Final Report
Executive Summary

HSC Public Health Agency
Research and Development

HSC R&D Division Final Progress Report

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The report should be completed on the attached form in clear typescript. Please extend boxes as required.
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HSC Public Health Agency
Research and Development

HSC R&D Division Award Details

HSC R&D File Reference	COM/5625/20
HSC R&D Funding Scheme	Opportunity-Led Research Award
Project Title	Impact of COVID-19 on mental health in Northern Ireland: an administrative data linkage study
Award Holder Name (Employer)	Dr Aideen Maguire (Queen's University Belfast)
Host Research Organisation	Queen's University Belfast
Award Duration	28 months
Award Start Date	01.04.21
Award End Date	31.07.23
Name of Lead Supervisor: ***(only applicable to training awards)***	

Signature

Award Holder Signature:

A. Maguire

Date: 15/12/2023

HSC Public Health Agency
Research and Development

Evidence Brief

(1 page: which may be used for dissemination by HSC R&D Division)

Why did we start? (The need for the research and/or Why the work was commissioned)	The COVID-19 pandemic led to never before seen limits on social movement and social interactions. These limits had a major impact not only on individuals' personal lives but on the interaction with, and delivery of, our health services. Social distancing rules and guidance led to increased isolation for some. Add in financial concerns and a decrease in help seeking behaviour and many feared the impact of the pandemic on population mental health would be catastrophic. This project aimed to explore the impact of the pandemic and subsequent "lockdown" on mental health using administrative health data. Administrative health data is data that is collected in the delivery of a particular service. This can be anonymised by removing personal identifiers and analysed to identify patterns and trends in the population.
What did we do? (Methods)	For this project we explored trends in the uptake of psychotropic medications, i.e medications related to mental ill-health including antidepressants, antianxiety, hypnotic and antipsychotic medications, and trends in presentations to Emergency Departments for self-harm or self-harm /suicide ideation (hereafter "ideation"). Expected trends for 2020 and beyond (based on the previous 8 years) were compared to actual observed trends as the pandemic broke in Northern Ireland and lockdown began right through to medium and longer term outcomes. This project was supported by the Administrative Data Research Centre Northern Ireland and anonymised data were made available to accredited researchers within the secure setting of the Northern Ireland Trusted Research Environment (NITRE) within the Honest Broker Service.
What answer did we get? (Findings)	In terms of medications for mental ill-health, March 2020 (the first lockdown) saw uptake of all medicines increase beyond expected values (suggestive of initial "stockpiling"), before returning to normal from May 2020 on for antidepressants, antianxiety and antipsychotics. However, uptake of hypnotic medication (to aid sleep) was higher than expected in <18 year olds, and antianxiety medication higher than expected in those >65 years, suggesting increased sleep disturbance and anxiety in these subgroups. For self-harm and ideation, the number of individuals presenting with self-harm or ideation dropped significantly March-May 2020, before returning mostly to normal from June 2020, except for those <16 years, where numbers increased above expected levels. Findings suggest those most affected by the pandemic & lockdowns were the very old and very young.
What should be done now? (Practice/Policy Implications and/or Recommendations)	The anticipated tsunami of mental ill-health is not yet evident in statistically significant changes in medication uptake for mental ill-health or self-harm / ideation presentations. However, these measures of population mental ill-health do not capture everyone who may be suffering in Northern Ireland. Findings do suggest that those potentially most affected by the pandemic & subsequent lockdowns were the very old and very young, therefore interventions, support and further research should be targeted towards those groups. Findings, from the self-harm and ideation analyses in particular, may be used to inform the revision of the Protect Life 2 Strategy in Spring 2024.

Final Report

(no more than 20 pages)

Please structure the report using the headings below

Background:

The COVID-19 pandemic led to never before seen limits on social movement and social interactions. These limits had a major impact not only on individuals' personal lives but on the interaction with and delivery of our health and social care services. Enforced social distancing led to increased isolation and loneliness. Add in financial concerns and a decrease in help seeking behaviour and the impact of the pandemic on population mental health was predicted to be catastrophic. Experts predicted a "tsunami of mental health problems" in the wake of COVID-19. This project aimed to explore the impact of the pandemic and subsequent "lockdown" on mental health using administrative health data. Administrative health data is data that is collected in the delivery of a particular service. This can be anonymised, made available in a safe setting, and examined by accredited researchers (who have completed the appropriate training) in order to explore trends in the population.

