Estimated Survival and Additional Years of Life Expected among Registrants to the Residential Institutions Redress Board (RIRB)

A REPORT COMMISSIONED BY CARANUA

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Introduction

This report arises from a commission by Caranua, an independent Irish state body for survivors of institutional abuse, "... *to estimate the current likely size of a population, given that some (members) will have passed away. The population in question are those who, as children experienced abuse in institutions managed by religious congregations and who have received awards of compensation through the Residential Institutions Redress Board."*

The Residential Institutions Redress Board (RIRB) was set up in 2002 under the Residential Institutions Redress Act (www.**acts**.ie/en.**act**.**2002**.0013.1.html) to to make fair and reasonable awards to persons who, as children, were abused while resident in industrial schools, reformatories and other institutions subject to state regulation or inspection.

The rationale for this commission, set out in the initial representation, was as follows: *"Caranua is responsible for responding to applications from this population (by providing payment for services in the areas of health, housing and education) and we would like to be able to project the likely size of the population so that we can set targets".*

Methods

UCD-CSTAR engaged with face-to face meetings with representatives of Caranua, and subsequently by email as clarifications to the data were required.

Data on the population, available to Caranua, were provided to CSTAR in the form of an Excel file. Individual-level data items provided included: date of birth, gender and current country of residence for a total of 14,840 registrants to the Residential Institutions Redress Board (RIRB).

In order to estimate the likely current size of the population in question the following information was required:

(a) knowledge of the last date on which each member of the cohort was known to be alive;
(b) age and gender-specific probabilities of survival relevant to the cohort;
(c) the period of follow up of interest.

With this information it would be possible to:

(d) apply the unique age and gender-specific probability of survival to each member of the cohort, over the period of follow up;
(e) compute the likely number at each age who survived the period of follow up; and
(f) compute the number in 5-year age groups and overall likely to have survived the period of follow up.

(a) <u>Knowledge of the 'date last known alive'</u>

Data available to Caranua on this cohort included date of birth, gender and country of residence. What was not known for sure was when they were last known alive. Possibilities explored to establish this included:

- the likely age at which residents may have left institutions. However, this was speculative, inconsistent and not individualized, and therefore, could not be used as a proxy for 'date last known alive';
- years in which institutions closed. However, this was also inconsistent, in that not all institutions closed at the same time and not all residents left at the time of closure (some before). Therefore, this could not be used as a proxy for individuals of 'date last known alive';
- registration with the RIRB. This was regarded as the most appropriate proxy estimate of 'date last known alive' in that applicants for awards were required to register with RIRB before 31 December 2005 (personal communicaton from Caranua). As RIRB was established early in 2002, it can safely be assumed that all registrants were alive at 31 December 2001. **This is the index date ('date last known alive') from which forward projections of survival of the cohort have been made.**

(b) Relevant Age & Gender-specific Probabilities of Survival

The probability of surviving another year for each year of age and gender may be derived from census data (annual registrations of births and deaths, including age at death) and published by the Central Statistics Office after each census year as the Irish Life Tables (www.cso.ie). The relevant Irish Life Tables for estimating survival in this cohort from a known (common) date last known alive, are those published after the 2002 census (Irish Life Tables No. 14 2001-2003-Central Statistics Office).

(c) Period of Follow Up of Interest

The period of 'follow up' of interest for this cohort was up to 31 December 2015 (i.e. 14 years from 31 December 2001)

Estimating the likely size of the Cohort at December 2015

Data provided by Caranua on 14,840 individuals were imported into the Statistical Package for the Social Sciences (SPSS), version 20 for analysis. Those for whom gender was unknown (n=3) were included as females. Age at 31 December 2001 was computed for each individual based on date of birth (provided). Using the Irish Life Tables estimates of annual survival from 2002 for each year of age and gender, the probability of survival over a 14-year period for each individual was computed and applied to the number of persons in the Caranua cohort in that age group, to derive the number likely to have survived to end December 2015.

Data were compiled into 5-year age intervals by gender for ease of presentation. Two sets of age and gender-specific data are available, i.e. the number known living at 31 December 2001 and the number estimated living at 31 December 2015 (based on the above). Results are presented separately for males and females (Males: Table 1 & Figure 1; Females: Table 2 and Figure 2).

