



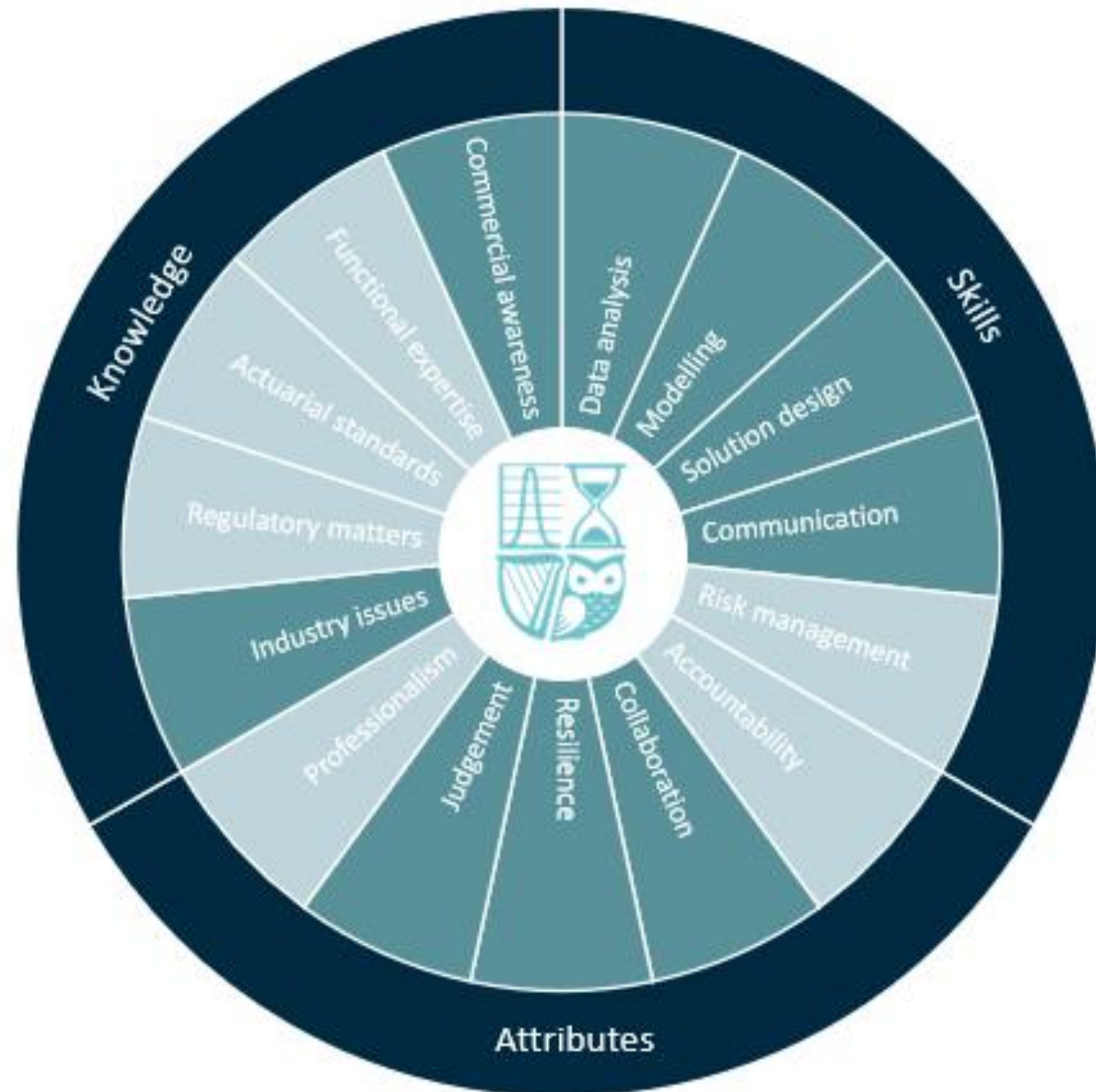
Society of Actuaries in Ireland

Excess Mortality in Ireland during the COVID-19 pandemic

Thursday, 3rd September 2020

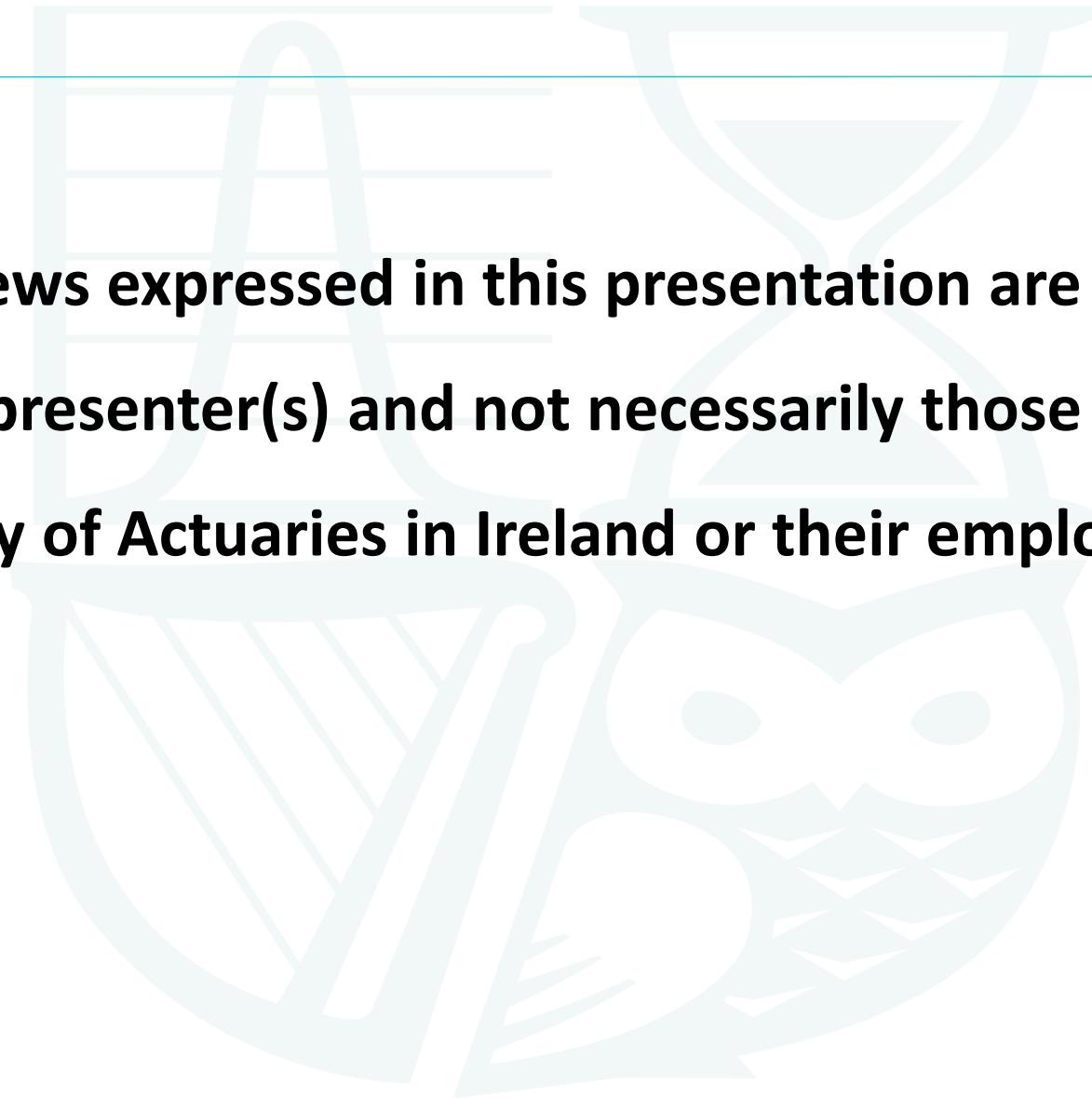


Competency Framework



Disclaimer

The views expressed in this presentation are those of the presenter(s) and not necessarily those of the Society of Actuaries in Ireland or their employers.