Aims and objectives:

There were three main aims of this project:

(i) Identify any changes in the uptake of psychotropic medications (i.e. medications for mental ill-health), before and after the pandemic

(ii) Examine the impact of the pandemic on presentations to hospital emergency departments for self-harm or self-harm / suicide ideation (hereafter "ideation")

(iii) Use statistical regression modelling techniques to determine if the mental health impacts of the pandemic have varied according to demographic and socio-economic characteristics

Methods:

National medication data from the Enhanced Prescribing Database (EPD), i.e. the population-wide database recording all prescriptions dispensed from community pharmacies in Northern Ireland, on psychotropic medications (i.e. medications for mental ill-health) and data from the Northern Ireland Registry of Self-harm were linked to demographic and area level data from healthcare registration records for the whole population aged 10 years and over in Northern Ireland from 2012-2021 (N=1,899,437).

Monthly prescription uptake and monthly presentations of self-harm or ideation were split (pre-COVID-19 restrictions: April 2012 to February 2020; and during restrictions: March to September 2020 in the first instance with revised analysis after an updated download examining during restrictions as: March 2020 to December 2021). Trends were graphed to illustrate actual numbers over the 10 years. Then a statistical technique called Auto-regressive integrated moving average (ARIMA) modelling was carried. This allowed us to model the expected trends if things were to continue on their observed trajectory given the data from April 2012-March 2019, taking into consideration trends and seasonal effects. Forecast ('expected') monthly values were compared with 'actual' values, split by demographic factors, medication type and method of self-harm to explore any differences. Our analysis was carried out in the statistical package R.

Personal and Public Involvement (PPI):

A project Steering Group consisting of Prof Siobhan O'Neill, a Senior academic at Ulster University and Mental Health Champion for Northern Ireland, Prof Dermot O'Reilly, a Senior Clinical academic at Queen's University Belfast and then Director of the Administrative Data Research Centre - Northern Ireland and Dr Lynsey Patterson, then Head of Health Protection Surveillance in the Public Health Agency, Northern Ireland were consulted regularly around formulation of research questions, data analysis plans and interpretation of results. The primary stakeholders for this research at the time were policy makers and health professionals. We were invited to present our work regularly at the International COVID-19 suicide research collaboration (ICSPRC) webinars designed to keep key policy contacts across the globe updated on advances of our understanding of the potential impact of COVID-19 on mental ill-health and death by suicide.

PPI was not possible as this research was reactive, was carried out over a short time period and to tight timelines and took place during the time of strict COVID restrictions when accessing public and patient stakeholders was difficult. Ideally, public stakeholders and experts by experience would have been engaged from the beginning of this research, helping to shape research questions and interpret the results. However, in-person events and meetings were cancelled and rules for recruiting and engaging in PPI remotely were ever changing during the COVID period. Unfortunately, PPI then became too difficult and resource intensive to pursue at the time. Now the results of the study are complete we plan to use our links through the Mental Health Champion and through Dr Aideen Maguire's position on the SE Protect Life Implementation Group to share the results with community and advocacy groups in order to discuss and learn from their interpretation of the results as they relate to their real world experiences and to determine how these findings may be useful in practice and policy.

Findings:

All findings can be found in our Open Access published papers:

- Maguire A, Kent L, O'Neill S, O'Hagan D, O'Reilly D. Impact of the COVID-19 pandemic on psychotropic medication uptake: time-series analysis of a population-wide cohort. Br J Psychiatry. 2022 Dec;221(6):748-757. doi: 10.1192/bjp.2022.112
- Paterson EN, Kent L, O'Reilly D, O'Hagan D, O'Neill SM, Maguire A. Impact of the COVID-19 pandemic on self-harm and self-harm/suicide ideation: population-wide data linkage study and time series analysis. Br J Psychiatry. 2023 Nov;223(5):509-517. doi: 10.1192/bjp.2023.76

  ***update of both papers submitted for publication yielding similar results*

(i) Identify any changes in the uptake of psychotropic medications (i.e. medications for mental ill-health), before and after the pandemic

(iii) Use statistical regression models techniques to determine if the mental health impacts of the pandemic have varied according to demographic and socio-economic characteristics

In terms of medications for mental ill-health, uptake for all these medicines, had been following a stable or upward trend since January 2012 (see Figure 1 below). The vertical red line here indicates March 2020, when the first COVID-19 restrictions were announced. We did not see a significant change in medication uptake after this at the population level.