Table 1: Distribution of Male RIRB* Registrants by 5-year Age Group, known living at 31 December 2001 and estimated living at 31 December 2015

Age Group	N in 2001	(%)	N in 2015	(%)
< 15	9	(0.1)		
15 - 19	91	(1.0)		
20 - 24	250	(2.8)	1	(0.0)
25 - 29	384	(4.3)	12	(0.2)
30 - 34	476	(5.3)	100	(1.4)
35 - 39	631	(7.1)	273	(3.8)
40 - 44	867	(9.7)	376	(5.3)
45 - 49	1,271	(14.3)	475	(6.7)
50 - 54	1,401	(15.7)	629	(8.9)
55 - 59	1,233	(13.8)	853	(12.0)
60 - 64	951	(10.7)	1,165	(16.4)
65 - 69	780	(8.7)	1,200	(16.9)
70 - 74	398	(4.5)	917	(12.9)
75 - 79	139	(1.6)	599	(8.4)
80 - 84	29	(0.3)	348	(4.9)
85 - 89	10	(0.1)	103	(1.5)
90 - 94			26	(0.4)
95 - 99			9	(0.1)
100+			6	(0.1)
TOTAL	**8,920**	**(100)**	**7,092**	**(100)**

Fig 1: Distribution of Male RIRB* Registrants by 5-year Age Group, known living at December 2001 (n=8,920) and estimated living at December 2015 (n=7,092)

