

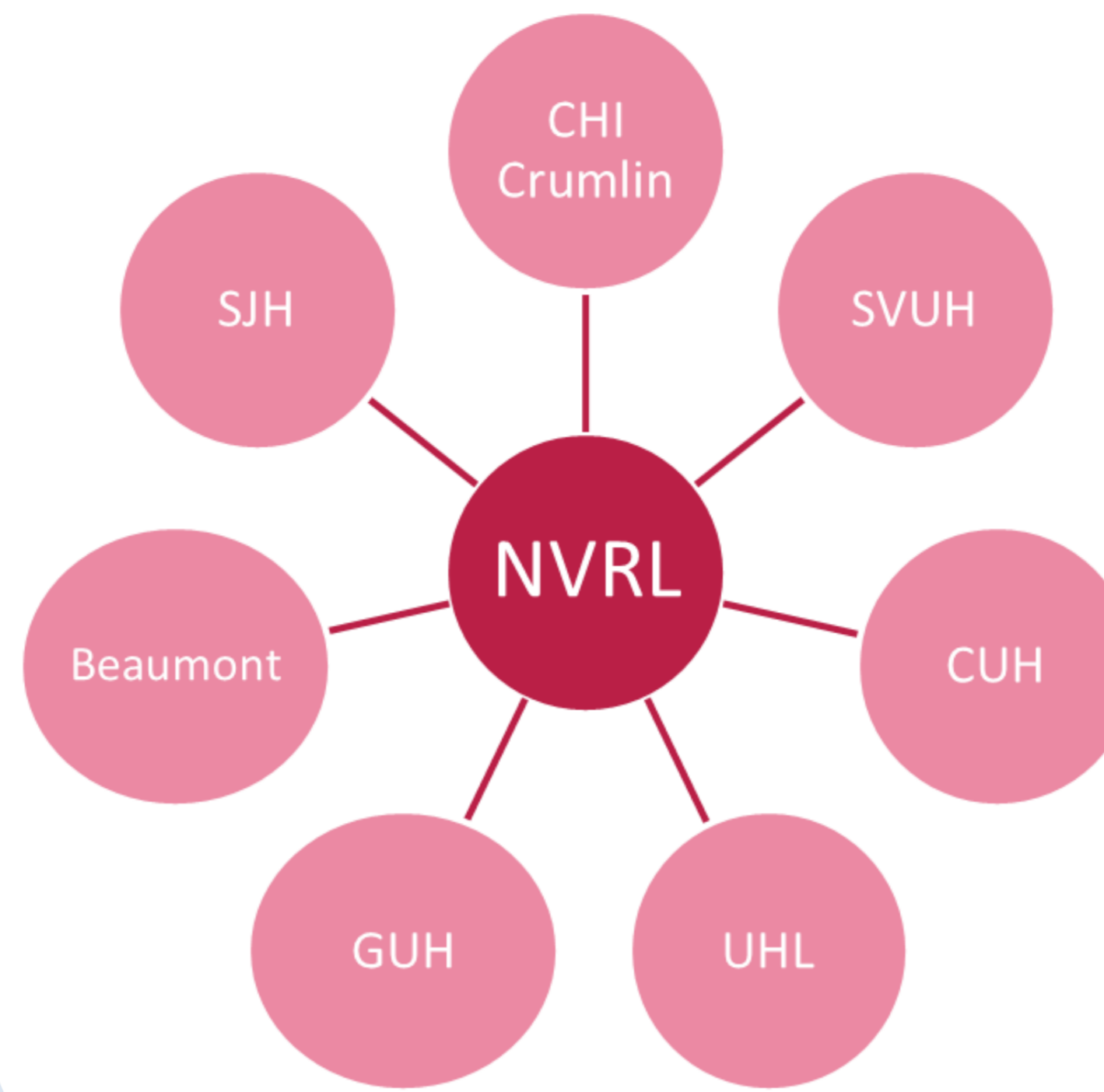
# HSE The National SARS-CoV-2 Whole Genome Sequencing Surveillance Programme

