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Meeting the pre-hospital challenges of the Covid-19 pandemic in the UK

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CaHRU research programmes

- Quality and Outcomes in Primary Healthcare (QOPH)
- Prehospital Emergency Quality and Outcomes (PEQO)
- Enhancing Experience and Equity in healthCare (EPiC)
- Pandemic and COVID-19 studies (COVID-19)*
- Evidence Synthesis for Improvement (ESI)
- Lincoln Clinical Trials Unit (LinCTU)*
- (*now Public Health Infectious Disease and Data)

International Covid-19 collaborations

University of Colombo Postgraduate Institute of Medicine (PGIM)



Waterloo University, Ontario, Canada Diffusion of COVID-19 vaccines: Building vaccine confidence among diverse communities in Canada and the United Kingdom

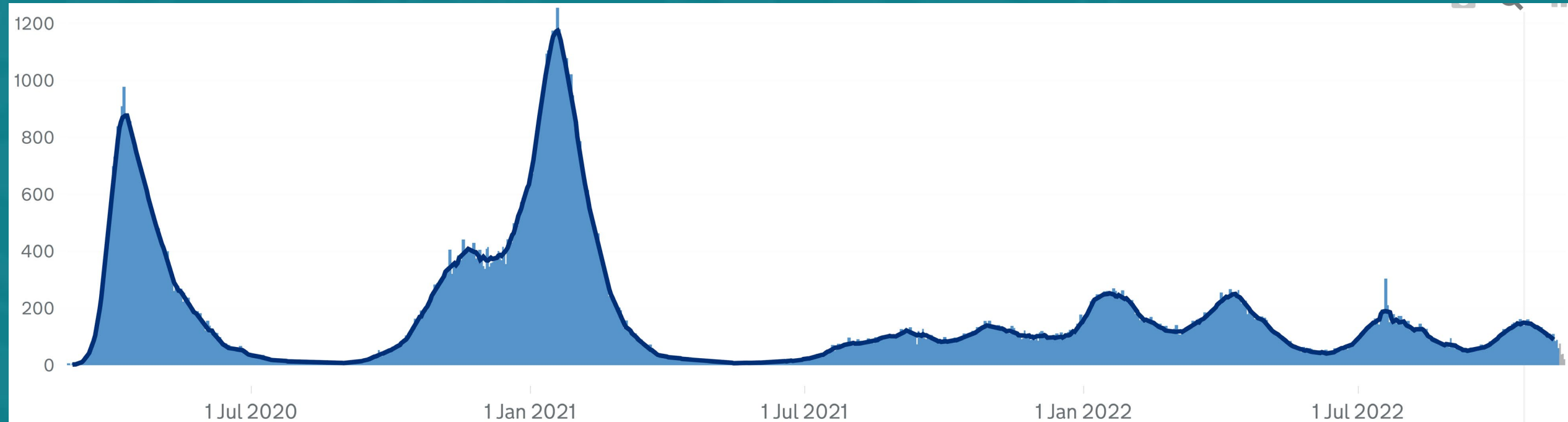
UK Canada Emergency calls Data analysis and GEospatial mapping (EDGE) Consortium with McMaster and Niagara/Hamilton EMS

Overview

- Importance of Emergency Medical Systems to epidemics and pandemics
- Potential for EMS to provide early warning of epidemics
- Opportunities for research
- Importance of organisational preparedness, coordination and systems
- Innovation as a result of the pandemic

