The impact of Covid-19 on long-term conditions in the UK

A report commissioned by AbbVie
Research, data analysis and observations were conducted by Carnall Farrar using a mix of publicly-available and proprietary data sources.

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Overview

This report was commissioned and funded by AbbVie. Research, data analysis and observations were conducted by Carnall Farrar using a mix of publicly-available and proprietary data sources. See Appendix for full references. Data periods used: March – January for GP data, April – Sept for Health Checks, mid-March – December for hospital data. The data below is based on calculations obtained via the model and is a possible scenario only.

Executive summary

This report seeks to identify the impact of Covid-19 on long-term conditions, using six specific condition areas as examples. It is hoped this work will contribute to our understanding of the current situation and the potential medium term impact to inform healthcare prioritisation and service redesign. It is clear that opportunities exist to build on best practice to address these challenges.

The current situation

Our data analysis shows that new and existing patients in England with long-term conditions have been negatively impacted by the Covid-19 pandemic throughout the whole patient pathway – from presentation to GP, diagnosis and timely referral and management

- In-person GP appointments, often the first point of contact for individuals seeking a diagnosis, have dropped by 40%, with a particular drop in those appointments planned 2 or more days in advance where we would typically expect to see long-term condition diagnosis and management taking place
- Across the six condition areas focused on in this report, first outpatient attendances, which represent patients in the process of diagnosis, have dropped 25%. This suggests that 25% fewer new patients are being captured by the healthcare system
- The drop in subsequent or follow-up outpatient attendances was smaller across each of the diseases, with an 11% drop overall
- Elective or planned admissions reduced by 17% overall, largely driven by Inflammatory Bowel Disease, which accounts for a large proportion of elective admissions across the diseases of interest. The reduction in elective admissions was more extreme for the other conditions

The potential future impact for patients

Covid-19 has not delayed the onset of new long-term conditions, potentially creating future challenges where patients may be diagnosed later, with more severe disease and thus experience worse outcomes. Our modelling suggests for the six long-term conditions investigated:

- A total of 124,000 patients in the UK are estimated to be missing from the healthcare system
- The rise in years lived with disability as a result of late diagnosis is estimated at 4,500 years. This represents an increase of 47%. This could result in additional years of suffering experienced by patients, and higher healthcare costs associated with management

Healthcare innovation can help to address this challenge

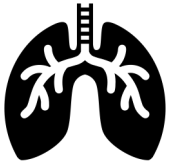
This works highlights the need for innovation in certain areas, and recommendations outlined by the UK research community are now more important than ever:

- The Covid-19 pandemic has strengthened the need for streamlining long-term condition diagnosis and in particular early diagnosis. Recommendations include the development of tools to assist clinicians to recognise early signs of disease and to rapid refer into specialist services
- The sharp rise in telemedicine is one example of the healthcare system's ability to adapt rapidly. It presents an opportunity to understand the knock-on effects of virtual care and for use of more effective digital communication methods

This analysis focusses in on 6 long-term disease areas

Rheumatoid arthritis

Asthma



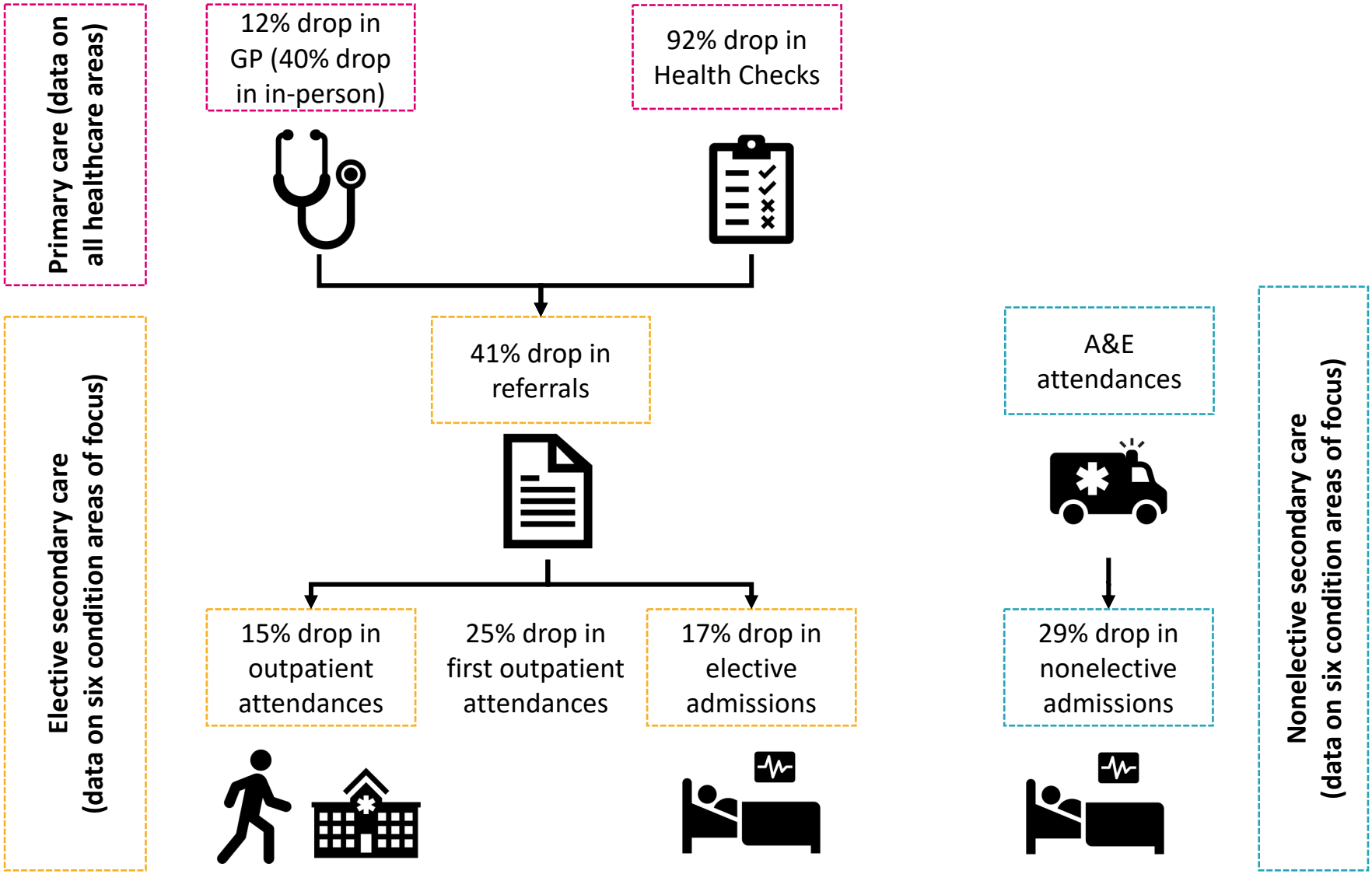
Psoriasis

Diabetes

Parkinson's

Inflammatory bowel diseases

For these diseases, Covid-19 has resulted in disruption across the healthcare system

