



The impact of covid-19 on neurological care within the NHS

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INTRODUCTION

Within the United Kingdom, Coronavirus (COVID-19) has caused major disruptions to the NHS system and consequently to the care of those who use the service.

Disruptions and inconsistencies within the NHS were already prevalent for those with neurological conditions and as COVID-19 began affecting services within the NHS, the impact on the care of those with neurological conditions was significant. In the UK, there has been little research into the scale of the impact that COVID-19 had on the care of those with neurological conditions.

For those with neurological conditions, the access to and quality of treatment, care and support plays a vital role in managing their illness. The importance of accessing the right medications and treatment plans can mean that symptoms such as chronic pain and fatigue decrease to more manageable levels. Moreover, many with neurological conditions were among those who were the most vulnerable to the virus and were told by the UK government to shield.

In this report, the data from more than 300 NHS Clinical Commissioning Groups (CCGs) and Trusts within England has been analysed in order to gauge the true scale of the impact COVID-19 had on the care of those with neurological conditions. This can help provide insight into the areas where the most attention should be given in the future, so that those with neurological conditions do not need to suffer more as a result of lack of treatment during this pandemic.

The repercussions that Coronavirus had on the care of those with neurological conditions must not be permanent and careful consideration has to be taken to learn from the past few months. NHS England has the power to change neurological care, by working closely with those who have neurological conditions and evaluating their prior performance. This will help provide a solid foundation from where NHS England can improve the services they provide.

This report aims to highlight the key findings of our analysis so that relevant steps can be taken to ensure that disruption on such a large scale does not occur again.

METHOD

In order to assess the impact that COVID-19 had on the care of those with neurological conditions, we aim to answer the following questions:

- i. Which regions experienced the most significant increase or decrease in NHS activity year-on-year, in inpatient and outpatient care?

- ii. Were any neurological conditions within neurology particularly impacted by disruptions to care?
- iii. Were any specialties (e.g. neurology, occupational therapy, speech and language therapy) particularly impacted?
- iv. How many people with a neurological condition were admitted to hospital with COVID-19 during March – June 2020?

Wilmington Health Care provided an initial cut of HES data, which contained information on inpatient and outpatient activity in both March - June 2019 and March - June 2020, data on the spells of those with neurological conditions who contracted COVID-19 in March - June 2020 and a dataset for prescriptions in the time periods March - June 2019 and March - June 2020.

We grouped the data using the National Neurology Intelligence Network categorization¹. This uses International Classification of Diseases codes (ICD10 2015), to map and define the conditions included in adult neurology in England. These codes have been grouped into 16 main categories and an additional catch-all group, as shown below.

¹ National Neurology Intelligence Network (2015) Defining adult neurological conditions: National Neurology Intelligence Network technical briefing, <https://webarchive.nationalarchives.gov.uk/20170302174829/http://www.yhpho.org.uk/default.aspx?RID=207314> accessed 16 October 2020



- Ataxia
- Central Nervous System Infections
- Cranial Nerve Disorder
- Development Disorder
- Epilepsy
- Functional Disorders
- Headaches and Migraine
- Motor Neurone Disease and Spinal Muscular Atrophy
- Multiple Sclerosis and Inflammatory Disorders
- Neuromuscular Diseases
- Parkinsonism and other Extrapyrarnidal Disorders/Tic Disorder
- Peripheral Nerve Disorders
- Sleep Disorders
- Spondylotic Myelopathy and Radiculopathy
- Traumatic Brain and Spinal Injury
- Tumours of the Nervous System
- Rare and other neurological diseases (catch-all group)



Before starting the analysis, the data had to be restructured to better suit our needs.

Values between 1 to 7 (inclusive) in the dataset had initially been suppressed. We decided that the best way to deal with the suppressed data points would be to treat these as zero, since they would not impact our analysis in a way that would be significant. We then treated all missing values by using a variation of complete case analysis in order to restrict the focus to only the complete observations. The data was then analysed using the statistical software R.

All questions apart from (iv) were analysed by looking at percentage changes, and in the case of question (i) we observed the values that differed the most from the average percentage change. In the case of question (iv) we have summed the cases for those with COVID-19 who had a pre-existing neurological condition. Graphical visualisations from the analysis will be shown where relevant and a full appendix of tables and graphs can be found at the end of this report.

The methodologies for this analysis were chosen since (for all but question (iv) we are comparing specific time periods with their respective time period in the previous year. In order to account for the varying sizes of the different NHS CCGs and Trusts, we have used percentage changes instead of absolute changes.

Results

Which regions experienced the most significant increase or decrease in NHS activity year-on-year, in inpatient and outpatient care?

First, we decided to look at the percentage change for total inpatient appointments. In Figure 1, the red lines are the average percentage change between regions and the points between the two green lines account for approximately 70% of all regions, the further away these lines are, the larger variation is between the regions.

In March, we can see that the mean percentage change for inpatient appointments was approximately 15% and that most regions had a negative percentage change. However, the spread of the percentage changes was relatively large, indicating that the regions were not impacted equally.

In April, the average percentage change between 2019 and 2020 was approximately -40%, this indicates a change much greater than what was experienced in March. The spread of the data is also narrower showing that the disruption to the number of appointments was more visible in most regions as well.

In May, the mean percentage change was approximately -35%, which is less negative than April. This tells us that the disruption to the numbers of appointments in May was less than that of April. Moreover, the spread of the regions was the same as the previous month, showing that the impact to each region was just as consistent as in April.