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Measuring Mortality During the Covid-19 Pandemic

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Challenge & Context

- Collect timely, inclusive and accurate information on deaths



Solution, in short

- Monitor death notices, using RIP.ie





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Historical Comparisons



A Journal of the Plague Year

- Daniel Defoe's Fictional account of London's bubonic plague (1665), published in **1722**
- Tale begins in September 1664, when rumours circulate of the return of 'pestilence' to Holland
- Next comes the first suspicious death in London, in December, and then, come spring.....



A Journal of the Plague Year

- ...Defoe describes how ***death notices*** posted in local parishes have taken an ominous rise.

Source: <https://www.bbc.com/culture/article/20200413-what-can-we-learn-from-pandemic-fiction>



A Week of Parish Death Notices, London, 1665

- “Bill of Mortality” showing Death Tally of all city parishes for the week of Aug. 15-22, 1665, when the plague had infected 96 of the 130 parishes reporting.

Buried	Males	2656	} Plague	3880	
	Females	2663			
	In all	5319			
Increased in the Burials this Week		1289			
Parishes clear of the Plague		34	Parishes Infected 96		

- Source: <https://slate.com/human-interest/2014/01/bill-of-mortality-document-shows-death-toll-during-the-great-plague-of-london.html>, reviewing Shakespeare's Restless World: An Unexpected History in Twenty Objects, by Neil McGregor, ISBN: 9780670026340

The Diseases and Casualties this Week.

A Bortive	6	Kingsevil	10
Aged	54	Lethargy	1
Apoplexie	1	Murthered at Stepney	1
Bedridden	1	Palie	2
Cancer	2	Plague	3880
Childbed	23	Plurisie	1
Chrifomes	15	Quinsie	6
Collick	1	Rickets	23
Consumption	174	Rifing of the Lights	19
Convulsion	88	Rupture	2
Dropsie	40	Sciatica	1
Drowned 2, one at St. Kath. Tower, and one at Lambeth	2	Scowring	13
Feaver	353	Scirvy	1
Fistula	1	Sore legge	1
Flox and Small-pox	10	Spotted Feaver and Purples	190
Flux	2	Starved at Nurfe	1
Found dead in the Street at St. Bartholomew the Leffs	1	Stilborn	8
Frighted	1	Stone	2
Gangrene	1	Stopping of the stomach	16
Gowt	1	Strangury	1
Grief	1	Suddenly	1
Griping in the Guts	74	Surfeit	87
Jaundies	3	Teeth	113
Impofthume	18	Thrush	3
Infants	21	Tifick	6
Kild by a fall down stairs at St. Thomas Apostle	1	Ulcer	2
		Vomiting	7
		Winde	8
		Wormes	18

Christned	Males	83	} Buried	Males	2656	} Plague	3880	
	Females	83		Females	2663			
	In all	166		In all	5319			
Increased in the Burials this Week		1289						
Parishes clear of the Plague		34	Parishes Infected 96					

The Afixe of Bread forsh by Order of the Lord Mayor and Court of Aldermen;
A penny Wheaten Loaf to contain Nine Ounces and a half, and three half-penny White Loaves the like weight.



“A Method of Dealing with Unregistered Deaths”

- Journal of the American Statistical Association
- Volume 10, **1907**, Issue 80
- Marshall Langton Price M.D., State Board of Health, Maryland, U.S.A.
- “The...method is founded upon.....”



“A Method of Dealing with Unregistered Deaths”

- “...death notices appearing in local papers.
- The method has been used recently to determine the efficiency of registration in the registration areas, and
- is in general more accurate and complete than that obtained by the [Maryland census] enumerators.”





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Death Registration in Ireland

Death Registration in Modern Ireland

- Not the responsibility of a modern census enumerator, who counts people alive and in the state on census night, once every 5 years
- Death registration is a statutory requirement, with individuals' responsibilities set out in **The Civil Registration Act 2004**
- <http://www.irishstatutebook.ie/eli/2004/act/3/enacted/en/html>



Civil Registration Act 2004

- **37.—(1)** When a death occurs in the State, it is the duty of
 - (a) ***a relative of the deceased*** who has knowledge of the required particulars in relation to the death, and
 - (b) if there is no such relative who can be found or every such relative is incapable through ill health of complying with this subsection, ***each other qualified informant***, unless he or she reasonably believes that another qualified informant has complied with it in relation to the death
 - **within 3 months** from the date of the death to give to any registrar the required particulars of the death in the form standing specified for the time being by an tArd-Chláraitheoir.



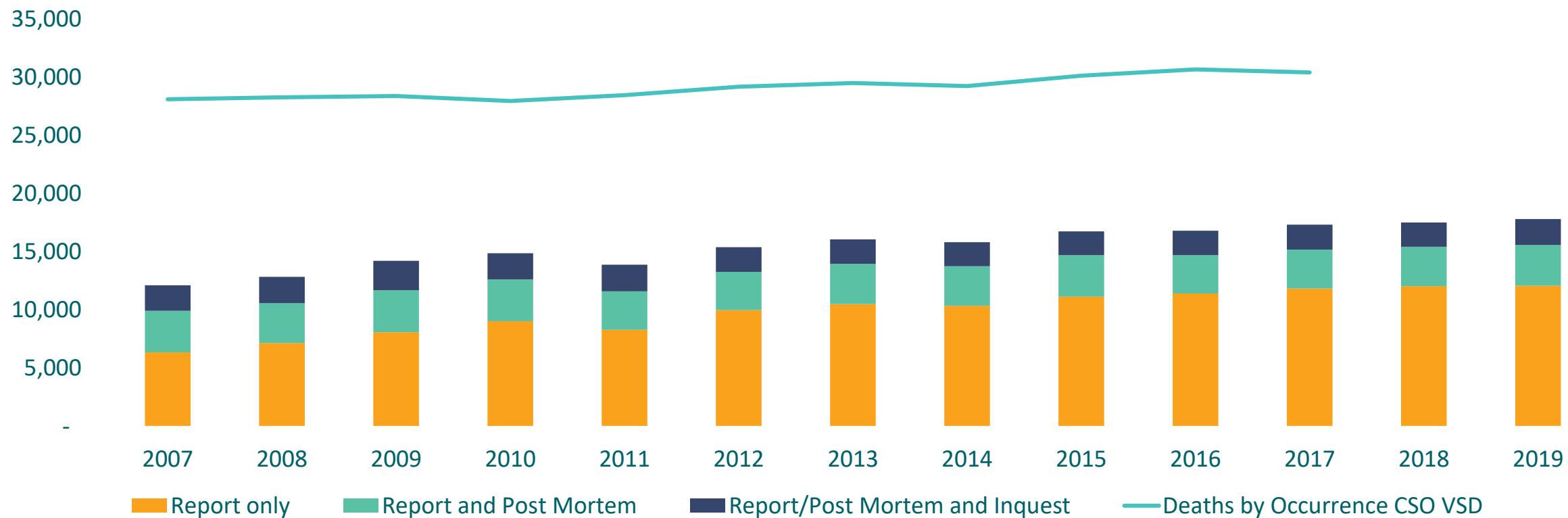
Current Registration practice poses difficulty

- Three months is quite long, especially during a pandemic
- Lengthy delays can be experienced, for example, due to involvement of the Coroner, Gardaí, DPP, HSA
- Ratio of deaths to coroners is highest in Dublin, meaning higher workloads
- Registered Deaths as a percentage of actual deaths is clearly affected by personal compliance with the Act
- Non-compliance could be due to a variety of factors
- <https://www.cso.ie/en/releasesandpublications/in/vs/informationnoteontheimplicationsofcovid-19ontheprocessingofdeathcertificates/>



Coronial Involvement, 2007 to 2019

Coroner Cases by Year and Type
<http://www.coroners.ie/en/cor/pages/publications>



Coronial Involvement

- 2007, 43% of deaths (12,124 out of 28,117)
- 2017, 57% of deaths (17,337 out of 30,418)
- Why the increase?
- Response from Coroner's Society of Ireland:
 - “explanation is primarily legislative...there is an increased reporting of cases subsequent to 2007”
 - “..all nursing home deaths are reported, as are all neonatal deaths and still births”
 - “refer...to 2nd Schedule of Coroners Amendment Act 2019, as to Deaths reportable to a Coroner”
 - “see full list of reportable deaths, which is much increased on the previous 1962 reportable cases”
 - <http://www.irishstatutebook.ie/eli/2019/act/29/schedule/enacted/en/html>



Technology and Response

- Anecdotal, from conversation with an OTC stat in 2008
- Increase of Mobile Phone ownership by teens, correlated with “increase” in tobacco usage
- No causal relationship
- Simply put, OTC realised teens had opportunity, out of earshot of parents, to respond honestly about tobacco consumption – had to revise earlier time series as a result
- New collection methods can mean breaks in time series



Technology and Response

- “During the coronavirus pandemic, you can apply to register a death ... by e-mail or by post. You do not need to attend the civil registration service offices in person.”
- <https://www2.hse.ie/services/births-deaths-and-marriages/registering-a-birth-death-or-marriage/how-to-register-a-death-in-ireland.html>
- You can take a photo or scan of your ID and email along with death certificate
- **Question:** What effect, if any, has this technological adaptation had on the volume of registrations?
- **Question:** What effect, if any, has isolation and “cocooning” of, e.g., recently-bereaved elderly widows and widowers had on volume of registrations?
- Will the effect constitute a break in time series? Will it persist or revert?