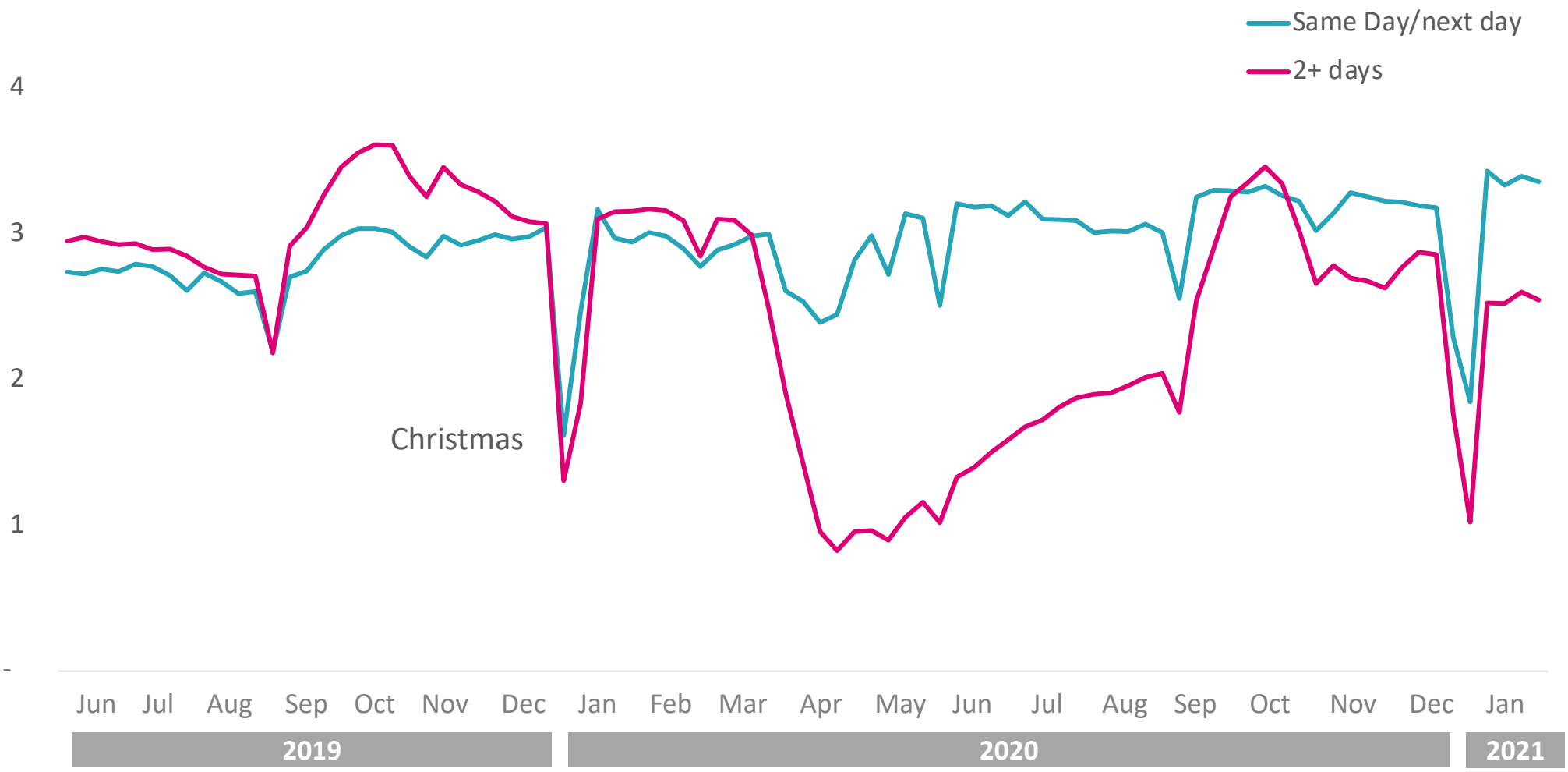


This report was commissioned and funded by AbbVie. Research, data analysis and observations were conducted by Carnall Farrar using a mix of publicly-available and proprietary data sources. See Appendix for full references

Data periods used: March-January for GP data, April-September for Health Checks, Mid-March-January for referrals, March-December for hospital data

GP appointments dropped 12% overall: the drop was driven by fall in those appointments planned 2 or more days in advance

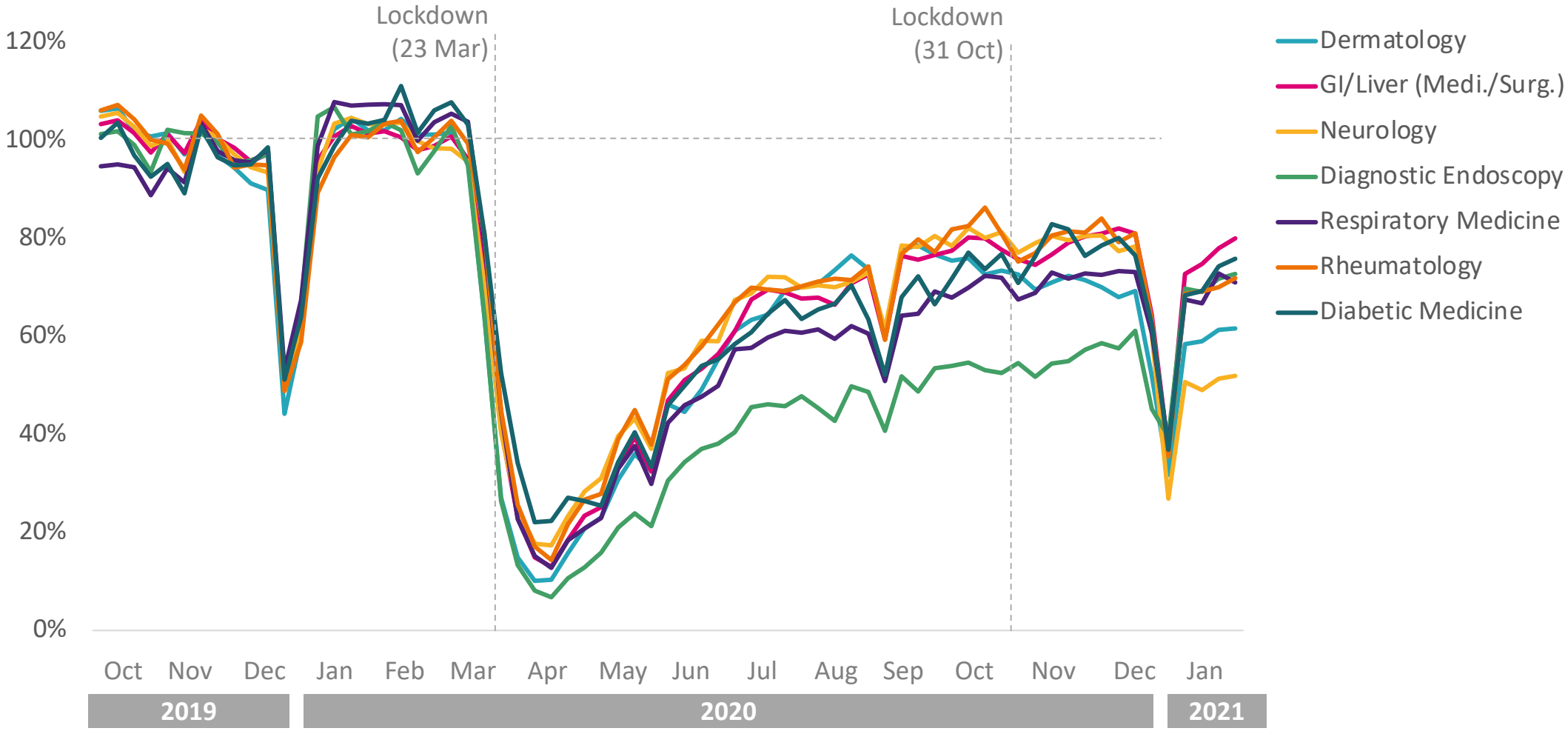
Weekly GP appointment count by time between booking date and appointment date, up to 31 January 2021 (all appointment types), millions



Source: NHS Digital, https://digital.nhs.uk/data-and-information/publications/statistical/appointments-in-general-practice

Referrals relative to the pre-Covid period: reduced by 41% overall and remain lower in January 2021

Weekly referrals as a percentage of average levels up to 16 March 2020 (excluding Christmas period), 7 Oct '19 – 31 Jan '21

