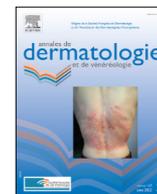




Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en



Original article

Retaining dermatology patients in primary care through dialogue with secondary care providers: A service evaluation



J. Brainard ^{a,*}, A. Crawford ^b, B. Wright ^c, M. Lim ^d, P. Everden ^{a,b}

^a Norwich Medical School, University of East Anglia, Norwich NR4 7TJ, United Kingdom

^b North Norfolk Primary Care, 4 Alkmaar Way, Norwich NR6 6BF, United Kingdom

^c North Bristol NHS Trust, Southmead Road, Westbury-on-Trym, Bristol BS10 5NB, United Kingdom

^d Norfolk and Waveney Integrated Care Board, County Hall, Martineau Lane, Norwich NR1 2DL, United Kingdom

ARTICLE INFO

Article history:

Received 30 March 2023

Accepted 7 November 2023

Keywords:

Pathway management

Health services

Primary care

Referrals

Dermoscopy

ABSTRACT

Background: There are long patient waiting lists for specialist care. A dermatology dialogue service between primary and secondary care (DDPS) was developed in eastern England. Primary care referrers uploaded patient images of skin conditions for review by and dialogue with consultant dermatologists in an attempt to retain patients in primary care rather than refer them to secondary care.

Methods: Evaluation of service performance against specific targets, including reduction in secondary care waiting list growth over the period April 2021–March 2022 inclusive. Service activity was summarized in terms of speed of resolution, case numbers, and dispositions. Clinician and patient satisfaction were assessed using structured questionnaires. Actual numbers of new referrals were compared to projections based on historical data. Waiting list growth was compared to other specialties and other commissioning areas. Waiting times to initial treatment were monitored.

Results: Over 3300 patients were enrolled and >90% of dialogues were resolved within 36 hours. Clinician and patient satisfaction were high. Frequently asked questions and conditions were highlighted by dermatologists to design and deliver an educational event for primary care clinicians that was well received. Waiting list growth for dermatology patients in the commissioning area was smaller than for other major specialties, and generally smaller than growth for dermatology waiting lists commissioned by other NHS commissioners. There was no negative impact on the urgent priority (cancer pathway) waiting list.

Conclusion: The DDPS was satisfactory for clinicians and patients and coincided with lower growth in dermatology waiting lists than might otherwise have been expected.

© 2024 The Author(s). Published by Elsevier Masson SAS. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Skin conditions are among the most common reasons why people seek health care [1]. Most skin conditions can be identified and treated by primary care practitioners without the need for specialist consultation, but historically in the UK, approximately 1 in 15 primary consultations for skin conditions result in referral to secondary care [2]. The vast majority of UK residents receive their healthcare through the National Health Service (NHS) [3]. In the NHS model, a registered general practice (GP) surgery is the ‘care home’ for patients, where most of their healthcare is initiated. General practitioner (GP) surgeries can refer patients onward to

consultants in secondary care for any conditions that require specialist knowledge and treatment, including all suspected cancers. The COVID epidemic has exacerbated what were already significant delays in assessment and treatment across all secondary specialties in the UK [4,5]. Teledermatology has often been proposed as a way to improve the efficiency of service delivery. The exchange of images and patient histories between primary and secondary care providers could potentially retain patients in primary care without the need to see a specialist. All good quality telemedicine relies on accurate and relevant patient information alongside high quality and representative images. An innovative dermatology pathway was implemented in Norfolk and Waveney (N&W) in the East of England as part of an entire system pathway redesign, which also aligned well with NHS England’s Transforming Elective Care programme. The aim of the service was to develop a ‘Transfer to Transform’ specification. The intended outcome was

* Corresponding author at: Norwich Medical School, University of East Anglia, Norwich NR4 7TJ, United Kingdom.

E-mail address: j.brainard@uea.ac.uk (J. Brainard).

a single system, a clinically sustainable service with a central specialist hub (Norwich) and a service firmly rooted in primary care. Other potential benefits of the Dermatology Dialogue Service between Primary and Secondary Care (DDPS) pathways were much faster diagnosis, faster treatment, upskilling of primary care generalists, and shorter waiting lists for those needing to see dermatology consultants. The DDPS is fully integrated with other pathways and was planned at commissioning to be evaluated in terms of patient-centered outcomes, service performance targets, wider system effects (particularly waiting list sizes), and clinician satisfaction.

