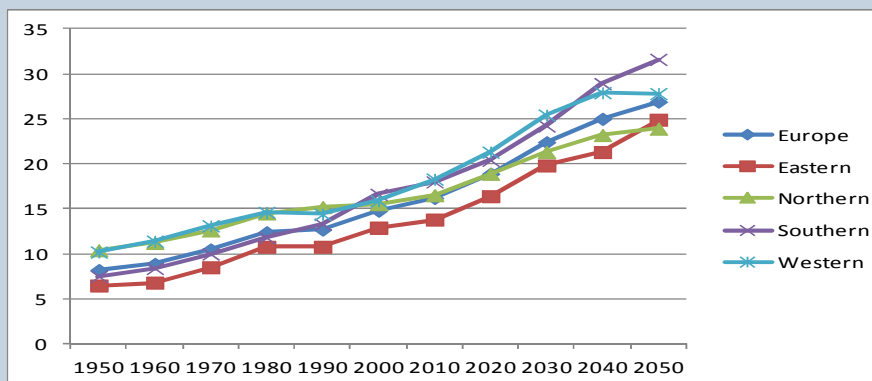
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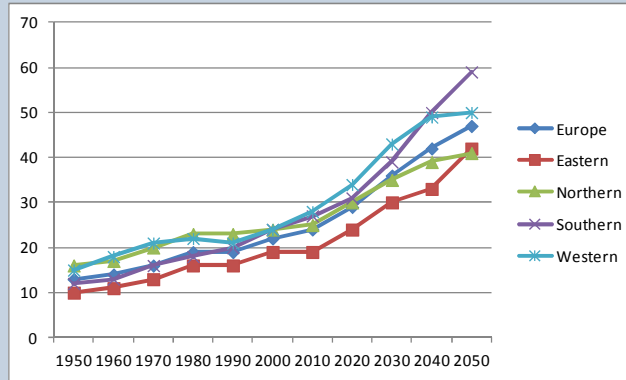
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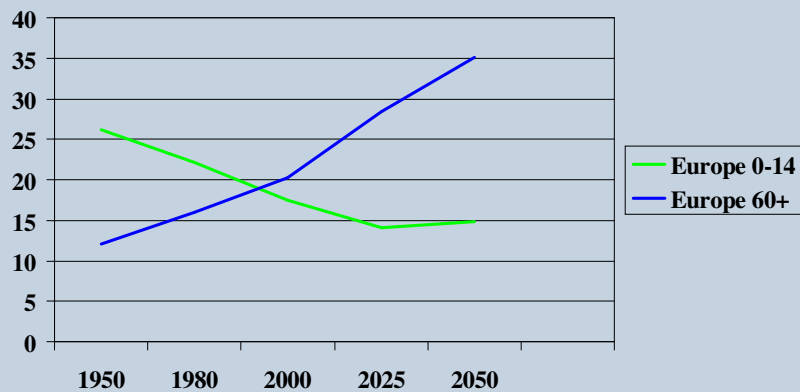
21st CENTURY POPULATION DEVELOPMENT – ageing in Europe - Percentage 65+, 1950-2050



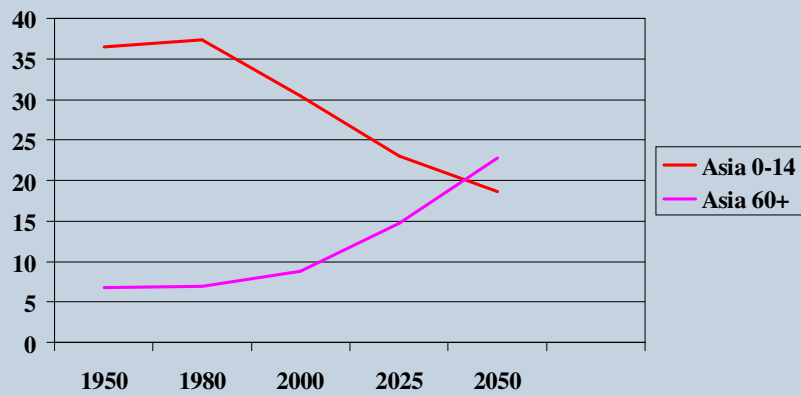
21st CENTURY POPULATION DEVELOPMENT – ageing
in Europe - Old age (65+ : 15-64) dependency ratio,
1950-2050 (no. of dependents per 100 persons of working age)