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www.rip.ie

www.rip.ie

- Privately-owned company
- Has become a popular website to notify deaths and provide funeral details
- Used by Irish and Northern Irish citizens and expatriates
- 150,000 hits per day
- (The CSO are grateful to RIP.ie for permission to use their website)



www.rip.ie

- Only funeral directors can post a notice using a secure login, ensuring the data is of good quality and duplicates are rare
- Irish custom of holding funerals within two to three days following death
- Notices are placed in a fast and efficient manner, **usually within 1 day of death**



www.rip.ie

- The combination of these market and cultural forces have made RIP.ie a valuable crowd-sourced means of tracking deaths
- As close to “real-time” public death notifications as are available
- When compared with the statutory time limit of **3 months** for the registrations of deaths in the State, this is a opportune data source for monitoring trends in mortality during the pandemic.



Death Notice Publication Process

Publish a death notice

To publish a death notice on RIP.ie, simply ask your funeral director to do so. This is a free service to bereaved families and all funeral directors in Ireland have secure access to the site for the purpose of publishing death notices for funerals which they are undertaking.

In cases where, for example, a funeral is taking place abroad, the family can contact RIP.ie directly and we will liaise with the funeral director who is handling the arrangements.

Given the sensitive nature of the information on RIP.ie, we cannot accept notices directly from the public. Similarly, we cannot make changes to a notice published on the site by a funeral director, such changes can only be made by the funeral director.

The only way to guarantee that a notice appears on RIP.ie is if the funeral director publishes the notice on the site.

Source: <https://rip.ie/article.php?AID=52>



Sample Death Notice Structure (Mock-up)

Address(es)

The death has occurred of Martin Aaron

Annagassan, Louth / Borris Carlow

Names, including maiden names and nicknames



Aaron, Martin (9 South Street, Annagassan, Co. Louth and formerly of Borris, Co. Carlow). Suddenly, but peacefully, in the presence of his loving family. Beloved husband of Anne (nee Moran) and father of Martin, Leo, Anita and Jane; sadly missed and lovingly remembered by his wife, daughters, sons, brother Jim and Tom, sisters Alice (O'Connor), Molly (Dolan) and Nellie (Lavelle), grandchildren, daughters-in-law, son-in-law, nieces, nephews, sisters-in-law, brothers-in-law, cousins and a large circle of friends.

Rest in Peace.

Reposing at The Community Mortuary Chapel tomorrow evening, Friday, from 5.30pm with removal at 8pm to St. Monica's Church, Durrin. Requiem Mass on Saturday at 11.30am. Burial afterwards in the adjoining cemetery.

"Metadata": includes various information such as **place of death**, e.g. "Peacefully at home", "Suddenly. In the wonderful care of XYZ Nursing Home"

Publication Date

Date Published: Monday 1st January 2016

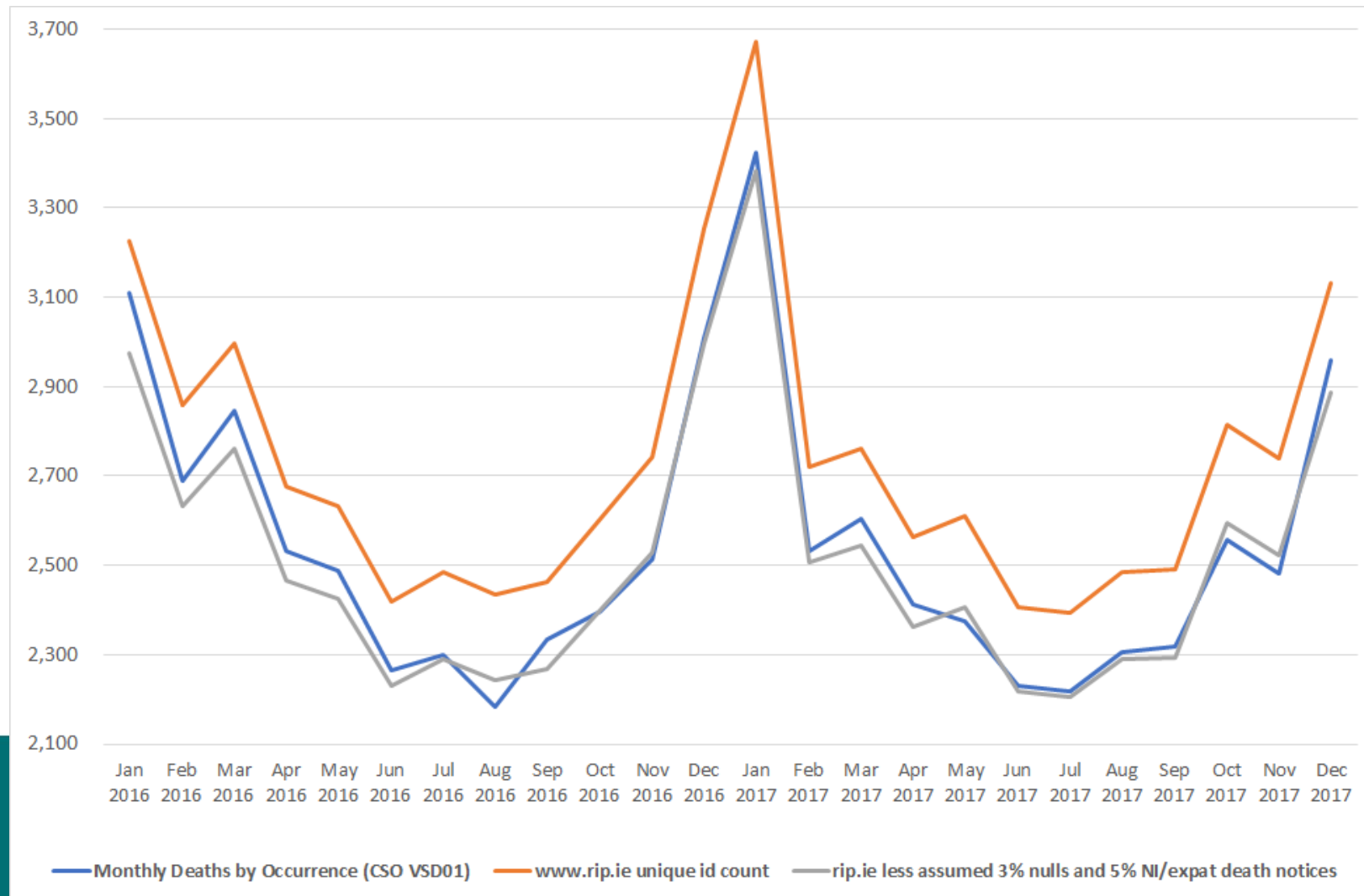
Date of Death: Saturday 30th December 2015

Date of Death

Source: http://ripservices.ie/FamilyNotices/DeathNotice_Ack.htm



Monthly Deaths by Occurrence (CSO) vs rip.ie death notices January 2016 to December 2017



