

A review of teledermatology pathways in the East of England: Considerations for planning and commissioning

Summary report

June 2023



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Background and context

Background

In 2019/20 there were 3 million outpatient appointments in dermatology in England. Skin cancer is the most common cancer in the UK and dermatology services receive more urgent referrals for suspected cancer than any other specialty. Basal cell carcinoma (BCC) is by far the most common type of skin cancer, followed by cutaneous squamous cell carcinoma (cSCC) and melanoma. The cancer registry counts only malignant melanoma within official cancer statistics, and is the ninth most commonly diagnosed cancer in the East of England.

According to data from the East of England Cancer Alliances, skin cancer referrals from primary care have seen some of the largest increases during the latest year of the pandemic, presenting challenges in diagnostic services and waiting times for patients. The project was required due to the skin pathway being one of the most challenged pathways - exacerbated post-pandemic in the East of England (EoE).

In November 2022, Eastern Academic Health Science Network (AHSN) was commissioned by the East of England Cancer Alliances to review how teledermatology platforms have been implemented and used in the East of England across routine and two-week wait (2WW) pathways. The objective of the project was to collate information on the various teledermatology platforms, technologies and service models in place in order to provide a report to support informed commissioning decisions.

The purpose of this report is to support system leads and providers to develop appropriate teledermatology plans as part of their system-wide cancer planning for 2023/24.

Guidance and support for teledermatology

Teledermatology refers to the use of static digital images to triage, diagnose, monitor or assess skin conditions without the patient being physically present.

Teledermatology presents an opportunity to better manage demand for dermatology diagnosis. It has the potential to reduce outpatient appointments, enable quicker diagnosis and improve patient experience.

Better use of technology is a key part of the NHS Long Term Plan – the ten year NHS plan published in 2019, including the ambition for some dermatology patients to be managed entirely digitally.

In June 2020, the British Association of Dermatologists (BAD) published updated guidance in response to Covid-19 around how to manage dermatology patients remotely. The guidance set out seven key principles – including to streamline skin cancer patients on two-week wait (2WW) pathways, using teledermatology to triage referrals and

book patients directly to surgery where possible, and to redirect new patients through teledermatology advice and guidance (A&G) services where possible rather than referral. A&G is defined as non-face-to-face activity delivered by consultant-led services. A&G allows a clinician (often in primary care) to seek advice from another (usually a specialist) prior to or instead of referral.

NHS England has also published a teledermatology roadmap. It sets out five steps to deliver teledermatology triage.

There is also detailed guidance from NHS England and BAD regarding implementing a timed skin cancer diagnostic pathway in order to meet the Faster Diagnosis Standard (FDS). The FDS ensures patients will be diagnosed or have cancer ruled out within 28 days of being referred urgently by their GP for suspected cancer. We recommend that any implementation of a 2WW teledermatology pathway takes this guidance and best practice into account.

Guidance for the use of artificial intelligence (AI)

In February 2022, BAD released a position statement which stated that they are “concerned there may be products on the market which make unsubstantiated or misleading claims about the power of AI in its use for skin cancer triage and implied diagnostics”. The statement called for a tighter regulatory framework, given that there “are indications that current pre-market regulatory requirements are not always robust enough”.

In March 2023, further clarification on the use of AI for 2WW pathways was provided by BAD. The letter stated that “Trusts need to be aware that the responsibility for AI used in clinical decision making will fall to the clinician who uses the technology, the deploying organisation, the industry innovator that developed the technology or those who validated and approved the technology for clinical use... There is currently minimal externally validated evidence supporting the safety of AI when deployed outside of pilot

studies or at scale, and little consensus as to how this safety is assured.”

It is also important to note that any doctor knowingly diagnosing and treating skin cancer patients must be employed by their NHS hospital and be a core member of the skin MDT. Consultants who diagnose skin cancer and do not carry out any surgical work should be named as an extended member of the MDT. This has implications for the use of consultants from a third-party provider in teledermatology models.