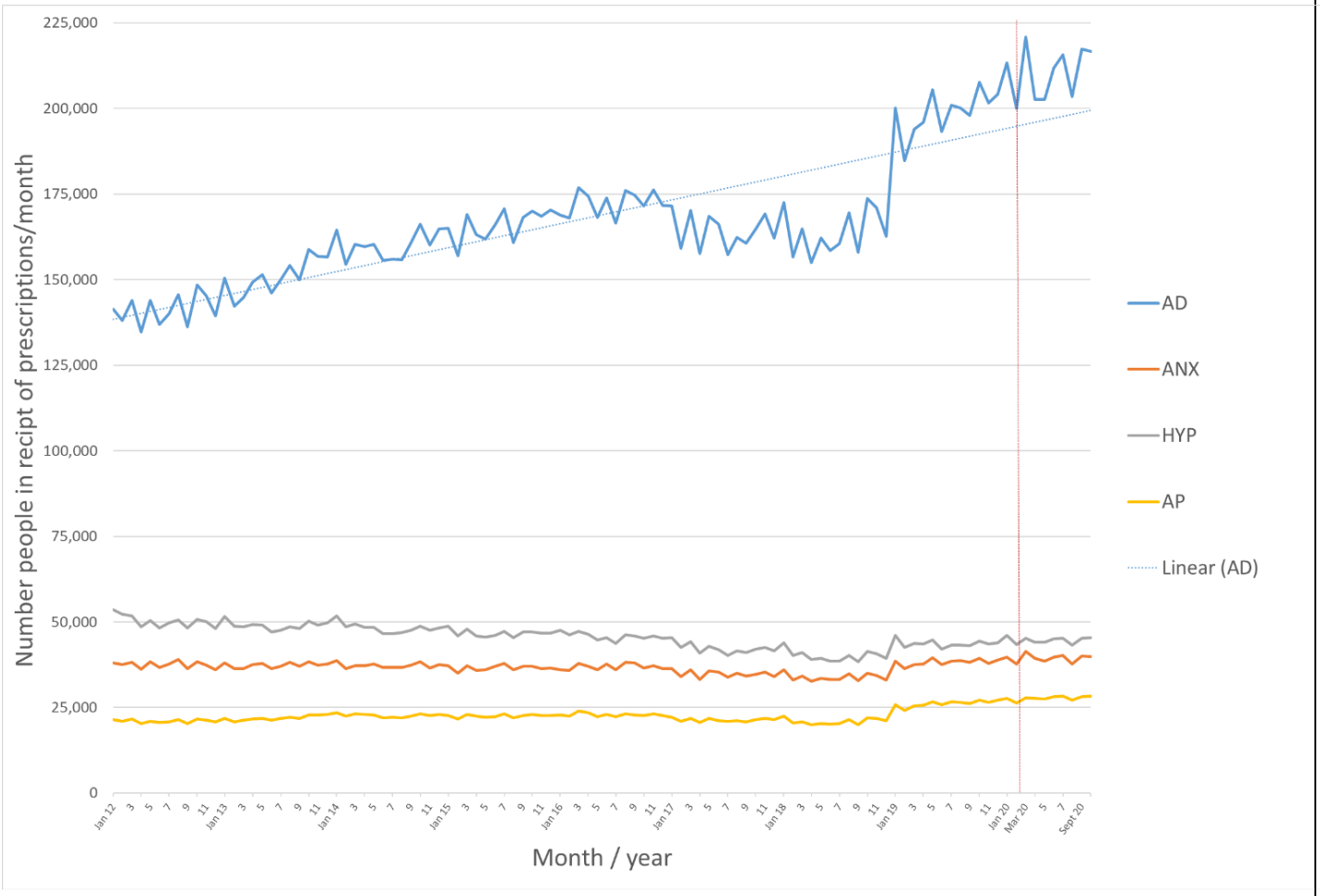

Figure 1: Number of people in receipt of medications for mental ill-health from 2012-2020

ARIMA analysis allows us to look at expected numbers of prescription versus actual numbers during the first 8 months of COVID. In Figure 2 below the black line shows the expected trend in uptake of medications and the grey shaded areas are the confidence intervals or “margins of error” in our calculated trend. The red line shows actual observed uptake of medicines. So, when the red line falls outside the grey shaded area then medication uptake was higher (above the lines) or lower (below the lines) than expected. Included in this analysis is anti-epileptic medication as a counterfactual comparator. This means that there is no hypothesis to suggest COVID-19 should affect the rate of epilepsy and therefore the uptake of anti-epileptic medication, however, it could affect the rate of mental ill-health and therefore the uptake of medications for mental ill-health.