Correlation > 0.99



Duplicates

- Less of an issue as presumably just one funeral director
- Each record below relates to same individual but **url** resolves to the same webpage by way of a **unique id**
- Assists those searching by place, deceased has likely had more than one address
- Duplicates can occur for a Gaeilgeoir or a decedent from a Gaeltacht area, one in each language. However, bilingual notices are more common

↑ Home ▶ Death Notice

Name	Town	County	Published
Buckley, T	Templemore	Tipperary	0 /05/
Buckley, T.	Ballinasloe	Galway	0 /05/
Buckley, T	Ballinasloe	Roscommon	0 /05/

◀ Previous | Next ▶ 1



Url Structure & Unique Id

- The Unique Id is an incremental numeric variable, e.g. 1,2,3 etc.
- This was exploited to implement the webscrape
- Facilitates simple and effective record keeping



Approach

- Scrape regularly
- Read all death notices
- Clean & Classify
- Tabulate
- 11 months complete – October 2019 to August 2020
- Time consuming but good quality results and provides reliable training and test-data for potential automated classification



Scraped Variables

- Unique ID
- Names
- Addresses (sometimes Northern Ireland, overseas)
- Date of Publication
- Date of Death (sometimes missing)
- Metadata aka Death Notice or Obituary (often informative)



Derived Variable - Gender

- Circa 1,100 names were manually coded
- Personal pronouns etc: As metadata contains “hints” as to the gender, e.g. “née”, “mother of”, “husband to” etc., it was useful in a formulaic means of classification. This was initially checked against the 1,100 and is superior as ambiguous names (e.g. Pat, Fran) would otherwise need manual intervention
- Combination of both yields high accuracy, requiring rare manual coding



Northern Ireland Death Notices

- NI deaths often contain UK postcode, all of which begin with “BT” in the 6 counties
- Deceased may have an address on each side of border
- Therefore, metadata (death notice) is searched for mention of 6 counties or string “BT”.
- Best to read each suspected NI death notice as it can be a legitimate RoI death
- NI deaths make up just under half of non-RoI deaths
- Publication Lag \approx 1.3 Days



Overseas Deaths

- Generally occur in expatriate strongholds
- UK: London, Manchester, Birmingham
- North America: New York, New Jersey, Massachusetts, Toronto
- Antipodes: New Zealand, Australia
- Common to find death notices for emigrant missionaries
- Likely holiday deaths, e.g. Spain, are deemed to be Irish deaths and relevant to Irish official statistics, unlike expat deaths where the deceased had made a new life there e.g. married, had children – often clear from the metadata, negligible
- Just over half of non-Rol deaths
- Publication Lag \approx 11.7 days



Place of Death – Manually Coded

- Each death notice is read to determine place of death
 - If Overseas (expatriate) or Northern Ireland then it is removed
 - Otherwise, it is coded to Hospice, Hospital, Nursing Home, At Home or Other
 - Other includes Accidents, on Holiday or Other Residential e.g. Convents, Assisted Living



On Nursing Homes

- Originally, ran an n-gram analysis – identifying common words, and phrases
- “Nursing home” (a bigram, two words) was common – Covid-stricken nursing homes also ranked highly
- HIQA Codes were applied to records where death occurred in a HIQA-regulated “Older Person’s” Facilities, also known as “Nursing Homes”, “Care Centres”, “Community Hospitals”, “Care Homes”, “Retirement Homes”, “Homes”
- If the nursing home was only mentioned in the context of a donation, it was not coded as the place of death
- Register: https://www.hiqa.ie/centre/export/older_persons_register.csv?format=csv
- Certain Homes, e.g. Assisi House Navan Rd., for the Retired Religious i.e. nuns and priests are not HIQA regulated
- N.B. HIQA Older Person’s Facilities can incorporate hospices on campus, e.g. Marymount in Cork or Milford in Limerick – However, death notice will not distinguish which facility was used
- N.B. If the deceased’s death notice mentioned that they died in hospital but were previously cared for in a Nursing Home, then, in the context of the pandemic, they were coded as having died in a Nursing Home



Nursing Homes and Location of Death

- Let's say the deceased's lifetime addresses were listed as Lucan/Sandymount/Ballsbridge, but they passed away in a nursing home in Bray
- Then, the three addresses are irrelevant, especially in the context of Covid-19 clusters
- Large proportions of deaths occur in nursing homes, but tragically, in particularly large numbers in April 2020
- Where a decedent passed away in a nursing home, nursing home county was used
- This was one clear advantage of reading the death notice





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The Death Events Publishing Service (DEPS)

Late Registered Deaths and the Coroners Office

- The CSO publishes annual statistics on deaths by year of occurrence, ***with a time lag of about 22 months.***
- This is to allow for late registrations
- <https://www.cso.ie/en/releasesandpublications/in/vs/informationnoteontheimplicationsofcovid-19ontheprocessingofdeathcertificates/>



Death Events Publishing Service (DEPS)

- Needed a data source for evaluation/validation of rip.ie
- Period under investigation (of death notice monitoring) begins in October 2019 (Q4)
- <https://deathevents.gov.ie/>



Death Events Publishing Service (DEPS)

- DEPS is a service that distributes information on death events to public sector bodies.
- This information contains details on all deaths notified to the General Register Office.
- It is currently updated every Monday lunchtime.
- There were **1,237,280** death events published between **Dec. 31, 1980** and **May 1, 2020**. Duplicates occur

Source: <https://deathevents.gov.ie/>



DEPS Variables

- 35 Variables
- Registration Date, Publication Date
- First Name, Middle Name, Last Name
- Date of Birth, **Date of Death**, PPSN
- Registered Place of Death, e.g. Hospital, Nursing Home
- Gender, Marital Status, Home Address (can also be nursing home)
- **Nationality**
- Occupation
- Spouse's Details including Occupation & PPSN – GDPR applies where spouse survives



DEPS vs RIP

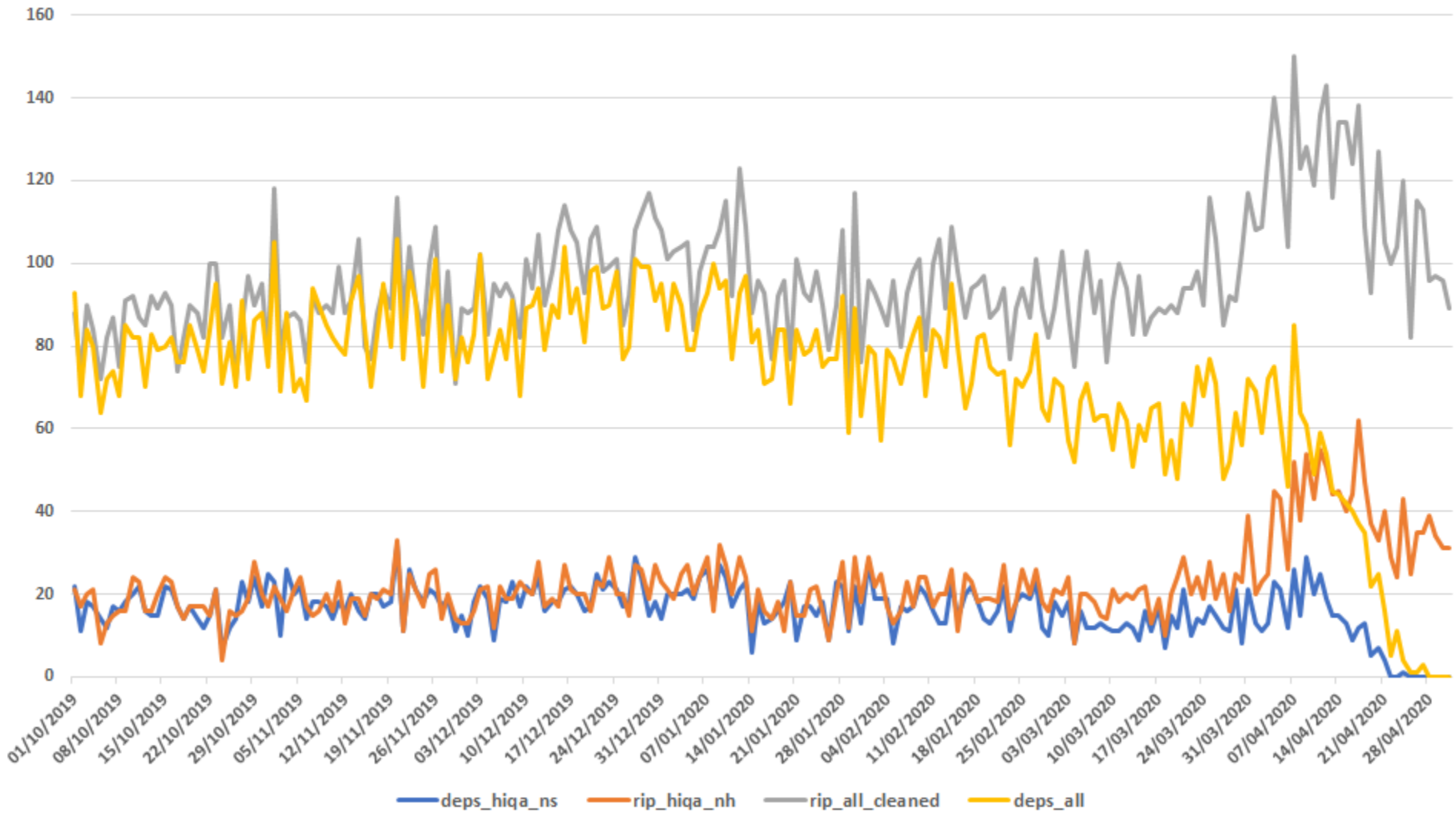
- In the next slide, a comparison of DEPS and www.rip.ie is shown for all deaths, by date of death - and - nursing home deaths by date of death
- Each comparison is of similar magnitude but the closer we get to 1st May , the lower the availability of registered deaths
- The 3 month statutory lag, vs 1.15 day death lag can be seen
- We'll look at a more up-to-date time-lapse later



