PRIVATE CONSULTATIONS EXCESS RESPIRATORY ENCOUNTERS REPORT

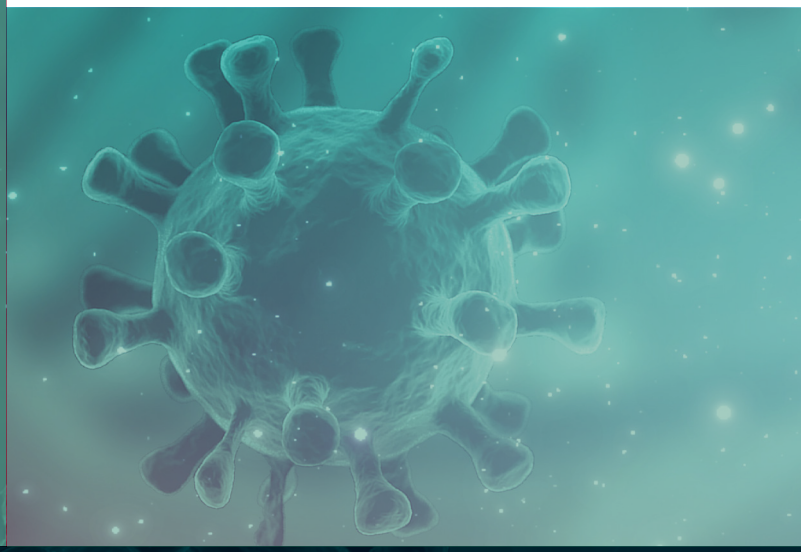
NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
Division of the National Health Laboratory Service

SOUTH AFRICA | WEEK 15 2022

CONTENTS

HIGHLIGHTS: WEEK 15

- Respiratory hospital admissions continue to increase in all provinces and age groups but predominantly in those aged 0-4 years.
- Respiratory general practitioner visits continue to increase remaining high and above projected levels in all provinces and age groups especially among those aged 0-4 years.
- Respiratory emergency department consultations have been decreasing in all provinces and age groups. However, the consultations remain high especially in those aged 0-4 years.



INTRODUCTION

Worldwide, there have been significant challenges for accurately estimating coronavirus disease 2019 (COVID-19) cases and mortality. Assessing changes in syndromic activity through preexisting respiratory surveillance systems can provide broader insight concerning the impact of COVID-19, as well as inform public health decision-making and preparedness strategies. In this report, we use time series regression models, adjusted for influenza and respiratory syncytial virus (RSV) activity, to evaluate increases in respiratory outpatient consultations and hospital admissions relative to those expected in the absence of COVID-19. Measuring excess respiratory encounters can identify locations with heightened COVID-19 activity and vulnerable demographic groups.

DATA SOURCES

Virologic Surveillance Data:

We receive weekly counts of influenza positive samples and respiratory syncytial virus (RSV) positive samples from three syndromic respiratory illness surveillance programmes coordinated by the National Institute for Communicable Diseases (NICD): The Viral Watch Programme, the ILI Public Clinics Programme, and the Pneumonia Surveillance Programme. Viral Watch collects samples from a network of general practitioners, spread throughout eight of South Africa's nine provinces. Samples are collected from patients who present with acute respiratory illness, fever (≥ 38°C), and cough. ILI Public Clinics systematically collects samples from patients at public hospitals and clinics in KwaZulu-Natal, Western Cape, and North-West provinces, using the same eligibility criteria as the Viral Watch programme. The Pneumonia Surveillance Programme collects samples from hospitalized patients with severe respiratory illness, at sites located in KwaZulu-Natal, Mpumalanga, North-West, Gauteng, and Western Cape provinces. Samples are tested at NICD for influenza, RSV, and, more recently, SARS-CoV-2.

Respiratory Medical Encounters Data:

We receive inpatient and outpatient data every week from a private hospital group and a network of general practitioners. Provinces with sufficient levels of reporting vary according to the type of consultation: inpatient (Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, North-West, Western Cape), outpatient-emergency department (Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Western Cape), outpatient-general practitioner (Gauteng, KwaZulu-Natal, Northern Cape, Western Cape). Consultations were coded based on discharge diagnosis using the International Classification of Diseases and Related Health Problems, 10th revision (ICD-10). Respiratory hospital admissions and outpatient consultations are calculated as all cause respiratory-coded encounters (J00-J99), including confirmed and suspected COVID-19 encounters (U07.1, U07.2). Weekly data were aggregated by age group (<5 years, 5-19 years, 20-49 years, ≥50 years) and by province, with the <5 age group removed for all provincial analyses.

