UK NHS Sickness Absences Analysis

Global Trends in Data

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Summary

In this study we investigate the trends in sickness absence rates among NHS workers. We compute excess sickness absence rates, which are the difference between observed sickness absence rates and a given baseline for expected sickness absence rates. We measure changes in the behaviour of NHS sickness absence rates before the Covid-19 pandemic with the post-pandemic period.

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1. Introduction

Beginning in early 2020, the world changed due to the emergence of a global pandemic caused by the SARS-Cov2 virus which, in some individuals, manifested in the form of Covid-19 viral disease. The Covid-19 crisis led to several alterations in individuals' lifestyles and perceptions of risk for their day-to-day choices. Additionally, the introduction of unprecedented measures such as the pandemic lockdowns and mass inoculations based upon experimental mRNA-based vaccine technology led to different behaviours from 2020 onwards.

In this context, measuring excess sickness absence rates post 2020 provides us important information regarding the evolution of the pandemic, its aftershocks and collateral damage from the policy responses. It is important to contextualise the magnitude of impact of the pandemic so that lessons can be learned, and policy can be chosen that is based on the most accurate numbers possible.

In this study, we investigate the sickness absence rates for all causes, particularly for NHS workers, in England. The data is monthly and synchronous in nature as the absence rates for a given period are reported as the events occur and not in a delayed manner. Consequently, the data can be used for a real-time analysis of the post-2020 behaviours of NHS workers, a subsample of UK workers. This work reinforces and provides additional detail to our prior work on measuring trends in sickness absence rates for the UK population[1].

2. Data

The data used in this analysis is the monthly sickness absence rates of NHS Hospital and Community Health Services (HCHS) staff working in NHS Trusts and other core organisations and NHS Support Organisations and Central Bodies. Data is presented by NHS England region, ICS area, organisation, organisation type, staff group, and reason for sickness absence.

According to the NHS data file, absence rates have been calculated by dividing the "Full Time Equivalent (FTE) Number of Days Sick" by the "FTE Number of Days Available" from the absence dimension on the ESR Data Warehouse. Rates are presented in 4 separate tables showing the National and NHS England (NHSE) region monthly rates, rates by staff group, rates by type of organisation, and rates at organisation level.

Link to the data source (NHS Digital): UK National Health Service (NHS) Digital .

Link to the latest data release: NHS Sickness Absence Rates, February 2023.

Direct link to the source file: Data Excel File.

The data is in the format of monthly time series of absence rates for different regions in England from 2009 to 2023. Additionally, NHS digital provides sickness absence data on the different types of workers within the NHS, but only from 2017 onwards.

[1] https://phinancetechnologies.com/HumanityProjects/UK%20Absence%20rates.htm

3. Methodology

In this study, we investigate the trends in sickness absence rates in NHS workers. To measure trends in absence sickness rates we use a methodology of computing **excess sickness absence rates**, which are the difference between observed sickness absence rates and a given baseline (expected sickness absence rates). Because we want to measure the impact of the Covid-19 pandemic and post-pandemic periods relative to the prior state of the world, our baselines are based upon an estimation faction for the period of 2009 to 2019, prior to the pandemic.

When visualising the data (Figure 1) we observe that the pre-2020 sickness absence rates for England follow a very stable seasonal pattern, with low absence rates of about 4% in summer months and high absence rates of about 4.6% in winter months. The pre-2020 data shows little evidence of a noticeable trend in the data from 2009 to 2019.