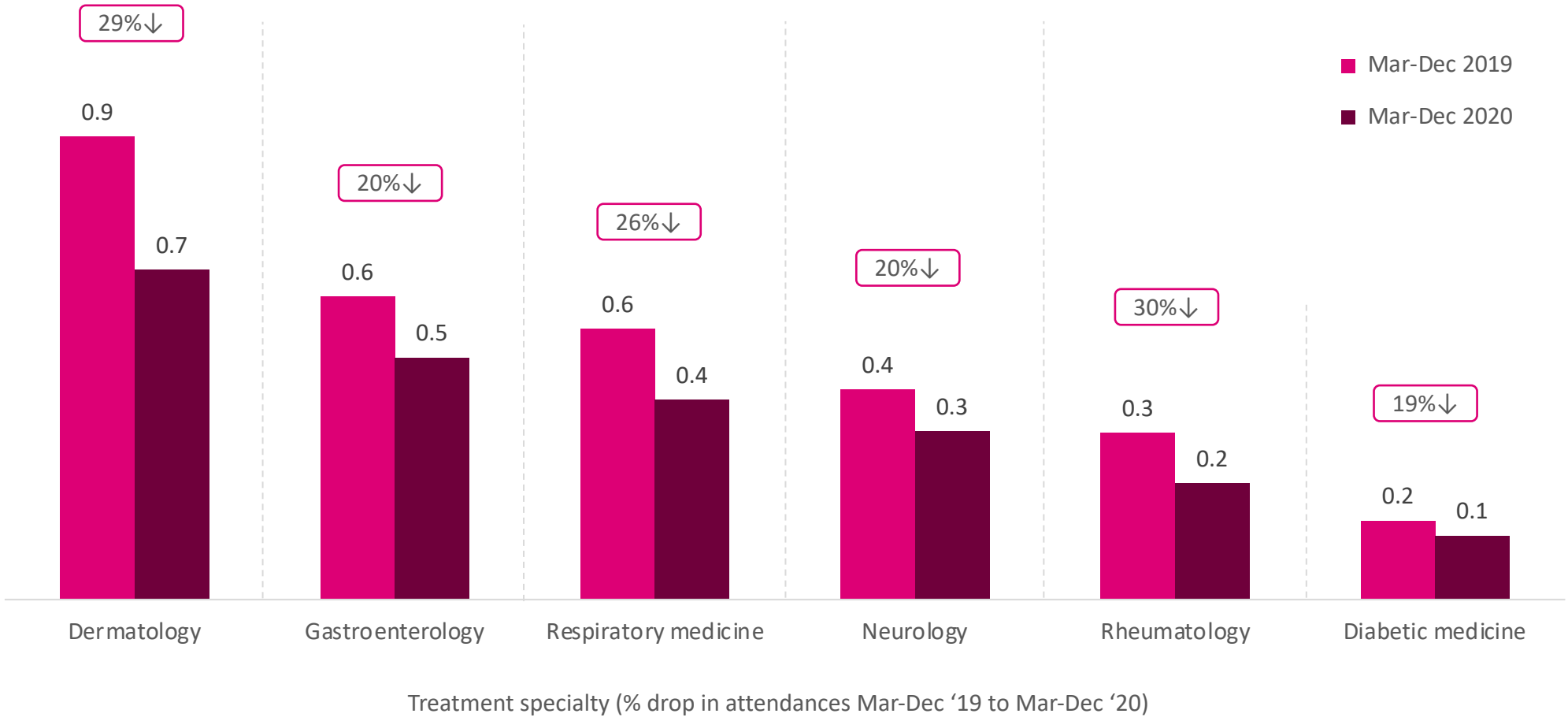


Source: NHS Digital, e-Referrals: https://digital.nhs.uk/data-and-information/publications/statistical/mi-nhs-e-referral-service-open-data/

First outpatient attendances relative to 2019: 19-30% decline

First outpatient attendances for March-December from 2019-2020 and percentage reduction from 2019 to 2020, England, millions

Outpatient attendances saw a particular decline, of 25% overall, dropping by 19-30% across relevant treatment specialties relative to 2019. This captures individuals entering the health system for the first time and seeking a diagnosis and therefore enables us to see the potential impact on missed or late diagnosis.

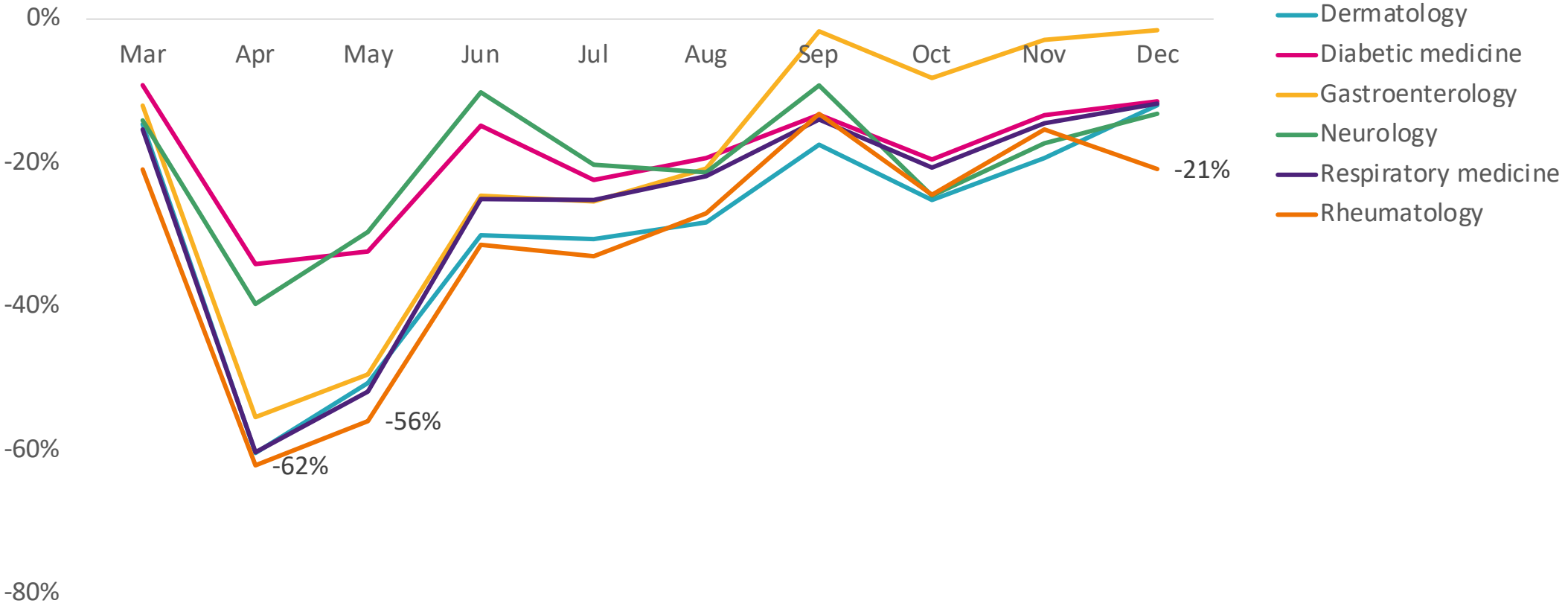


Source: NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity, CF analysis
'First' outpatient attendances are those flagged as the initial visit for a particular condition, as opposed to a subsequent/follow-up attendance.
Note: for some diseases, including dermatology and rheumatology, physical examination is important for diagnosis

Percentage reduction in first outpatient attendances compared to the same months in 2019: particularly stark in April and May 2020

Percentage reduction in first outpatient attendances for March-December 2020 compared to the same months in 2019 by month, England

Splitting the period down month by month and looking relative to the same month one year prior, outpatient attendances saw the most dramatic decline in April and May 2020 relative to 2019. For example, first outpatient attendances (those in the process of diagnosis) for rheumatology dropped by 62% in April 2020 compared to April 2019.