Sarah McGarry<sup>1</sup>, Carina Brehony<sup>1</sup>, Lisa Domegan<sup>1</sup>, Kevin Brown<sup>1</sup>, Tina Smith<sup>1</sup>, Eva Rushe<sup>1</sup>, Jonathan Dean<sup>2</sup>, Patrick Stapleton<sup>3</sup> and WGS Programme Steering Group

## Introduction

- National SARS-CoV-2 Whole Genome Sequencing (WGS) Surveillance Programme established in 2021 in response to COVID-19 pandemic
- “Hub-and-Spoke”<sup>4</sup> model led by HPSC with NVRL as the hub laboratory and seven acute hospital laboratories as spoke sites
- Network of genomic experts including Scientists, Bioinformaticians, Epidemiologists, Microbiologists, Public Health Physicians and other clinicians

## Hub-and-Spoke Model



## Objectives

- Collect WGS typing data on confirmed SARS-CoV-2 cases and record data nationally
- Provide timely reporting on epidemiology of SARS-CoV-2 lineages, variants of concern or interest in Ireland
- Contribute to global knowledge base on SARS-CoV-2 to inform global health response
- Improve integration of genomics into standard Public Health Practice

## Methods

### The Programme sequences SARS-CoV-2 samples from:

- Sentinel surveillance programmes – Sentinel GP ARI and hospital-based SARI surveillance<sup>5</sup>
- Severe disease cases including laboratory confirmed SARS-CoV-2 hospitalised and ICU cases and deaths
- Targeted sequencing for outbreak investigations, epidemiological changes, chronic infection cases and risk groups
- HPSC uploads SARS-CoV-2 sequence data submitted by laboratories to CIDR<sup>6</sup>, linking to notified COVID-19 cases, where it is available to regional departments of public health

## Results

- Programme has contributed over 110,000 SARS-CoV-2 sequences to the public domain to add to global knowledge base on the virus
- Tracked variant trends in Ireland from B.1.1.7 (Alpha) wave through to current JN.1 (Omicron) predominance
- JN.1 (BA.2.86 sub-lineage) has been dominant lineage in Ireland since December 2023
- SARS-CoV-2 sequence data uploaded to GISAID is used nationally and internationally to monitor spatiotemporal trends and variant emergence