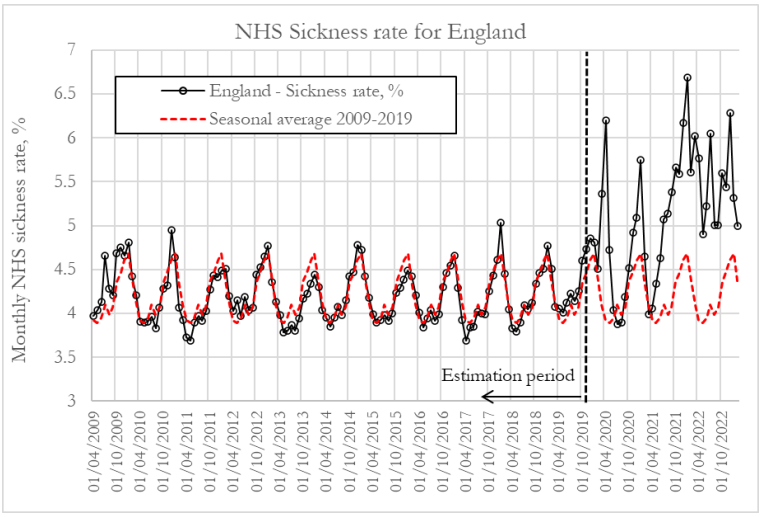

Figure 1 - Monthly Sickness Absence Rates for England. The dashed line shows the seasonal component estimated from 2009 to 2019.

Consequently, we believe that a good approximation for estimating a post-2020 baseline for expected sickness absence is to project forward the monthly averages from 2009 to 2019. This is shown in the red-dashed line in Figure 1. By plotting the expected absence rates, we can observe clearly that there was a change in behaviour since 2020, with absence rates increasing markedly in particular since late 2021 onwards.

For accurateness and completeness, we're going to establish two alternative baselines that can be used to compute expected absence rates. One is the seasonal pattern as mentioned above, and the other is the seasonal pattern and linear trend from 2009 to 2019, which provides a more general baseline to be used in case the data has a pronounced trend in the estimation period.

Due to the nature of the data, both methods produce very similar results as the trend component is very small. By using the seasonal adjustment alone, one has a simpler baseline and, consequently, easier to interpret in some occasions.

3.1. Method for Estimating Excess Sickness Rates

$$ExcessSickness_{ti}^{AG} = Sickness_{ti}^{AG} - Baseline_{ti}^{AG} \qquad Eq.\ 1$$

Equation (1) is a general expression for estimating the excess absence rates relative to a given baseline. We use the subscript "AG" to indicate a given population age cohort which could refer to an age range, type of NHS staff worker or region.

3.2. Baseline for Estimating Excess Deaths.

The second method for estimating excess deaths first estimates the excess death rate and then multiplies that value by the estimated population of the age group. As we will show below, death rates tend to monotonically decline over time for a given population age cohort, as living conditions have generally been improving since after the Second World War (with some exceptions).

3.2.1. Baseline #1 for estimating excess absence rates (seasonal adjustment):

From the sickness absence data for England, plotted in Figure 1, we can observe that the data has a very noticeable seasonal component, where absence rates are at a maximum in winter months and minimum in summer months. The pattern is particularly visible in the pre-pandemic period of 2009 to 2019.

The first approach for estimating a baseline for "normal" absence rates is to estimate the average absence rates in each month of the year, from 2009 to 2019, which is shown by the dashed line in Figure 1. In this case, the baseline is given by:

$$Baseline(t_i) = \widehat{Av} + Season(Month(t_i)) \qquad Eq.\ 2$$

Where $\widehat{Av}$ is the average sickness absence rate from 2009 to 2019 and Season(month(t)) is the average seasonal component of the sickness absence rate (from 2009 to 2019) for each month (t). The seasonal component is the seasonal average after removing the average absence rate for the whole period. Figure 2 shows the average component and the seasonal component of baseline #1, separately.

