Continuous Mortality Investigation
Technical Support and Research Committee
of the Pensions Board

Working Paper 4

Report on the preliminary results of an analysis into the mortality experience of pensioners of self-administered pension schemes for the period 2000 to 2002

March 2004

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Introduction

In 2002 the Actuarial Profession commissioned the CMI Bureau to begin an investigation into the mortality experience of self-administered pension schemes and to report to the Technical Support and Research Committee of the Pensions Board. This followed on from the pilot investigation conducted in the period 1998-2000 and reported on in *C.M.I.R.* **20**, 109-140 (2001).

Data collection started in early 2003. This initial report gives broad details of the mortality experience of submissions made to February 2004. Work is under way on what further analyses should be done and what results should be reported on a regular basis. When that work is ready, additional information relating to this mortality investigation may be made available.

Data

The larger actuarial consultancies and the GAD were asked to contribute data to the investigation. After some discussions with these consultancies about 15 intimated they would be able and willing to contribute.

The agreed requirement for submissions was schemes with more than 500 current pensioners. It was anticipated that this would equate to approximately 600 schemes; with valuations being performed triennially this may give rise to 200 submissions each year.

Currently submissions have been received for approximately 100 schemes. This is somewhat lower than our anticipated level of submissions, but there are a number of reasons to believe these will increase in subsequent years. The rate of submissions has been increasing; with only 10 schemes submitted in the first six months of 2003, 30 schemes in the third quarter and about 45 schemes in the last quarter. Furthermore, out of the 15 consultancies expected to contribute data only 9 have done so as yet; data is expected from a further 2 consultancies. The remaining 4 consultancies have informed us, since the initial discussions, that they do not advise any pension schemes with more than 500 pensioners.

Considering the current rate of data submission and the additional data expected from the consultancies yet to provide data, we would hope to have received more than 100 submissions in the current year.

For about 90% of the submissions made, the data covered a three-year period, which fell into four calendar years (or three calendar years if the scheme year coincided with a calendar year). The remaining schemes were mainly split between four year and two year periods. The data received covered periods from 1996 to 2003, with the great majority covering the years 2000 to 2002. This report concentrates on the provisional results for these three years only.

The data is further subdivided by type of pensioner and by industry sector. The types of pensioner groupings are normal retirements, ill-health retirements, a combined group (where the health of the pensioner at retirement was not known), dependants of deceased pensioners, and by unknown (where the data could not be split between retired scheme member and dependants). The industry sector categories broadly relate to those of the FTSE indices. In this report, no analysis is provided by industry sector.

Exposure and Deaths

For the analyses shown below, initial exposed to risk has been calculated.

In the three years, from 2000 to 2002, the total exposure for the lives based investigation (all retirement types) was of the order of 1,396k and 960k years for males and females respectively. The corresponding figures for the amounts investigation were £9,254m for males and £2,633m for females.

For the lives investigation, the number of deaths was 51k for males and 35k for females. By amounts the number of deaths was £232m for males and £80m for females.

Comparison Bases

The actual deaths in each analysis were compared against the expected deaths from a population taken from standard tables. The data was compared against two base tables.

1. the relevant "92" Series tables projected to the calendar year of use for both lives and amounts and
2. a(90) less 2 years for the lives analysis or, for the amounts analysis, PA(90) less 2 years, which is the MFR basis.

The following summarises the data over the three year period, 2000 to 2002.

		Males Lives	Males Amounts (£'000)	Average pension (Males)	Females Lives	Females Amounts (£'000)	Average Amounts (Females)
Exposure	**2000**	452,570	£2,803,937	£6,196	324,681	£840,332	£2,588
	2001	531,103	£3,404,461	£6,410	368,510	£973,504	£2,642
	2002	412,283	£3,045,784	£7,388	266,597	£819,477	£3,074
	All	1,395,957	£9,254,181	£6,629	959,788	£2,633,313	£2,744
Deaths	**2000**	16,466	£70,245	£4,266	11,137	£24,226	£2,175
	2001	19,863	£88,621	£4,462	13,364	£29,571	£2,213
	2002	14,622	£73,068	£4,997	10,064	£26,302	£2,613
	All	50,951	£231,935	£4,552	34,565	£80,099	£2,317

The following shows the same data summarised by pensioner type for the three year periods 2000 to 2002.

