



Data use for severity and risk assessment – experience from Ireland

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Pandemic Severity Assessment (PSA) in Ireland

- Established a Pandemic Severity Assessment (PSA) monitoring system during the first COVID-19 pandemic wave (2020) in Ireland*
- WHO Pandemic Influenza Severity Assessment (PISA)
 - Standardised method - timely assessment of the severity of pandemic
- **Transmissibility**
 - reflects the ease of transmission of virus between individuals/communities
- **Seriousness of disease**
 - Severity of illness, clinical complications and outcome
- **Impact**
 - On the health-care sector (e.g. hospitalisations, ICU admissions) and on society (e.g. excess mortality)

*Domegan L, *et al.* Establishing a COVID-19 pandemic severity assessment surveillance system in Ireland. *Influenza Other Respir Viruses*. 2021 Oct 5.



- **Transmissibility**

- Sentinel GP surveillance - influenza-like illness (ILI) consultation rates & % positivity
- GP out of hours 'flu' and 'cough' calls
- COVID-19 and influenza incidence/100,000 population – notification data
- Nursing home outbreaks – Influenza, COVID-19, Acute Respiratory Infections (ARI)

- **Seriousness of disease**

- Severe Acute Respiratory Infection (SARI) surveillance data
- COVID-19/influenza cumulative % cases hospitalised or admitted to ICU
- COVID-19/influenza ICU:hospital ratios
- COVID-19/influenza - Case Fatality Rates hospitalised and ICU cases

- **Impact**

- Confirmed COVID-19/influenza hospitalisations and ICU admission rates/100,000
- Confirmed COVID-19/influenza mortality rate/1,000,000
- Excess Mortality – All cause (Z scores) using Euromomo* algorithm

*<https://www.euromomo.eu/>

Statistical Threshold Levels

- Statistical age specific threshold levels for each parameter
- For syndromic parameters and excess mortality - historical data available
- Moving Epidemic Method (MEM) - transmissibility and impact parameters
- Means and standard deviations - seriousness of disease parameters
- COVID-19 thresholds - limited historical data – exploring options
 - WHO PISA project threshold tools
 - Proxy thresholds - historical influenza data
 - Include pandemic period?
 - Exclude pandemic period - five seasons 2014/15-2018/19
- Threshold levels described with qualitative descriptions



Threshold Levels – Transmissibility and Impact Parameters - Moving Epidemic Method (MEM)*



MEM Threshold Level	Description
Below Baseline	Below the seasonal threshold
Low	Between the seasonal threshold and the upper limit of the 40% one sided CI of the geometric mean
Moderate	Between the upper limit of the 40% and 90% one sided CIs of the geometric mean
High	Between the upper limit of the 90% and 97.5% one sided CIs of the geometric mean
Extraordinary	Between the upper limit of the 97.5% and 99% one sided CIs of the geometric mean
Super-Extraordinary	Above the upper limit of the 99% one-sided CI of the geometric mean

*Vega T, Lozano JE, *et al.* Influenza Other Respir Viruses. 2013 Jul;7(4):546-58.

Threshold Levels - Seriousness of Disease Parameters



Threshold Levels	Description
No activity	No cases/deaths
Low	< Mean
Moderate	Between the Mean and the Mean + 1 SD
High	Between the Mean +1 SD and the Mean +3 SDs
Extraordinary	>Mean + 3 SDs

Transmissibility Parameters by Age Group

March - June 2020



Schools Closed

Stay at home

Easing of restrictions

0-14 years

Week Number	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Sentinel GP ILI rate/100,000	13.0	8.8	127.0	89.4	13.2	6.7	3.3	6.6	5.0	1.7	3.3	8.2	5.0	0.0	0.0	1.7	3.3
% GP OOHs Flu Calls (of total calls)	1.3	1.5	1.0	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
% GP OOHs Cough Calls (of total calls)	24.7	33.8	34.9	21.0	11.6	8.0	7.0	5.8	5.7	3.6	3.9	2.2	1.4	3.7	2.6	2.6	1.6
COVID-19 incidence/100,000	0.0	1.9	6.0	11.2	17.8	34.5	35.9	27.1	22.9	15.2	13.5	7.1	4.9	2.6	2.4	1.1	1.2

15-64 years

Week Number	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Sentinel GP ILI rate/100,000	13.1	13.7	198.2	167.8	51.2	38.2	27.2	17.5	22.4	15.1	14.8	14.3	6.9	2.9	1.1	3.2	2.7
% GP OOHs Flu Calls (of total calls)	6.3	8.3	5.2	2.9	1.4	1.2	0.9	0.6	0.4	0.4	0.5	0.8	0.6	0.4	0.3	0.7	0.3
% GP OOHs Cough Calls (of total calls)	9.9	20.9	19.8	13.1	8.5	5.8	5.5	3.7	3.3	3.3	2.6	2.1	1.4	2.1	1.9	1.6	2.0
COVID-19 incidence/100,000	0.6	4.3	23.1	50.5	86.6	140.5	147.9	116.3	67.6	41.7	31.7	13.2	12.8	4.5	3.0	2.2	2.2

≥65 years

Week Number	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Sentinel GP ILI rate/100,000	5.1	11.2	133.7	101.7	39.1	42.1	31.3	38.9	31.3	7.9	36.3	28.5	5.2	5.8	0.0	2.6	7.8
% GP OOHs Flu Calls (of total calls)	0.7	0.8	0.6	0.5	0.3	0.3	0.2	0.1	0.1	0.2	0.0	0.0	0.1	0.2	0.0	0.1	0.1
% GP OOHs Cough Calls (of total calls)	5.2	7.5	7.9	6.0	5.4	3.9	3.7	2.9	3.0	2.8	2.0	2.2	1.7	1.4	1.6	1.4	1.9
Number COVID-19 Nursing Home outbreaks	0	0	4	19	52	67	23	34	14	14	16	0	2	1	5	2	2
COVID-19 incidence/100,000	0.3	3.6	21.8	61.3	118.6	152.8	201.7	246.4	93.6	47.7	20.2	15.5	15.2	5.0	4.2	2.7	2.7

Below Baseline	Low	Moderate	High	Extraordinary	Super-Extraordinary
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Challenges for Ireland 2022/2023 season

- Establishing ARI surveillance in primary care – new
- SARI surveillance - new sentinel network to be established
- Hospitalisation 'Due to COVID-19' or 'with COVID-19'
- Changes to surveillance/testing policies
- Health seeking behaviour
- Need for regional and national severity assessments
- Small numbers
- Thresholds development – Work in progress

Looking forward

- Lessons learnt from COVID-19 pandemic
- WHO PISA project working group – work collaboratively
- Agree a standardised approach to developing/using thresholds
- Take advantage of new partnerships developed during the pandemic e.g. statisticians/modellers

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