Unity Insights

My Online Care

Evaluation report

August 2023

Working in collaboration with

The NHS consists of various organisations working together to provide a variety of health and care services for patients and carers.

East Midlands Academic Health Science Network (AHSN) aims to support organisations to adopt technologies and pathways that respond to local health priorities.

Nottingham University Hospitals NHS Trust provides acute and specialist services to 2.5 million people within Nottingham and surrounding communities.

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Executive summary

Context

The demand for outpatient healthcare has risen by nearly 50% over the last decade and reached 124.9 million appointments in England in 2020 (NHS Digital, 2022; NHS England, 2019).

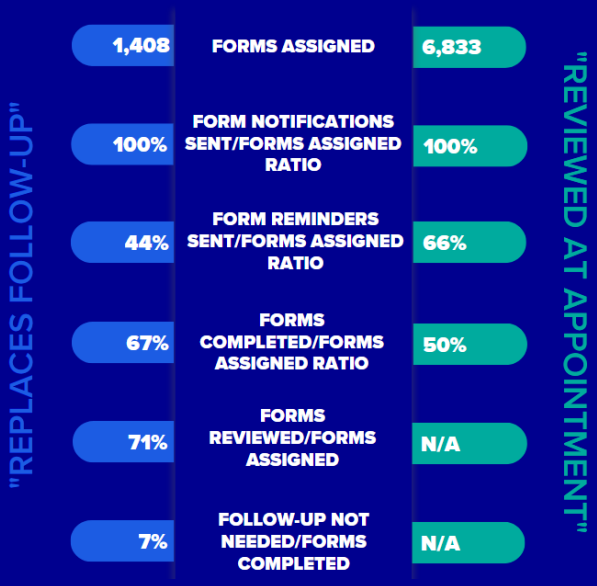
My Online Care is a digital outpatient management solution. Through a desktop and mobile-based digital care delivery platform, provided by DrDoctor, it allows patients to complete questionnaires regarding their care. Based on the patients' questionnaire responses, clinicians are able to identify and avoid, where clinically safe and appropriate, follow-up appointments (*"replaces follow-up"*) or streamline clinical data collection ahead of appointments (*"reviewed at appointment"*).

Unity Insights were commissioned by the East Midlands Academic Health Science Network (East Midlands AHSN) to evaluate the potential impact of using My Online Care digital health questionnaires on outpatient appointments at Nottingham University Hospitals (NUH). This evaluation was conducted using a mixed methods approach that included qualitative and quantitative analysis. Further details have been included within the 'Methodology' section of the report.

Key results

Effectiveness

My Online Care has been shown to be used effectively by staff and patients across all evaluated pathways with consistent questionnaire use, completion and reviews. On average 7% of appointments could be avoided as they were deemed to be clinically not needed. While the appointment-replacing capacity of the questionnaires in respective pathways was lower than the 29% seen in the pilot study, additional benefits associated with their use were identified. Measures of effectiveness varied across pathways and there was no clear indication as to which pathways might use the solution more or less effectively than others.



Averages have been rounded to the nearest whole percentage. The forms reviewed/forms assigned and follow-up not needed/forms completed metric do not apply to the *"reviewed at appointment"* pathway.

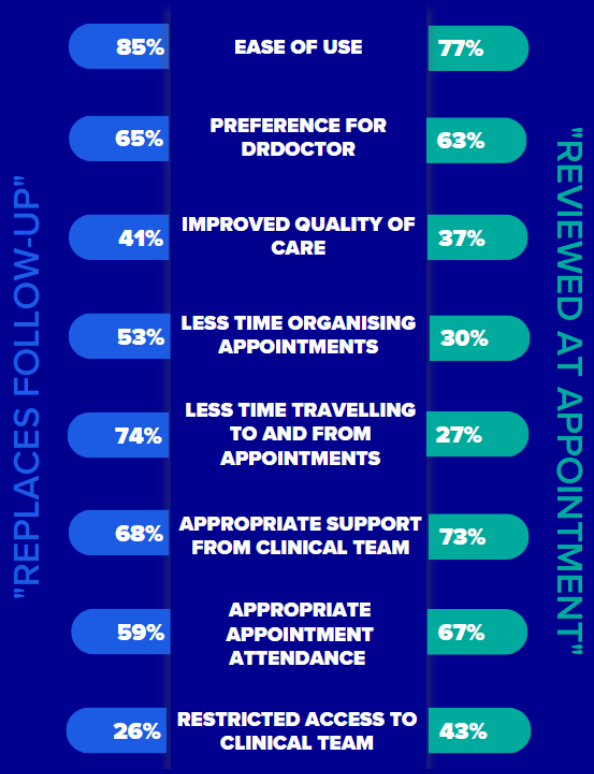
Patient experience

There were 34 survey respondents for the *"replaces follow-up"* pathway and 30

respondents for *“reviewed at appointment”*. Patients reported that the app was easy to use and preferred the app over other methods of completing health-related questionnaires. Further, patients reported benefits such as My Online care helping them with:

- discussing their care with their doctor
- feeling supported by the clinical team
- saving time travelling to and attending appointments, and
- experiencing improvements in the quality of care.

Such benefits have the potential to positively impact patients’ wellbeing and quality of life.



Staff experience

Clinicians reported positive opinions on the technical delivery, training and technical support of the solution and identified benefits of:

- My Online Care questionnaire responses effectively enabling pathway decisions
- More standardised patient care
- Increased efficiency of appointments and administrative processes
- Time savings resulting in more time for the review of cases with complex needs
- More personalised patient care

Staff using My Online Care identified some technical limitations of the solution. Addressing these, as detailed in the ‘Technical improvements’ recommendations, could improve workflows and create further efficiencies.

Scale

The use of My Online Care across multiple pathways with differing activity levels demonstrates that the solution is scalable. It was highlighted by clinicians that support from a designated team to oversee the implementation and management of digital pathways can facilitate the successful integration of My Online Care into work practice.

Impacts on the wider healthcare system

This evaluation showed that My Online Care has the potential to provide a wide range of benefits to facilitate and improve the provision of care services. The solution was shown to enable:

- Efficiencies in care provision and administration

- Improvements in the personalisation and quality of care
- Standardisation of patient response documentation and pathway processes

These benefits could impact patient wellbeing and increase healthcare providers' capacity for care provision.

Limitations

- **Evaluation delays and timelines:** Several challenges resulted in a change of the evaluation scope.
- **Data availability:** Limited availability of clinical outcome and appropriate comparator data has resulted in anecdotal findings.

Further details have been included within the 'Limitations' section of the report.

Recommendations

- **Technical improvements:** Better integration between DrDoctor and the Medway Patient Administration System (PAS) could introduce further workflow efficiencies
- **Communication:** Notifying patients during the early stages of their journey that My Online Care is part of their care plan.
- **Cohort suitability:** My Online Care seems to be better suited to well-defined pathways with generally stable patient outcomes and consistent pathway decisions.
- **Development of implementation guidance:** Ensuring that pathway maps exist and are shared with relevant teams and stakeholders for both the baseline and intervention pathways can clarify potential benefits and impacts of deviations from recommended workflow and documentation practices.
- **Data capture:** Building a comprehensive and linkable dataset of relevant impact metrics would allow for ad hoc assessments and ongoing monitoring of impact metrics against the baseline, review of current practices, could inform potential improvements, and further assess their impact.
- **Understanding and sharing wider benefits:** As there is acceptance of the solution across patients and clinicians, insights should be shared with relevant stakeholders to enable a wider implementation of the solution.

Further details have been included within the 'Recommendations' section of the report.

Conclusion

My Online Care presents a digital pathway management solution, which could be used effectively after a short implementation period across different pathway types (*"replaces follow-up"* and *"reviewed at appointment"*), a range of specialties and pathways of varying scale.

Addressing the points below could allow the approach to work effectively at scale and for the wider healthcare system benefits to be better articulated:

- Workflow challenges
- Establishing a dedicated implementation and management team

- Considering the suitability of patient cohorts
- Implementing guidance on documentation
- Facilitating more robust data collection

The solution was well received by patients and staff, with staff highly recommending the solution.

1. Introduction

1.1. Context

The demand for outpatient healthcare has risen by nearly 50% over the last decade and reached 124.9 million appointments in England in 2020 (NHS Digital, 2022; NHS England, 2019). Additionally, the increasing healthcare backlog, aggravated by the SARS-CoV-2 pandemic, of almost six million people waiting for treatment in 2021, elevates the pressures on the NHS and healthcare staff to unsustainable levels (British Medical Association, 2022). At the same time, unattended outpatient appointments amounted to 7.7 million in 2020 (NHS Digital, 2020), unnecessarily reducing the capacity of the NHS to cope with the outpatient care demand. Therefore, methods of reducing Did Not Attend (DNA) appointments should be sought to ensure effective use of clinical time and allow patients to be seen more quickly.

The NHS long-term plan aims to safely reduce the number of face-to-face (F2F) outpatient appointments by 30 million annually by 2024 (NHS England, 2019). This aims to improve access to care by avoiding unnecessary attendances and removing barriers to attending appointments, for example, by expanding online services and reducing travel requirements, therefore reducing costs to the NHS by £1 billion annually (NHS England, 2019). Digitalising care services aims to restore healthcare worker capacity, reduce treatment backlog and improve patient quality of life.

Reducing travel and waiting times allows patients to proactively shape their patient journey through greater control and flexibility when accessing healthcare. Furthermore, reducing the need for travel to attend outpatient appointments likely reduces the environmental impact of NHS services, in line with the plan to deliver a net zero NHS by 2040 (NHS England, 2020).

1.2. My Online Care

The East Midlands Academic Health Science Network (East Midlands AHSN) collaborated with Nottingham University Hospitals (NUH) to implement the digital outpatient management solution, My Online Care. The desktop and mobile-based digital care delivery platform is provided by DrDoctor and includes integrated assessment, communication and appointment booking tools, to form a digital pathway specifically designed to meet the needs of patients and healthcare providers. The DrDoctor app allows clinician-designed digital health questionnaires to be sent to patients ahead of their scheduled follow-up appointments for two distinct purposes or pathways:

1) *"Replaces follow-up"* pathway:

A questionnaire is completed by patients ahead of a scheduled follow-up outpatient appointment to assess the follow-up need. Based on the responses provided by patients, clinicians can identify and avoid clinically unnecessary follow-up appointments (Figure 1).

2) *"Reviewed at appointment"* pathway:

A questionnaire is completed by patients ahead of a scheduled appointment to provide detailed information ahead of the consultation. This allows clinicians to be more informed with the aim of improving the quality of a conversation (Figure 1). This use of questionnaires is not exclusive to follow-up appointments.

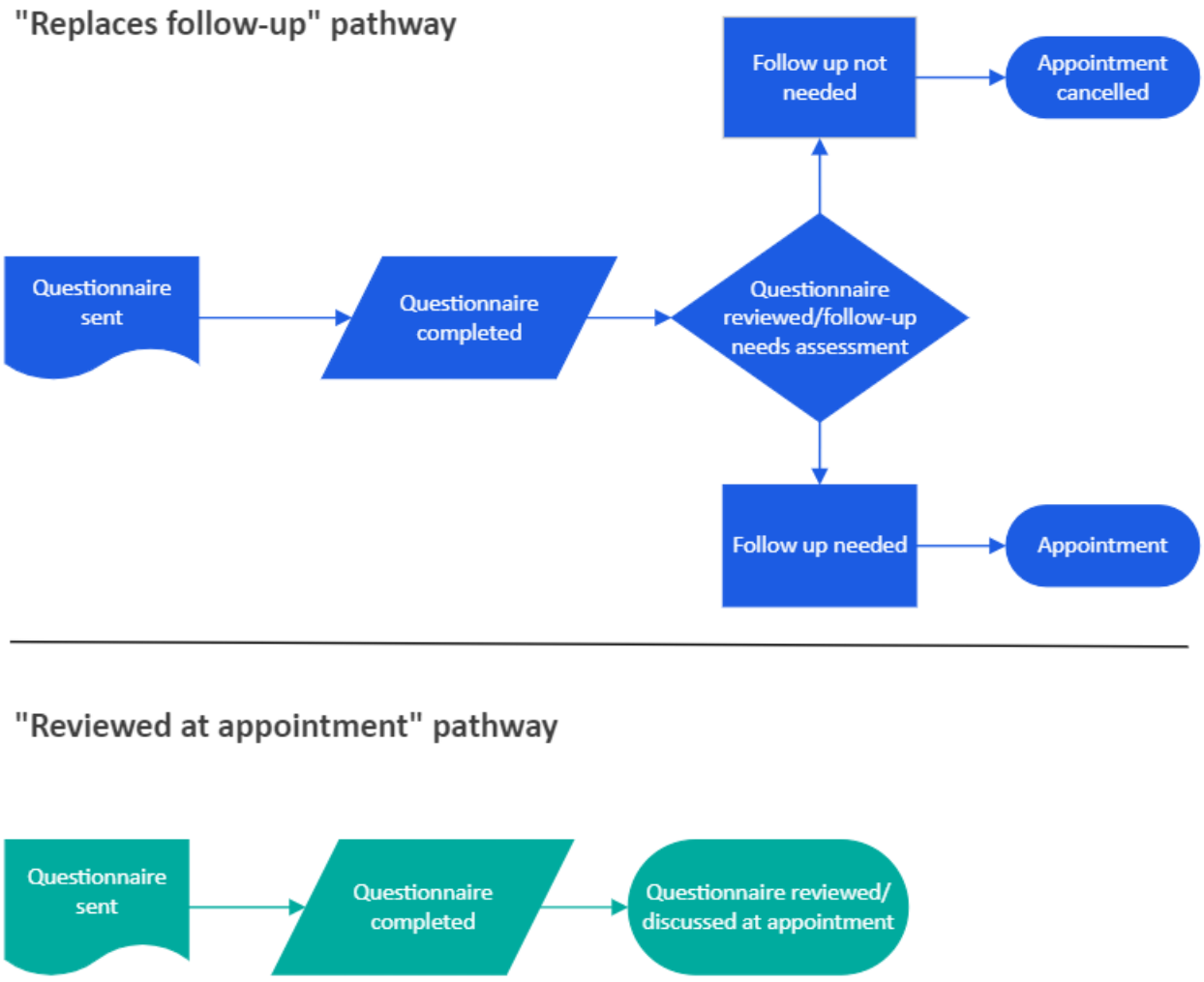


Figure 1. Generic pathway maps for "Replaces follow-up" and "Reviewed at appointment" pathways.

Pilot evaluation

My Online Care was initially implemented during a pilot study conducted by Sivanandan et al. (2021) in two selected specialties, Oncology, and Breast Services. The Common Terminology

Criteria for Adverse Events (CTCAE), a set of criteria used for standardised classification and severity grading of adverse events related to cancer therapy drugs, were reworded to accommodate the target patient cohort and formed the treatment-specific digital questionnaires to explore the feasibility of using digital patient-reported outcome measures (PROMs) for follow-up need assessments. The study included 90 patients receiving cancer treatment across ten different treatment pathways. Bespoke data collection during the pilot allowed follow-up need assessments to be reviewed for accuracy and safety of using digital health questionnaires for follow-up need assessments. The suitability of patients for digital pathways was assessed by clinicians based on diagnosis, capacity to understand and complete digital questionnaires, access to internet, reliable reporting of symptoms, and safeguarding considerations (East Midlands Academic Health Science Network, 2019). Appointments deemed clinically unnecessary based on questionnaire responses could still be held, if requested by the patient. During this pilot, the response rate was 92.6% (Sivanandan et al., 2022) and questionnaires completed by patients were found to be 94% accurate in highlighting whether a F2F appointment was required, with 100% of patients with severe symptoms being correctly identified. Additionally, 29% of patients did not require a F2F appointment based on their presenting symptoms, demonstrating the potential of My Online Care to reduce the number of unnecessary follow-up appointments and free up appointment capacity. Feedback from patients and clinicians suggested that both cohorts approved of the digital questionnaire.

Wider implementation of My Online Care

Following the success of the pilot study, NUH implemented My Online Care across a wider range of specialties in the form of designated digital clinic pathways for each respective patient questionnaire. All patients on these digital pathways receive automated notifications through the DrDoctor app to complete the digital questionnaires ahead of their scheduled follow-up appointments, depending on the type of questionnaire (opt-out model). For the pathways included within this evaluation questionnaires were sent three, seven, ten, or fourteen days ahead of appointments. The suitability of treatment or care pathways for the use of My Online Care was determined based on diagnoses, types of treatments and relatively low risk of deterioration. The digital questionnaires must be fully completed to allow the questionnaire to be submitted by a patient and are either reviewed at the appointment or used for a follow-up need assessment for *“replaces follow-up”* pathways. If questionnaires for the latter are not returned, the follow-up appointment is retained by default. The implementation of My Online Care was considered a smooth process across the different specialities, except for Enterology, which implemented My Online Care ahead of the automated approach of distributing questionnaires and experienced some initial teething issues as a result. The assessment of this wider implementation of My Online Care forms the focus of this evaluation.

1.3. Purpose of the current evaluation

An initial evaluation plan was developed by the South West AHSN. Unity Insights further refined the evaluation plan in collaboration with East Midlands AHSN and NUH in accordance with implementation timelines, data availability and feasibility. Clinical specialties suitable for the evaluation of the wider implementation of My Online Care were identified jointly with East Midlands AHSN and NUH. The aims of the evaluation were to:

1) Explore the effectiveness of the use of digital questionnaires (within the context of follow-up outpatient appointments) in different specialities, such as:
    a. Clinical Haematology
    b. Hepatology
    c. Neurology
    d. Oncology
    e. Paediatric Dermatology
2) Explore the experiences of patients using the solutions in terms of impact on their quality of life and impressions of treatment care and support.
3) Explore the impact of the use of digital questionnaires on staff workload and work experience of clinicians, administrative and managerial staff.
4) Understand what is needed to make this approach work effectively at scale.
5) Understand the impacts on the wider healthcare system.

From this analysis, the effectiveness and impact of My Online Care could be determined within multiple specialties to identify the most appropriate use case beyond the solution's original use within Oncology and understand how to appropriately upscale My Online Care.

2. Methodology

A mix of quantitative and qualitative data sources were used within the current evaluation:

- Activity data
- Clinical outcome data
- Patient survey
- Clinician survey
- Clinician interviews

The clinician survey and interviews were conducted by Unity Insights. All other data was obtained from relevant sources through post-hoc data collection and shared in non-identifiable or aggregated format by NUH, in accordance with data protection regulations and agreements.

2.1. Pathway selection

The evaluation aimed to assess the use of My Online Care across two types of pathways; those that use digital health questionnaires to replace appointments (*"replaces follow-up"* pathways) and those that are used to streamline patient data collection ahead of appointments *"reviewed at appointment"* pathways). The six digital pathways included in this evaluation have therefore been selected to include both pathway types and based on whether questionnaires had been used for a minimum of six months, with sufficient frequency of questionnaires having been sent to patients, to yield adequate sample sizes for analysis. The pathways included in this evaluation are detailed in Table 1.

Table 1: Specialties and their respective questionnaires that were examined within the current evaluation.

Specialty	Digital pathway	Use case	Launch date
Clinical Haematology	Clinical Haematology MGUS Questionnaire V.1	Replaces follow-up	16/12/2021
Hepatology	Hepatology HBV Hepatitis B Questionnaire V.2	Replaces follow-up	19/08/2021
Neurology	Neurology Headache Impact and Diary Questionnaire v.1	Reviewed at appointment	25/02/2021
Oncology	Oncology Head and Neck Post Treatment Questionnaire V.1	Replaces follow-up	12/04/2021
	Oncology Prostate Treatments Combined Questionnaire V.1	Replaces follow-up	17/05/2021
Paediatric Dermatology	Paediatric Dermatology Questionnaire V.3	Reviewed at appointment	17/06/2021

2.2. Activity data

Quantitative activity data was obtained from the DrDoctor patient platform and shared by NUH for each of the specialties and digital pathways. Due to technical and resource challenges, data was provided in the form of two separate activity data reports. The first dataset contained data from

January 2020 to October 2022 in form of aggregated monthly counts or averages. The second dataset included additional metrics for the time period September 2021 to March 2022 in form of total aggregated counts, averages and selected ratios.

The metrics provided by DrDoctor (DrDoctor, 2023) are defined as detailed below:

- **Forms assigned:** The volume of forms assigned to a patient (form is created and associated with a list of patients)
- **Form notifications sent:** The volume of forms sent to a patient
- **Form reminders sent:** The volume of reminders to complete the form sent to a patient
- **Forms completed:** The volume of forms completed by a patient (or a clinician in some instances)
- **Forms reviewed:** The volume of forms reviewed by a clinician with a resulting review outcome (only applicable to follow-up need assessments)
- **Follow-ups not needed:** Count of all forms with a review outcome that contains the phrase '*not needed*'
- **Average days to review:** For all follow-up need forms which have been completed and reviewed – the average time (in days) between the form completion date and the form reviewed date
- **Average days to complete:** For all forms which have been sent and completed – the average time (in days) between the form notification date and the form completion date
- **Patients contacted:** The number of unique patients who have been sent at least one form in the time period specified

2.3. Clinical outcome data

Due to data sharing limitations regarding patient-identifiable data, East Midlands AHSN facilitated the analysis of clinical outcome data through the provision of NUH-affiliated team resource. All data was provided in aggregated form to Unity Insights.

An analysis of outpatient activity was performed in two groups: *"replaces follow-up"* pathways (where questionnaires can yield an "*appointment not needed*" outcome) and *"reviewed at appointment"* pathways (no outcome is added to the DrDoctor system), consisting of four and two pathways, respectively (Table 1).

"Replaces follow-up" pathways

Questionnaire activity data was provided by DrDoctor in February 2023 and included patients with follow-up need questionnaire activity for the selected pathways' clinic codes from 1st January 2022

onwards. While the inclusion of all DrDoctor activity during the specified timeframe was intended, the data extract available at the time of analysis only included appointments for which a review outcome had been added to the DrDoctor system.

Outpatient appointment activity, including those appointments that were cancelled after the questionnaire was sent and those who *"Did Not Attend"*, was extracted from the Medway PAS for the period between 1st January 2022 and 30th June 2022, to match the dates of the questionnaire review outcomes being added to DrDoctor during this period. As the timeframe between the questionnaire notification being sent to a patient and the patient's appointment date differed for pathways within this group and the evaluation aimed to assess data for patients who had the opportunity to respond to a questionnaire, any cancelled appointments prior to the individual questionnaire notification dates were excluded from the analysis (i.e., the 3 days for Oncology Prostate Treatments Combined, 10 days for Hepatology HBV Hepatitis B, and 14 days for Clinical Haematology MGUS, and Oncology Head and Neck Post Treatment).

Medway PAS appointment activity was linked to the DrDoctor questionnaire activity. Response groups were coded as *"Non-response - review outcome added"* where a match was found in DrDoctor dataset but *"Completed date"* was missing, *"Responded - review outcome added"* where a match was found in DrDoctor dataset with *"Completed date",* and *"Response unknown - no review outcome added"* where there was no match in the DrDoctor dataset. It was noted that around 3% of the appointments had a review outcome added 1 or 2 days before their appointment, so there is a small risk that some appointments at the beginning of the time period may not have been included in the DrDoctor dataset provided.

The data flow for the *"replaces follow-up"* pathways details the inclusion and exclusion of appointment data and the breakdown by specialty Figure 2.

"Reviewed at appointment" pathways

Questionnaire activity data was provided by DrDoctor in February 2023 and included patients with respective questionnaire activity for the selected pathways' clinic codes between 1st January 2022 and 30th June 2022. Outpatient appointment activity, including those appointments that were cancelled after the questionnaire was sent and those who *"Did Not Attend",* was extracted from the Medway Patient Administration System (PAS) for the period between 8th January 2022 and 1st July 2022. These data accounted for questionnaires being sent to patients automatically seven days prior to an appointment, and for appointments taking place the day after the seven-day response period. PAS data was linked to the DrDoctor data based on patient identifiers and specialty, with the PAS appointment dates being matched to the DrDoctor "*FormDueDate*". The data flow for the non-appointment-replacing questionnaire pathways (*"reviewed at appointment"*) details the inclusion and exclusion of appointment data and the breakdown by specialty (Figure 3).

