

Changing times and changing lives:
investigating age related change using the
Office for National Statistics Longitudinal
Study of England & Wales

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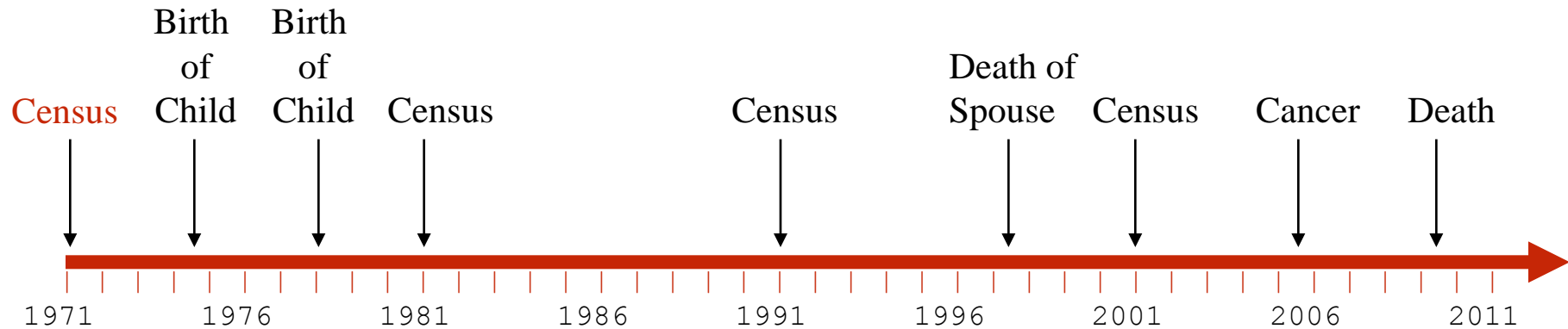


Longview Conference, Cambridge 22 September 2009

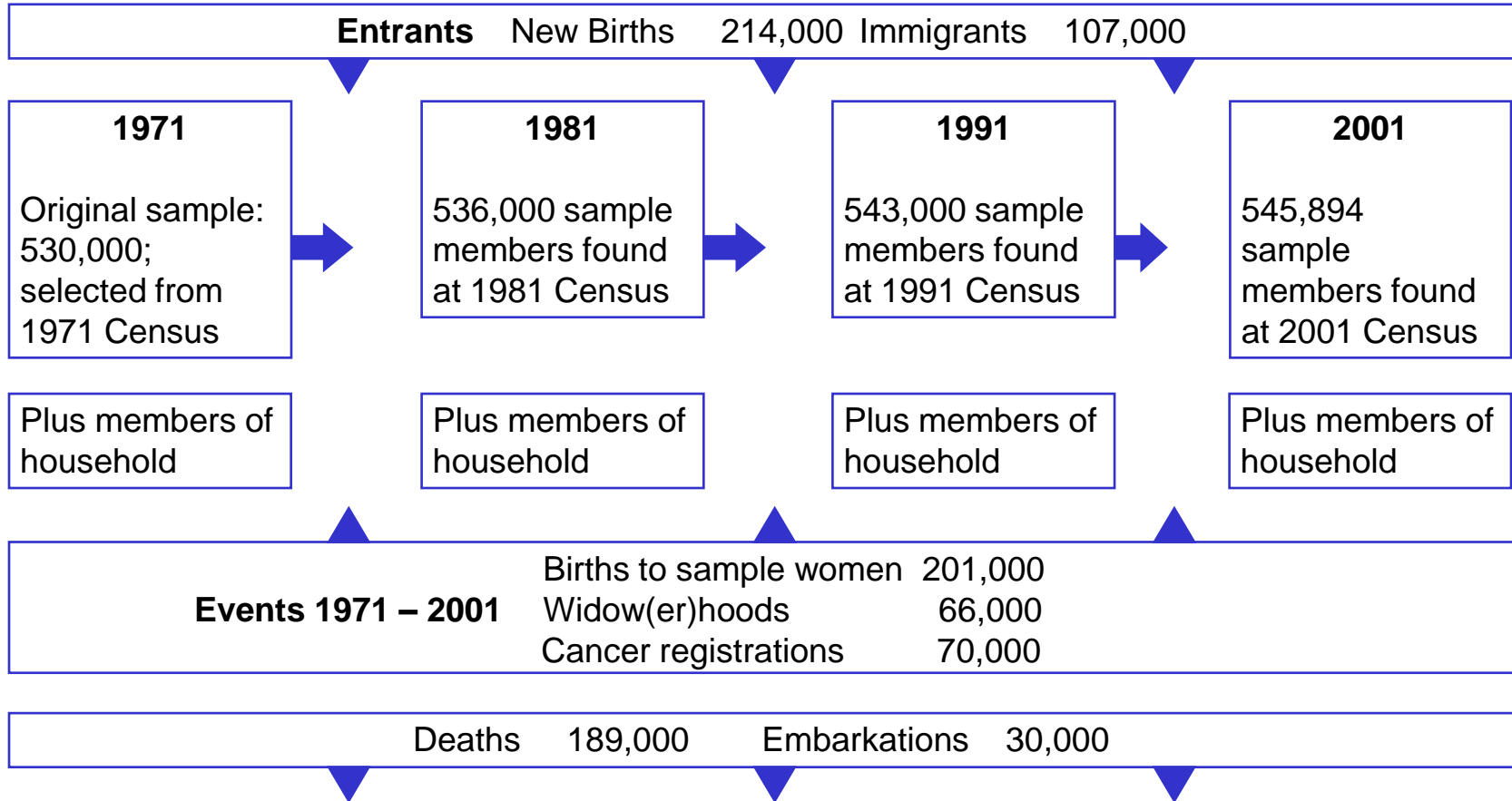
The ONS Longitudinal Study of England and Wales

- Census data for individuals with one of four birthdates enumerated at the 1971 Census (c. 1% of population).
 - Census data on other people in LS members' households
 - Maintained through addition of immigrants and new births with LS birth date.
 - Information from later censuses (1981, 91 & 2001) added.
 - Linked event data including death of the spouse of sample members, deaths of sample members, births to sample mothers and cancer registrations.
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Person Included from 1971 Census



Study Structure



Census Data in the LS (measured every ten years)

Marital status & family type

Housing and amenities

Migration & travel to work

Economic activity

Occupation & social class

Ecological (area level) data

Ethnicity (1991 & 2001)

Education (all levels 2001)

Religion (2001)

Caregiving (2001)

Self-rated health (2001)

Long-term illness (1991 & 2001)

Data for LS members and other members of their households

Event Data in the LS (added every year)