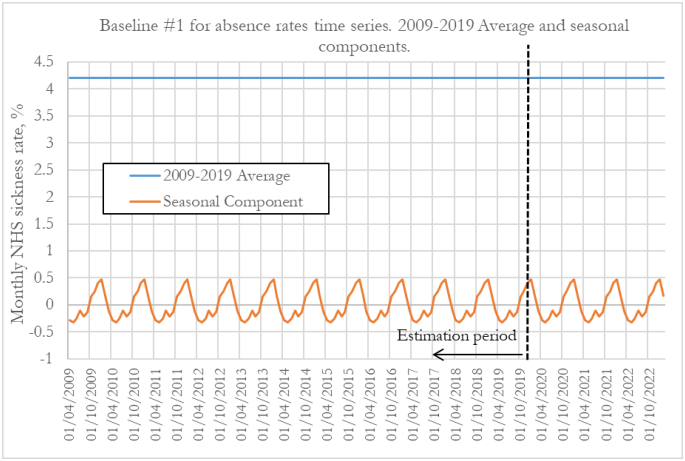

Figure 2 - Baseline #1 average and seasonal components.

3.2.2. Baseline #2 for estimating excess absence rates (de-trended and seasonal adjustment)

The second approach for estimating a baseline for "normal" absence rates is to first remove the trend in sickness absence rates from 2009 to 2019, using yearly data that remove the seasonal effects. Then we estimate the average absence rates in each month of the year for the de-trended time series. In this case, we can write the equation to estimate the baseline as:

$$Baseline(t_i) = \hat{b} + \hat{a}(t_i - t_0) + Season(Month(t_i)) \qquad (Eq.\ 3)$$

Where â and û are the estimated coefficients of the sickness rate trendline from January of 2009 to December of 2019 and Season(month(t)) is the average sickness absence rate (from 2009 to 2019) for the desired time series. The seasonal component is the seasonal average after removing the linear trend component for the whole period. Figure 3 shows the trend component and the seasonal component of baseline #2, separately.

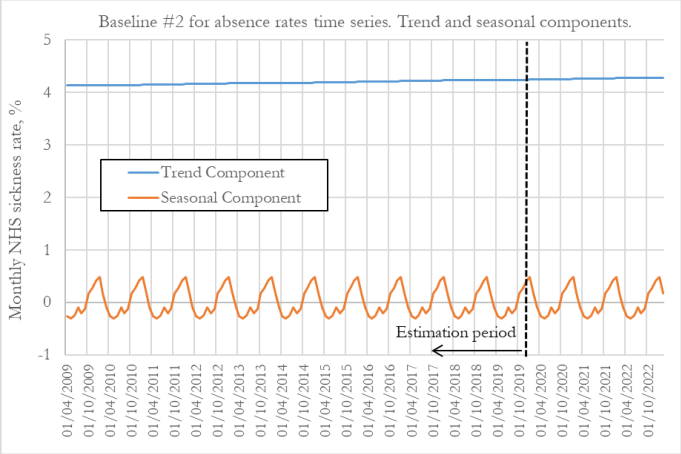

Figure 3 - Baseline #2 Trend and seasonal components.

4. Monthly Analysis of Excess Sickness Absence Rates

4.1. Estimating excess sickness absence rates using baseline #2.

In this section we analyse the trends in NHS sickness absence rates using monthly data. We use baseline #2 to compute excess rates. We use baseline #2 for "normal" absence rates in the pre-pandemic period from 2009 to 2019, which consists of a trend components and seasonal component as shown in Figure 3.

The excess sickness absence rates are computed by subtracting the baseline from the observed rates. The results of this operation are shown in Figure 4, with the chart on the left showing absolute deviation from the baseline and the chart on the right showing the relative deviation from the projected baseline.

