

Anticipatory care in 2024: New models for prediction and their application in Ireland

Prof Matthew Cooke

7 February 2024

20th National Health Summit

Intro to Matthew

- Retired EM physician
- Ex Govt emergency medicine tsar
- Professor of Clinical Systems Design, University of Warwick
- Advisory roles in digital healthcare, emergency care and innovating to improve
- Advisor and clinical safety committee member at HN.



Introduction to HN

- UK's largest RCT on clinical case management
- Supported over 3,500 patients in 2022 with digitally-inclusive virtual care
- NHS Innovation Accelerator Fellows 2022 and 2021
- HN national AI demonstrator project – largest in England
- HSE ECC Demonstrator Project



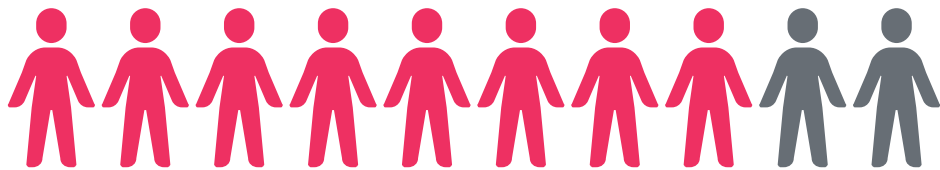
nuffieldtrust

UCLPartners





HN Predict is scientifically proven to **identify 8 out of 10** patients requiring immediate preventative support to avoid unplanned hospitalisation.



Our services are clinically validated and published in peer reviewed journals including the BJGP and EMJ

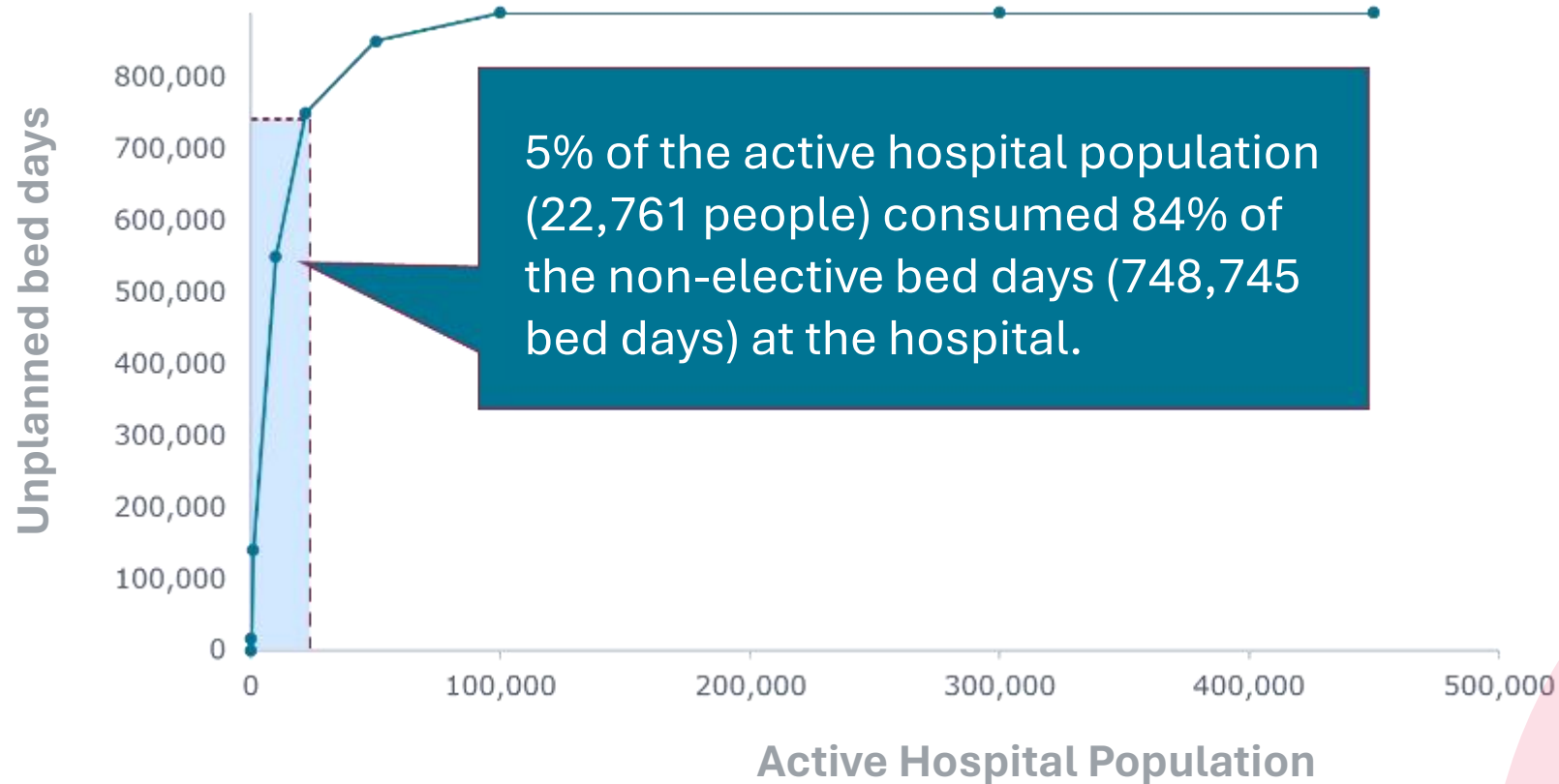


Our RCT found that patients over 75 were 46% less likely to die within two years of receiving HN's intervention



Our approach to UEC avoidance is adopted by the NHS Innovation Accelerator and accredited by the PCI.