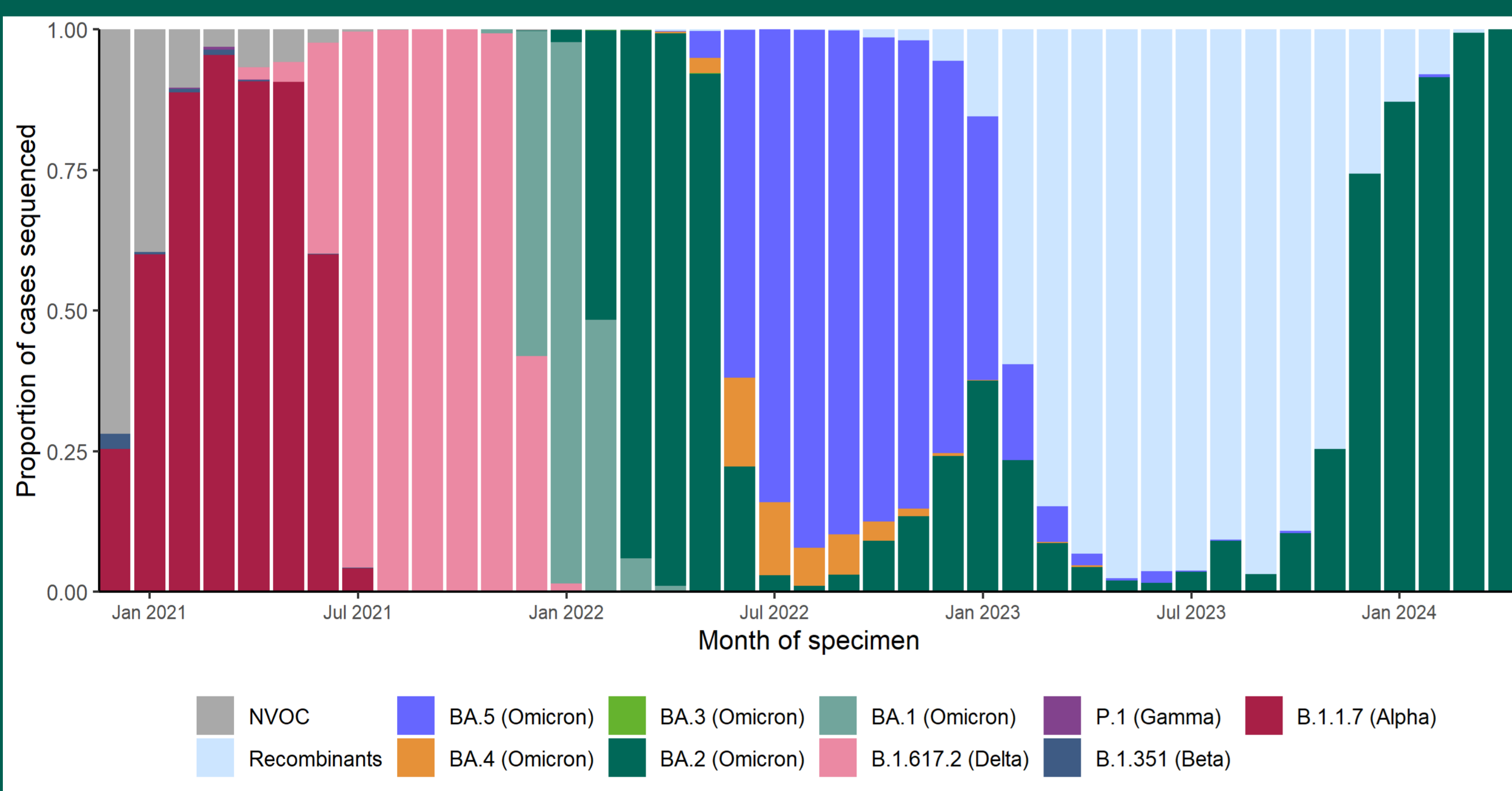


Figure 1: Proportion of sequenced SARS-CoV-2 specimens, by variant of concern or interest, specimen collection dates, December 2020 to April 2024, Ireland.

