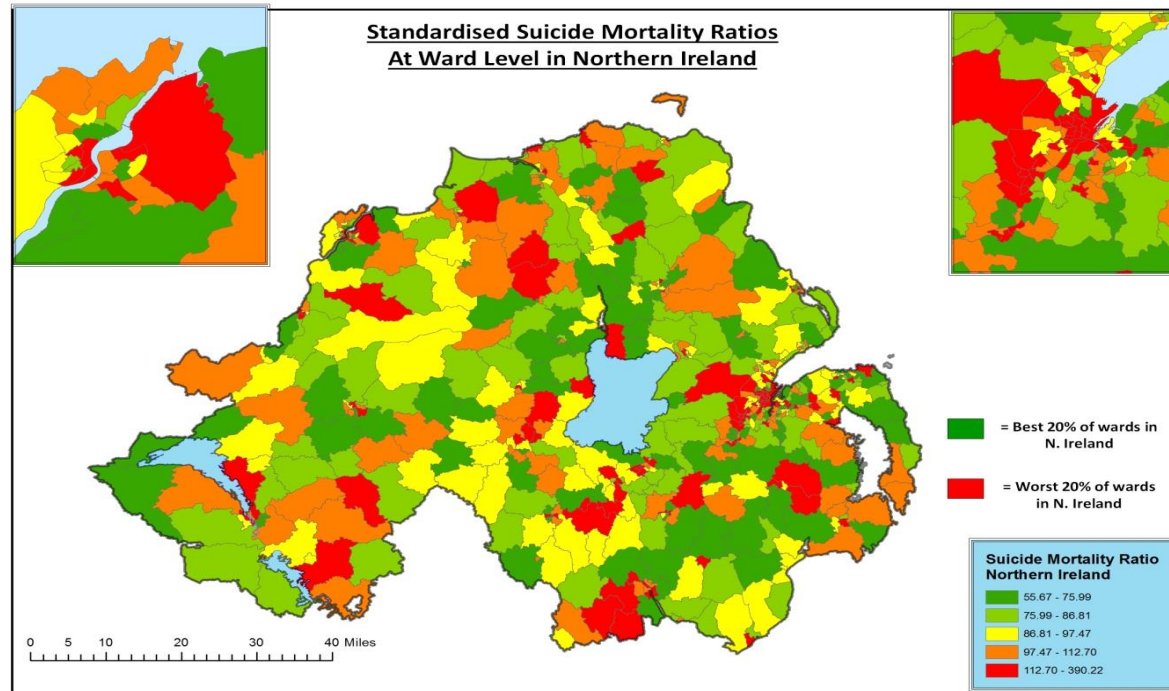


# Death by Suicide: A Report Based on the Northern Ireland Coroner's Database



Report prepared by

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# Deaths by Suicide (2005 – 2011)

- Standardised Mortality Ratio (SMR)
- Descriptive Statistics
- Differential area effects
  - Local Government Districts
  - Wards
  - Wards stratified by age structure
- Some concluding comments

## Standardised Mortality Ratio

$$SMR = \frac{\text{Observed deaths}}{\text{Expected deaths}} \times 100$$

- Sample calculations

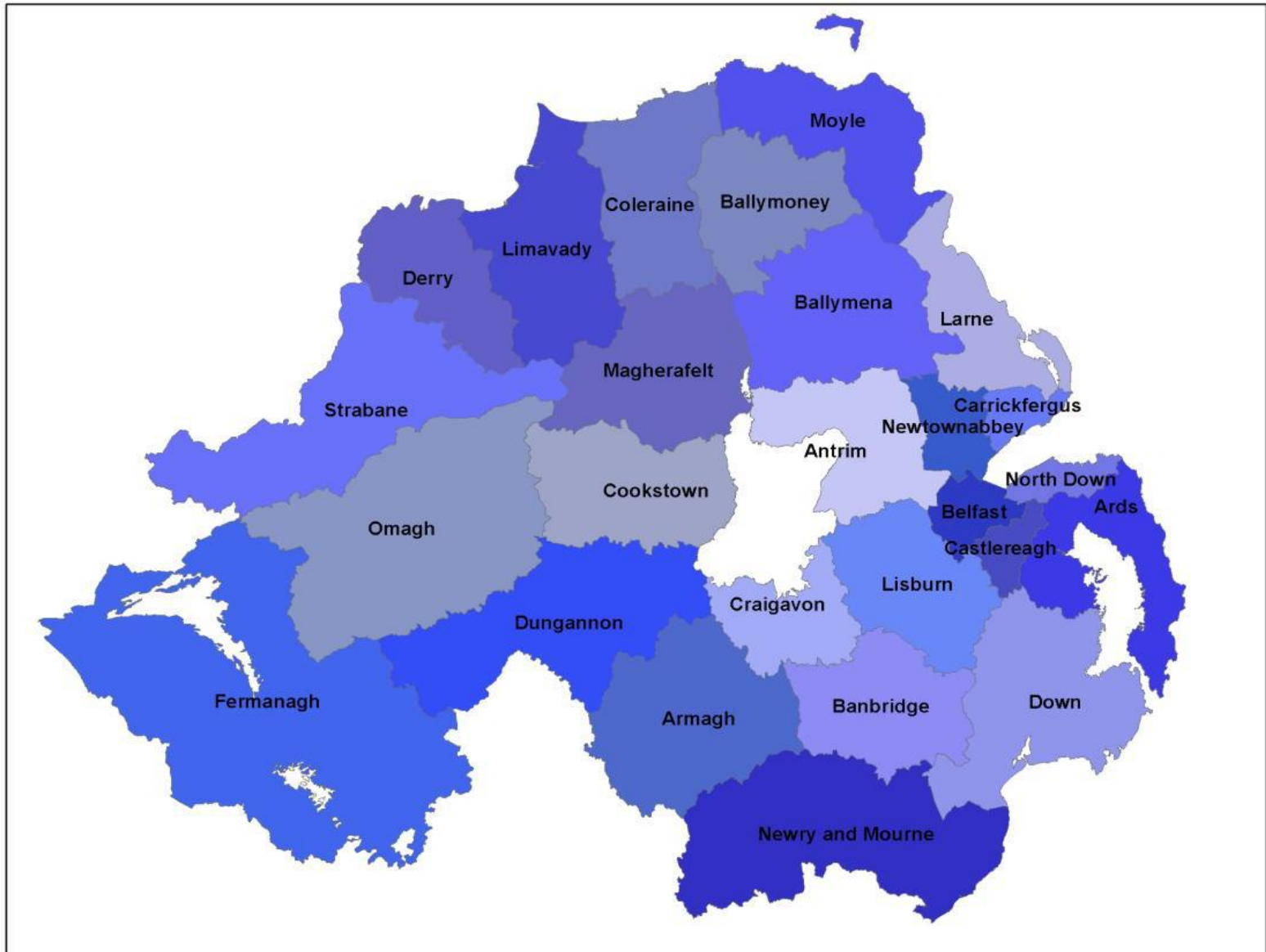
- Population = 10,000
- Number of individuals in a given district = 1000
- Calculated %:  $1000/10000=0.1 \times 100=10\%$
- Therefore the area has 10% of the population
  
- Ten individuals have died by suicide in the general population during given period
  
- Expected number of deaths in the population is 10 in 10,000 = 1 in 1000 = 0.001
  