Unscheduled hospital care demand is concentrated to a small population



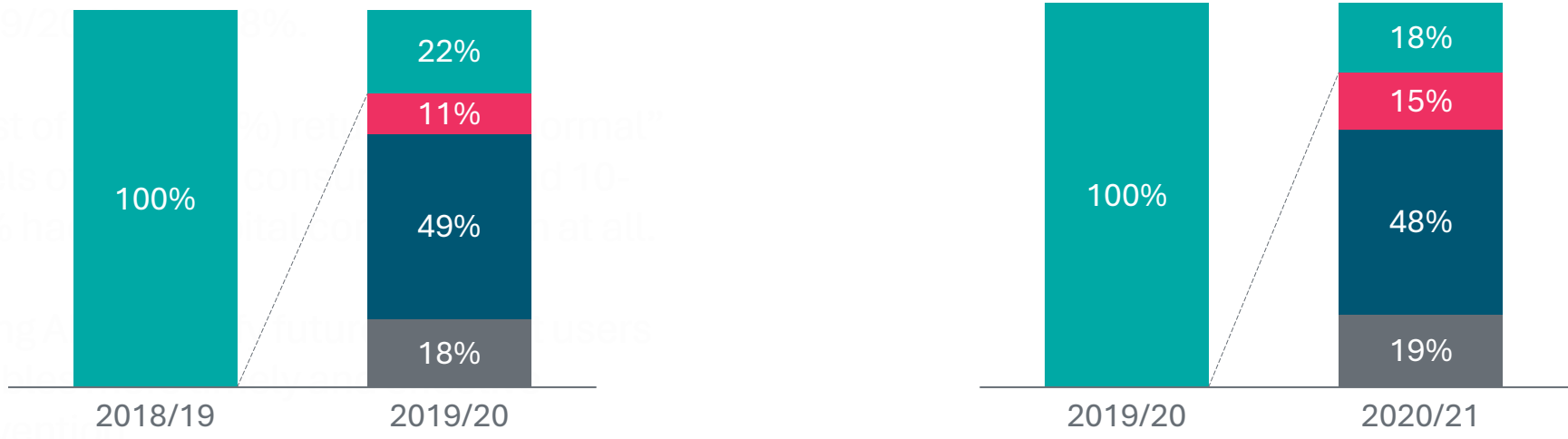
Annual Turnover of High Users

In this example: turnover of the frequent users between 2018/2019 and 2019/2020

Most of the 10% returned to normal levels of activity. Only 10-15% had no activity at all.

Using AI to identify future users enables prevention

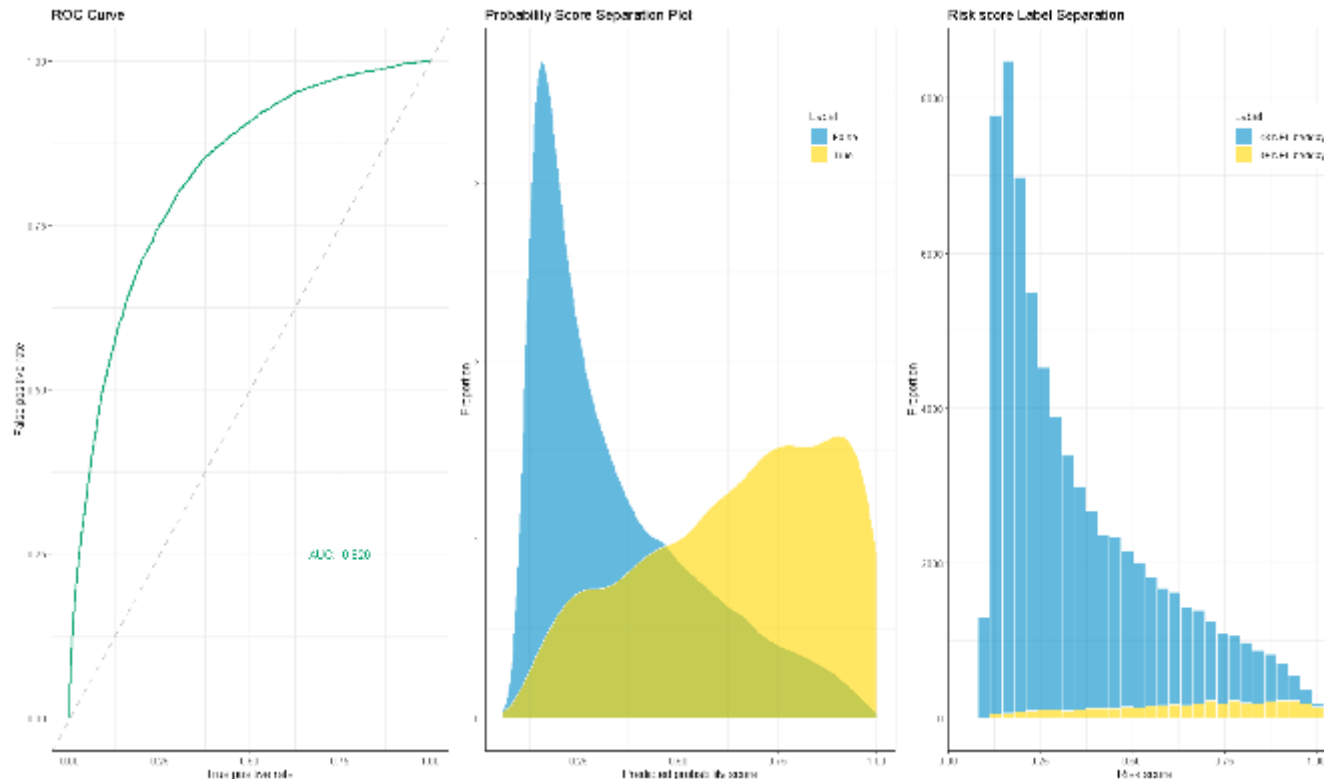
Example from Scotland. Similar results seen in Ireland, the UK, and Sweden.



- Top 5%
- No activity
- Rest of 95%
- Deceased

Prediction

The HN Predict AI model can identify 8 out of 10 HIUs -before they become high users (predicting >3 unplanned bed days).