Death Events Publishing Service (DEPS) vs RIP (Cleaned) by Date of Death

RIP - October 1st 2019 to May 1st 2020

DEPS - Last Update May 1st 2020





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Minorities and Inclusion



Motivated by International Experience

- **USA:** “Long-standing systemic health and social inequities have put many people from racial and ethnic minority groups at increased risk of getting sick and dying from COVID-19.”
<https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html>
- **UK:** “Death rates from COVID-19 were higher for Black and Asian ethnic groups when compared to White ethnic groups. This is the opposite of what is seen in previous years, when the all-cause mortality rates are lower in Asian and Black ethnic groups.”
<https://www.gov.uk/government/publications/covid-19-understanding-the-impact-on-bame-communities>



Is RIP.ie representative of Irish society?

- No way of knowing – one could only make loose assumptions based on the probable nationality implied by names and other information in the death notice – not a sound basis for investigation
- There are clearly decedents from overseas in death notices, e.g. “formerly of Glasgow”, “originally from Krakow”
- One way of collecting experience of minorities is to consult representative organisation



Muslim Community

- Contacted Islamic Foundation of Ireland
- They suggested Contacting South Dublin County Council (SDCC) who administer a Muslim burial plot in Newcastle Burial Ground
- SDCC provided anonymised Muslim Burials from January 2015 to April 2020
- Number of burials for were small for the >5 yr. period (circa 250), but no unusual increases were noted for March and April, 2020



Irish Traveller and Roma Community

- Represented by Pavee Point, who advised
- Most information about Traveller deaths are spread by word of mouth and by phone and social media
- A small proportion of young Travellers use RIP.ie but the vast majority of older Travellers do not
- At the time of contact (28th May 2020) Pavee Point had recorded six deaths of the Roma community due to COVID-19 in Ireland
- In the East of Ireland, they had recorded three Traveller deaths due to COVID-19
- They recommended that ethnicity be recorded as part of death registration – the validity of this recommendation is clear – while it was possible to identify Muslim* deaths by burial ground, there was no apparent commonality to help identify deaths in the Irish Traveller or Roma Community.
- *It is acknowledged that Islam is a religion, not an ethnicity



Direct Provision and Homelessness

- The Irish Refugee Council was contacted, in relation to deaths of COVID-19 in Direct Provision in Ireland.
- At the time of contact they indicated they were not aware of any deaths due to COVID-19 but noted the difficulty in obtaining information on deaths in Direct Provision.
- Three Homeless representative groups were contacted to inquire about potential Covid-related mortality amongst homeless people but no response was received



Embassies and Consulates

- Contacted 22 Embassies – top 22 by population represented as per 2016 census
- Six responses – deaths are registered in Ireland and may be registered in home country in cases where body is repatriated
- No unusual spikes were noted by responding nations
- Also contacted Irish-Polish Society and St. Audoen's Polish Chaplaincy - were not aware





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Results and Conclusions in Initial Publication

Evaluation of RIP.ie

- The www.rip.ie service is an excellent substitute for a statutory near-real-time mortality feed, with a lag of just over 1 day
- The solemnity of the event and relationship between funeral directors and rip.ie underpins the quality of the data – funeral directors are competent records keepers
- The correlation between rip.ie and the CSO death by occurrence for the months of 2016 and 2017 at over 0.99 is reassuring
- Rip.ie competently tracked the daily Covid-19 deaths, as notified to the government
- Metadata provides useful information on the place of death, especially nursing homes at such a critical time
- Potential blindspot due to lower coverage of minorities



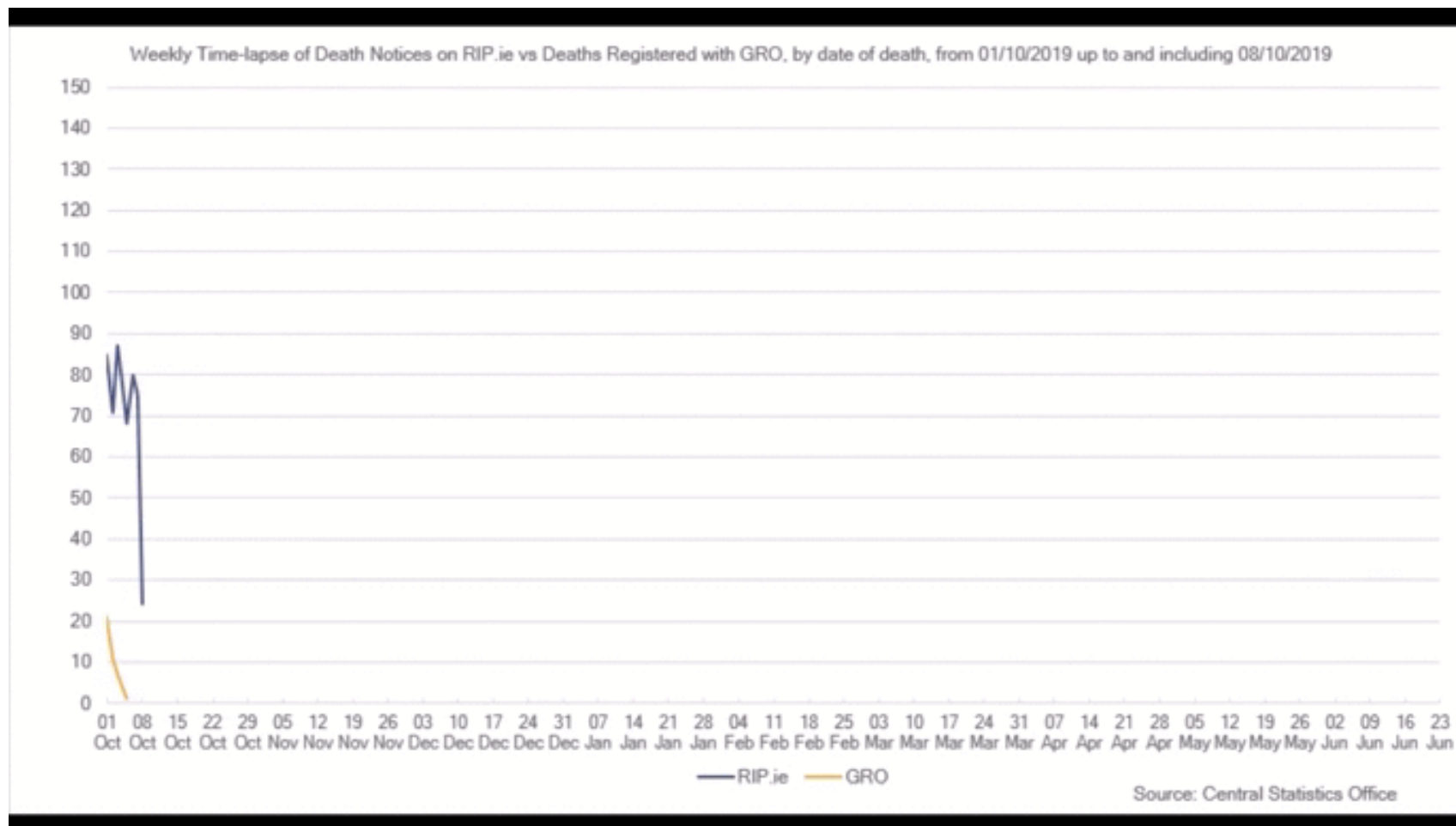
CSO Publication in July 2020 covered period to End June 2020