June also experienced an increase in the average percentage change, indicating further improvement to the disruption COVID-19 had on the numbers of appointments. However, most CCGs and Trusts still had a percentage change between 0% and -50%, showing that for the majority of regions the disruption continued.

Finally, we observed the trends shown by the percentage change of total outpatient appointments comparing each month in March to June 2020 to its equivalent month in 2019 (see Figure 2). We can see that for the outpatient data the spread is much greater than that of the inpatient data, indicating that the percentage change for total outpatient appointments varied a lot by region.

In March, the average percentage change for total outpatient appointments was positive. This meant that in March 2020 the total number of appointments was greater than it was in March 2019. The spread of the regions in March was much greater than May and June, indicating that there was less consistency across regions in March than these months when looking at percentage change.

In April, the mean percentage change was approximately -20%, telling us that the number of appointments in April 2020 was less than in April 2019. However, the spread of the regions was similar to that of March. This tells us that COVID-19 did not impact every region in the same way, with some regions having more than double the amount of appointments they had in April 2019 and others having a percentage change of almost -100%.

In May, approximately 70% of all regions were experiencing a negative percentage change in the total number of outpatient appointments. The average percentage change was -

35%. The spread of the data decreased, telling us that as well as the regions having far fewer appointments on average, that there was more consistency in how the regions were performing.

In June, the average percentage change is higher compared to that of May. This tells us that the impact that Coronavirus had on the regions in the previous months was starting to decrease. The spread is slightly greater than in May, which could be because some of the regions started to offer appointments again.

Were any neurological conditions within neurology particularly impacted by disruptions to care?

We first looked at changes of total appointments for each condition group for each month within the period March – June before looking at condition groups that appeared to have the most significant change throughout the whole period.

In March (see Figure 3) we can see that most condition groups experienced a decrease of approximately 10% in 2020 compared to the same point in the previous year. The *Traumatic Brain and Spinal Injury* condition group was significantly more effected than

other condition groups with a 31% decrease in the total number of appointments in March 2020 compared to March 2019.

In April (see Figure 4) we see that the percentage change becomes more negative, with

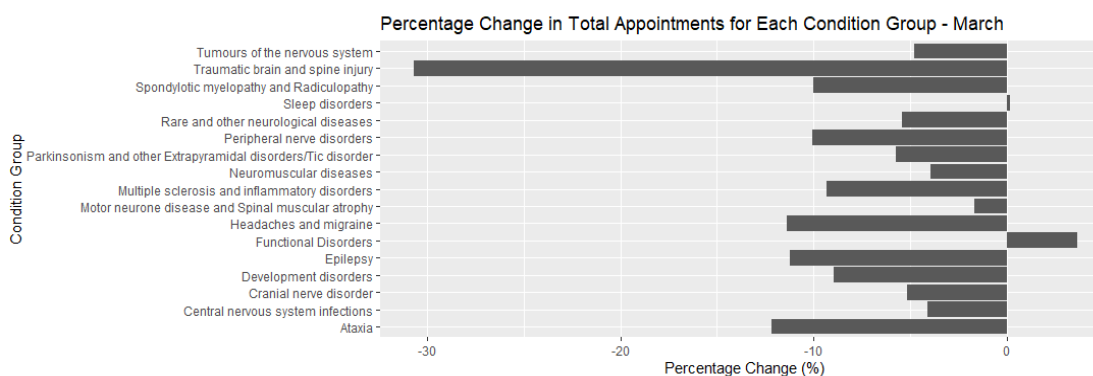


Figure 7: Percentage change of total appointments for each condition group – March

Spondylotic Myelopathy and Radiculopathy (-57%), Peripheral Nerve Disorders (-55%), Sleep Disorders (-53%) and Traumatic Brain and Spinal Injury (-52%) being impacted the most. However, many other condition groups also experienced a large negative percentage change.

In May and June (see Figures 5 and 6) we see the percentage changes of *Traumatic Brain and Spinal Injury, Spondylotic Myelopathy and Radiculopathy, Sleep Disorders* and *Peripheral Nerve Disorders* decreased drastically compared to the other condition groups.

Traumatic Brain and Spinal Injury, Spondylotic Myelopathy and Radiculopathy, Sleep Disorders and *Peripheral Nerve Disorders* were the most impacted by COVID-19 in the period of March – June 2020 when compared to the same time period in the previous year.

Were any specialties (e.g. neurology, occupational therapy, speech and language therapy) particularly impacted?

We first looked at each month within the period March – June before looking at specialties that appeared to have the most significant change throughout the whole period. We did this for both inpatient and outpatient specialties separately.

Outpatient Specialties

In March (see Figure 7) we can see that *Rehabilitation* decreased in total appointments by 10% when comparing March 2019 to March 2020 and that *Neurology* had an approximate increase of 8%. All other specialties increased or decreased their total appointments within the 5% margin.

In April (see Figure 8) *Physiotherapy* and *Occupational Therapy* had the largest negative percentage change, at -51% and -47% respectively. We can also observe that the impact on all specialties is now negative when comparing April 2019 to April 2020.

In May (see Figure 9) the impact of COVID-19 on the percentage change for *Physiotherapy* and *Occupational Therapy* increased further, with their respective percentage changes being -67% and -62%. The percentage changes for *Rehabilitation* and *Speech and Language Therapy* were less negative than they were for April.