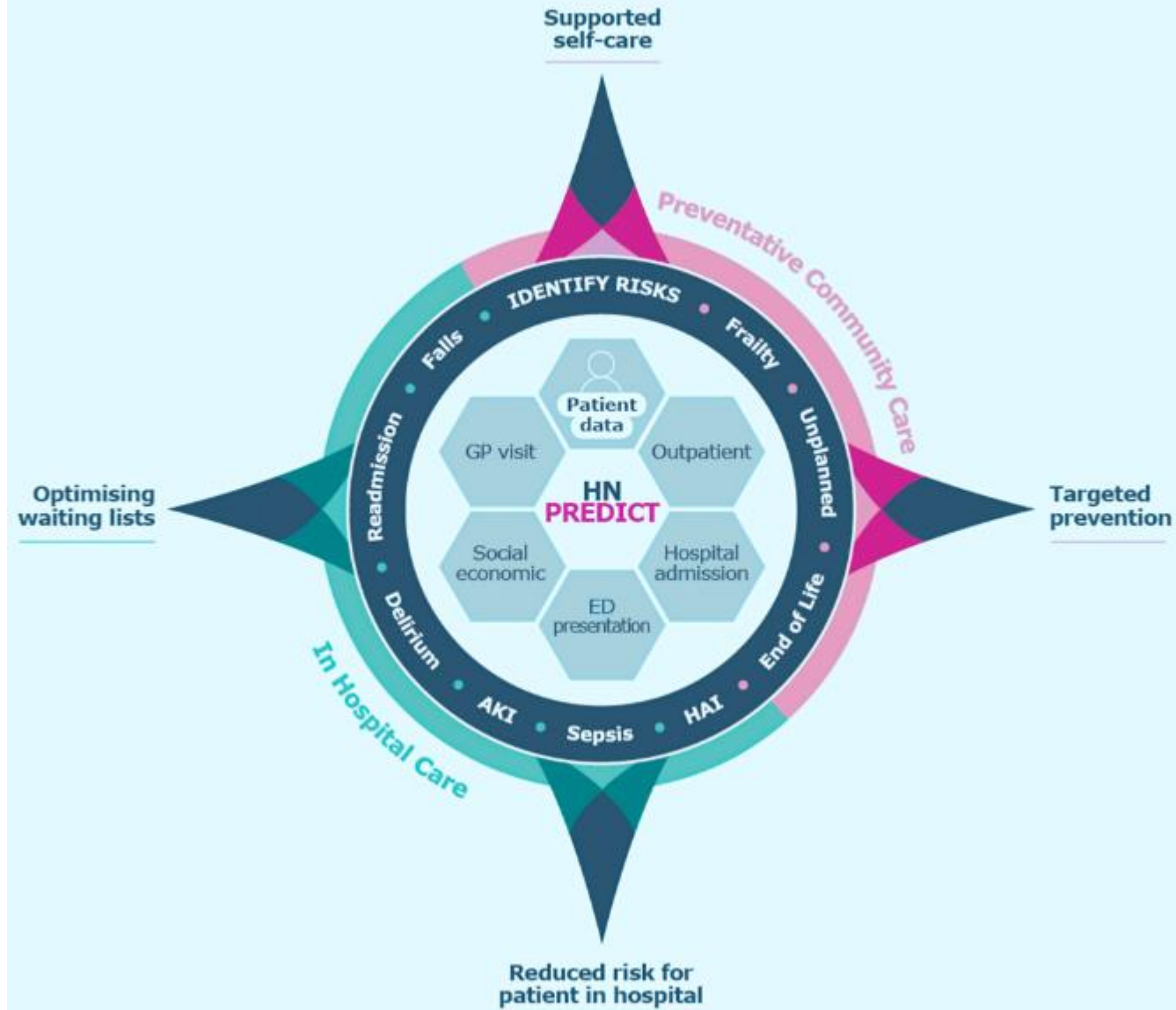




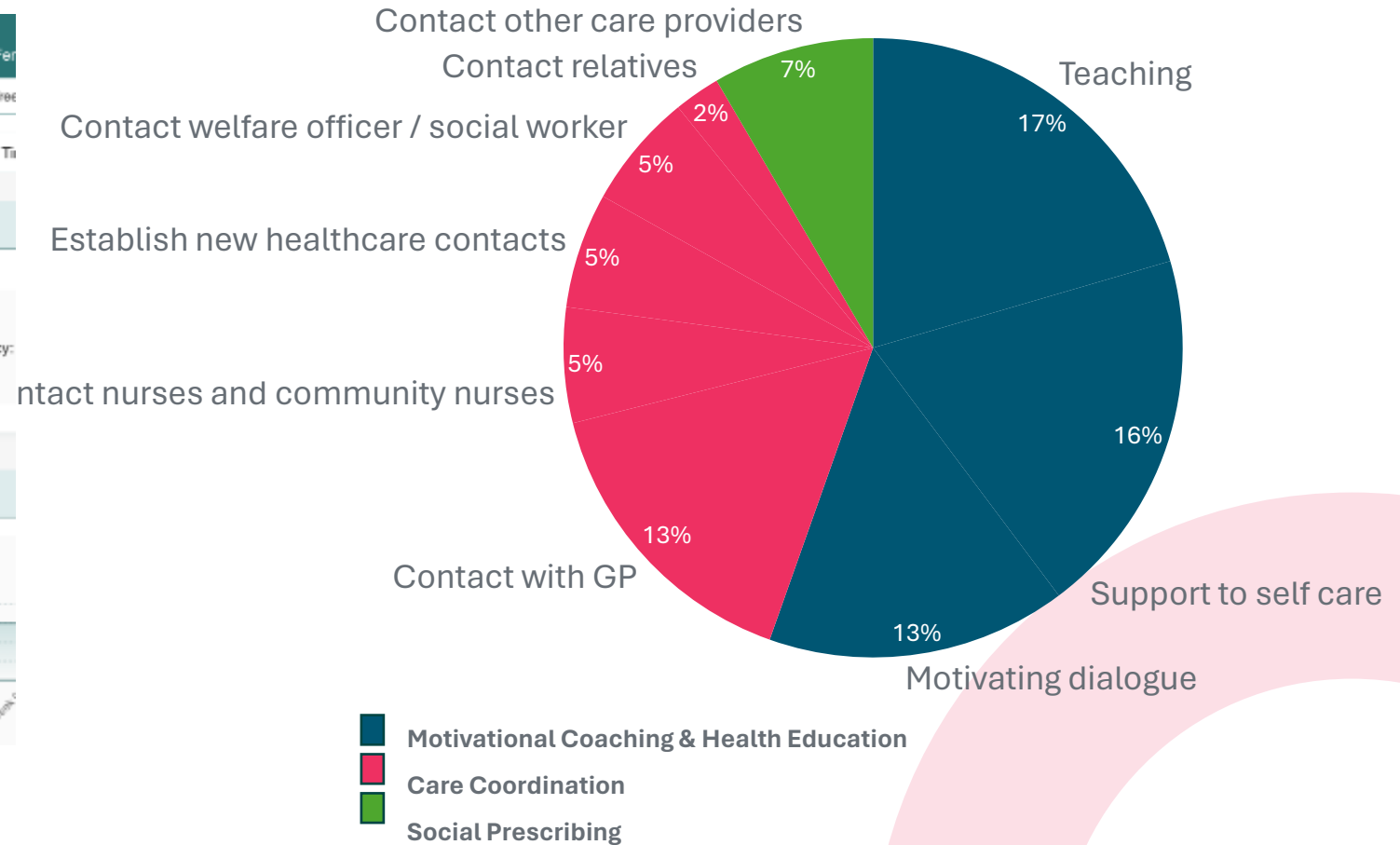
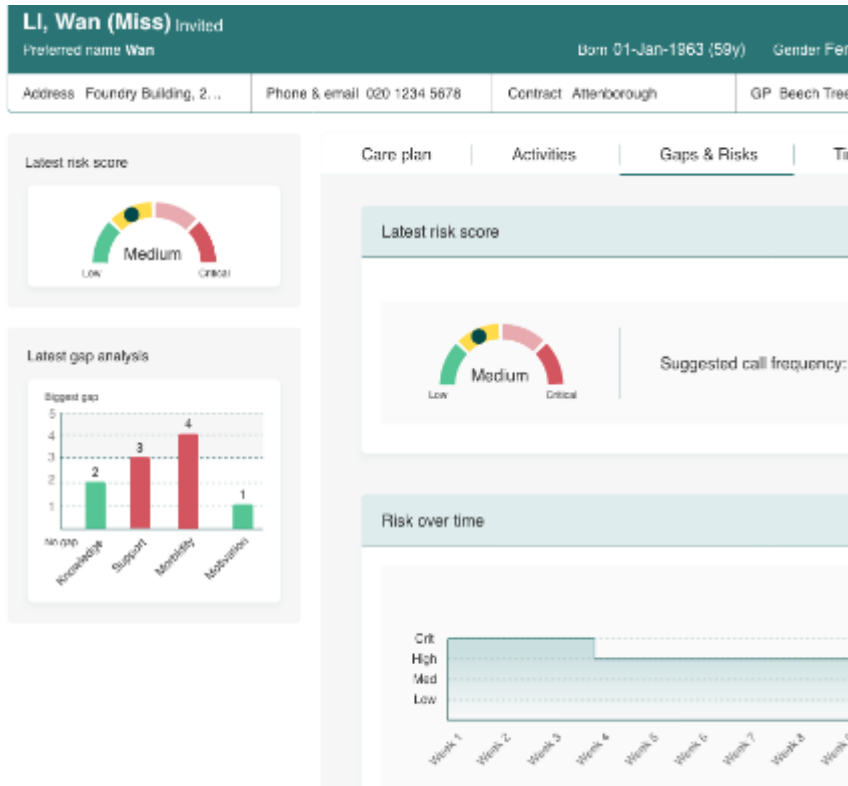
HN Predict is the engine that powers predictive care.