Deaths (cause specific) Widow(er)hoods

Cancer Registrations Live Births to Sample Mothers

Births of LS Members

Emigrations (recorded) Still Births to Sample Mothers

Immigrations

Infant Deaths to Sample Mothers

The ONS LS: Strengths

- ✓ Inclusion of data on other household members at each Census point.
 - ✓ Geographic and ecological data – users can specify geographies/link to look up tables.
 - ✓ Large nationally representative population – ability to look at population sub groups, e.g. regional populations; ethnic minority groups.
 - ✓ Intergenerational perspectives: e.g. examine 2001 adult characteristics of LS members who were children in 1971 by parental characteristics.
 - ✓ Inclusion of institutional population (usually omitted from surveys).
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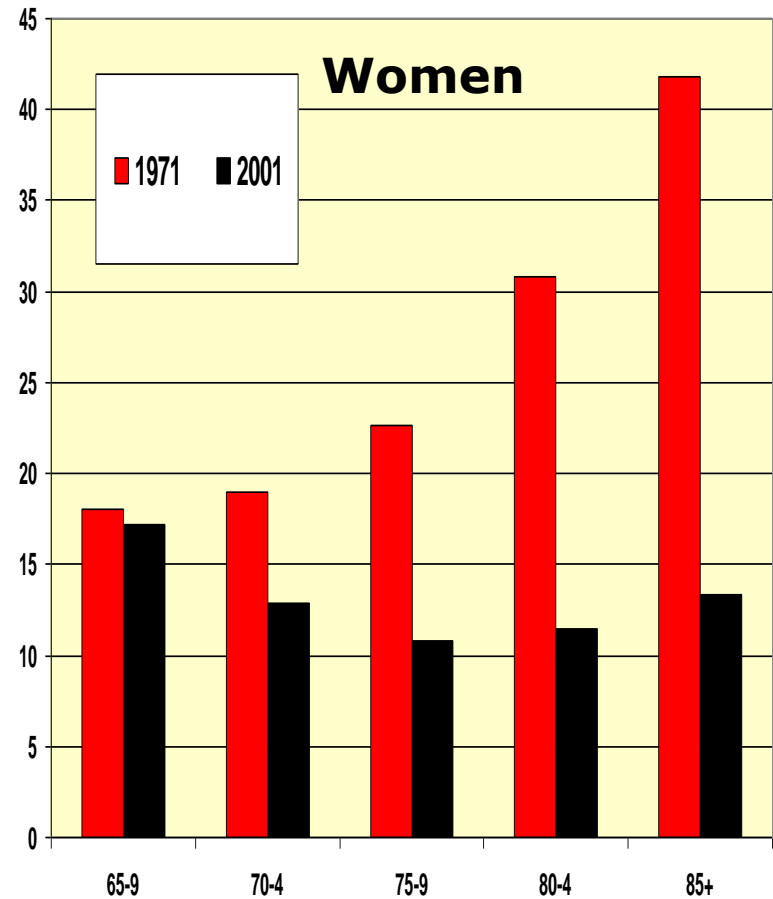
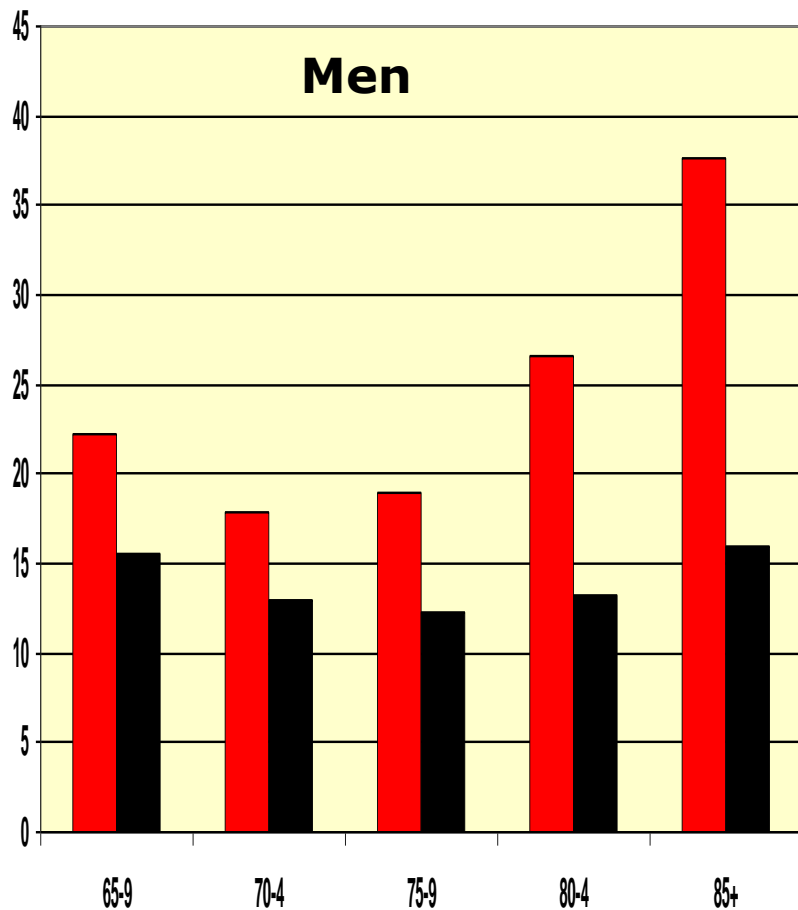
The ONS LS: Potential Designs

- Cross-sectional at census point: 1971, 1981, 1991 or 2001.
 - Change between censuses: investigating same people at two census points.
 - Cross-sequential: comparing two cohorts e.g. class mobility 1971 to 1991 with class mobility 1981 to 2001.
 - Census + events: mortality, fertility, cancer incidence and survival by census characteristics
 - Life course analysis: 35 years of follow-up of initial sample members.
 - Intergenerational: adult characteristics of members who were children in 1971 or 1981 by characteristics of their parents.
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Research example 1: Changes in living arrangements of older people

- Cross sectional comparison of 1971 and 2001
 - Cross sequential comparisons of changes 1971-81, 1981-91 and 1991-2001 (comparing three sets of longitudinal transitions)
 - Mortality rates associated with these changes
 - Longer life course perspective: transitions to live in institutions by parity (number of children born).
institutional households change over three decades
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Proportion (%) of elderly men and women living in households with two or more generations, England and Wales, 1971 and 2001 (private household population).



Source: Analysis of ONS LS data.