METHODS

Adjusting for Reporting Delays:

Depending on the province, the reporting delay for hospital admissions and outpatient consultations is typically 1-4 weeks. Thus, we used a Bayesian approach [1] to account for occurred-but-not-yet-reported all cause respiratory (J00-J99) and COVID-19 (U07) encounters from weekly data drawdowns. The reporting delay distribution was used to backfill age-specific and province-specific encounters and these backfill-adjusted time series were used in subsequent time series regression models. Time series were estimated through the week starting April 17, 2022 (the last week of data available).

Excess Respiratory Encounters:

We conducted a counterfactual analysis, in which observed respiratory consultations were compared to the baseline number of consultations expected in the absence of COVID-19. Age groups and provinces were analyzed separately for each data source (inpatient, outpatient- emergency department, outpatient-general practitioner). We fit dynamic regression models with ARIMA errors [2] to the weekly number of all cause respiratory consultations from the weeks of January 3, 2016 to February 23, 2020. Models were adjusted for seasonality and weekly influenza and RSV activity. For the model prediction period, observed weekly percentages of samples testing positive for influenza or RSV were replaced with values from the same epidemic week in 2019. The baseline number of respiratory consultations was projected for the weeks of March 1, 2020 to April 17, 2022 and compared to the observed number of all cause respiratory consultations (J00-J99), including confirmed and suspected COVID-19 (U07).

INTERPRETATION OF DATA PRESENTED

This report focuses on trends since December. For interpretation of trends prior to January 2021 please see the **Private Consultations Excess Respiratory Encounters Report - week 2 of 2021.**

Inpatient (Figures 1-2)

In provinces with sufficient levels of reporting (Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, North West and Western Cape), respiratory hospital admissions in all ages and provinces increased during the recent fourth wave, but the levels did not exceed that of the previous third wave. In the last few weeks, there have been increases in respiratory admissions in all provinces, while COVID-19 admissions remain low. Among children aged <5 years, respiratory hospitalizations began to increase prior to the onset of the fourth wave (possibly in part related to the circulation of non-COVID-19 respiratory viruses) reaching levels similar to previous waves and have continued to increase surpassing levels recorded pre-COVID. Among individuals aged 5-19 years, respiratory hospitalizations have continued to increase similar to trends among children <5 years but not to the same scale. Among individuals aged ≥20 years respiratory and COVID-19 admissions increased reaching levels lower than in previous waves then decreasing, with small increases seen in recent weeks.

Outpatient - General Practitioner (Figures 3-4)

Following a spike in outpatient respiratory consultations in early March 2020, general practitioner visits have generally remained below projected levels across South African provinces and age groups until mid-May 2021, reflecting the impact of the lockdown and potential increased usage of telemedicine. General practitioner visits peaked in late June/early July 2021 and in late November/December 2021 in all provinces and age groups reflecting the impact of circulation of SARS-CoV-2 variants namely Delta and Omicron. In recent weeks, respiratory general practitioner consultations have been increasing in all provinces and age groups, remaining high and above projected levels.

Outpatient - Emergency department (Figures 5-6)

In all provinces, respiratory and COVID-19 emergency department consultations are decreasing following a peak in late November/December 2021 which corresponded with the fourth SARS-CoV-2 wave. Respiratory consultations in all age groups slightly increased in the first 2 weeks of April 2021, then declined, before increasing and peaking in late June/early July 2021 for adults aged ≥20 years. Recently, respiratory and COVID-19 emergency department consultations are on the decline following the recent fourth wave in all provinces and in adults aged ≥20 years. During March 2022, respiratory consultations have increased to proportions above projected levels in those aged 0-19 years, but have been decreasing recently.