Analysis

Demographic data were extracted from Medway PAS including the patient's postcode at the time of the appointment, which was linked to the 2019 Index of Multiple Deprivation (IMD) dataset to

calculate the IMD quintile (Ministry of Housing, Communities, & Local Government, 2019; Office for National Statistics, 2022). The Charlson co-morbidity index (CCI) score was calculated for any inpatient episodes occurring at NUH within one year prior to their outpatient appointment date. Where there was more than one inpatient episode, the maximum score was taken. The original weights by Charlson et al., (1987), a method of using International Classification of Diseases (ICD) diagnosis codes to categorise comorbidities of patients, was calculated using the R package 'comorbidity' (Gasparini et al., 2023).

Data was aggregated at appointment level rather than patient level, to capture a more comprehensive picture of attendances, cancellations, and "*did not attend*" occurrences, where patients may have had multiple appointments. Aggregated counts and percentages were provided for the number of appointments for patients receiving a questionnaire, number of responses per patient, number of appointments per patient, gender, age band, ethnic group, IMD quintile, and CCI by specialty and response status ("*responded*" versus "*no response*"). Due to data sharing requirements, small number suppression was applied to counts less than 5, with zeroes unchanged and all other values rounded to the nearest 5. Percentages were calculated based on rounded values and, where numbers were small, percentages may not reflect actual percentages.

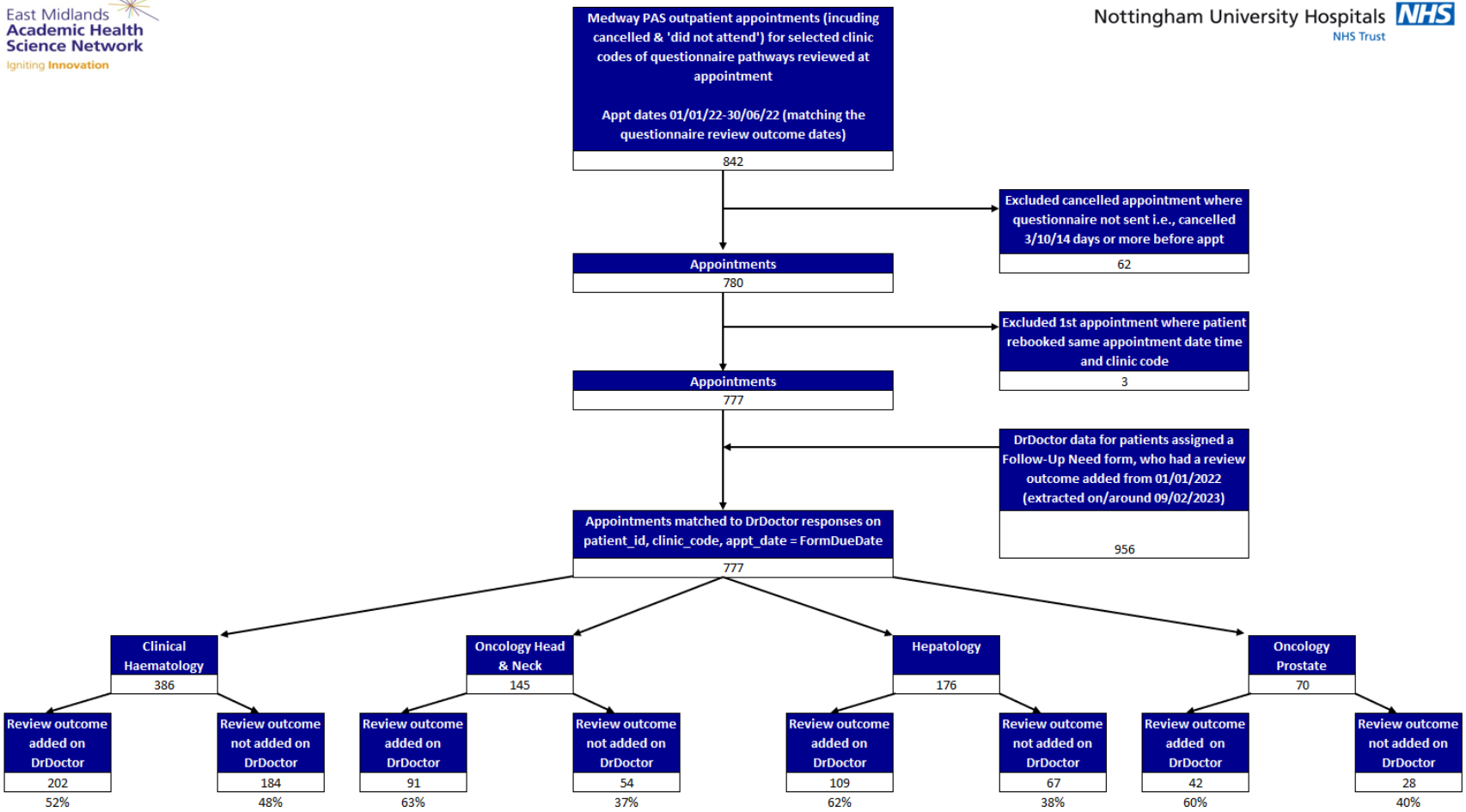
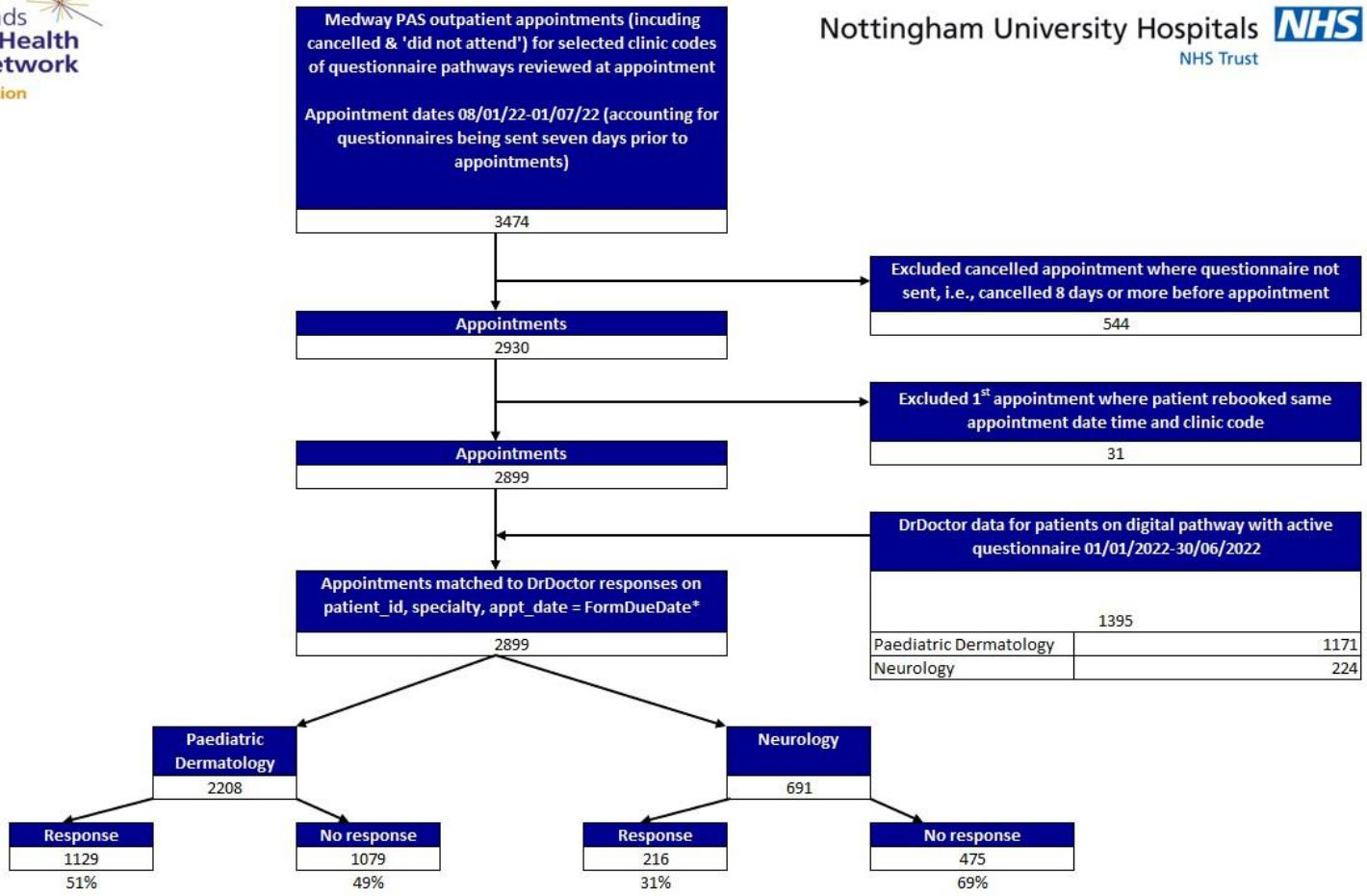


Figure 2. Analysis data flow for clinical outcomes of patients on *"replaces follow-up"* questionnaire pathways. All data (i.e., review outcome added and review outcome not added) was excluded from the evaluation as available data points were insufficient for conclusive interpretation (see further explanation in the *"Replaces follow-up"* pathways results section).



*In instances where patients had more than one appointment booked on same day within the same specialty, the questionnaire response has been mapped to both appointments (n=4).

Figure 3. Analysis data flow for clinical outcomes of patients on *"reviewed at appointment"* questionnaire pathways. "Response" or "no response" refers to whether a questionnaire was completed by a patient for the respective appointment.

2.4. Surveys

Surveys were created by Unity Insights and aimed to comprehend staff and patient perspectives and experiences when using My Online Care. Patient and clinician surveys were distributed across all digital pathways included in the evaluation (Table 1) and responses were collected anonymously.

Patient survey

Patients who accessed the My Online Care service between 1st July 2022 and 31st December 2022 were invited to complete a survey assessing views on technical delivery, implementation, and user experience of My Online Care using Likert-scale and free-text questions (Appendix B: Patient survey). The patient survey was distributed to patients through the DrDoctor patient platform at NUH between February 2023 and April 2023. For patients of the Paediatric Dermatology pathway, guardians received the survey, as is the case with digital questionnaires. Data was analysed through a combination of descriptive statistics for multiple choice or Likert scale questions and thematic analysis for free-text responses.

Clinician survey

Clinicians who had used My Online Care were invited to complete a survey assessing elements such as technical delivery, implementation, safety, and user experience of My Online Care using Likert-scale and free-text questions. The survey was created in SurveyMonkey and distributed to relevant clinicians by the local programme manager at NUH between January 2023 and March 2023 (Appendix A: Clinician survey). Clinicians had the option to provide personal details to participate in a further interview. Data was analysed through a combination of descriptive statistics for multiple choice or Likert scale questions and thematic analysis for free-text responses.

2.5. Clinician interviews

Semi-structured Interview questions were designed by Unity Insights based on previously collected survey responses to explore key themes surrounding My Online Care in greater depth (Appendix C: Clinician interview questions). The interviews, lasting approximately 15 minutes, were conducted with clinicians who had used My Online Care. Personal information for interview arrangements was collected optionally during clinician surveys with explicit consent and in accordance with data protection regulation and agreements. Interviews (n=2) were held using Microsoft Teams and data was analysed using thematic analysis to identify common themes between interviewees.

3. Results

3.1. Activity data

Data considerations

Activity data regarding the use and outcomes of digital health questionnaires was delivered in two separate datasets. Dataset 1 contained aggregated monthly activity metrics for the time period January 2020 until October 2022, whereas dataset 2 covered September 2021 to March 2022 and contained only total aggregated data for the entire period. Some of the activity metrics were contained in both datasets, whereas others were present in only dataset 1 or dataset 2. Due to a high variability in questionnaire volumes between pathways, metrics were converted into ratios relative to the number of assigned or completed forms, as appropriate.

The generalisability of insights generated from discrete metrics was established through the comparison of metrics contained in both datasets. Figure 4 shows the proportions of assigned questionnaire volumes across pathways. The observed distribution of assigned questionnaire volumes follows a similar trend between the datasets, with the pathways with questionnaires *"reviewed at appointment"* recording the majority of questionnaires (83% and 84% for dataset 1 and dataset 2 respectively). There is a slight difference within this pathway grouping, with dataset 1 showing that 23% of assigned questionnaire volumes are attributed to the Neurology Headache Impact and Diary pathway and 60% to Paediatric Dermatology and dataset 2 displaying 18% and 66% for these pathways respectively. The remainder of pathways is represented approximately evenly between the datasets, with differences of no more than one percentage point.

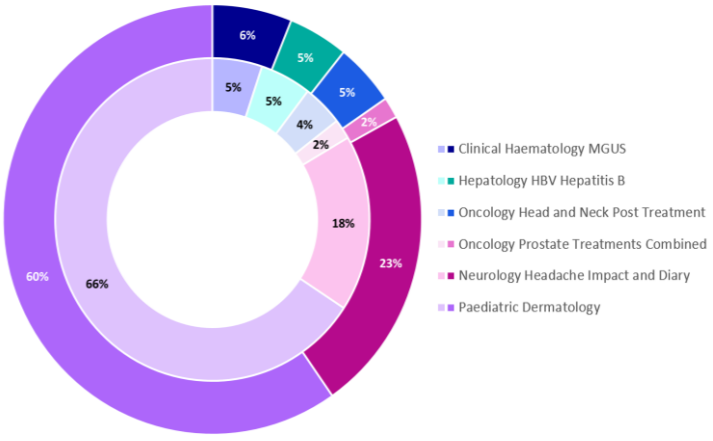


Figure 4. Dataset comparison for the breakdown of assigned forms by pathway. The outer circle (darker colours) represent dataset 1 (January 2020 - October 2022), the inner circle shows dataset 2 (September 2021 - March 2022).

A comparative view of the activity metric ratios contained in both datasets, shown in Figure 5, verifies a high level of congruence between datasets 1 and 2. Differences between the datasets for most metrics are only marginal (<±5%). A more pronounced difference was seen in the number of form reminders sent for the Hepatology pathway, which is 10 percentage points lower in dataset 2.

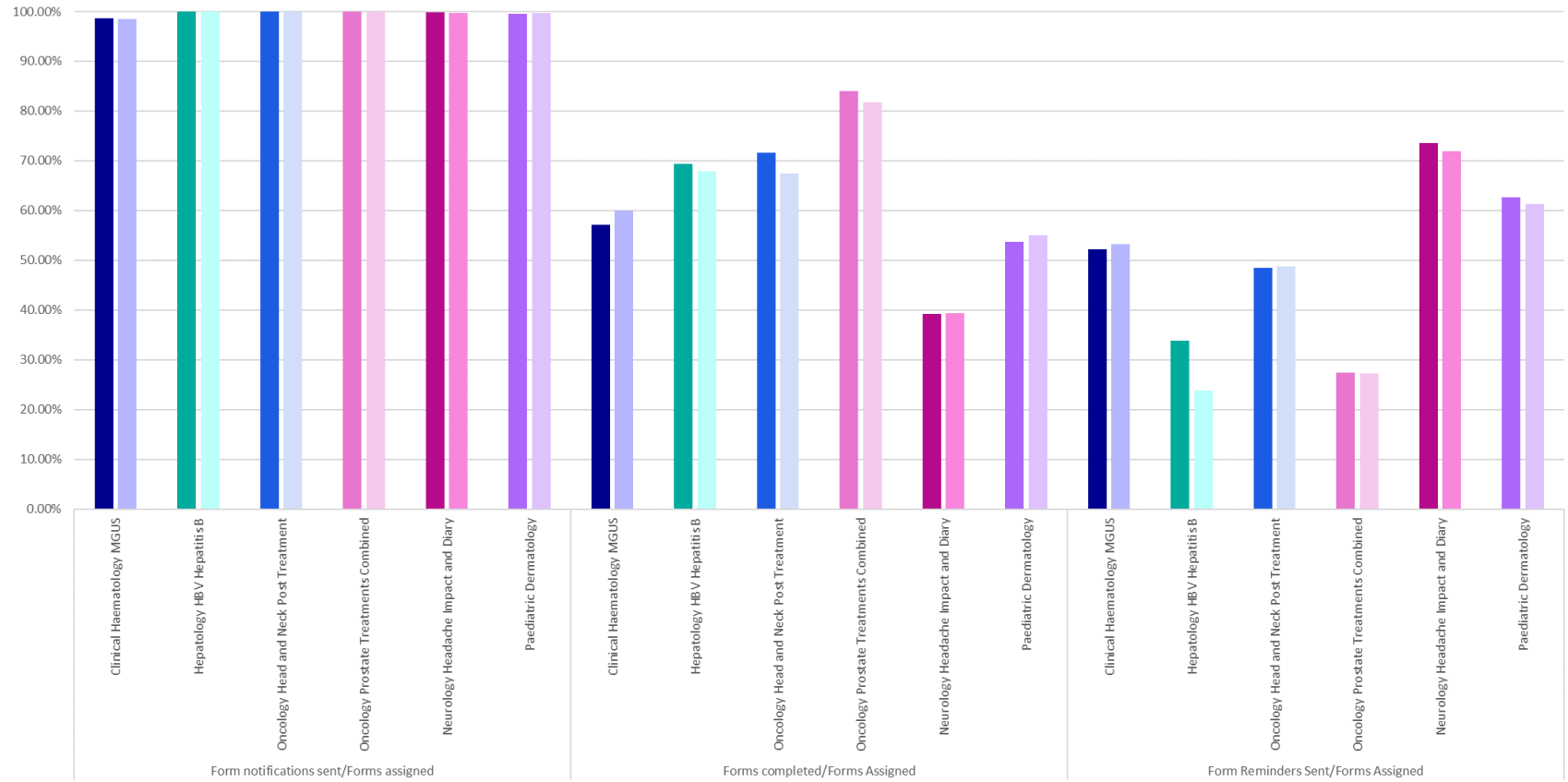


Figure 5. Dataset comparison of available activity ratios by pathway. Darker colours (left column for each ratio and pathway) represent dataset 1 (January 2020 - October 2022) and lighter colours (right for each ratio and pathway) show dataset 2 (September 2021 - March 2022).

An assessment of the days taken for a questionnaire to be reviewed by a clinician, further shows that this metric also behaves similarly across applicable pathways (Figure 6). The review times across three out of four pathways differ no more than half a day or 7% between datasets 1 and 2. The Clinical Haematology pathway exhibits the largest difference of one day or 12% between the datasets.

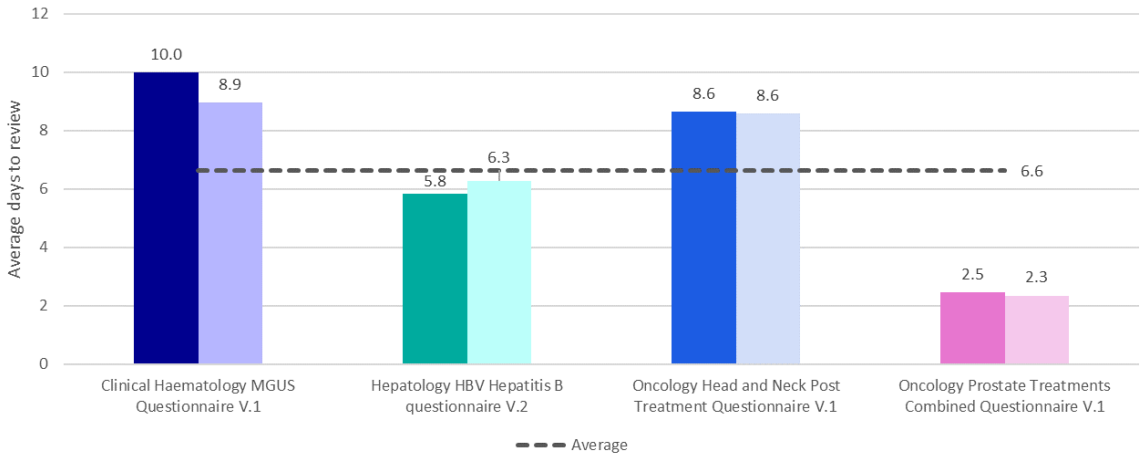


Figure 6. The average number of days taken by clinicians to review a patient questionnaire by pathway for datasets. Darker colours (left column for each ratio and pathway) represent dataset 1 (January 2020 - October 2022) and lighter colours (right for each ratio and pathway) show dataset 2 (September 2021 - March 2022).

All activity data in the following 'Insights' sub-section refers to the dataset covering the period January 2020 to October 2022, unless otherwise specified.

Insights

Table 2 depicts the number of months of available data alongside the activity metrics for each examined pathway type and individual questionnaire pathway, expressed as monthly averages. The average number of months of data collection since implementation was 15.3 (ranging from 11 to 20) for *"reviewed at appointment"* pathways and 20 (ranging from 19 to 21) for *"replaces follow-up"* pathways. The activity level recorded for *"reviewed at appointment"* pathways was considerably higher across all applicable metrics compared to *"replaces follow-up"* pathways, with volumes of assigned forms, notifications sent, reminders sent, and forms completed being 5.5-11.1 times higher for the former pathway type. The monthly average volume of assigned questionnaires for *"reviewed at appointment"* pathways was 170.8 (0-388) compared to 23.1 (1-73) for *"replaces follow-up"* pathways, representing 83% of the total volumes. On an individual pathway level, activity volumes across all metrics were highest for the Paediatric Dermatology Questionnaire. This pathway represented 60% of the total assigned forms, followed by Neurology Headache Impact and Diary (23.2%), whereas the *"replaces follow-up"* pathways ranged from 1.6-6.2% of the total assigned forms, with Oncology Prostate Treatments Combined having the lowest representation.

Table 2: Number of months of collected data and activity metrics by digital pathway, presented as monthly average and range for individual pathways and as averages across pathways for pathway groupings. Metric definitions are shown in section Activity data.

Digital pathway	Months	Forms assigned	Form notifications sent	Form reminders sent	Forms completed	Forms reviewed	Follow-ups not needed
Replaces follow-up	15.3	23.1 (1-73)	23 (1-72)	10.1 (0-36)	15.5 (1-46)	16.4 (0-55)	1.1 (0-12)
Clinical Haematology MGUS Questionnaire V.1	11	46.1 (23-73)	45.5 (23-72)	24.1 (6-36)	26.4 (10-46)	34.6 (10-55)	0.8 (0-3)
Hepatology HBV Hepatitis B questionnaire V.2	16	23.9 (2-43)	23.9 (2-43)	8.1 (0-19)	16.6 (1-26)	16 (0-25)	0.9 (0-12)
Oncology Head and Neck Post Treatment Questionnaire V.1	20	19.4 (5-35)	19.4 (5-35)	9.4 (2-21)	13.9 (2-23)	13.5 (3-22)	2.2 (0-6)
Oncology Prostate Treatments Combined Questionnaire V.1	14	9.4 (1-15)	9.4 (1-15)	2.6 (0-6)	7.9 (1-11)	6.9 (1-11)	0 (0-0)
Reviewed at appointment	20	170.8 (0-388)	170.2 (0-387)	112.3 (0-248)	84.8 (0-229)	n/a	n/a
Neurology Headache Impact and Diary Questionnaire V.1	21	91.1 (59-115)	90.9 (59-114)	67 (47-95)	35.7 (21-46)	n/a	n/a
Paediatric Dermatology Questionnaire V.3	19	258.9 (0-388)	257.8 (0-387)	162.4 (0-248)	139 (0-229)	n/a	n/a

Implementation and seasonality

The volumes of assigned forms appear to have reached steady levels, defined as having reached the average activity without further sustained growth, across all pathways by month two of the implementation, except for Paediatric Dermatology, which exhibited the largest volumes but also high variability in monthly numbers (0-388) throughout the evaluation period (Figure 7). When viewed by calendar rather than implementation months, a pattern of reduced form assignments around periods coinciding with extended school holidays of two or more weeks can be seen (Figure 8). This is more readily visible for the year 2022 compared to 2021, and most pronounced for the Paediatric Dermatology pathway, with the Oncology pathways being least affected by this pattern.