- Key Findings:
 - Pronounced increase in death notices in April 2020. The numbers of death notices rose from 2,861 in March to 3,502 in April and decreased to 2,635 in May and 2,155 in June
 - Death notices related to older persons' facilities increased from 722 in March to 1,237 in April
 - Information contained in the death notice shows that Dublin and surrounding counties were heavily impacted, while there were also rises in death notices for Cavan, Donegal and Monaghan
 - Text analysis showed that mentions of “cortège” and “webcam” & “broadcast” rose sharply, while references to “rosary” fell
- Read here: <https://www.cso.ie/en/releasesandpublications/br/b-mpds/measuringmortalityusingpublicdatasources/>



Weekly Time-lapse comparison of GRO (DEPS) vs RIP

October 1st 2019 to 30th June 2019



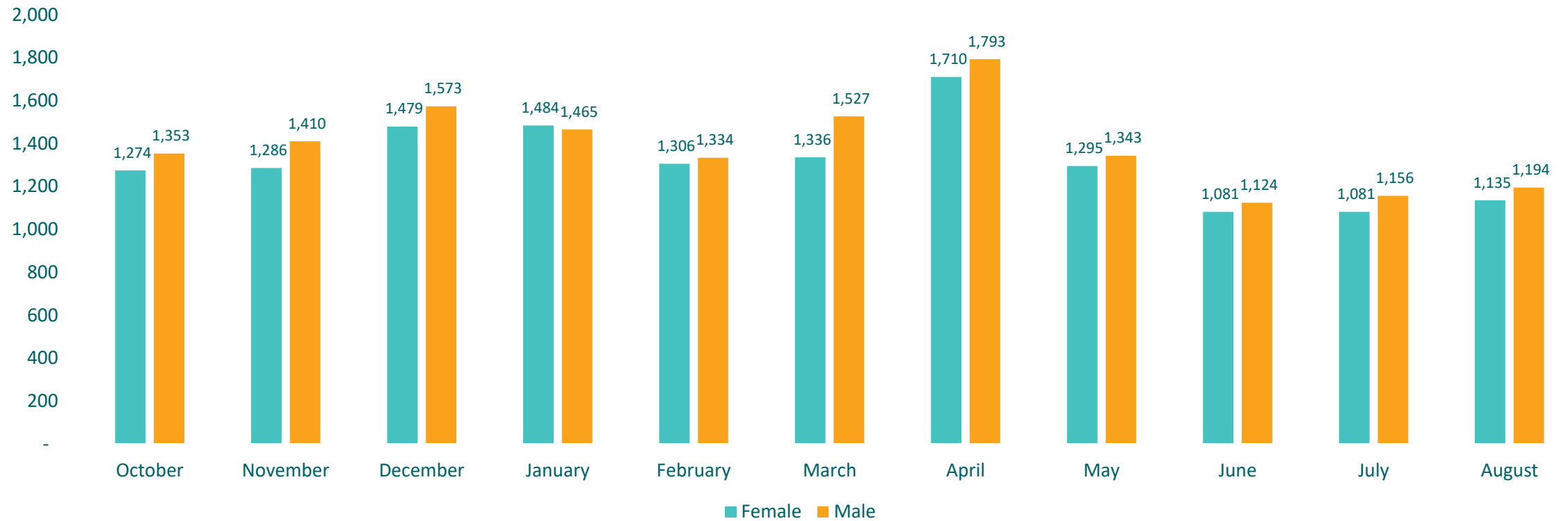


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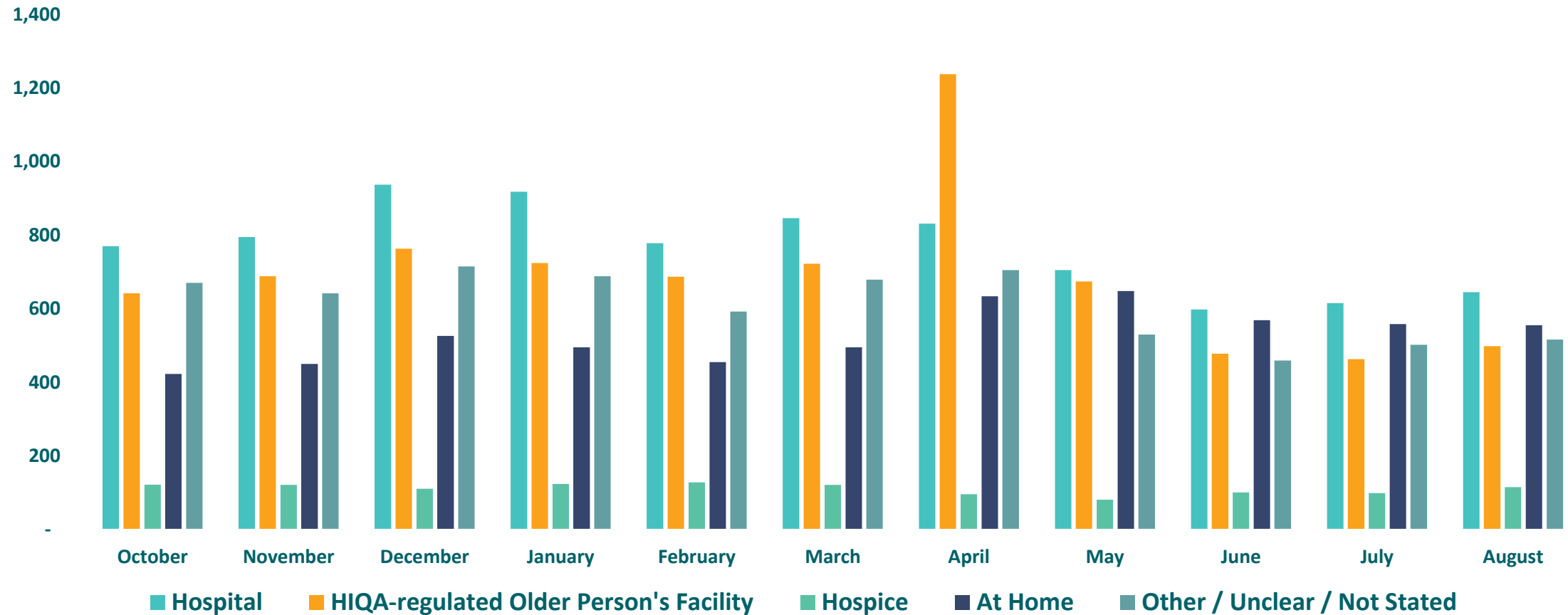
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Latest Data as of
02/09/2020, 9pm

Cleaned Death Notices by Gender, by Month (n = 29,739) October 2019 to August 2020, Source www.rip.ie



Cleaned Death Notices by Place of Death, by Month (n = 29,739) October 2019 to August 2020, Source www.rip.ie