2. Materials and methods

2.1. DDPS service description

The DDPS was designed for patients who would otherwise be eligible for routine priority referrals for face-to-face assessment by secondary care specialists. Primary care practices were supplied with an imaging device (dermatoscope) and a mobile phone application that was fully integrated with existing primary care referral management systems (either System One or EMIS). The dermatoscopes were either Schuco DermLite DL200 Hybrid or Illuco Dermatoscope IDS-1100, both supplied with smartphone adapters. The mobile phone interface was on the CINAPSIS platform. Service activity data was collected by an outsourcing company, Xyla Elective Care. The DDPS required primary care clinicians (General Practitioner or Advanced Nurse Practitioner) to take a patient history together with images of the affected skin areas and upload the information to a secure information exchange platform. Specialists reviewed the information with response options to request more information, urge the patient to attend a face-to-face visit with the specialist, or discharge with a care plan to be implemented in primary care. Following dialogue between the generalist and specialist, the primary care provider contacted the patient to communicate the preliminary diagnosis and treatment plan. Fig. 1 shows the DDPS pathway and outcomes. The DDPS was piloted from November 2020 and was available as a routine service from mid-

February 2021. We focus our reporting on service activity during the months of April 2021 to March 2022.

2.2. Evaluation

The performance of the DDPS in relation to serious incidents (resulting in serious harm or death in patients) or complaints (which had to be investigated and dealt with within the timescales required by national regulators at the same time) was assessed and reported elsewhere (performance was good) [6]. Otherwise, at launch, the service had the following specific performance goals:

- Ensure 100% of dialogue resolutions within 72 hours
- Among those enrolled in the DDPS, reduce the number of patients referred to hospital by at least 60%.
- Where patients remained in primary care, 100% of diagnosis and management plan to be agreed within two days
- Good clinician and patient satisfaction
- Identification of training opportunities for generalists
- Reduction in patient waiting times for secondary care.

We used service activity records to report how well the service met the first three specific objectives. Primary and secondary care providers were asked to provide feedback on ease of use and quality of training soon after registration and training on the software system. In subsequent questionnaires, healthcare professionals were asked for suggestions on possible benefits or challenges associated with using the DDPS service. Consenting patients were contacted by text message or email a few days after completion of their DDPS referral to complete a brief satisfaction survey. Satisfaction results and an educational session designed with clinician feedback are described qualitatively herein. The potential impact of DDPS on dermatology care in N&W was considered in terms of mean waiting times, number of new waiting list entries, total waiting list size, and existing target waiting time. As a comparison to N&W, we looked at commissioners in the rest of England (excluding N&W). Services in the rest of England could in practice be any commissioning centre or clinical commissioning group. A concur-

Patient Pathway for Shared Management Dermatology (SMD)

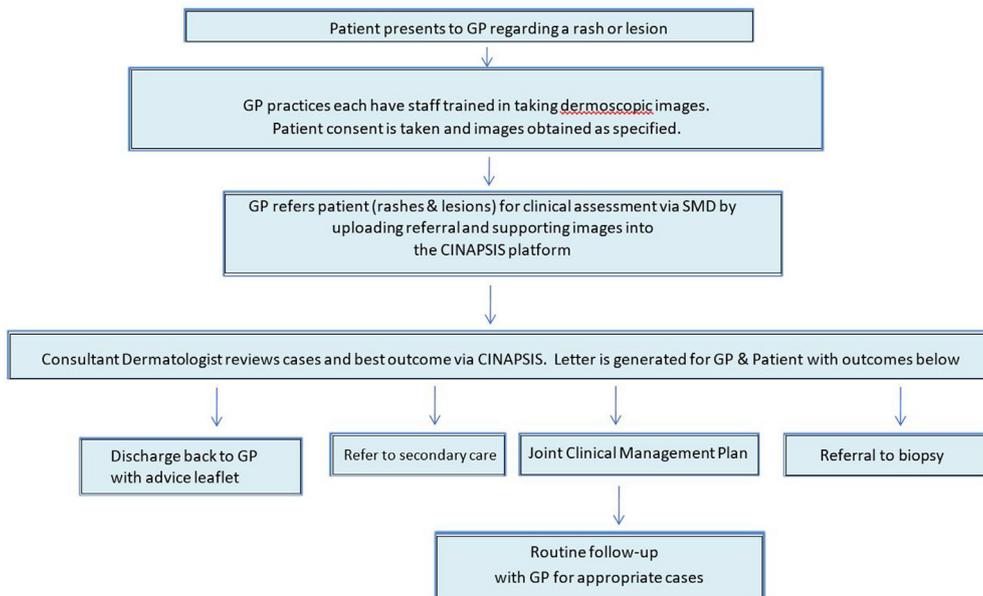


Fig. 1. The DDPS pathway.

