



**An
Phríomh-Oifig
Staidrimh**

Central
Statistics
Office

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				
<hr/>							
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



<i>The Diseases and Casualties this Week.</i>				
A Bortive	6	Kingsevil	10	
Aged	54	Lethargy	1	
Apoplexie	1	Murthered at Stepney	1	
Bedridden	1	Palſie	2	
Cancer	2	Plague	3880	
Childbed	23	Plurisie	1	
Chriſomes	15	Quinſie	6	
Collick	1	Rickets	23	
Conſumption	174	Riſing of the Lights	19	
Convulſion	88	Rupture	2	
Droſie	40	Sciatica	1	
Drowned 2, one at St. Kath.		Scowring	13	
Tower, and one at Lambeth	2	Scirvy	1	
Feaver	353	Sore legges	1	
Fiſtula	1	Spotted Feaver and Purples	190	
Flox and Small-pox	10	Starved at Nurſe	1	
Flux	2	Stillborn	8	
Found dead in the Street at		Stone	2	
St. Bartholomew the Leſſe	1	Stopping of the ſtomach	16	
Frighted	1	Strangury	1	
Gangrene	1	Suddenly	1	
Gowt	1	Surfeit	87	
Grief	1	Teeth	113	
Gripping in the Guts	74	Thruſh	3	
Jaundies	3	Tiſſick	6	
Impoſthume	18	Ulcer	2	
Infants	21	Vomiting	7	
Kild by a fall down ſtairs at		Winde	8	
St. Thomas Apoſtle	1	Wormes	18	
Christned	Males 83	Buried	Males 2656	
	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				
<i>The Aſſize of Bread ſet forth by Order of the Lord Mayor and Court of Aldermen;</i>				
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.



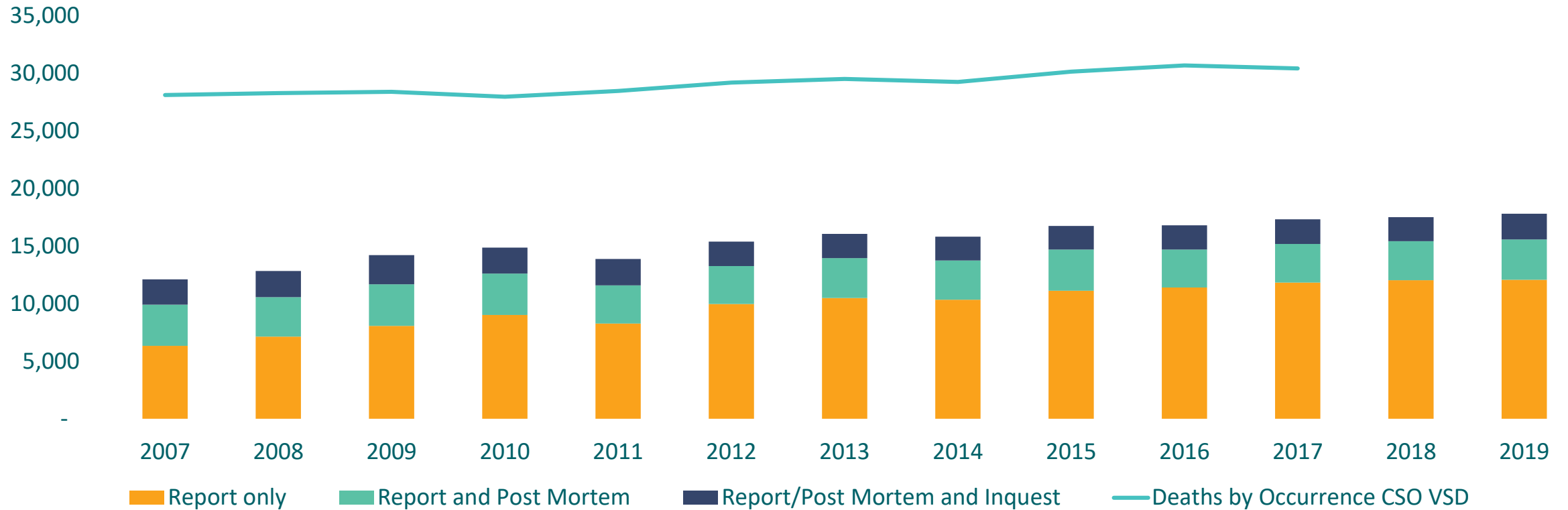
Current Registration practice poses difficulty

- 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>





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- 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.