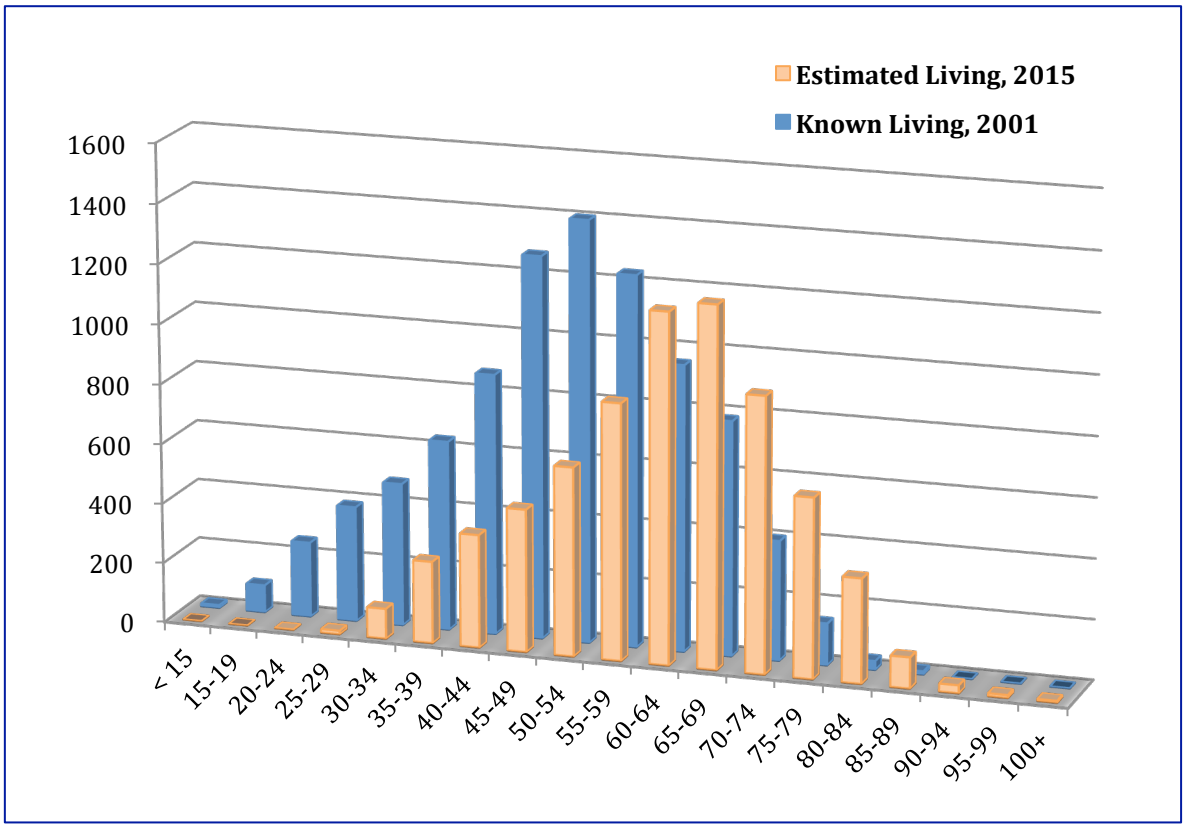
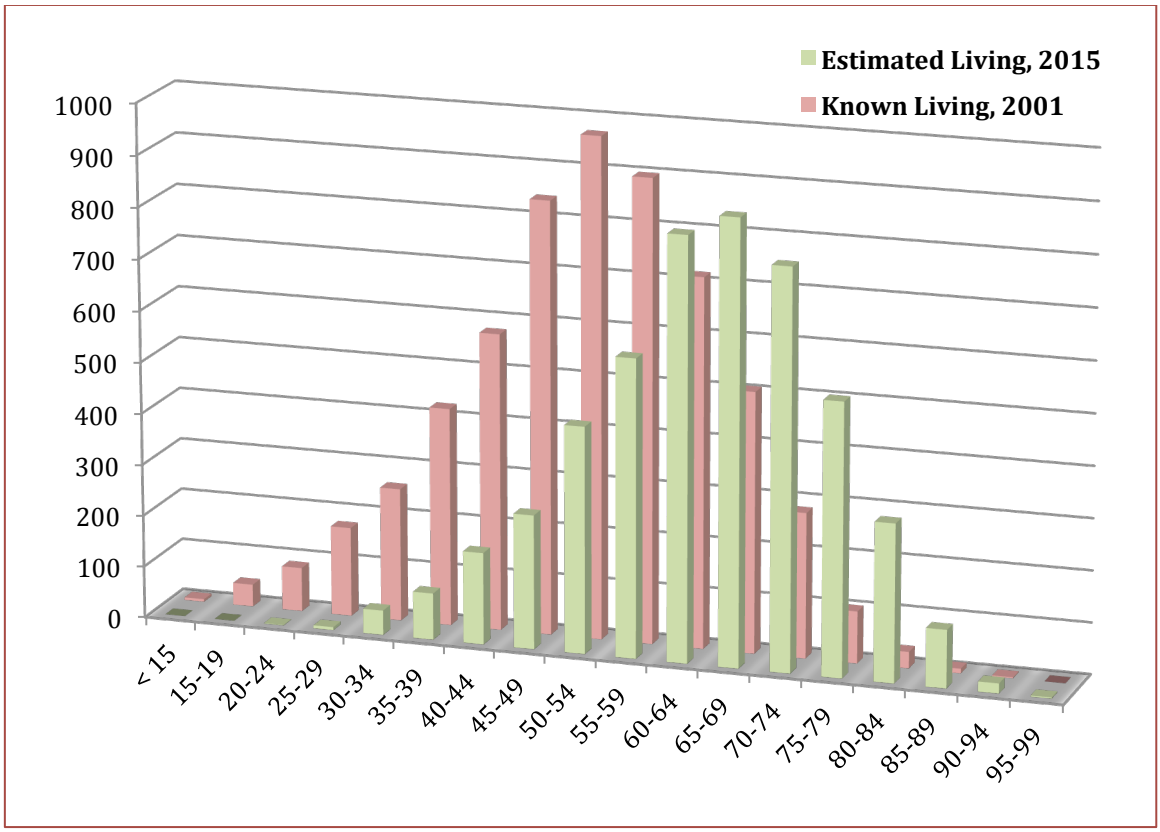


Table 2: Distribution of Female RIRB* Registrants by 5-year Age Group, known living at 31 December 2001 and estimated living at 31 December 2015