In June (see Figure 10) the percentage change of *Neurology* appointments was positive, indicating that its total appointment numbers were larger in 2020 than in 2019. However,

Physiotherapy and *Occupational Therapy* are still visibly worse in terms of percentage change than the other specialties.

From looking at which specialties were impacted the most on a month by month basis, it appears that *Physiotherapy* and *Occupational Therapy* were the specialties that were the most impacted by Coronavirus between March to June in comparison to the same time in 2019.

Inpatient Specialties

In March (see Figure 11), we can see that *Neurology ACT Rehabilitation* had a large increase in activity in March 2020 compared to March 2019. Whereas *Neurology ACT* had a significant negative percentage change, indicating a large decrease in activity.

In April (see Figure 12), we can see that all inpatient specialties are now negative, showing that COVID-19 was causing disruption across all areas. The specialties which experienced the most negative percentage change were *Neurology ACT*, *MRI* and *EEG*.

In May (see Figure 13), all specialties were still experiencing negative percentage changes. However, the percentage changes were not as large as they had been for April. This tells us that the disruption caused to the activity was not as large in May 2020 than April 2020. Significant negative percentage changes were experienced by *Ventilator*, *Neurology ACT*, *Neurology ACT Rehabilitation*, *MRI* and *EEG*.

In June (see Figure 14), the percentage changes were still all negative, but not as negative as in May indicating further recovery from the impact of COVID-19. However, *Ventilator*, *Neurology ACT Rehabilitation* and *Neurology ACT* all experienced significant negative percentage changes.

Across March – June we can see that the inpatient specialties that were the most effected were *Neurology ACT*, *Neurology ACT Rehabilitation* and *Ventilator* when comparing to the same time in the previous year.

How many people with a neurological condition were admitted to hospital with COVID-19 during March – June 2020?

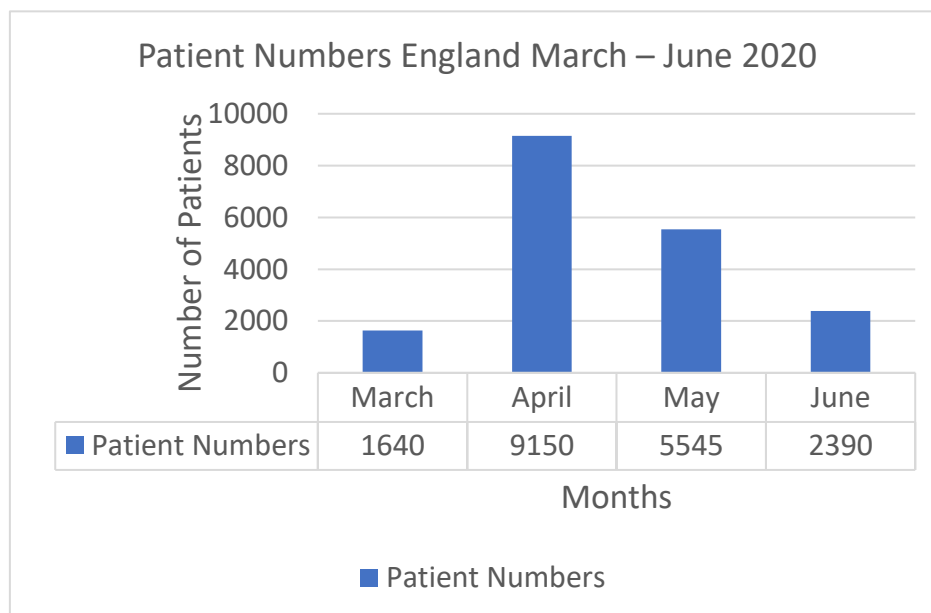


Figure 15: Numbers of COVID-19 patients with a neurological condition

The total number of patients with COVID-19 who had a pre-existing neurological condition for the period March – June 2020 was 18,725. The graph above shows that the number of cases was the most in April before steadily decreasing over the months of May and June, which is in line with the pattern of Coronavirus cases for the general population.

Discussion & Conclusion

The results above indicate that there has been a heavy impact on the care of those with neurological conditions in the NHS, with a drastic decrease in the total number of appointments across inpatient and outpatient care. Those who fall into the condition groups *Traumatic Brain and Spinal Injury*, *Spondylotic Myelopathy and Radiculopathy*, *Sleep Disorders* and *Peripheral Nerve Disorders* were among those most effected.

There was significant disruption to the outpatient specialties *Physiotherapy* and *Occupational Therapy*. There was also significant disruption to the inpatient specialties *Neurology ACT*, *Neurology ACT Rehabilitation* and *Ventilator*.

These results are in line with the initial hypothesis that the number of appointments vastly decreased compared to the same time period last year. The results also showed that all condition groups were negatively impacted in terms of NHS care due to COVID-19. All specialties were negatively impacted during the period where the number of cases of Coronavirus were the worst (April – May 2020).

These also seem to confirm reports from people with neurological conditions about disruptions to their care. In a survey of more than 1,600 people with neurological conditions, over 7 in 10 respondents reported delays to their medical appointments during the first peak of the pandemic, and 4 in 10 people didn't know when their appointment had been delayed until².

Due to not having data available on prescription changes, it is difficult to understand why the relevant proportions of drug types have stayed the same when the percentage changes seemed to vary. There was also no data on the number of COVID-19 wards within each region, this may have been useful to understand the reasons for significant increases or decreases to NHS activity within regions.

These results should be considered when planning how the NHS will respond to further outbreaks of COVID-19, by providing support to those specialties and condition groups most effected in March – June 2020 to ensure that a disruption on this scale is not replicated.