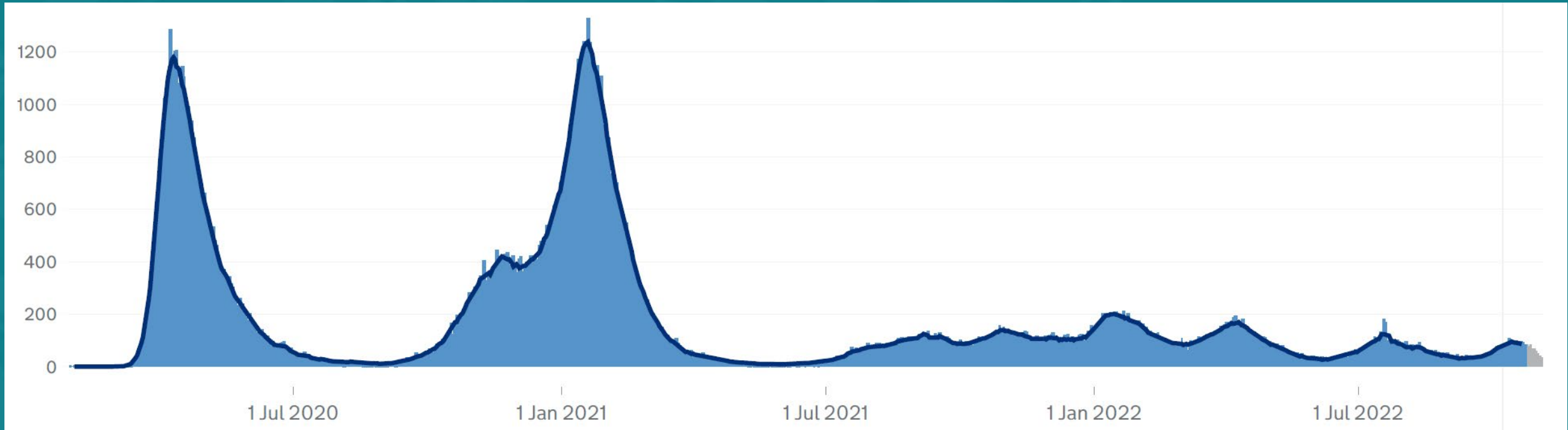
Importance of Emergency Medical Systems to epidemics and pandemics

COVID-19 deaths UK (<28 days of positive test)



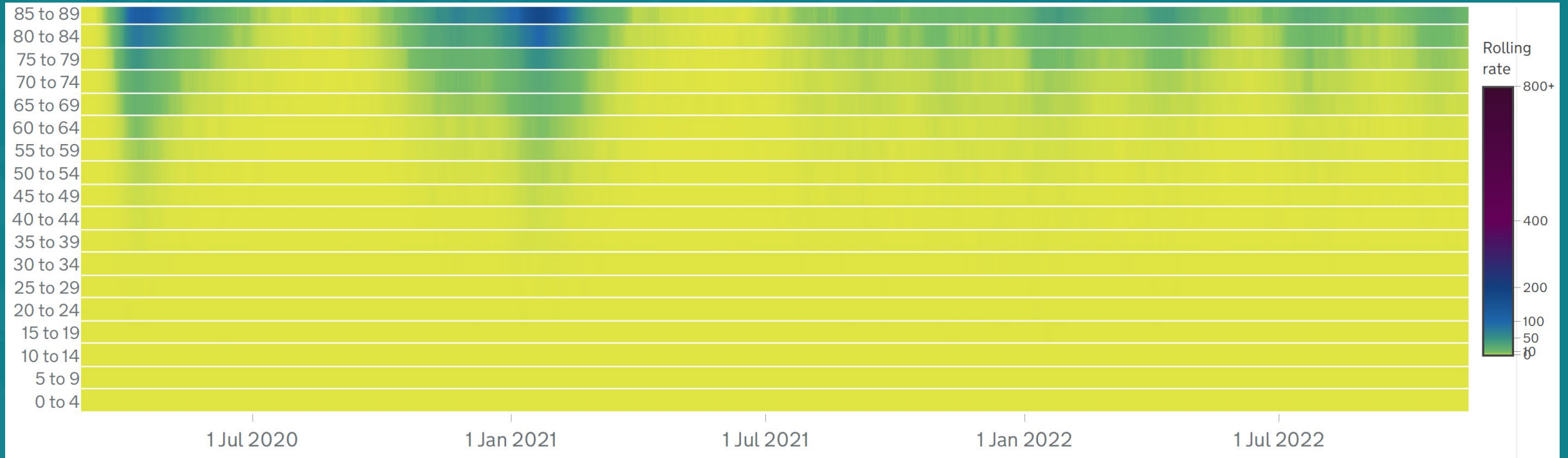
GOV.UK Coronavirus (COVID-19) in the UK: <https://coronavirus.data.gov.uk/>

COVID-19 deaths UK (death certification)



GOV.UK Coronavirus (COVID-19) in the UK: <https://coronavirus.data.gov.uk/>

COVID-19 deaths UK (<28 days positive test by age)