Methods and design

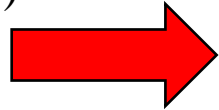
- Cross sequential analyses of data from the ONS Longitudinal Study of England & Wales comparing 1971-81, 1981-91 and 1991-2001.
 - Analyses of changes in proportions moving from private to institutional household between beginning and end of each decade using logistic regression models.
 - Analyses of changes in household type between beginning and end of each decade using multinomial logistic regression models.
 - Analysis of mortality 1981-5; 91-95; and 2001-05 by household type at start and end of relevant decade using Poisson regression.
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Design of analysis

1971

65+ (birth year LE 1906)

HOUSEHOLD TYPE



1981

75+ (birth year LE 1906)

HOUSEHOLD TYPE

1981-85

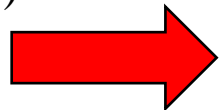
MORTALITY



1981

65+ (birth year LE 1916)

HOUSEHOLD TYPE



1991

75+ (birth year LE 1916)

HOUSEHOLD TYPE

1991-95

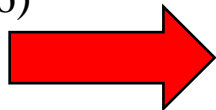
MORTALITY



1991

65+ (birth year LE 1926)

HOUSEHOLD TYPE



2001

75+ (birth year LE 1926)

HOUSEHOLD TYPE

2001-05

MORTALITY



Definitions & variables used in analysis:

Household: co resident group with shared living space and/or shared housekeeping

Family: co-resident couple +/- never-married child(ren); lone parent with never-married child(ren); grandparent with never married grandchild if no intervening generation present

Institution: nursing or residential home or similar where meals are provided communally .
Temporary residents/visitors excluded.

Variables:

Start of decade

Household/family type

- Solitary
- Couple alone
- Other family (couple + child/others; /lone parent +/- others)
- Complex (lives with others but not in a family; in two family household).

Other

Age (single years); gender

- Housing tenure (owner v. non-owner)

End of decade:

Household/family type

- Solitary/couple alone
- Other family/complex*
- Institution

Others

- Marital status
- Limiting long-term illness (not 1981)

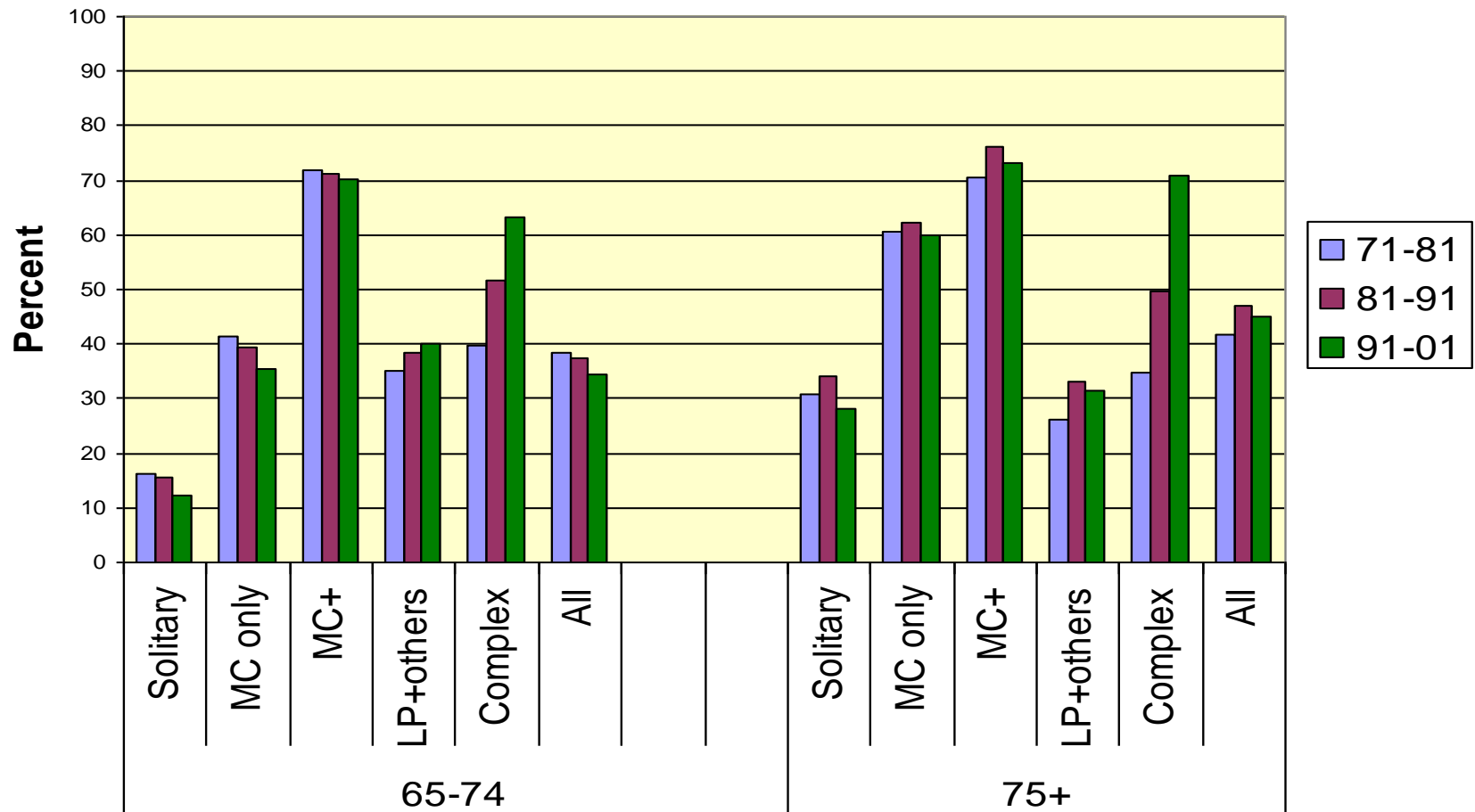
*distinguished in mortality analysis.

Distribution of 1971-81, 1981-91 and 1991-2001 samples by socio-demographic characteristics.

	1971-81		1981-91		1991-2001	
	M	F	M	F	M	F
Mean age ¹ (SD)	69.54 (4.14)	70.56 (4.72)	69.98 (4.30)	71.16 (4.95)	70.00 (4.38)	71.17 (5.04)
Home owner ¹ (%)	58.36	52.73	61.31	56.04	72.61	65.81
Tenant ¹ (%)	41.64	47.27	38.69	43.96	27.39	34.19
Married ²	61.21	20.22	63.84	23.79	63.62	25.90
Never-married ²	6.12	13.01	5.37	10.05	5.49	6.98
Wid./div ²	32.67	66.77	30.79	66.16	30.88	67.12
N	8,482	17,259	10,971	20,978	13,587	23,107

¹ Start of decade; ² end of decade.