Age Group	N in 2001	(%)	N in 2015	(%)
< 15	5	(0.1)		
15 - 19	43	(0.7)		
20 - 24	85	(1.4)	1	(0.0)
25 - 29	173	(2.9)	6	(0.1)
30 - 34	258	(4.4)	48	(0.9)
35 - 39	423	(7.1)	91	(1.8)
40 - 44	576	(9.7)	178	(3.5)
45 - 49	840	(14.2)	260	(5.2)
50 - 54	970	(16.4)	440	(8.7)
55 - 59	898	(15.2)	579	(11.5)
60 - 64	717	(12.1)	821	(16.3)
65 - 69	506	(8.5)	861	(17.1)
70 - 74	282	(4.8)	777	(15.4)
75 - 79	101	(1.7)	530	(10.5)
80 - 84	32	(0.5)	307	(6.1)
85 - 89	9	(0.2)	113	(2.2)
90 - 94	2	(0.0)	20	(0.4)
95 - 99	0		2	(0.0)
TOTAL	**5,920**	**(100)**	**5,033**	**(100)**

Fig 2: Distribution of Female RIRB* Registrants by 5-year Age Group, known living December 2001 (n=5,920) and estimated living at December 2015 (n=5,033)



Tables and Figures 1 and 2 clearly show the 14-year shift in the age distribution of registrants from 2001 to 2015, as well as demonstrating the change in overall cohort numbers in the time period:

- of a total of 8,920 males known alive at December 2001, an estimated 1,828 (20.5%) would have died in the ensuing 14 years, resulting in an estimated 7,092 living at end December 2015;
- of at total of 5,920 females known alive at December 2001, an estimated 887 (15%) would have died in the ensuing 14 years, resulting in an estimated 5,033 living at endDecember 2015.

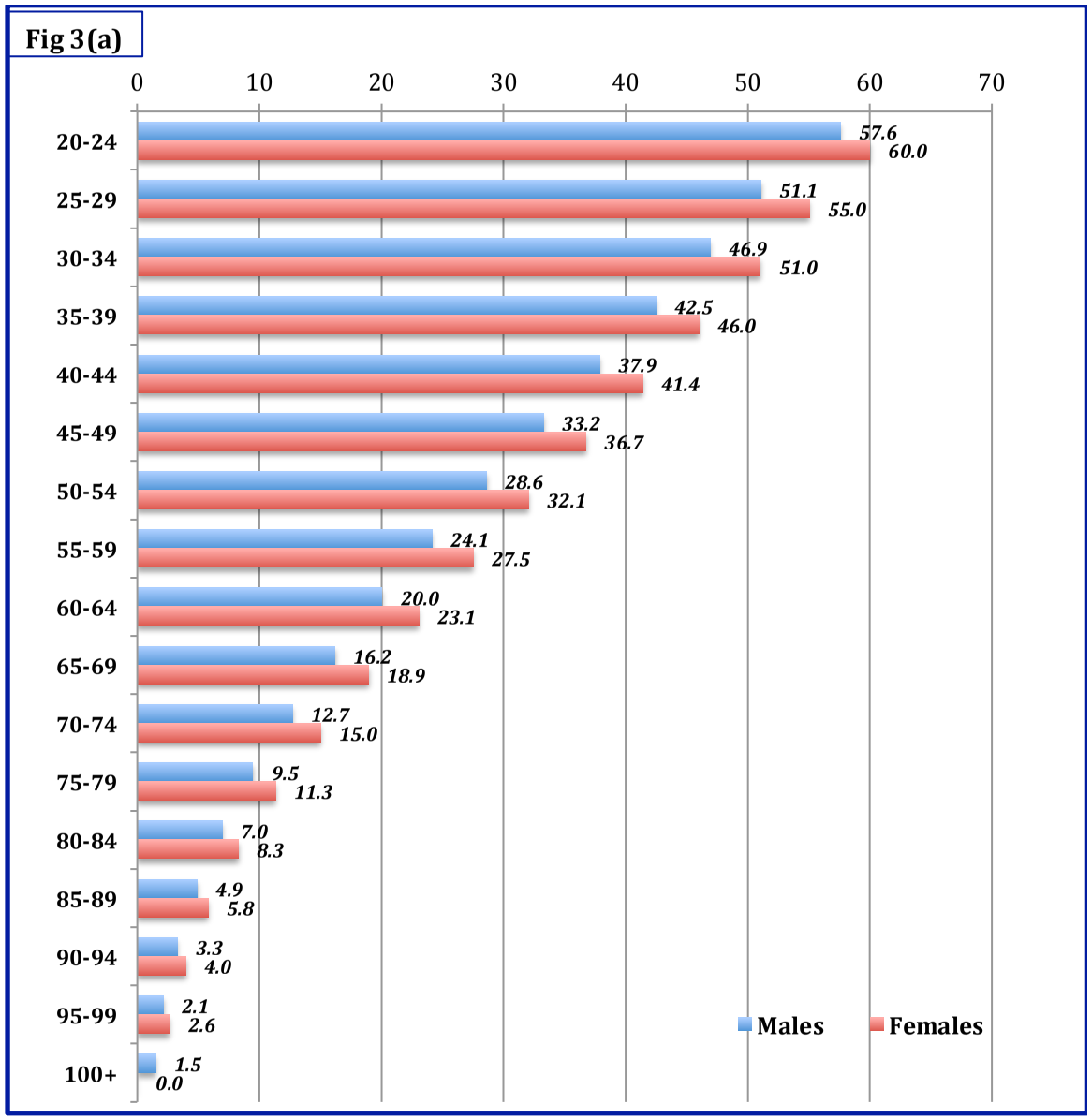
Estimating the Additional Years of Life expected for this Cohort