rent national key performance indicator (KPI) was that 95% of patients referred to secondary care should be seen within 18 weeks. Data on performance in relation to this waiting time KPI were obtained from NHS England. Exact URLs for this KPI and other data sources are provided in each results section. We consider mean waiting times for N&W-commissioned dermatology compared to dermatology services commissioned by other major providers (at least 1000 referrals on the waiting list) in the rest of England, and waiting lists for other specialist care commissioned for N&W residents. The N&W system itself consisted of about 105 general practices, with about 690 GPs and about 30 dermatology consultants working in the three secondary care hospitals in the area, and serving a population of around 1.1 million. Finally, in terms of waiting times, we considered whether the DDPS had had a detrimental effect on another pathway of care. The DDPS was designed with the aim of reducing the size of the waiting list for people on the routine (non-urgent) referral pathway. If images of lesions were not of sufficient quality for diagnosis, the safest decision for consultants might be to refer patients to the urgent pathway (cancer, two-week wait: 2WW). It thus seemed possible that patients whose treatment priority was escalated through the DDPS service might have the unintended consequence of overloading the 2WW urgent care pathway.

Moving to the 2WW pathway could bring both potential benefits and harm to the system and to the patients themselves. While most patients might appreciate faster assessment and treatment, they could also be unnecessarily alarmed by escalation of their care priority. From a system perspective, there is potential harm if specialists unnecessarily move routine referrals to the urgent pathway. Without increased provider capacity, pathway movement could lead to longer waits to be seen and greater delays in treatment for those subsequently diagnosed with cancer. A separate evaluation would be needed to fully understand whether these unintended escalations in fact led to earlier cancer diagnoses or were instead truly unnecessary, and how individual patients were affected. Our limited assessment looked only at some possible impacts on treatment pathways (waiting times and waiting list sizes). The data we used to assess potential impacts on the 2WW pathway in N&W relate to the time taken to see a specialist (“referral to treatment time”, RTT). The national target (KPI) of 2WW is that 95% of patients should be seen by a specialist within 14 days of initial referral.

Descriptive and comparative statistical analyses were performed using Stata v. 17. Approval to conduct this analysis was granted by our IRB, Ref. ETH21-22-0034.

3. Results

3.1. Activity summary

Table 1 shows the number of DDPS dialogues among the 105 eligible N&W surgeries. In each surgery where the DDPS was tested, it typically generated about 7 resolved cases per month.

Table 1
Statistics about general practice (GP) surgeries and clinicians using the DDPS: March 2021–March 2022.

Month	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
#GPS	8	15	28	41	50	42	53	51	50	47	54	53	59
#Refs	21	36	53	89	109	100	137	128	135	116	122	130	155
Avg#	5.5	4	3.5	5.3	6.0	6.5	7.6	6.2	7.2	5.6	5.6	7.1	7.2
R	11	24	36	49	18	39	65	47	44	38	44	45	66
L	33	36	60	161	112	223	318	243	246	172	194	267	307
O	0	0	2	7	172	12	21	26	72	51	67	63	51

#GPS: number of unique surgeries. #Refs: number of clinicians who initiated dialogues, Avg.#: number of completed cases in participating practices. R, L, O: numbers of cases in which skin condition was presented as rash, lesion, or other, respectively.

By July 2021, the DDPS was consistently used by approximately 51 individual surgeries at least once per month. During the monitoring period, 337 individual callers (from primary care) tried the DDPS at least once. Four specialists participated, of whom two handled 91% (n = 3089) of all 3398 dialogues resolved in the period 1 April 2021 to 31 March 2022 inclusive.

3.2. Timeliness

The mean time from case initiation to resolution was 8 hours 12 minutes. Nearly 95% (n = 3211) of cases were resolved within 36 hours. A small proportion (n = 57, 1.7%) of cases were resolved > 3 days after case initiation. In addition to the 3398 resolved cases, there were 351 unresolved cases (with outstanding requests from secondary care for additional images or more information) at the audit date (5 May 2022).