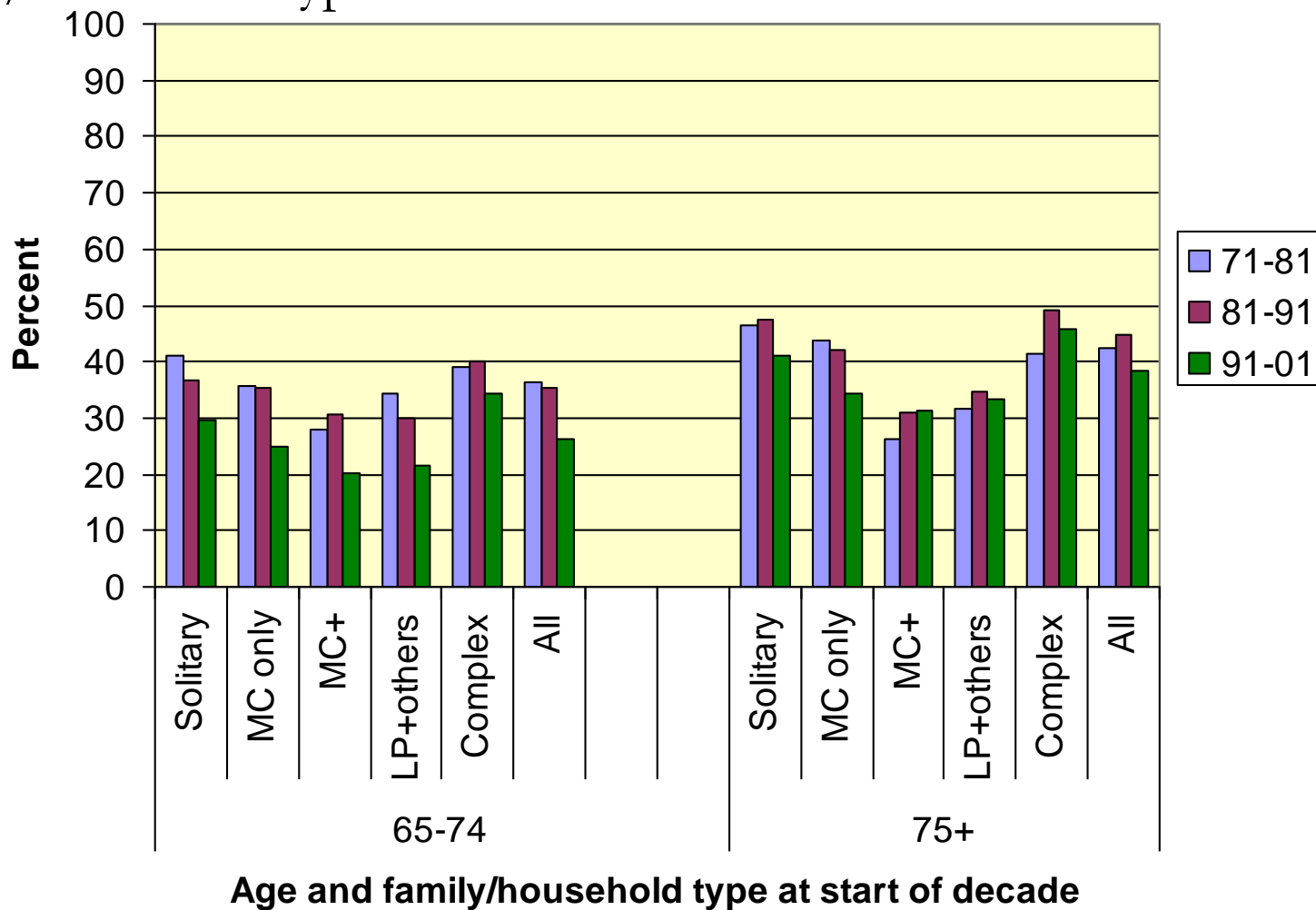
Proportion (%) of people aged 65 and over who changed family/household type between censuses; 1971-81; 1981-91; 1991-2001 by age and family/household type at start of decade



Age and family/household type at start of decade

Source: ONS LS data, author's analysis (earlier decades from Glaser & Grundy 1998)

Proportion (%) of people aged 65 and over who moved home between censuses; 1971-81; 1981-91; 1991-2001 by age and family/household type at start of decade