Having estimated the likely size and age/gender structure of the cohort at end December 2015, it is possible to estimate the additional years of life expected for those who have survived to that point. This may be useful in terms of planning future services or supports required.

In addition to calculating probability of survival, the Irish Life Tables provide estimates of the number of additional years of life expected at each year of age. The most recent estimates for Ireland are based on the 2011 Census of Ireland. Based on the assumption that there will have been negligible change in life expectancy at any age since 2011, and that the next census will take place in April 2016, the estimates from 2011 were applied to the profile of the cohort estimated to be living at December 2015. Years of life expected in 5-year age intervals and overall were computed and applied to the number of survivors in each age and gender group. Thus, total additional years of life expected by age and gender group, and overall, could be derived.

From the data generated it was also possible to compute average life expectancy for each age and gender group (weighted for this cohort). These data are presented in Figures 3(a) and 3(b). Only life expectancy for age groups relevant to this exercise is presented.

Fig 3: (a) Weighted Average Life Expectancy, by 5-year Age Group, among RIRB* Registrants deemed living at December 2015; (b) Number in each age group deemed alive at December 2015 & additional Years of Life expected for Males & Females



3(b)	Males		Females	
N Alive in 2015	Additional Yrs Expected		N Alive in 2015	Additional Yrs Expected
1	58		1	60
12	607		6	330
100	4,737		48	2,434
273	11,579		91	4,170
376	14,211		178	7,379
475	15,766		260	9.540
629	17,952		440	14,070
853	20,625		579	15,885
1,165	23,359		821	18,925
1,200	19,403		861	16,352
917	11,629		777	11,695
599	5,665		530	6,003
348	2,422		307	2,545
103	506		113	653
26	86		20	78
9	20		2	6
6	9		0	0
7,092	148,633		5,033	112,126

The total additional years of life expected for 7,092 males is 148,633 years; for 5,033 females this figure is 112,126; the combined total additional years of life expected in this cohort 260,759 years (Fig 3(b)).

Relocation to Other Countries

Some members of the cohort relocated to other countries, most notably to the UK, Australia, Canada and the USA. It is not known when they relocated; however, it is assumed that country of residence was recorded at the time of registration with the RIRB between 2002 and 2005. The distribution of country / region of residence by gender is given in Table 3.

Table 3: Country of Residence of RIRB Registrants

	Total	**Male**		**Female**		**p-value**
Country	**N**	**N**	**(%)**	**N**	**(%)**	
Ireland	9,091	5,899	(66.0)	3,192	(54.0)	
United Kingdom	4,934	2,629	(29.5)	2,305	(38.9)	p < 0.001*
Rest of the World	815	392	(4.4)	423	(7.1)	
Total	**14,840**	**8,920**	**(100)**	**5,920**	**(100)**	

** Chi-square test*

It is of note that 66% of males stayed in Ireland, compared with 54% of females. The corollary is that 34% of males, but 46% of females emigrated. These differences are statistically significant ($p<0.001$).