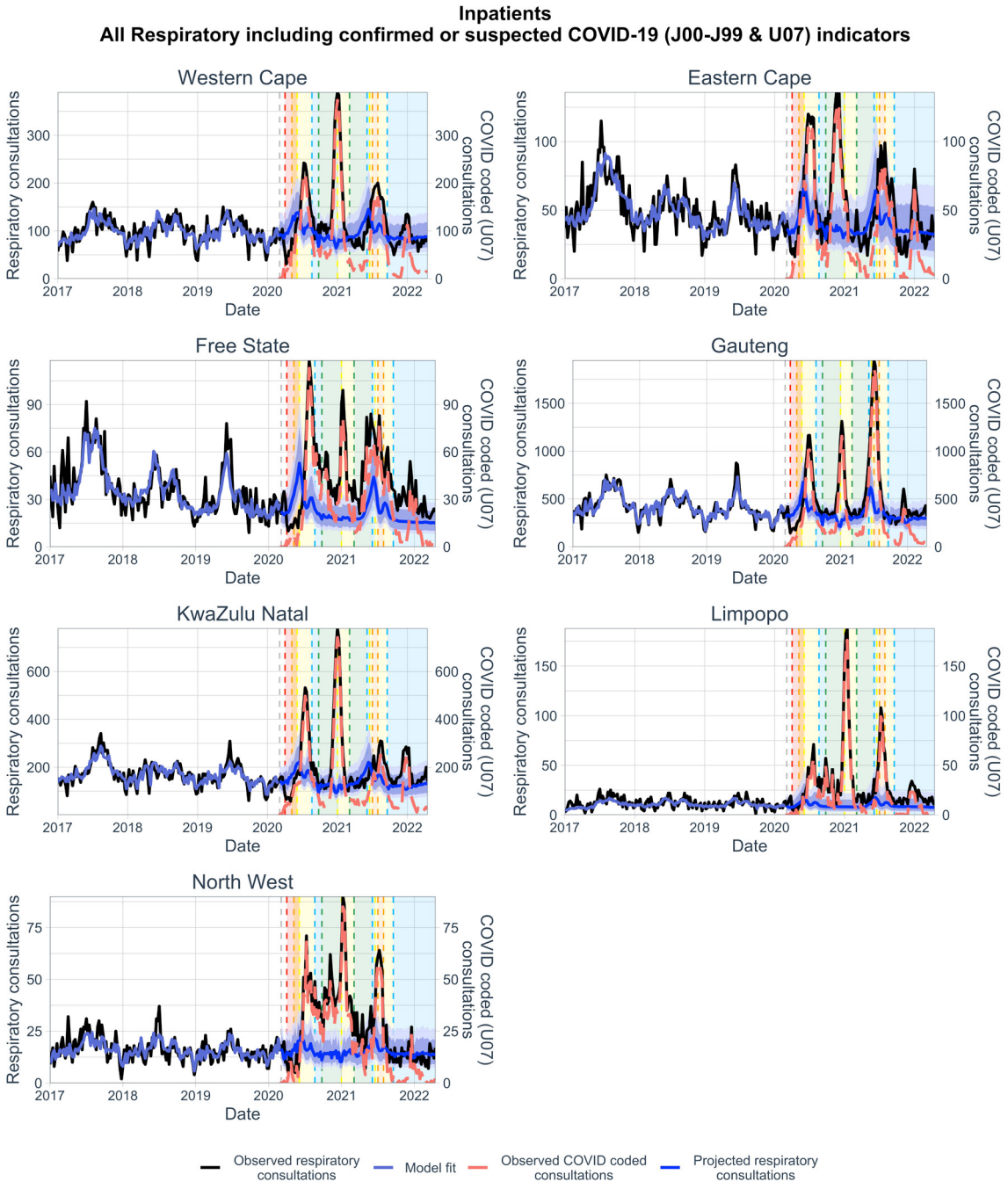


Figure 1. Weekly hospital admissions among individuals aged ≥5 years in seven provinces (black), relative to admissions expected in the absence of COVID-19 (blue band). The red line is the number of COVID-coded admissions (U07). The grey vertical dashed line indicates the start of the model prediction period (March 1, 2020 – April 17, 2022), and panel colours indicate lockdown alert levels (Level 5: red, Level 4: orange, Level 3: yellow, Level 2: blue, Level 1: green). The left y-axis refers to all cause respiratory admissions (J00-J99 & U07), and the right y-axis refers to COVID-coded (U07) admissions.