Publication Date

Date Published: Monday 1st January 2016

Date of Death: Saturday 30th December 2015

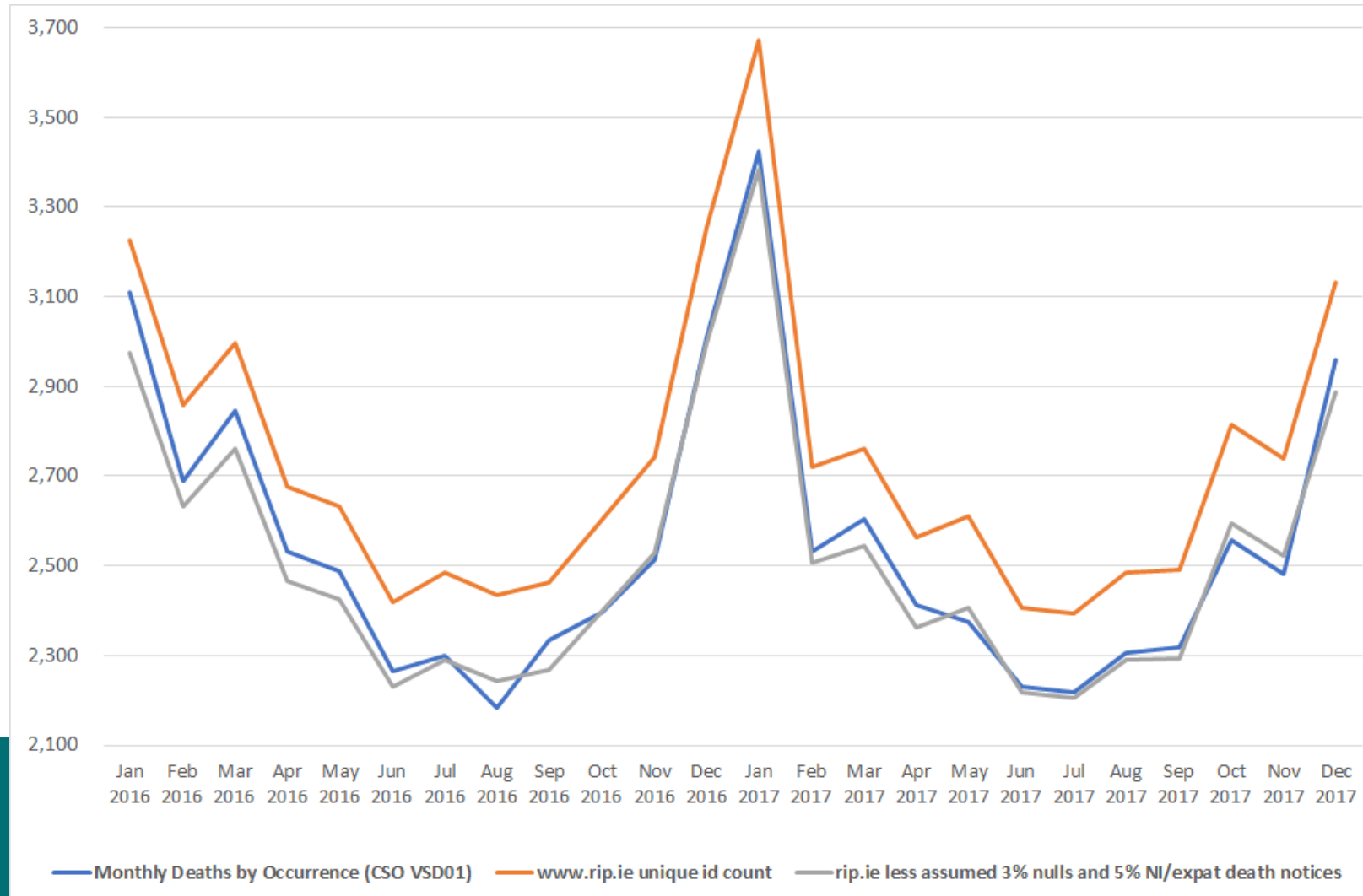
Date of Death

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

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



www.cso.ie

Approach

- Scrape regularly
- Read all death notices
- Clean & Classify
- Tabulate
- 12 months complete – October 2019 to September 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