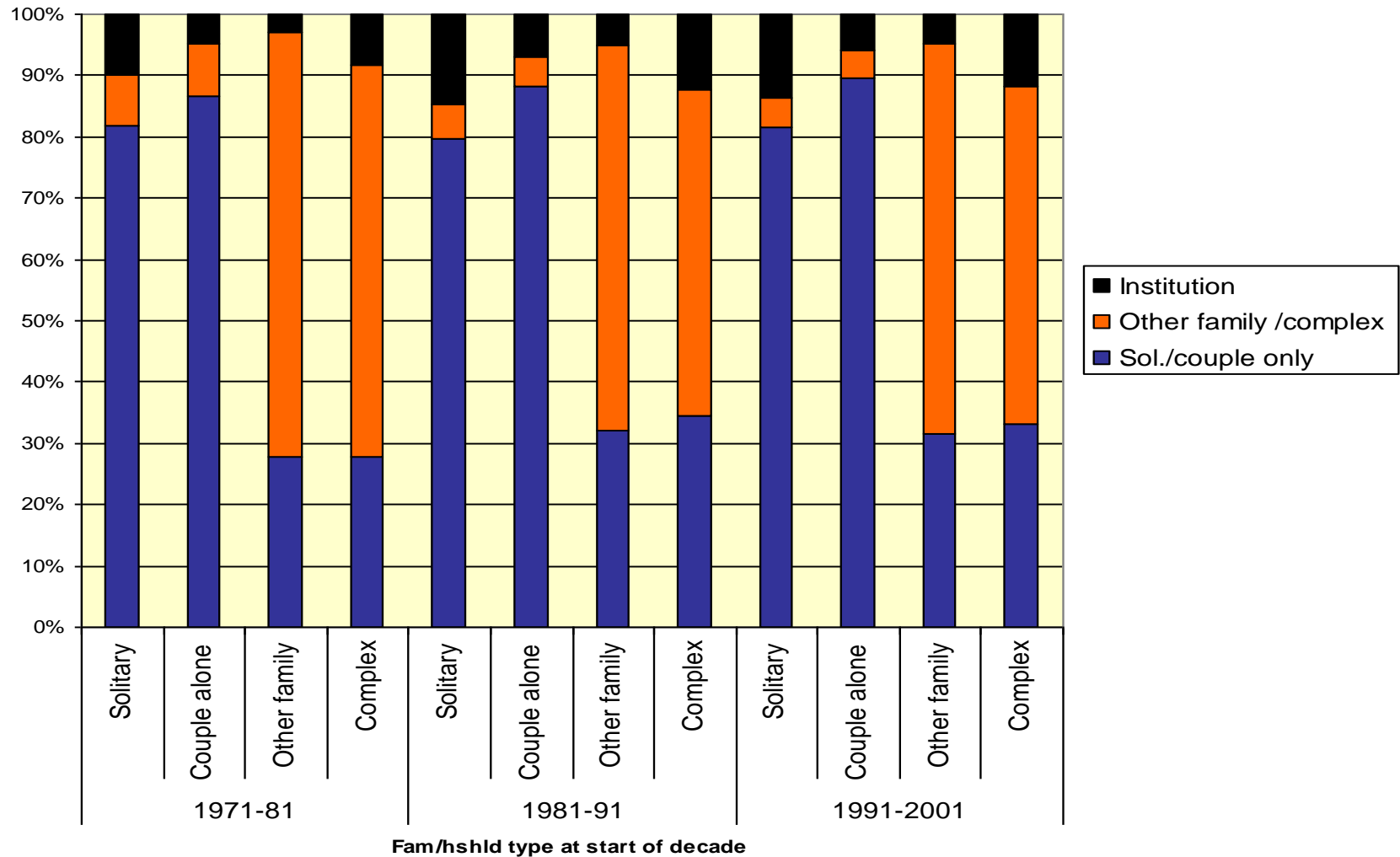


Source: ONS LS data, author's analysis (earlier decades from Glaser & Grundy 1998)

Changes in family/household type and residential mobility: results from LS analysis

- Around 40% of older people at each census considered were in a different family/household type than at preceding census (life-course change). Among those living alone or just with a spouse proportion of transitions tended to decrease or remain stable per decade (time period comparison); reverse the case for those in complex households or lone parent families. More change in older age groups.
 - Around 40% of older people at each census considered had moved home since the preceding census. Those initially in lone parent families or with spouse and others were the least likely to move. Lower proportions moved 1991-2001 than in preceding decades.
 - Around 15% of younger elderly people (65-74 at start) and 25% of older old (75+) had both changed family/household type and moved location.
 - Around 40-50% changed neither location nor family/household type – this proportion was highest in the most recent decade (1991-2001).
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Distribution of female samples by family/household type at start of end of decade, 1971-81, 1981-91, 1991-2001.



Variables used in analysis:

Start of decade

Household/family type

- Solitary
- Couple alone
- Other family (couple + child/others;/lone parent)
- Complex.

Others

Age (single years); gender

- Housing tenure (owner v. non-owner)

End of decade:

Household/family type

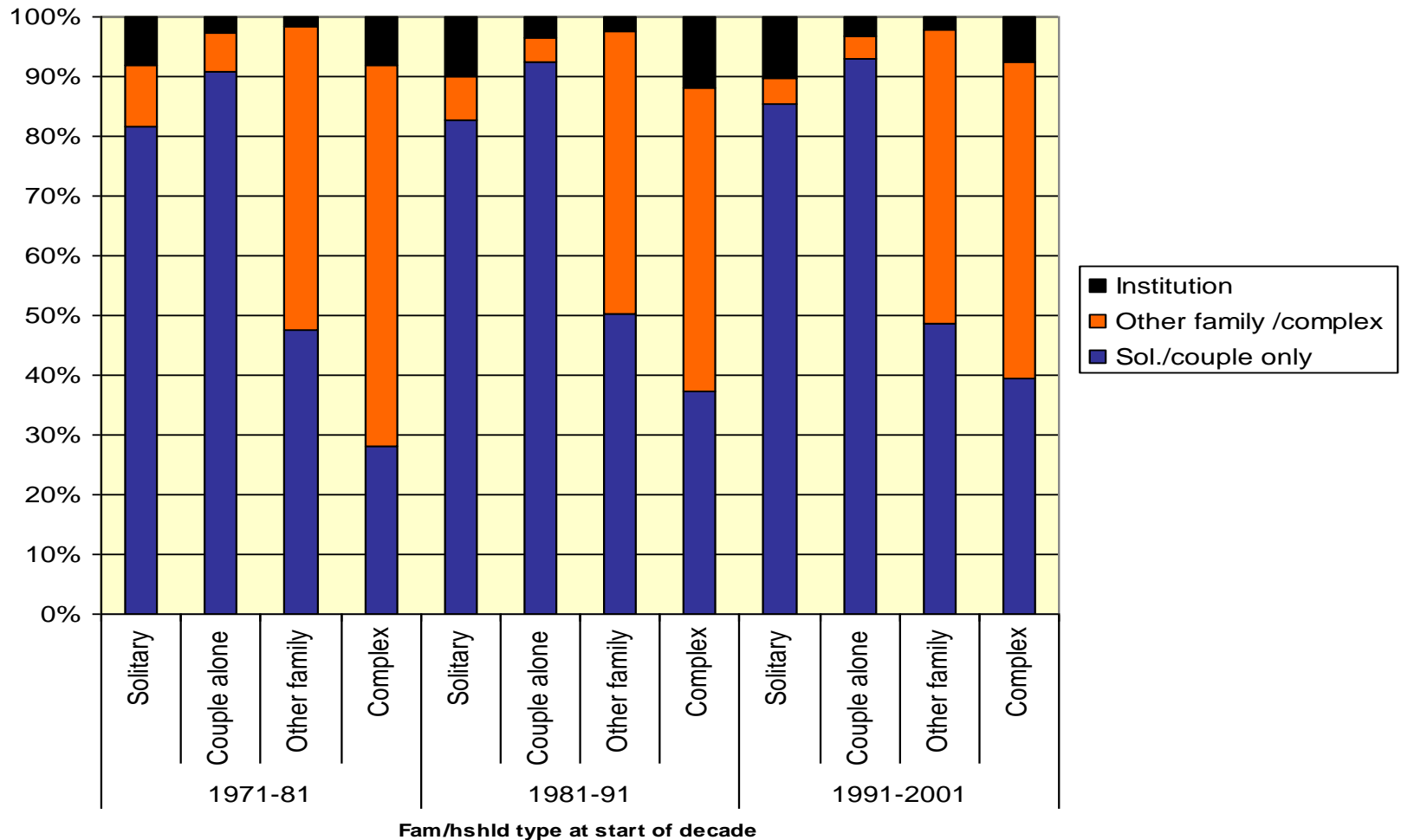
- Solitary/couple alone
- Other family/complex*
- Institution

Others

- Marital status
- Limiting long-term illness (not 1981)

*distinguished in mortality analysis.

Distribution of male samples by family/household type at start of end of decade, 1971-81, 1981-91, 1991-2001.



Objective 2). Results from multinomial regression models of transitions between household/family types 1971-81; 1981-91 and 1991-2001, men.