In order to estimate the number likely to be currently alive and the additional years of life expected by country / region of residence, the same assumptions and procedures as were applied to the full group were used for the numbers in the regions. It was assumed that the probabilities of survival were similar to that in Ireland as life expectancy in Ireland has been at or marginally above the European average life expectancy since 2005 (Health in Ireland, Key Trends 2013). Data for males in each region are presented in Table 4 and Figure 4; data for females in each region are presented in Table 5 and Figure 5.

Table 4: Number alive at December 2015; Estimated additional Years of Life (Male)									
	IRELAND			UNITED KINGDOM			REST OF THE WORLD		
	Deemed Alive Dec 2015		Estimated Additional Years of Life	Deemed Alive Dec 2015		Estimated Additional Years of Life	Deemed Alive Dec 2015		Estimated Additional Years of Life
Age Group	N	%		N	%		N	%	
< 25	1	0	58	-		-	-	-	-
25-29	12	0	607	-	-	-	-	-	-
30-34	97	2	4,550	4	0	187	-	-	-
35-39	255	5	10,832	16	1	666	2	1	80
40-44	350	7	13,213	25	1	923	2	1	75
45-49	400	8	13,292	67	4	2,217	8	3	258
50-54	532	11	15,184	79	4	2,268	17	6	500
55-59	676	14	16,361	151	8	3,650	25	9	614
60-64	900	18	18,059	234	13	4,673	31	11	627
65-69	812	16	13,174	332	18	5,311	57	21	917
70-74	467	9	5,935	398	21	5,031	53	19	663
75-79	265	5	2,527	296	16	2,774	38	14	363
80-84	135	3	938	185	10	1,295	27	10	189
85-89	49	1	240	45	2	220	9	3	46
90-94	11	0	34	13	1	43	3	1	8
95-99	4	0	7	6	0	12	0	0	1
100+	4	0	6	2	0	3	-	-	-
Total	**4,967**	**100**	**115,018**	**1,852**	**100**	**29,274**	**273**	**100**	**4,342**