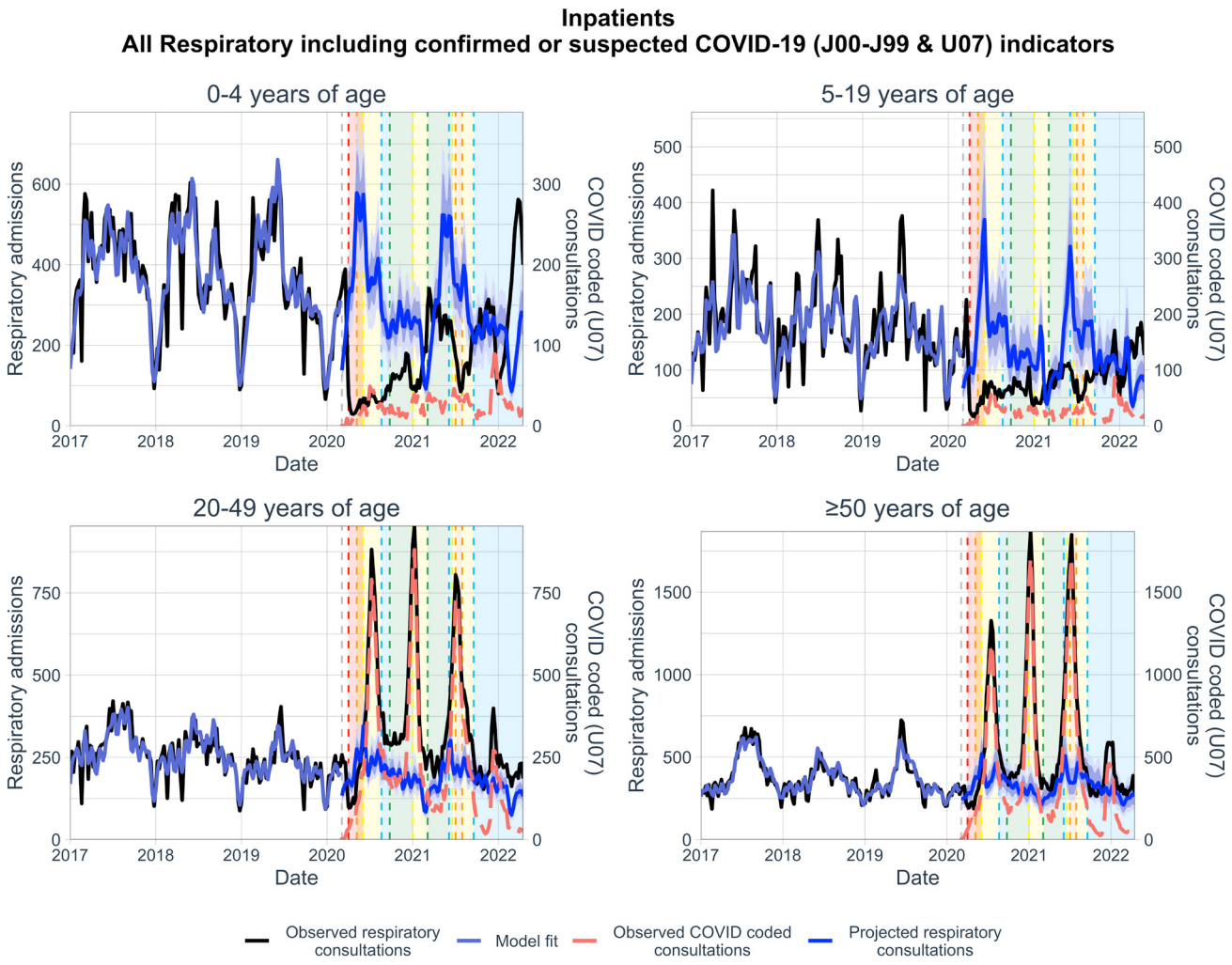


Figure 2. Weekly hospital admissions by age group (black), relative to admissions expected in the absence of COVID-19 (blue band). The red line is the number of COVID-coded admissions (U07). The grey vertical dashed line indicates the start of the model prediction period (March 1, 2020 – April 17, 2022), and panel colours indicate lockdown alert levels (Level 5: red, Level 4: orange, Level 3: yellow, Level 2: blue, Level 1: green). The left y-axis refers to all cause respiratory admissions (J00-J99 & U07), and the right y-axis refers to COVID-coded (U07) admissions.