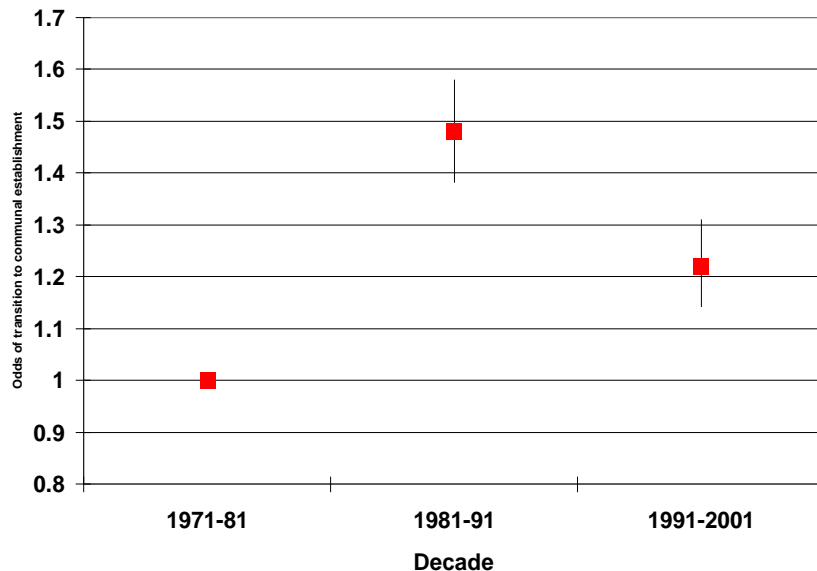
Men	Institution vs. solitary/couple only	Institution vs. Family/complex	Family/complex vs. solitary/couple only
Age	1.16***	1.10***	1.05***
Solitary (ref.)	1.00	1.00	1.00
Couple alone	0.94	0.80*	1.18*
Other family	1.47***	0.05***	27.02***
Complex	3.72***	0.14***	26.24***
Tenant (ref. owner)	1.44***	1.63***	0.88**
Married (ref.)	1.00	1.00	1.00
Never-married	5.86***	2.53***	2.32***
Wid./divorced	4.75***	1.73***	2.74***
1971-81	0.79**	0.57***	1.38***
1981-91 (Ref.)	1.00	1.00	1.00
1991-2001	0.84**	0.90	0.94
N	32,915		

Results from multinomial regression models of transitions between household/family types 1971-81; 1981-91 and 1991-2001, women.

Women	Institution vs. solitary/couple only	Institution vs. family/complex	Family/complex vs. solitary/couple only
Age	1.18***	1.12***	1.06***
Solitary (ref.)	1.00	1.00	1.00
Couple alone	1.07	0.79***	1.34***
Other family	1.96***	0.05***	42.30***
Complex	2.49***	0.10***	25.88***
Tenant (ref. owner)	1.20***	1.41***	0.85***
Married (ref.)	1.00	1.00	1.00
Never-married	4.58***	2.03***	2.28***
Wid./divorced	3.29***	1.27***	2.59***
1971-81	0.75***	0.51***	1.48***
1981-91 (Ref.)	1.00	1.00	1.00
1991-2001	0.78***	0.87**	0.90**
N	61,237		

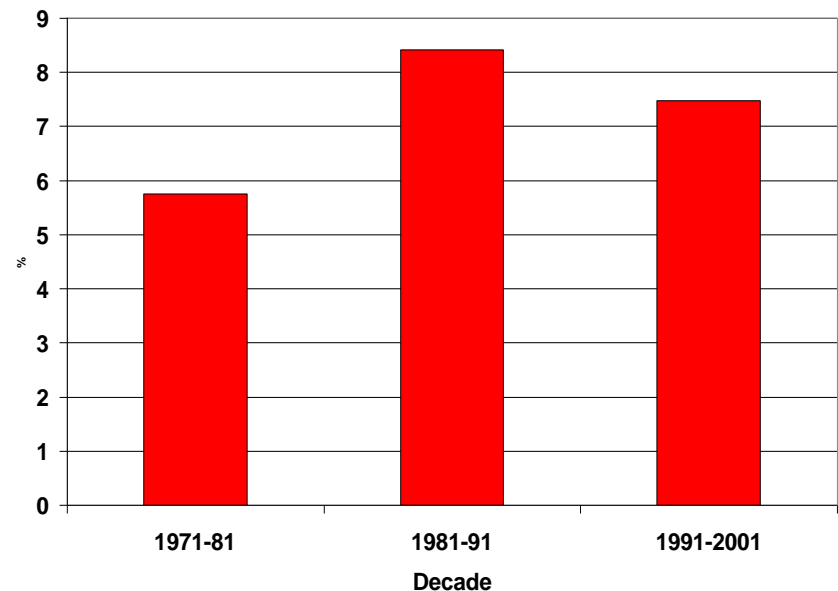
% aged 65+ who moved from private household to communal establishment between censuses, by decade.

Odds ratios



(Controlling for age, sex, marital status & housing tenure)

%



Objective 3). Results from Poisson regression analysis of mortality post decade end

	1981-85		1991-95		2001-05	
	M	F	M	F	M	F
Age	1.04***	1.04***	1.03***	1.04***	1.08***	1.09***
Tenant	1.04	1.04	1.08**	1.04	1.25***	1.20***
<i>Household type at start of decade</i>						
Couple alone	1.04	0.99	1.02	0.97	0.98	1.03
Other family	1.04	0.93	0.97	0.96	1.00	0.99
Complex	1.02	0.98	0.98	1.01	0.94	1.03
<i>Household type at end of decade</i>						
Family/complex	1.08	1.15***	1.07	1.10**	1.10	1.25***
Institution	1.91***	1.85***	2.19***	1.97***	2.80***	2.85***
Marital status						
Single	1.04	0.98	1.00		1.00	1.04
Widowed/divorced	1.10**	0.99	1.02		1.34**	1.08*
Number of deaths	1162	1596	1230	1705	1204	1641

***P<.0001, ** P<.001, * P<.05

Results:

- **Transitions from private to non-private households (institutions)** The risk of making a transition from a private to a non-private household was much higher in the 1981-91 decade than in 1971-81; in 1991-2001 it fell but was still higher than in the first decade – reflection of policy changes?
- Higher risks of transitions to institutions were associated with long term illness; older age; being unmarried (especially never-married); not owning a home; being female.
- **Mortality:** Those in institutions higher mortality than those living with family – not equivalent groups in terms of health status. Excess mortality of institutional population higher 2001-05 than previous decades – suggests effect of stricter prior assessment.
- **Multinomial results: Relative to 1981-91:**
- In **1971-81** lower risks of transition to an institution, especially versus family/complex; higher risk of family v. solitary/couple alone.
- In **1991-2001** lower risks transition to institution or to family/complex – i.e. greater chance living alone or in couple only.
- Tenants: higher risk institution v family/complex; being in family/complex start of decade higher chance of same arrangement end of decade.