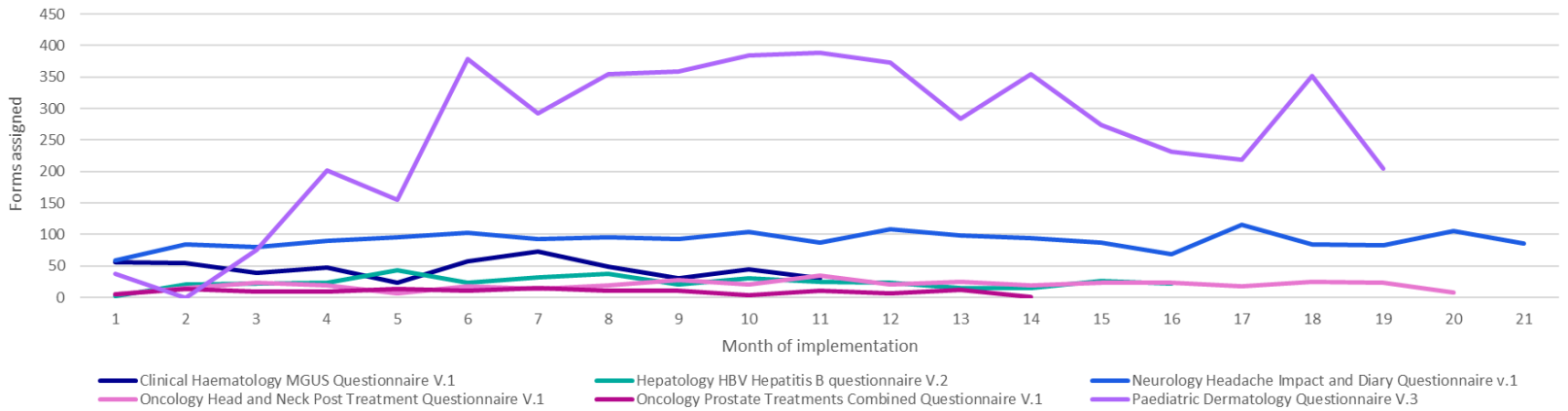


Figure 7. Number of forms assigned by digital pathway and month of implementation.

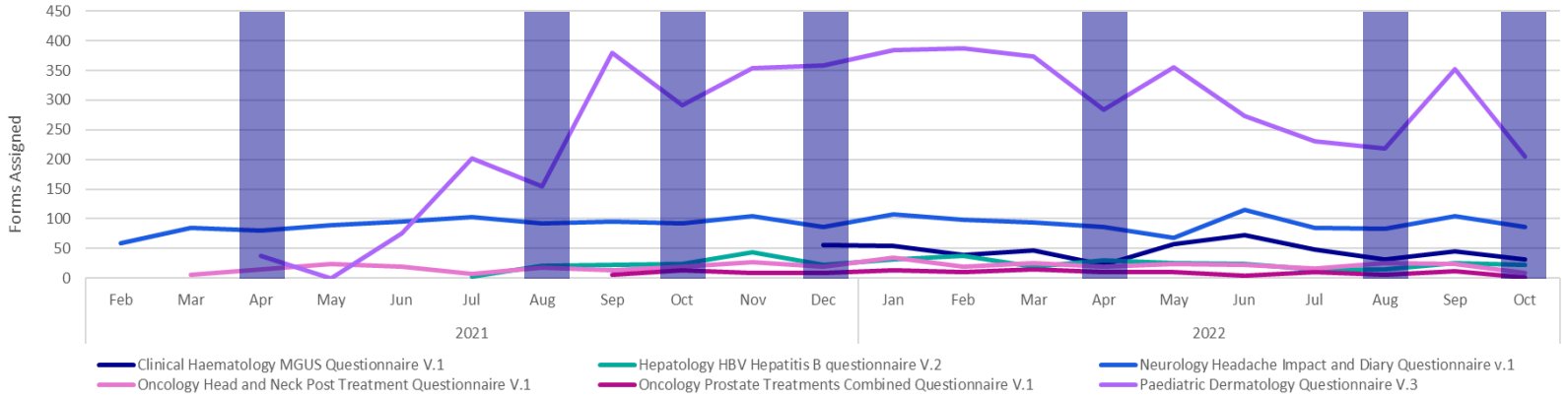


Figure 8. Number of forms assigned by digital pathway over time. Months with two or more weeks of East Midlands school holidays are highlighted in blue.

Activity ratios

As activity volumes differed greatly between pathways, activity metrics were converted into ratios relative to the number of assigned forms or the completed forms, as appropriate, to allow for a direct comparison of pathway-specific activity.

The proportion of unique patients recorded as contacted on the DrDoctor system, relative to the number of assigned forms, is shown in Figure 9 based on dataset 2. On average, the proportion of unique patients contacted was 57%. Among *"replaces follow-up"* pathways, the proportion of unique patients contacted was generally high (93%-96%), other than for the Oncology Prostate Treatments Combined pathway, which recorded only 42% of unique patients as contacted. The proportion of unique patients contacted within *"reviewed at appointment"* pathways was 51% for both Neurology and Paediatric Dermatology. There was no apparent relationship between the pattern observed for this metric and the activity ratios shown in Figure 10.

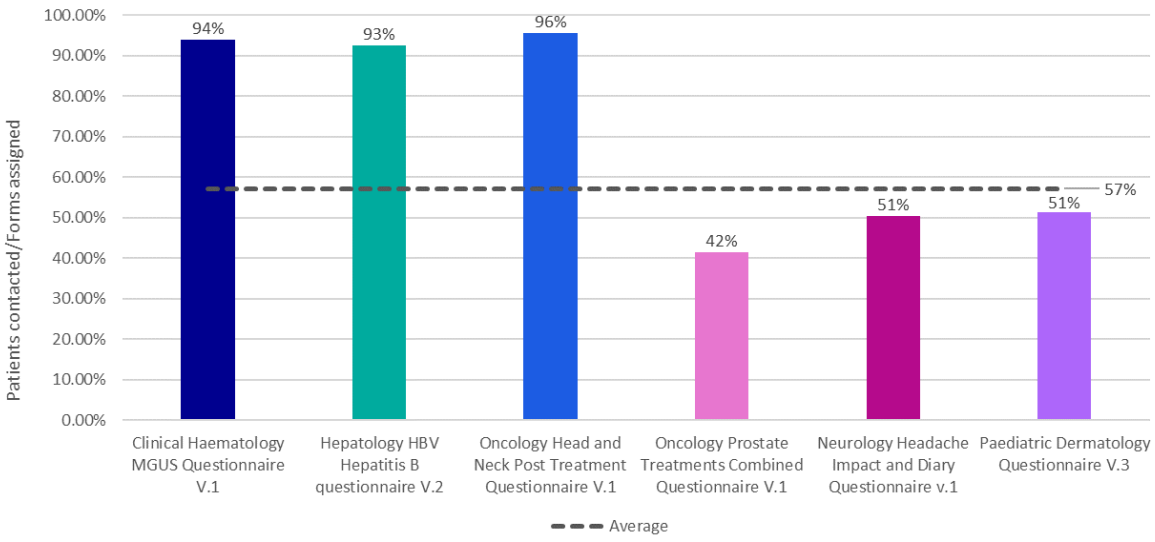


Figure 9. The proportion of unique patients contacted relative to the number of forms assigned by pathway, derived from dataset 2.

The overall activity ratios for each pathway are shown in Figure 10. Nearly all patients with assigned forms also received a form notification (98.6-100%). The proportion of forms requiring a reminder to be sent, and forms completed are highly variable across pathways (34-74% and 39-84% for the respective metrics), with a partial inverse relationship between these metrics. Completion rates show an average of 53% and are generally higher for *"replaces follow-up"* pathways (67%) compared to those reviewed at appointment (50%), with the highest completion rates seen in the two Oncology pathways (72% for Head and Neck Post Treatment and 84% for Prostate Treatments Combined). Form review rates are relatively constant across pathways, averaging at 71% for the *"replaces follow-up"* pathways to which this metric is applicable. The highest review rate is seen in Clinical Haematology with 73% and the lowest in Hepatology with

67%. The average proportion of follow-ups not needed relative to the number of completed questionnaires was 7.1% within *"replaces follow-up"* pathways, ranging from 0% in Oncology Prostate Treatment Combined to 15.9% in the Oncology Head and Neck pathway.

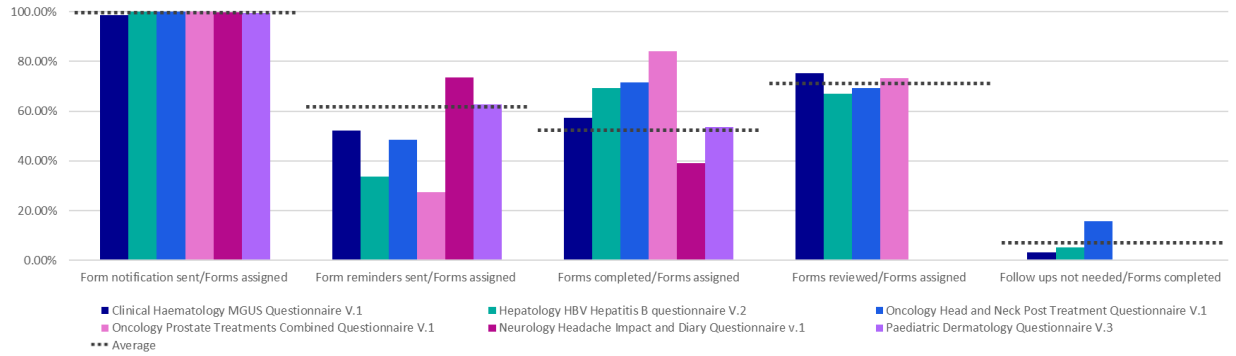


Figure 10. The proportion of form notifications sent, reminders sent, forms completed, and reviewed compared to forms assigned, and the proportion of follow-ups not needed compared to forms completed.

Figure 11 shows selected activity ratios over time. The proportion of assigned forms for which a reminder had been sent (a) appears to be highly variable between and within pathways, ranging from 0-100%. *"Reviewed at appointment"* pathways exhibit a relatively steady pattern, in alignment with their larger sample sizes (see Figure 8) but also the highest proportions in form reminders sent (42-83%), whereas the Hepatology pathway, and both Oncology pathways show the largest variability. In comparison, completion (b) and reviewed rates (d) are only moderately variable with no apparent pattern of seasonality, except a pronounced reduction in forms reviewed across pathways in May 2022. Further, the Oncology pathways demonstrate a slight increase in reviewed rates over time. The proportion of "follow-up not needed" outcomes (d), relative to the number of completed forms, is predominantly consistently small to moderate (0-8%). The Oncology Head and Neck pathway displays a moderate and consistent level of variability (0-43%) in alignment with its small sample size. The Hepatology pathway showed a marked increase to 86% in August 2021, during its second month of implementation, but rapidly returned to a sustained low ratio of *"follow-up not needed"* outcomes (0-5%).

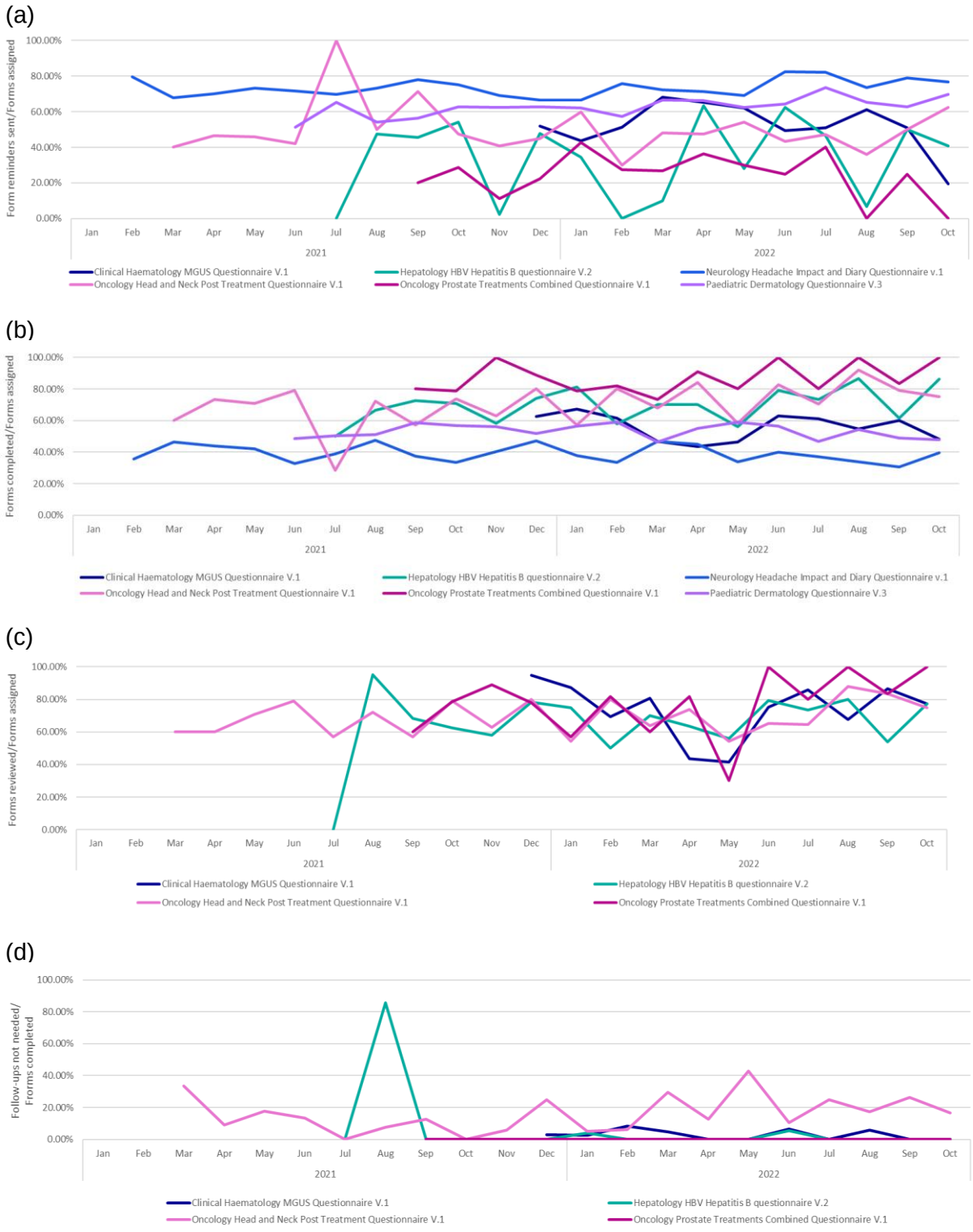


Figure 11. Proportion of assigned forms, (a) for which form reminders were sent, (b) that were completed and (c) reviewed, and (d) proportion of completed forms with a *"follow-up not needed"* outcome by digital pathway over time by pathways over time. Reviewed status and *"follow-up not needed"* outcomes are only applicable to *"replaces follow-up"* pathways.

Activity durations

Figure 12 highlights the average days taken for a patient to complete an assigned digital health questionnaire across the different pathways. This data was derived from the dataset 2 (September 2021 to March 2022). On average, patients took 3.3 (0.7-5.4) days to complete questionnaires. The average completion time for *"replaces follow-up"* and *"reviewed at appointment"* pathways showed no meaningful difference (3.2 and 3.5 days respectively). Notably, differences in *"replaces follow-up"* pathways are most pronounced, with completion times for Clinical Haematology and Oncology Head and Neck Post Treatment being well above average at 5.4 and 4.7 days respectively, and Hepatology HBV Hepatitis B and Oncology Prostate Treatment recording the lowest completion times of 0.7 and 2.2 days respectively.

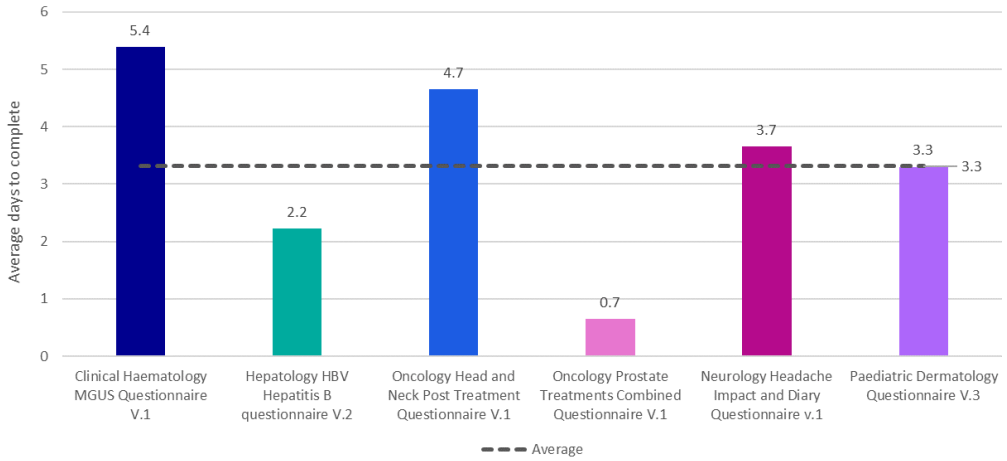


Figure 12. Average days taken by patients to complete an assigned digital health questionnaire, derived from dataset 2.

The number of days taken for a form to be reviewed by a clinician once completed by pathway can be seen in Figure 6. This metric is only applicable to *"replaces follow-up"* pathways. For optimal comparability with the average days to complete a form, days to review are reported from dataset 2. The average number of days for review was 6.6 days across pathways (for dataset 2 as well as across datasets). At individual pathway level, the days to review a form were highest for Clinical Haematology (10), followed by Oncology Head and Neck Post Treatment (8.4) and lowest for Oncology Prostate Treatments Combined (2.5) with Hepatology HBV Hepatitis B performing closes to the pathway average (5.8).

These differences in days to complete and to review between pathways were found to be proportional to the form dispatch period for the individual pathways, i.e., the number of days from form notification to the follow-up appointment, with exception of the Hepatology pathway, which recorded a low average completion time (0.7) relative to the dispatch period (10), as seen in Figure 13.

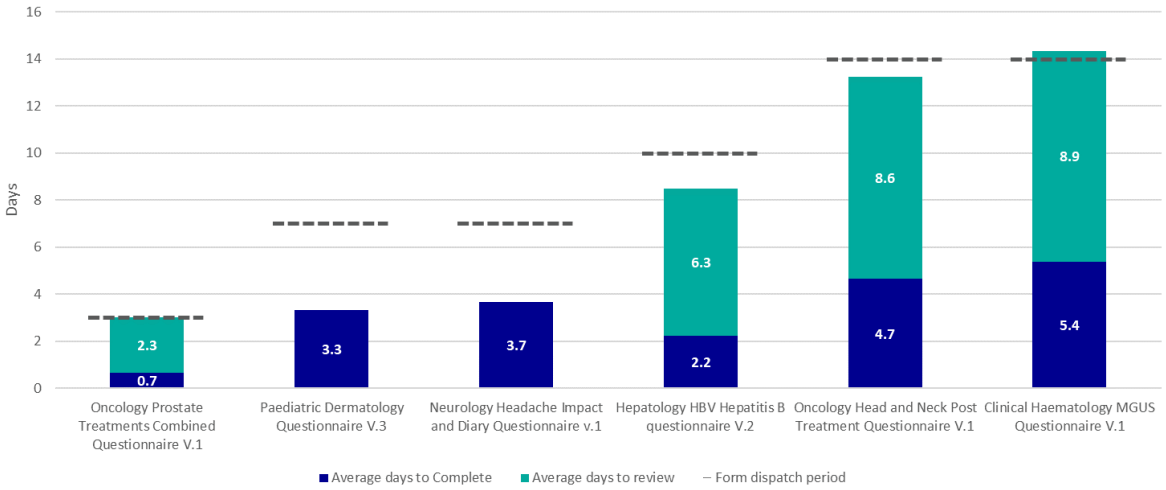


Figure 13. Average time taken for form completion and form review compared to the form dispatch period, derived from dataset 2.

3.2. Clinical outcome data

This section describes the results of the analysis of clinical outcome data provided to Unity Insights by NUH. Presented appointment counts generally include any appointments within the specified pathways during the assessments period, including those that were attended, cancelled after the questionnaire notification was sent to a patient, or those that were recorded as *"DNA".* Full details of inclusion and exclusion criteria for this data set can be found in the Clinical outcome data section.

To ensure data protection compliance for potentially identifiable data from small sample sizes, counts smaller than or equal to five were suppressed, zeroes unchanged, and all other counts were rounded to the nearest five. Percentages were calculated based on rounded values and where numbers were small percentages may not reflect actual percentages and may therefore not sum to 100%. Sample sizes may deviate slightly, where small sample suppression was applied. The applied methodology has been highlighted in relevant sections and figure captions as appropriate.

"Replaces follow-up" pathways

Clinical outcome data was provided for Clinical Haematology (n=386) Hepatology (n=176), Oncology Head and Neck (n=145), and Oncology Prostate (n=70). The data analysis revealed that for a large proportion of appointments associated with digital health questionnaires (n=770), no questionnaire review outcome had been recorded on the DrDoctor system for 38-48%, depending on the pathway (Figure 14). For Clinical Haematology, approximately half of the appointment data (48%) had no recorded review outcomes. For three out of four pathways (Hepatology, Oncology Prostate and Oncology Head and Neck), where review outcomes had been documented, recorded metrics were either zero or supressed for non-responders.

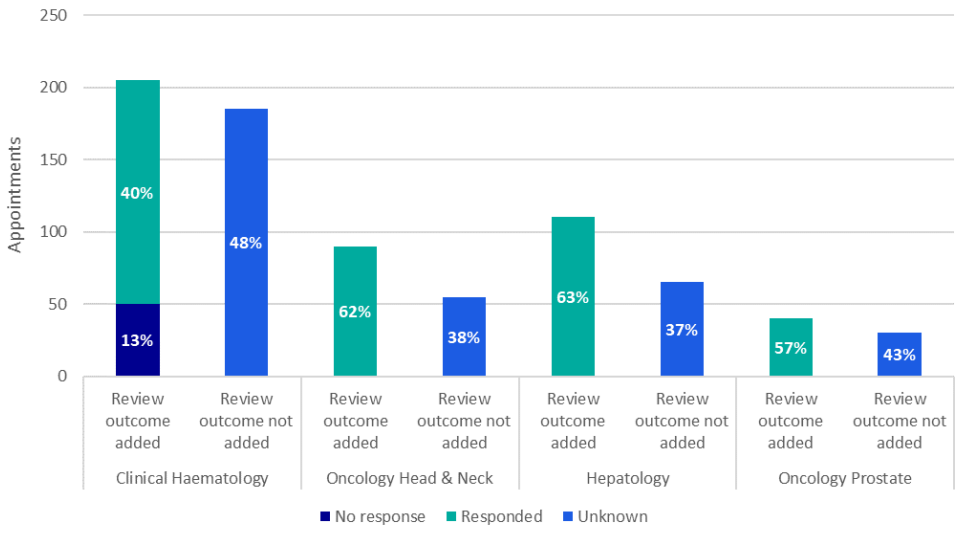


Figure 14. Overview of clinical outcome data availability for *"replaces follow-up"* pathways with a large proportion of unrecorded questionnaire outcomes. Counts smaller than or equal to five were suppressed, zeroes unchanged, and all other counts were rounded to the nearest five. Percentages were calculated based on rounded values and where numbers were small percentages may not reflect actual percentages and may therefore not sum to 100%.