² Judy Abel, Restarting services for people with neurological conditions after the COVID-19 pandemic and planning for the longer term, <https://www.neural.org.uk/wp-content/uploads/2020/07/20200703-Final-Restarting-Services-for-People-with-Neurological-conditions-v3.pdf> Accessed 16 October 2020

Appendix

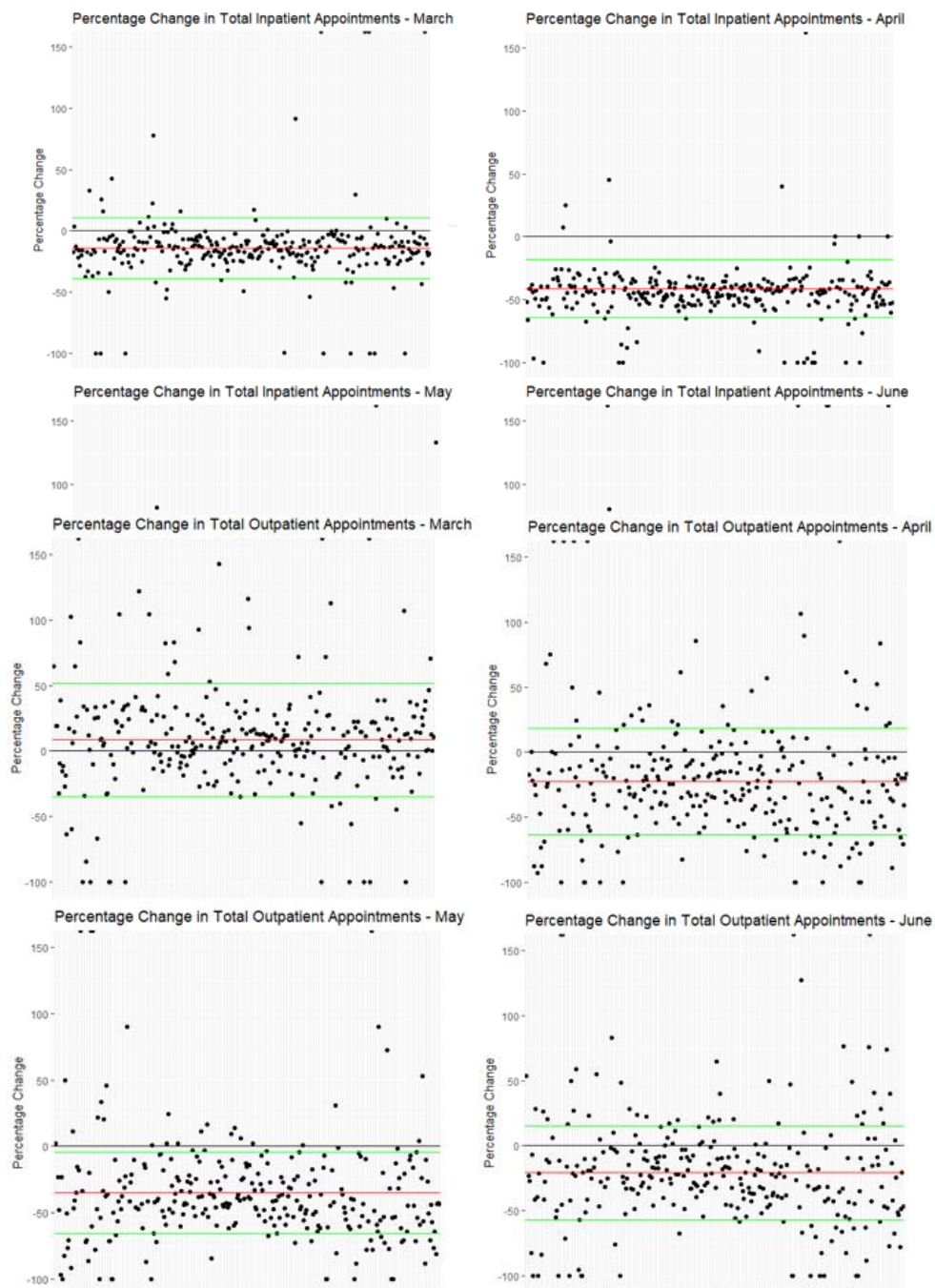


Figure 1: Plot showing percentage change in total inpatient appointments for each CCG and trust for March – June, comparing 2019 to 2020.

Figure 2: Plot showing percentage change in total outpatient appointments for each CCG and trust for March – June, comparing 2019 to 2020.

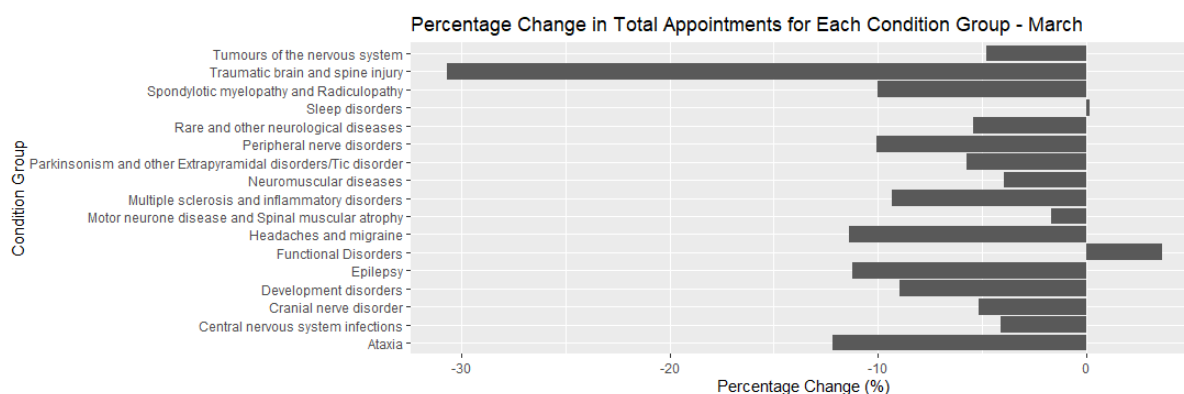


Figure 3: Percentage change of total appointments for each condition group – March

