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Introduction

Since the COVID-19 pandemic had hit Germany since March 2020, nation-wide containment measures including social distancing were implemented consequently. This may have also influenced infectious diseases other than COVID-19. *Neisseria meningitidis* (Nm) is transmitted by respiratory droplets and can cause invasive infections and it has already been shown earlier that Nm carriage is associated with the number of social contacts.

In this study, prevalence data of invasive Nm infections for twelve months under containment measures in Germany were compared to the preceding year's period to analyse changes in the epidemiology.

Methods

Besides notification according to the German infection protection act (IfSG), diagnostic laboratories send invasive Nm isolates on a voluntary basis to the National Reference Laboratory for Meningococci and *Haemophilus influenzae* (NRZMHi). Submissions were analysed for 01.04.2019 to 31.03.2020 (pre-pandemic period, prePP) and 01.04.2020 to 31.03.2021 (first year of the pandemic period, PP). Coverage was assessed by comparing the NRZMHi cases with the number of notified cases (SurvStat@RKI).

Weekly notification invasive meningococcal disease (IMD) notification numbers were compared to Google mobility data to identify activities correlated with Nm spread from 17 February 2020 to 3 October 2021.

Results

Invasive Nm was detected in 210 cases in pre-PP. The number dropped to 45 cases in PP, which equals a decrease by 79%. Nm invasive infection incidence for prePP and PP according to IfSG notifications was 0.30/100,000 and 0.07/100,000, respectively (Fig. 1). Coverage of cases analyzed at the NRZMHi was 84% for the prePP, and 83% for the PP.