GOV.UK Coronavirus (COVID-19) in the UK: <https://coronavirus.data.gov.uk/>

Early warning of epidemics

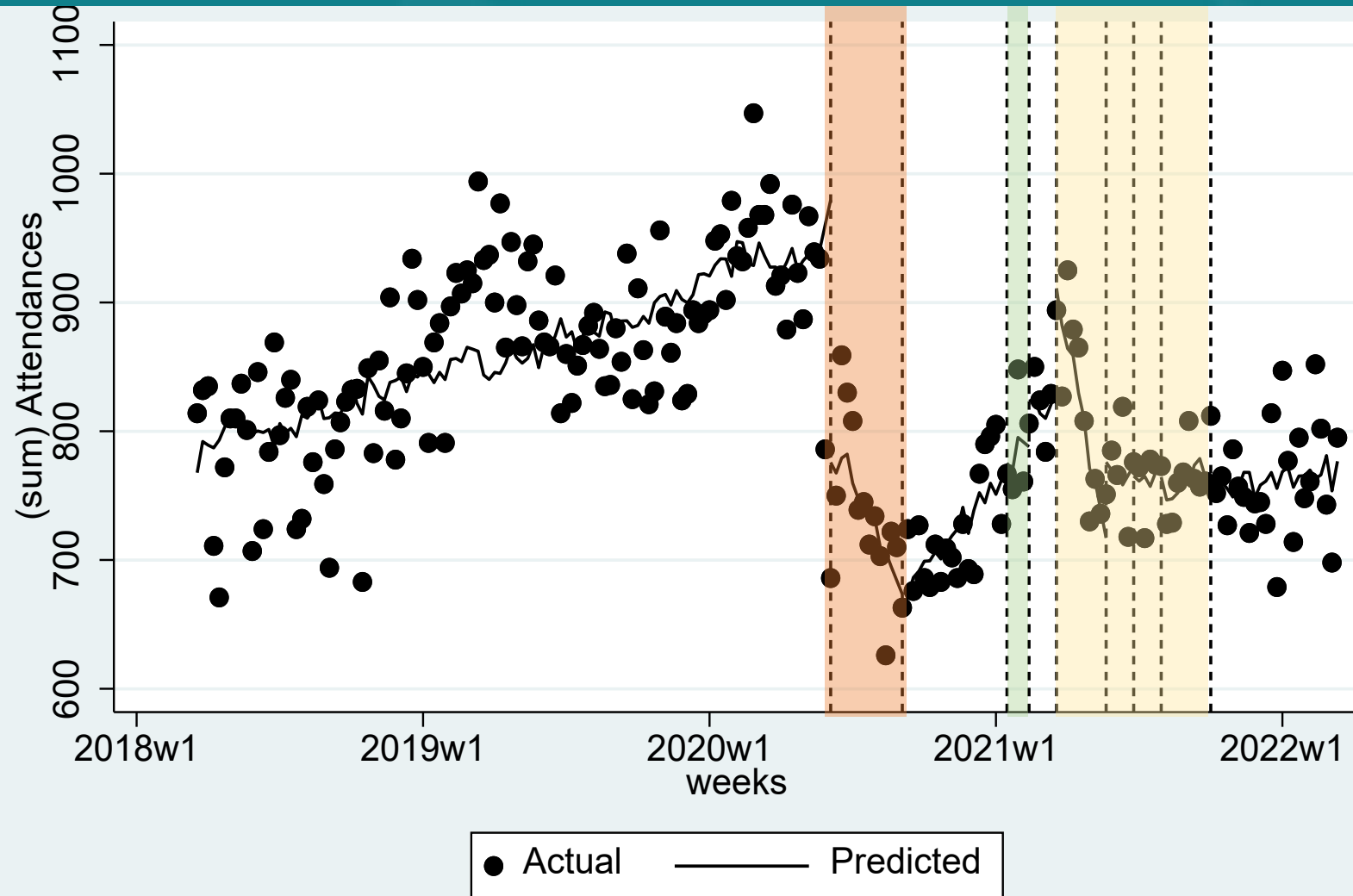
Opportunities for research

Care homes

Care home attendances	Other attendances
170,612 (7.46%)	2,117,692 (92.54%)

Records of all attendances between 01/01/2018 and 31/12/2021 in the East Midlands.