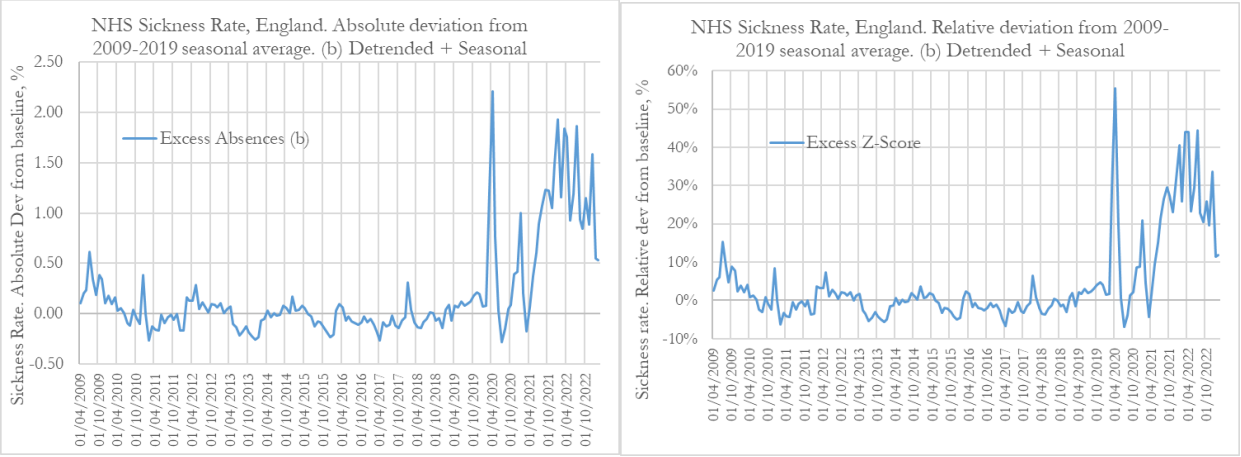

Figure 4 – Sickness absence rate deviation from baseline (trend + seasonal). Left: Absolute deviation. Right: Relative deviation.

As shown in Figure 4, using monthly data allows us to observe real time information as the pandemic developed, from 2020 onwards.

The charts show the extreme peak (above 50% rise) in absences from sickness in March/April of 2020, which occurred at the start of the pandemic. This peak was likely due to a combination of factors including stricter rules for showing up at work when NHS workers have cold-like symptoms, and fear of the disease, among other factors.

The second peak (reaching a 20% rise) occurring in January 2021 coincided with the vaccine rollout for health workers, the strict lockdowns in early 2021, and a surge in Covid-19 cases during that period. All these factors could have played a role during this peak. A deeper analysis of the underlying cause for the sickness could help clarify the nature of the phenomenon occurring during this peak.

From May 2021 onwards we observe a sustained increase in sickness absence rates which peaked during the spring/summer of 2022 (45% rise). This sustained increase is difficult to explain in the context of high vaccination rates of a supposedly high-efficacy Covid-19 vaccine, the dominance of the Omicron variant (a milder and more contagious SARS-Cov2 variant), and the increase in natural immunity as most of the population was already exposed to the virus. One of the challenges to explain the rise in excess absence rates after May 2021 is that excess absence rates have been persistently high both in summer and winter months.

When measuring the statistical significance of the results above, shown in Figure 5, we observe that all the above mentioned rises in absence rates have a very high degree of statistical significance with Z-Scores reaching values above 10. Even the last datapoint in February 2023 that shows a 10% excess sickness absence rates in NHS workers has a high statistical significance of around 4.

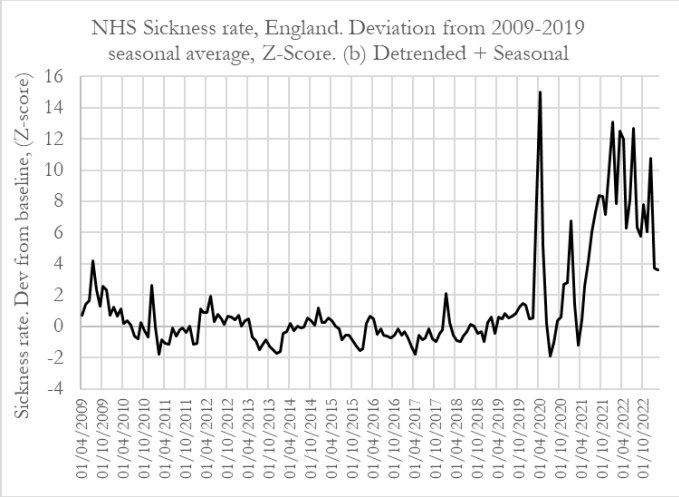

Figure 5 - Sickness absence rate deviation from baseline (trend + seasonal) in volatility normalised terms (Z-score).