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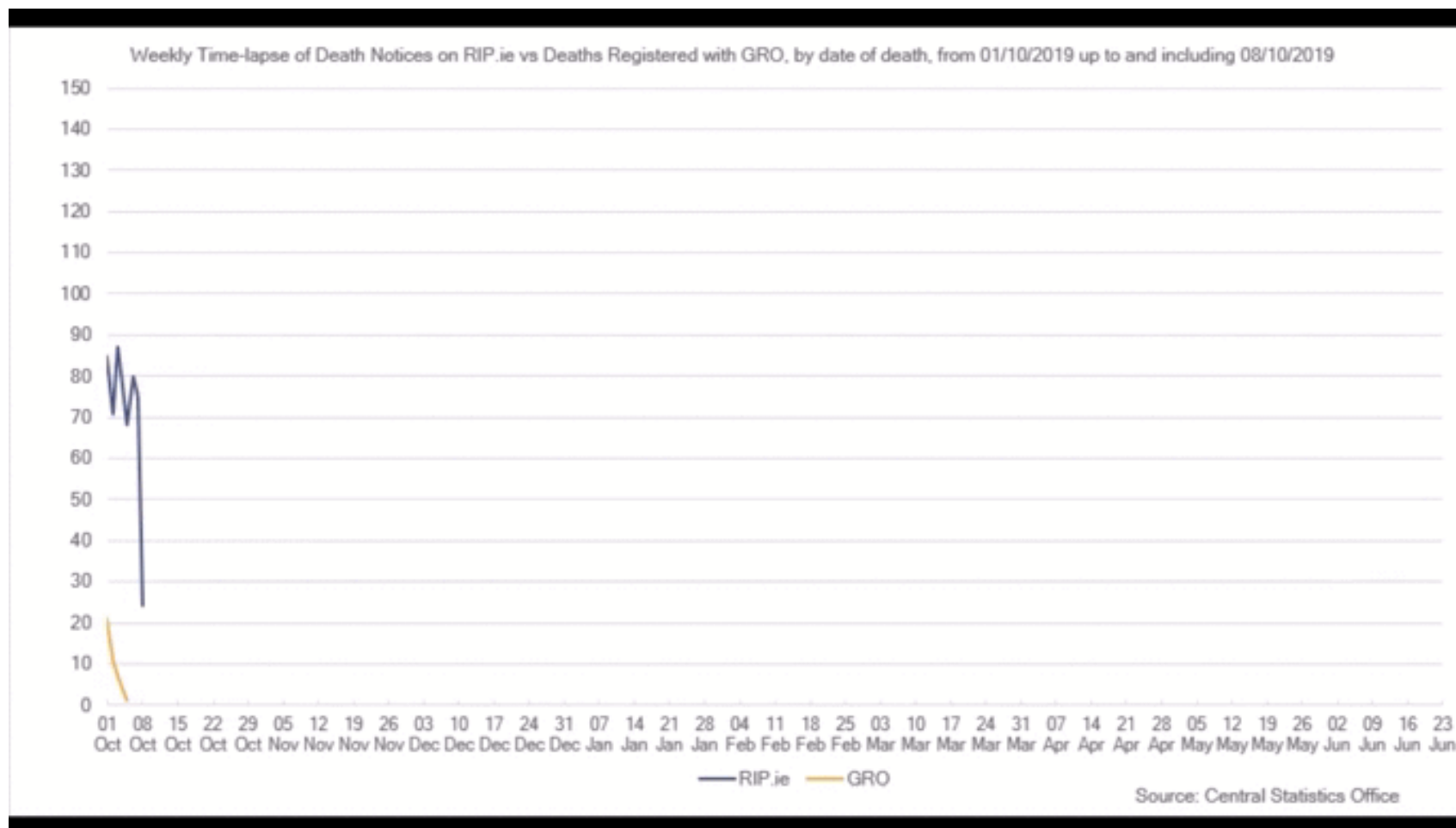
Results and Conclusions in Initial Publication

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



Weekly Time-lapse comparison of Death Registrations vs Death Notices (Rip.ie) October 1st 2019 to 30th June 2019