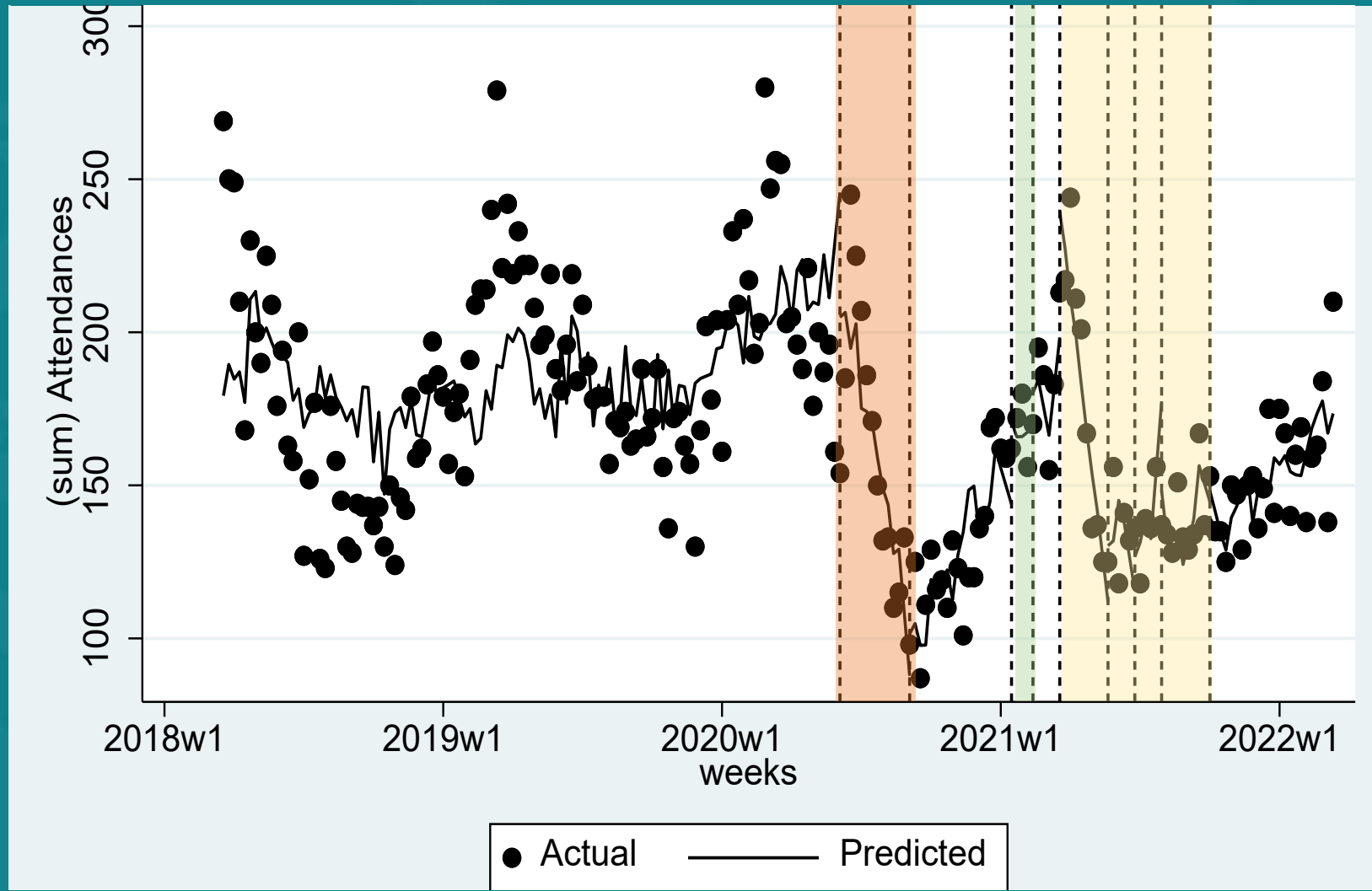
Care home attendances



- 1st lockdown 26th of March -23rd of June 2020
- 2nd lockdown 5th of November – 2nd of December 2020
- 3rd lockdown 6th of January 2021 – 8th of March, 12th April, 17th May, 19th July 2021

As expected, lockdowns reduced the number of ambulance attendances. During the 1st lockdown, there was a significant decrease of 9.9 attendances per week relative to the pre-lockdown period (CI: -19.1, -0.8, $p=0.034$). It was followed by a significant increase of 13.7 attendances per week until the 2nd lockdown (CI: 4.0, 23.5, $p=0.006$) relative to the 1st lockdown period. There was a last significant decrease of 19.7 attendances per week in the first step of the 3rd lockdown (CI: -30.5, -9.0, $p<0.001$).