Figure 15 shows the documented outcomes across *"replaces follow-up"* pathways, where these were available (n=445). As stated above, the depicted breakdown of outcomes may not be representative of the entire patient cohort. It was, however, noted that data for outcomes other than a follow-up appointment being needed or not needed, such as a patient being called by a clinician, was recorded to be zero for three out of four pathways. Small number suppression was applied to the Oncology Head & Neck pathway for this outcome type, representing a total volume of up to five outcomes. This low number could be an underrepresentation and be indicative of a bias against "other actions" (e.g., a patient being called by a clinician) being recorded within the DrDoctor system.

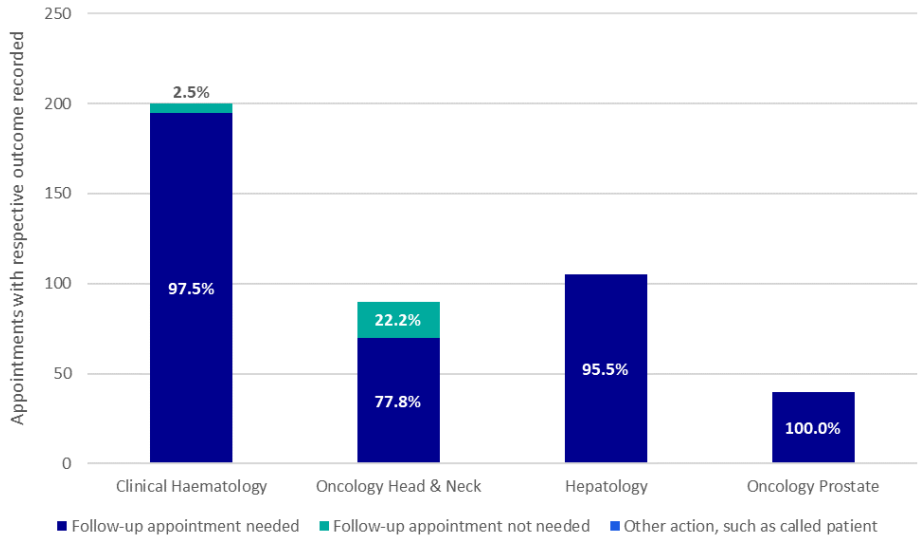


Figure 15. Breakdown of documented outcomes associated with digital pathway appointments. Counts smaller than or equal to five were suppressed, zeroes unchanged, and all other counts were rounded to the nearest five. Percentages were calculated based on rounded values and where numbers were small percentages may not reflect actual percentages and may therefore not sum to 100%.

"Reviewed at appointment" pathways

The clinical outcome data analysis explored appointment attendance and demographics by questionnaire response status across *"reviewed at appointment"* pathways for patients who responded to a health questionnaire's notification (i.e., those who completed a questionnaire, and those who did not respond). A total of 2,899 appointments were recorded across Paediatric Dermatology (n=2,208) and Neurology (n=691). It should be noted that digital health questionnaires for paediatric patients may be sent to and completed by a guardian rather than a patient. Therefore, conclusions about the association of assessed metrics and the response status may be limited and not generalisable to other pathways.

Below is a breakdown of the number of individual questionnaire responses received per unique patient (n=1,664) throughout the assessed period across both pathways (Figure 16). Most patients (42%) responded to a single questionnaire. An equivalent proportion of patients (41%) never responded to any questionnaire. A further 14% responded to 2 questionnaires, and only 2% and 1% responded to three, and four or more questionnaires respectively.

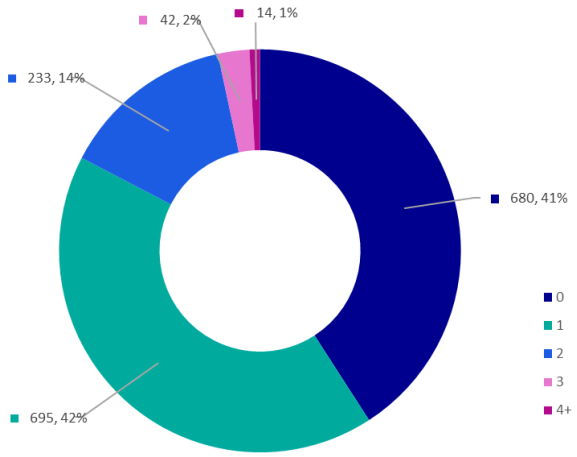


Figure 16. Breakdown of unique patients by number of responses to digital health questionnaires across *"reviewed at appointment"* pathways.

Number of appointments per patient

Figure 17 shows the number of appointments per patient and per referral for Paediatric Dermatology (n=2208) and Neurology (n=690). Within both pathways, most patients had one to two appointments within the assessed period. Patients having three appointments was more common in Paediatric Dermatology compared to Neurology. The split of the number of appointments is approximately even between patients who responded (49%) and those who did not respond (51%) to digital health questionnaires for the Paediatric Dermatology pathway, with a trend of patients with more appointments being less likely to respond. Within Neurology, responses were received for approximately one third (31%) of appointments, with a comparable breakdown for patients with one and two appointments. The response rate for patients with three appointments within this pathway is shown as zero due to small number suppression.

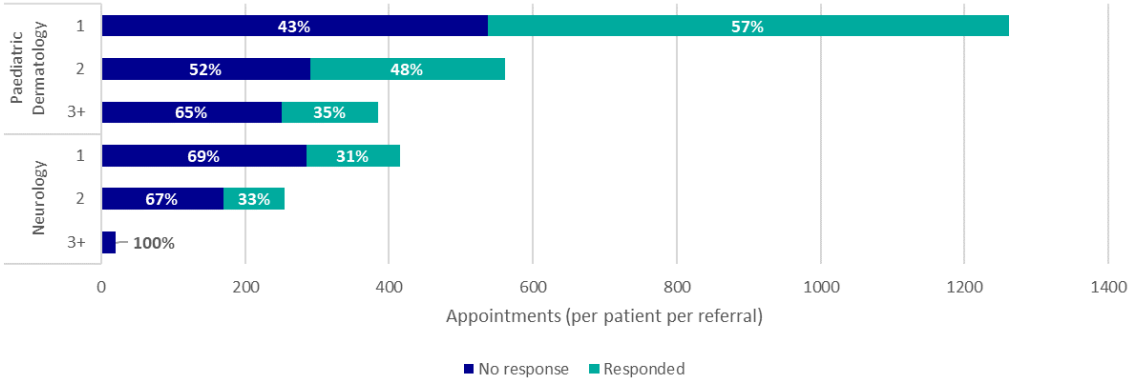


Figure 17. The number of appointments per patient and referral for *"reviewed at appointment"* pathways. Counts smaller than or equal to five were suppressed, zeroes unchanged, and all other counts were rounded to the nearest five. Percentages were calculated based on rounded values and where numbers were small percentages may not reflect actual percentages and may therefore not sum to 100%.

Appointment attendance

Attendance data for appointments within Paediatric Dermatology (n=2,208) and Neurology (n=690) shows the breakdown of attended, cancelled (by hospital or patient), and DNA appointments between responders, and those who did not respond to the digital health questionnaire notification (Figure 18). The majority of appointments were attended by 79% and 89% of patients in Paediatric Dermatology and Neurology respectively. Cancellations were recorded for 13% and 8% of appointments within these pathways, and DNAs for 8% and 2%. The proportion of responders was generally higher in Paediatric Dermatology (52%) compared to Neurology (31%). Within both pathways, the representation of responders was above average among appointments which were attended (60% and 34% respectively), while the proportion of non-responders was between 75% and 91% for cancelled appointments and those recorded as “DNA”. For the Neurology pathway, small number suppression was applied for responders with cancelled appointments or “DNA” status.

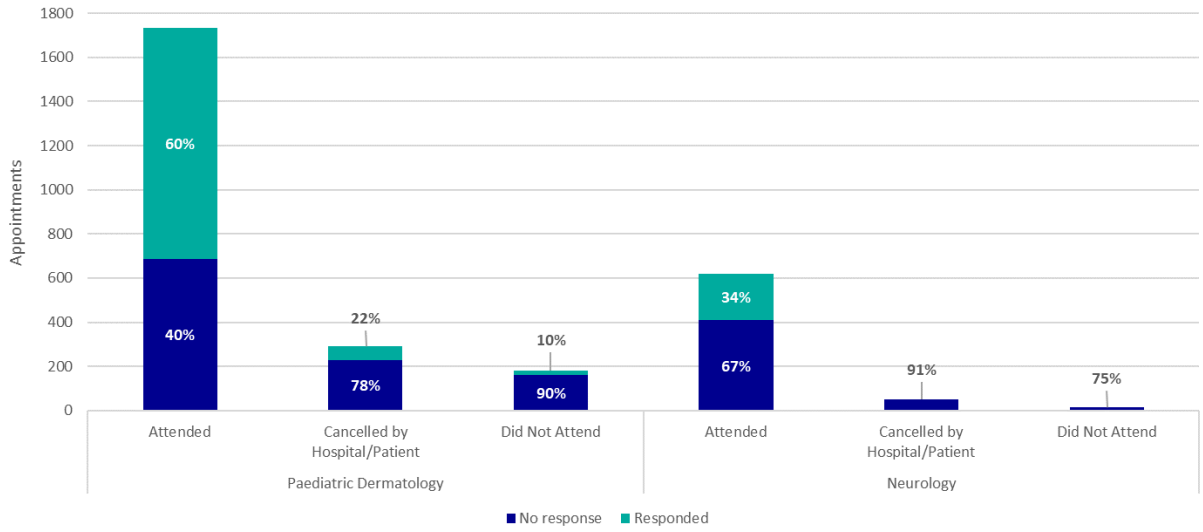


Figure 18. The number of appointments by attendance and response status to the digital health questionnaire for *“reviewed at appointment”* pathways. Counts smaller than or equal to five were suppressed, zeroes unchanged, and all other counts were rounded to the nearest five. Percentages were calculated based on rounded values and where numbers were small percentages may not reflect actual percentages and may therefore not sum to 100% where small number suppression was applied.

Gender

The number of appointments by patient gender and response status for digital health questionnaires is shown in Figure 19. Within Paediatric Dermatology (n=2,208) the split between female (51%) and male (49%) was approximately even, while the representation was 78% and

23% for Neurology respectively. For Paediatric Dermatology, the proportion of appointments associated with a responded status was approximately half and only slightly higher slightly higher in females (55%) compared to males (47%). While there was a smaller proportion of appointments with a responded status in Neurology (31%), the gender split followed a similar trend, being slightly higher in females (33%) compared to males (27%).

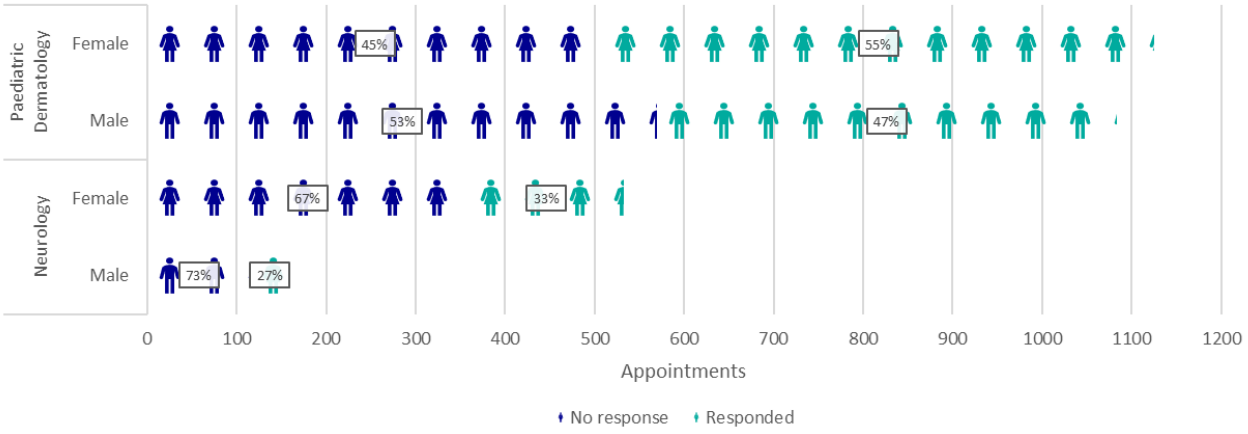


Figure 19. The number of appointments by gender and response status to the digital health questionnaire for *"reviewed at appointment"* pathways.

Age

A summary of response status for digital health questionnaires by age for Paediatric Dermatology and Neurology is shown in Figure 20. Age band histograms and descriptive statistics were provided by NUH. The pathways inherently include distinct patient cohorts, and the age distributions between the pathways therefore differ starkly, with the patient cohort for Paediatric Dermatology being considerably younger than the Neurology pathway cohort. No meaningful difference in response type by age was observed for Paediatric Dermatology (responded status: 51%, age: $\mu = 10.2$, $SD = 5.66$; $m = 12$; $IQR = 10$ compared to no response: 49%, age: $\mu = 10.2$, $SD = 5.49$, $m = 11$, $IQR = 9$). For Neurology (n=691), the larger proportion of appointments with a "no response" status (69%) was associated with a higher patient age (age: $\mu = 56.7$, $SD = 15.8$) compared to the "responded" status (31%) for which the patient age was approximately 10 years lower (age: $\mu = 46.1$, $SD = 14$). Median and IQR were unavailable for the latter.

Figure 20. Number of appointments (count) by response status to digital health questionnaires and age of patient for *"reviewed at appointment"* pathways. Histograms were provided by NUH.

Ethnicity

Figure 21 displays the representation of ethnicities according to digital health questionnaire response status by the number of appointments. In both Paediatric Dermatology (n=2,208) and Neurology (n=690), the patient cohorts are reported to be predominantly white (57% for Paediatric Dermatology and 89% for Neurology). While there is considerable representation of Asian or Asian British (11%), black or black British (7%) mixed (7%), and other ethnic groups (9%) in Paediatric Dermatology, 10% have been reported as not stated or unknown. Where the ethnicity was known, the average proportion of those with response (51%) and those without response (49%) is relatively even across ethnicities. At individual ethnicity group level, the proportion of those who responded is above average in white (54%), black or black British (50%) and other ethnic groups (51%) compared to Asian or Asian British (44%) and mixed ethnicities (43%). Within the Neurology pathway there is comparably little representation of non-white ethnicities (11%, 1-2% per group). Due to the small sample sizes for these ethnic groups, small number suppression was applied and the reported percentages for the response status may be skewed. Where data was not supressed, the proportion of the recorded responses is similar to the group average, being 33% for both white, and Asian or Asian British ethnicities.

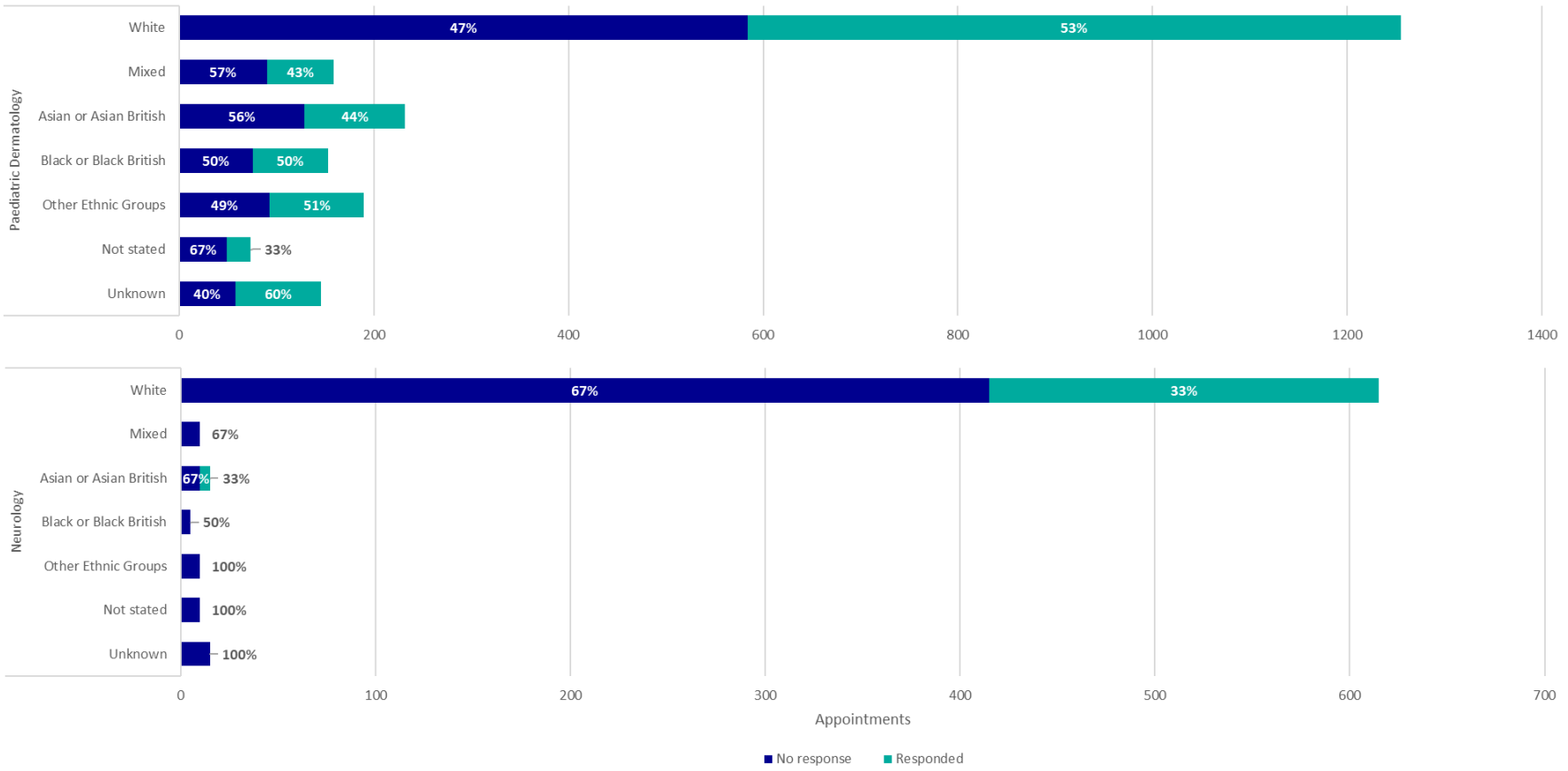


Figure 21. Number of appointments by digital health questionnaire response status and ethnicity for *"reviewed at appointment"* pathways. Counts smaller than or equal to five were suppressed, zeroes unchanged, and all other counts were rounded to the nearest five. Percentages were calculated based on rounded values and where numbers were small percentages may not reflect actual percentages and may therefore not sum to 100% where small number suppression was applied.

Deprivation

The number of appointments by digital health questionnaire status and IMD quintile for Paediatric Dermatology (n=2,208) and Neurology (n=691) is shown in Figure 22. The first quintile represents the most deprived and the fifth quintile the least deprived 20% of Lower Layer Super Output Areas (LSOAs) nationally. Within the Paediatric Dermatology pathway, the count of appointments is highest within the most (33%) and the least deprived (20%) quintiles, compared to the representation within the middle range of deprivation (quintiles 2-4; 13-17%). The proportion of received responses is highest in the least deprived (63%) and middle (54%) quintiles, and lowest within the most deprived quintile (45%). The remaining quintiles show an approximately even split (49% responded for both). For Neurology, the proportion of responded statuses is reversed when compared to the Paediatric Dermatology pathway, being highest in the most deprived (36%) and middle quintiles (35%) and lowest in the two least deprived quintiles (26-28%).

Figure 22. Number of appointments by digital health questionnaire response status and IMD quintile for *"reviewed at appointment"* pathways (1 = most deprived 20% to 5 = least deprived 20% of LSOAs nationally).

Comorbidity

The number of appointments by digital health questionnaire response status and CCI score band for Paediatric Dermatology (n=2,210) and Neurology (n=690) is shown in Figure 23. There was a large proportion of appointments with unknown comorbidity score in both pathways (78% for both). Where known, the majority of patients were reported to have a comorbidity score of 0-1 (21% for Paediatric Dermatology and 18% for Neurology). Comorbidity scores of 2-3 and 4 were slightly more prevalent in Neurology (4% and 1% respectively) compared to Paediatric Dermatology (less than 1% for both score bands), however, these figures may be skewed due to applied small number suppression. Where scores were available (not suppressed) for both response statuses, the split was even between those who responded and those who did not respond for Paediatric

Dermatology, and showing a proportion below the pathway average (31%) for score band 1-2 within Neurology (24%).

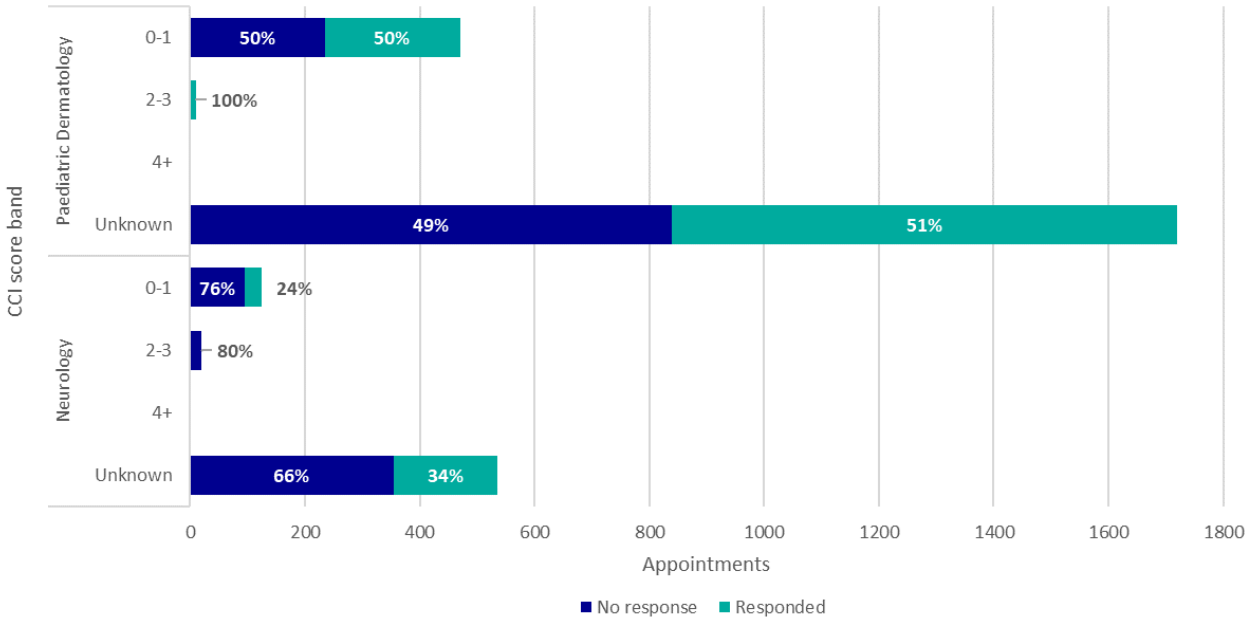


Figure 23. Number of appointments by digital health questionnaire response type CCI score band for *"reviewed at appointment"* pathways. Counts smaller than or equal to five were suppressed, zeroes unchanged, and all other counts were rounded to the nearest five. Percentages were calculated based on rounded values and where numbers were small percentages may not reflect actual percentages and may therefore not sum to 100% where small number suppression was applied.

3.3. Surveys

Patient survey

Demographics

The patient survey was sent to approximately 600 patients, 64 of which completed the survey. Questions were completed by all respondents (n=64), unless otherwise specified.