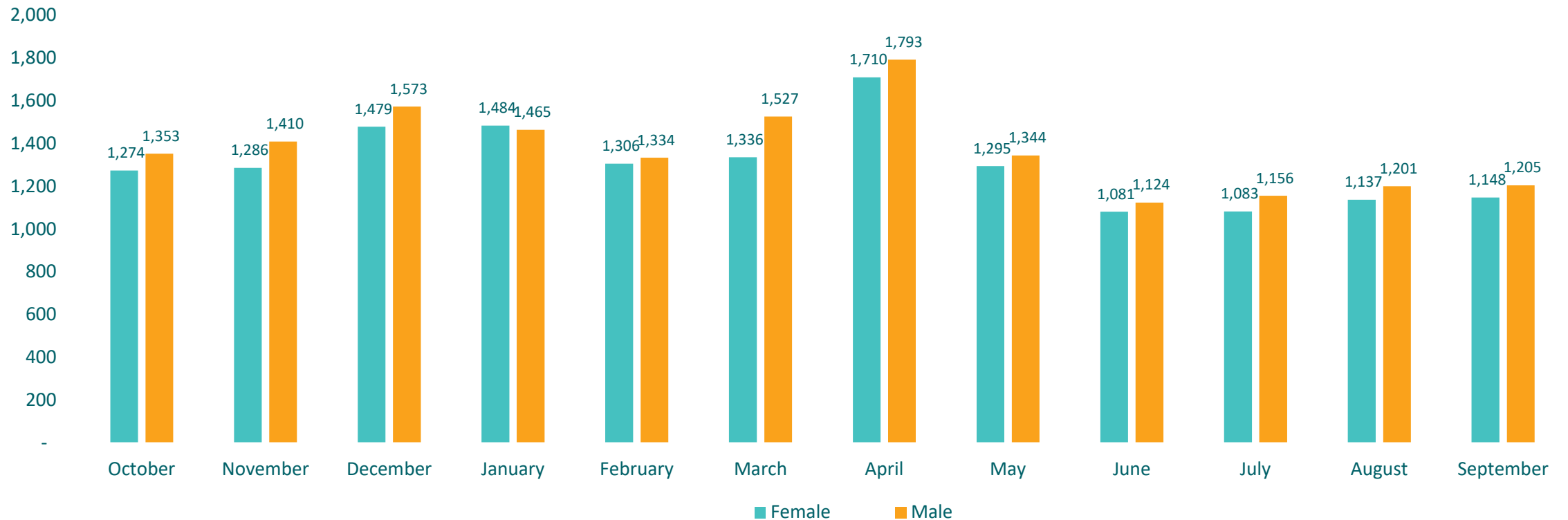
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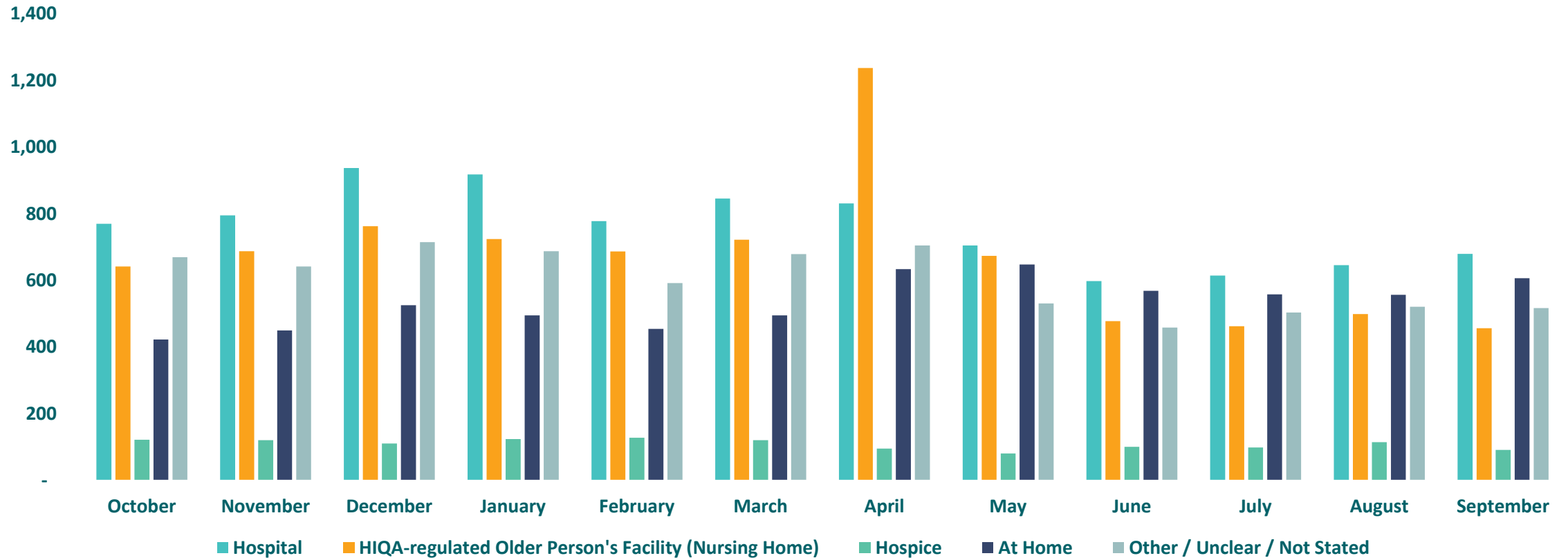
Latest Data as of
04/10/2020, 11pm