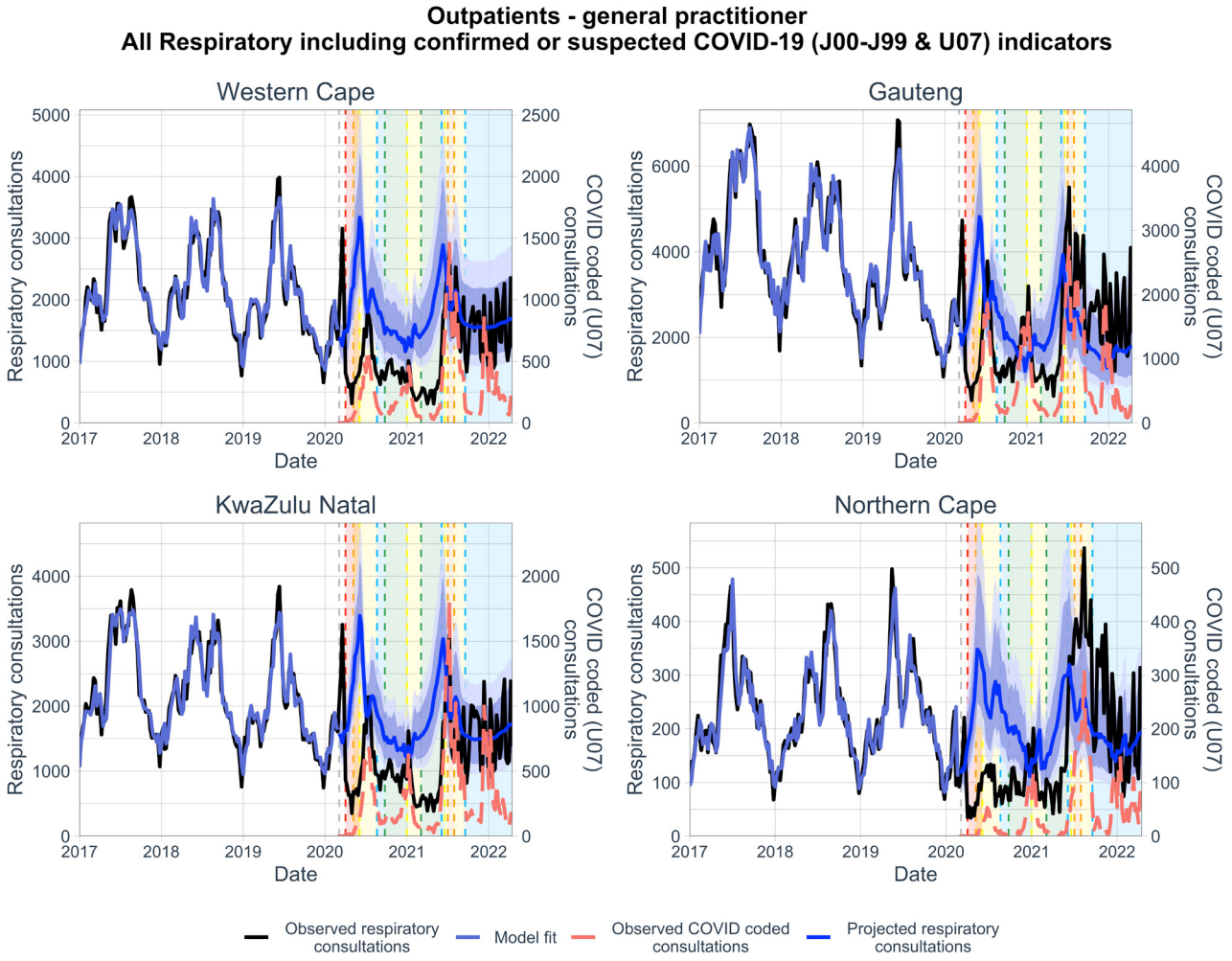


Figure 3. Weekly general practitioner consultations among individuals aged ≥5 years in four provinces (black), relative to consultations expected in the absence of COVID-19 (blue band). The red line is the number of COVID-coded consultations (U07). The grey vertical dashed line indicates the start of the model prediction period (March 1, 2020 – April 17, 2022), and panel colours indicate lockdown alert levels (Level 5: red, Level 4: orange, Level 3: yellow, Level 2: blue, Level 1: green). The left y-axis refers to all cause respiratory consultations (J00-J99 & U07), and the right y-axis refers to COVID-coded (U07) consultations.