4.2. Relationship with the vaccine rollout.

As previously mentioned, the persistently high levels of excess absence rates after May 2021 are difficult to explain in the context of the official explanations from health authorities, which are inconsistent with:

- High vaccination rates of a supposedly high-efficacy Covid-19 vaccine;
- The dominance of the Omicron variant (a milder and more contagious SARS-Cov2 variant);
- The increase in natural immunity as most of the population was already exposed to one or more variants of the corona virus;
- Excess absence rates have been persistently high both in summer and winter months.

Consequently, we believe that different explanations need to be proposed. One explanation that has been advanced is the phenomenon of long-covid which does not have a precise definition. Furthermore, the symptoms of long-covid appear to be similar to those of vaccine-damaged individuals.

From our previous work that associates the Covid-19 vaccine rollout to a rise in disabilities in the UK and US, we must consider that the Covid-19 vaccines are likely playing a role in the excess absence rates in the NHS, as we can observe when we superimpose the cumulative vaccine doses for the total UK population (as a percentage of the population) to the excess sickness absence rates, as illustrated in Figure 6.

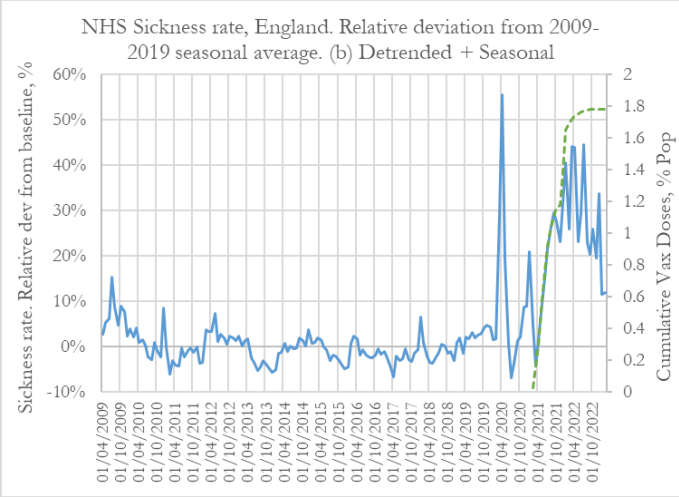

Figure 6 - Sickness absence rate - Relative deviation from baseline (trend + seasonal). The dashed line corresponds to the cumulative vaccine rollout in the UK population.

It should be noted that in the previous chart, the healthcare workers were the first in line to receive the Covid-19 shots, with a high uptake. Consequently, the vaccine rollout for the whole of the UK population shown in Figure 6 likely is delayed relative to the rollout schedule for NHS workers.

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5. Yearly Analysis of Excess Sickness Absence Rates

5.1. NHS workers

In this section we perform a yearly analysis of the NHS sickness absence data. This allows for the natural removal of the substantial seasonal effects that we observe in the monthly data, and therefore, a reduction of the yearly fluctuations during the 2009-2019 pre-pandemic period, shown in Figure 7. In this analysis we use the 2009-2019 average sickness absence rate as the baseline estimate for excess absence rates. As with the monthly analysis, excess absence rates for the 2009-2019 period are in-sample while the rates for 2020, 2021, and 2022 are out of sample computations.