Care home cardiovascular attendances



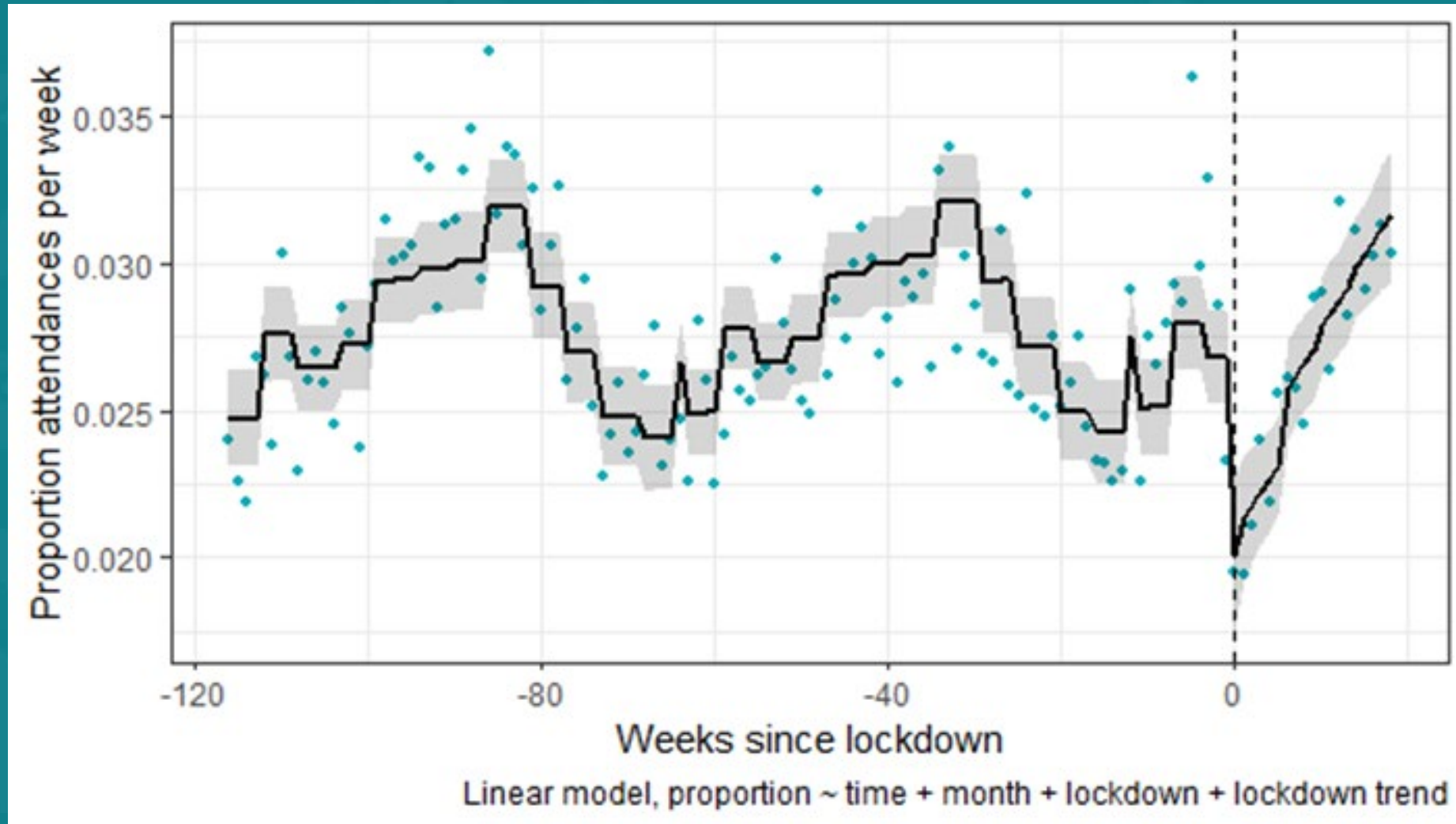
- 1st lockdown 26th of March -23rd of June 2020
- 2nd lockdown 5th of November – 2nd of December 2020
- 3rd lockdown 6th of January 2021 – 8th of March, 12th April, 17th May, 19th July 2021