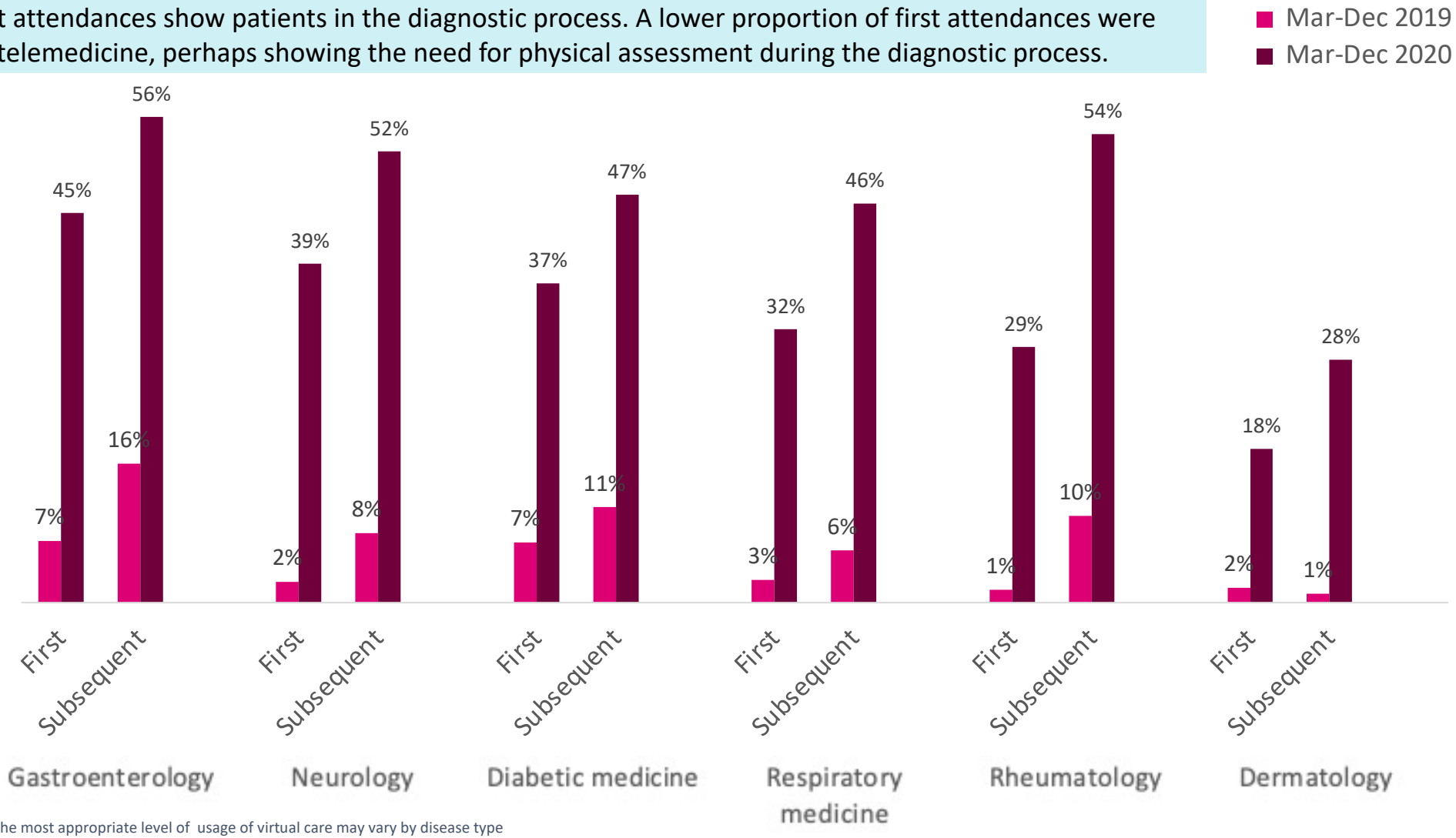


Source: NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity, CF analysis
'First' outpatient attendances are those flagged as the initial visit for a particular condition, as opposed to a subsequent/follow-up attendance

Mode of delivery of outpatient appointments: a shift towards telephone and telemedicine from 2019 to 2020 for both first and subsequent attendances

Proportion of outpatient attendances that were recorded as telephone/telemedicine, March-December 2020 compared to the same period in 2019 (with diseases ordered from high to low for 2020 proportion of first appointments)

First attendances show patients in the diagnostic process. A lower proportion of first attendances were via telemedicine, perhaps showing the need for physical assessment during the diagnostic process.



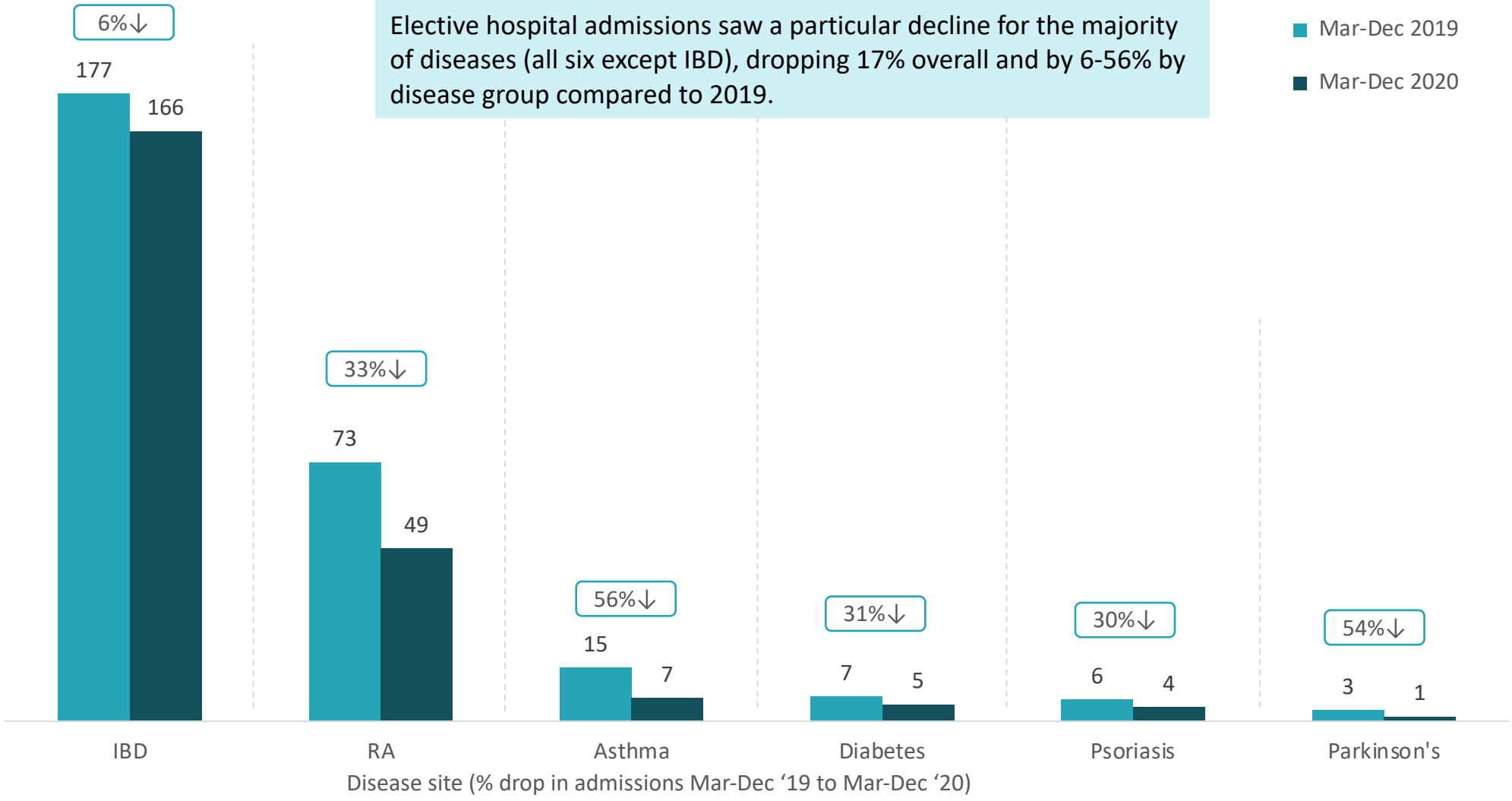
Note: the most appropriate level of usage of virtual care may vary by disease type