The representation of pathway types and individual pathways was markedly different compared to the activity data. There was an approximately even split between *"replaces follow-up"* pathways (53%) and those with questionnaires being reviewed at appointments (47%). The breakdown of the type of care patients reported to receive through My Online Care is presented in Figure 24. The Neurology Headache pathway showed the highest proportion of responses, while Oncology Prostate and Hepatology had low representation, with the remaining responses being distributed relatively evenly across pathways.

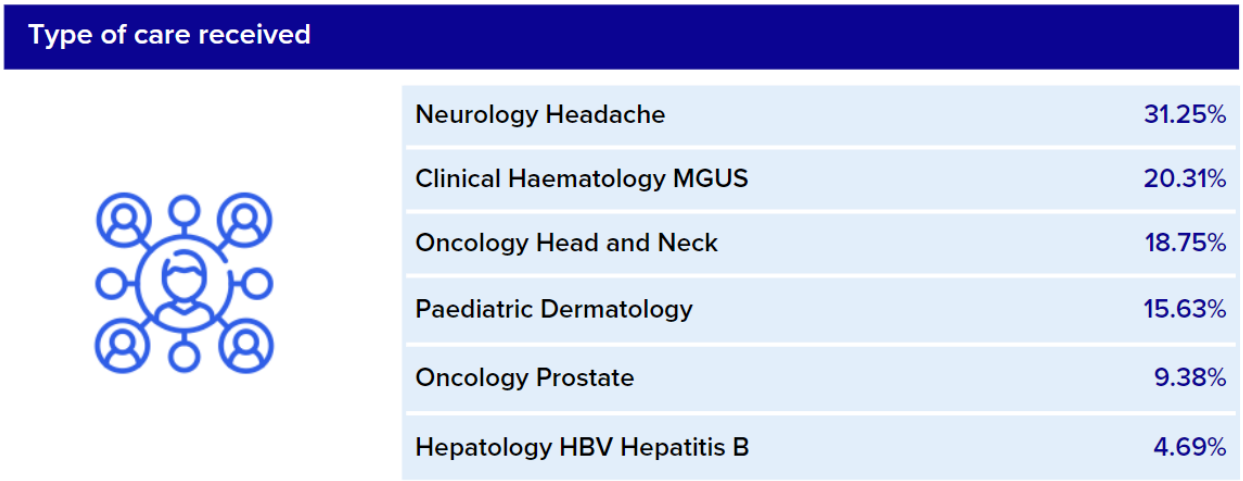


Figure 24. The type of care received through My Online Care by patients who responded to the survey.

Most patients (59%) had been using DrDoctor for six months or more, with the majority (73%) receiving F2F care from the same clinic before using DrDoctor (Figure 25). For *"replaces follow-up"* pathways, the proportion of long-term users (>6 months) and those who had not received F2F care from the same specialty before was slightly higher (65% and 21%, respectively) compared to *"reviewed at appointment"* pathways (53% and 13%, respectively). All individual pathways displayed similar patterns, with the majority of patients being long-term users (50%-83%) and having received F2F care from the same specialty before (50%-90%).

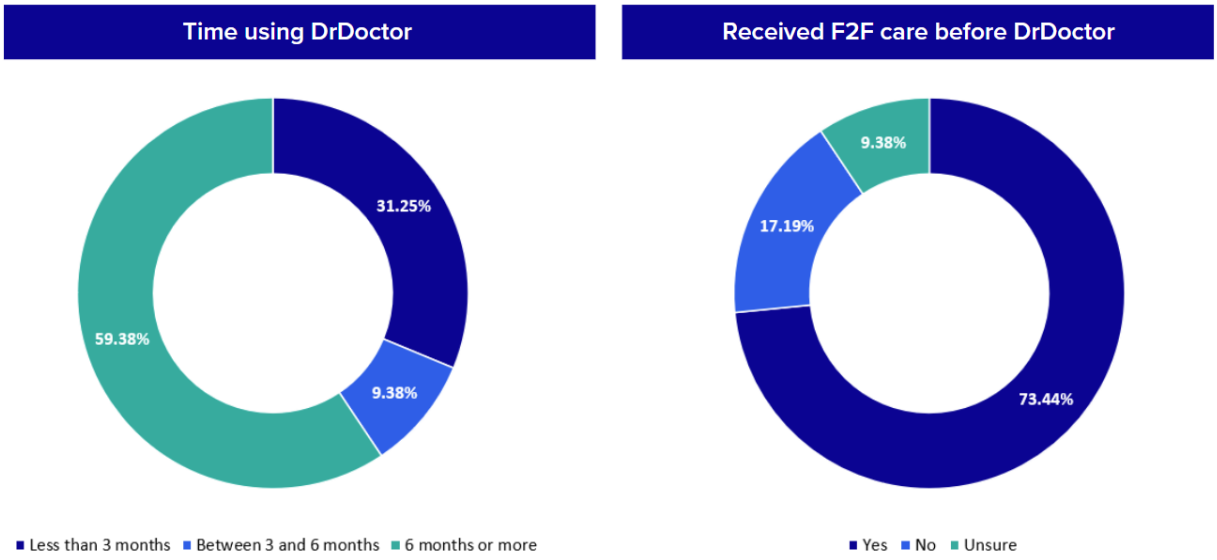


Figure 25. Donut charts depicting how long patients had been using DrDoctor for and whether they received F2F care before My Online Care.

Patient experience

Patients were asked questions regarding their impression of My Online Care (Figure 26). Responses were overall neutral to very positive and similar across pathway groupings. There was a small trend of patients from *"replaces follow-up"* pathways generally providing slightly more polarised (positive and negative, where applicable) responses compared to the more neutral responses for *"reviewed at appointment"* pathways. More pronounced pathway-specific differences are discussed below, where relevant.

Most patients responded positively or neutrally to the statement: "*When I first heard of DrDoctor, I thought it would be a good solution for facilitating my appointments*". The 9% who responded "*disagree*" were within Clinical Haematology, Neurology, and Paediatric Dermatology where 23%, 5%, and 20% of patients within each specialty respectively disagreed.

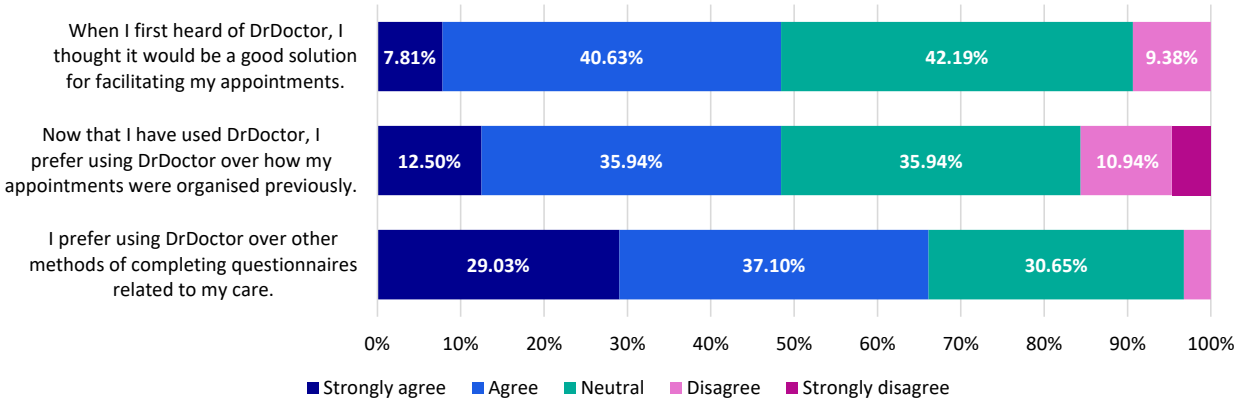


Figure 26. Patient responses to survey questions surrounding their perceptions of My Online Care.

When asked whether patients prefer using DrDoctor over how their appointments were organised previously, most patients either agreed (28%) or remained neutral (47%; Figure 26).

Most patients (66%) suggested a preference for DrDoctor over other questionnaires related to their care (Figure 26). Within Hepatology, 67% responded with "*neutral*". Within the *"replaces follow-up"* pathways, one patient within both Neurology and Paediatric Dermatology respectively responded with "*disagree*", whereas no negative responses were seen in *"reviewed at appointment"* pathways. The patient within Paediatric Dermatology responded with "*No I don't mind filling in [the] questionnaire*" and the patient within Neurology responded with "*So impersonal*".

Responses indicated a higher concentration on neutral and agreeable attitudes related to experience using My Online Care (Figure 27). For the statement "*The quality of my care has improved*", 39% of respondents agreed and 53% felt "*neutral*". This was particularly present within Hepatology, Neurology, and Paediatric Dermatology, where over half of responses were "*neutral*". Most patients (67%) within Hepatology reported "*neutral*" opinions surrounding the perceived quality of care, with 33% responding "*disagree*". Further, 23% and 5% of respondents in Clinical Haematology and Neurology Headache respectively responded with "*disagree*" to the statement.

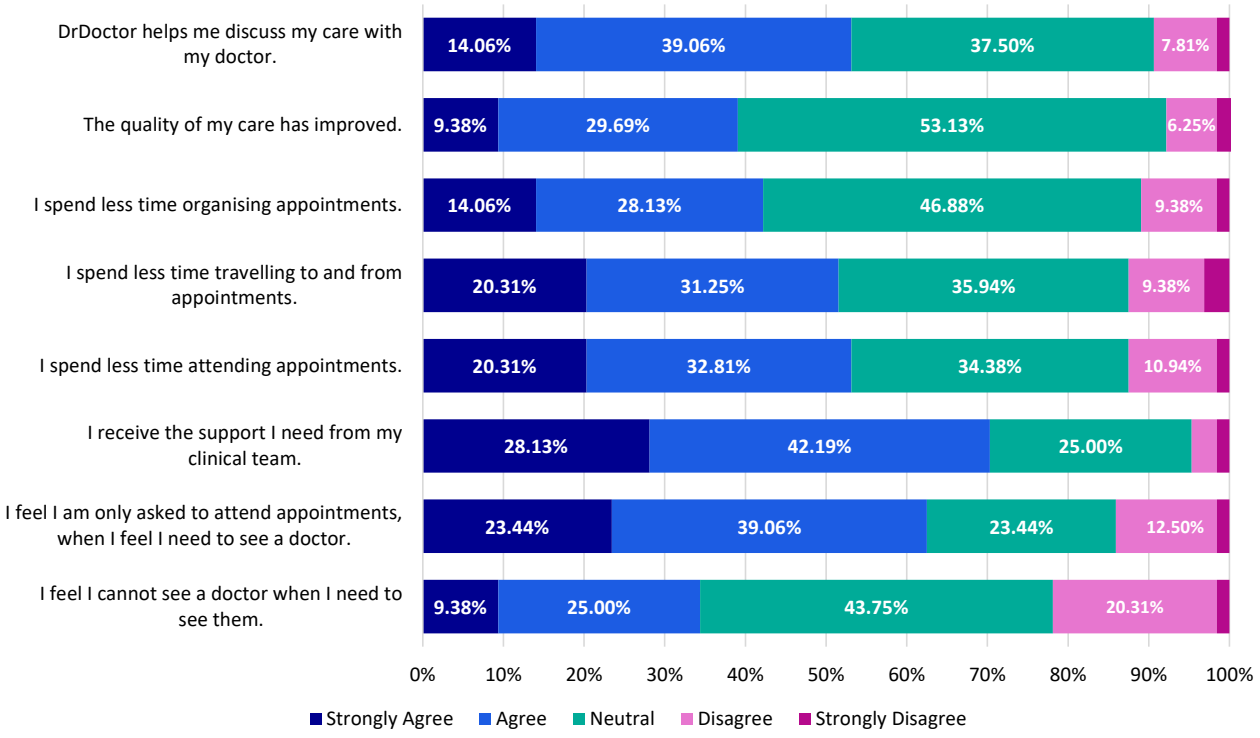


Figure 27. Patient responses to survey questions surrounding their experience with My Online Care.

Contrastingly, 34% of patients felt they could not see a doctor when they needed to see one (Figure 27). Further, 44% of respondents were "*neutral*", and 22% disagreed. Figure 28 depicts the

survey responses to the aforementioned statement by specialty. Half of patients within Paediatric Dermatology felt they could not see a doctor when they needed to. Further, 40% of patients within Neurology Headache expressed a similar opinion. Clinical Haematology, on the other hand, had the lowest number of patients, who felt that they could not see a doctor when needed..

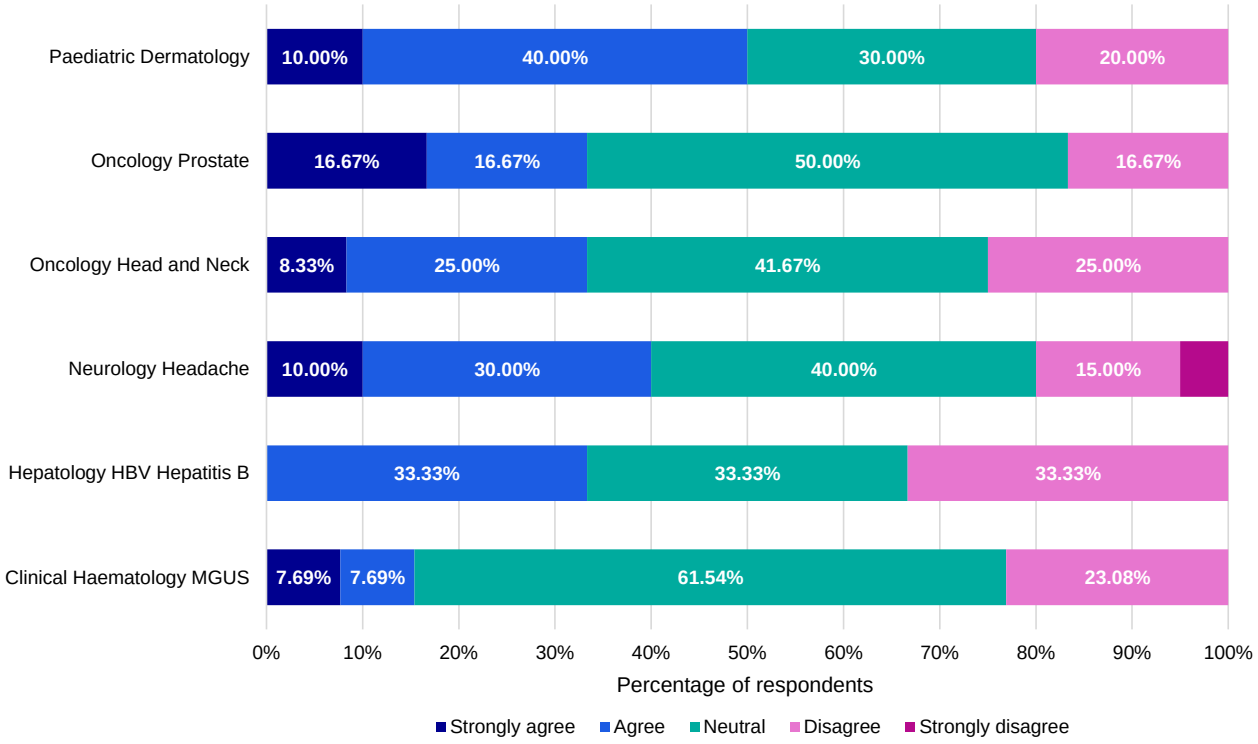


Figure 28. Responses by specialty to the survey statement "*I feel I cannot see a doctor when I need to see them*".

Questions regarding time savings in organising, travelling to, and attending appointments received mostly neutral to strongly positive responses overall. For these questions, there was a pronounced difference in responses for the pathway groupings, with *"replaces follow-up"* pathways recording an absolute majority of positive responses (53-74%) and only few negative responses (3-9%), whereas *"reviewed at appointment"* pathways generally resulted in neutral responses or disagreed (40-57% and 13-23%, respectively).

Exploring these questions individually, most patients either agreed (42%) or were neutral (47%) with the statement that they spent less time organising appointments. Despite this, some patients within Clinical Haematology (23%), Neurology (15%), and Paediatric Dermatology (10%) spent more time organising their appointments. Conversely, 100% of patients within Hepatology spent less time organising their appointments.

Most patients reported to spend less time travelling to and from appointments (52%) or attending appointments (53%) (Figure 27). In contrast, some patients disagreed that there was a reduction in travel time to and from appointments within Neurology (25%), Paediatric Dermatology (20%), and Clinical Haematology (8%) respectively, or that there was a reduction in time spent attending appointment Paediatric Dermatology (30%), Neurology (20%), and Clinical Haematology (8%).

Figure 29 depicts the main themes and examples of patient responses when asked to expand on their experience (n=38). Fourteen patient responses were excluded, as patients either highlighted that they did not want to expand on their answer or provided information not applicable to the evaluation. The most frequent theme was patients being aware that they still had access to care whilst using DrDoctor (*n* = 9). Five patients highlighted that they were satisfied with using DrDoctor.

Figure 29. Themes and representative examples of patient responses when asked about their experience of My Online Care.

Figure 32 separates the qualitative themes in Figure 29 by specialty. Patients from all specialties apart from Oncology Prostate noted an awareness of access to care. Two patients within Clinical Haematology showed a need for either patient-centred care, or a preference for F2F appointments.

Two patients from Neurology were satisfied with DrDoctor, whilst three patients from Neurology highlighted the low availability of appointments.

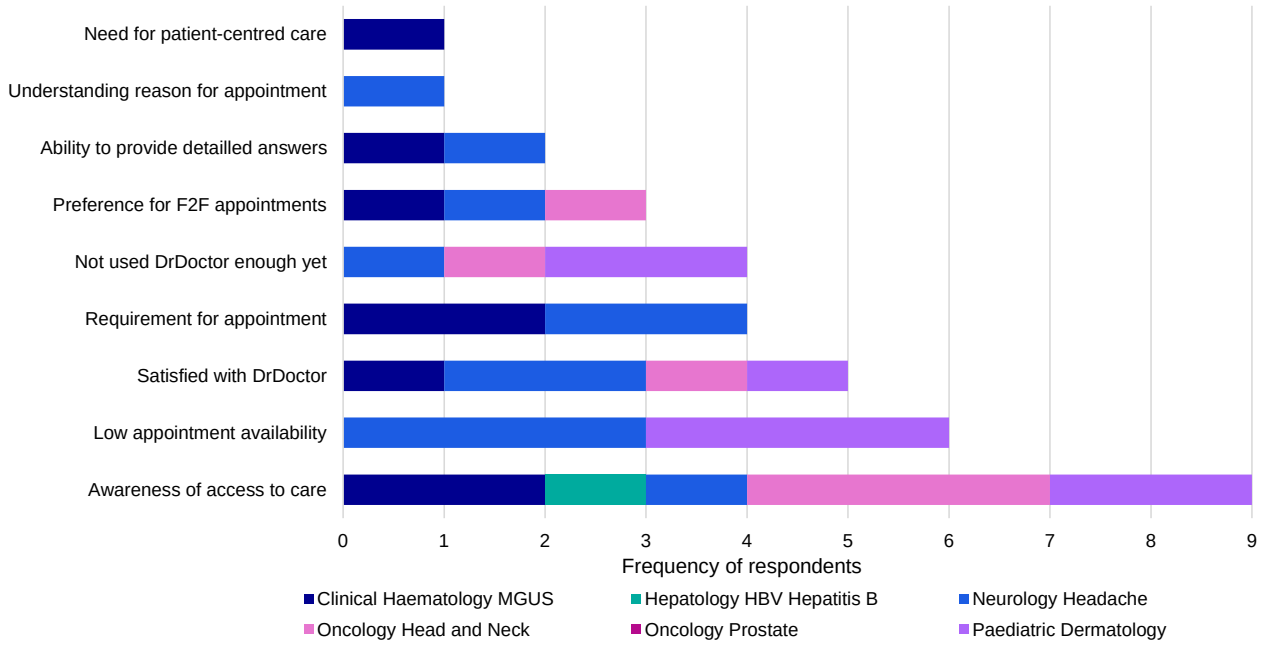


Figure 30. Qualitative themes separated by specialty.

Technical delivery

Figure 31 highlights that patients generally demonstrate a positive attitude towards My Online Care's ease of use and guidance. The one respondent (2%) who responded "*disagree*" to "*I feel the information requested in the questionnaire is appropriate for my care*" was within Clinical Haematology and noted that it "*might help to be able to give feedback about general health*".

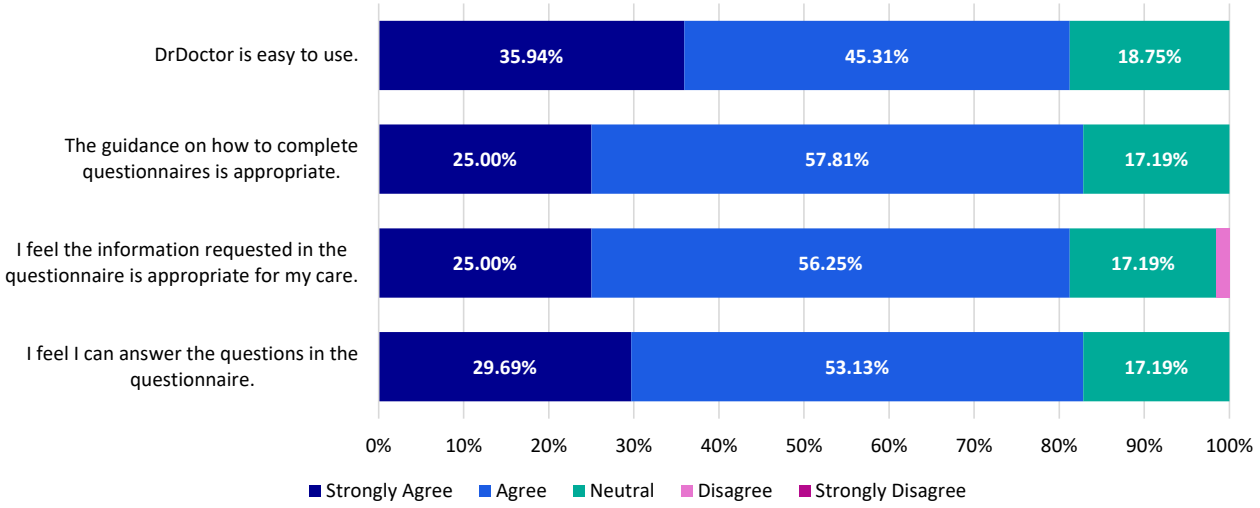


Figure 31. Patient responses regarding the technical delivery of My Online Care.

When separating responses within Figure 31 by specialty, most findings were consistent with the above, apart from questionnaires within the Oncology and Hepatology specialties. Here, 100% of patients within Oncology agreed that DrDoctor was easy to use and the guidance on how to complete the questionnaires was appropriate. Furthermore, 100% of patients within Hepatology agreed that they felt they could answer the questions within the questionnaire.

The technical statements in Figure 31 were further assessed separated by patients' duration of app use. When comparing both elements, there was no obvious trend between the two.

Clinician survey

Demographics

Six respondents who had been using My Online Care for more than six months completed the survey. Questions were completed by all respondents (n=6) unless otherwise specified. No clinicians within the Neurology or Paediatric Dermatology specialties completed the clinician survey (Figure 32). Due to the small sample size, an analysis by pathway groupings of duration of use was not performed. A proportion of 83% of respondents had been working at the same clinic before My Online Care implementation. The remaining respondent noted that they had not been working in the same clinic before My Online Care.