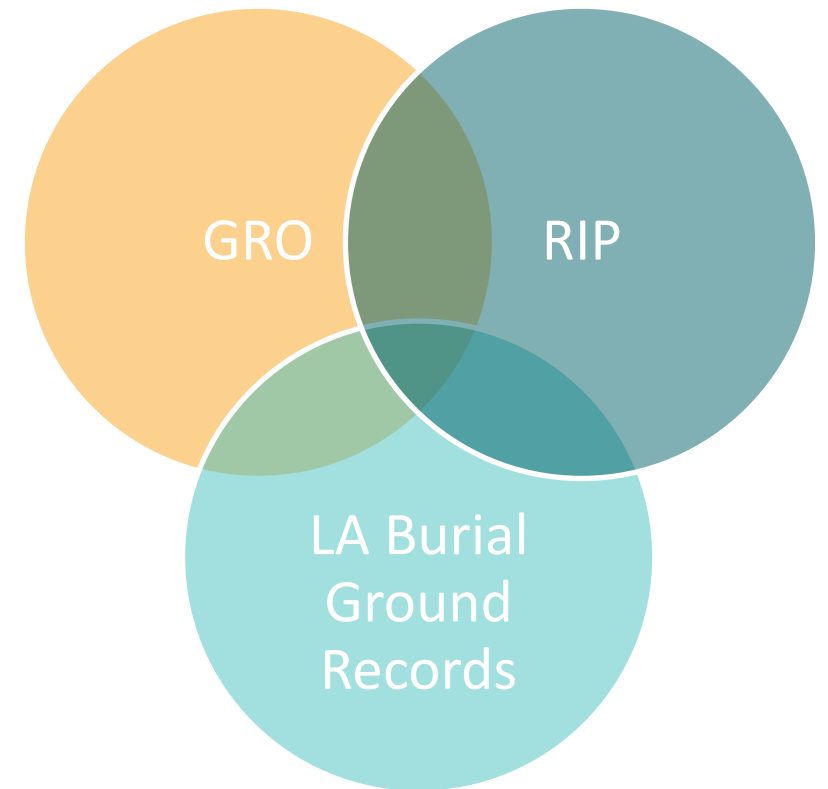
Excess Mortality, March to July 2020 inclusive

- Estimated at between 850 to 900 lives
- Will be updated for August in next “COVID-19 Deaths and Cases” publication
- Series 10 is here:
- <https://www.cso.ie/en/releasesandpublications/br/b-cdc/covid-19deathsandcasesseries10/>



Next Steps

- Death Notices and Local Authority Burial Records give us a new opportunity to identify and quantify unregistered deaths
- New Project, with preliminary results expected before end-2020