Source: NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity, CF analysis

Elective hospital admissions: dropping 17% overall and by 6-56% by disease group compared to 2019

Elective hospital admissions for March-December from 2019-2020 and percentage reduction from 2019 to 2020, England (including only the primary diagnosis field; daycase and overnight admitted patient care), thousands

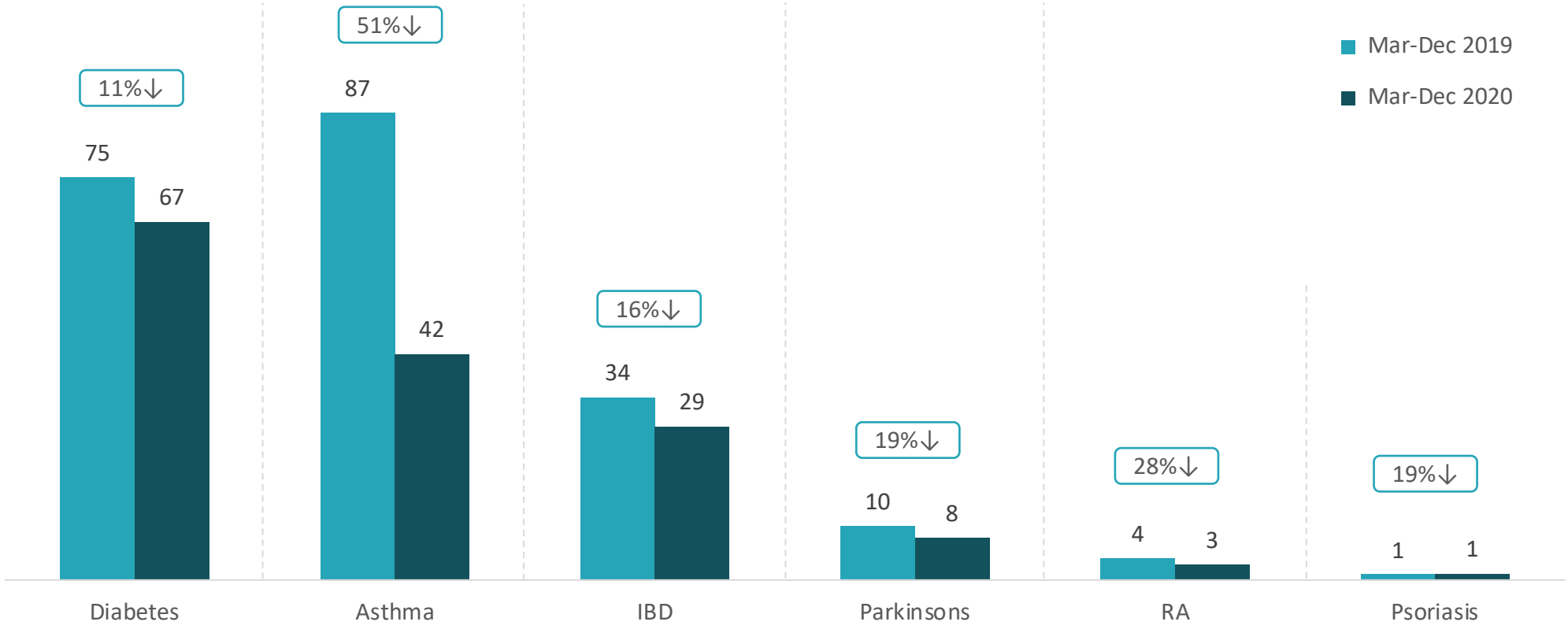
Elective hospital admissions saw a particular decline for the majority of diseases (all six except IBD), dropping 17% overall and by 6-56% by disease group compared to 2019.



Source: NHS Hospital Episode Statistics for Admitted Patient Care activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity, CF analysis

Nonelective hospital admissions: dropped 11-51% across disease areas in the ten months from March 2020 compared to 2019

Nonelective hospital admissions for March-December from 2019-2020 and percentage reduction from 2019 to 2020, England (including only the primary diagnosis field; daycase and overnight admitted patient care), thousands

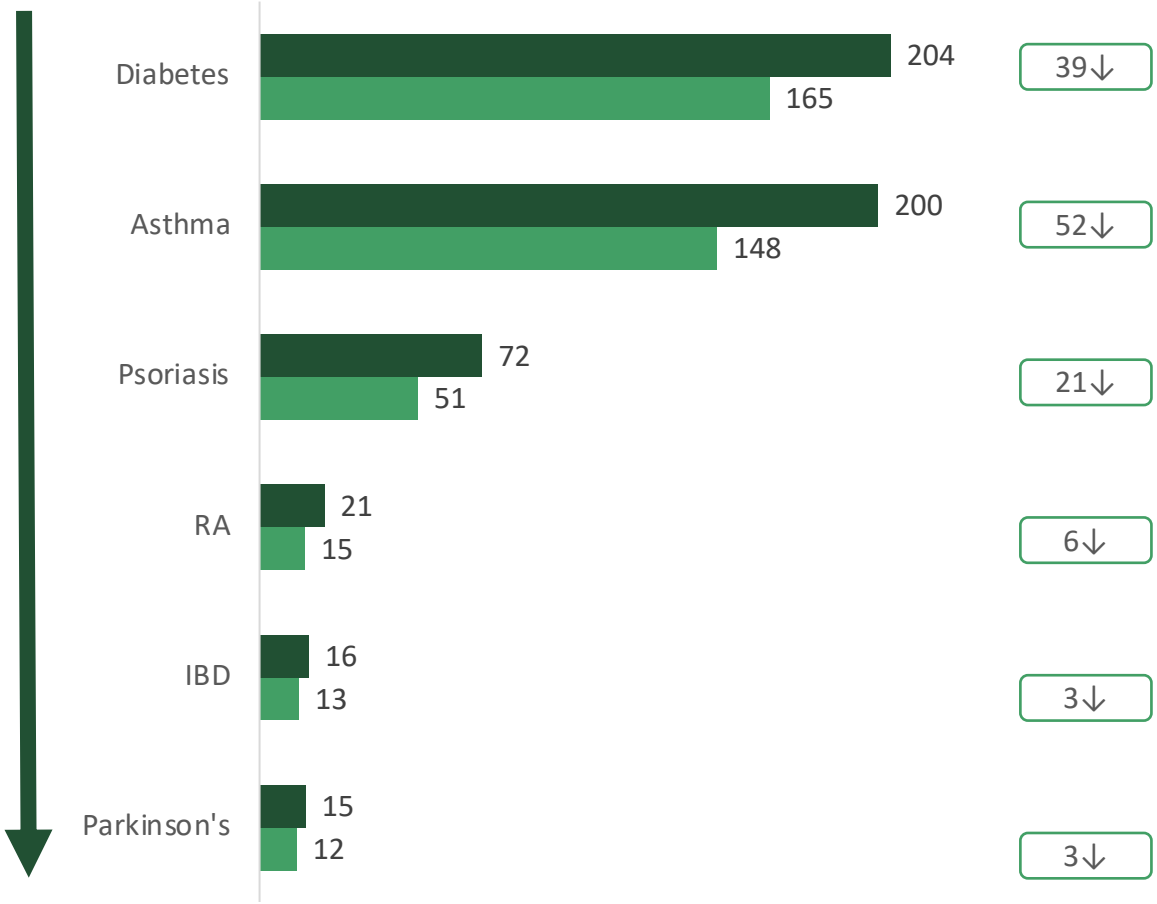


Source: NHS Hospital Episode Statistics for Admitted Patient Care activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity, CF analysis