Males

		Number or amount of deaths	100A/E	
			"92" Series	PA(90)-2 or a(90)-2
Lives	**Normal**	22,792	106	108
	Ill-health	3,251	187	171
	Combined	23,269	94	96
	Dependant	1,100	111	117
	Unknown	539	109	116
	All	50,951	103	105
Amounts (£'000)	**Normal**	£109,183	112	79
	Ill-health	£12,656	239	137
	Combined	£107,837	102	73
	Dependant	£1,135	114	88
	Unknown	£1,124	104	76
	All	£231,935	110	78

Females

		Number or amount of deaths	100A/E	
			"92" Series	PA(90)-2 or a(90)-2
Lives	**Normal**	6,759	103	121
	Ill-health	954	176	189
	Combined	7,769	108	126
	Dependant	18,779	108	129
	Unknown	304	111	131
	All	34,565	108	128
Amounts (£'000)	**Normal**	£18,551	114	101
	Ill-health	£2,467	202	164
	Combined	£18,635	120	105
	Dependant	£40,088	112	100
	Unknown	£358	113	101
	All	£80,099	116	103

Results of Analysis

The results of the analysis of the data, subdivided by various categories, are shown in the attached tables. The analyses shown are:

Table Number	Sex	Lives or Amounts	Pensioner Type	100A/E "92" Series	100A/E PA(90)-2 a(90)-2
1	M	Lives	All	103	105
2	M	Amounts	All	110	78
3	F	Lives	All	108	128
4	F	Amounts	All	116	103
5	M	Lives	Normal	106	108
6	M	Amounts	Normal	112	79
7	M	Lives	Ill Health	187	171
8	M	Amounts	Ill Health	239	137
9	M	Lives	Combined	94	96
10	M	Amounts	Combined	102	73
11	F	Lives	Normal	103	121
12	F	Amounts	Normal	114	101
13	F	Lives	Ill Health	176	189
14	F	Amounts	Ill Health	202	164
15	F	Lives	Combined	108	126
16	F	Amounts	Combined	120	105
17	F	Lives	Dependants	108	129
18	F	Amounts	Dependants	112	100

For some of the above groupings, the results shown come from a relatively small number of schemes and some anomalies are apparent. For instance, we would expect that the 100A/E for normal retirements would be lower than for combined retirements and this is not the case with the male data analysed to date. It would, therefore, be injudicious to put too much weight on some of the sub-divided groups until larger volumes of data have been received and analysed or until any bias has been removed by combining groups.

16 March 2004

Table 1

Mortality Analysis split by Age – All Retirements, Males, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PML92 (C=Year of submission)**	**a(90)-2 (males)**
20-24	164	16	21,685	10,467
25-29	134	1	1,797	1,043
30-34	785	3	903	583
35-39	2,409	22	1,786	1,108
40-44	5,948	60	1,326	757
45-49	10,983	134	894	504
50-54	86,241	490	210	126
55-59	153,212	1,114	145	93
60-64	218,244	2,525	118	83
65-69	269,937	4,874	98	82
70-74	249,250	8,027	97	95
75-79	206,712	11,347	97	106
80-84	119,170	10,373	98	113
85-89	55,166	7,953	106	124
90-94	15,310	3,280	112	128
95-99	2,087	674	125	137
100-104	203	58	87	90
105-110	0	0	0	0
60-110	1,136,082	49,111	101	105
All Ages	1,395,957	50,951	103	105
Result from Pilot Investigation				
56-105	625,285	28,300	108	
All Ages	662,542	28,500	108	