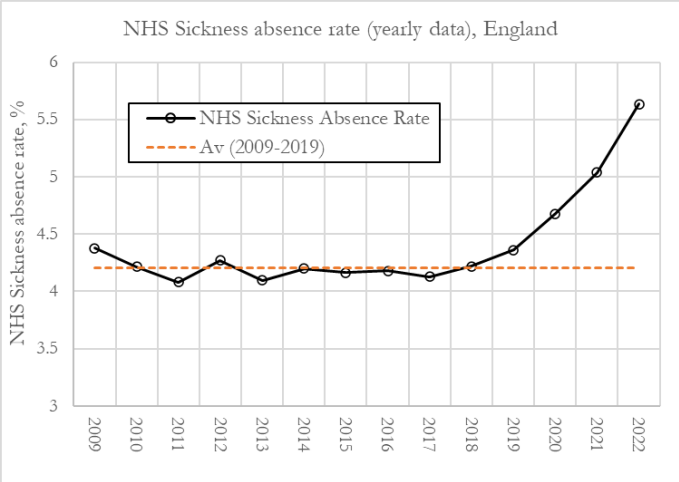

Figure 7 - Yearly Sickness Absence Rates for England. The dashed line shows the average from 2009 to 2019.

We can observe that average sickness absence rates for the 2009-2019 period were about 4.2% with slight variations from year to year and no noticeable trend (red dashed line in Figure 7). We also observe that sickness absence rates have been rising every consecutive year since 2020.

When computing **excess** sickness absence rates, shown in Figure 8, we observe that in 2020 there was a 11% rise in absence sickness rates corresponding to a Z-Score of 5, which means that it is a high level of statistical significance. As we observed in the previous monthly analysis, most of the excess absence rates in 2020 occurred during the March/April period when the pandemic officially started.

The excess absence rate in 2021 was about 20% (corresponding to a Z-Score around 8.5) and in 2022 it was about 34% (corresponding to a Z-Score of around 15). The high level of statistical significance is due not only to the large deviations from trend in 2020, 2021, and 2022, but also due to the low year-to-year variation in sickness absence rates during the 2009-2019 period.

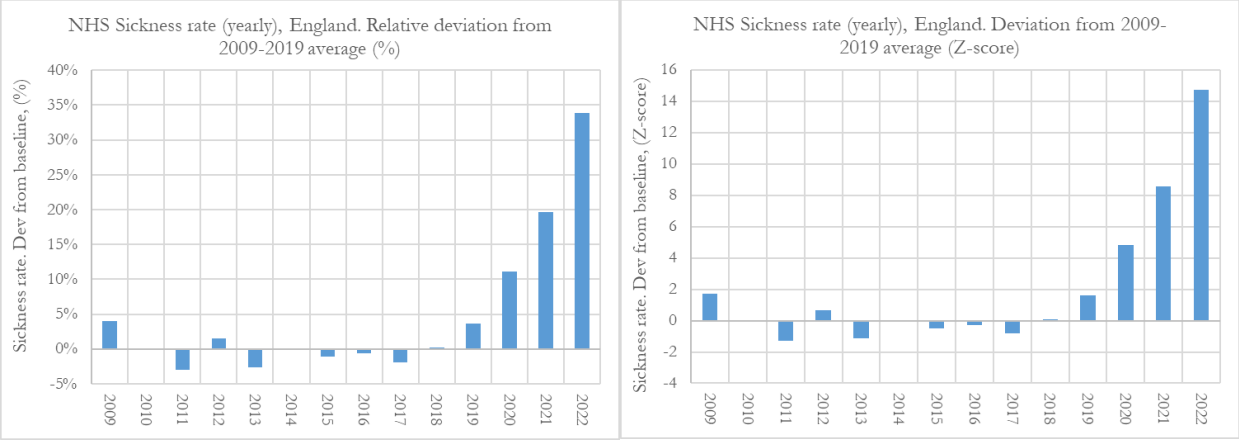

Figure 8 – Yearly sickness absence rate deviation from 2009-2019 average. Left: Relative deviation. Right: Deviation Z-score.

5.2. Comparison with UK absence rates (ONS data, all workers)

In this section we compare how the trends in sickness absence rates for NHS workers in England compare with similar trends in the UK labour market, which we investigated independently[2]. Sickness absence rates for the UK labour market are compiled by the UK Office of National Statistics (ONS)[3] and provide yearly sickness absence rates by age group, sex, and region. In Figure 9 we show the trend in the UK workforce aged 25 to 64, for both sexes, from 2009 to 2022. As a baseline for computing excess absence rates, we use the 2009-2019 trend in absence rates because we observe that for the UK workforce there was a noticeable declining trend in absence rates from 2009 to 2019. While sickness absence rates for NHS workers do not show a trend from 2009 to 2019, we can observe that this was not the case for the general workforce in the UK. Furthermore, we observe that absence rates for NHS workers are roughly double those for the general UK workforce, as shown in Figure 9.