- And since in a specific area there are 1000 individuals we would then expect that 1 person will have died by suicide ( $0.001 \times 1000 = 1$ )

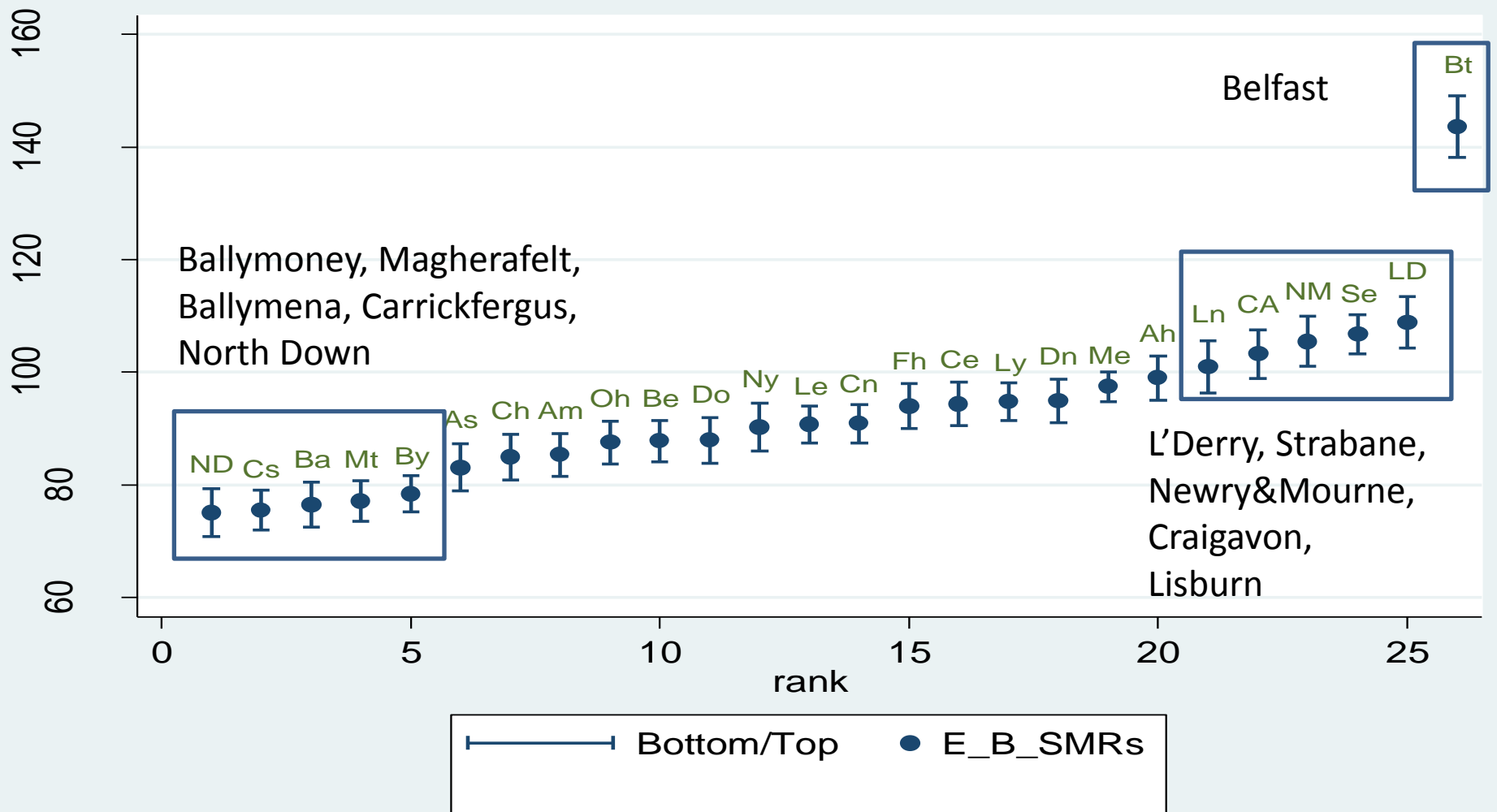
- **Standardised Mortality Ratio** = Observed deaths/expected deaths x 100
- $3/1 \times 100 = 300\%$
- An **SMR** of 300% (3.0) indicates that deaths by suicide in our area is 3 times greater than what we would expect.

# Descriptive Statistics

- Around 50% of the sample had either a recorded prior suicide attempt or a record of suicidal thoughts.
- The major adverse event recorded before death was relationship problems.
- Over 50% of the individuals in this sample were recorded as having been unemployed at the time of death.
- Approximately 22% of the sample had a recorded mental and physical health condition (comorbidity); with 36% presenting with recorded mental health problems only. Over 80% of the sample had a recorded medical prescription.
- Amongst the adult population, over the seven years of the data examined in this report, approximately 1 in every 1000 citizens had taken his or her own life.
- After adjusting for the residential population within each LGD, deaths from suicide were 40% higher in Belfast than the Northern Ireland average.
- Differences between Wards indicated that a significant number of Wards had between two and four times the number of deaths, and an association with deprivation was evident.
- In terms of the raw statistics, 82% of deaths which occurred in the 16 to 39 year age group were amongst males. Seventy-four percent of the deaths within the age group 40 to 64+ were males.
- Stratified age structure (four age groups) within Wards, when adjusted for number of individuals, indicated no difference in the expected number of deaths in the 16 – 39 year old age band and those within the 40 – 64 year old age group.