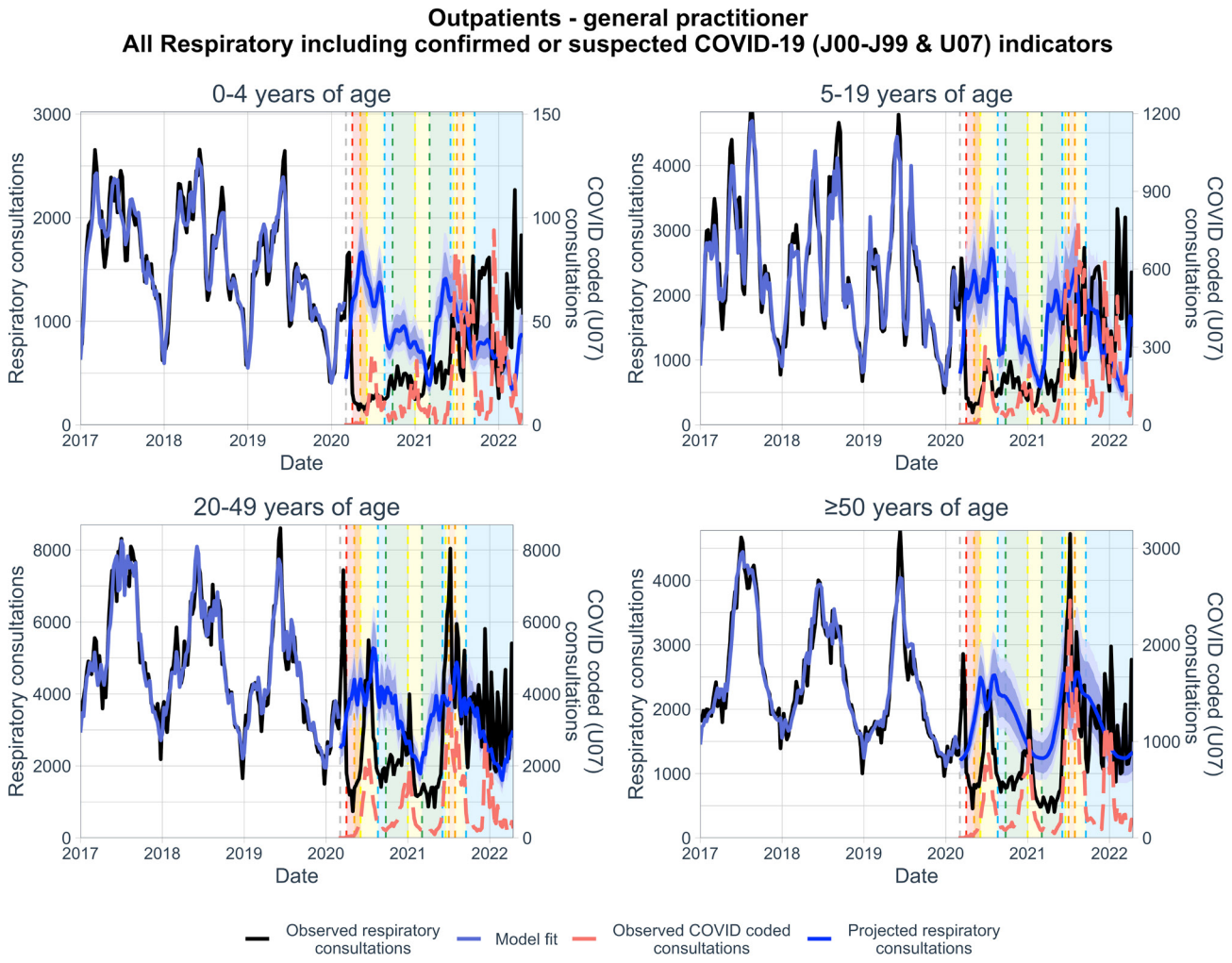


Figure 4. Weekly general practitioner consultations by age group (black), relative to consultations expected in the absence of COVID-19 (blue band). The red line is the number of COVID-coded consultations (U07). The grey vertical dashed line indicates the start of the model prediction period (March 1, 2020 – April 17, 2022), and panel colours indicate lockdown alert levels (Level 5: red, Level 4: orange, Level 3: yellow, Level 2: blue, Level 1: green). The left y-axis refers to all cause respiratory consultations (J00-J99 & U07), and the right y-axis refers to COVID-coded (U07) consultations.