Fig 4: Proportion of Males alive at December 2015 by Country / Region

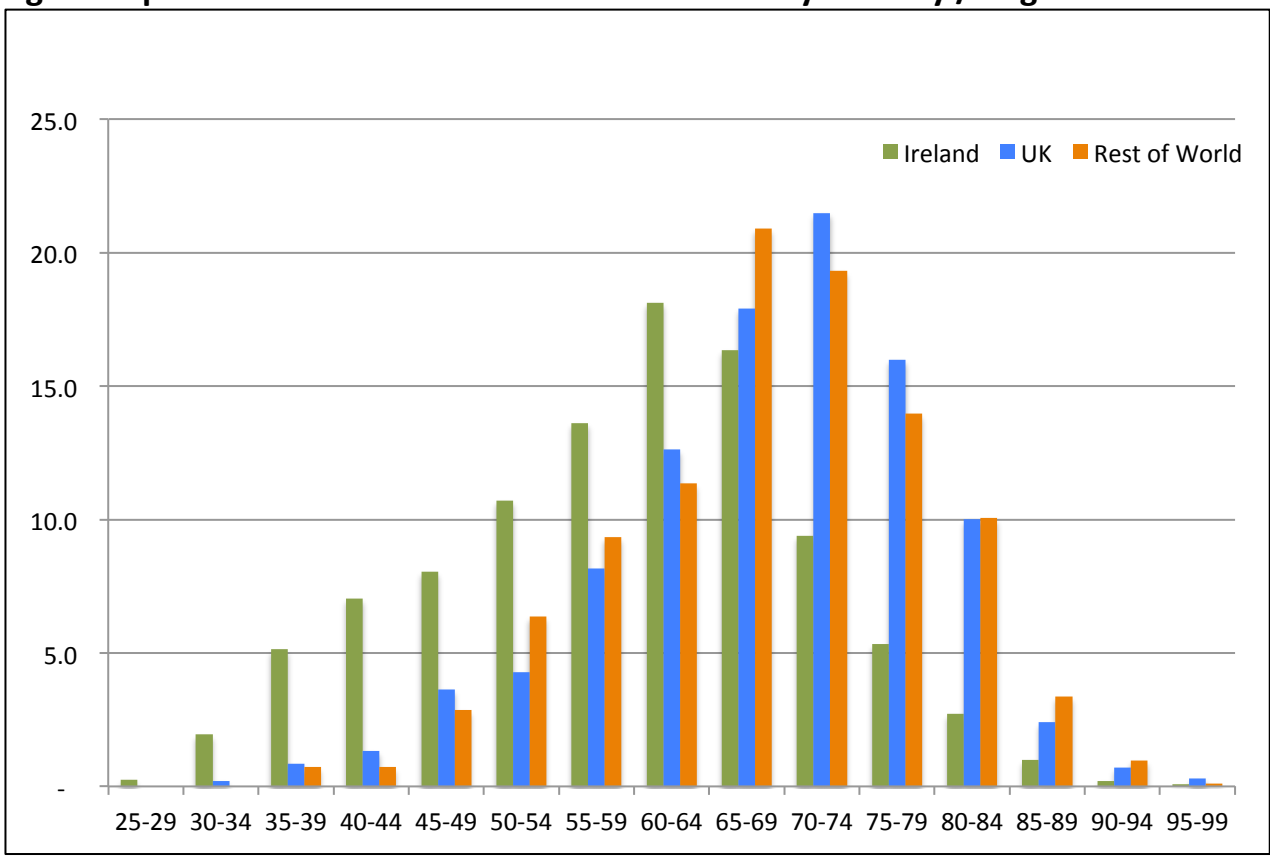
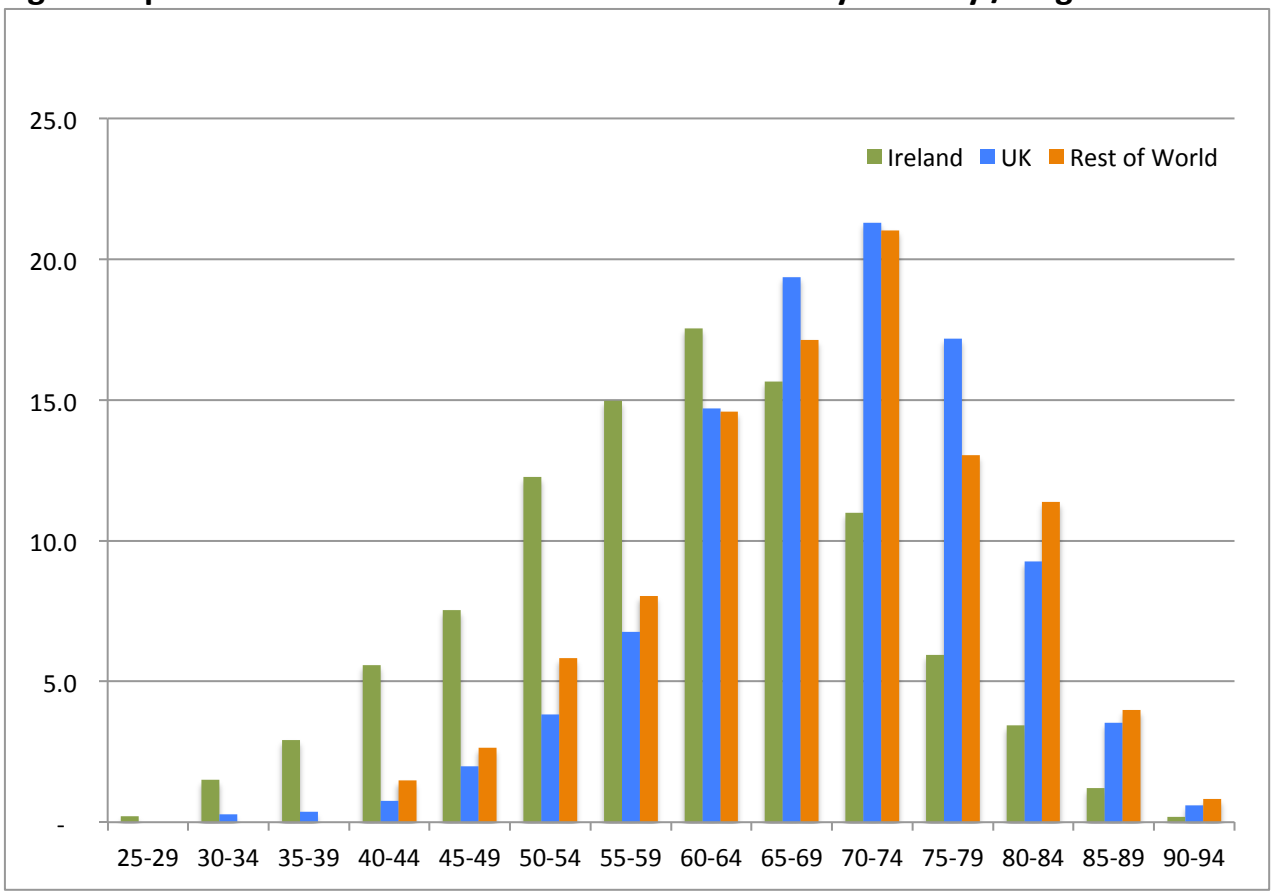