HN Predict can **identify 8 out of 10** patients requiring immediate preventive support to avoid unplanned hospitalisation.

As a flexible AI platform, it turns routinely-collected data into predictive insights.

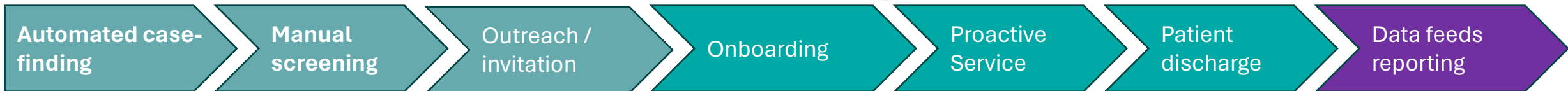


A nurse-led, scalable, remote, preventative intervention



All HN Clinical Coaches are registered healthcare professionals who undergo an NHS Personalised Care Institute Accredited Training Programme.

Combining predictive analytics with preventative clinical coaching



Daily algorithm supported case-identification

HN nurses screen against EPRs/EMRs (Human in the Loop)

Patients actively recruited

One Clinical Coach has an active case-load of between 30-60 patients at any time.

System activity savings and PROMs evaluated



DS&P Toolkit



Evidenced impact from HN's RCT with Nuffield Trust



35%

reduction in **A&E attendances** on average



34%

reduction in **non-elective spells** on average



30%

reduction per patient in the average **total hospital care cost**



57%

reduction in **A&E tariff registered cost** in the 49–79 year age group



59%

of patients reported an improvement in their **mental health**

Latest trial

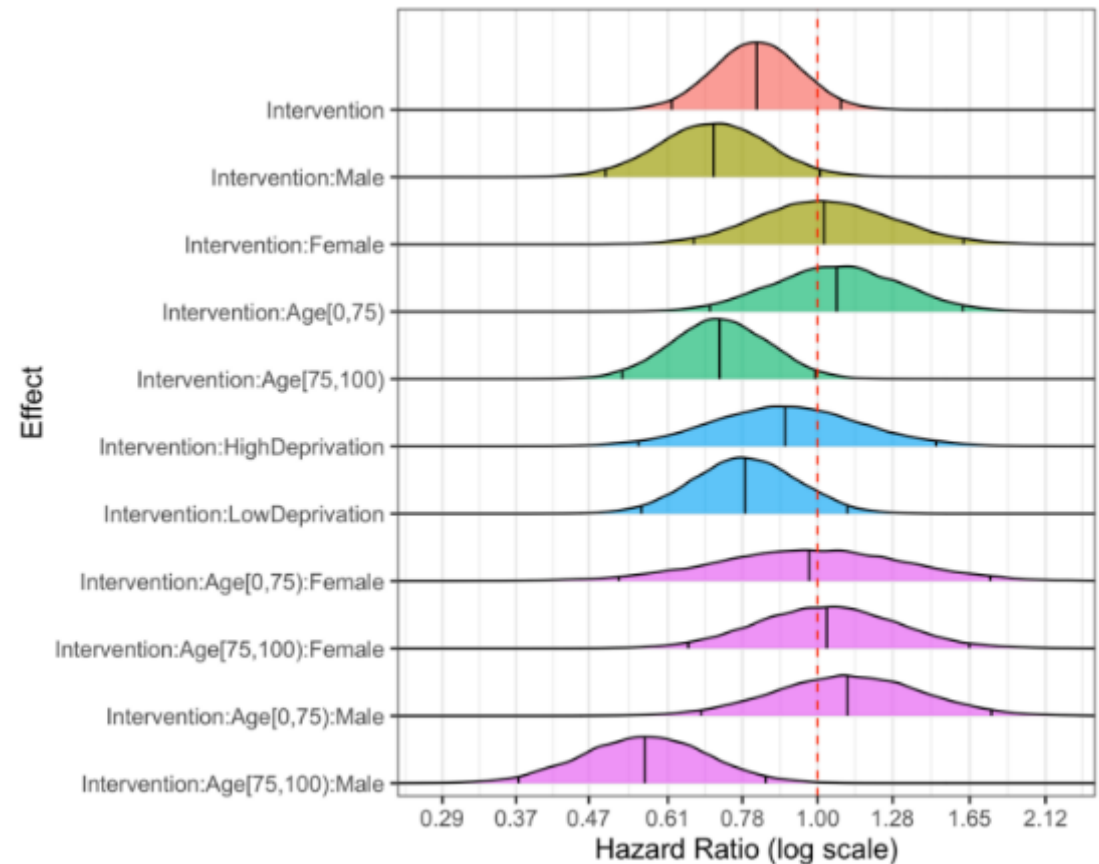
- Automated screening of hospital ED attendance and admission date using a locally trained clinical prediction model.
- Those at high risk were screened and then randomised.
- Trial= one-to-one telephone health coaching for 4–6 months, led by registered health professionals.
- The intervention involved motivational guidance, support for self-care, health education, and coordination of social and medical services.
- Control = routine care with no contact after randomisation.
- Mortality at 24 months was a safety endpoint.