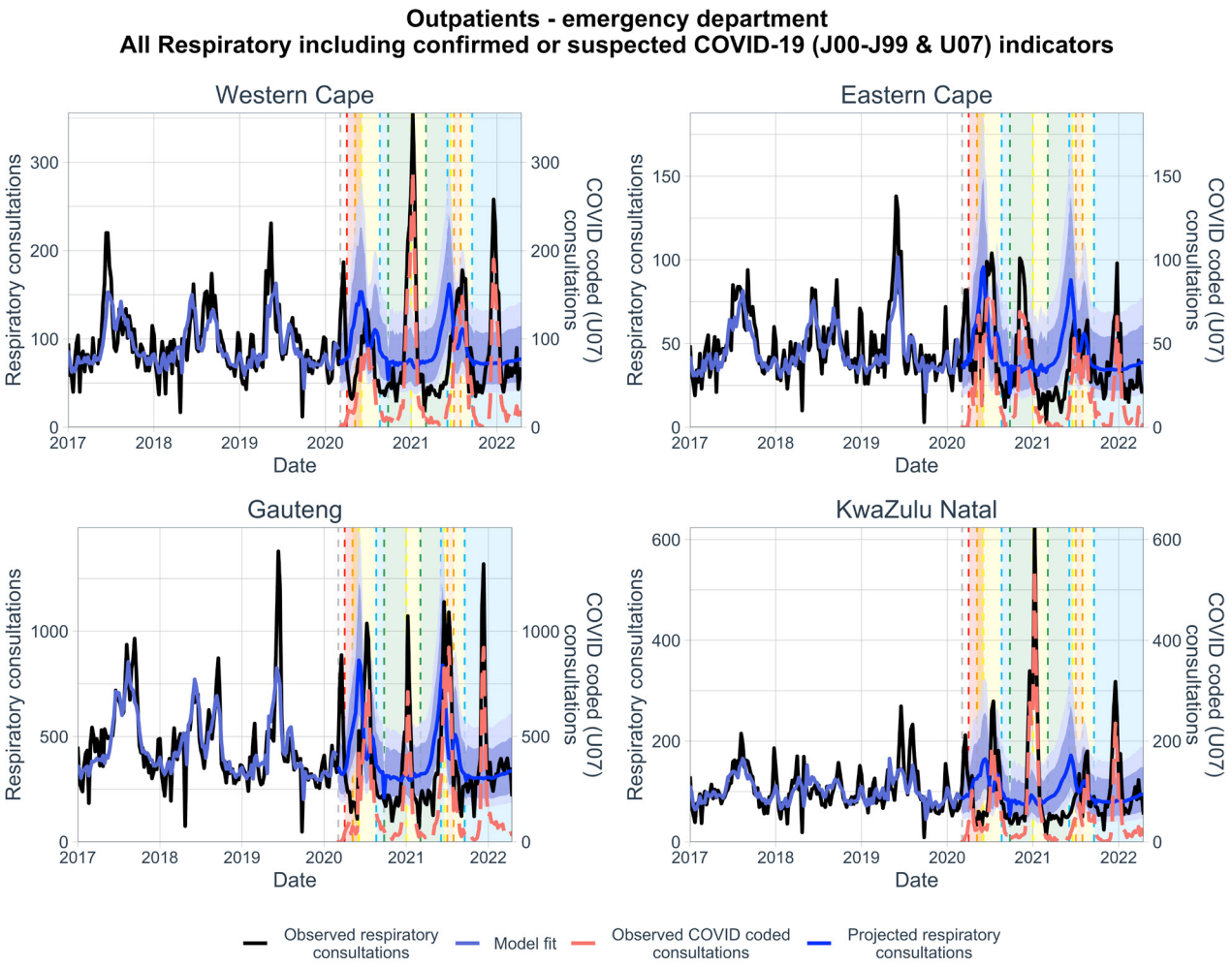


Figure 5. Weekly outpatient emergency department consultations among individuals aged ≥5 years in four provinces (black), relative to consultations expected in the absence of COVID-19 (blue band). The red line is the number of COVID-coded consultations (U07). The grey vertical dashed line indicates the start of the model prediction period (March 1, 2020 – April 17, 2022), and panel colours indicate lockdown alert levels (Level 5: red, Level 4: orange, Level 3: yellow, Level 2: blue, Level 1: green). The left y-axis refers to all respiratory consultations (J00-J99 & U07), and the right y-axis refers to COVID-coded consultations alone (U07).