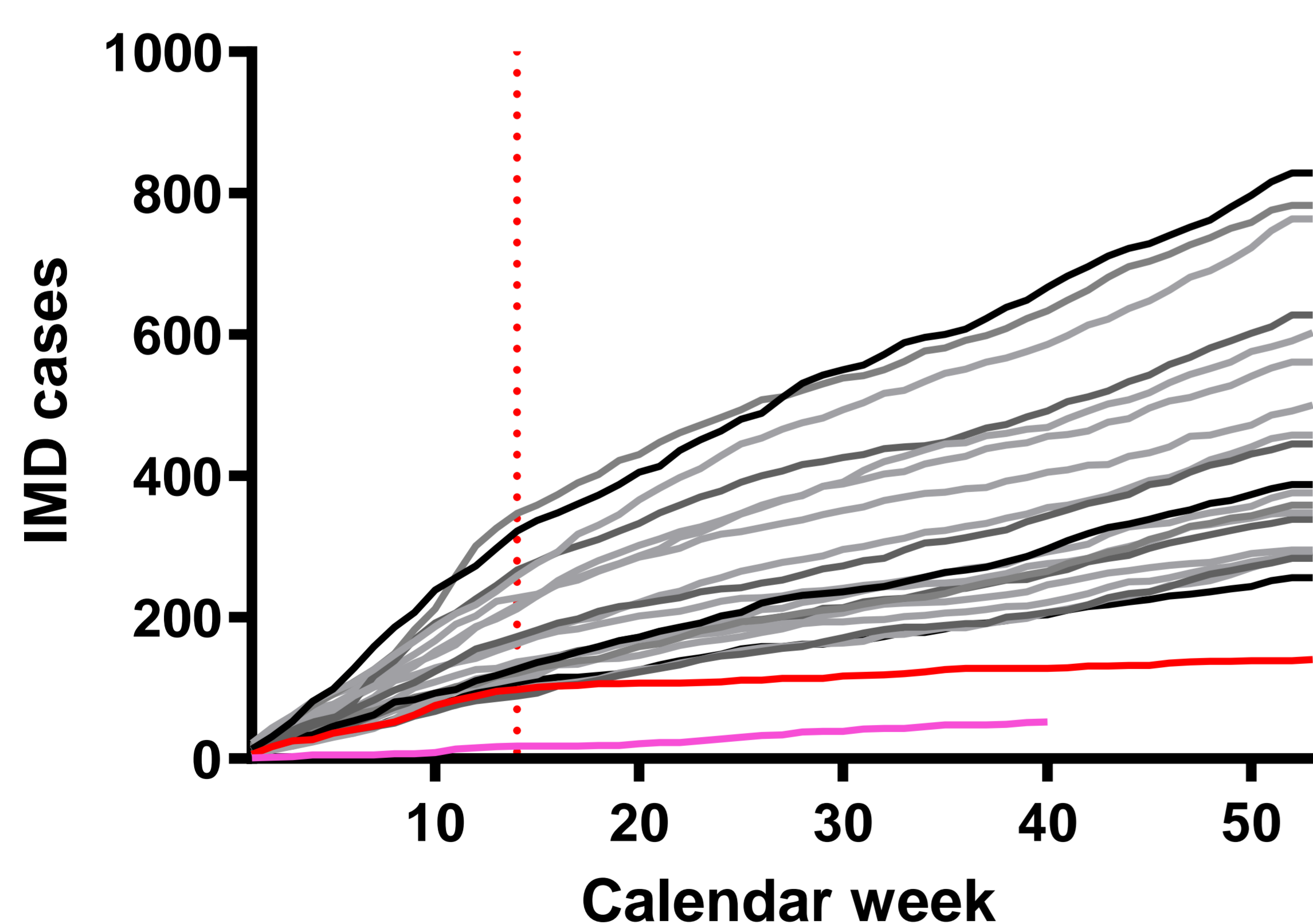


Fig 1: Cumulative reported number of invasive meningococcal diseases (IMD) cases during a year. Grey: 2009 – 2019; red: 2020; pink: 2021; dotted line: Begin of pandemic effect in Germany (31 March 2020) Data Source: SurvStat@RKI

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No significant changes in serogroup and age distribution could be observed between prePP and PP (Fig. 2).

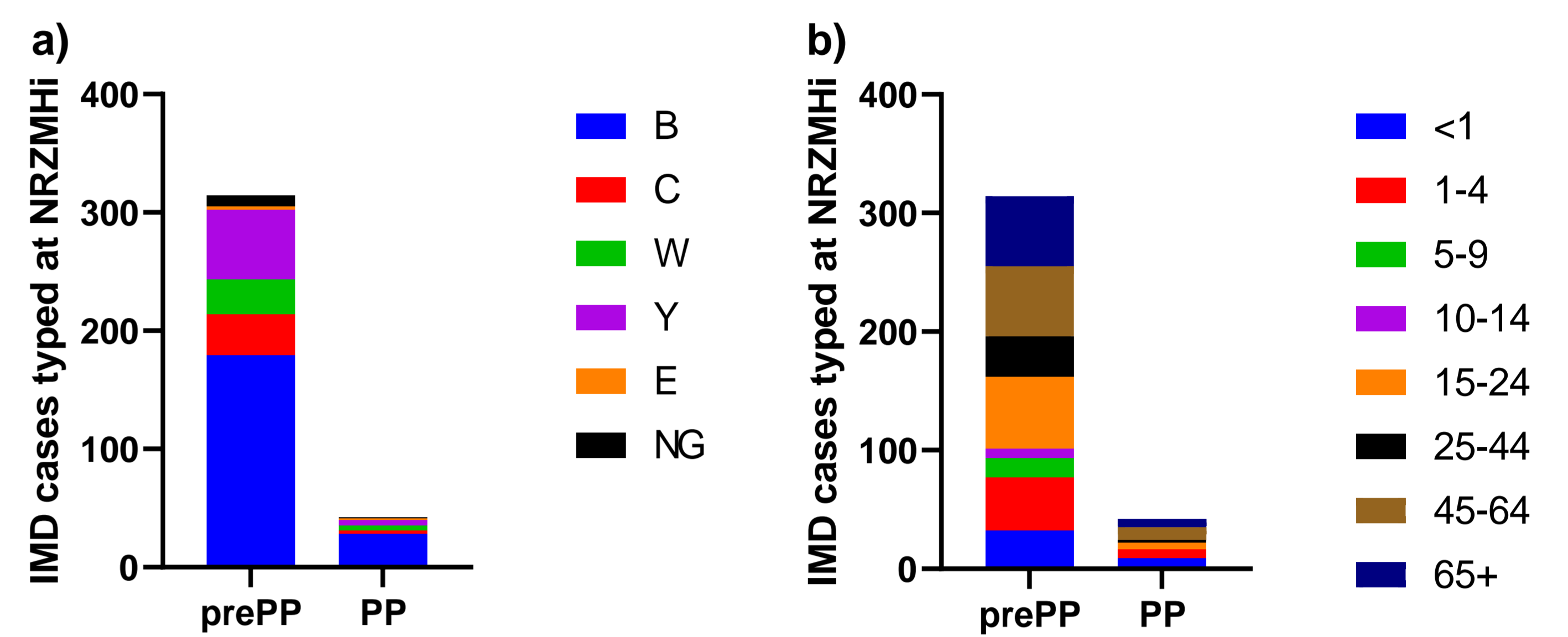


Fig 2: Distribution of invasive meningococcal disease (IMD) cases typed at the National Reference Laboratory for Meningococci and *Haemophilus influenzae* (NRZMHi) by serogroup (a) and age (b) in the pre-pandemic period (prePP) and pandemic period (PP)

Despite a large variability in mobility since the beginning of the COVID-19 pandemic, IMD numbers remained low during all phases. In a multivariate linear regression model the seasonal effect was still a highly significant influence variable on the weekly number of IMD cases ($p < 0.0001$) as was Retail and Recreation mobility ($p = 0.02$) while Park mobility was negatively correlated with IMD cases ($p < 0.01$).