Thank You

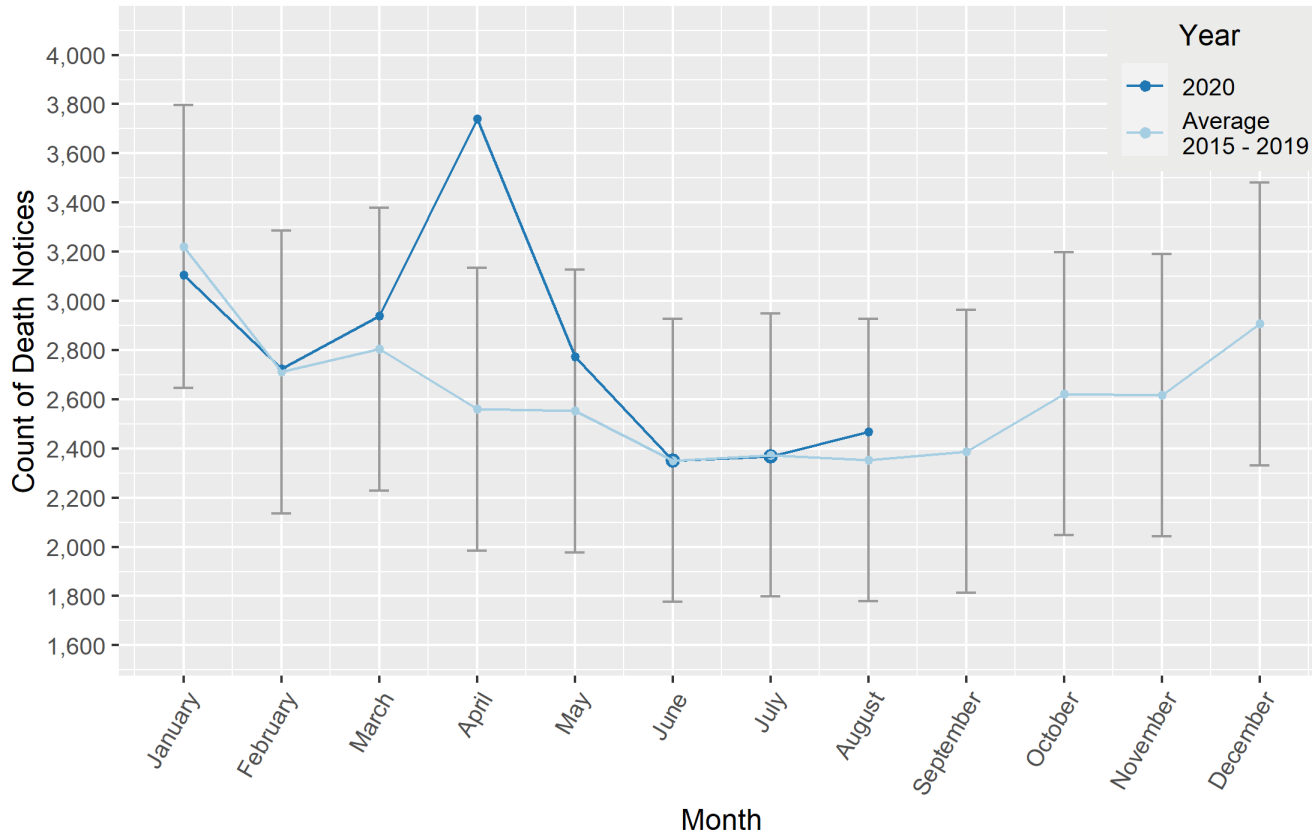
- john.flanagan@csso.ie





Excess Mortality

Irish Death Notices by Month and Year



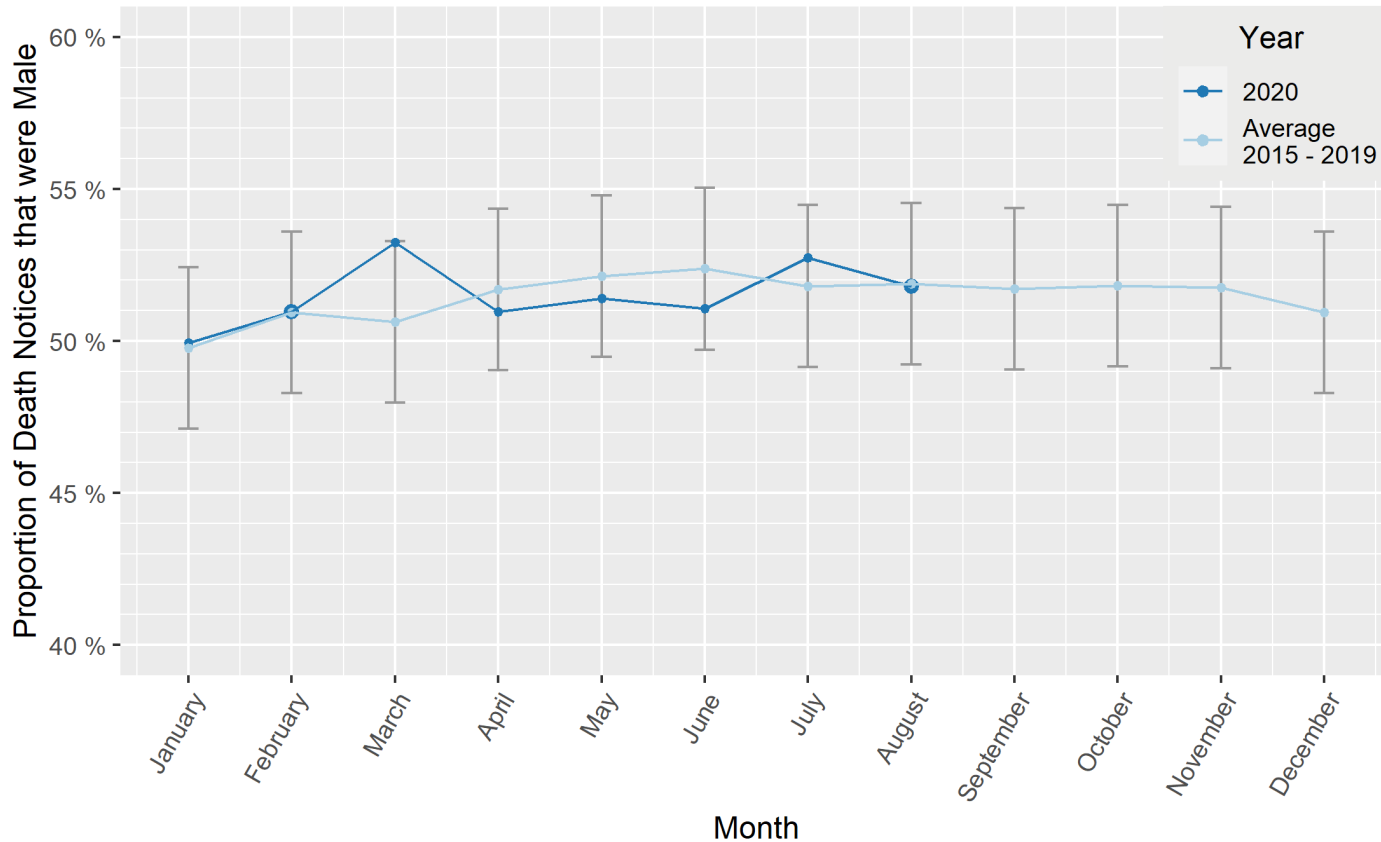
Data from RIP.ie as at 1 September 2020

- Average will incorporate trends of normal flu season
- Large spike in mortality for April
- All other months within confidence interval
- Slight uptick in August



Exploring Gender Bias

Proportion of Irish Death Notices that were Male
by Month and Year



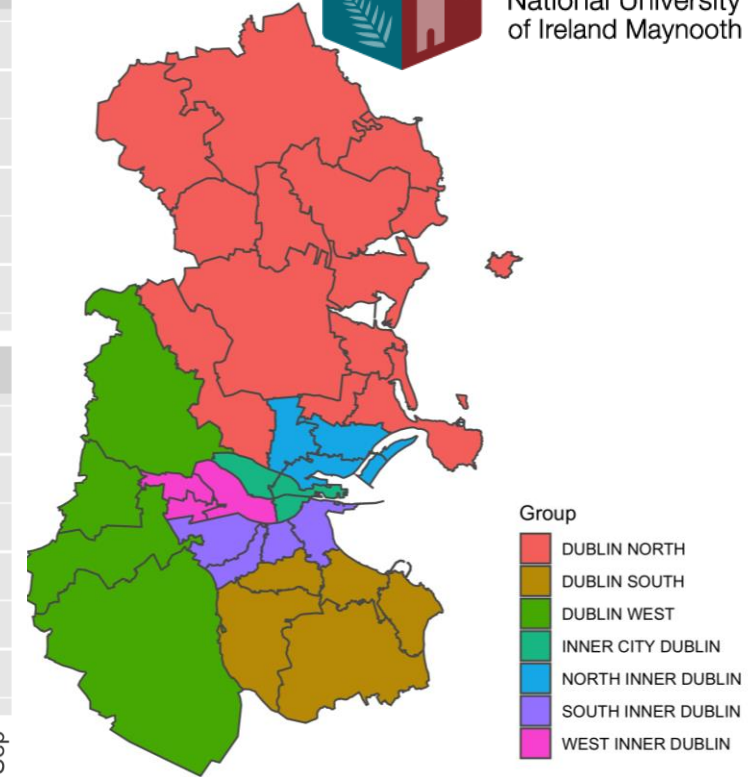
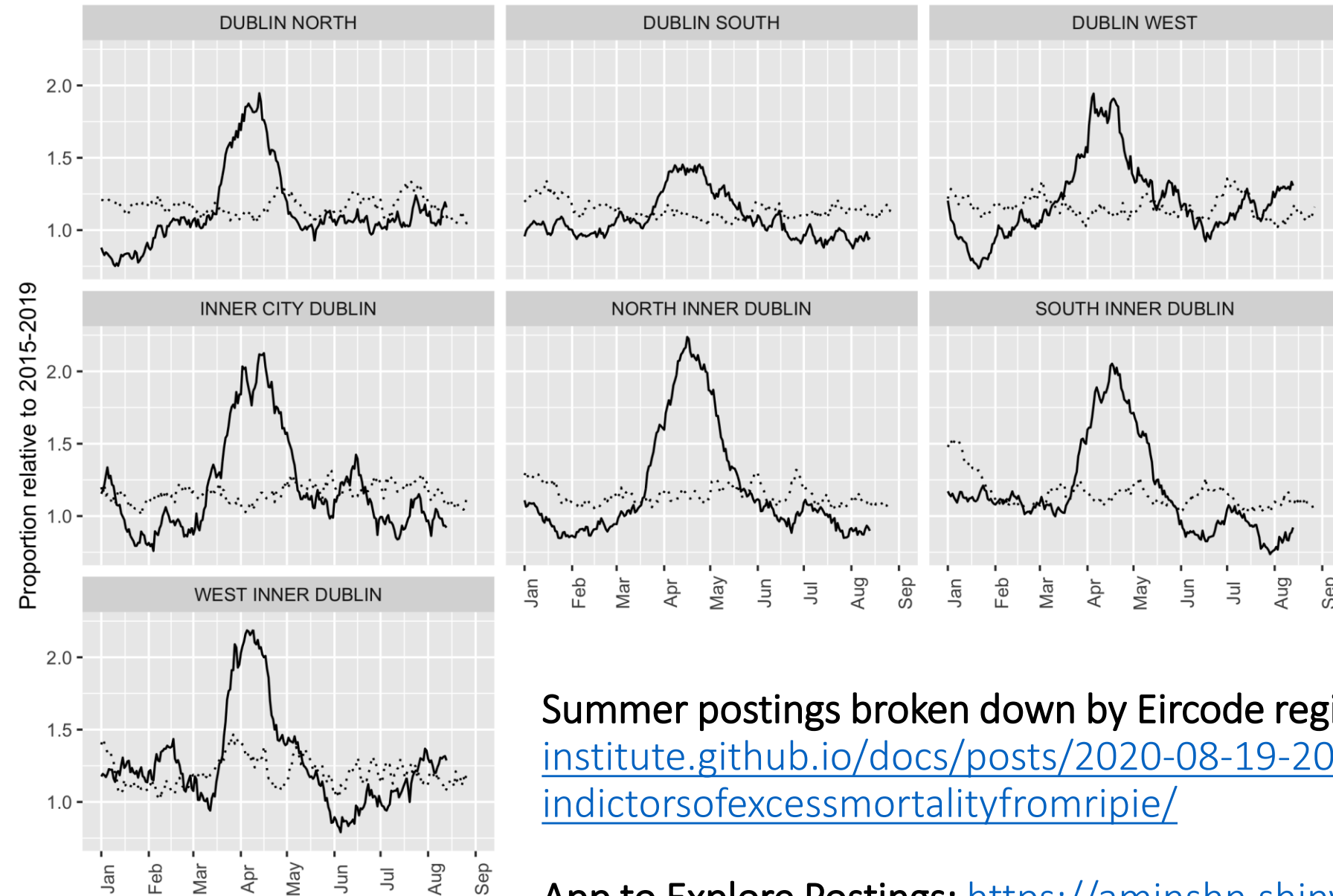
Data from RIP.ie as at 1 September 2020

- Spike in proportion of male deaths at start of pandemic
- The male/female split over 2020 as a whole is broadly in line with the average (~51%)

Proportional Change Notices Posted in 2020



Maynooth University
National University of Ireland Maynooth



Summer postings broken down by Eircode region: <https://hamilton-institute.github.io/docs/posts/2020-08-19-2020-08-indicatorsofexcessmortalityfromripie/>

App to Explore Postings: https://aminshn.shinyapps.io/RIP_data/

Questions

Please click on the Raise
Hand icon
to ask a question
and
wait to be unmuted
or
Use the Q&A function