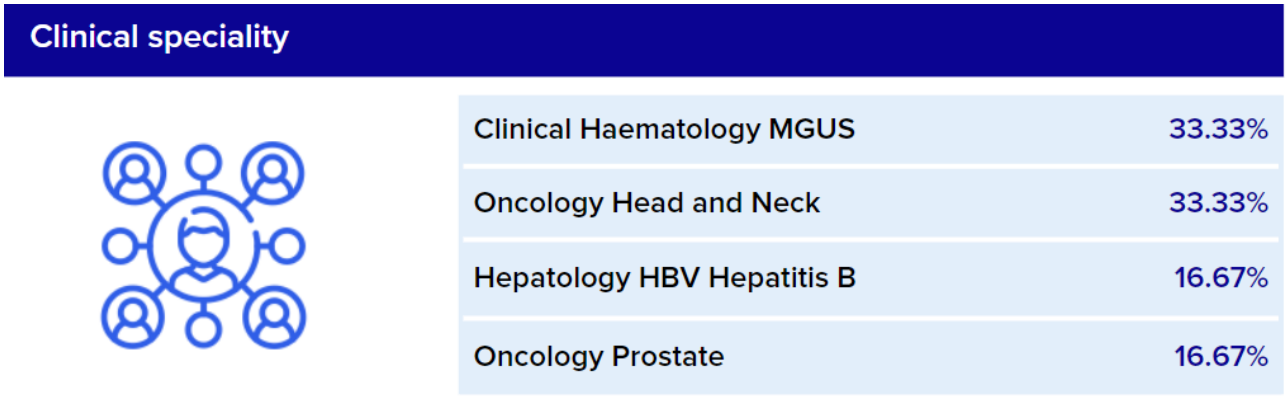


Figure 32. Clinician responses regarding the specialities using My Online Care that they worked within.

Clinician experience

Most clinicians indicated a positive experience using My Online Care (Figure 33); no clinicians disagreed with the statements.

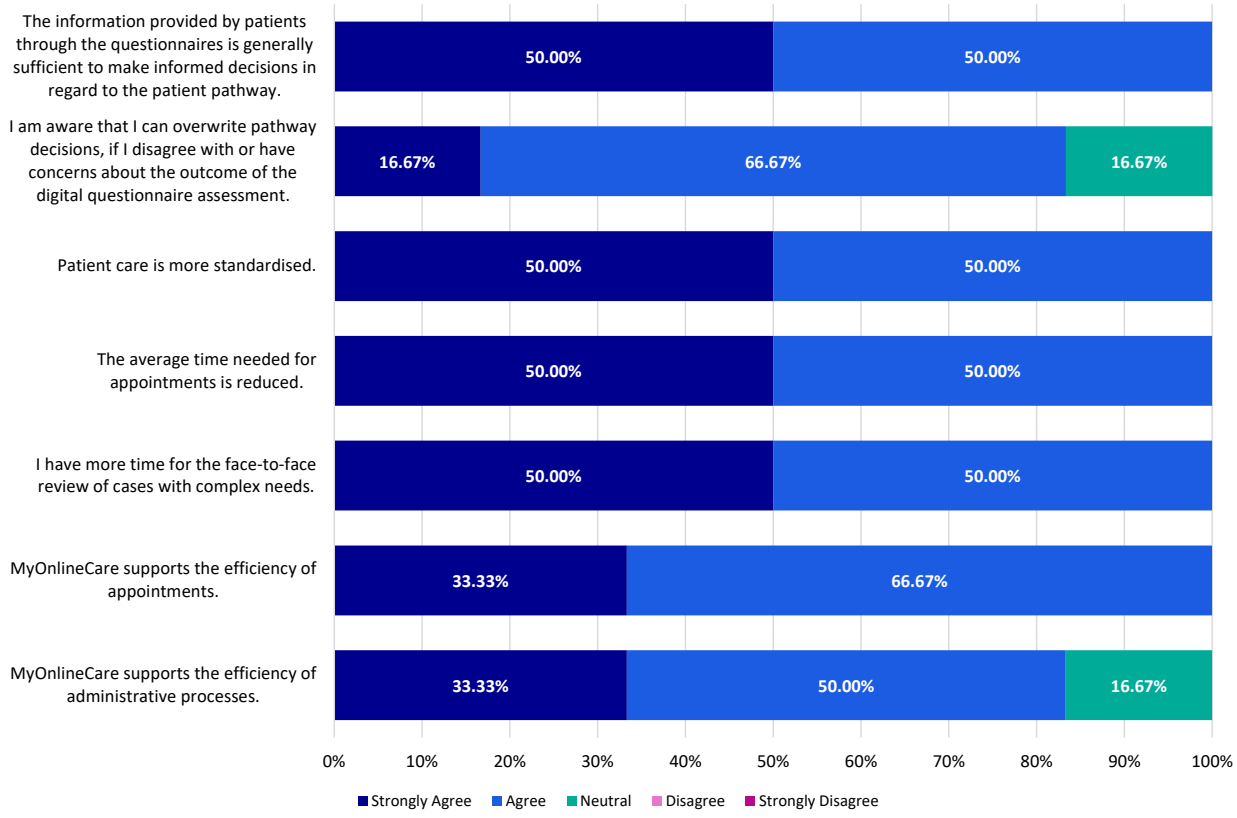


Figure 33. Stacked bar charts depicting clinician responses to statements surrounding their experience of using My Online Care.

Clinicians were asked about the effectiveness of My Online Care at two points in time: when they had first heard of My Online Care, and after using My Online Care (Figure 34). Here, 100% of clinicians showed preference for My Online Care before and after using the system.

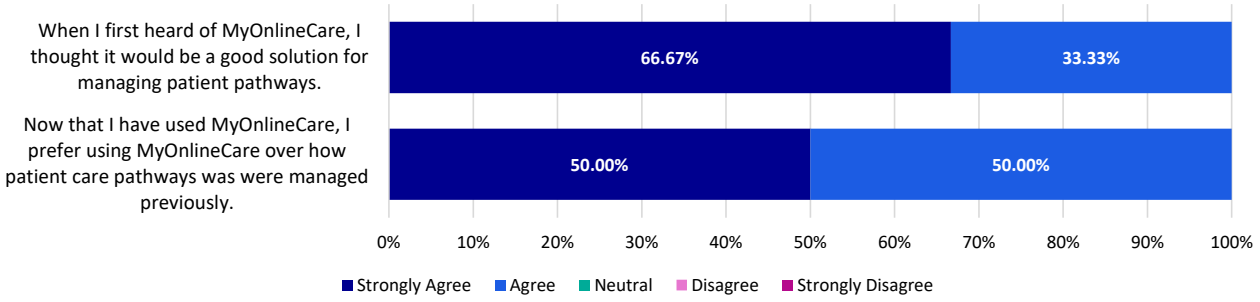


Figure 34. Stacked bar charts depicting clinician responses to statements surrounding perceived effectiveness of My Online Care.

Clinicians were asked "*How likely is it that you would recommend My Online Care (DrDoctor digital)?*". Responses were used to calculate a net promoter score (NPS) for My Online Care, which define responders with scores of 9-10 as promoters, 7-8 as passives, and 6 or lower as detractors. Here, 83% of clinicians responded with a rating of either 9 or 10, and 17% of responses indicated a rating of 8 (Figure 35). No respondents submitted a score lower than 8. As depicted in Figure 35, My Online Care scored an NPS of 83 (promoters *n* = 5; passives *n* = 1, detractors *n* = 0). This score indicates that users would likely recommend the platform to friends or colleagues.

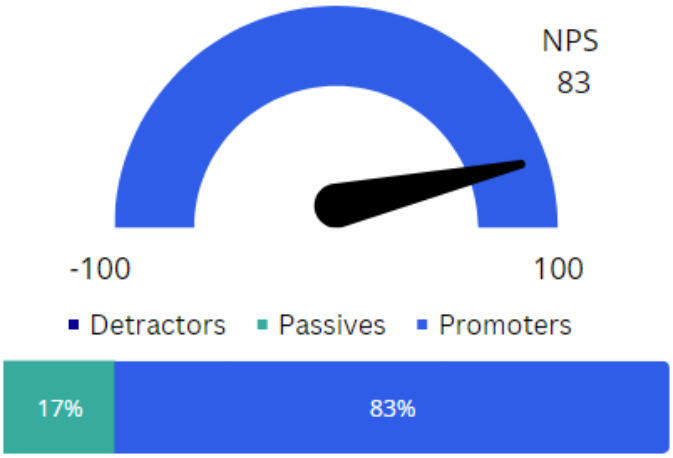


Figure 35. NPS for the My Online Care solution as calculated from a questionnaire within the clinician survey.

When asked whether clinicians had any further thoughts regarding My Online Care, the following responses (n=2) provided additional insight for clinician perceptions of My Online Care regarding the solutions impacts.

"Fantastic way to review stable patients. Saves times and convenient for both the clinic and patients. Some [patients] are excluded if digitally illiterate or who do not have access to appropriate technology."

- Clinician survey respondent

"It is a great way to assess patients, [it is] just a shame our patient group is typically over 70, so they struggle with the technology side of it. I am hoping over the years this will become less of an issue"

- Clinician survey respondent

Technical delivery

Clinicians mostly agreed with statements surrounding their experience of the technical delivery and implementation of My Online Care (Figure 36). One staff member disagreed with the statement: "*The training I received before starting to use My Online Care was adequate*".

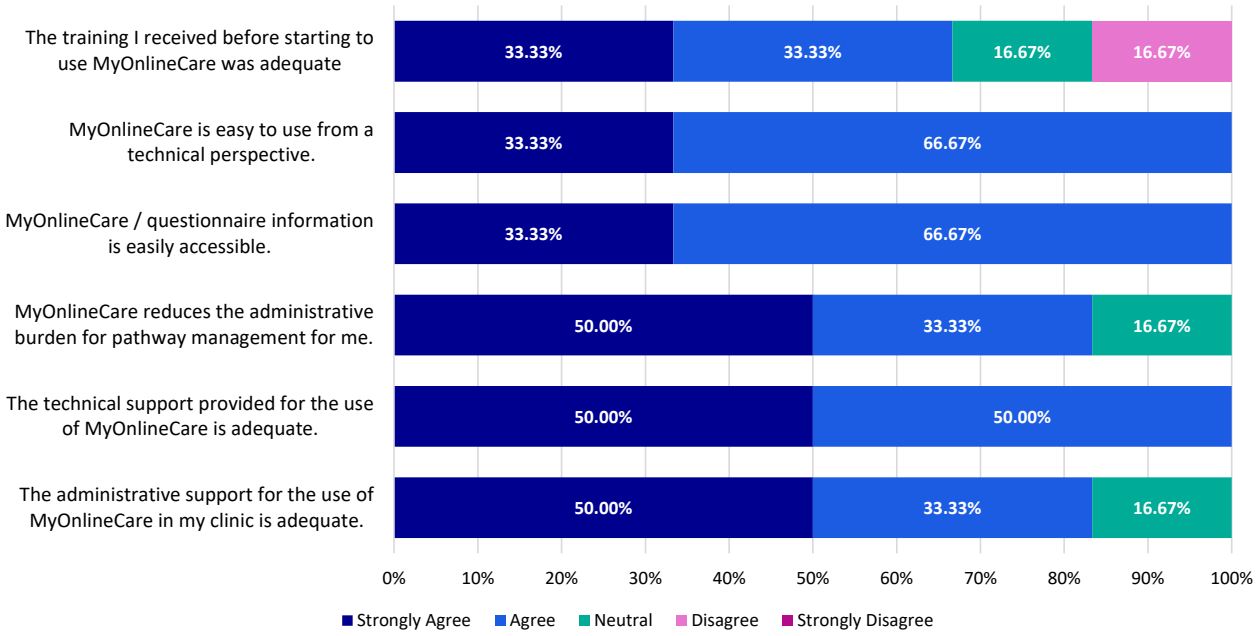


Figure 36. Stacked bar charts depicting clinician responses to statements surrounding technical delivery and implementation of My Online Care.

Safety

Clinicians were asked if My Online Care allowed for safe assessment of patients (Figure 37), resulting in a wide spread of responses. Of those who responded, 33% agreed, 17% were neutral, and 17% disagreed.

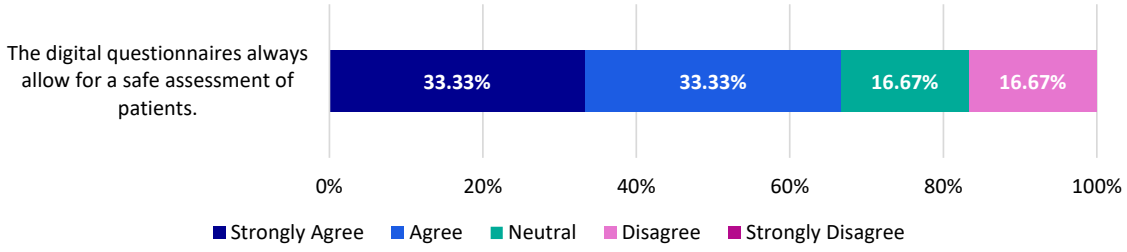


Figure 37. Clinician responses for the statement "*The digital questionnaires always allow for a safe assessment of patients*".

The follow-up question for clinicians who responded "*disagree*" to the statement in Figure 37 (n=1) showed "*neutral*" responses to the following statements: "*I think the digital pathway could cause adverse events (e.g., patients not being recalled for appointments when needed)*", "*I have*

experienced the digital pathway causing adverse events", "*I know how to raise concerns about the safety of the digital questionnaires*". No clinicians provided additional comments or concerns surrounding the safety of My Online Care; all clinicians 'skipped' this optional free-text question within the survey.

3.4. Clinician interviews

Demographics

Survey responses identified six clinicians who were willing to be contacted for a further interview. Of the six clinicians contacted for an interview, two responded and completed the interview process. Although interviews intended to explore "reviewed at appointment" pathways, survey responses only consisted of clinicians from the Oncology *"replaces follow-up"* pathways. Key benefits of *"reviewed at appointment"* pathways were therefore not the focus of the interviews. The themes discussed during the interviews are outlined below.

Benefits

Clinicians gave mostly positive feedback surrounding My Online Care. The different themes that arose through interviews have been highlighted below.

Time savings

Both interviewees mentioned that My Online Care yielded time savings for patients and clinicians. Here, it was mentioned that some patients do not need to be seen, and completing questionnaires can allow them to spend less time in hospital. Reducing the number of appointments can help get "*the right patients to the right clinics at the right time*". This spare time is now spent reducing the backlog of patients.

Increased accuracy and standard of care

The standardised questionnaires allowed patients to be screened for a wide range of health concerns; clinicians tend to ask patients different questions during F2F appointments so may not screen patients fully. Interviewees noted that the questionnaires gave patients the ability to discuss their health in their own environment and time, and highlight what aspects are important to them. This was suggested to allow clinicians to focus on what matters to the patient and streamline them to the correct care they require. Clinicians noted that they had "*generally no*" safety concerns for patients as typically patients are provided with an emergency contact number if anything concerning is highlighted.

One interviewee noted that the ability to ask patients a wider range of direct questions regarding their health allows them to provide more accurate answers. Allowing patients to answer the questionnaires alone can result in patients answering honestly.

"[I] *think it's a great system that's transformed the service*"

- Interviewee working in Oncology

Furthermore, the ability to review the scored patient responses was perceived as a quick and easy way of monitoring and comparing a patient's health status over time.

Enablers

Dedicated implementation and management team

Having a dedicated team of people focusing on the implementation and management of My Online Care helped push the service forward and was noted as beneficial. The clinician stated that during the initial implementation, it was hard to find the time to implement the service and obtain clinician engagement themselves, and the project did not progress as hoped. As a result, a designated team evolved, that was concerned with the setup, clinician and patient engagement, questionnaire design and approval, to oversee and progress the implementation and use of My Online Care and could be used across services. Another interviewee noted that the admin team removed the pressure from clinicians as it was reassuring that the admin team knew how to operate the system.

Ease of use

Interviewees noted that My Online Care has been easy to use overall and enabled the service to carry on during the COVID-19 pandemic. The training provided was "*really good*" and the helpline was also useful. One of the interviews noted they "*found their way around*" and "*learnt on the job*".

Inclusiveness

Clinicians were asked which demographics were most and least suited to My Online Care. Interviewees suggested that patients of all ages were able to complete the questionnaires on DrDoctor; the SARS-CoV-2 pandemic helped older patients to become fluent in technology use. My Online Care was suggested to be beneficial for patients who live far away from their hospital, as it can reduce the need to travel to attend F2F appointments. Clinician suggestions of patients least suited to My Online Care are presented in Figure 38. Most elements related to accessibility issues such as access to technology, and ability to understand the questionnaires.

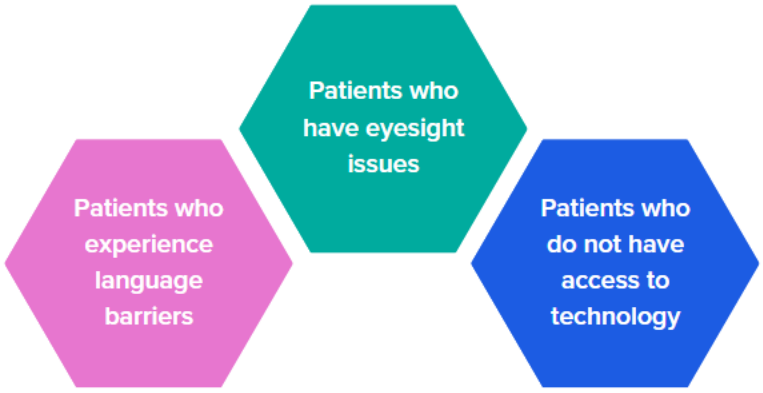


Figure 38. Patients less suited to My Online Care, as noted by clinicians.

Clinicians tend to select patients depending on the suitability of their treatment. For example, one interviewee noted they selected patients undergoing immunotherapy rather than chemotherapy as immunotherapy is more stable, thus avoiding the potential of sudden patient deterioration. One interviewee highlighted that the level of uptake within different treatments varies, suggesting that Head and Neck Therapy patients complete the questionnaires 60% to 70% of the time whereas Breast Treatment patients complete the questionnaires approximately 20% of the time.

Free-text response options

Clinicians noted that, where available, free-text boxes were used by patients to identify elements that would not arise elsewhere. This can allow clinicians to, for example, track the late effects of cancer over time, allowing patients to feel supported, know what symptoms to be looking for, and expand on their answers. Where pathways do not already allow for free-text responses, it was felt that this could be a useful addition to the questionnaires.

Barriers

Workflow challenges

Both clinicians noted issues with streamlining workflow. One clinician noted that it is difficult to compare questionnaire responses from old and new versions, as these cannot be reviewed side by side. The inability to compare questionnaire responses in such cases was suggested to make clinicians reluctant to update the questionnaires.

The options for reviewing questionnaires could be improved. One clinician highlighted that the ability to view the clinics held on a particular day would have improved their experience. The other clinician noted that it would be useful to track the entire patient cohort's data over time. Currently, only one patient's data can be viewed at any one time, meaning clinicians must maintain a separate database to allow them to track the entire cohort.

One clinician noted that the administration team were setting up appointments on three different systems. This was considered time consuming, however, the clinician was unsure how this could

be overcome, as the integration of clinical systems is a common challenge. Further, it was mentioned that patients would 'opt-out' of the digital questionnaires, however, clinicians did not receive a notification, so were not made aware of this.

Patient enrolment and communication

Clinicians suggested that patients should be aware of My Online Care earlier as they can be reluctant to move away from systems that they are accustomed to. Communicating with patients about My Online Care early in their patient journey can help patients perceive the solution more positively. It was suggested that clinicians should receive comprehensive how-to guides to allow effective use of My Online Care. Additionally, it was noted that the information shared with patients to allow them to use My Online Care could be improved. Currently, patients receive an information leaflet to help them use DrDoctor, but it was suggested that patients should receive further guidance to allow efficient use of DrDoctor. Furthermore, the text messages that patients receive were also considered to be confusing. Communication options between clinicians and patients were also highlighted, as clinicians noted that capture forms could only be completed once and, where it was required to follow up on information, clinicians had to rely on other means of communication. Instead, clinicians wanted to have two-way conversations and communicate more information, when needed.

Patient safety for non-responders

One clinician noted that it can be difficult to know whether a patient is well if they have not completed an assigned questionnaire, as is the case for unattended F2F appointments.

Comparison with other solutions

One clinician noted that they used a digital pathway solution previously that "*wasn't very good*". The clinician could not change the questions within the solution, and it was difficult to identify the "*subjective bother*" from the questionnaire, thus lowering the level of personalised care patients received compared to My Online Care.

4. Discussion

My Online Care presents a digital pathway management solution that can be used effectively after a short implementation period across different pathway types, a range of specialties and pathways of varying scale. It is generally well perceived by patients and specifically clinicians. While this evaluation found the rate of appointment replacements in relevant pathways to be lower compared to the pilot, wider benefits of quality, standardisation and personalisation of care were identified with a high perceived level of patient safety. Potential process and workflow improvements could

increase efficiency, while considerations surrounding accessibility and potential health inequalities could be further explored to optimise uptake in less engaged patient groups.

4.1. Use of My Online Care

Although activity data were received in two distinct reports, including different timeframes (January 2020 – October 2022 and September 2021 – March 2022) and aggregations (monthly vs entire period aggregation), it was concluded that a high level of congruence existed between dataset 1 and 2. Therefore, the datasets could be used and compared when assessing metrics such as forms assigned, form notifications sent, forms completed, form reminders sent etc. (Figure 4).

The total assigned forms recorded for *"reviewed at appointment"* pathways (Neurology Headache Impact and Diary Questionnaire and Paediatric Dermatology Questionnaire) were higher in comparison to *"replaces follow-up"* pathways (Clinical Haematology MGUS Questionnaire, Hepatology HBV Hepatitis B Questionnaire, Oncology Head and Neck Post Treatment Questionnaire and Oncology Prostate Treatments Combined Questionnaire). Activity levels seem to be affected by holiday seasonality which is most pronounced in pathways with patient cohorts consisting of children and young people (e.g., the Paediatric Dermatology pathway). The implementation of the solution was rapid as activity levels plateau from about the second month of implementation across most pathways, with the Paediatric Dermatology pathway being an exception to this trend due to the pathway's sensitivity to the apparent school holiday seasonality.

Higher activity levels within *"reviewed at appointment"* pathways could indicate greater suitability of the solution. It is unclear whether the greater volume of questionnaires being utilised is due to comparably higher demand for this type of service at NUH, or a higher suitability of patients to be assigned to these digital pathways.

Ratios between metrics were calculated in order to establish activity trends in the presence of volume differences across the pathways. Broadly, the form notifications sent/forms assigned ratio were consistently high across *"reviewed at appointment"* and *"replaces follow-up"* pathways (Figure 5). This indicates that forms are effectively distributed to patients once they have been assigned, and that there is no mismatch early in the digital pathway process.

Overall, form completion (forms completed/forms assigned ratio) was considerably lower during the evaluation when compared to the pilot study. This may be explained by a change from an opt-in model during the pilot to an opt-out model upon wider implementation (i.e., patients on a given pathway, for the opt-out model, were enrolled by default rather than selected based on individual suitability criteria). The forms completed/forms assigned ratio was higher in *"replaces follow-up"* pathways, compared to *"reviewed at appointment"* pathways. This difference may be explained by the potential time saving benefits for patients within *"replaces follow-up"* pathways, which could be seen as an incentive to complete a questionnaire. On an individual pathway level, both Oncology pathways and the Hepatology pathway performed above average, which is consistent with the positive patient feedback regarding the ease of use and ability to answer questions within these

pathways. In contrast, the completion rate for the Neurology pathway was below average. Survey data did not provide clear indication for a possible explanation, potentially due to a bias in willingness to complete a survey in patients who do not complete questionnaires, meaning that non-responders may not have been represented within the survey. An exploration of barriers to questionnaire completion at the time of patient contact may provide further insights and inform attempts to improve completion rates.

There was a high variability in the form reminders sent/forms assigned ratio across pathways, with *"replaces follow-up"* pathways displaying the lowest rates of reminders being sent (Figure 5). The available data provided no clear insights into possible explanations for this observation, which could be due to behavioural differences inherent to the characteristics of specific patient cohorts, such as pathway specific demographics or state of health. Possible effects of age, gender, ethnicity, deprivation, and comorbidity on form completion were observed in the analysis of clinical outcome data for *"reviewed at appointment"* pathways ('*"Reviewed at appointment"* pathways' section), however, due to data quality challenges for *"replaces follow-up"* pathways, the pathway type specific differences could not be explored further.