# LGD (n = 26)



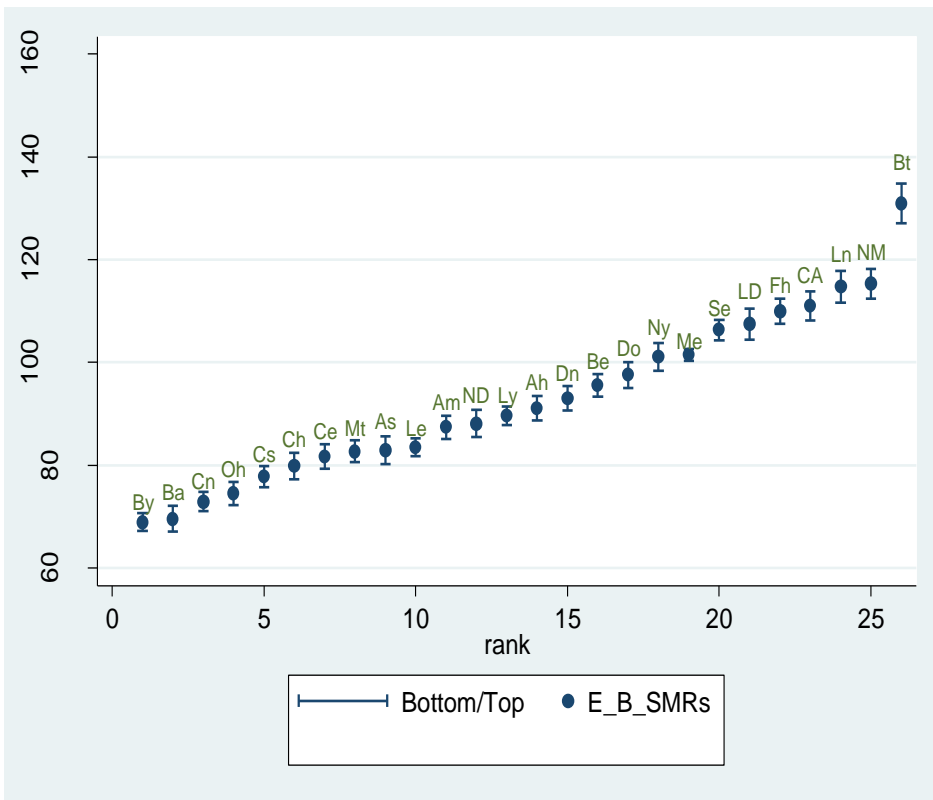


**Figure 6.1. Empirical Bayes Standardised Mortality Ratios for the 26 Local Government Districts in Northern Ireland**

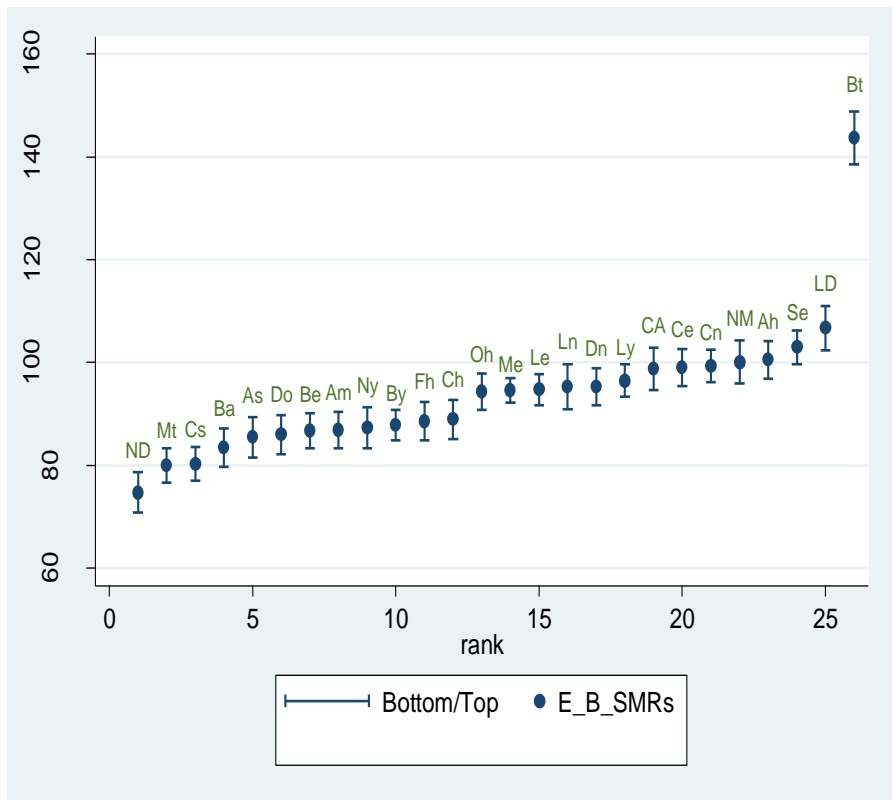
Notes: LGD names are as follows. North Down (Nd), Carrickfergus (Cs), Ballymena (Ba), Magherafelt (Mt), Ballymoney (By), Ards (As), Castlereagh (Ch), Antrim (Am), Omagh (Oh), Banbridge (Be), Down (Do), Newtownabbey (Ny), Larne (Le), Cookstown (Cn), Fermanagh (Fh), Coleraine (Ce), Limavady (Ly), Dungannon (Dn), Moyle (Me), Armagh (Ah), Lisburn (Ln), Craigavon (CA), Newry&Mourne (NM), Strabane (Se), Derry/Londonderry (LD) and Belfast (Bt).

# Deaths by gender and LGD (adjusted for population size)

Females



Males



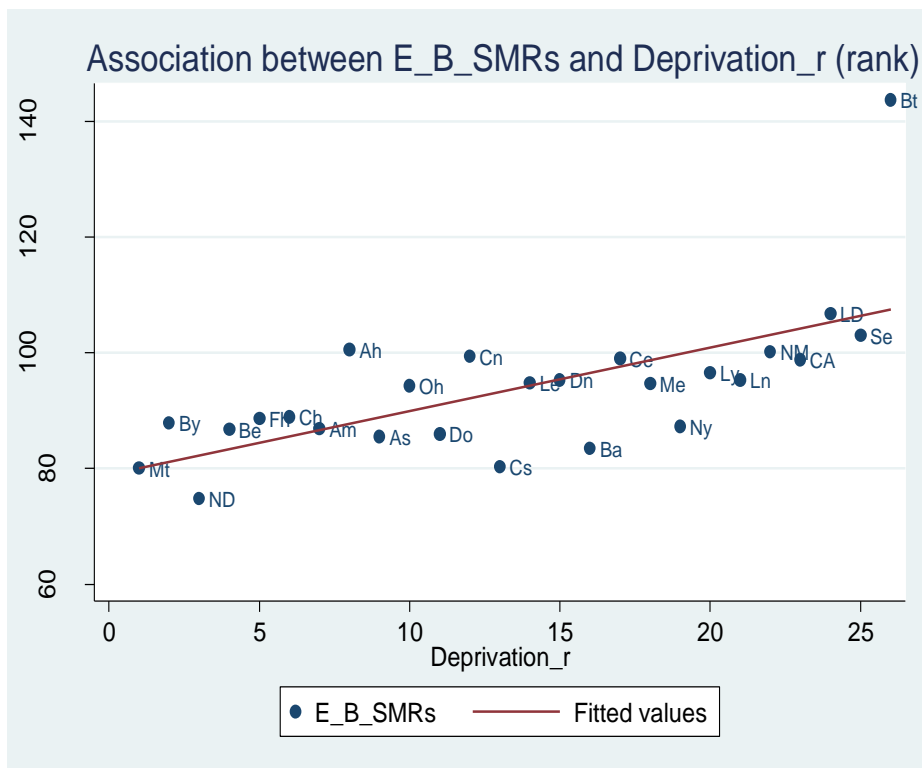
**Figures 6.2. and 6.3. Empirical Bayes Standardised Mortality Ratios for females and males within the 26 Local Government Districts in Northern Ireland**

LGD. Ballymoney, Ballymena, Cookstown, Omagh, Carrickfergus, Castlereagh, Coleraine, Magherafelt, Ards, Larne, Antrim, North Down, Limavady, Armagh, Dungannon, Banbridge, Down, Newtownabbey, Moyle, Strabane, Derry, Fermanagh, Craigavon, Lisburn, Newry&Mourne and Belfast