Lockdowns had a positive significant effect on cardiorespiratory conditions. During the 1st lockdown, there was a significant decrease of 7.3 attendances per week relative to the pre-lockdown period (CI: -12.6, -1.9, $p=0.008$). It was followed by a significant increase of 9.4 attendances per week until the 2nd lockdown (CI: 4.0, 14.8, $p=0.001$) relative to the 1st lockdown period. There was a last significant decrease of 12.7 attendances per week in the first step of the 3rd lockdown (CI: -19.4, -6.0, $p<0.001$).

Care homes

Condition	Care Homes	Entire Sample (Baseline)
Head Injury **	15,483 (9.28%)	76,924 (3.44%)
Chest Infection**	13,889 (8.32%)	119,170 (5.33%)
Limb Injury	7,553 (4.52%)	74,241 (3.32%)
Collapse	7,098 (4.25%)	72,986 (3.27%)
Other Infection	5,768 (3.46%)	54,400 (2.44%)
Other respiratory problem	4,806 (2.88%)	79,493 (3.56%)
Acute Abdominal Problem*	4,799 (2.87%)	125,007 (5.60%)
Sepsis	4,687 (2.81%)	23,982 (1.07%)
No apparent problem	4,667 (2.80%)	53,298 (2.39%)
Fall Non-Injury	4,511 (2.70%)	38,083 (1.70%)

Mental health emergencies and COVID-19 lockdown



Covid-19 and landscape factors

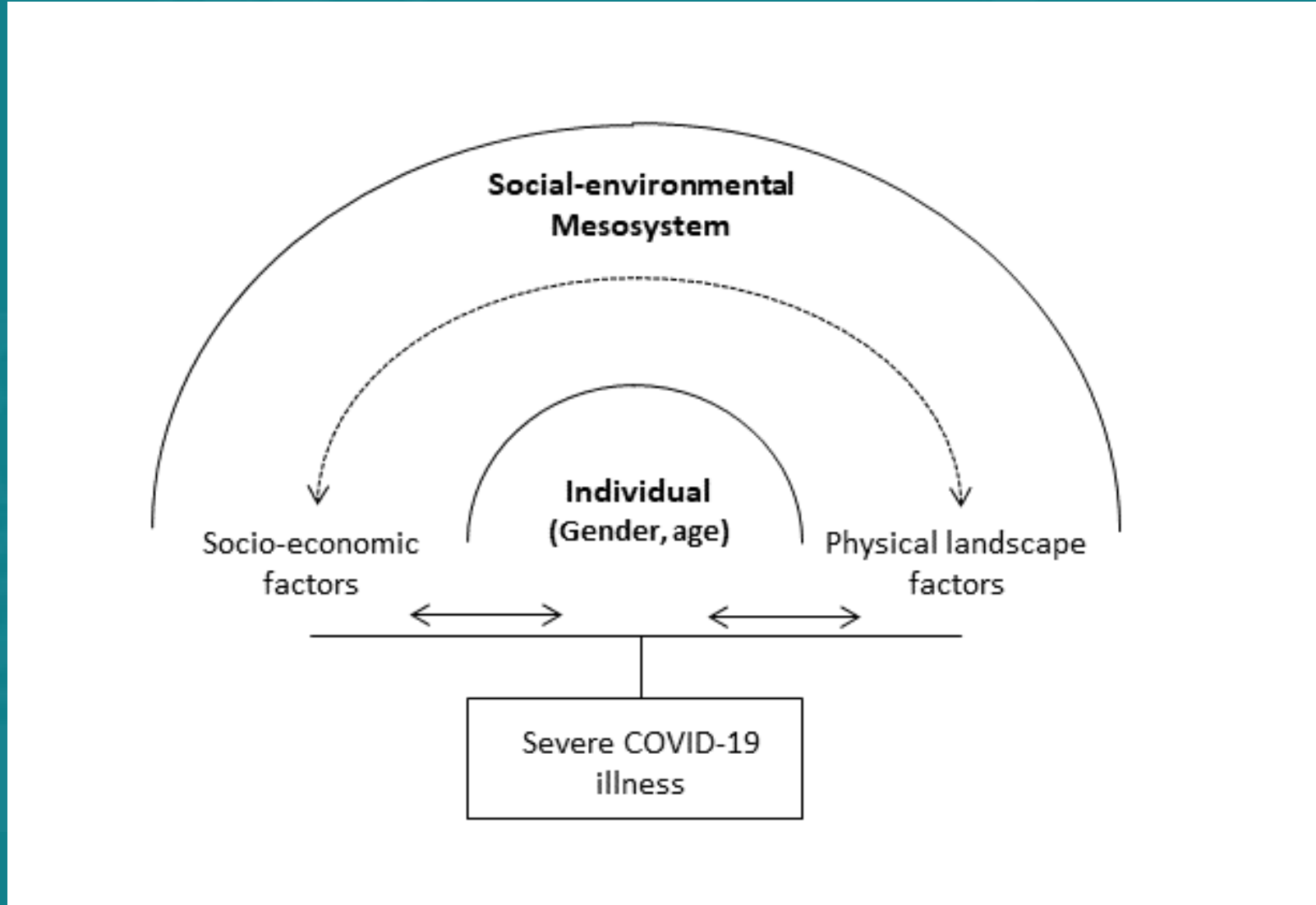
Binary logistic regression analysis predicting cluster membership. Positive B values indicate an increased likelihood of random distribution and a decreased likelihood of cases occurring in clusters. Negative B values indicate a decreased likelihood of random distribution and an increased likelihood of cases occurring in clusters.