Life course analysis: marital and fertility histories and later life mortality

Associations between marital history of men and women aged 60-79 in 1991 and their mortality 1991-2000 and presence of long-term illness in 1991 and 2001.

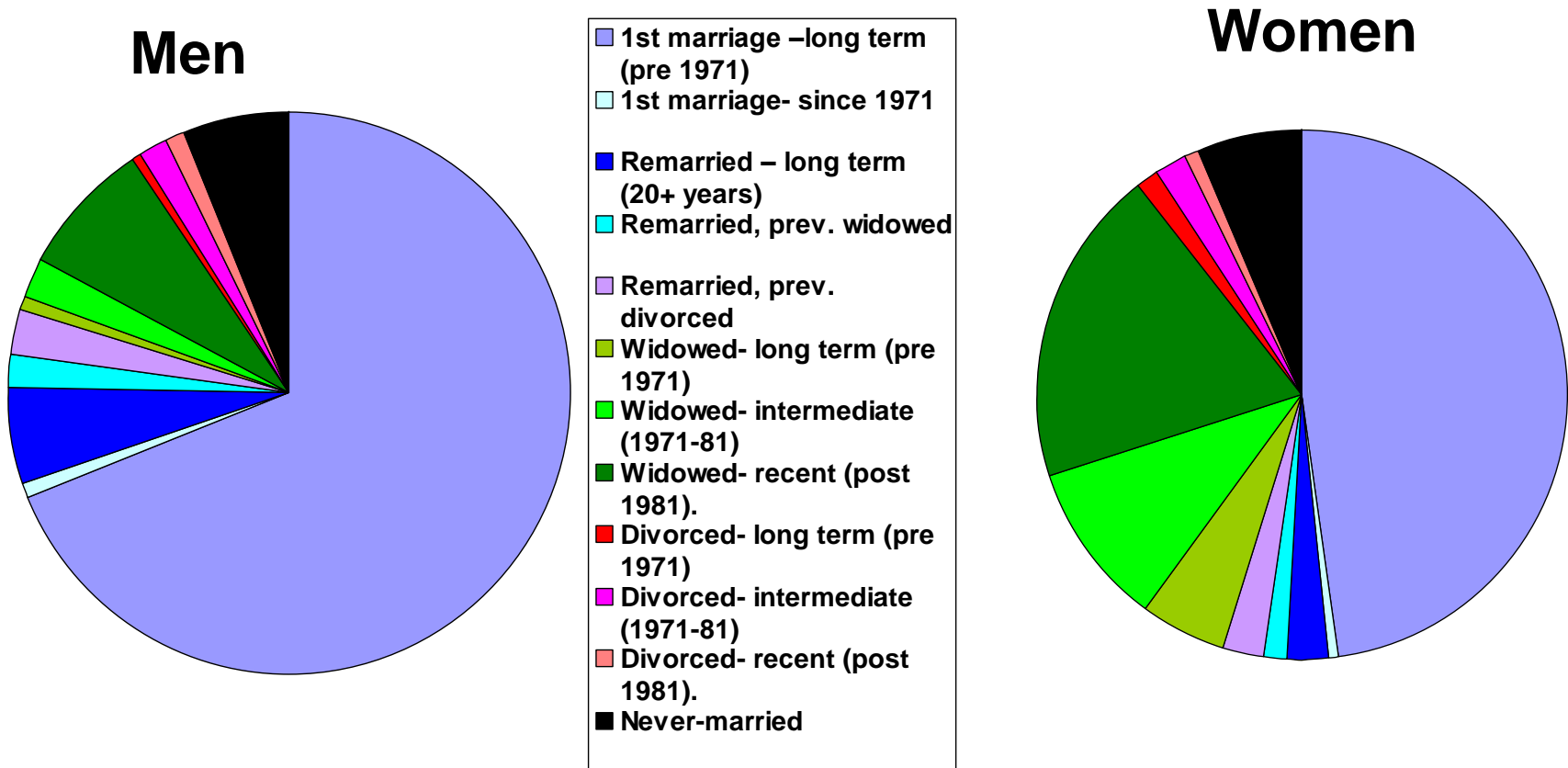
Associations between fertility histories of women born 1911-1940 and (1) mortality after age 50 and (2) presence of limiting long term illness in 2001

Data source: The Office for National Statistics Longitudinal Study (LS) of England and Wales.

Derivation of marital and fertility histories from census and event data included in the ONS Longitudinal Study

- Marital status at census. All except 1971 distinguish remarried from those in first marriage – but we can assume those in a first marriage in 1981 and married in 1971 were then in first marriage; comparisons of spousal characteristics from household roster information to check same spouse
 - Event data on widow(er)hoods from linked vital registration records on deaths of spouses; no registration data on marriage or divorce
 - Assume people who change from first marriage to remarriage without intervening widowhood experienced divorce.
 - Judgement used on recoding of small proportion of inconsistent histories, e.g. people recording themselves as never-married but married in an earlier census recoded as divorced; people recording themselves as in first marriage but remarried/divorced/widowed in an earlier census recoded as remarried.
 - Fertility history data from women comes from fertility history collected in the 1971 Census from women who were then ever-married and aged 16-49 together with information from linkage of subsequent births. excludes pre 1971 non marital births (c.4%).
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Distribution of men and women aged 60-79 in 1991 by marital history



Male mortality 1991-2001, men aged 60-79 in 1991 (rate ratios)

<i>Marital history at 1991</i>	Model 1	Model 1
Age	1.10***	1.10***
Long term first marriage	1.00	1.00
First marriage since 1971	0.82	0.81
Long term remarriage	1.11**	1.13**
Remarried, previously widowed	0.92	0.93
Remarried, previously divorced	1.05	1.03
Long-term widow (20+ years)	1.49***	1.34***
Widow (10-19 years)	1.46***	1.36***
Widow (<10 years)	1.29***	1.20***
Long-term divorced (20+ years)	1.24*	1.11
Divorced (10-19 years)	1.43***	1.30***
Divorced (<10 years)	1.23*	1.15
Never-married	1.38***	1.22***
Tenure/car score 1971-91		0.95***
Educational qual. (ref. none)		0.91***
Social class score		0.96***
Number of deaths	13,296	

Female mortality 1991-2001, women aged 60-79 in 1991, (Rate ratios)