Table 2

Mortality Analysis split by Age – All Retirements, Males, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PMA92 (C=Year of submission)**	**PA(90)-2 (males)**
20-24	346	27	31,275	7,575
25-29	314	3	3,792	1,304
30-34	2,664	2	364	155
35-39	9,464	82	2,998	1,040
40-44	28,633	312	2,742	813
45-49	61,204	702	1,663	469
50-54	819,142	3,217	274	78
55-59	1,560,105	8,383	189	56
60-64	1,795,990	16,678	151	57
65-69	1,745,917	26,409	118	60
70-74	1,365,118	36,113	104	69
75-79	992,177	46,803	100	80
80-84	549,396	43,230	100	90
85-89	244,682	32,856	106	103
90-94	69,157	14,099	110	110
95-99	9,249	2,785	119	116
100-104	625	233	115	107
105-110	0	0	0	0
60-110	6,772,311	219,205	107	79
All Ages	9,254,181	231,935	110	78
Result from Pilot Investigation				
56-105	3,493,629	118,632	113	88
All Ages	3,812,750	119,987	114	88

Table 3

Mortality Analysis split by Age - All Retirements, Females, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PFL92 (C=Year of submission)**	**a(90)-2 (females)**
20-24	183	20	58,422	32,441
25-29	157	1	3,303	1,724
30-34	955	7	3,345	1,738
35-39	3,081	20	2,239	1,098
40-44	6,231	32	1,135	510
45-49	10,040	66	800	379
50-54	38,110	192	312	183
55-59	69,110	396	189	143
60-64	120,373	1,018	144	131
65-69	147,127	1,820	109	113
70-74	166,220	3,746	107	123
75-79	170,518	6,577	104	127
80-84	126,892	7,983	104	129
85-89	70,873	7,297	105	128
90-94	24,471	4,053	113	132
95-99	4,769	1,164	116	127
100-104	659	166	90	92
105-110	20	7	96	91
60-110	831,921	33,831	107	127
All Ages	959,788	34,565	108	128
Result from Pilot Investigation				
56-105	247,894	9,282	107	
All Ages	260,067	9,341	107	

Table 4

Mortality Analysis split by Age - All Retirements, Females, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PFA92 (C=Year of submission)**	**PA(90)-2 (females)**
20-24	344	31	60,857	30,054
25-29	504	5	5,910	3,020
30-34	3,026	29	5,558	3,116
35-39	10,640	71	2,892	1,366
40-44	22,846	112	1,358	594
45-49	37,616	230	930	433
50-54	161,498	608	284	152
55-59	263,399	1,372	207	126
60-64	358,913	2,912	162	114
65-69	402,111	4,353	110	89
70-74	416,095	8,090	106	94
75-79	407,938	14,232	107	100
80-84	299,340	17,508	110	103
85-89	170,661	16,760	114	104
90-94	63,528	10,060	124	107
95-99	13,111	3,254	137	109
100-104	1,660	455	115	85
105-110	81	16	63	43
60-110	2,133,440	77,641	114	102
All Ages	2,633,313	80,099	116	103
Result from Pilot Investigation				
56-105	637,760	21,253	110	104
All Ages	684,196	21,454	111	104

Table 5

Mortality Analysis split by Age – Normal Retirements, Males, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PML92 (C=Year of submission)**	**a(90)-2 (males)**
20-24	-	-	-	-
25-29	6	0	0	0
30-34	55	0	0	0
35-39	165	0	0	0
40-44	435	6	1,795	1,025
45-49	1,091	21	1,409	794
50-54	46,370	177	141	85
55-59	76,788	470	123	78
60-64	99,070	1,041	108	76
65-69	111,183	1,921	94	79
70-74	103,781	3,370	97	95
75-79	91,300	5,303	103	112
80-84	53,695	5,045	106	122
85-89	24,148	3,744	114	134
90-94	6,063	1,419	122	140
95-99	794	253	124	136
100-104	47	22	144	147
105-110	0	0	0	0
60-110	490,079	22,118	105	109
All Ages	614,988	22,792	106	108