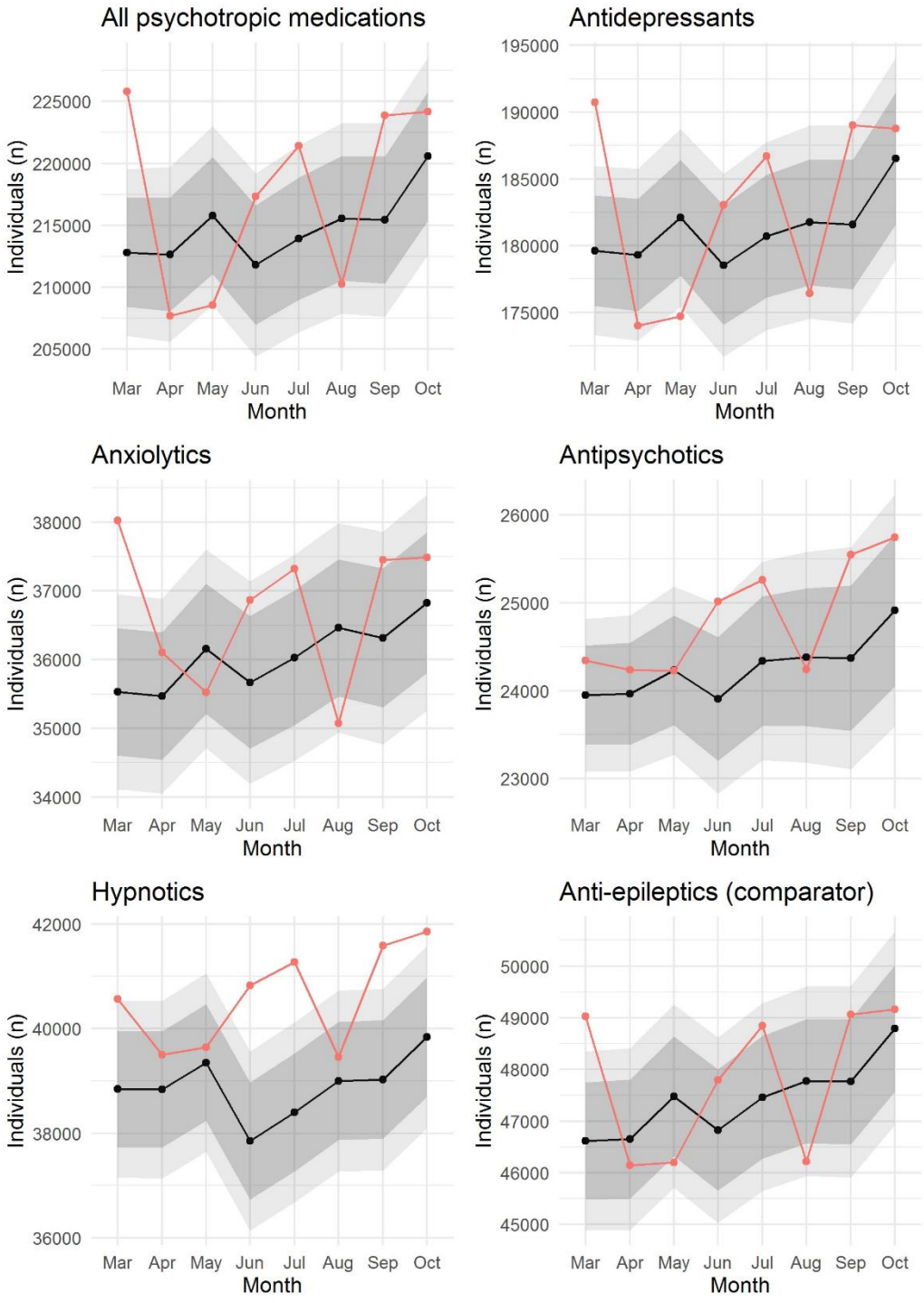

Figure 2: ARIMA Analysis illustrating expected and observed numbers of individuals in receipt of medications for mental ill-health in the first 8 months of the COVID-19 pandemic.