3.3. Retention in primary care or placement on the secondary care pathway

As of 5 May 2022, 65% (n = 2217) of 3398 resolved cases had been retained in primary care following DDPS, 16% (n = 538) were referred for routine secondary care, and 19% were moved to the two-week (urgent) waiting pathway. The percentage of cases each week that were retained in primary care (mean: 66%, 90% range: 55–78%) or transferred to the urgent pathway (mean 20%, 90% range: 11–27%) was fairly consistent throughout the monitoring period. There was no significant trend (increase or decrease) in the number of patients retained in primary care or transferred to the 2WW pathway (linear regression not shown).

3.4. Referrer satisfaction with the service

Forty-five primary care referrers provided at least some responses in the satisfaction survey: 75% of 37 respondents were very satisfied with the service, 25% were satisfied (no negative responses were received), and 67% reported no problems using the service. Open-ended comments about the service were solicited. Many of the negative comments were related to infrastructure (e.g., poor Wi-Fi in the practice) or difficulty using a dermatoscope. The most commonly cited benefit was speed of response (n = 15, 60%) in 25 comments; the fact that the service provided a training opportunity was cited by 5/25 (20%). The value of access to expertise and the high quality of responses from specialists was praised in several responses.

3.5. Training for referrers

Taking into account the feedback from referrers and specialists, a training session for 34 primary care staff was held on 7 December 2021 on how to use the dialog platform (CINAPSIS) in an optimal way, how to diagnose skin diseases in primary care (especially seborrheic keratoses), and how to use a dermatoscope. In an

anonymous post-event survey, 17 of 18 respondents agreed or strongly agreed that “It was a fun way to learn” and that “The information presented was useful”.

3.6. Patient satisfaction

Nine patients completed the patient satisfaction questionnaire, and they all reported a ‘very positive’ experience with DDPS, the highest rating possible. There were no complaints. Comments included:

- “very fast service”
- “excellent service”
- “fabulous service”
- “very pleased with the speed of response”
- “my level of anxiety has diminished completely”.

3.7. Waiting times to treatment

Data were taken from the table entitled “Incomplete waits by commissioner” at <https://www.england.nhs.uk/statistics/statistical-work-areas/rtt-waiting-times/rtt-data-2021-22/>. The mean waiting time (number of weeks that had elapsed for referrals still waiting to be seen on any pathway, routine or urgent) for dermatology cases in N&W was 19.3 weeks at the end of April 2021 and 20.5 weeks at the end of March 2022. This compares to other large providers (at least 1000 people on the waiting list in either April 2021 or March 2022), for which the mean waiting time was 7.2 weeks (IQR 5.3–9.7) in the rest of England at the end of April 2021 and 12.2 weeks (IQ 8.8–16.9) at the end of March 2022, i.e. an increase of 5 weeks. Waiting times in N&W increased over this period (by 1.2 weeks), but much less than dermatology waiting times, which tended to increase elsewhere in England.

3.8. Waiting list sizes: Dermatology and other specialties

We compared the size of the waiting lists to receive specialist dermatology services from N&W and all Rest-of-England commissioners. Table 2 shows how waiting lists grew for each group of commissioners. Waiting lists for N&W grew initially, followed by a reduction in list size from October 2021 to March 2022 inclusive. A different growth trajectory was observed for Rest-of-England, where there was a steady growth or plateau in the monthly number of waiting cases between April 2021 and March 2022. Due to unobserved multi-factorial other management and system factors, these results cannot be taken as objectively demonstrating that the

DDPS resulted in a fall in waiting list size in N&W, but it was encouraging that N&W commissioned dermatology bucked the national trend coinciding with the later period of DDPS operation.

From the end of April 2021 to the end of March 2022, the increase in waiting list size was 42.8% for Rest-of-England and 13.2% for N&W. The increase in waiting list size for specialist dermatology over the monitoring period was much smaller in N&W than in Rest-of-England, and decreased between the end of October 2021 and the end of March 2022.

3.9. Waiting times for other specialties in N&W

At the end of March 2022, the nine largest non-surgical waiting lists for specialist care in England in 2021–22 were: trauma and orthopaedics 730,930; ophthalmology 632,817; ear, nose, and throat 498,397; gynaecology 481,083; urology 351,203; paediatrics 340,240; gastroenterology 340,131; dermatology 316,383; and cardiology 298,304. Table 3 shows the size of the waiting lists for each of the non-dermatology specialties in N&W for the period March 2021–March 2022 inclusive. All waiting lists grew by a mean 23.3% between the end of April 2021 and the end of March 2022. Three specialties (gastroenterology, ophthalmology, and trauma and orthopaedics) had waiting list increases that were smaller (in percentage terms) than the change in the size of the dermatology waiting list over the same period. Most specialties peaked in the first quarter of 2022. Dermatology in N&W had waiting list increases that were slightly better (smaller) than most other specialties.