21st CENTURY POPULATION DEVELOPMENT – global
ageing: mature societies



21st CENTURY POPULATION DEVELOPMENT – global ageing: mature societies

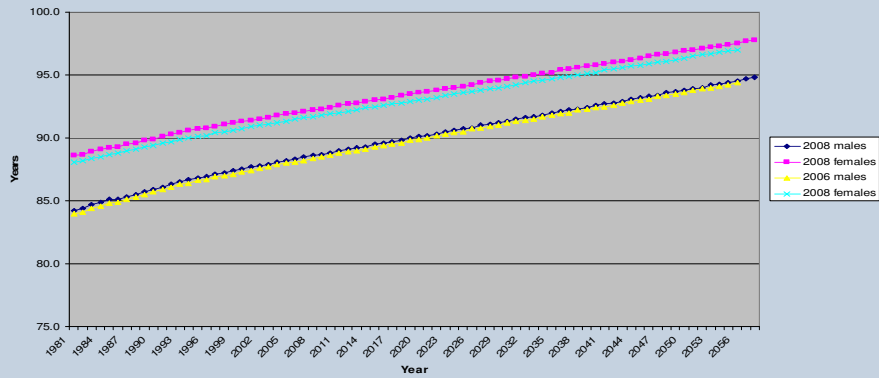


The Century of Centenarians



21st CENTURY POPULATION DEVELOPMENT – radical life extension

Cohort life expectancy at birth, 2006 and 2008 based projections, United Kingdom



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21st CENTURY POPULATION DEVELOPMENT – radical life extension

“... the possibilities of lengthening life appear practically unlimited” *Regelson (1996)*

“... the only practical limit to human life span is the limit of human technology” *Rose (1996)*

“... the cure for ageing...is no longer science fiction” *De Grey (2003)*

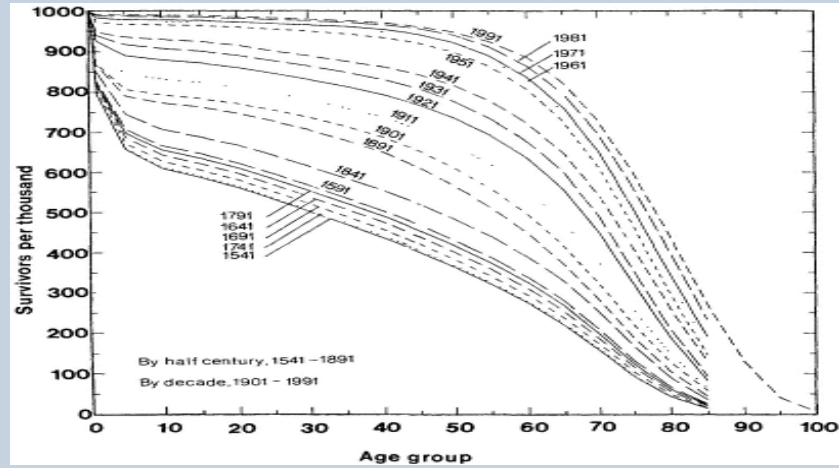
“... the 21st century will be the century of centenarians...” *Leeson (2009)*



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21st CENTURY POPULATION DEVELOPMENT – radical life extension



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21st CENTURY POPULATION DEVELOPMENT – the century of centenarians

Centenarians – 1000s

	2010	2050	2100
World	292	3224	17795
More developed	199	1946	6634
Less developed	93	1279	11161
LA & the Caribbean	44	521	3220
Brazil	18	224	1010
Chile	2	29	121
Mexico	7	85	698
Cuba	2	20	64
Bolivia	0	1	19

United Nations World Population Prospects 2010 Revision



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21st CENTURY POPULATION DEVELOPMENT – the century of centenarians

In the United Kingdom:

More than 10 million alive in the UK today can expect to live to 100 years old – 17% of the current population

3 million are currently aged under 16 years

5.5 million are currently aged 16-50 years

1.3 million are currently aged 51-65 years

and

Almost 1 million are already aged over 65 years

Source: DWP



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21st CENTURY POPULATION DEVELOPMENT – the century of centenarians

Verified highest age of death in England & Wales

1968-1972	111
1973-1977	112
1978-1982	112
1983-1987	114
1988-1992	113
1993-1997	115



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21st CENTURY POPULATION DEVELOPMENT – the
century of centenarians

Supercentenarians?

People aged 110+

**Highest ages in England & Wales 1968-1997
were in the range 111-115 years.**

**If death rates at very high ages fall in line
with official projections, then in the 2080s
the highest ages will be 116-123 years – and
this is the bumper 1966 cohort.**



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