		B	SE	Wald	df	Exp(B)	95% CI
AHAHI	Accessibility to fast food outlets	-0.16	0.04	15.63	1	0.85 ^{**}	0.78, 0.92
	Accessibility to pubs/bars/nightclubs	0.2	0.04	21.43	1	1.22 [*]	1.12, 1.33
	Accessibility to Blue Space	0.09	0.02	14.5	1	1.1 [*]	1.04, 1.14
	Accessibility to Off Licenses	0.02	0.01	5.18	1	1.02 ^{**}	1, 1.04
	Accessibility to tobacconists	-0.1	0.02	17.73	1	0.91 [*]	0.87, 0.95
	Passive Green Space (within 900 m buffer)	0.56	0.1	33.26	1	1.75 [*]	1.45, 2.11
	Accessibility to GP practices	-0.14	0.045	10.28	1	0.87 [*]	0.92, 1.2
	Accessibility to A&E hospitals	-0.12	0.005	529.67	1	0.9 [*]	0.89, 0.91
	Accessibility to pharmacies	-0.11	0.05	3.89	1	0.9 ^{**}	0.81, 1.01
	Level of Nitrogen Dioxide (NO ₂)	-1.12	0.05	591.83	1	1.75 [*]	0.3, 0.4
	Level of Particulate Matter (PM10)	1.51	0.06	662.64	1	4.53 [*]	4.04, 5.9
	Level of Sulphur Dioxide (SO ₂)	1.98	0.28	48.26	1	7.22 [*]	4.13, 12.6
RUC	Urban minor conurbation	-0.92	0.09	103.03	1	0.4 [*]	0.33, 0.48
	Urban city and town in a sparse setting	-0.54	0.17	10.23	1	0.58 [*]	0.48, 0.81
	Rural town and fringe	-3.01	1.26	5.77	1	0.05 ^{**}	0.00, 0.58
	Rural village and dispersed	-3.9	0.7	34.76	1	0.02 [*]	0.00, 0.07

*Statistically significant at $P < .01$.

**Statistically significant at $P < .05$.

Landscapes and Covid-19



Importance of organisational preparedness, coordination and systems

Preparedness

- Real-time data
- Coordination with other services
- Pandemic protocols
- Personal protective equipment
- Staff sickness

Innovation as a result of the pandemic

Innovation

- Community Paramedicine at Clinic Program (CP@clinic): COVID-19 telephone screening
- Mass COVID-19 nasopharyngeal swab testing
- Hospital at home and 'Flumedic' role in home treatment

Summary

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Thank you

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