Table 6

Mortality Analysis split by Age - Normal Retirements, Males, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PMA92 (C=Year of submission)**	**PA(90)-2 (males)**
20-24	-	-	-	-
25-29	4	0	0	0
30-34	60	0	0	0
35-39	271	0	0	0
40-44	975	15	3,884	1,149
45-49	3,811	68	2,528	713
50-54	499,601	1,427	199	57
55-59	789,235	4,049	181	54
60-64	873,180	7,677	143	54
65-69	764,906	11,016	112	58
70-74	613,456	16,518	105	70
75-79	471,529	22,975	104	83
80-84	265,684	22,141	105	96
85-89	116,937	16,676	113	110
90-94	26,606	5,711	117	117
95-99	2,685	815	120	117
100-104	172	94	171	159
105-110	0	0	0	0
60-110	3,135,155	103,624	110	81
All Ages	4,429,113	109,183	112	79

Table 7

Mortality Analysis split by Age – Ill Health Retirements, Males, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PML92 (C=Year of submission)**	**a(90)-2 (males)**
20-24	10	0	0	0
25-29	80	1	3,023	1,763
30-34	409	1	576	373
35-39	1,513	16	2,054	1,277
40-44	3,934	36	1,199	687
45-49	6,957	57	602	340
50-54	11,017	156	545	327
55-59	13,156	197	298	191
60-64	17,561	432	249	176
65-69	20,046	673	182	153
70-74	15,391	849	170	166
75-79	5,944	502	154	167
80-84	1,941	198	116	134
85-89	602	114	143	167
90-94	63	17	144	166
95-99	8	2	101	111
100-104	-	-	-	-
105-110	-	-	-	-
60-110	61,555	2,787	171	161
All Ages	98,631	3,251	187	171

Table 8

Mortality Analysis split by Age – Ill Health Retirements, Males, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PMA92 (C=Year of submission)**	**PA(90)-2 (males)**
20-24	13	0	0	0
25-29	194	3	6,123	2,124
30-34	1,194	0	106	45
35-39	5,633	60	3,673	1,273
40-44	18,477	186	2,522	749
45-49	38,192	275	1,047	296
50-54	64,064	891	1,023	291
55-59	71,638	1,046	511	152
60-64	85,727	1,872	347	133
65-69	91,355	2,832	239	124
70-74	63,782	3,144	198	130
75-79	21,505	1,528	158	125
80-84	5,554	539	125	113
85-89	1,620	243	120	117
90-94	257	29	64	64
95-99	79	7	33	32
100-104	-	-	-	-
105-110	-	-	-	-
60-110	269,879	10,194	205	126
All Ages	469,284	12,656	239	137

Table 9

Mortality Analysis split by Age – Combined Retirements, Males, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PML92 (C=Year of submission)**	**a(90)-2 (males)**
20-24	28	0	0	0
25-29	13	0	0	0
30-34	162	1	1,471	943
35-39	416	6	2,866	1,763
40-44	1,022	14	1,820	1,032
45-49	2,123	48	1,629	916
50-54	27,423	146	196	117
55-59	61,250	426	138	88
60-64	98,534	996	103	72
65-69	133,431	2,159	88	74
70-74	123,576	3,531	86	84
75-79	102,922	5,195	90	97
80-84	58,955	4,709	90	104
85-89	28,512	3,827	98	115
90-94	8,816	1,771	105	120
95-99	1,237	406	127	139
100-104	137	34	76	78
105-110	-	-	-	-
60-110	556,121	22,628	92	96
All Ages	648,558	23,269	94	96