In March 2020 uptake of all medications increased beyond expected values (above the grey lines), returning to expected trends from May 2020 for antidepressants, antianxiety and antipsychotic medication. This suggest an initial “stockpiling” of medicines when the first restrictions were announced as people were unsure how the lockdown would affect their usual prescription supply. In 4 of the 8 months during COVID restrictions uptake of hypnotic medication appeared higher than

expected. This was explored in more detail by breaking down uptake by demographic factors (see Figure 3 below).

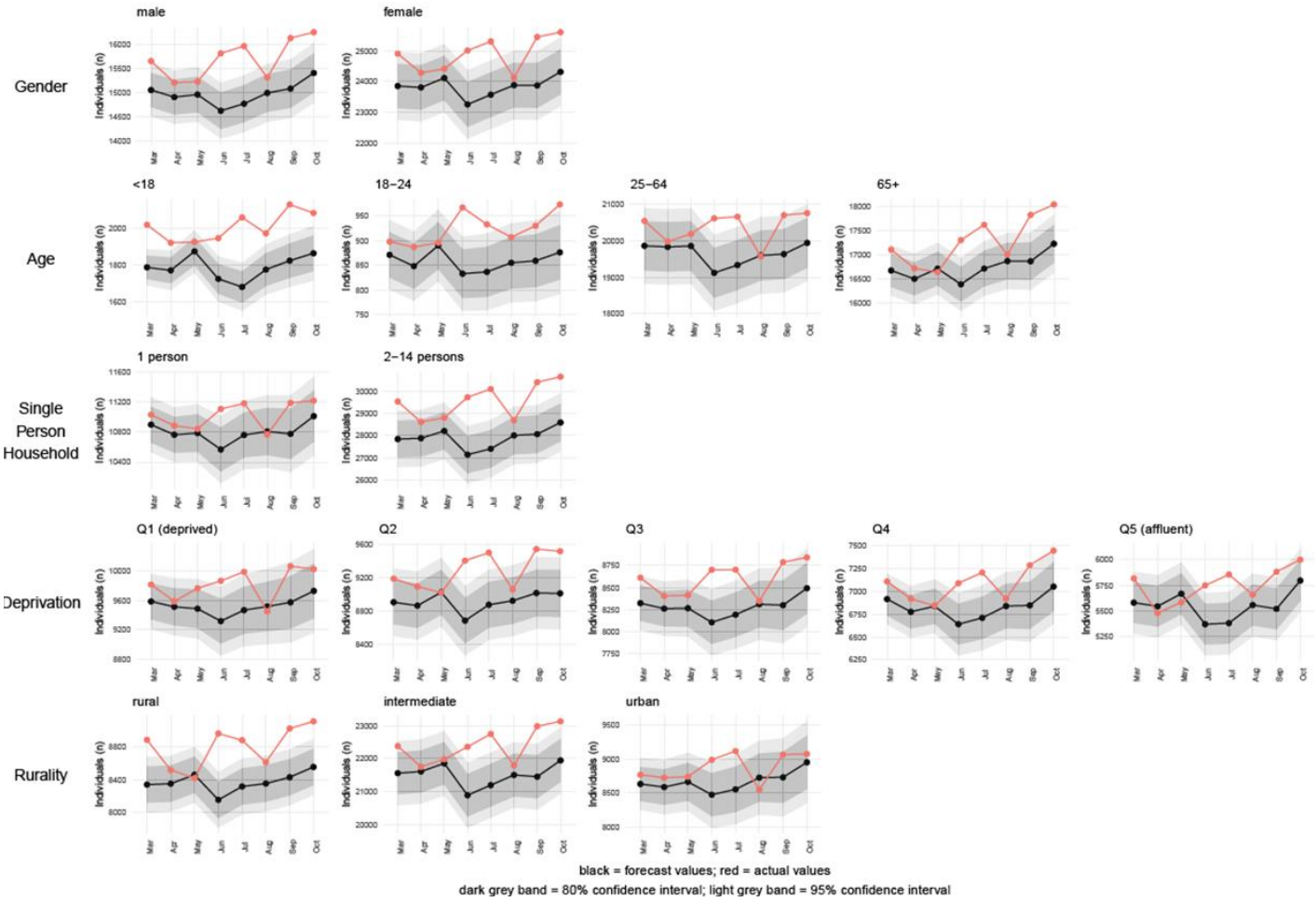

Figure 3: ARIMA Analysis illustrating expected and observed numbers of individuals in receipt of hypnotic medication (for disordered sleep) in the first 8 months of the COVID-19 pandemic by demographic factors.