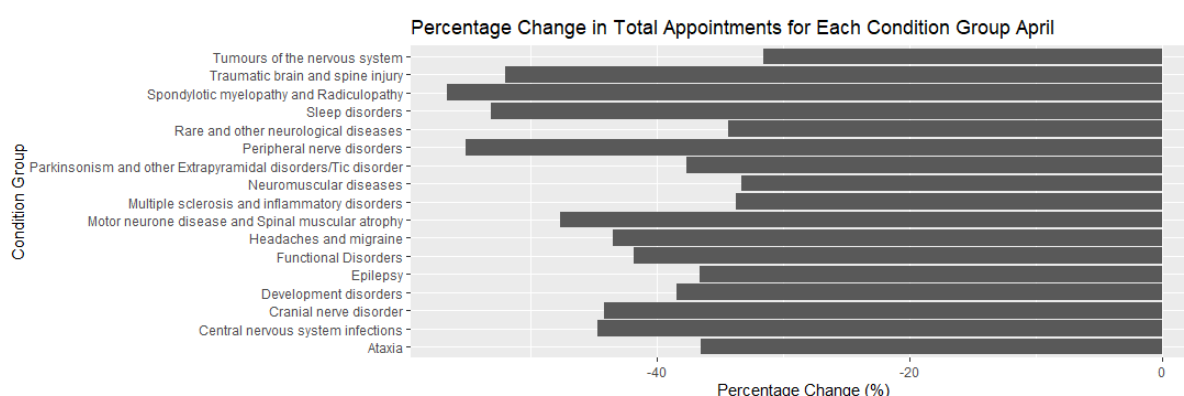


Figure 4: Percentage change of total appointments for each condition group – April

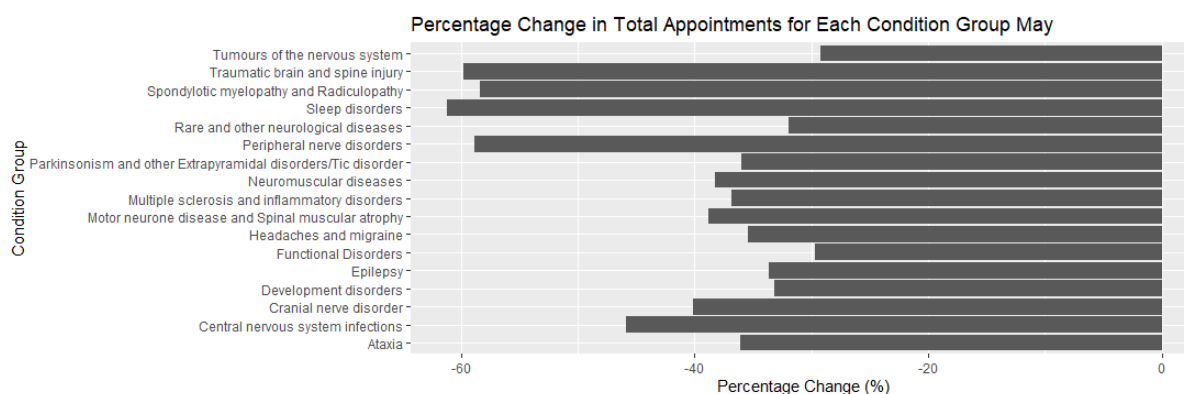


Figure 5: Percentage change of total appointments for each condition group – May

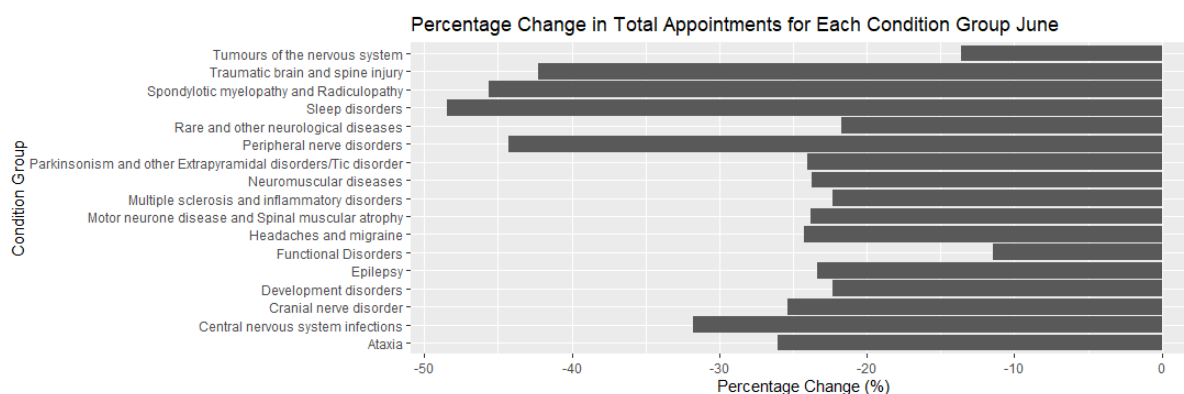


Figure 6: Percentage change of total appointments for each condition group – June