3.10. Effects of DDPS on the two-week pathway (urgent, suspected cancer)

The 2WW has as a key performance indicator (KPI) that 95% of patients should be seen by a specialist within 14 days of initial referral. Over 99% of N&W commissioned services are provided by three acute providers whose case numbers are shown in Table 4. These data show that the 2WW target was rarely met, either for N&W patients or nationally. Both N&W and Rest-of-England had an increase in 2WW referrals during June–November 2021. In June–November 2021, cases transferred from the DDPS pathway to the 2WW pathway accounted for approximately one fifth of the increase in referrals. This means that the vast majority of the surge in demand in N&W in 2021 was not due to cases moved from DDPS.

Table 2

Month-on-month increase in the size of the dermatology waiting list for Norfolk and Waveney (N&W) commissioners vs. the rest of England.

Audit point	Cases waiting Rest of England	Rest of England % monthly incr.	Cases waiting N&W	N&W % monthly incr.
Mar-21	199 426		7606	
Apr-21	215 320	8.0%	7850	3.2%
May-21	230 070	6.9%	7898	0.6%
Jun-21	250 008	8.7%	8157	3.3%
Jul-21	268 605	7.4%	8415	3.2%
Aug-21	279 454	4.0%	8908	5.9%
Sep-21	291 802	4.4%	9439	6.0%
Oct-21	297 896	2.1%	9658	2.3%
Nov-21	297 070	−0.3%	9638	−0.2%
Dec-21	293 693	−1.1%	9302	−3.5%
Jan-22	295 640	0.7%	9236	−0.7%
Feb-22	301 077	1.8%	8928	−3.3%
Mar-22	307 495	2.1%	8888	−0.4%

Waits are for combined pathways (urgent and routine); incr. = increase; audit point = last day of each calendar month); Source: Table “Incomplete waits by commissioner” at <https://www.england.nhs.uk/statistics/statistical-work-areas/rtt-waiting-times/rtt-data-2021-22/>.

Table 3
 Sizes of waiting list for secondary care specialties commissioned in Norfolk and Waveney (N&W).

Audit point	Cardiology	ENT	Gastroenterology	Gynaecology	Ophthalmology	Paediatric	T&O	Urology
Mar-21	3731	8088	3738	8552	11,186	n/a	14,098	5002
Apr-21	3819	8480	3996	8787	11,386	5235	14,921	4994
May-21	4056	8939	3999	9013	11,924	5778	15,184	5012
Jun-21	4191	9579	3985	9320	12,355	6152	15,025	5100
Jul-21	4248	9887	4011	9433	12,455	6388	15,522	5256
Aug-21	4261	10,243	3895	9775	12,444	6465	15,888	5448
Sep-21	4308	10,587	3992	10,325	12,379	6242	15,967	5563
Oct-21	4452	10,934	4120	10,615	12,626	6253	16,475	5788
Nov-21	4584	11,038	4098	10,486	12,336	6353	16,314	5829
Dec-21	4777	11,207	4122	10,643	12,428	6662	16,517	5977
Jan-22	4607	11,248	4166	10,852	12,350	6959	16,241	6153
Feb-22	4773	11,182	4399	11,036	12,327	7099	15,993	6429
Mar-22	4967	11,064	4379	11,034	12,731	7278	16,438	6470
% increase	30.1%	30.5%	9.6%	25.6%	11.8%	39.0%	10.2%	29.6%

ENT: Ear Nose and Throat; T&O: Trauma and Orthopaedics. The Paediatric category did not exist in March 2021. The % increase refers to the period from the end of April 2021 to the end of March 2022. The waiting list sizes are for combined pathways (urgent and routine). Source: Incomplete waits by commissioner at <https://www.england.nhs.uk/statistics/statistical-work-areas/rtt-waiting-times/rtt-data-2021-22/>. List peak points are in bold typeface.

Table 4
 Waits to be seen on the urgent (cancer) dermatology pathway, Rest-of-England vs. Norfolk and Waveney (N&W).