It is unclear why the forms reviewed/forms assigned ratio was consistently around 70% across *"replaces follow-up"* pathways, while completion rates differed and were below the reviewed rate for some specialties (Figure 10). A further exploration of workflow and documentation practices between pathways may provide insight into the causes, potential benefits and enablers for a complete and consistent review practice and documentation across pathways.

A small proportion of follow-up appointments were avoided in three out of four *"replaces follow-up"* pathways through the use of digital health questionnaires (Clinical Haematology, Hepatology, and Oncology Head and Neck pathways; Figure 10 and Figure 15). On average 7% of appointments could be avoided as they were deemed to be clinically not needed compared to 29% of appointments being avoided during the My Online Care pilot study. Notably, some of the specialties examined within the current evaluation are concerned with the treatment or monitoring of severe or high-risk conditions, which warrant a cautious approach to appointment-need assessments. It may be beneficial to explore such cases further (e.g., by integrating a sense-check conversation into the appointment practice) as this could inform possible questionnaire amendments to improve the accuracy of appointment-need assessments. Further, additional benefits of using My Online Care were identified by relevant staff, which are discussed in the 'Clinician survey' section.

The duration of questionnaire completion by the patient and review of the questionnaire by the clinician was quickest in the Oncology Prostate Treatment Combined pathway (Figure 6 and Figure 12), in alignment with questionnaires for this pathway being dispatched only three days ahead of appointments. It is unclear, whether this efficiency is driven by the shorter form dispatch period, or whether the dispatch period is determined by other factors contributing to the shorter turnaround times, such as patient engagement with the solution, staff capacity, or the earlier integration of My Online Care within other Oncology pathways during the pilot study leading to more experience with the solution. The Clinical Haematology pathway is the only pathway where the combined average

completion and review periods exceeded the number of days from form notification to the follow-up appointment (Figure 13). This is unexpected as the questionnaire review *"replaces follow-up"* pathway is required to assess the follow-up need ahead of the appointment. This could indicate that, in some instances, the review deadline is either missed due to capacity challenges or inefficiencies or is not immediately documented on the DrDoctor system (e.g., when discussed on the phone). This observation should be explored further with input from the clinical team, as this could indicate a potential barrier to the effective use of My Online Care.

In summary, activity data indicates that the use of digital questionnaires is similarly effective in *"replaces follow-up"* and *"reviewed at appointment"* pathways and across pathways of varying scale. While the appointment-replacing capacity of the questionnaires in respective pathways was lower than found during the pilot, additional benefits associated with their use were identified, which are discussed in detail in the 'Clinician survey' section. Further insight is required to understand factors impacting activity volumes, completion rates, and efficiency levels. Findings could be generated through detailed pathway and workflow mapping exercises to understand potential enablers and barriers to the effective use of My Online Care. A review of insights in the context of more comprehensive pathway-specific patient demographics data than was available for this evaluation could further help understanding their impacts on the effective use of the solution.

4.2. Clinical outcomes

"Replaces follow-up" pathway data indicated that, for a large proportion of patients, questionnaire review outcomes have not been documented on DrDoctor, while an outcome was documented on Medway PAS (Figure 14). This discrepancy could be indicative of potential workflow issues with the DrDoctor system. Discussions with the wider project team highlighted that this issue may occur in instances where the documentation on the Medway PAS system is required (e.g., when a patient is contacted by phone), and potentially omitted on the DrDoctor system. This explanation is consistent with the observed lack of other outcomes being documented within the assessed clinical outcome data (Figure 14). The need for potential duplication of documentation should be assessed and clear guidance regarding documentation requirements should be provided to staff to optimise data completeness and efficiency, where possible.

These gaps in outcome documentation mean that for three out of four *"replaces follow-up"* pathways, the comparator group was zero or suppressed. For the remaining pathway, a large volume of undocumented review outcomes did not allow for conclusive interpretation of the data. These findings indicate that there is a probable bias in outcome documentation in favour of responders and mean that the analysis outputs are likely not representative for clinical outcomes of the total examined patient cohort. As a result, it was not possible to draw conclusions about the available clinical outcome data for *"replaces follow-up"* pathways and this analysis had to be largely excluded from this evaluation.

The proportions of patients who did not respond to questionnaires within the *"reviewed at appointment"* pathways were comparable to those observed within the activity data. Most of the

scheduled digital pathway appointments had been attended by patients, with a moderate association of responsiveness and attendance (i.e., both pathways recorded the highest proportion of responders for attendances, a moderate proportion of responders for cancellations, and a small proportion of responders for DNAs; Figure 18). While the percentage of non-responders was higher among patients with multiple appointments per referral (Figure 17), it was unclear whether there was any difference in appointment attendance between patients with more or fewer appointments. One explanation could be low patient engagement across questionnaire completion and appointment attendance, leading to more appointments being booked and possibly not attended. Alternatively, patients could be less likely to complete questionnaires and more likely to require more appointments due to lower wellbeing or deterioration. An assessment of possible causes at the point of patient contact may provide further insights.

A review of patient demographics and response status to digital health questionnaires revealed possible effects of gender, age, ethnicity, and deprivation. The effects of comorbidity were inconclusive, due to a large proportion of unknown comorbidity scores (Figure 23). There appeared to be a small effect of women being 6-8% more likely than men to complete questionnaires (Figure 19). Age did not appear to have a predictive effect on questionnaire completion within the Paediatric Dermatology pathway, which may be due to guardians commonly completing questionnaires on behalf of children and young people, whereas older age seemed to be associated with lower completion rates within the Neurology pathway (Figure 20). The latter could indicate a possible age barrier to the use of the digital solution. Staff interviews, however, indicated that this had not been observed in Oncology pathways, where older patients were reported to show high levels of engagement. Alternatively, there could be an association between age and symptomatic presentation within the Neurology pathway, which could interfere with patient engagement, rather than age itself. Staff and patient opinions should be sought to assess this further and reduce the risk of exclusion.

Ethnicity-specific differences in questionnaire completion were observed to differing extents between Paediatric Dermatology and Neurology pathways. Paediatric Dermatology recorded the highest proportion of responders among white, black or black British and other ethnic groups, and slightly lower rates among mixed, Asian or Asian British ethnicities. There were more pronounced differences in the proportion of respondents within Neurology, possibly as a result of the applied small number suppression, with higher proportions of responders being observed among white and Asian and Asian British ethnicities, and low response rates within other ethnic groups (Figure 21). Additionally, the Neurology pathway consisted of a higher number of white patients whilst the Paediatric Dermatology pathway included larger volumes of patients across other ethnicities (Figure 21). It is unclear whether these differences in ethnic representation stem from specialty-specific risk factors for certain ethnic groups or differences in access to care. It is, however, important to acknowledge and assess these differences in the use of My Online Care to minimise potential health inequalities.

Deprivation appears to have moderate but differing effects on questionnaire completion between pathways. While response rates are highest for the most and the least deprived patients of the Paediatric Dermatology pathway, there is a more pronounced difference in Neurology, where the

most deprived patients are more likely to respond and the least deprived patients less likely to respond (Figure 22). These inconsistencies in the association of deprivation and responsiveness are difficult to assess with the limited availability of data within this evaluation. A further analysis through segmentation by previously discussed demographic variables, access to care, and the severity of pathway specific symptoms is recommended to assess possible interactions or modulation.

No conclusions could be drawn on possible effects of comorbidity on questionnaire completion due to the large proportion of patients rated as “unknown” (Figure 23).

While the analysis of the clinical outcome data revealed some potential determinants of patient engagement, insights regarding pathway differences are limited by data challenges within this evaluation. Furthermore, as patient-level clinical data could not be accessed directly due to data protection requirements and data was provided in aggregated form, an assessment of causal relationships between the use of My Online Care and resulting impacts on clinical outcomes could not be performed.

4.3. Patient experience

Survey results indicate that patients perceive DrDoctor as a preferred solution compared to how care was received previously and to other similar solutions (Figure 26). While patients’ opinions were predominantly neutral with regards to the solution’s impacts on the quality of care across most pathways, a considerable proportion of patients reported improvements in the perceived quality of care, and a relatively small to moderate proportion of patients reported negative perceptions within Hepatology, Clinical Haematology, and Neurology (Figure 27). The majority of patients noted that they felt supported by the clinical team and were only asked to attend relevant appointments. This observation could suggest that most patients felt doctors were identifying their needs correctly (i.e., through more personalised care).

66% **of patients prefer My Online Care over other methods of completing questionnaires related to their care**

In contrast, a proportion of patients felt that they could not see a doctor when they wanted to do so, due to low appointment availability (Figure 30). This response was more prevalent in *“reviewed at appointment”* pathways which is unexpected since appointments are not replaced by questionnaires within this type of pathway. This could be explained by general pressures on the healthcare system and the existing appointment backlog, which are known to currently limit access to care (British Medical Association, 2022). This assumption is supported by some optional free-text responses, which indicated that appointments were “*hard to come by*”. However, patients were

aware that the digital questionnaires are not the only way they could receive care (e.g., optional free-text responses indicated that patients were aware that they could "*contact the clinic*", should they need to see a doctor). Additionally, some patients noted that they preferred F2F appointments over digital questionnaires (Figure 30). A further assessment of appointment capacity and options to prioritise appointments by urgency may be advisable to reduce potential risks of negative patient outcomes.

The majority of patients agreed that they spent less time travelling to and attending appointments but did not necessarily experience time efficiencies when organising appointments due to My Online Care. Perceived time savings due to the use of My Online Care were mostly seen in *"replaces follow-up"* pathways but found a smaller proportion of agreement and a small proportion of disagreement within "reviewed at appointment" pathways. These observations were consistent with the expected differential impacts of My Online Care on the different pathway types.

53% **of patients report spending less time attending appointments**

Patients reported positive opinions towards the technical delivery of the solution and found it easy to use (Figure 31). While there could be a potential bias in patients with higher digital literacy being more likely to complete the survey, this finding indicates that the solution is generally accessible and could minimise possible negative impacts on existing health inequalities.

81% **of patients find My Online Care easy to use**

In summary, patients generally expressed positive attitudes towards My Online Care's impact on their quality of life (travel efficiencies) and support across pathways, and reported neutral to positive impacts on improvements in quality of care.

4.4. Staff experience

Due to survey uptake, there were no available insights from clinicians using the solution within the "*reviewed at appointment*" pathways (i.e., findings are only relevant to the *"replaces follow-up"* pathways). The clinician responses were positive across a variety of statements assessing workflow efficiencies, appropriateness of the questionnaire, and standardisation of care.

100% **of clinicians prefer My Online Care over previous methods of how patient care was managed**

Most clinicians suggested that the solution results in efficiencies such as a reduction in appointment time, supporting the efficiency of appointments and administrative processes. Despite this, the impact of My Online Care on administrative tasks within different specialties could not be determined within the current evaluation. Future assessments should seek to explore how different specialties may require different administrative tasks to be completed, and the impact on clinician workload as a result. In an interview, one clinician highlighted that some patients do not need to be seen via a F2F appointment ('Clinician interviews' section). By reducing the number of such appointments, clinicians were able to spend more time providing care to patients who need to be seen and reducing the appointment backlog. This indicates that information provided in questionnaires is sufficient to effectively assess a patient's follow-up need within *"replaces follow-up"* pathways (Figure 33).

100% **of clinicians report having more time for face-to-face review of cases with complex needs**

In contrast, some interview responses suggested challenges which may impact clinician workload. One clinician highlighted that they could not track an entire patient cohort over time and could only view one patient's data at a time. Currently, clinicians report to keep separate databases to allow for such cohort tracking. Transferring the data between datasets can be considered time consuming, thereby increasing clinician workload, and can be subject to error. One clinician noted that the administration team were setting up appointments on three different systems. Clinicians were unsure as to how this issue could be overcome. Ways to integrate the separate systems to increase interoperability of My Online Care and improve the review and comparison of data should be sought to improve workflow efficiencies.

100% **of clinicians believe that My Online Care supports the efficiency of appointments and state that the average time for an appointment is reduced**

Interviews highlighted that My Online Care allowed patients to be screened for a wide range of health concerns and gave patients the ability to answer questions in their own time. This could potentially increase the accuracy of responses to allow for personalised care focusing on patient needs. The increased accuracy of questionnaires allows patients to receive the treatment they require, whilst clinicians retain the ability to make informed decisions surrounding their care. Should a clinician disagree with an outcome from the questionnaire assessment, clinicians knew they could overwrite such decisions (Figure 33).

100% **of clinicians believe that patient care is more standardised**

The initial expectation of the solution seemed to generally match the reality of using the solution (Figure 34). The solution yielded an NPS score of 83, meaning that 83% of clinicians are likely to recommend the use of My Online Care, with the remainder of respondents reporting a passive NPS, and no detractor scores (unsatisfied users) being recorded. A study conducted on the average NPS for companies within the healthcare industry suggested a benchmark NPS score of 58, indicating that the solution has exceed industry standards within the digital health community (CustomerGauge, 2021). Notably, this score was provided by a US based study, therefore, the score may not be entirely comparable to the UK healthcare setting.

83% **of clinicians would recommend using My Online Care**

The technical delivery may have contributed to the overall positive impression of the solution as clinicians reported that adequate training and support was received, and the solution was easy to use (Figure 36). This is further supported by interview responses, which highlighted that My Online Care was easy to use overall and allowed the service to continue during the SARS-CoV-2 pandemic. One interviewee noted that they "*found their way around*" and "*learnt on the job*", implying that they benefitted from using the system more so than from the training itself. Further insight is required to understand how to improve clinician training to ensure effective use of My Online Care upon implementation and for ongoing monitoring.

100% **of clinicians find My Online Care easy to use**

Clinicians highlighted some concern surrounding whether all patients could access My Online Care. It was believed that some patients may not have the technology required to use DrDoctor or may not know how to operate the technology. This is supported with the interview findings, which suggested that patients, who did not have access to technology or were unsure how to use technology, may have limited access to My Online Care. It was further noted that text messages sent to patients through the DrDoctor system can be confusing. One interviewee noted that some patients may have improved their technology literacy during the SARS-CoV-2 pandemic due to video-calling their family and friends.

When asked whether the digital questionnaires allowed for safe assessment of patients, the majority of clinicians agreed. One interviewee noted that it can be difficult to know whether a patient is well, if they have not responded to a questionnaire. This could be the reason why some clinicians remained neutral to the safety related statements or disagreed. Future insight should seek to understand clinician perceptions on patient safety to determine whether any risks to patient safety due to My Online Care may be present. Notably, the challenge of not being able to assess a patient's wellbeing due to lack of engagement is present in conventional care management pathways and is not specific to My Online Care.

100% **of clinicians report that the information provided by patients in the digital health questionnaires is sufficient to effectively inform pathway decisions**

Staff experiences indicate that clinicians, across *"replaces follow-up"* pathways, express positive attitudes towards My Online Care's impact on staff workload and work experience. Further insights will be required to fully understand administrative and managerial impacts. Additionally, clinician opinions indicated that My Online Care could allow for other wider healthcare system benefits such as workflow efficiencies, increased accuracy and standard of care, as well as increased personalisation of care.

4.5. Addressing the evaluation aims

Effectiveness

My Online Care has been shown to be used effectively by staff and patients across all evaluated pathways from an operational and clinical perspective, with consistent questionnaire use, completion and reviews. While questionnaire completion rates could be increased further, as outlined in the 'Communication and Cohort suitability' recommendations, the digital pathway management solution has been shown to yield a range of benefits. The appointment-replacing capacity within the evaluated pathways was lower compared to the pilot, but the wider benefits,

such as standardised capture of patient responses, appointment time savings for staff and patients and more personalised care. System integration and documentation of questionnaire review outcomes could be improved across pathways to improve workflows and enable improved assessment and ongoing monitoring of the solution's impact. Measures of effectiveness varied across pathways and there was no clear indication as to which pathways might use the solution more or less effectively than others. The effectiveness metrics across each pathway have been summarised in Table 3.

Table 3. Comparison of the effectiveness metrics across the two pathways. Where appropriate, averages have been rounded to the nearest whole percentage. Forms reviewed/forms assigned and follow ups not needed/forms completed ratios do not apply to the *"reviewed at appointment"* pathway.

Metric	"Replaces follow-up"	"Reviewed at appointment"
Forms assigned	1,408	6,833
Form notifications sent/forms assigned ratio	100%	100%
Form reminders sent/forms assigned ratio	44%	66%
Forms completed/forms assigned ratio	67%	50%
Forms reviewed/forms assigned	71%	N/A
Follow ups not needed/forms completed	7%	N/A

Patient Experience

Patients generally expressed positive views about My Online Care. They reported that the app was easy to use and preferred it over other methods of completing health-related questionnaires. Further, patients reported benefits such as My Online care helping them:

- discussing their care with their doctor
- feeling supported by the clinical team
- saving time travelling to and attending appointments, and

- experiencing improvements in the quality of care.

Such benefits have the potential to positively impact patients' wellbeing and quality of life. Patient experiences across each pathway have been summarised in Table 4.

Table 4. Comparison of the patient experience across the two pathways. Percentages detail responses provided for "strongly agree" or "agree" across key questions. Averages have been rounded to the nearest whole percentage. There were 34 survey respondents for the "replaces follow-up" pathway and 30 respondents for "reviewed at appointment".

	"Replaces follow-up"	"Reviewed at appointment"
Ease of use	85%	77%
Preference for DrDoctor	65%	63%
Improved quality of care	41%	37%
Less time organising appointments	53%	30%
Less time travelling to and from appointments	74%	27%
Appropriate support from clinical team	68%	73%
Appropriate appointment attendance	59%	67%
Restricted access to clinical team	26%	43%

Staff experience

My Online care was received well by staff and considered to be a good pathway management solution that is preferred over previously used methods. Clinicians reported positive opinions on the technical delivery, received training and technical support of the solution and identified benefits of:

- My Online Care questionnaire responses effectively enabling pathway decisions
- More standardised patient care

- Increased efficiency of appointments and administrative processes
- Time savings resulting in more time for the review of cases with complex needs
- More personalised patient care

Staff using My Online Care identified some technical limitations of the solution in terms of system integration and patient data review options. Addressing these, as detailed in the Technical improvements recommendations, could improve workflows and create further efficiencies.

Notably, these findings are only relevant to the *"replaces follow-up"* pathway as there were no responses from the *"reviewed at appointment"* pathway staff.

Scale

The use of My Online Care across multiple pathways with differing volumes of use, demonstrates that the solution is scalable from a technical and process perspective. It was highlighted by clinicians that the support of a designated team to oversee the implementation and management of digital pathways can facilitate the successful integration of My Online Care into work practice, by providing or enabling:

- Guidance for the implementation setup
- Clinician and patient engagement
- Questionnaire design and approval
- Oversight of implementation and ongoing use

This designated team could be a helpful resource to support the effective and efficient adoption of My Online Care across pathways and sites.

Impacts on the wider healthcare system

This evaluation showed that My Online Care has the potential to provide a wide range of benefits to facilitate and improve the provision of care services. The solution was shown to enable:

- Efficiencies in care provision and administration
- Improvements in the personalisation and quality of care
- Standardisation of patient response documentation and pathway processes

These benefits could impact patient wellbeing and increase healthcare providers' capacity for care provision. An increase in care capacity could allow for the provision of personalised care and reduce waiting times which could have impacts on patients' longer-term health outcomes. While the gained insights into wider healthcare benefits within this evaluation were impacted by data limitations, further data capture and assessment could be used to provide quantitative estimates of capacity improvements, patient health and financial benefits associated with My Online Care.

5. Limitations

5.1. Evaluation delays and timelines

The evaluation experienced significant delays throughout the project. Such challenges affected various elements of the evaluation, from agreement of the Data Protection Impact Assessment (DPIA) and evaluation plan amendments to the distribution of surveys and the collection of retrospective data. Further complexities included the development of the evaluation plan without direct access to available metrics and data formats required in accordance with local data protection requirements (aggregated, pseudonymised, with applied small number suppression etc.), the involvement of multiple stakeholders in the provision of data across different data sources and the resulting timelines for data extraction. These delays, limitations and challenges further led to a considerable change in the scope of the evaluation.

For example, originally, six quick-win pathways were identified in the evaluation plan. Due to delays, pathway implementation had already begun and the opportunity to collect data prospectively had passed. Instead, new pathways were selected based on sample size and sufficient availability of retrospective data.

The comparison of pathways presented challenges due to differences in the size, patient flow, and nature of each pathway. Further comparison challenges were introduced as the implementation period of My Online Care differed across the pathways. The lack of pathway maps at the time of analysis introduced further difficulties for the comparative assessment.

Additionally, data collection periods for different data sources, i.e., activity data and survey data could not be aligned as implementation had already taken place. Further, activity data was collected over a prolonged period whereas survey data was collected at a single time point. This means that caution should be taken when comparing quantitative and qualitative survey data, as the differing data collection periods could be impacted by external factors potentially reducing their comparability.

5.2. Data availability

With the implementation of My Online Care, digital pathways were introduced with new designated clinics for patient cohorts which were deemed well-suited to the use of the solution. This means that comparable clinics did not exist prior to implementation, which led to the inability to assess patient cohorts and pathways before and after implementation. This lack of a suitable baseline comparator introduced challenges in the interpretation of impact data and limited the ability to form conclusions regarding whether My Online Care yields improvements in efficiency. Additionally, as implementation had already occurred, evaluators were reliant on retrospective metrics.

The evaluators tried to mitigate this data limitation by comparing the responders versus non-responders in the clinical outcome data; however, data may be inherently biased as the response status and clinical outcomes may both be influenced by similar factors, such as the patients' existing health conditions, rather than having a direct causal relationship. There could further be underlying bias in the data as some patient conditions may be of a higher severity or have a greater symptomatic impact on patients' ability to use My Online Care (e.g., experiencing headaches may lead to avoidance of digital screen exposure). It is therefore important to consider such potential biases, when interpreting findings within the current evaluation.

Only two clinician interviews could be conducted due to few clinicians consenting to a further interview. As the sample size was small and from the same speciality (Oncology), findings cannot be generalised to the wider target population of clinicians using My Online Care.

Due to data sharing restrictions, East Midlands AHSN provided support in conducting the clinical outcome data analysis to provide data in aggregated and anonymised form to Unity Insights. During the analysis it was noted that there were some data challenges concerning clinical outcomes being recorded in Medway PAS but not in the DrDoctor system. This resulted in no or only suppressed data for the non-responders across the majority of the pathways, therefore, severely limiting conclusions that could be drawn for *"replaces follow-up"* pathways. Additionally, available data did not allow for the distinction between different types of appointments (e.g., F2F, digital etc.). This has resulted in all avoided appointments being considered as digital appointments rather than F2F appointments. Firm conclusions on wider system benefit relating to patient travel could not be determined due to a lack of post code data.

Further, due to data limitations and current documentation practices, the use of questionnaires for triage and research purposes, and alternative possible questionnaire review outcomes to those discussed in this report, such as phone calls or nurse practitioner appointments, did not form part of the current evaluation.

Missing data points and data challenges have resulted in the evaluators being unable to make firm claims against staffing efficiencies as the data could not allow for the quantification of time savings or the decrease in the duration of appointments; although there are qualitative data to provide anecdotal evidence of time savings.

6. Recommendations

6.1. Technical improvements

To enhance workflow efficiencies, My Online Care could be modified to allow all patient data to be viewed in one dataset and allow the ability to filter clinics by date. One clinician suggested they

would benefit from the ability to compare questionnaire responses from old and new questionnaires. Currently, it is difficult to assess multiple submissions by the same patient and it is difficult to assess how the patient cohort is progressing over time. Clinicians have adapted to this challenge by keeping a spreadsheet of the scores so that this could be viewed over time. This solution, however, could be prone to error.