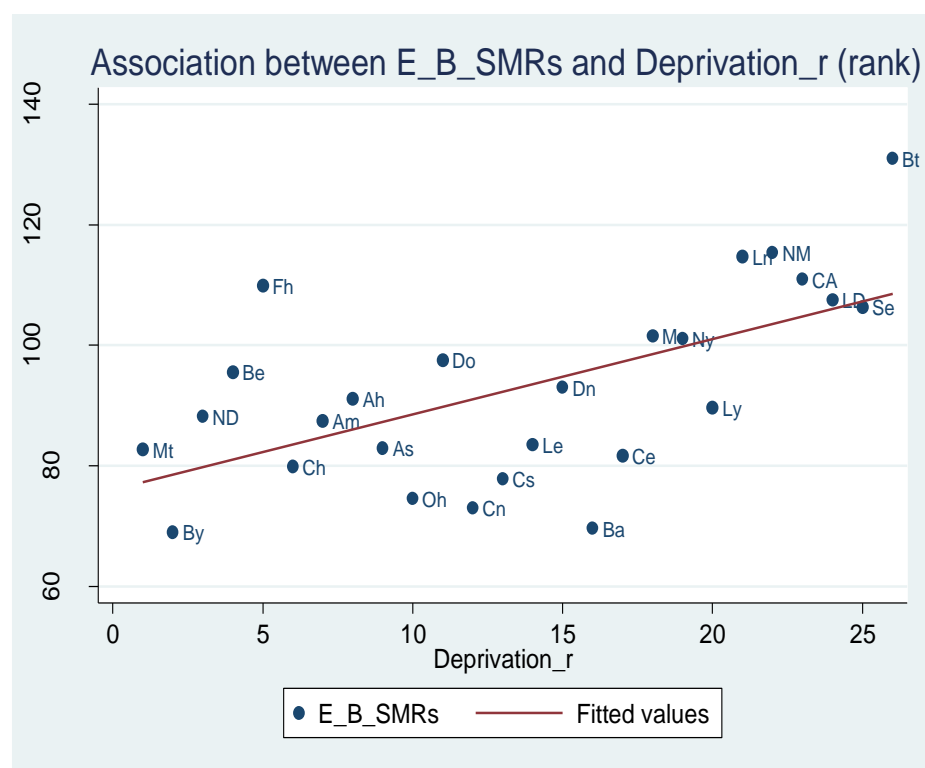
LGD. North Down, Magherafelt, Carrickfergus, Ballymena, Ards, Down, Banbridge, Antrim, Newtownabbey, Ballymoney, Fermanagh, Castlereagh, Omagh, Moyle, Larne, Lisburn, Dungannon, Limavady, Cookstown, Coleraine, Craigavon, Newry&Mourne, Armagh, Strabane, Derry and Belfast

# LGD and Deprivation

## Males



## Females

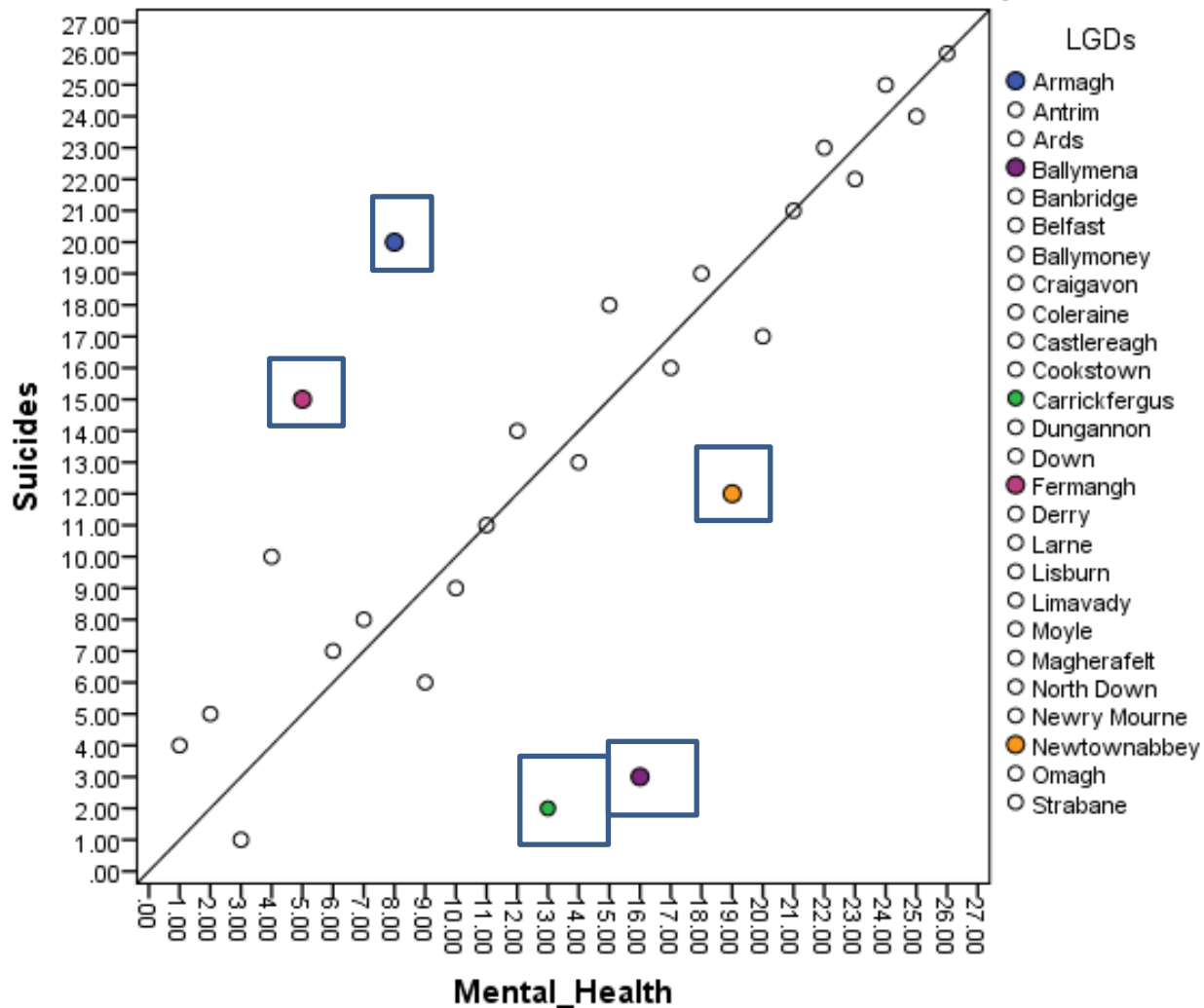


**Figure 6.4. Empirical Bayes Standardised Mortality Ratios for the 26 Local Government Districts in Northern Ireland correlated with order of deprivation**

Notes: LGD names are as follows. North Down (Nd), Carrickfergus (Cs), Ballymena (Ba), Magherafelt (Mt), Ballymoney (By), Ards (As), Castlereagh (Ch), Antrim (Am), Omagh (Oh), Banbridge (Be), Down (Do), Newtownabbey (Ny), Larne (Le), Cookstown (Cn), Fermanagh (Fh), Coleraine (Ce), Limavady (Ly), Dungannon (Dn), Moyle (Me), Armagh (Ah), Lisburn (Ln), Craigavon (CA), Newry&Mourne (NM), Strabane (Se), Derry/Londonderry (LD) and Belfast (Bt).