Table 5: Number alive, December 2015; Estimated additional Years of Life (Female)									
	IRELAND			UNITED KINGDOM			REST OF THE WORLD		
	Deemed Alive Dec 2015		Estimated Additional Years of Life	Deemed Alive Dec 2015		Estimated Additional Years of Life	Deemed Alive Dec 2015		Estimated Additional Years of Life
Age Group	N	%		N	%		N	%	
< 25	1	0	60	-	-	-	-	-	-
25-29	6	0	330	-	-	-	-	-	-
30-34	43	1	2,181	5	0	253	-	-	-
35-39	83	3	3,849	7	0	321	-	-	-
40-44	160	6	6,594	14	1	580	5	1	205
45-49	215	8	7,878	36	2	1,337	9	3	325
50-54	350	12	11,186	70	4	2,248	20	6	637
55-59	427	15	11,744	124	7	3,396	27	8	745
60-64	501	18	11,600	271	15	6,206	49	15	1,120
65-69	447	16	8,516	357	19	6,740	58	17	1,096
70-74	313	11	4,728	392	21	5,900	71	21	1,067
75-79	170	6	1,937	316	17	3,571	44	13	495
80-84	98	3	816	171	9	1,418	38	11	311
85-89	34	1	200	65	4	374	13	4	78
90-94	6	0	23	11	1	44	3	1	11
95-99	-	-	-	1	0	3	0	0	0
100+	-	-		0	0	0	-	-	-
Total	**2,854**	**100**	**71,642**	**1,842**	**100**	**32,393**	**336**	**100**	**6,091**

Fig 5: Proportion of Females alive at December 2015 by Country / Region



Among those resident in Ireland (n=9,091) at time of registration, 86% (n=7,821; i.e. 4,967 males + 2854 females) were estimated to be alive at end December 2015. This compares with 75% (3,694/4,934) of those residing in the UK and 75% (609/815) of those residing in the rest of the world. It is clear from Tables and Figures 4 and 5 that those who emigrated were older than those who stayed in Ireland.

It would appear that, regardless of location, females have a survival advantage over males. Among the Irish cohort, **89%** of females (2,854/3,192) compared with **84%** of males (4,937/5,899) were estimated to be alive at end December 2015. Among the UK cohort the equivalent percentages were **80%** of females (1,842/2,305) and **70%** of males (1,852/2,629), while among those elsewhere the figures were **79%** of females (336/423) and **70%** of males 273/392). This is despite a virtually identical age distribution of males and females in the cohort (this can be ascertained from comparing the proportions by age group given in Columns 3 of Tables 1 and 2).

Tables 4 and 5 also give the age-related and total additional years of life expected for males and females in Ireland, UK and elsewhere. This is likely to be the most relevant data from the point of view of the needs of this group for services and support into the future.

Conclusions

The combination of data on a defined cohort of individuals and Irish Life Tables has facilitated estimation of the number of cohort members expected to be stiull living, and an estimate of the additional life-years expected for that group. It is hoped that these data will be of value in planning services and support requirements for the cohort in question.

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