Table 10

Mortality Analysis split by Age - Combined Retirements, Males, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PMA92 (C=Year of submission)**	**PA(90)-2 (males)**
20-24	55	0	0	0
25-29	51	0	0	0
30-34	1,038	1	469	198
35-39	2,817	22	2,704	938
40-44	7,861	99	3,210	948
45-49	17,386	343	2,839	797
50-54	251,551	868	238	67
55-59	692,905	3,261	165	49
60-64	827,769	7,025	137	52
65-69	876,338	12,381	110	56
70-74	673,964	16,077	94	62
75-79	488,915	21,861	95	76
80-84	271,422	19,972	94	85
85-89	123,456	15,583	99	96
90-94	41,805	8,274	107	106
95-99	6,393	1,937	120	117
100-104	431	134	96	89
105-110	-	-	-	-
60-110	3,310,494	103,243	100	74
All Ages	4,284,157	107,837	102	73

Table 11

Mortality Analysis split by Age – Normal Retirements, Females, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PFL92 (C=Year of submission)**	**a(90)-2 (females)**
20-24	-	-	-	-
25-29	3	0	0	0
30-34	26	0	0	0
35-39	152	3	6,826	3,347
40-44	265	1	817	368
45-49	487	7	1,776	839
50-54	8,808	34	236	140
55-59	17,783	96	178	134
60-64	38,263	254	113	103
65-69	44,521	495	98	102
70-74	45,482	902	95	109
75-79	42,496	1,536	98	119
80-84	26,352	1,662	105	131
85-89	11,194	1,157	106	130
90-94	3,083	489	110	129
95-99	434	114	126	139
100-104	31	9	105	107
105-110	-	-	-	-
60-110	211,857	6,618	102	121
All Ages	239,380	6,759	103	121

Table 12

Mortality Analysis split by Age – Normal Retirements, Females, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PFA92 (C=Year of submission)**	**PA(90)-2 (females)**
20-24	-	-	-	-
25-29	1	0	0	0
30-34	15	0	0	0
35-39	233	14	25,200	11,842
40-44	550	2	871	382
45-49	1,078	20	2,738	1,278
50-54	54,532	141	195	104
55-59	91,136	387	169	103
60-64	133,155	797	120	85
65-69	136,206	1,399	105	85
70-74	129,127	2,321	98	88
75-79	119,809	4,238	109	102
80-84	74,058	4,477	115	108
85-89	30,387	3,133	121	110
90-94	7,808	1,259	130	111
95-99	1,227	339	153	121
100-104	103	25	101	75
105-110	-	-	-	-
60-110	631,880	17,987	113	101
All Ages	779,425	18,551	114	101

Table 13

Mortality Analysis split by Age – Ill Health Retirements, Females, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PFL92 (C=Year of submission)**	**a(90)-2 (females)**
20-24	2	0	0	0
25-29	32	0	0	0
30-34	306	0	0	0
35-39	1,261	0	0	0
40-44	2,155	8	824	371
45-49	2,714	25	1,132	538
50-54	4,941	51	647	380
55-59	7,004	66	309	234
60-64	10,195	153	254	233
65-69	10,531	180	153	160
70-74	7,032	216	151	173
75-79	2,766	134	136	166
80-84	976	79	135	168
85-89	239	28	122	150
90-94	28	10	246	289
95-99	12	3	114	124
100-104	2	1	198	204
105-110	-	-	-	-
60-110	31,781	804	158	176
All Ages	50,196	954	176	189

Table 14

Mortality Analysis split by Age – Ill Health Retirements, Females, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PFA92 (C=Year of submission)**	**PA(90)-2 (females)**
20-24	9	0	0	0
25-29	62	0	0	0
30-34	816	0	0	0
35-39	4,734	0	0	0
40-44	8,359	23	762	335
45-49	11,055	103	1,430	667
50-54	18,669	178	730	390
55-59	23,410	219	368	226
60-64	31,812	474	296	210
65-69	31,323	472	157	127
70-74	18,754	540	163	144
75-79	6,045	242	129	120
80-84	1,813	142	149	140
85-89	414	48	138	126
90-94	60	18	235	202
95-99	48	8	88	69
100-104	2	0	21	16
105-110	-	-	-	-
60-110	90,271	1,944	172	146
All Ages	157,385	2,467	202	164