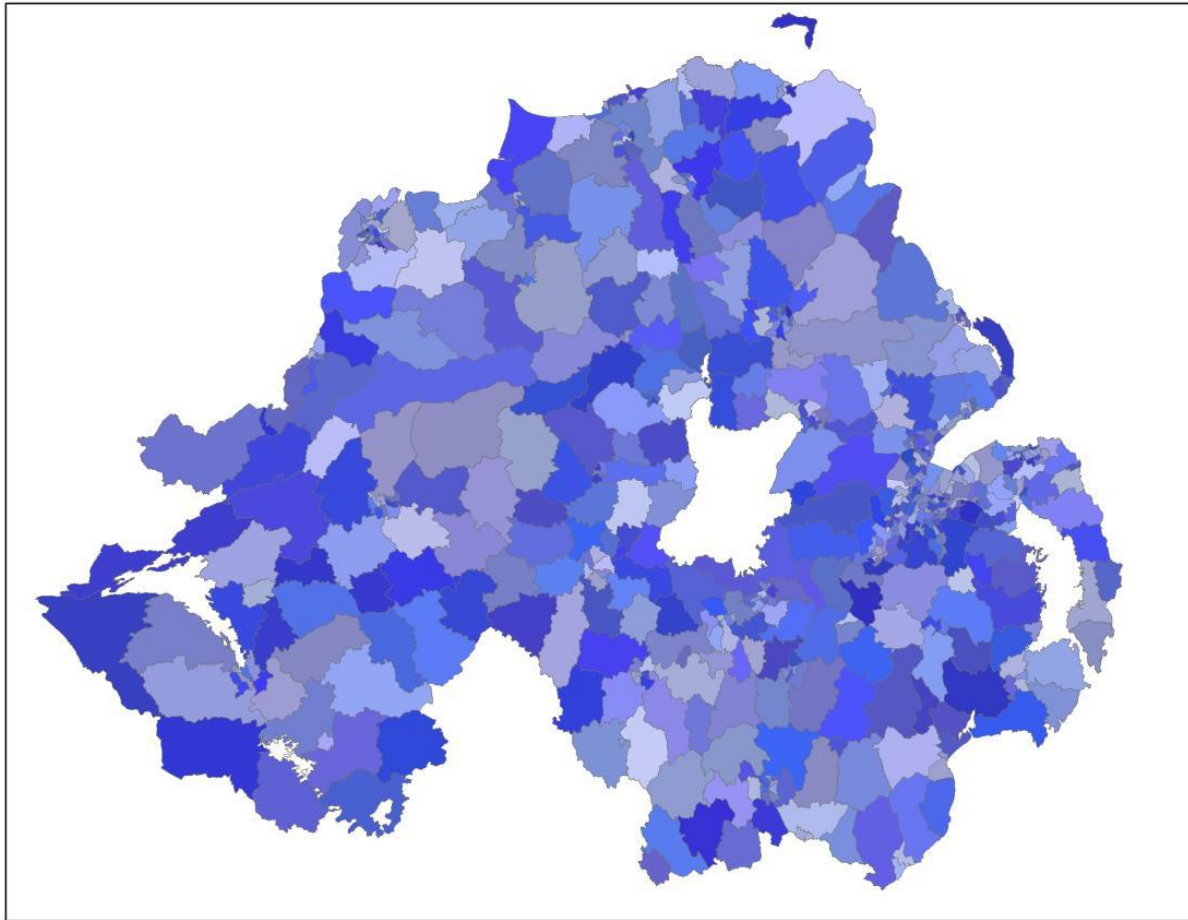
Scatterplot for LGDs representing the rank order of E\_B\_SMRs and Mental Health area estimates based on random intercepts



	SMRs	MH
Belfast	26.00	26.00
L'Derry	25.00	24.00
Strabane	24.00	25.00
Newry&Mour	23.00	22.00
Craigavon	22.00	23.00
Lisburn	21.00	21.00
<b>Armagh</b>	<b>20.00</b>	<b>8.00</b>
Moyle	19.00	18.00
Dungannon	18.00	15.00
Limavady	17.00	20.00
Coleraine	16.00	17.00
<b>Fermanagh</b>	<b>15.00</b>	<b>5.00</b>
Cookstown	14.00	12.00
Larne	13.00	14.00
<b>Newtownabbey</b>	<b>12.00</b>	<b>19.00</b>
Down	11.00	11.00
Banbridge	10.00	4.00
Omagh	9.00	10.00
Antrim	8.00	7.00
Castlereagh	7.00	6.00
Ards	6.00	9.00
Ballymoney	5.00	2.00
Magherafelt	4.00	1.00
<b>Ballymena</b>	<b>3.00</b>	<b>16.00</b>
<b>Carrickfergus</b>	<b>2.00</b>	<b>13.00</b>
North Down	1.00	3.00

Correlation between suicide and mental health at the LGD level

# Wards (n = 582)



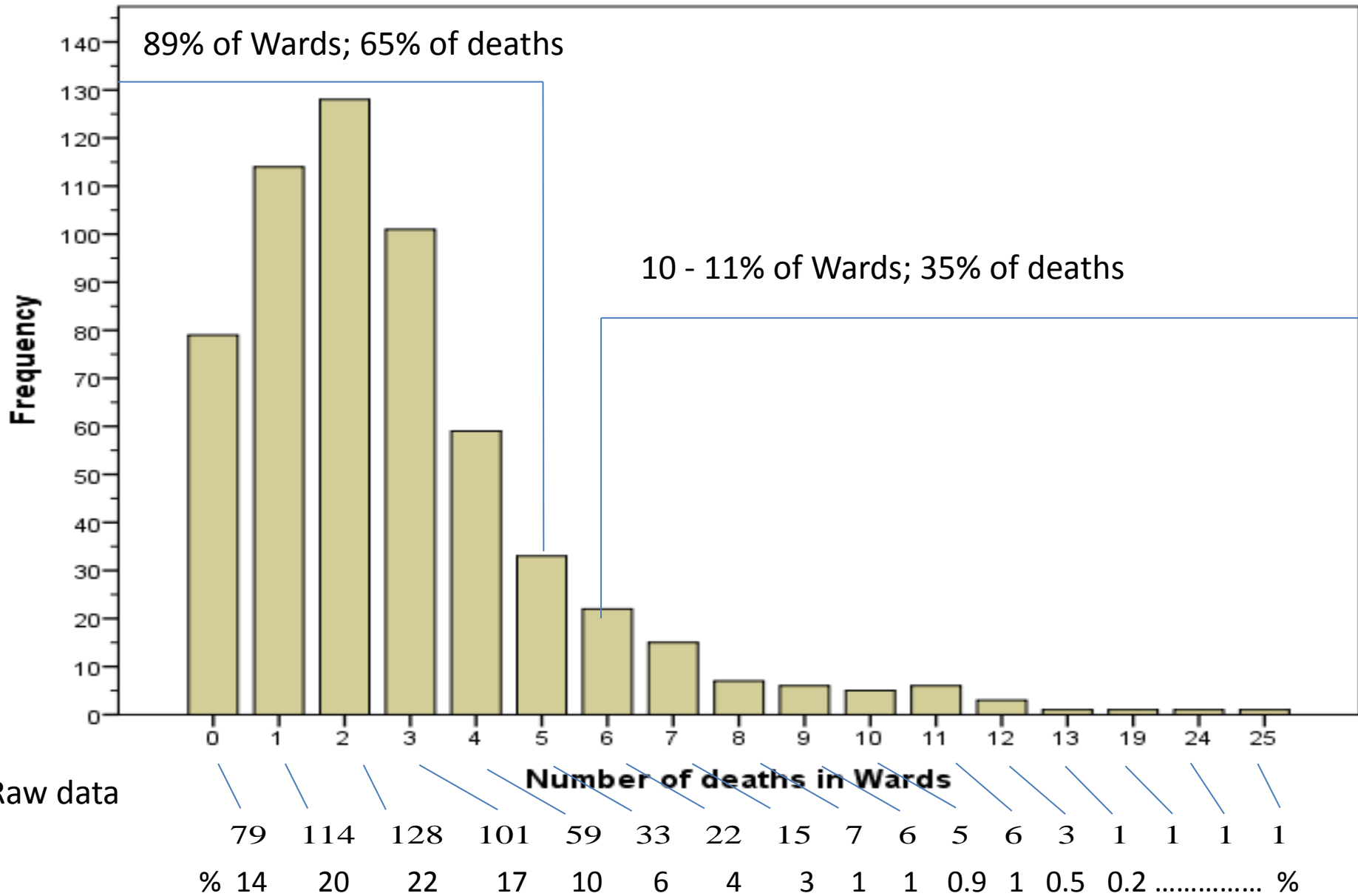


Figure 7.1. Histogram representing the number of Wards reporting between zero and twenty-five deaths, with the frequencies reported on both the vertical (y) and horizontal axis