In Figure 3 we see hypnotic medication higher than expected for a number of months during the first 8 months of the pandemic across different demographic subgroups but the clearest increase (where we see the red line appear outside the grey lines the most) is observed in the Age breakdown in young people under the age of 18 years. Hypnotic medication uptake was 12% higher than expected among those <18 years during this period. The figures exploring antianxiety medication uptake show that uptake remained as expected for most subgroups but is higher than expected in those aged >65 years *(full results available in the open access paper above or upon request*). These analyses suggest that younger people had increased sleep disturbance and older people had increased anxiety during the first 8 months of the pandemic.

(ii) Examine the impact of the pandemic on presentations to hospital emergency departments for self-harm or self-harm / suicide ideation (hereafter "ideation")

(iii) Use statistical regression models techniques to determine if the mental health impacts of the pandemic have varied according to demographic and socio-economic characteristics

In terms of self-harm and ideation, the number of individuals presenting with self-harm or ideation dropped significantly at the beginning of the pandemic (March-May 2020), before returning mostly to expected trends from June 2020. Here in Figure 4 below the blue line represents the observed number of presentations to Emergency Departments with self-harm or ideation. This is to be expected as the “stay at home” order was announced in March 2020.

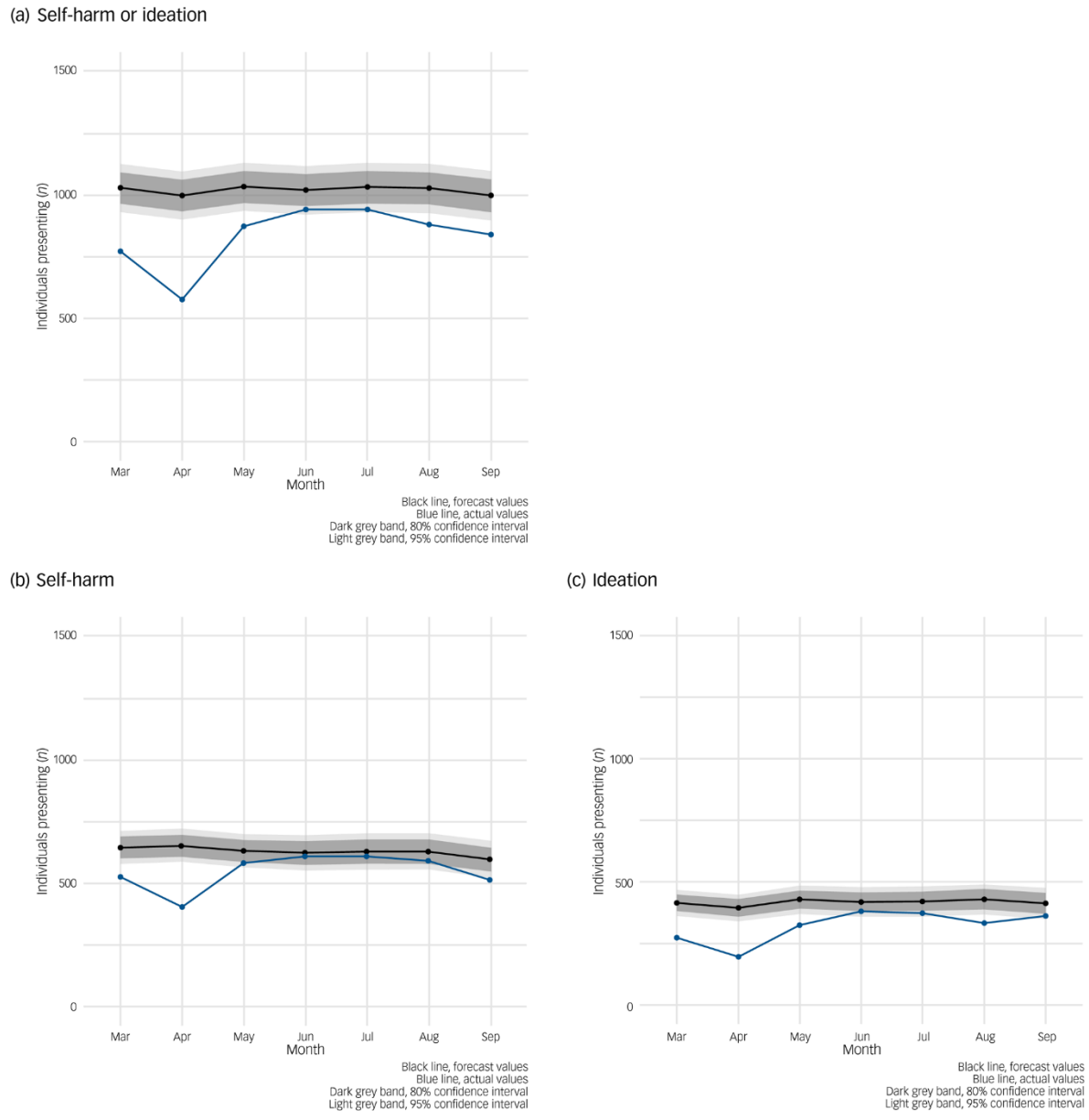

Figure 4: ARIMA Analysis illustrating expected and observed numbers of individuals presenting to Emergency Department in Northern Ireland with self-harm or ideation in the first 8 months of the COVID-19 pandemic.

Stratified analysis showed similar presentation trends across most demographic subgroups except for those aged over 65 years, living alone or in affluent areas, where presentations remained unaffected, and those aged under 16 years, where numbers presenting with self-harm or ideation

increased above expected levels (see Figure 5 below – sub figure (a) to left). years *(full results available in the open access paper above or upon request*).