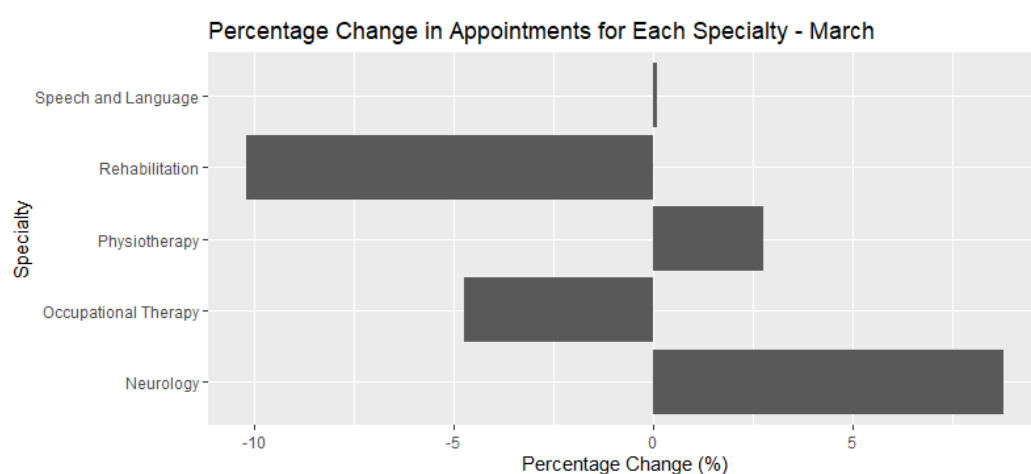


Figure 7: Percentage change of total appointments within each outpatient specialty – March

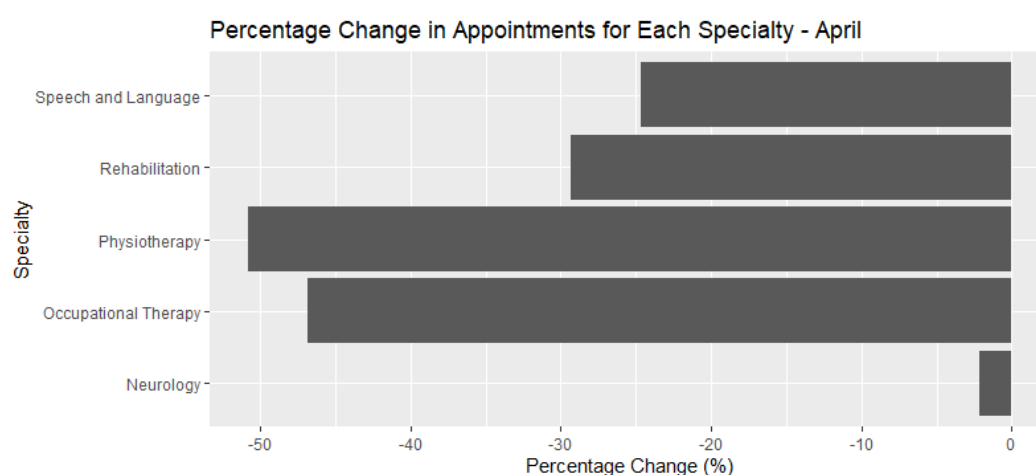


Figure 8: Percentage change of total appointments within each outpatient specialty – April