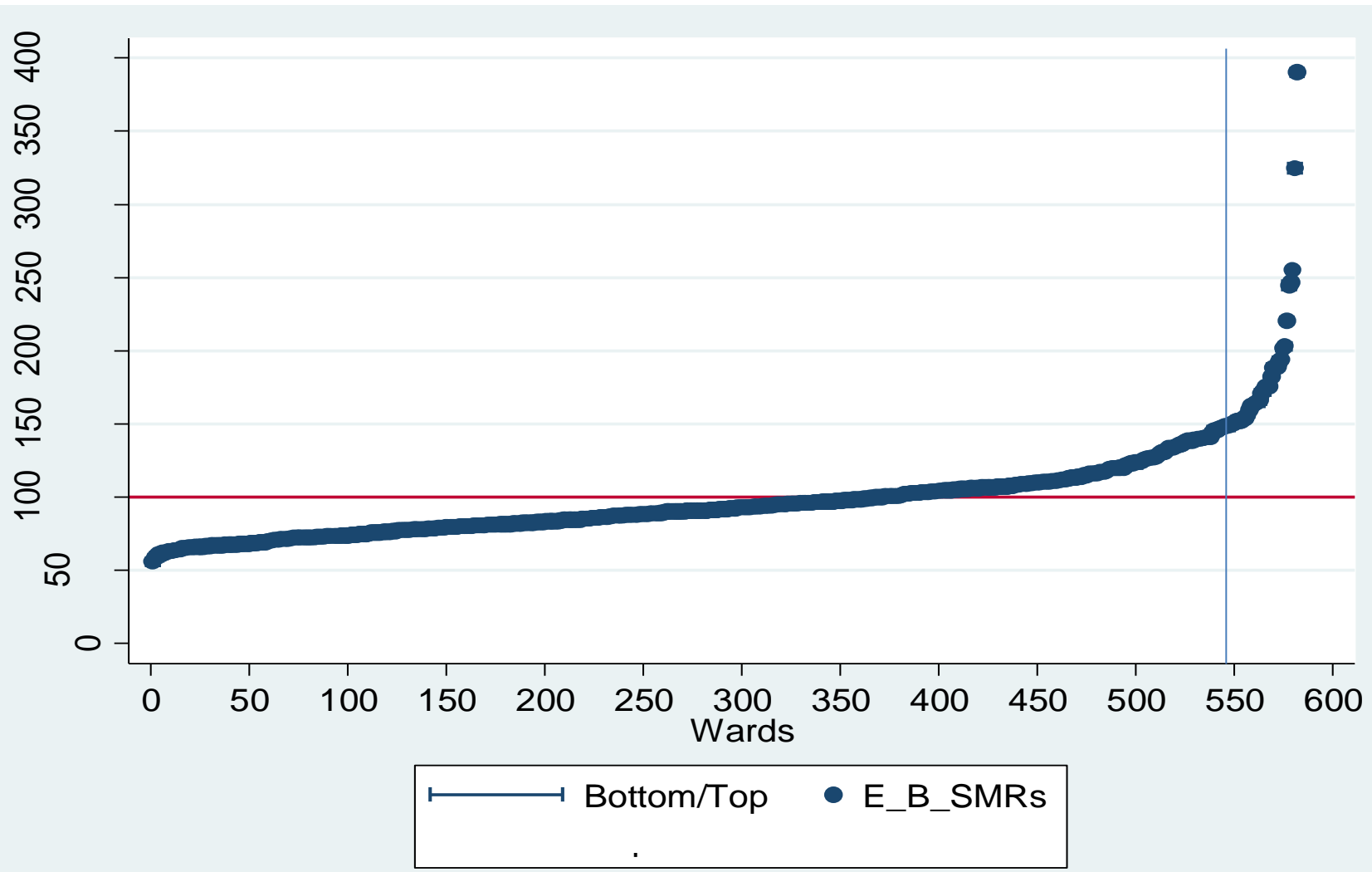
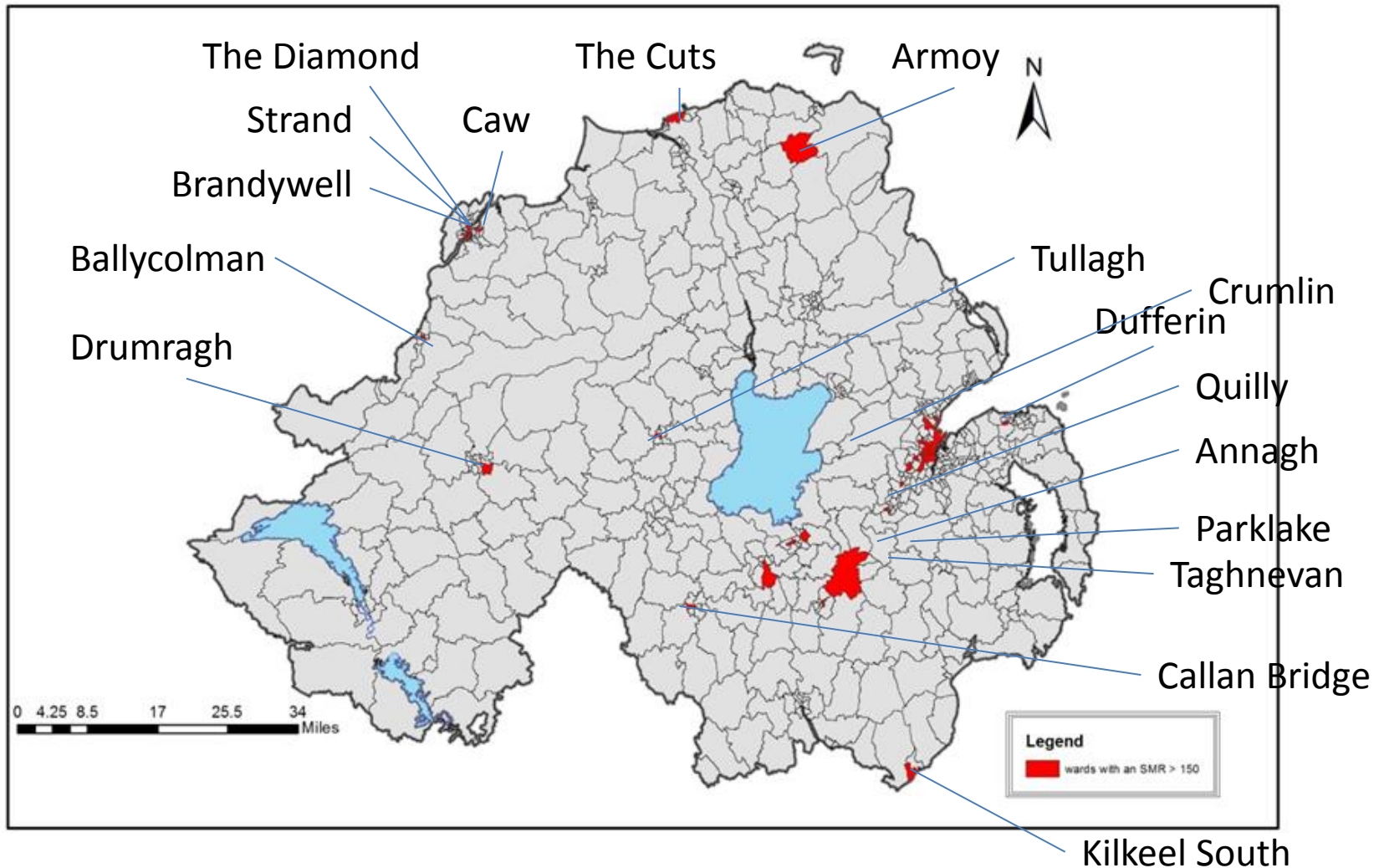