*Bull LM, Arendarczyk B, Reis S, et al.
Emerg Med J 2024;41:51–59.*

Results and findings

- Analysis among 1,688 consented participants (media age 75 years, 52% female, 1139 intervention, 549 control)
- No significant difference in overall mortality between treatment groups (HR (95% CI): 0.82 (0.62, 1.08), $\text{pr}(\text{HR}<1)=0.92$),
- but did suggest a significantly lower mortality in men aged >75 years (HR (95% CI): 0.57 (0.37, 0.84), number needed to treat=8).
- Early mortality in men aged >75 years may be reduced by supporting individuals at risk of unplanned hospitalisation with a clear outreach, out-of-hospital nurse-led, telephone-based coaching care model.



Headlines

- For every 1,000 patients, the control group reported 280 deaths whereas the intervention group reported 152 deaths, a reduction of 128 deaths. These results were statistically significant.
- For this cohort, the results demonstrated a **substantial positive impact**, with one additional life saved for every 8 elderly males receiving the intervention.
- Compared to pharmaceutical prevention methods such as statins, which avoid 1 heart attack per 60 treated patients over 5 years and 1 stroke per 268 treated patients over 5 years, the impact for these older males was much more pronounced.

AI screening followed by personalised health coaching **reduced deaths by 46% in males aged over 75**

Findings from HN's randomised controlled trial in 8 NHS trusts enrolling ~1,700 patients.

Findings published in Emergency Medicine Journal. Patients were followed up with over a period of two years

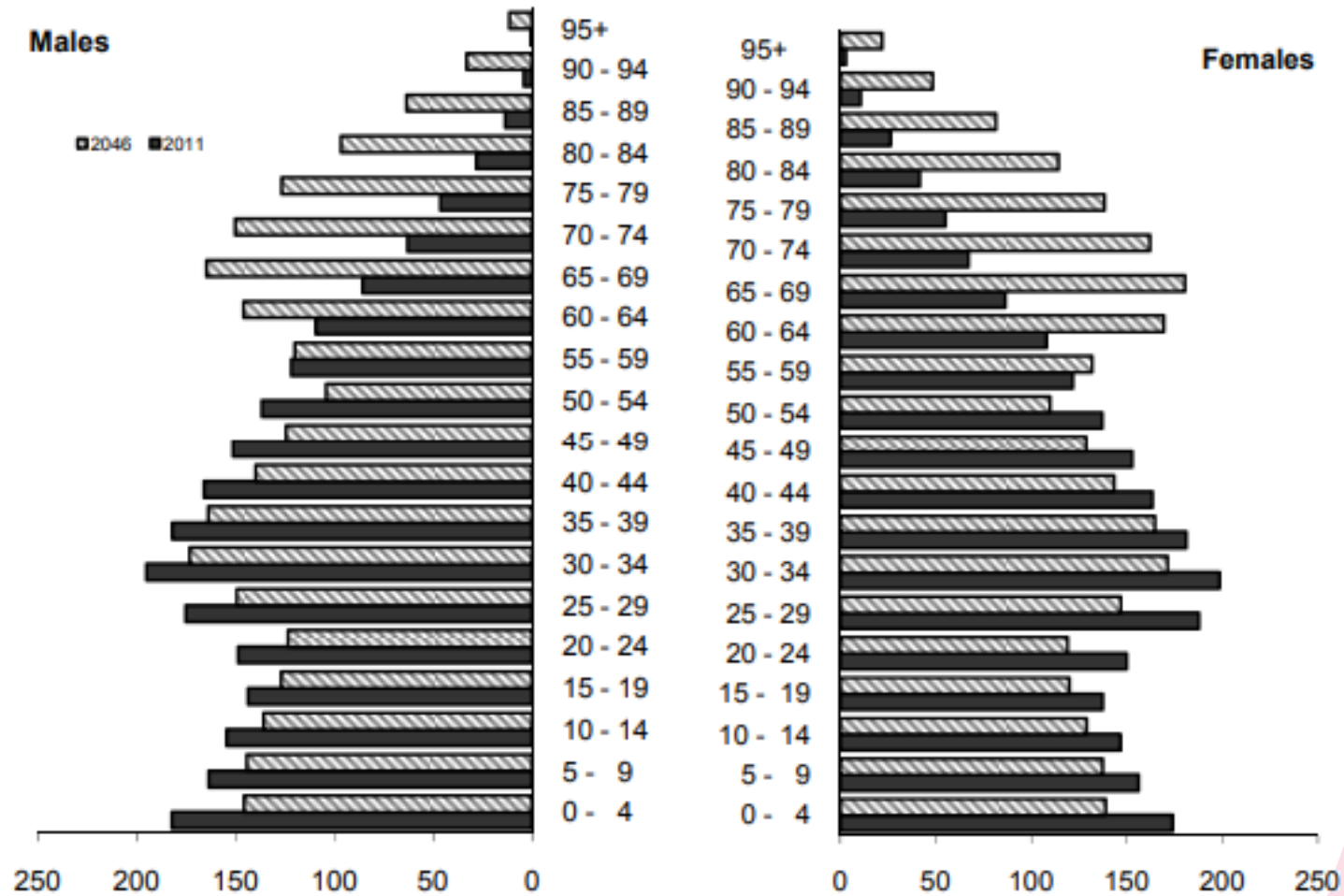


**Prof Garry
Courtney**

The background is a solid teal color. It features a pattern of small dots in white and red. These dots are arranged in several curved, parallel lines that sweep across the frame from the bottom left towards the top right. The dots are of varying sizes and are scattered throughout the teal field, creating a dynamic, abstract visual effect.