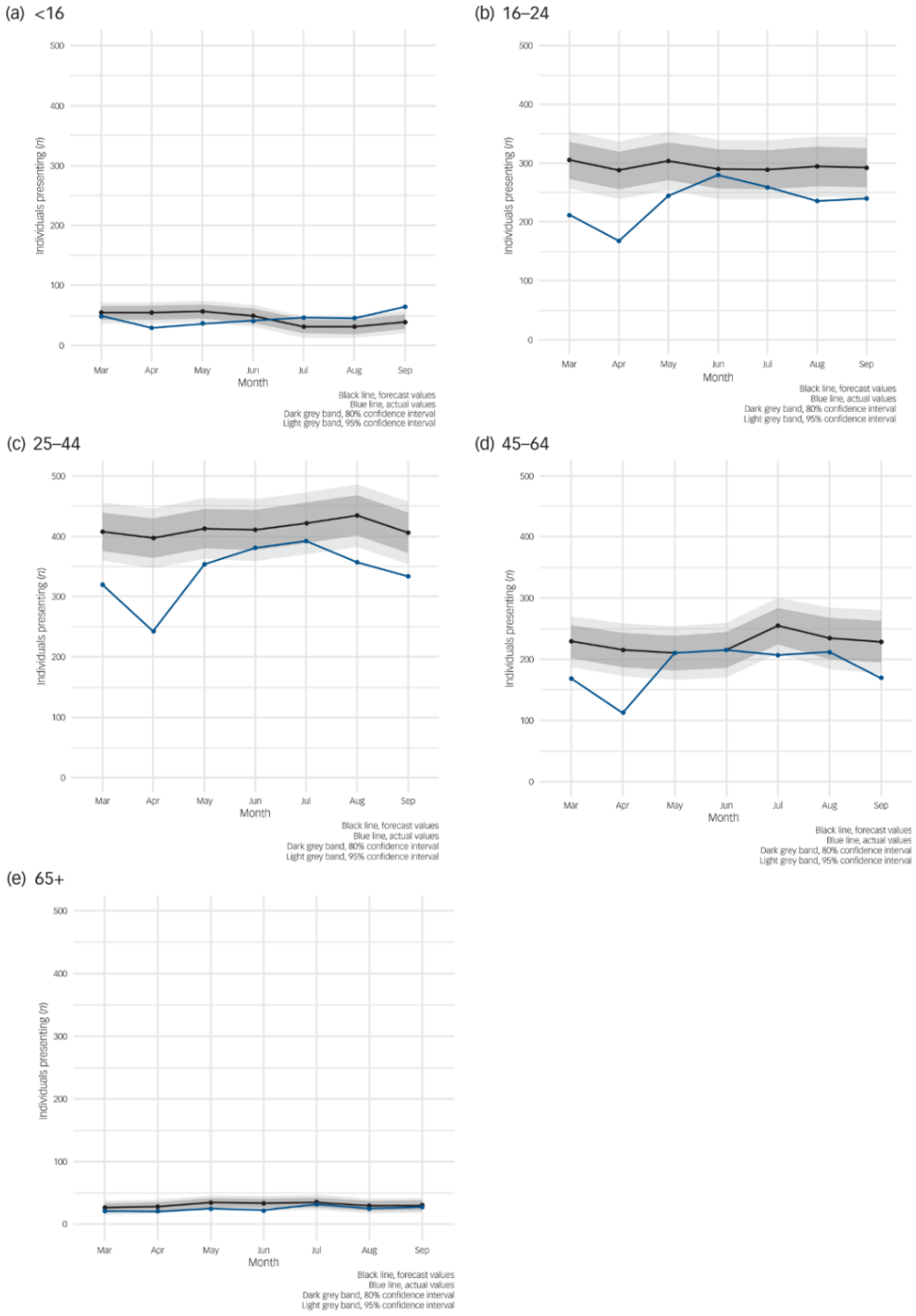

Figure 5: ARIMA Analysis illustrating expected and observed numbers of individuals presenting to Emergency Department in Northern Ireland with self-harm or ideation in the first 8 months of the COVID-19 pandemic by age group.

In those aged <16 years in Northern Ireland we did not see the same magnitude of drop in presentations during March to May 2020 and in fact by August 2020 the observed values (blue line) were now higher than expected (above the grey shaded area) suggesting more young people than usual were presenting with self-harm or ideation during this period.

These analyses have been repeated now with follow up data up to December 2021 and the same trends prevail, with a higher uptake than expected of hypnotic medications in the very young, a higher uptake of antianxiety / antipsychotic medication in the very old and an increase in presentation or self-harm / ideation in the very young. These findings are not yet published and so cannot be reported on here at this time.

Conclusion:
The results of these analysis suggest that for the population as a whole there has not been a statistically significant change in the mental health status as measured by prescription medication uptake or presentation to Emergency Department with self-harm / ideation. The anticipated "tsunami" of mental ill-health is not yet evidenced in these measures of administrative data. However, these data capture only a very small proportion of individuals in the population with mental ill health and do not capture those who do not receive pharmacological treatments, those who self-harm but do not end up in Emergency Department and those who are yet to seek help.