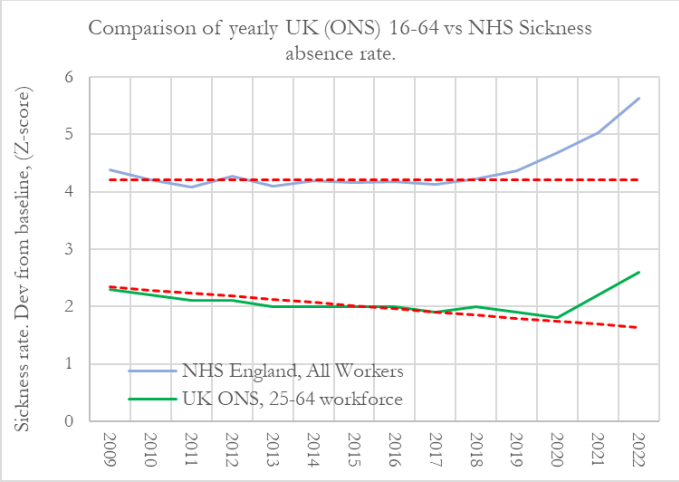

Figure 9 – Comparison of yearly sickness absence rates for NHS England versus the UK 25-64 workforce. The dashed lines show the respective 2009 to 2019 baselines.

When we compute and compare the **excess** sickness absence rates, shown in Figure 10, we observe that in absolute terms (left chart), the rise in sickness absence rates were higher for NHS workers than for the UK workforce. However, in relative terms, the opposite is true as sickness absence rates for the UK workforce had a lower reference level (as mentioned above). When comparing 2022 alone, the UK workforce suffered a 60% increase relative to the baseline while for NHS workers the increase was "only" 34%.

It should also be mentioned that the data does not show that in 2020 the general UK workforce suffered a significant rise in sickness absence rates, while this was true for NHS workers. The rise in sickness absence

[2] https://phinancetechnologies.com/HumanityProjects/UK%20Absence%20rates.htm

[3] https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/sicknessabsenceinthelabourmarket

rates for NHS workers in 2020 occurred at the onset of the pandemic in the months of March/April, and we suspect that pandemic rules, fear of the disease, or other external factors might have played a role.