	14 day KPI N&W	No. of moved DDPS to 2WW	Cases seen in N&W	No. moved as % of seen	14-day KPI Eng	Cases seen Rest of Eng
Mar-21	97.5%	11	793	1.4%	94.7%	47,316
Apr-21	58.1%	11	766	1.4%	91.0%	43,500
May-21	61.6%	21	945	2.2%	89.8%	45,074
Jun-21	42.6%	36	1037	3.5%	84.8%	52,988
Jul-21	44.1%	55	960	5.7%	80.8%	51,954
Aug-21	33.7%	88	1143	7.7%	77.6%	48,992
Sep-21	45.2%	77	1247	6.2%	77.0%	52,784
Oct-21	36.9%	64	1113	5.8%	77.8%	49,348
Nov-21	64.1%	66	1214	5.4%	77.8%	50,517
Dec-21	92.1%	41	759	5.4%	80.9%	40,797
Jan-22	72.4%	54	876	6.2%	80.1%	38,828
Feb-22	83.9%	56	876	6.4%	84.0%	43,995
Mar-22	55.7%	66	1045	6.3%	83.5%	51,218

Number and % of cases seen are provisional data for April 2021 onwards. The KPI (key performance indicator) refers to the performance of the 3 secondary care providers in the N&W region receiving > 99% of N&W commissioned referrals. Two of these providers often met or nearly met the KPI during this monitoring period, but the largest single provider (NNUH) performed particularly poorly in terms of KPI during the surge period. Rest of Eng = all other providers in England, excluding the 3 secondary care providers in N&W. The surge period is June–November 2021 inclusive, light green shading. Source data for KPIs and cases seen: <https://www.england.nhs.uk/statistics/statistical-work-areas/cancer-waiting-times/monthly-prov-cwt/2021-22-monthly-provider-cancer-waiting-times-statistics/>.

4. Discussion

Trettel and Augustin provide a comprehensive overview of telemedicine applications in dermatology, including 59 triage-style services, updated to October 2015 [7]. Reduced waiting times for specialist care (where this was the patient’s choice) is a substantial and commonly reported individual benefit. For patients not retained in primary care, Whited et al. found an 86-day reduction in waiting time to first treatment, while Bianchi et al. reported a 78% reduction in waiting time [8,9]. According to Börve et al., patients (with squamous cell carcinoma) had mean waiting times to their first secondary care consultation that were 83 days shorter than patients on the usual referral pathway [10]. Our analysis is perhaps unusual in that we looked at the impact on the system as a whole rather than on individuals, because this is how the greatest benefits can be achieved for the greatest number of patients. From the perspective of the service funder and commissioner, the DDPS demonstrated significant benefits. It enabled patients and their carers to receive a timely diagnosis and reduced the need for patients to attend hospital for the diagnosis and management of skin lesions, thereby widening access. We cannot confirm that the DDPS has reduced system-wide waiting times, but there is strong evidence that it has. The service is currently in operation and has been commissioned until the end of March 2024; we

see very similar results in more recent service performance data. Elsewhere, we have also found evidence that the period in which the DDPS was operational coincided with lower levels of new referral generation than would have been plausibly predicted from historical demand data [6]. In the historical data, we found that dermatology referral generation in N&W mirrored national trends throughout 2020 (early period of the Covid epidemic in the UK) [6]. This close relationship in 2020 makes it unlikely that the disruptive nature of the pandemic itself could explain the DDPS benefits apparently observed in N&W. Approximately 50% of the one million dermatology referrals in the UK each year are on the two-week waiting pathway [11]. The vast majority of these cases are later found to be benign [11]. Educating primary care referrers to better differentiate likely cancers from benign lesions could have significant knock-on benefits in terms of reducing specialists’ workload and ensuring faster treatment for cancer patients [12,13]. The DDPS service provided an opportunity to collect data on training needs and enabled the design of a training session to help generalists differentiate between malignant lesions and those likely to be benign. Assessment of this skill gain was not a primary focus of the service evaluation, but could be incorporated into future service evaluation designs.