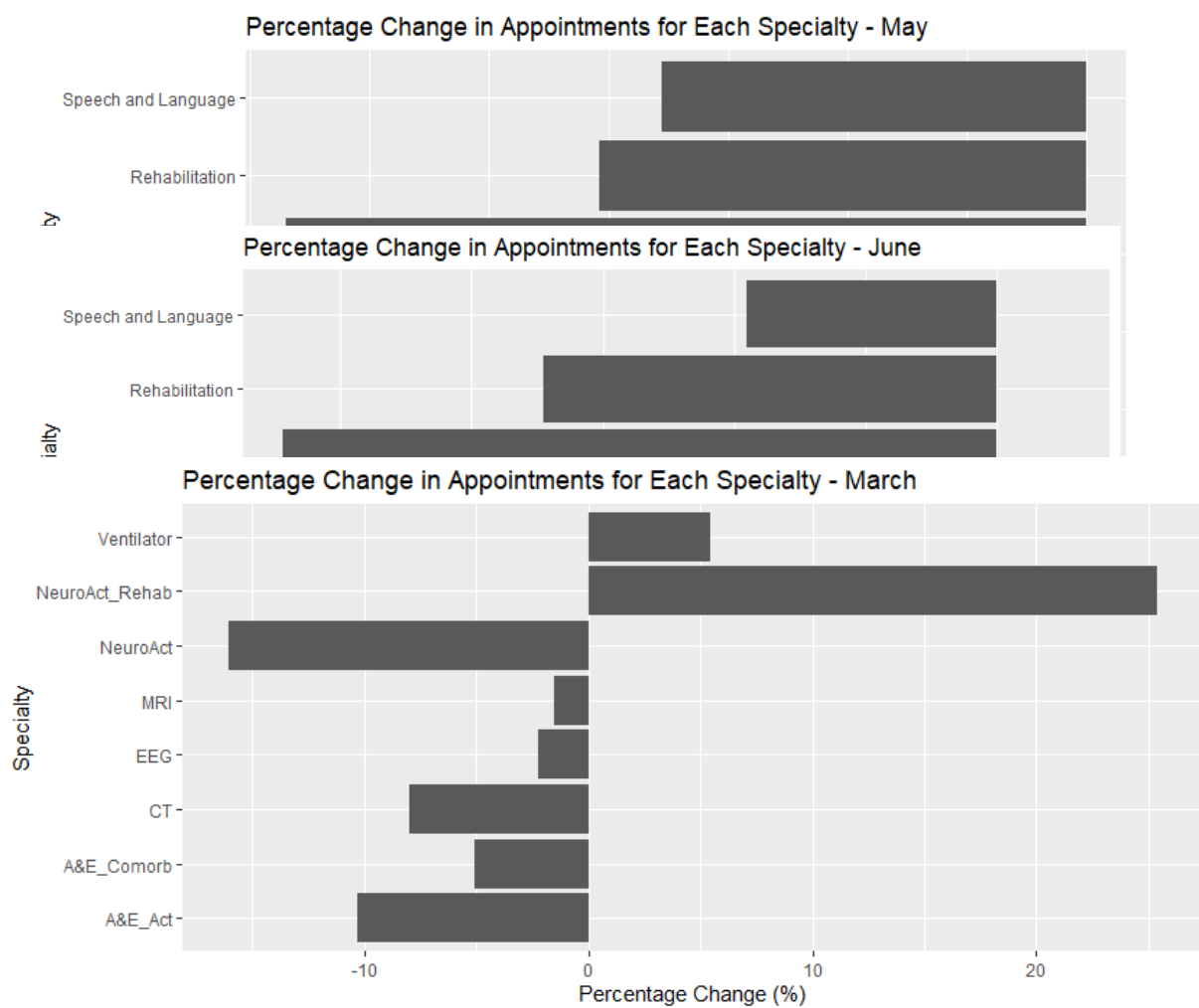


Figure 11: Percentage change of total appointments within each inpatient specialty - March

Figure 10: Percentage change of total appointments within each specialty - June

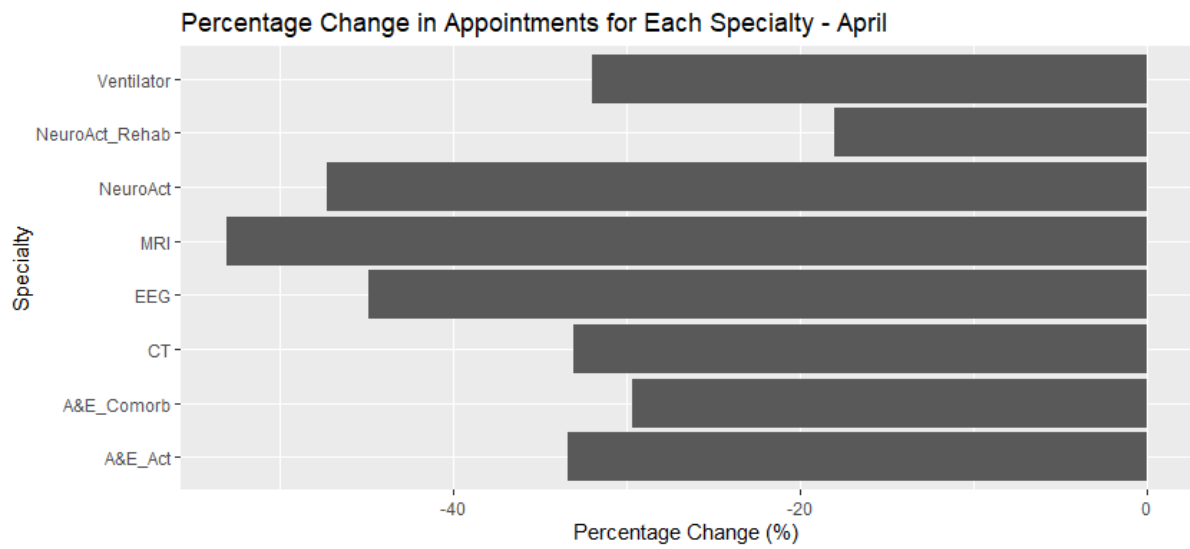


Figure 12: Percentage change of total appointments within each inpatient specialty - April