Figure 7.2. Empirical Bayes Standardized Mortality Ratios based on a random intercept Poisson regression

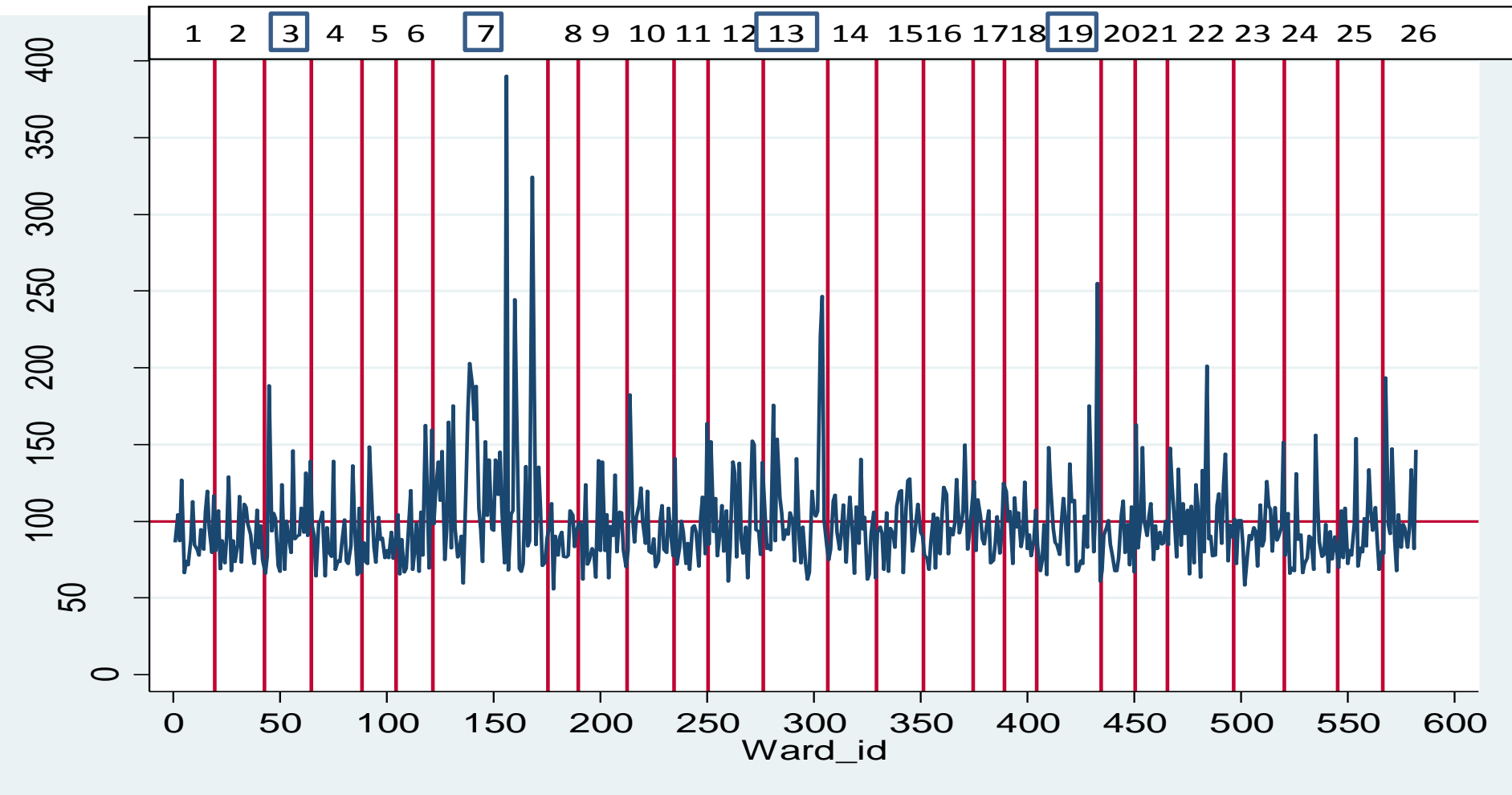
**Table 7.2. Empirical Bayes standardised mortality ratios for Wards where the predicted value exceeded a 50% increase in deaths over the average expected rate in Northern Ireland**

Ward Name	E_B_SMRs	Ward Name	E_B_SMRs
Taghnevan	150.1153	Blackstaff	175.5638
Whitehouse	151.5619	Brandywell	175.8601
Glen Road	151.9667	Atlantic	182.6018
Annagh	152.1473	Falls	188.237
Parklake	152.5901	Crumlin	188.2591
Caw	153.7982	Callan Bridge	188.4468
Drumragh	154.2816	Whiterock	192.7861
Dufferin	156.1439	Ballycolman	193.5144
The Cuts	159.6616	Kilkeel South	201.5271
Quilly	162.5285	Clonard	203.0535
Armoy	162.9908	Strand	220.6672
Tullagh	163.9322	Shaftesbury	244.7299
Bellevue	164.6018	The Diamond	246.7099
Duncairn	165.8928	Twinbrook	255.254
Cliftonville	170.7362	Waterworks	324.7393
Shankill	171.8981	New Lodge	390.2299
Old Warren	175.2934		

**Northern Ireland Wards with a Standardised Suicide Mortality Rate  
(2005-2011) greater than 150 (n=33)**



**Figure 7.4. Empirical Bayes standardised mortality ratios, for Wards, with a value in excess of 150 (SMR)**



**Figure 7.5. Empirical Bayes standardized estimates displayed in alphabetical order within Wards and grouped by Local Government Districts**

LGDs are as follows: (1) Antrim (2) Ards (3) Armagh (4) Ballymena (5) Ballymoney (6) Banbridge (7) Belfast (8) Carrickfergus (9) Castlereagh (10) Coleraine (11) Cookstown (12) Craigavon (13) Derry (14) Down (15) Dunganon STyrone (16) Fermanagh (17) Larne (18) Limavady (19) Lisburn (20) Magherafelt (21) Moyle (22) Newry and Mourne (23) Newtownabbey (24) North Down (25) Omagh and (26) Strabane

**Table 7.3. A two-level random intercept Poisson regression for the estimation of standardised mortality ratios**

tot_suicides	exp(b)	Std. Err.	z	P> z	[95% Conf. Interval]
MDM_score	1.020556	.0015461	13.43	0.000	1.01753 1.023591
_cons	.5856762	.0288375	-10.94	0.000	.5321533 .6445822
_lne	1	(offset)			

Variances and covariances of random effects

\*\*\*level 2 (Ward\_id)

var(1): .05112364 (.0183877)

Note. A quadratic and cubic relationship between SMR and deprivation was also examined. These were not statistically significant, and the results have not been reported.