Before 2020, digitally-enabled customised dermatology triage was tried in some primary care practices in England [14,15]. Where

such services involve routine communication between generalists and specialists, they may be considered forms of advice and guidance [16]. A dermatology advice and guidance service was available to all clinicians in N&W and the rest of England before 2021, namely the NHS e-Referral Service (e-RS), which also allowed generalists to request specialist advice based on the patient's clinical presentation and history. The total number of N&W cases on the e-RS did not fall when the DDPS was introduced (reported elsewhere), suggesting that the DDPS did not replace the e-RS pathway [6]. Subjectively perceived benefits of using the CINAPSIS platform over e-RS for service managers and developers were: better user interface, improved speed of use, better image generation and handling utilities, reminders to ensure timely communication, facilitation of collaboration between generalists and specialists, collection and reporting tools for activity, training, scheduling and other performance monitoring [6]. The DDPS was commissioned to provide benefits over the e-RS system, but our service evaluation could not directly compare the two systems due to a lack of suitable e-RS data, as well as paucity of prior evaluation of the impact of e-RS anywhere [6].

We looked for unintended consequences such as bias in clinician decisions. For example, increased access to specialist advice might lead generalists to place on the DDPS patients who might previously have been placed directly on the 2WW pathway. It is difficult to understand this type of bias in clinical decision-making, even in a randomized controlled trial study, and even more difficult to measure it reliably [17]. Although more patients were transferred from DDPS to 2WW than the service designers had anticipated, DDPS did not account for most of the concurrent increase in cases on the 2WW list in N&W. Some evaluations of teledermatology programs are described elsewhere [9,14,15]. These other programs were not as obviously and seamlessly integrated into existing electronic referral systems as the CINAPSIS platform was for the physicians in this study. Such integration was critical to making the service easy and attractive for clinicians to use, and to supporting good collaboration between clinicians.

The benefits of programs such as the DDPS would be more reliably determined in a randomized controlled trial study design. The success of a DDPS-type service could be more confidently assessed if it were adopted by a larger number of practices. Some aspects of service evaluation were not undertaken here but would be informative. Cost-benefit analysis and clinical audit would be useful for the determination of several aspects of service performance. Individual patient outcomes were not part of our evaluation, such as cancer diagnosis rates for people on the 2WW pathway, with and without prior DDPS enrolment, or waiting times for first treatment for those patients with skin cancer. The design of such a service must be compatible with other existing ways of providing access to specialist care. For example, the DDPS was designed for a UK setting in which most specialist dermatology is generally accessed only after consultation with primary care.

5. Conclusion

The DDPS was largely successful. It was trialled by over 300 primary care referrers in Norfolk and Waveney in 2021–2022. Approximately 95% of dialogues were resolved quickly, with conventional pathway assignment or retention in primary care within 36 hours. Feedback from patients and clinicians was overwhelmingly positive. The service helped identify diagnostic skills gaps and informed an education and training event for primary care staff, which was mostly described as useful. Most service KPI targets were met. For resolved cases placed on the DDPS pathway, over 60% were retained in primary care and did not enter specialist waiting lists. Performance on the two-week wait (“cancer”) path-

way did not appear to correlate (positively or negatively) with DDPS activity. The period during which the DDPS was operational coincided with a much smaller increase in waiting-list size than was typically experienced during the same period by other English commissioners for dermatology and most other specialist services sought by N&W commissioners. Taken together, these findings suggest that the DDPS resulted in intelligent pathway management that achieved lower service demand and smaller dermatology waiting lists than would otherwise have occurred in the absence of the DDPS.

Funding

This evaluation was funded by the UEA Health and Social Care Partnership (UEAH&SCP). UEAH&SCP were not involved in the data collection, analysis and manuscript preparation. JB is affiliated to the National Institute for Health Research Health Protection Research Unit (NIHR HPRU) in Emergency Preparedness and Response at King's College London in partnership with the UK Health Security Agency (UK HSA) and collaboration with the University of East Anglia. The views expressed are those of the author(s) and not necessarily those of the UEAH&SCP, NHS, NIHR, UEA, UK Department of Health, UKHSA, any funder, private company or NHS organisations involved with service delivery.

Author contributions

PE and AC conceived of the research with oversight from ML. JB and AC designed the service activity monitoring plan with Xyla Elective Care staff. AC extracted the service outcome data, which were analysed by JB and AC. JB obtained and analysed the national new period count, waiting list size data, and clinician/patient satisfaction information, with input from AC and PE. JB wrote the first draft and assembled revisions. All authors revised for content.

Institutional review and ethics committee approval

Consent to undertake this service evaluation was granted by North Norfolk Primary Care (26 March 2021) and by the UEA Faculty of Medicine and Health Sciences Research Ethics Subcommittee on 26 Nov 2021 (their Ref. ETH21-22-0034).