Table 15

Mortality Analysis split by Age – Combined Retirements, Females, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PFL92 (C=Year of submission)**	**a(90)-2 (females)**
20-24	38	2	28,126	15,663
25-29	32	1	15,993	8,252
30-34	201	3	6,828	3,535
35-39	467	12	8,985	4,386
40-44	891	13	3,237	1,447
45-49	1,576	15	1,147	544
50-54	14,011	67	294	173
55-59	26,540	136	171	128
60-64	42,051	322	132	119
65-69	42,802	459	96	99
70-74	39,081	805	99	114
75-79	35,337	1,372	105	128
80-84	24,636	1,616	108	134
85-89	14,946	1,503	102	125
90-94	6,308	1,052	113	132
95-99	1,435	347	115	126
100-104	141	40	100	102
105-110	9	4	126	119
60-110	206,746	7,520	106	125
All Ages	250,502	7,769	108	126

Table 16

Mortality Analysis split by Age - Combined Retirements, Females, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PFA92 (C=Year of submission)**	**PA(90)-2 (females)**
20-24	73	3	28,849	14,411
25-29	146	5	20,365	10,428
30-34	951	23	13,585	7,618
35-39	2,118	55	11,415	5,388
40-44	4,538	66	4,036	1,759
45-49	7,774	62	1,192	556
50-54	52,523	212	302	161
55-59	91,344	469	206	125
60-64	105,749	913	175	123
65-69	101,019	986	101	81
70-74	84,590	1,660	108	96
75-79	73,251	2,582	108	101
80-84	55,591	3,566	119	112
85-89	40,179	3,889	112	102
90-94	18,936	2,984	123	105
95-99	4,181	1,036	137	109
100-104	403	112	116	85
105-110	24	11	153	105
60-110	483,925	17,740	117	103
All Ages	643,392	18,635	120	105

Table 17

Mortality Analysis split by Age - Dependants, Females, Lives 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk**	**Deaths**	**PFL92 (C=Year of submission)**	**a(90)-2 (females)**
20-24	143	18	67,262	37,306
25-29	89	0	0	0
30-34	417	4	4,404	2,279
35-39	1,196	5	1,438	704
40-44	2,892	9	686	308
45-49	5,196	19	444	210
50-54	10,130	39	242	141
55-59	17,360	94	178	134
60-64	28,940	287	166	152
65-69	47,933	666	120	126
70-74	72,999	1,776	115	132
75-79	88,175	3,464	105	128
80-84	73,743	4,557	102	126
85-89	43,913	4,552	106	129
90-94	14,893	2,474	113	133
95-99	2,870	696	115	126
100-104	485	116	85	87
105-110	11	3	73	68
60-110	373,963	18,591	108	129
All Ages	411,386	18,779	108	129

Table 18

Mortality Analysis split by Age - Dependants, Females, Amounts 2000-2002				
			100A/E by reference to :	
Age group	**Exposed to risk (£'000)**	**Deaths (£'000)**	**PFA92 (C=Year of submission)**	**PA(90)-2 (females)**
20-24	262	28	71,996	35,449
25-29	295	0	0	0
30-34	1,231	7	3,215	1,792
35-39	3,546	2	232	109
40-44	9,293	21	632	276
45-49	17,529	46	397	184
50-54	35,125	74	162	86
55-59	56,111	280	196	120
60-64	86,248	726	165	117
65-69	131,389	1,465	112	91
70-74	181,474	3,511	105	93
75-79	206,671	7,114	105	98
80-84	166,319	9,248	104	98
85-89	98,930	9,610	113	102
90-94	36,557	5,768	124	106
95-99	7,628	1,866	135	107
100-104	1,152	318	116	86
105-110	57	5	25	17
60-110	916,425	39,631	111	100
All Ages	1,039,815	40,088	112	100