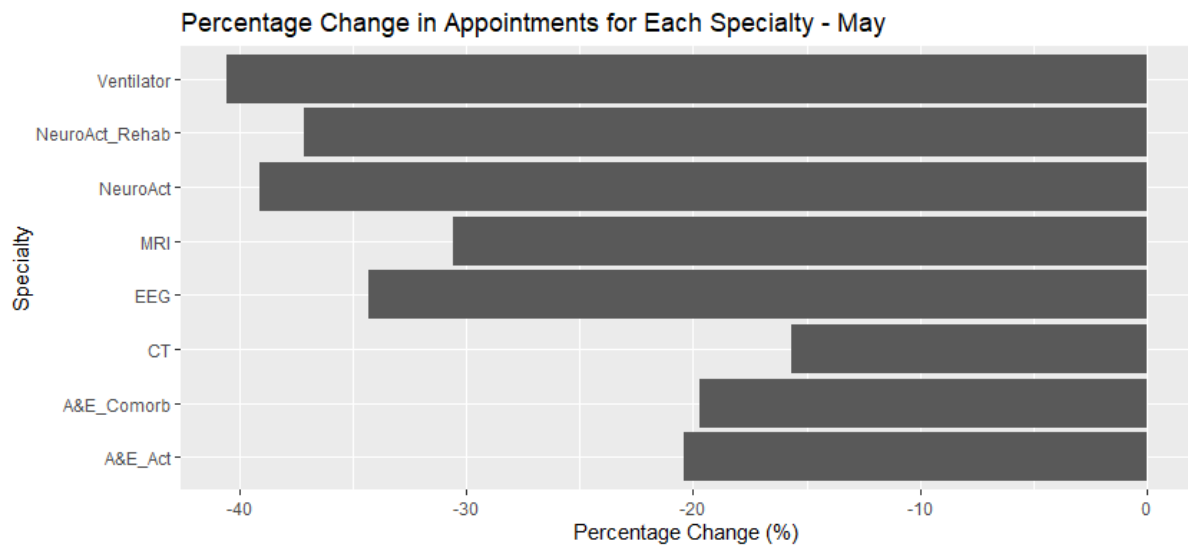


Figure 13: Percentage change of total appointments within each inpatient specialty - May

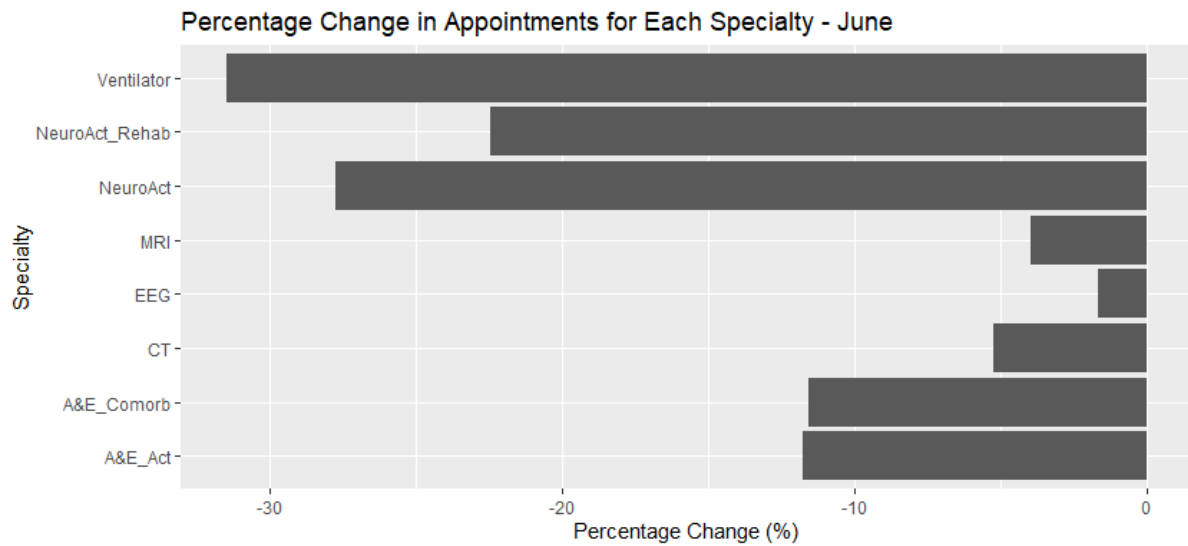


Figure 14: Percentage change of total appointments within each inpatient specialty - June

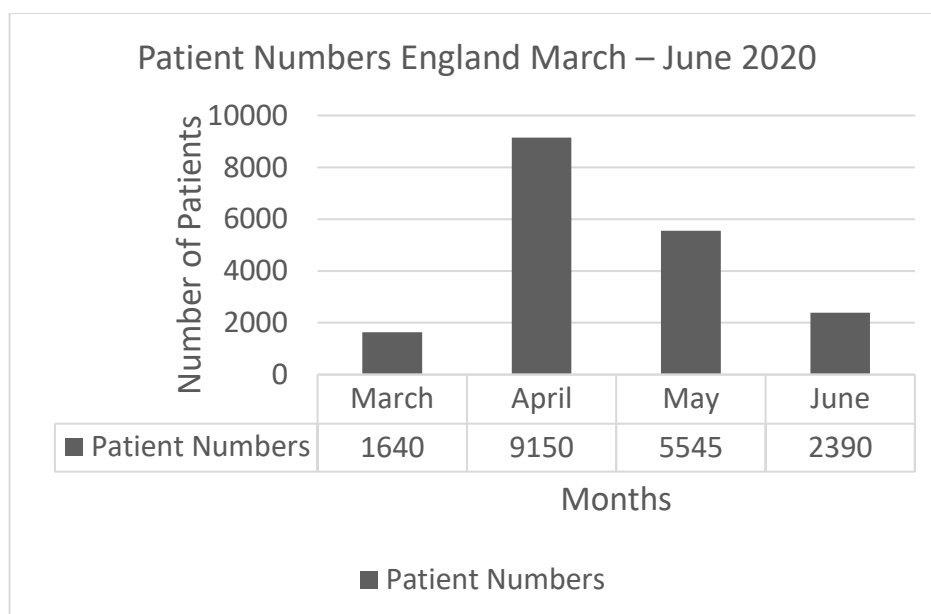


Figure 15: Number of COVID-19 cases for people with pre-existing neurological conditions

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An example being the prescribing of pharmaceutical products
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