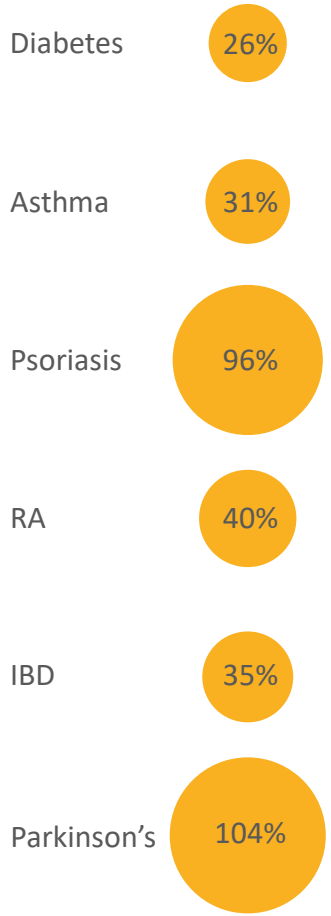
124,000 patients are estimated to have been missed and diagnosed late, resulting in approximately 4,400 additional years (or 47% increase), in disability

Approximate UK incidence, estimated incidence following the reduction in new outpatient appointments and the absolute difference, for March-December 2020 from 2019, thousands

Modelled incidence from Mar-Dec '19 to Mar-Dec '20 (and change i.e., the 'missing patients'), thousands



Modelled % of additional years lived with disability (YLDs) by the 'missing' patients diagnosed late



See Appendix for incidence references and sensitivity analysis

Source: NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity, CF analysis

Recommendations outlined by the UK research and charity communities can help to address these challenges

The current and modelled impact of Covid-19 on the long-term conditions identified in this work, across diagnosis through to referral and patient management, highlights significant challenges. However, research conducted by Carnall Farrar demonstrates recommendations for improved patient care and pathway management already exist that could be further implemented to reduce this impact and maintain, or elevate, standards of care in these healthcare conditions. The below points highlight just some of those focus areas.

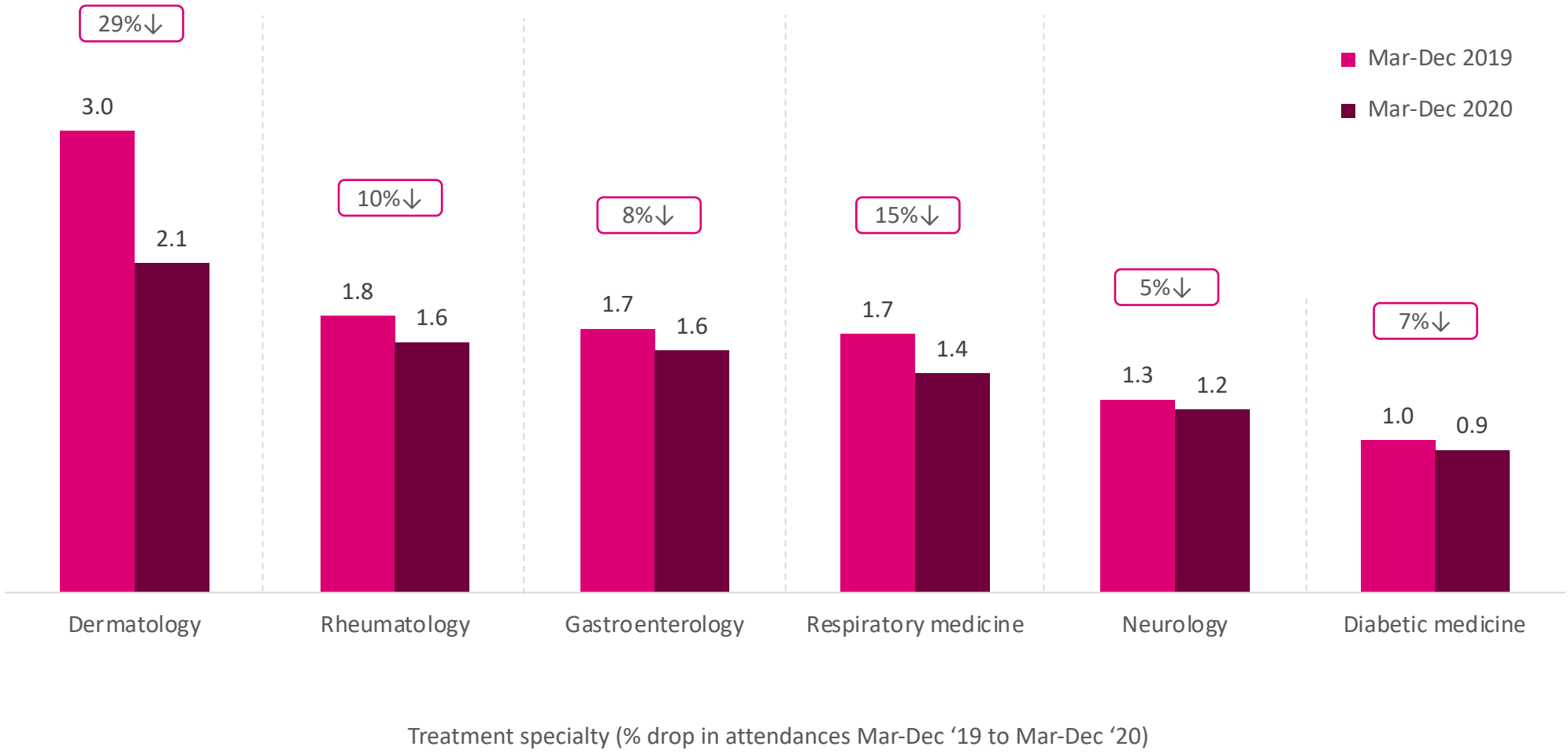
Strengthening the focus on earlier diagnosis of long-term conditions	• Recovering GP services and streamlining referrals so that new patients can confidently enter the healthcare system and be identified, diagnosed and initiated on treatment in a timely way • Raising awareness of the symptoms of long-term conditions in the public and the benefits of timely diagnosis, to encourage patients to present earlier on when treatment can be more effective
Preparing and evolving to care for the changing patient population and their needs	• Recovering elective care so that services are available for patients with long-term conditions, in both providing optimal care for existing patients and prioritising the diagnosis of new patients • Re-engaging with patients who have not been seen during the pandemic months, ensuring their condition is being reviewed and condition treated appropriately, including use of innovative treatments • Exploring treatment and management options that help to manage the backlog in 'safe' clinical environments • Encouraging the view of a holistic approach to the treatment of long-term conditions through development of seamless pathways across traditional boundaries focussed on patient experience
Embracing innovation including truly digital options	• Recognising the rapid progress made in some areas including the rise in telemedicine, in particular via telephone, which has made the healthcare system more accessible for some • Building and making use of more effective communication options which can improve patient care, such as virtual GP appointments, eConsultations, pharmacist-led care and opportunities in outpatient optimisation • Identifying where digital innovation is most important, including in the diagnosis and management of patients, and ensuring the move to digital does not increase inequalities in access to care and is done in conjunction with patients

Source: The Future of Immunology: Shaping the future of immunological research in the UK together https://www.immunology.org/sites/default/files/Future_of_Immunology_booklet.pdf
Innovations in Diabetes Care for a Better "New Normal" Beyond COVID-19 https://academic.oup.com/jcem/article/106/1/e377/5921164

Appendix

Outpatient attendances have dropped by 15% overall and 5-29% across specialties, relative to 2019