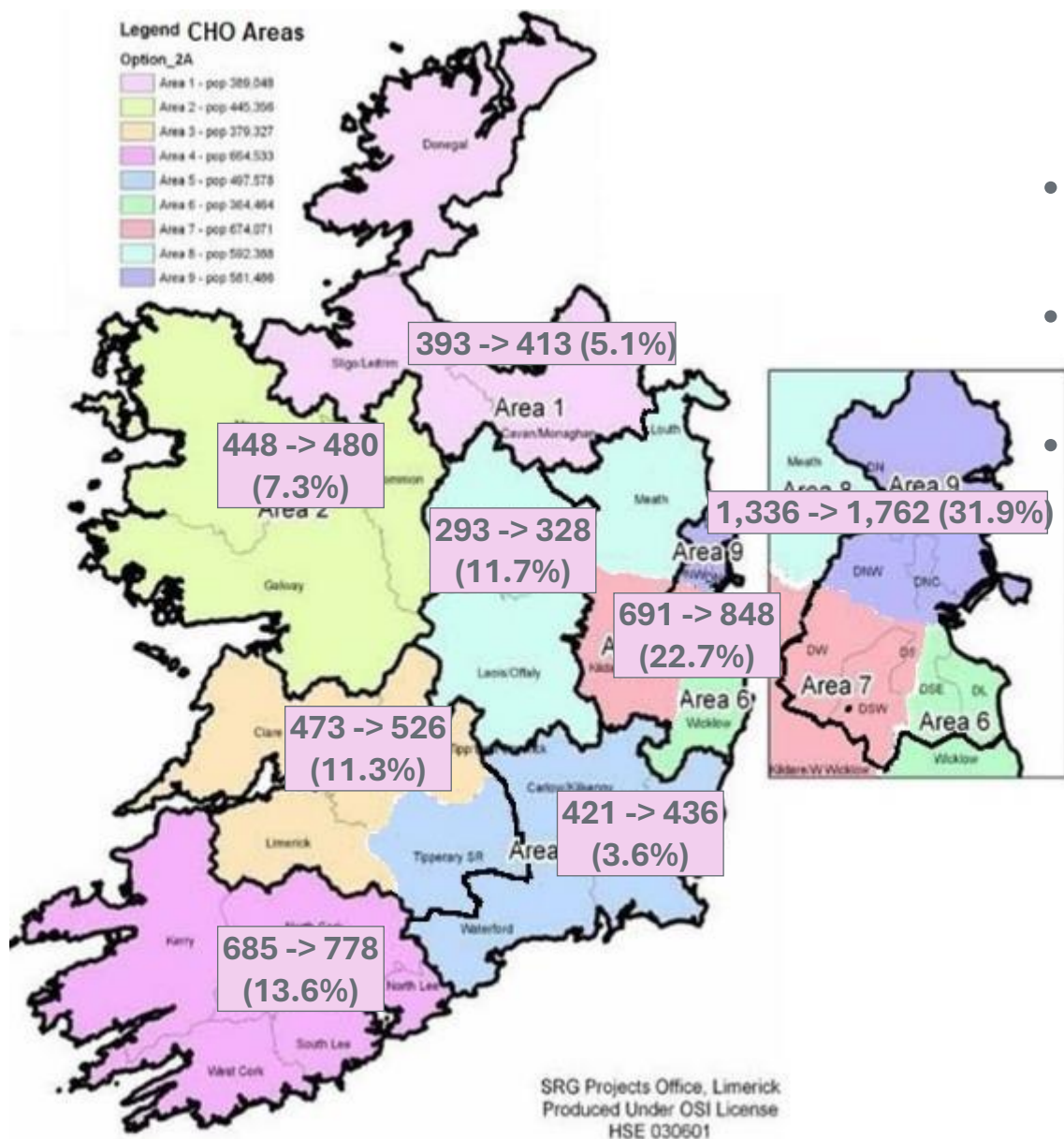
Population pyramids for 2011 and 2046

Figure 9 Population pyramids for 2011 and 2046 (M3F2)



Source: Population and Labour Force Projections, April 2013

— CSO Pop'n areas



CSO Regional population projections 2016 -> 2036

M2F2 – Dublin inflow - In 000's of population

Total population growth \approx 17.6% from 4,740 to 5,572 thousands

- \approx 21.9% growth East of Ireland (2,966 -> 3,616 thousands)
- \approx 12.7% growth South & Mid West (1,069 -> 1,205 thousands)
- \approx 6.5% growth West & NW (705 -> 751 thousands)