**Table 7.4. A two-level random intercept Poisson regression for a test of differences between LGDs**

tot_suicides	exp(b)	Std. Err.	z	P> z	[95% Conf. Interval]
MDM_score	1.019997	.0017258	11.70	0.000	1.01662 1.023385
Aldergrove	.9486861	.1473747	-0.34	0.735	.6996675 1.286333
Ards	.9005264	.1219265	-0.77	0.439	.6906345 1.174207
Armagh	1.131944	.2008976	0.70	0.485	.7993803 1.602862
Ballymena	.7421275	.1352308	-1.64	0.102	.5192448 1.060681
Ballymoney	.6490462	.2026124	-1.38	0.166	.3520113 1.196726
Banbridge	.9555191	.2215714	-0.20	0.844	.6065375 1.505293
Carrickfergus	.7003475	.1600055	-1.56	0.119	.4475516 1.095933
Castlereagh	.9925424	.1724881	-0.04	0.966	.706031 1.395322
Coleraine	1.010704	.1528902	0.07	0.944	.7513843 1.359522
Cookstown	.8585355	.1976735	-0.66	0.508	.5467305 1.348165
Craigavon	1.037667	.1403865	0.27	0.785	.7959736 1.35275
Derry	.8725773	.1163983	-1.02	0.307	.6718264 1.133315
Down	.8910442	.1444612	-0.71	0.477	.6484814 1.224337
DunganonST	.9760888	.1289645	-0.18	0.855	.7533996 1.2646
Fermanagh	1.03576	.1495303	0.24	0.808	.7805002 1.374501
Larne	.9482511	.1443411	-0.35	0.727	.7036473 1.277885
Limavady	.925623	.1495215	-0.48	0.632	.6744261 1.270381
Lisburn	1.013175	.1171126	0.11	0.910	.8077824 1.270793
Magherafelt	.7347531	.1485657	-1.52	0.127	.4943449 1.092076
Moyle	1.051373	.2939773	0.18	0.858	.6077849 1.81871
Newry Mourne	1.041402	.1302709	0.32	0.746	.8149668 1.330751
Newtownabbey	1.003023	.1245042	0.02	0.981	.7864153 1.279292
North_Down	.8645862	.1498176	-0.84	0.401	.6156162 1.214246
Omagh	.8152597	.1527907	-1.09	0.276	.5646369 1.177125
Strabane	.8604308	.1703734	-0.76	0.448	.5836736 1.268416
_cons	.6308198	.0613236	-4.74	0.000	.5213843 .7632253
_lne	1	(offset)			

Variances and covariances of random effects

\*\*\*level 2 (Ward\_id)

var(1): .04445398 (.01767009)



**Table 8.1. Age\_Gender\_Ward\_1\_revised\_restructured\_deaths for Age\_category**

<b>Age categories in years</b>	<b>Deaths within the 4 age categories</b>	<b>Number in subpopulation (% of the total pop shown in brackets)</b>
<b>Birth - 15</b>	<b>27 (1.63%) 70% male</b>	<b>381068 (21%)</b>
<b>16 - 35</b>	<b>805 (48.64%) 82% male</b>	<b>595639 (34%)</b>
<b>36 – 64</b>	<b>675 (40.79%) 74% male</b>	<b>502479 (28%)</b>
<b>65+</b>	<b>151 (9.12%) 75% male</b>	<b>295813 (17%)</b>
<b>Total Number</b>	<b>1655</b>	<b>1774999</b>

**Table 9.1. Empirical Bayes Standardised Mortality Ratios for Wards stratified by age**

```

.
.
• Age_deaths | exp(b) Std. Err. z P>|z| [95% Conf. Interval]
•
• _cons | .6710133 .0267914 -9.99 0.000 .6205052 .7256326
•
• lne | 1 (offset)
•
• Variances and covariances of random effects
• -----
• ***level 2 (Index1; age-group)
• var(1): .61256759 (.08216546)
• ***level 3 (id; Wards)
• var(1): 5.674e-15 (1.208e-13) ns
• ***level 4 (LGD_Code)
• var(1): .01758583 (.00963021) ns

```

**Figure 9.2. Dropline graphs showing the relationship between deprivation and SMRs by age grouping**



Note: Index1 1 = birth to 15 years; Index1 2 = 16 to 39 years; Index 3 = 40 = 64 years; Index 4 = 65+ years

**Table 9.5. Empirical Bayes Standardised Mortality Ratios with fixed effects for deprivation and age categories**

Age_deaths	exp (b)	Std. Err.	z	P> z	[95% Conf. Interval]	
MDM_score	1.020344	.0011389	18.04	0.000	1.018114	1.022579
Age_0_15	.0521857	.0130986	-11.76	0.000	.0319081	.0853498
Age_16_39	.9389181	.0724417	-0.82	0.414	.8071489	1.092199
Age_65_plus	.3784778	.0352882	-10.42	0.000	.3152658	.4543641

```

_cons | .840227 .0434687 -3.36 0.001 .759207 .9298933
lne | 1 (offset)

```

Variiances and covariances of random effects

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```

***level 2 (seq)Age group
var(1): .1339248 (.02833138)
***level 3 (id)Ward
var(1): 1.010e-17 (1.342e-14)ns
***level 4 (LGD_Code)
var(1): 5.765e-22 (1.569e-17)ns

```

## Concluding comments

- There is a need to record better, and to link and standardise information. Deaths by suicide in NI are far from random events, as is evident from the analysis in this report; and the search for a better understanding of the systematic element in these deaths should be maintained.
- Efforts should more closely target those areas, identified in this report, where suicide rates are much higher, through a people-based approach via the targeting of subpopulations.
- At this point we don't have sufficient information regarding the very young and older age groups who take their own lives, but there is sufficient evidence in this report to show that their characteristics may well be different from those in other age groups.
- More emphasis should be placed on the trends within locations over many years.
- The co-occurrence of mental health, deprivation, unemployment and relationship stressors are often a common characteristic; and while they are probably the most evident categories, a reason to live also implies that social and psychological capital requires both a societal and an individual response, and this in turn requires us to establish and maintain social norms that can enhance the lived experience.
- For further recommendations based both on the current analysis and on current knowledge, please consult the full report.

# ALBERT CAMUS, *An Absurd Reasoning*

“There is but one truly serious philosophical problem, and that is suicide. Judging whether life is or is not worth living amounts to answering the fundamental question of philosophy. All the rest -- whether or not the world has three dimensions, whether the mind has nine or twelve categories -- comes afterwards. These are games; one must first answer.”

Thank you for your attention