Outpatient attendances for March-December from 2019-2020 and percentage reduction from 2019 to 2020, England, millions



Source: NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity, CF analysis

Covid-19 has resulted in disruption across the healthcare system, with disruption varying by disease

Disease	Incidence (UK)	GP drop (all diseases)*	Treatment specialty	Referral drop**	First outpatient drop**	Subsequent outpatient drop**	Elective admission drop	Nonelective admission drop
Diabetes	245,000	12%	Diabetic Medicine	40%	19%	5%	31%	11%
Asthma	240,000		Respiratory Medicine	45%	26%	11%	56%	51%
Psoriasis	86,000		Dermatology	44%	29%	29%	30%	19%
RA	25,000		Rheumatology	37%	30%	5%	33%	28%
IBD	19,000		GI/Liver / Gastroent.	40%	20%	2%	6%	16%
Parkinson's	18,000		Neurology	38%	20%	-2%	54%	19%
Total	633,000	12%	Total	41%	25%	11%	17%	29%

*Figures for the drop in primary care (GP appointments) cover all disease areas, not just the six of interest
**Figures for the drop in referrals and outpatient attendances use data from the treatment specialty groups listed

Sources:
Incidence estimates - see slide 20
GP data - NHS Digital, https://digital.nhs.uk/data-and-information/publications/statistical/appointments-in-general-practice Referrals data - NHS Digital, e-Referrals: https://digital.nhs.uk/data-and-information/publications/statistical/mi-nhs-e-referral-service-open-data/
Outpatient data - NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity (CF analysis - not publicly available data)
Admissions data - NHS Hospital Episode Statistics for Admitted Patient Care activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-admitted-patient-care-activity (CF analysis - not publicly available data)

We have developed a method for modelling the missing patients and extra burden of disability

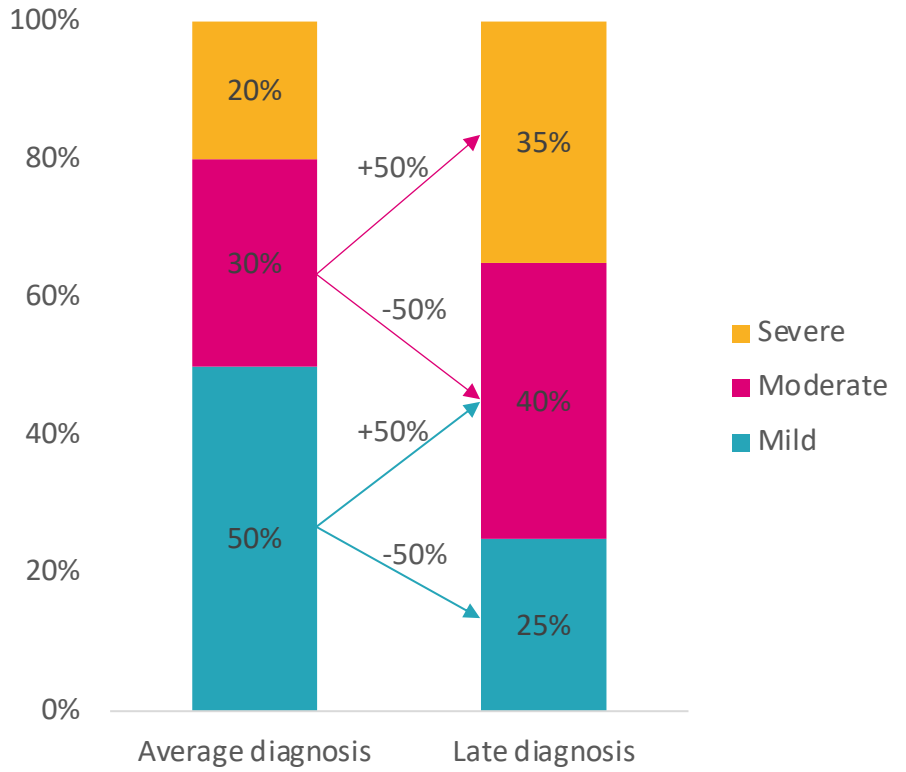
We use published incidence and the reduction in new outpatient attendances to estimate the **'missed' diagnoses**, assumed to be diagnosed late

We used published information on the UK **severity distributions.** For these late diagnoses we assume a shift towards more severe cases (see example)

To estimate the effect of a shift to more late diagnoses, we multiply the distribution by the published disability weights, to calculate an **approximation of the years lived with disability** for the 'late' cohort

We can **compare this to** the disability years that would have been experienced by **'average' diagnosis**

Example of the shift in severity distribution, where 50% of mild cases are diagnosed at moderate and 50% of moderate cases are diagnosed at severe



Example: An average distribution of mild: moderate: severe of 50%: 30%: 20%
If moving towards a late diagnosis:
Mild = 50% * 50% = 25%
Moderate = 30% + (50% * 50%) – (50% * 30%) = 40%
Severe = 20% + (50% * 30%) = 35%

Sources:
Outpatient data - NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity (CF analysis - not publicly available data)
Disability weights and severity distributions: WHO methods and data sources for global burden of disease estimates 2000-2019: https://www.who.int/docs/default-source/gho-documents/global-health-estimates/ghe2019_daly-methods.pdf?sfvrsn=31b25009_7; Scottish Burden of Disease Study: https://www.scotpho.org.uk/comparative-health/burden-of-disease/overview/

A total of 124,000 patients are estimated to have been missed and diagnosed late, resulting in approximately 4,400 additional years of disability

					Estimated rise in years lived with disability (YLDs) and confidence limits		
Disease	Incidence (UK)	Treatment specialty	First outpatient drop*	Estimated drop in diagnoses	Estimated increase	Lower confidence limit	Upper confidence limit
Diabetes	245,000	Diabetic Medicine	19%	39,000	700 (26%)	400 (16%)	900 (33%)
Asthma	240,000	Respiratory Medicine	26%	52,000	700 (31%)	500 (21%)	900 (40%)
Psoriasis	86,000	Dermatology	29%	21,000	1,800 (96%)	1,200 (64%)	2,400 (129%)
RA	25,000	Rheumatology	30%	6,000	600 (40%)	400 (28%)	800 (53%)
IBD	19,000	GI/Liver / Gastroenter.	20%	3,000	200 (35%)	100 (13%)	200 (35%)
Parkinson's	18,000	Neurology	20%	3,000	400 (104%)	200 (53%)	500 (129%)
Total	633,000	Total	25%	124,000	4,400** (47%)	2,800 (30%)	5,700 (61%)

*Figures for the drop in outpatient attendances use data from the treatment specialty groups listed