CSO regions for population forecasting

Borders: Cavan, Donegal, Leitrim, Louth Monaghan, Sligo

West: Galway city, Galway co, Mayo, Roscommon

Mid-West: Clare, Limerick city, Limerick Co, Tipp North

South-West: Cork city, Cork Co, Kerry

South-East: Carlow, Kilkenny, Tipp South, Waterford, Wexford

Mid-East: Kildare, Meath Wicklow

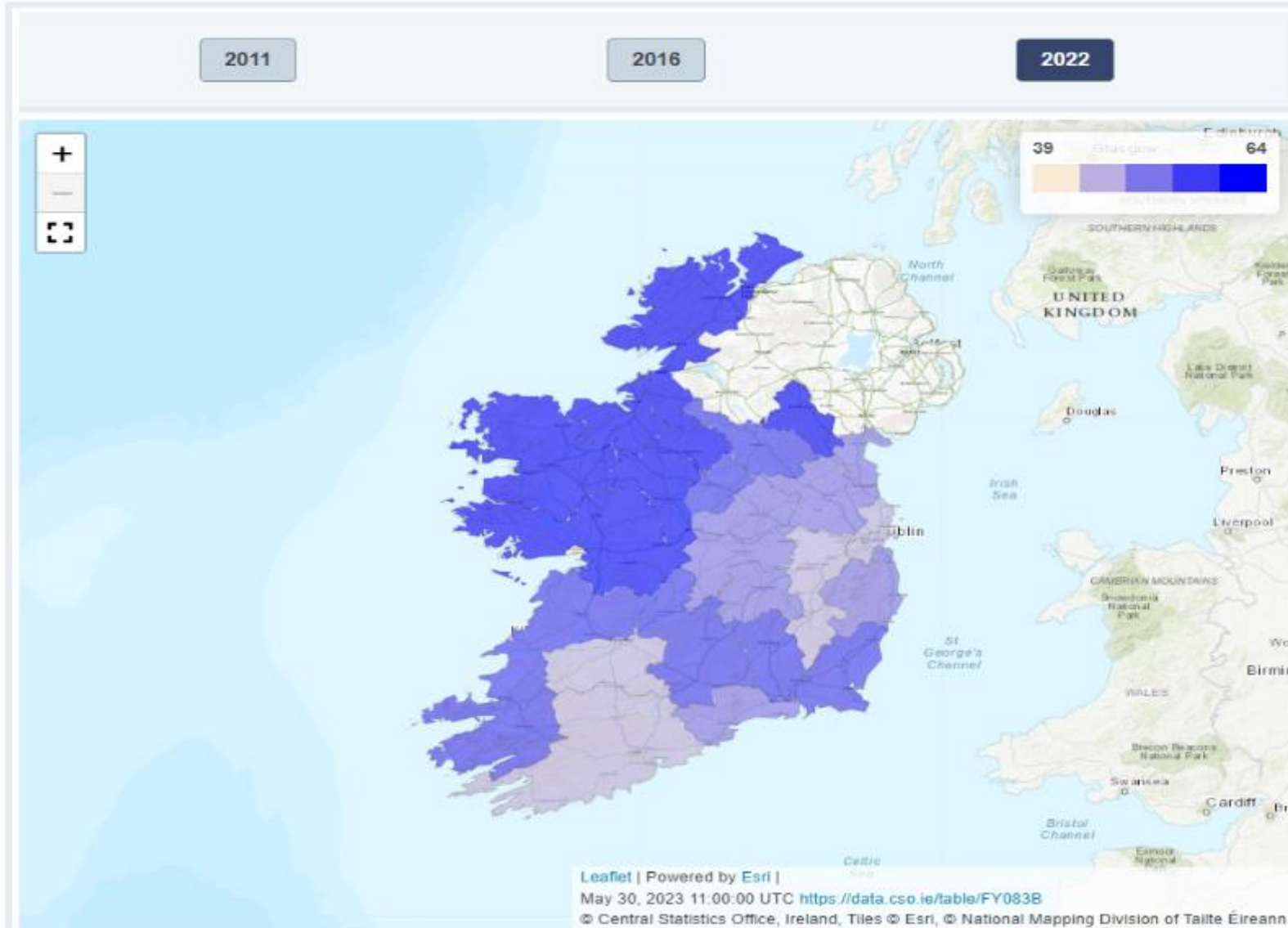
Midland: Laois, Longford, Offaly, West Meath

Dublin: Dublin city, Dun Laoghaire/Rathdown, Fingal, South Dublin

Regions are CSO Nomenclature of Territorial Units for Statistics (NUTS)

Age dependency ratio by county

Map 1.4 Age dependency ratio by county and city, 2011 to 2022



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Ireland has the highest levels of loneliness in Europe, new study finds



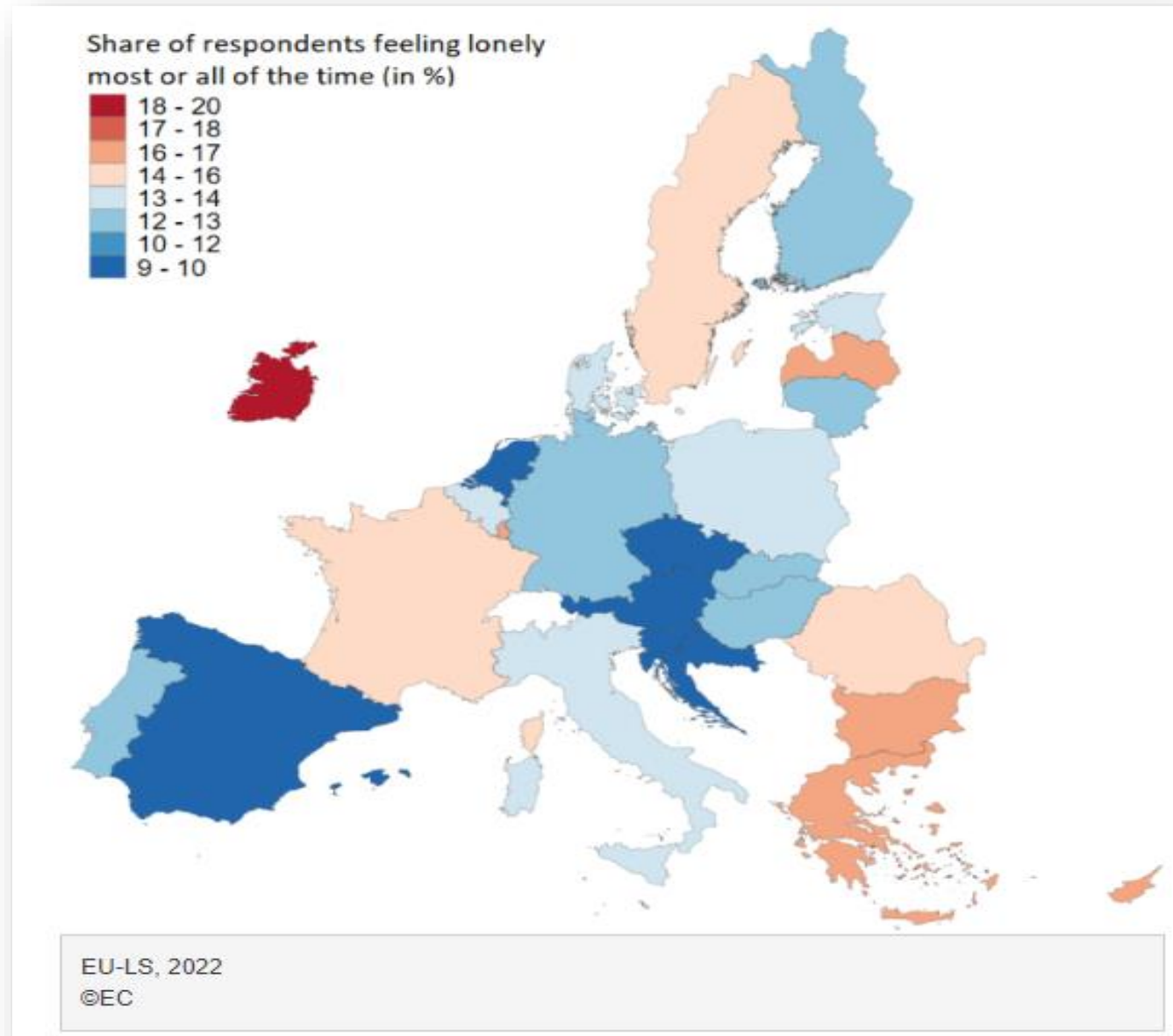
Stock image. Getty Images/Tetra images RF