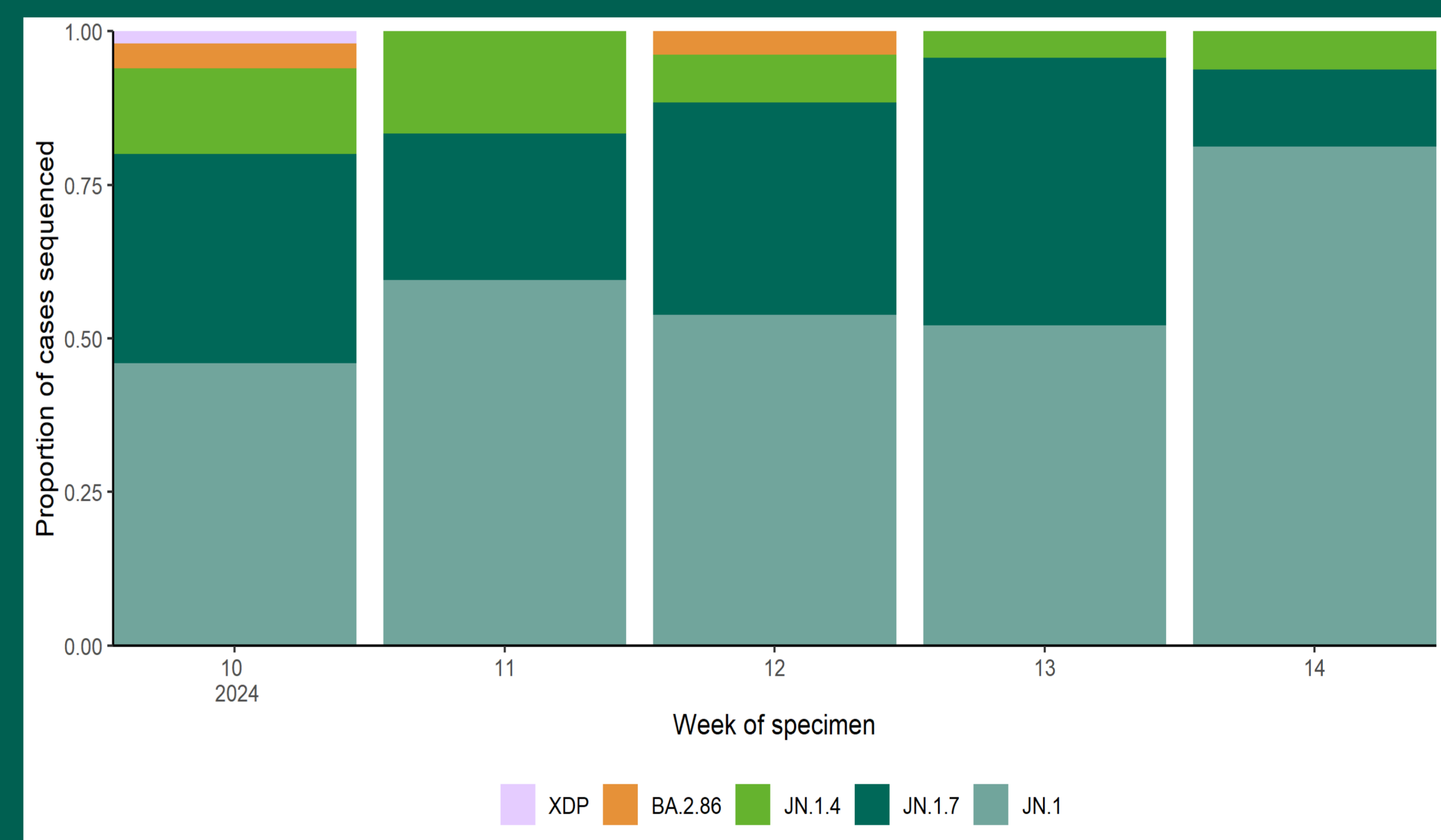


Figure 2: SARS-CoV-2 whole genome sequencing results by proportion by week specimen collected from week 10 2024 to week 14 2024, Ireland.

## Conclusions

Ireland's National SARS-CoV-2 WGS Surveillance Programme is among the top performing SARS-CoV-2 genomic surveillance programmes in Europe and Worldwide. The Programme has developed a sustainable nationwide genomic surveillance programme and network including laboratory equipment, technical skills, expertise and logistical arrangements. Going forward, genomic surveillance will be a key component of future epidemic and pandemic preparedness.

Acknowledgments: Sincere thanks to all who participated in the collection of these datasets, the National SARS-CoV-2 Whole Genome Sequencing Surveillance Programme, notifying clinicians and public health staff, microbiologists, laboratory, administrative staff and the HPSC respiratory virus unit.

1. HSE - Health Protection Surveillance Centre, Dublin, Ireland 2. National Virus Reference Laboratory, University College Dublin 3. On behalf of the WGS Programme Spoke Laboratories 4. The Programme Hub-and-Spoke model includes the following laboratories: The National Virus Reference Lab (NVRL), Beaumont hospital, St Vincent's University Hospital (SVUH), St James's Hospital (SJH), Cork University Hospital (CUH), University Hospital Limerick (UHL), Galway University Hospital (GUH) and Children's Health Ireland Crumlin Hospital (CHI Crumlin) 5. ARI: Acute Respiratory Infection. SARI: Severe Acute Respiratory Infection 6. The Computerised Infectious Disease Reporting System

Contact: Sarah.mcgarry@hpsc.ie