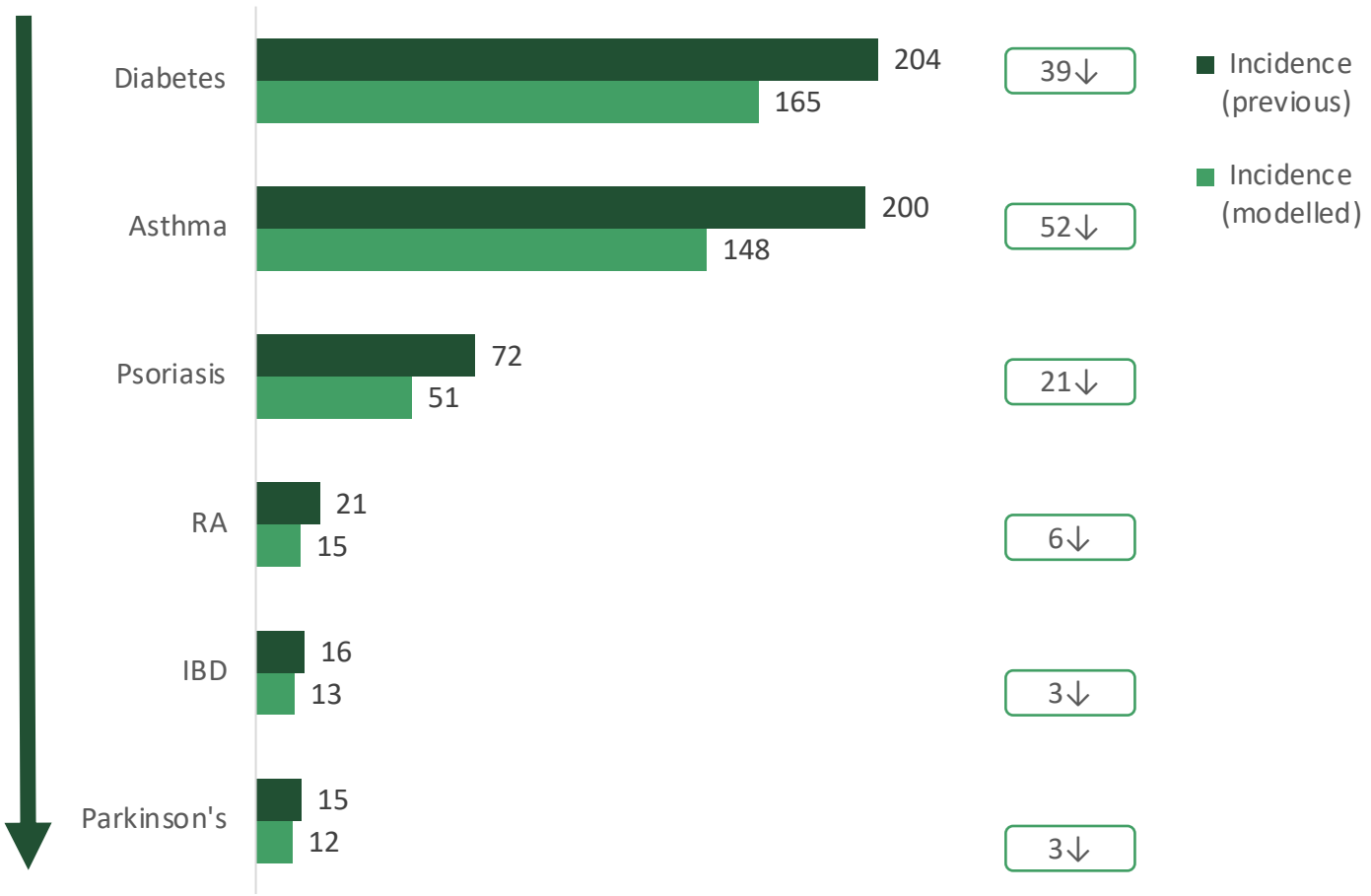
**4,400 represents an increase of 47% relative to if this population was not diagnosed late. Sensitivity analysis of our assumptions, using smaller (more conservative) shifts from mild to moderate, and moderate to severe disease, results in 2,800 additional years of disability (an increase of 30%). Analysis using larger (more extreme) shifts results in 5,700 additional years of disability (an increase of 61%).

Sources:
Incidence estimates - see slide 20
Outpatient data - NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity (CF analysis - not publicly available data)
Disability weights and severity distributions: WHO methods and data sources for global burden of disease estimates 2000-2019: https://www.who.int/docs/default-source/gho-documents/global-health-estimates/ghe2019_daly-methods.pdf?sfvrsn=31b25009_7; Scottish Burden of Disease Study: https://www.scotpho.org.uk/comparative-health/burden-of-disease/overview/

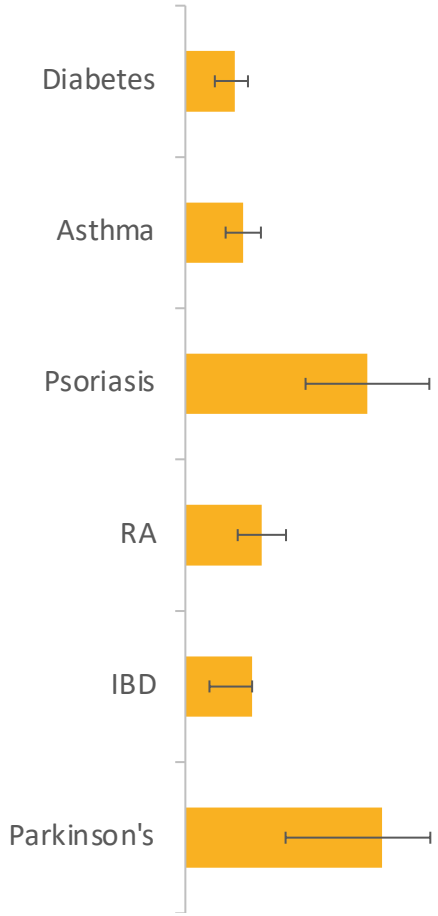
A total of 124,000 patients are estimated to have been missed and diagnosed late, resulting in approximately 4,400 additional years of disability

Approximate UK incidence, estimated incidence following the reduction in new outpatient appointments and the absolute difference, for March-December 2020 from 2019, thousands

Modelled incidence from Mar-Dec '19 to Mar-Dec '20 (and change i.e., the 'missing patients'), thousands



Modelled % of additional years lived with disability (YLDs) by the 'missing' patients diagnosed late*



*Sensitivity analysis of our assumptions for the calculations of years lived with disability, using smaller (more conservative) shifts from mild to moderate, and moderate to severe disease, results in 2,800 additional years of disability (an increase of 30%) (see lower confidence limits). Analysis using larger (more extreme) shifts results in 5,700 additional years of disability (an increase of 61%) (see upper confidence limits).

Source: NHS Hospital Episode Statistics for Outpatient activity: https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity, CF analysis

Sources of incidence estimates

Disease	Incidence (UK)	Incidence source	Quote	Link
Diabetes	245,000	Examining trends in type 2 diabetes incidence, prevalence and mortality in the UK between 2004 and 2014 (2016)	"incidence rate per 10 000 person-years (PYR) (95% CI) … 36.89 (36.19; 37.61) in 2014"	https://pubmed.ncbi.nlm.nih.gov/28387052/
Asthma	240,000	The epidemiology, healthcare and societal burden and costs of asthma in the UK and its member nations: analyses of standalone and linked national databases (2016)	"age-standardised incidence of GP-diagnosed asthma was 3.8/1000 (95 % CI, 3.8–3.9), equivalent to approximately 240,000 people in the UK developing asthma in 2011–12"	https://bmcmedicine.biomedcentral.com/articles/10.1186/s12916-016-0657-8
Psoriasis	86,000	Incidence, prevalence and mortality of patients with psoriasis: a U.K. population-based cohort study (2017)	"adjusted psoriasis incidence …129 per 100 000 person years (95% CI 126–133) in 2013"	https://pubmed.ncbi.nlm.nih.gov/27579733/
RA	25,000	Rheumatoid arthritis is getting less frequent—results of a nationwide population-based cohort study (2017)	"The incidence and prevalence of RA was 3.81/10 000 person-years and 0.67%, respectively, in 2014."	https://pubmed.ncbi.nlm.nih.gov/28064207/
IBD	19,000	Incidence and prevalence of inflammatory bowel disease in UK primary care: a population-based cohort study (2020)	"Crude incidence estimates of 'IBD overall' …28.6"	https://bmjopen.bmj.com/content/10/7/e036584
Parkinson's	18,000	The incidence and prevalence of Parkinson's in the UK (2018)	"estimated incidence of Parkinson's for people aged 45 or over 2018 is 18,461"	https://www.parkinsons.org.uk/sites/default/files/2018-01/CS2960%20Incidence%20and%20prevalence%20report%20branding%20summary%20report.pdf

References:
UK pop in 2018 = 66,436,000 (https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/august2019)
UK pop in 2018 aged 45+ years = 29,314,000 (https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/august2019)