Findings do suggest however those potentially most affected by the pandemic & subsequent lockdowns were the very old and very young as when we look at these sub-groups in particular we see changes in their uptake of medications for mental ill-health or trends in presenting to Emergency Department with self-harm or ideation. Therefore, post pandemic mental health interventions, support and further research should be targeted towards those groups.

Practice and Policy Implications/Recommendations:
Findings suggest those potentially most affected by the pandemic & subsequent lockdowns were the very old and very young therefore interventions, support and further research should be targeted towards those groups. Findings, from the self-harm and ideation analyses in particular, may be used to inform the revision of the Protect Life 2 Strategy in Spring 2024. However, as mentioned above, these data capture only a very small proportion of individuals in the population with mental ill-health and may not be telling the whole story of the impact of the pandemic on mental ill-health in Northern Ireland.

Pathway to Impact:
Results of this work have been published across two articles in The British Journal of Psychiatry to date.
In addition, results were presented at a range of national and international forums including the 28th British Isles Workshop on Research on Suicide and Self-Harm (October 2021), the Lancet Psychiatry Suicide Symposium (October 2021), and the International COVID-19 suicide research collaboration (ICSPRC) Symposium (February 2022).
The PI (Dr Aideen Maguire) sits on the All-Party Group (APG) for Suicide Prevention and intends to present these findings, plus others around mental health in NI more generally in early 2024 to this APG to help inform the Protect Life 2 refresh.