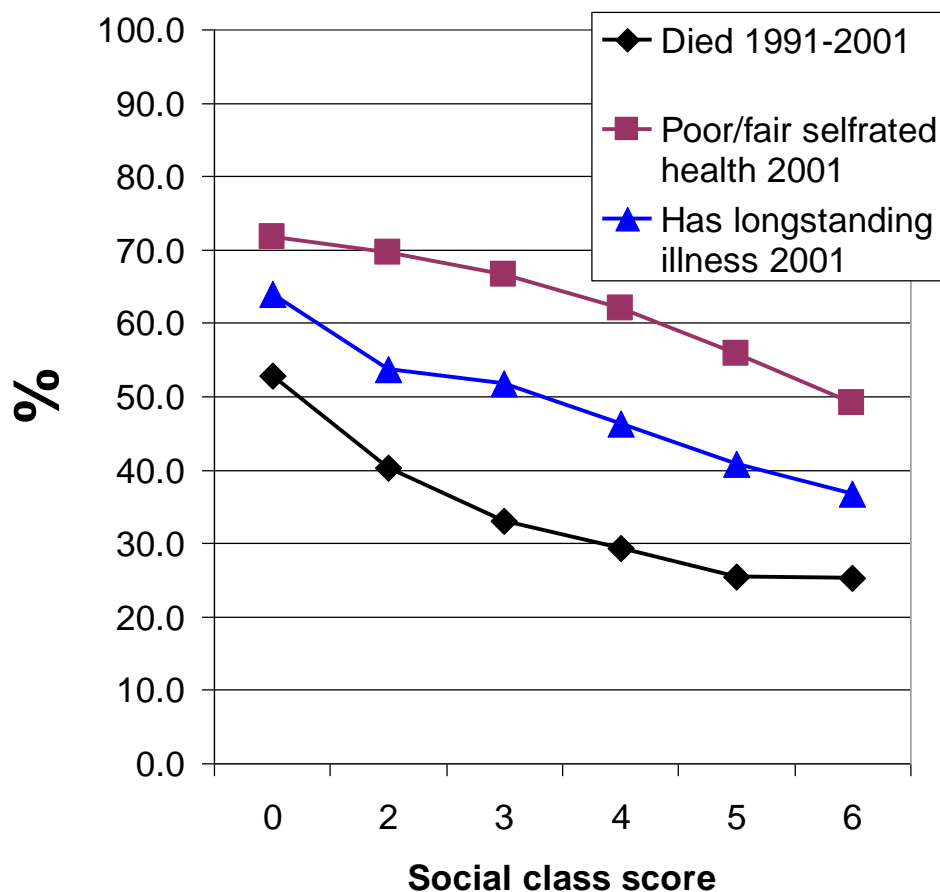
Marital history at 1991	Model 1	Model 2
Age	1.10***	1.10***
Long term first marriage	1.00	1.00
First marriage since 1971	1.24	1.23
Long term remarriage	1.09	1.08
Remarried, previously widowed	1.03	1.00
Remarried, previously divorced	1.21**	1.16*
Long-term widow (20+ years)	1.21***	1.10*
Widow (10-19 years)	1.19***	1.09**
Widow (<10 years)	1.19***	1.12**
Long-term divorced (20+ years)	1.38***	1.23**
Divorced (10-19 years)	1.26***	1.13
Divorced (<10 years)	1.61***	1.47***
Never-married	1.18***	1.12**
Tenure/car score		0.95***
Educational qual. (ref. none)		0.84***
Number of deaths	12,254	

Mortality at age 50+ by birth cohort and fertility history

(controlling for age, marital status & socio-economic status)

	1911-1920	1921-1930	1931-1940
ALL WOMEN: Parity	<i>Odds Ratio</i>	<i>Odds Ratio</i>	<i>Odds Ratio</i>
0	1.13	1.22	1.28
1	1.06	1.04	1.10
2 (ref)	1.00	1.00	1.00
3	1.01	0.99	1.01
4	1.05	1.01	1.11
5+	1.14	1.12	1.25
PAROUS WOMEN			
Had a child before 20	1.15	1.15	1.30
Had a child after 39	0.93	0.89	0.94
Had a birth interval < 18 months	1.19	1.00	1.08
Had twins	1.13	1.13	1.19
Number of deaths	<i>18495</i>	<i>8622</i>	<i>2212</i>
% dead between age 50 and end 2000	<i>60.4</i>	<i>28.3</i>	<i>8.4</i>

Associations between social class score 1971-81 and outcome variables among men aged 30-64 in 1971



- Social class score based on information about occupation and employment status at the 1971 and 1981 Censuses.
- Ranges from 0 (low) – not in work at either Census – to 6 (high) in a professional or managerial job at both Censuses

Summary of results

		Men			Women		
		Mortality	LLTI 91	LLTI 2001	Mortality	LLTI 91	LLTI 2001
First marriage since 1971			--				
Long term remarriage		++	+++	+		+++	++
RM prev. wid.							
RM prev. div.					+	+	++
Long-term widow		+++			+	(+++)	(++)
Intermediate widow		+++	+	+	++	(++)	(++)
Recent widow		+++	+	+	++	(+)	(++)
Long-term divorced		(+)	(+)		++	(+++)	
Intermediate divorced		+++	+++	+		(+++)	(++)
Recent divorced		(+)	+++		+++	++	(++)
Never-married		+++	(+++)		++	(++)	--
		() Not significant when SES controlled					

Conclusions and Discussion

- Results show the expected advantages in terms of mortality and health for those in long term first marriages.
 - Worse health/mortality for those in long-term remarriages (selection effect? – these are people divorced or widowed and remarried before age 40-59).
 - Higher mortality for unmarried groups; however differences *among* divorced and widowed by timing of divorce/widowhood inconsistent and generally not significant – more detailed breakdown of timing might reveal more.
 - Health disadvantages of unmarried women (apart from recent divorced) no longer significant once SES controlled and never-married women had *less* risk of LLTI in 2001. Unmarried men generally had worse health in 1991, but in 2001 this was only evident for those widowed since 1971 and those divorced 1971-91.
 - (Need to include mortality of survival to 1991)
 - Higher mortality and worse health among nulliparous and high parity women, even after allowance for marital history & SES.
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Research Use of LS

- 600+ publications.
 - Important policy impact.
 - Recently/currently used in academic studies of:
 - Ageing-Caregiving- Cancer incidence and survival- Cohabitation –Employment – Ethnicity- Fertility- Health - Households & household change- Marriage-Migration- Mortality- Social mobility.....
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On-line Resources

- Searchable database of publications.
- Information about current and past projects.
- Interactive training modules.
- Online Data Dictionary.
- Guide to using LS and applying for data.
- Links to other documentation & information.
- Downloadable mini data sets and tables

www.celsius.lshtm.ac.uk