Improved messaging capability could further enhance the application's functionality. For example, when questionnaires are reviewed, it would be beneficial to enable two-way in-app communication between the patient and the clinician, should there be additional questions. This could potentially avoid the clinician having to call the patient and reduce the risk of review outcomes not being documented on the DrDoctor system.

Better system integration between Medway PAS and DrDoctor could assist in avoiding any double documentation of outcomes.

Any amendments to the technical My Online Care platform should be designed, tested and refined through a collaborative development process with the platform provider and input from clinical teams and patients, where possible, to ensure that functionalities are optimised to meet user and workflow needs.

6.2. Communication

Notifying the patient of the solution at early stages of their patient journey (i.e., preventing that it is perceived as a sudden and unexpected change in their care) was viewed as helpful in achieving positive patient attitudes towards the solution. Such communication should further ensure that patients understand the potential benefits of My Online Care, as this could increase patient engagement.

Ensuring that patients are provided with clear notification and reminder text messages could increase the frequency of completed questionnaires and improve communication between patients and clinicians. Questionnaires could also explain to patients why some perceptually unusual questions may be asked to ensure patients understand why the question is appropriate for their care.

6.3. Cohort suitability

When implementing My Online Care into new specialties, it is recommended that well-defined pathways are selected with generally stable patient outcomes and consistent pathway decisions. Interview responses noted that patients who are unlikely to experience major adverse effects due to their treatment would be suitable for My Online Care. Additionally, it was noted that the most appropriate patient cohorts for this solution could be patients that do not live close to the hospital, as travel can be avoided. Whilst clinicians struggled to clearly articulate the most appropriate

patient cohort for the solution, clinicians found it easier to define cohorts where the solution would not be appropriate, for example, patients that experience language barriers, patients that have eyesight issues or patients that do not have access to technology. Such factors may be internal or external to specific pathways (e.g., pathways concerned with eyesight issues may not be a suitable patient cohort for this digital solution).

To mitigate digital literacy issues, implementation sites may want to develop a plan around assisting patient cohorts that may be excluded due to digital literacy or lacking access to digital devices. Providing patients with guidance to allow them to navigate the technology used to complete questionnaires on DrDoctor could lower the impact of health inequalities and increase accessibility to care.

To further improve patient safety, a possible integration of fail-safe mechanisms could be explored for clinicians to identify deterioration of high-risk patients in the non-responder groups.

6.4. Development of implementation guidance

Clinicians articulated the benefits of a dedicated implementation and management team for My Online Care across the pathways. Such a team was thought to help with a smooth implementation and ongoing support. Additionally, formalised guidance could outline what training is required for clinical staff, advice for the development of questionnaires (e.g., what types of questions to include), what level of technical guidance patients need to use the application correctly, as well as best practice for onboarding of patients and ensuring that assignment to the pathway is appropriate for the patient. Clinical workflow guidance should define clearly when reviews should be completed, how outcomes should be documented, on which system (e.g., Medway PAS or DrDoctor) and how to document information when patients are being contacted outside of the app. Ensuring that pathway maps exist and are shared with relevant teams and stakeholders for both the baseline and intervention pathways can clarify potential benefits and impacts of deviations from recommended workflow and documentation practices. Understanding the pathway, team and patient needs before implementation could allow for effective onboarding of staff before the solution is launched at other sites and could standardised the workflow.

6.5. Data capture

As data access was problematic, internal reviews of the relationship between key data points and clinical outcomes could enable a better understanding of the solution’s performance. Building a comprehensive and linkable dataset of relevant impact metrics would allow for ad hoc assessments and ongoing monitoring of impact metrics against the baseline, review of current practices, and could inform potential improvements and further assess their impact.

6.6. Understanding and sharing wider benefits

The solution has some promising benefits beyond appointment saving capabilities. As there is acceptance of the solution across patients and clinicians, the solution could be implemented more widely, regardless of the ability to replace appointments, as the solution could improve important elements of care, such as documentation of the patient responses, safety, and personalisation of care. Sharing learnings and potential benefits with commissioners and sites, interested in using the solution, could further enable informed decision making.

7. Conclusion

My Online Care presents a digital pathway management solution, which could be used effectively after a short implementation period across different pathway types (*"replaces follow-up"* and *"reviewed at appointment"*), a range of specialties and pathways of varying scale. While the appointment-replacing capacity of the questionnaires in respective pathways was lower than found during the pilot, additional benefits associated with the solution's use were identified for both patients and clinicians (e.g., possible workload efficiencies, delivering personalised care, continuation of the delivery of safe care, standardisation of care, reducing travel time to appointments). Additionally, the solution was well received by patients and staff, with staff highly recommending the solution.

As patient-level clinical data could not be accessed directly due to data protection requirements and data was provided in aggregated form, an assessment of causal relationships between the use of My Online Care and resulting impacts on clinical outcomes could not be performed. Potential health inequalities could be explored further to optimise uptake in less engaged patient groups.

Addressing workflow challenges, establishing a dedicated implementation and management team, considering the suitability of patient cohorts, implementing guidance on documentation, and facilitating more robust data collection could allow the approach to work effectively at scale and for the wider healthcare system benefits to be better articulated.

8. References

British Medical Association. (2022). *An NHS under pressure*. The British Medical Association Is the Trade Union and Professional Body for Doctors in the UK. https://www.bma.org.uk/advice-and-support/nhs-delivery-and-workforce/pressures/an-nhs-under-pressure

Charlson, M. E., Pompei, P., Ales, K. L., & MacKenzie, C. R. (1987). A new method of classifying prognostic comorbidity in longitudinal studies: Development and validation. *Journal of Chronic Diseases*, *40*(5), 373–383. https://doi.org/10.1016/0021-9681(87)90171-8

CustomerGauge. (2021). *The State of B2B Account Experience. B2B NPS & CX Benchmarks Report*.

DrDoctor. (2023). *Assessments Reporting*. DrDoctor Help Centre. https://docs.dr.doctor/en/articles/83303-assessments-reporting

East Midlands Academic Health Science Network. (2019). *Digital Outpatients at NUH [PowerPoint slides]*.

Gasparini, A., scores), H. S. (ICD-9-C., Williman, J., Chia, S. Y., & Teo, E. (2023). *comorbidity: Computing Comorbidity Scores* (1.0.7) [Computer software]. https://cran.r-project.org/web/packages/comorbidity/index.html

Ministry of Housing, Communities, & Local Government. (2019, September 26). *English indices of deprivation 2019*. GOV.UK. https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019

NHS Digital. (2020). *Hospital Outpatient Activity 2019-20*. https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity/2019-20

NHS Digital. (2022). *Hospital Outpatient Activity 2020-21*. https://digital.nhs.uk/data-and-information/publications/statistical/hospital-outpatient-activity/2020-21

NHS England. (2019). *The NHS Long Term Plan*. https://www.longtermplan.nhs.uk/publication/nhs-long-term-plan/

NHS England. (2020). *Delivering a 'Net Zero' National Health Service*. https://www.england.nhs.uk/greenernhs/publication/delivering-a-net-zero-national-health-service/

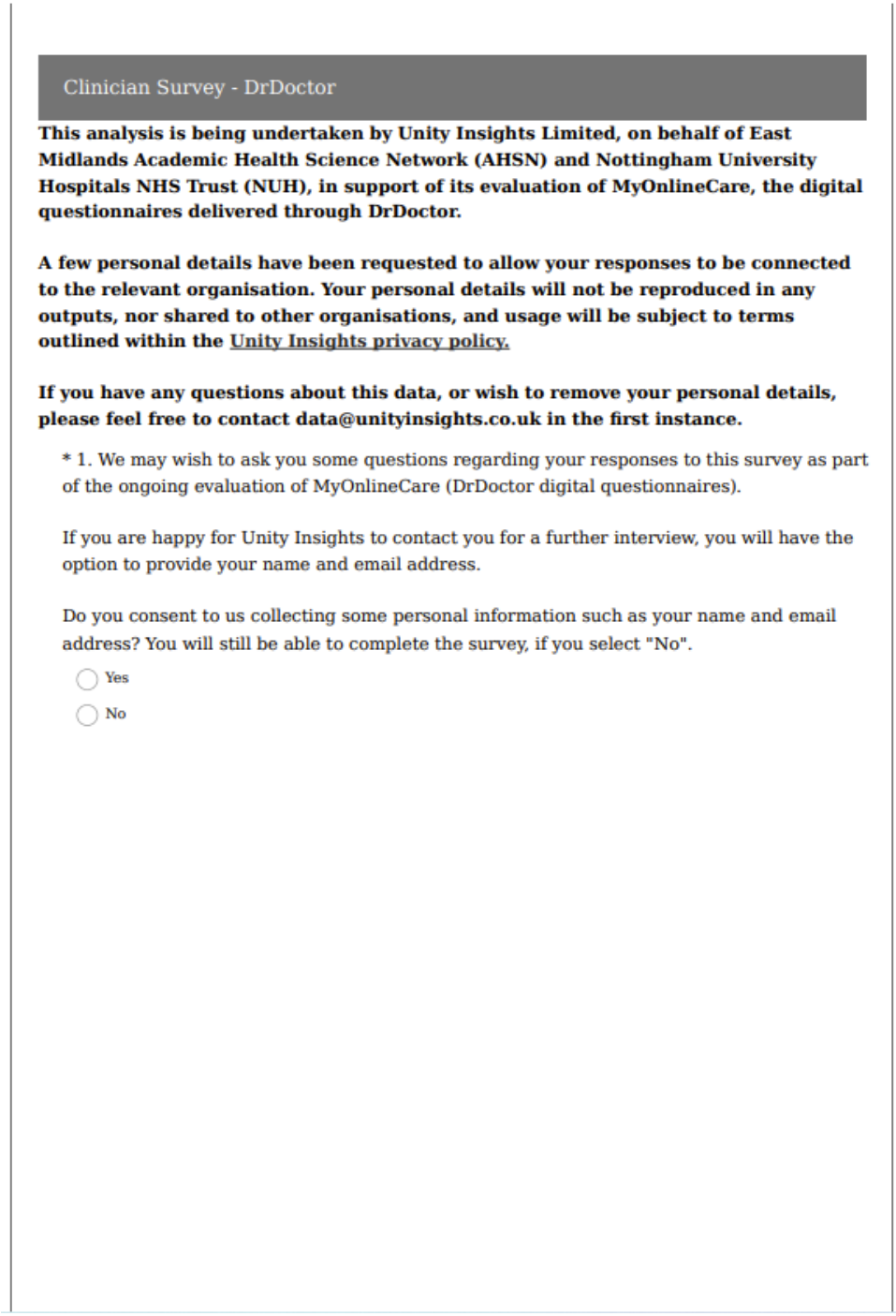
Office for National Statistics. (2022). *ONS Postcode Directory (August 2022)*. https://geoportal.statistics.gov.uk/datasets/ons::ons-postcode-directory-august-2022-1/about

Sivanandan, M. A., O'Cathail, M., & Christian, J. (2022). Electronic Patient-Reported Outcome Measures for Monitoring of Patients on Cancer Treatment Can Reduce the Need for Face-To-Face Hospital Visits: A Tertiary UK Oncology Centre Experience. *Clinical Oncology*, *34*(1), e79. https://doi.org/10.1016/j.clon.2021.10.003

Sivanandan, M. A., Sharma, C., Bullard, P., & Christian, J. (2021). Digital Patient-Reported Outcome Measures for Monitoring of Patients on Cancer Treatment: Cross-sectional Questionnaire Study. *JMIR Formative Research*, *5*(8), e18502. https://doi.org/10.2196/18502

9. Appendices

9.1. Appendix A: Clinician survey



Clinician Survey - DrDoctor

This analysis is being undertaken by Unity Insights Limited, on behalf of East Midlands Academic Health Science Network (AHSN) and Nottingham University Hospitals NHS Trust (NUH), in support of its evaluation of MyOnlineCare, the digital questionnaires delivered through DrDoctor.

A few personal details have been requested to allow your responses to be connected to the relevant organisation. Your personal details will not be reproduced in any outputs, nor shared to other organisations, and usage will be subject to terms outlined within the Unity Insights privacy policy.

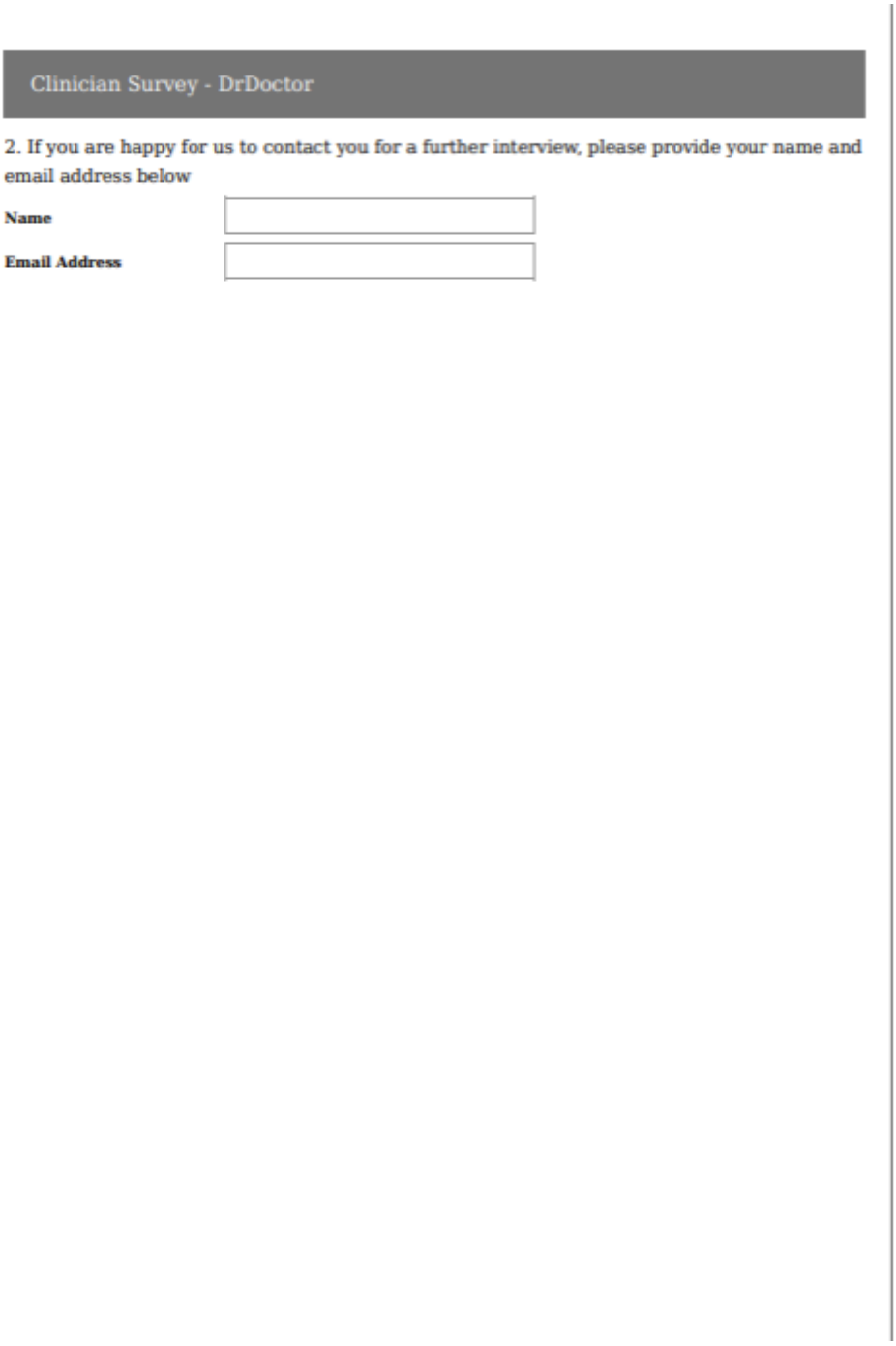
If you have any questions about this data, or wish to remove your personal details, please feel free to contact data@unityinsights.co.uk in the first instance.

* 1. We may wish to ask you some questions regarding your responses to this survey as part of the ongoing evaluation of MyOnlineCare (DrDoctor digital questionnaires).

If you are happy for Unity Insights to contact you for a further interview, you will have the option to provide your name and email address.

Do you consent to us collecting some personal information such as your name and email address? You will still be able to complete the survey, if you select "No".

- ◯ Yes
- ◯ No


Clinician Survey - DrDoctor
2. If you are happy for us to contact you for a further interview, please provide your name and email address below
Name
Email Address

Clinician Survey - DrDoctor

* 3. How likely is it that you would recommend MyOnlineCare (DrDoctor digital questionnaires) to a friend or colleague?

NOT AT ALL LIKELY — EXTREMELY LIKELY

0 1 2 3 4 5 6 7 8 9 10

* 4. Please indicate your clinical speciality. Please select all applicable specialties.

- [ ] Clinical Haematology MGUS
- [ ] Hepatology HBV Hepatitis B
- [ ] Neurology Headache
- [ ] Oncology Head and Neck
- [ ] Oncology Prostate
- [ ] Paediatric Dermatology

* 5. How long have you been using MyOnlineCare (DrDoctor digital questionnaires)?

- ( ) Less than 3 months
- ( ) Between 3 and 6 months
- ( ) 6 months or more

* 6. Have you worked in the same clinic before MyOnlineCare (DrDoctor digital questionnaires) was implemented?

- ( ) Yes
- ( ) No
- ( ) Unsure

* 7. Please indicate which answer is most appropriate for each statement relating to the technical delivery and implementation of MyOnlineCare (DrDoctor digital questionnaires) below:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The training I received before starting to use MyOnlineCare was adequate	○	○	○	○	○
MyOnlineCare is easy to use from a technical perspective.	○	○	○	○	○
MyOnlineCare / questionnaire information is easily accessible.	○	○	○	○	○
MyOnlineCare reduces the administrative burden for pathway management for me.	○	○	○	○	○
The technical support provided for the use of MyOnlineCare is adequate.	○	○	○	○	○
The administrative support for the use of MyOnlineCare in my clinic is adequate.	○	○	○	○	○

8. If you selected disagree or strongly disagree for any of the statements above, please provide further detail.

* 9. Please indicate which answer is most appropriate for each statement relating to your experience of using MyOnlineCare (DrDoctor digital questionnaires) below:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
The information provided by patients through the questionnaires is generally sufficient to make informed decisions in regard to the patient pathway (e.g., whether an appointment is needed).	○	○	○	○	○
I am aware that I can overwrite pathway decisions, if I disagree with or have concerns about the outcome of the digital questionnaire assessment.	○	○	○	○	○
Patient care is more standardised.	○	○	○	○	○
The average time needed for appointments is reduced.	○	○	○	○	○
I have more time for the face-to-face review of cases with complex needs.	○	○	○	○	○
MyOnlineCare supports the efficiency of appointments.	○	○	○	○	○
MyOnlineCare supports the efficiency of administrative processes.	○	○	○	○	○

10. If you selected disagree or strongly disagree for any of the statements above, please provide further detail.

11. The digital questionnaires always allow for a safe assessment of patients.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree

Clinician Survey - DrDoctor

* 12. Please indicate which answer is most appropriate for each statement relating to your opinion regarding the safety of using MyOnlineCare (DrDoctor) below:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
I think the digital pathway could cause adverse events (e.g., patients not being recalled for appointments when needed).	○	○	○	○	○
I have experienced the digital pathway causing adverse events.	○	○	○	○	○
I know how to raise concerns about the safety of the digital questionnaires.	○	○	○	○	○

13. Do you have any further comments or concerns around the safety of using MyOnlineCare (DrDoctor)? For example, if you feel that MyOnlineCare improves or hinders patient safety, please provide further details below.

Clinician Survey - DrDoctor

* 14. Please indicate which answer is most appropriate in relation to your impression of MyOnlineCare:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
When I first heard of MyOnlineCare, I thought it would be a good solution for managing patient pathways.	○	○	○	○	○
Now that I have used MyOnlineCare, I prefer using MyOnlineCare over how patient care pathways was were managed previously.	○	○	○	○	○

15. Do you have any further thoughts or comments in regard to MyOnlineCare?

9.2. Appendix B: Patient survey

This analysis is being undertaken by Unity Insights Limited, on behalf of East Midlands Academic Health Science Network (AHSN) and Nottingham University Hospitals NHS Trust (NUH), in support of its evaluation of MyOnlineCare, the digital questionnaires delivered through DrDoctor. All responses collected within this survey are anonymous and no personal data is collected.

* 1. Which of these best describes the type of care you receive through DrDoctor (digital questionnaires)?

- ◯ Clinical Haematology MGUS
- ◯ Hepatology HBV Hepatitis B
- ◯ Neurology Headache
- ◯ Oncology Head and Neck
- ◯ Oncology Prostate
- ◯ Paediatric Dermatology

* 2. How long have you been using DrDoctor (digital questionnaires)?

- ◯ Less than 3 months
- ◯ Between 3 and 6 months
- ◯ 6 months or more

* 3. Have you received face-to-face care from the same clinic before using DrDoctor (digital questionnaires)?

- ◯ Yes
- ◯ No
- ◯ Unsure

* 4. Please indicate which answer is most appropriate for each statement relating to the technical delivery of DrDoctor (digital questionnaires) below:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
DrDoctor is easy to use.	◯	◯	◯	◯	◯
The guidance on how to complete questionnaires is appropriate.	◯	◯	◯	◯	◯
I feel the information requested in the questionnaire is appropriate for my care.	◯	◯	◯	◯	◯
I feel I can answer the questions in the questionnaire.	◯	◯	◯	◯	◯

5. If you selected disagree or strongly disagree for any of the statements above, please provide further detail.

* 6. I prefer using DrDoctor over other methods of completing questionnaires related to my care.

- ◯ Strongly agree
- ◯ Agree
- ◯ Neutral
- ◯ Disagree
- ◯ Strongly disagree
- ◯ N/A

7. If you selected disagree or strongly disagree for the statement above, please provide further detail.

* 8. Please indicate which answer is most appropriate for each statement relating to your experience of using DrDoctor (digital questionnaires) below:

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
DrDoctor helps me discuss my care with my doctor.	◯	◯	◯	◯	◯
The quality of my care has improved.	◯	◯	◯	◯	◯
I spend less time organising appointments.	◯	◯	◯	◯	◯
I spend less time travelling to and from appointments.	◯	◯	◯	◯	◯
I spend less time attending appointments.	◯	◯	◯	◯	◯
I receive the support I need from my clinical team.	◯	◯	◯	◯	◯
I feel I am only asked to attend appointments, when I feel I need to see a doctor.	◯	◯	◯	◯	◯
I feel I cannot see a doctor when I need to see them.	◯	◯	◯	◯	◯

9. If you selected disagree or strongly disagree for any of the statements above, please provide further detail.

* 10. Please indicate which answer is most appropriate in relation to your impression of DrDoctor (digital questionnaires)

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
When I first heard of DrDoctor, I thought it would be a good solution for facilitating my appointments.	○	○	○	○	○
Now that I have used DrDoctor, I prefer using DrDoctor over how my appointments were organised previously.	○	○	○	○	○

11. Do you have any further thoughts or comments in regard to DrDoctor (digital questionnaires)?

9.3. Appendix C: Clinician interview questions

The questions clinicians were asked in their interviews were as follows:

1) What knowledge or experiences around barriers and enablers for a successful implementation would you want to share with sites looking to adopt My Online Care?
2) What kind of training could have improved the implementation process for My Online Care?
3) Which patient demographics are most and least suited to the use of My Online Care
4) Would it be helpful, if My Online Care questionnaires would by default allow patients to write a free text response about any issues or concerns, which may not be addressed otherwise by the questionnaire, e.g., if they would like to discuss complex answers to questions in person?
5) Do you have any concerns around patient safety when using My Online Care? If so, how could these be addressed?
6) From your perspective, what are the potential key benefits of My Online Care to the wider healthcare system?
7) How could My Online Care be improved?
8) How is DrDoctor / My Online Care different from other digital pathway solutions that you may have used in the past?

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