Seoirse Mulgrew

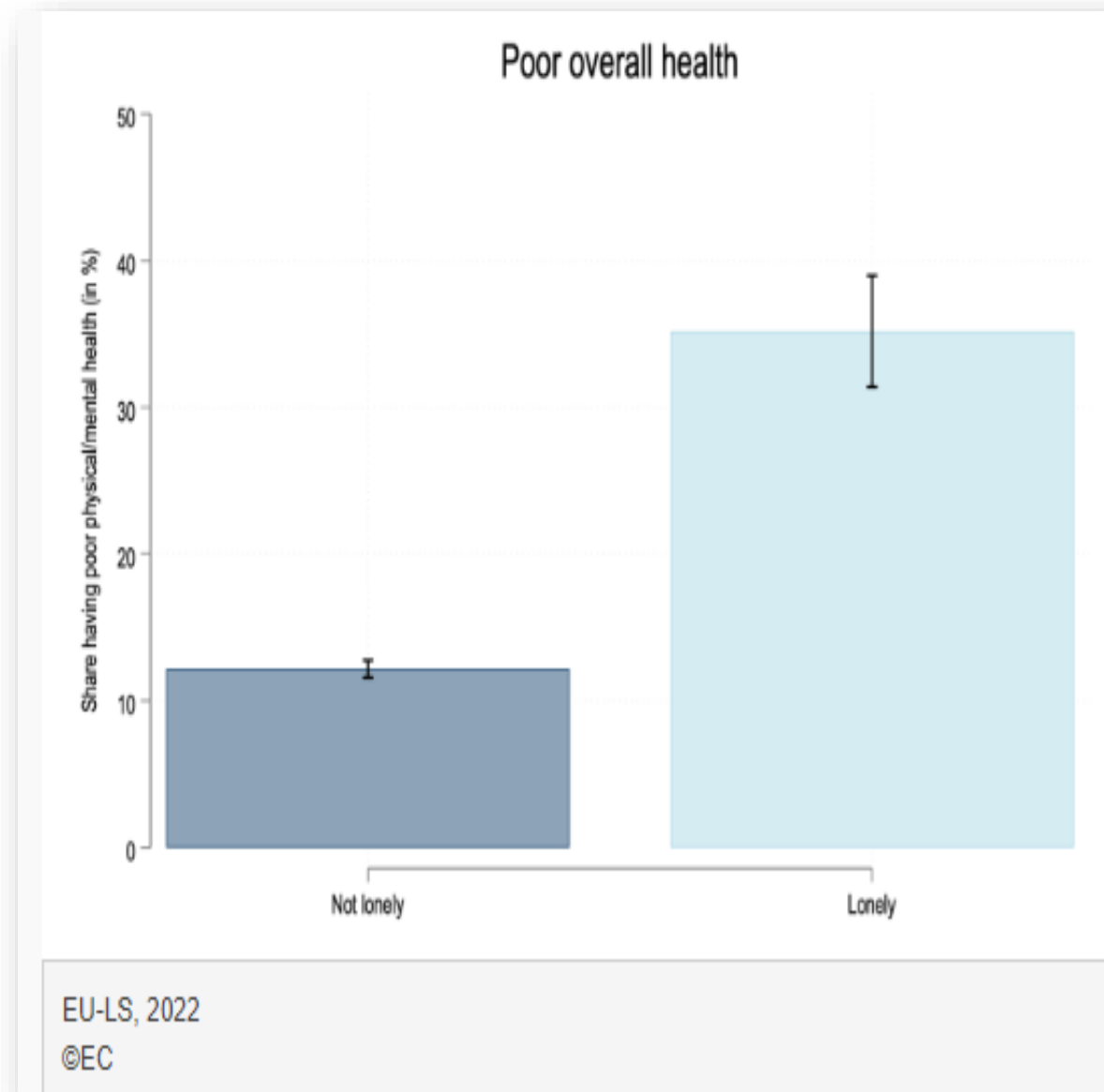
Wed 7 Jun 2023 at 11:53



Loneliness prevalence in the EU



Loneliness and health




Journal of Public Health: From Theory to Practice

<https://doi.org/10.1007/s10389-020-01338-4>

ORIGINAL ARTICLE

The impact of loneliness on healthcare use in older people: evidence from a nationally representative cohort

Annette Burns^{1,2}  • Gerard Leavey² • Mark Ward³ • Roger O'Sullivan^{1,2}

Received: 13 December 2019 / Accepted: 7 June 2020

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Loneliness, social isolation, and their discordance among older adults

Findings from The Irish Longitudinal
Study on Ageing (TILDA)

Mark Ward, Richard Layte, and Rose Anne Kenny

The Irish Longitudinal Study on Ageing

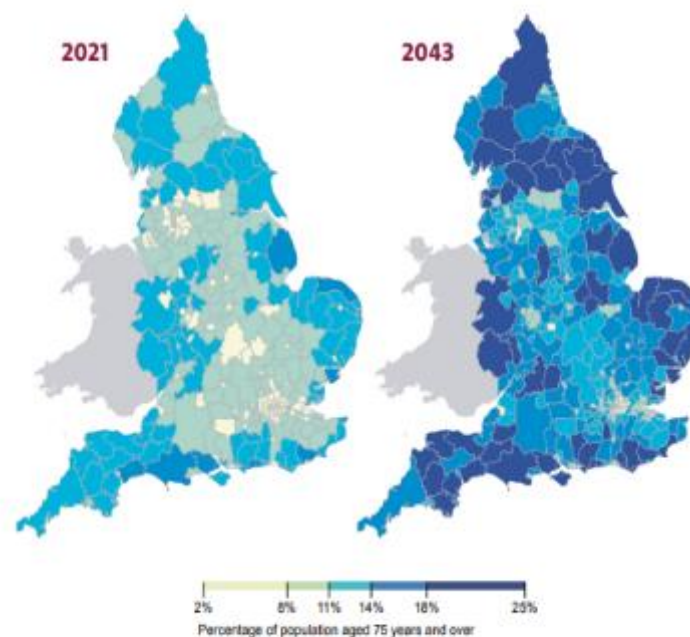
On behalf of the TILDA team

October 2019

Chief Medical Officer's Annual Report 2023

Health in an Ageing Society

Executive summary and recommendations



Questions?

Visit the HN stand outside (stand 21) for copies of the academic papers cited in this presentation that underpin a predictive, preventative care approach.

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