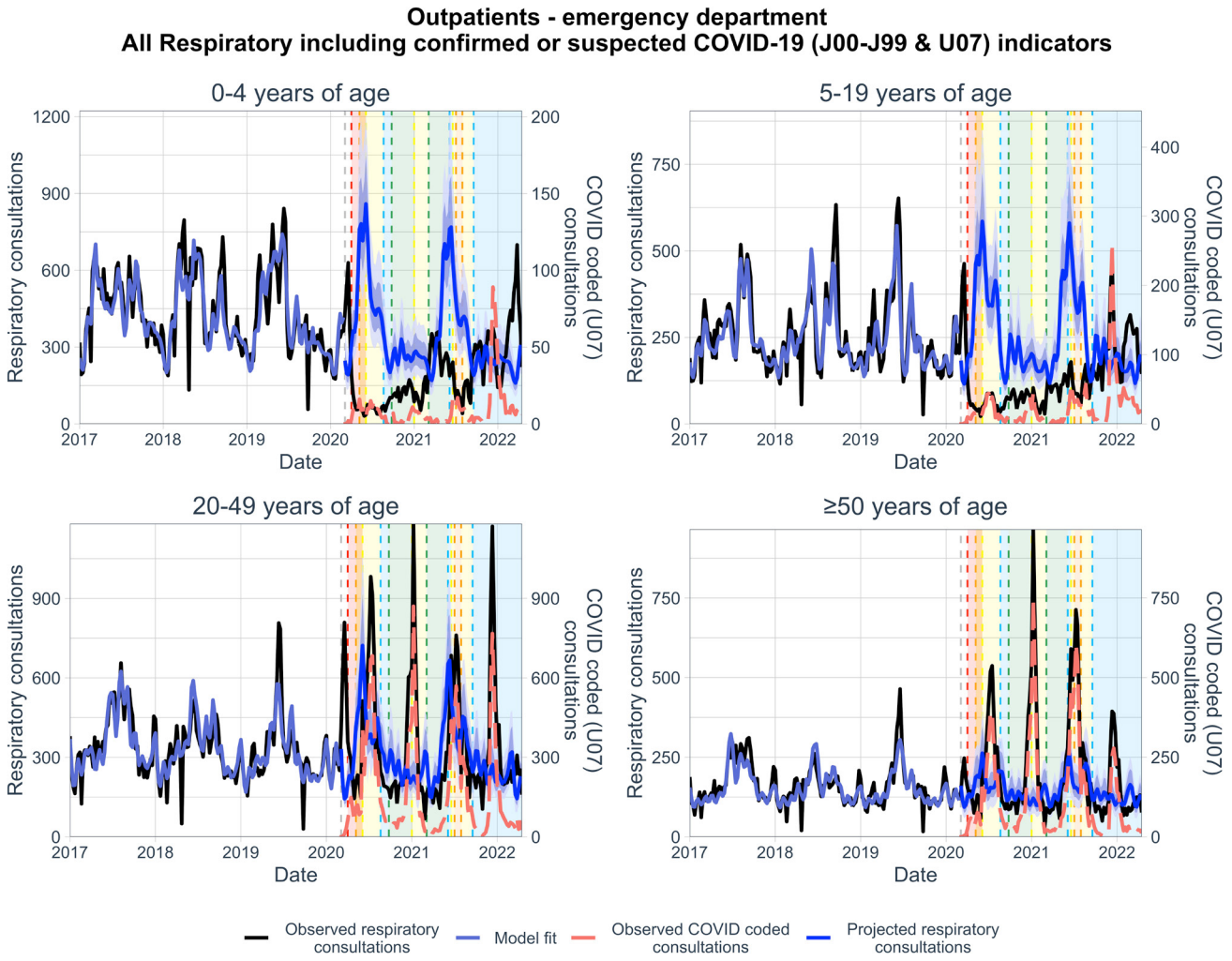


Figure 6. Weekly outpatient emergency department consultations by age group (black), relative to consultations expected in the absence of COVID-19 (blue band). The red line is the number of COVID-coded consultations (U07). The grey vertical dashed line indicates the start of the model prediction period (March 1, 2020 – April 17, 2022), and panel colours indicate lockdown alert levels (Level 5: red, Level 4: orange, Level 3: yellow, Level 2: blue, Level 1: green). The left y-axis refers to all respiratory consultations (J00-J99 & U07), and the right y-axis refers to COVID-coded consultations alone (U07).

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1. McGough SF, Johansson MA, Lipsitch M, Menzies NA. 2020 Nowcasting by Bayesian Smoothing: A flexible, generalizable model for real-time epidemic tracking. PLoS Comput. Biol. , 663823. (doi:10.1101/663823)
2. Rob J. Hyndman, Yeasmin Khandakar. 2008 Automatic Time Series Forecasting: The forecast Package for R. J. Stat. Softw. 27, 22.

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