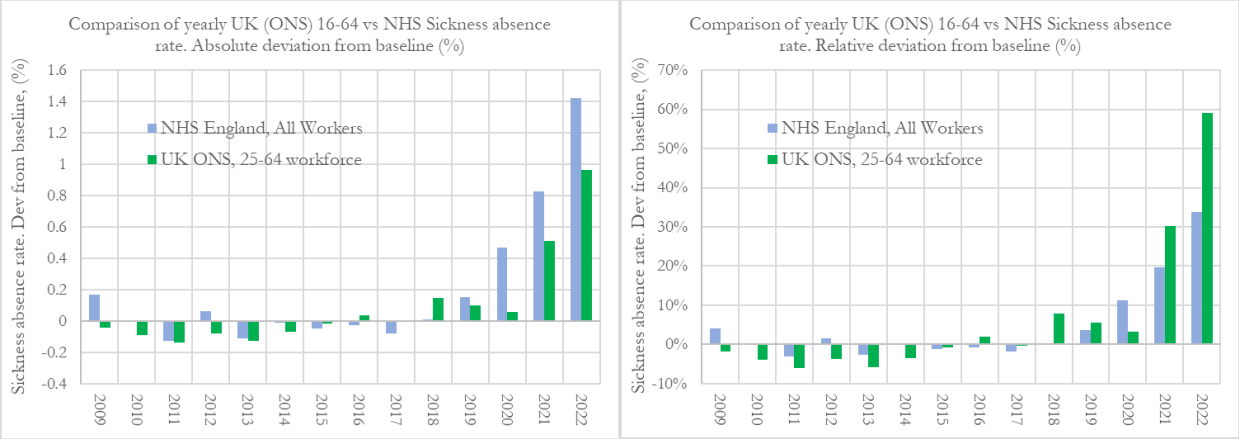

Figure 10 – Comparison of yearly excess sickness absence rates for NHS England versus UK 25-64 workforce. Left: Absolute deviation. Right: Relative deviation.

When computing the deviation of absence sickness rates relative to the baseline in normalised (volatility adjusted) terms, shown in Figure 11, we can observe that the statistical significance in changes in sickness absence rates for NHS workers was slightly higher than that for the general UK workforce. Additionally, we can observe that both datasets show similar (very high) levels of statistical significance.

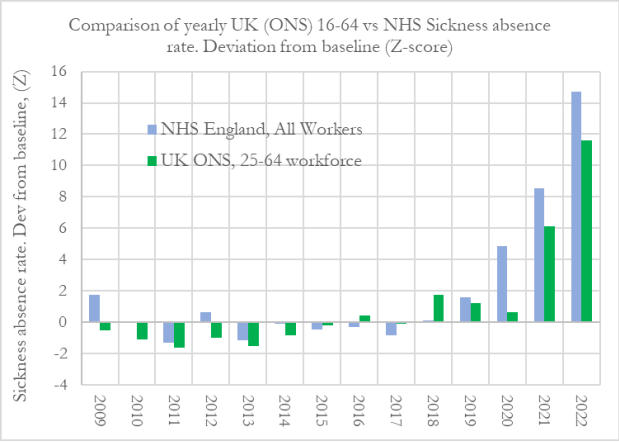

Figure 11 - Comparison of yearly excess sickness absence rates for NHS England versus UK 25-64 workforce. Deviation Z-score.

Our analysis is corroborated by an equivalent analysis[4] performed for the US labour market using BLS data. These analyses point towards a worrying phenomenon that is occurring, which is common across countries and institutions, and is likely putting strains on national industries, including healthcare systems.

[4] https://phinancetechnologies.com/HumanityProjects/US%20Absence%20rates.htm

6. Concluding Remarks

In this report we showed that there was an abnormally large increase in sickness absence rates in NHS workers in England. When comparing the yearly analysis with the equivalent investigation on sickness absence rates in the general UK workforce, we conclude that the results show similar patterns. From 2021 sickness absence rates in NHS workers in England saw large rises (20% in 2021 and 34% in 2022) with similar outcomes in the general UK workforce (aged 25-64) with rises of 30% in 2021 and 60% in 2022, relative to the baselines. These results show very high levels of statistical significance which indicate a clear signal.

The analysis of monthly NHS sickness absence rates allows us to hypothesise that the rise in sickness absence rates from March-2021 appears to be related to the Covid-19 vaccine rollout. This hypothesis is supported by (and reinforces) our previous work on US disabilities and the analysis of the adverse events in the mRNA vaccine clinical trials[5].

Independent of the underlying causes, our analysis points towards a worrying phenomenon that is occurring across countries and institutions. This phenomenon has several implications and apart from the human cost, is likely placing significant pressure on economic resources, in both the healthcare sector as well as other sectors of the economy. Lost worktime due to higher absence rates needs to be replaced and is likely one of the culprits for the exceptionally tight labour market that we observe in the UK and US at the present time[6]. Additionally, this phenomenon is likely also affecting productivity as healthy workers are overburdened and replacement workers are likely not to have matching skills.

We are currently in the process of pursuing further investigations into this issue in more detail.

[5] https://phinancetechnologies.com/HumanityProjects/US%20Disabilities%20-%20Part5.htm
[6] https://phinancetechnologies.com/HumanityProjects/The%20VDamage%20Project%20-%20Economic%20Impact.htm