CRedit authorship contribution statement

P. Everden: Conceptualization, Funding acquisition, Supervision, Methodology, Project administration, Writing – review & editing. **J. Brainard:** Funding acquisition, Data curation, Writing – original draft, Writing – review & editing, Investigation, Validation, Formal analysis, Methodology, Supervision, Resources, Project administration, Visualization. **A. Crawford:** Validation, Data curation, Formal analysis, Methodology, Supervision, Resources, Writing – review & editing. **B. Wright:** Formal analysis, Writing – review & editing.

Declaration of competing interest

BW is both an NHS consultant dermatologist and a reporting consultant dermatologist with Xyla Elective Care which is an outsourcing company that was contracted to provide clinical support and collect patient/clinician satisfaction with the DDPS service. No other author has an interest to declare.

Acknowledgements

We extend our thanks our NHS colleagues for their help with data collection and interpretation, and to Xyla Elective staff for their timely response in providing clinician and patient feedback. NNPC managers provided helpful comments on the manuscript.

References

- [1] Finley CR, Chan DS, Garrison S, et al. What are the most common conditions in primary care? Systematic review. *Can Fam Physician* 2018;64:832–40.
- [2] Levell N, Jones S, Bunker C. *Dermatology*. In: Consultant physicians working with patients, 5th ed. Royal College of Physicians; 2013, pp. 81–89.
- [3] Population estimates & GP registers: why the difference? 2016. <https://commonslibrary.parliament.uk/population-estimates-gp-registers-why-the-difference/>. Accessed Feb 21 2023.
- [4] Hospital waiting list 'may double to 10m by April'. 2021. <https://www.bbc.co.uk/news/health-56086978>. Accessed.
- [5] NHS Backlog Data Analysis. 2022. <https://www.bma.org.uk/advice-and-support/nhs-delivery-and-workforce/pressures/nhs-backlog-data-analysis>. Accessed Jun 9 2022.
- [6] Brainard JS, Crawford A, Wright B, et al. Retaining dermatology patients in primary care using dialogues with secondary care: A service evaluation. *medRxiv* 2022.07.07.22277375. <https://doi.org/10.1101/2022.07.07.22277375>.
- [7] Trettel A, Eissing L, Augustin M. Telemedicine in dermatology: findings and experiences worldwide—a systematic literature review. *J Eur Acad Dermatol Venereol* 2018;32:215–24.
- [8] Whited JD, Hall RP, Foy ME, et al. Teledermatology's impact on time to intervention among referrals to a dermatology consult service. *Telem J E Health* 2002;8:313–21.
- [9] Bianchi MG, Santos AP, Cordioli E. The majority of skin lesions in pediatric primary care attention could be managed by Teledermatology. *PLoS One* 2019;14:e0225479.
- [10] Börve A, Dahlén Gyllencreutz J, Terstappen K, et al. Smartphone teledermoscopy referrals: a novel process for improved triage of skin cancer patients. *Acta Derm Venereol* 2015;95:186–90.
- [11] Cancer Waiting Times (CWT) urgent suspected cancer referrals: referral, conversion and detection rates; 2022. https://www.cancerdata.nhs.uk/cwt_conversion_and_detection. Accessed Jun 9 2022.
- [12] Haile-Redai A, O'Connor J. Diagnostic accuracy amongst two week wait referrals for skin malignancy. *J Dermatol Res Ther* 2021;7:111.
- [13] Shariff Z, Roshan A, Williams A, et al. 2-Week wait referrals in suspected skin cancer: does an instructional module for general practitioners improve diagnostic accuracy? *Surgeon* 2010;8:247–51.
- [14] Ford JA, Pereira A. Does teledermatology reduces secondary care referrals and is it acceptable to patients and doctors?: a service evaluation. *J Eval Clin Pract* 2015;21:710–6.
- [15] Poolworalak N, Motley R. Teledermatology for all? A service evaluation of mandatory teledermatology in Cardiff and Vale UHB 2016–17. *Future Healthc J* 2020;7:s14–s.
- [16] Advice and guidance toolkit for the NHS e-Referral Service (e-RS). 2021. <https://digital.nhs.uk/services/e-referral-service/document-library/advice-and-guidance-toolkit>. Accessed Jun 14 2022.
- [17] Hajjaj FM, Salek M, Basra M, et al. Nonclinical influences, beyond diagnosis and severity, on clinical decision making in dermatology: understanding the gap between guidelines and practice. *Br J Dermatol* 2010;163:789–99.