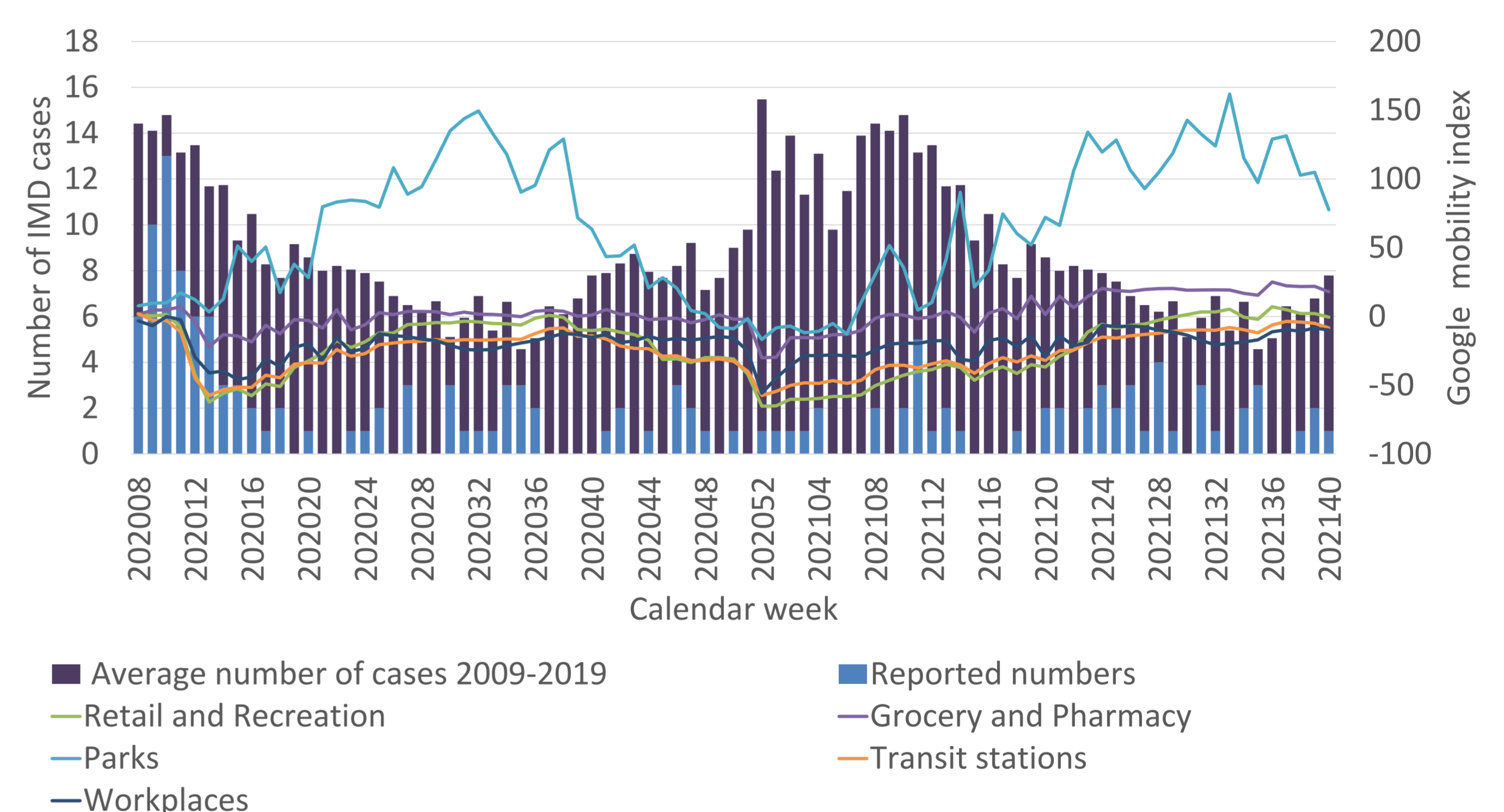


Fig. 3: Reported number of invasive meningococcal disease (IMD) cases by calendar week, average number of IMD cases in this calendar week 2009-2019 and average Google mobility index for different activities in Germany. Data source: Google mobility reports

Conclusions

The reduced submission to the NRZMHi correlated with pandemic response measures. Whereas submissions were comparable to the previous year in the first months of 2020, infection protection measures against COVID-19 seem to have a significant impact on IMD which could be observed since April 2020.

Analyzing different mobility data, a negative effect of retail and recreation mobility and a positive effect of Park activity on IMD case numbers could be observed on a population level which is in line with a transmission by respiratory droplets. Even during the pandemic a strong seasonal effect could be observed on IMD.

By interest, the share of IMD isolates sent to the NRZMHi did not change from prePP to PP.

It will be important to carefully monitor the development after restrictions have been lifted, since the effects of reduced transmission on natural immunity of the population are unknown.