Cleaned Death Notices by Gender, by Month (n = 32,104)

October 2019 to September 2020, Source www.rip.ie

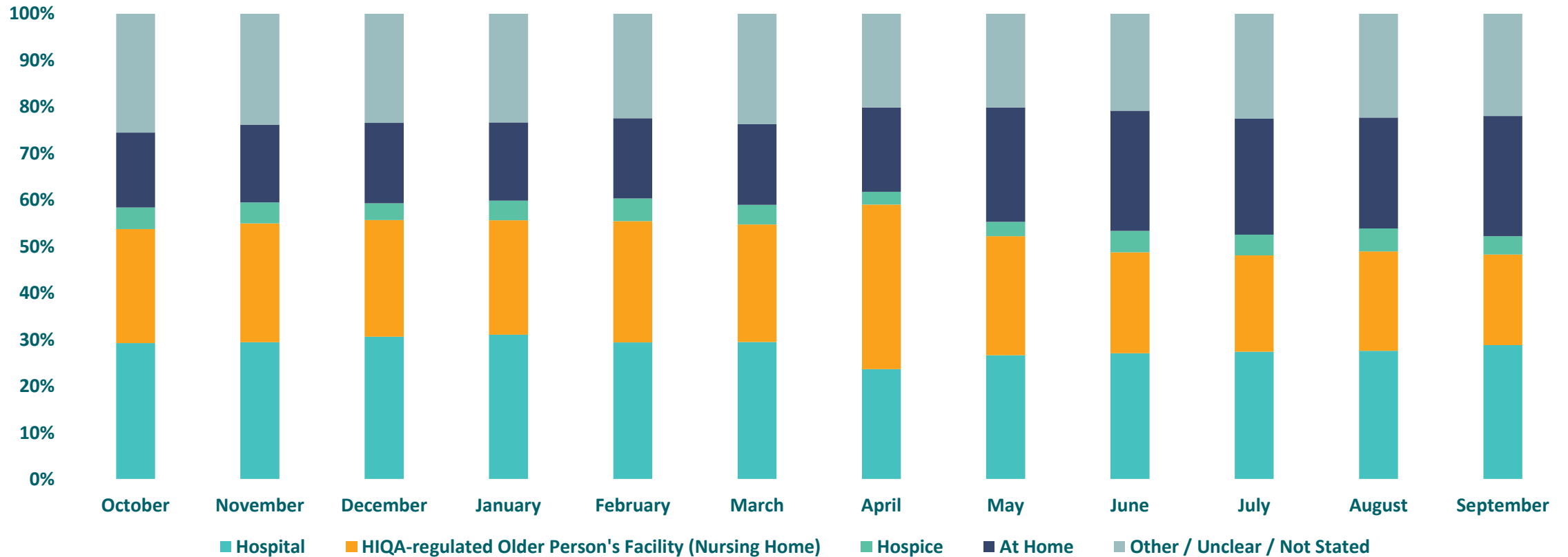


Cleaned Death Notices by Place of Death, by Month (n = 32,104) October 2019 to September 2020, Source www.rip.ie



Cleaned Death Notices by Place of Death, by Month (n = 32,104)

October 2019 to September 2020, Source www.rip.ie



Thank You

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