This is an evolving area, and new guidance is being developed. We recommend that systems check the NHS England and BAD websites regularly to stay up to date with the latest developments.



What we did

Our approach

In approaching this work, we held discussions with 28 key stakeholders overseeing teledermatology commissioning and use within Integrated Care Systems (ICSs) in the East of England. This included (but was not limited to) commissioning managers, clinical leads, GPs, innovation leads, outpatient transformation teams, transformation leads and service delivery managers. In addition to these discussions, we asked stakeholders for key documents including local evaluation or audit reports, business cases, data protection impact assessment, patient information leaflets and health inequalities assessments.

Analysis of the discussions and supporting documents were used to put together detailed case studies of each pathway. This report is based on the learning from those case studies, as well as a rapid review of guidelines, national policy documents and relevant literature – in order to draw out learning beyond the East of England.

Exploration of specific impacts was agreed with the EoE Cancer Alliances at the project outset and written into the discussion protocol, although we asked systems to send us any and every impact they had collected – in order that we could be as comprehensive as possible when reviewing impacts.

This report provides a summary of the impacts we found, as well as our recommendations for selecting, implementing and making the most of a teledermatology pathway.

It should be noted that all local impacts reported in this document have been provided to us by systems directly and have not been verified by Eastern AHSN. Where an evaluation has not been carried out locally, impact data is not reported.



What we found

We found positive evidence for a range of models

We found a wide range of teledermatology models in use across the East of England – some originating in primary care and others originating in secondary care.

In some models, primary care clinicians gain A&G from external providers (for example, consultants employed by a technology provider) or use a decision support tool – keeping the patient entirely in primary care unless a referral is needed. Primary care clinicians then either manage the patient in primary care or make an appropriate referral.

In other models, primary care clinicians gain A&G from local secondary care clinicians, either via a third-party platform or via eRS – and if eRS is used via the Referral Assessment Service, these requests can be converted directly into referrals if required or otherwise triaged appropriately. And of course, primary care clinicians can make a teledermatology referral with an accompanying image via eRS without seeking A&G first.

Models initiated in secondary care tend to require patients to be seen in a skin clinic post-GP referral. At this clinic high quality, dermoscopic images are taken and remotely assessed by a consultant – sometimes following AI review – enabling appropriate triage.

We found that systems had collected some data to measure the effectiveness of the models, identifying positive impacts – although very few formal service evaluations had been commissioned. This means that some data had been collected relating to, for example, impact on referrals or staff time savings, but this was not assessed as part of a formal economic model. Similarly, some patient and staff surveys had been undertaken, but response rates were very low. These limitations should be borne in mind when reading this document.

Based on this relatively limited data, we were unable to identify a discernible difference in impact arising from the different types of models.

Impact on system efficiencies, including referrals (1)

Where teledermatology was used as part of a referral (for example on 2WW pathways) there was evidence of a reduced need for face-to-face appointments. For example:

- In HWE, where dermoscopy was enabled in primary care to support 2WW referrals, 171 (33%) avoided a face-to-face outpatient appointment
- Where teledermatology is used as part of a secondary care-led skin clinic in Luton and Dunstable University Hospital in BLMK, the trust found it resulted in reduced reliance on locum consultants – resulting in an immediate consultant cost saving of £160,000. It also reduced the need for 2WW clinics
- In West Suffolk, where AI is used to support patient triage in a secondary care-led skin clinic, approximately 12% of referrals are being discharged, with a further 26.1% reduction in dermatology appointments.

A data review conducted by West Suffolk NHS Foundation Trust (WSFT) modelled the rise in the wait times for patients on a 2WW referral pathway, if teledermatology was not used. They found that the trust would not recover performance with the current workforce and would require an additional 1.5 WTE consultant dermatologists.



Impact on system efficiencies, including referrals (2)

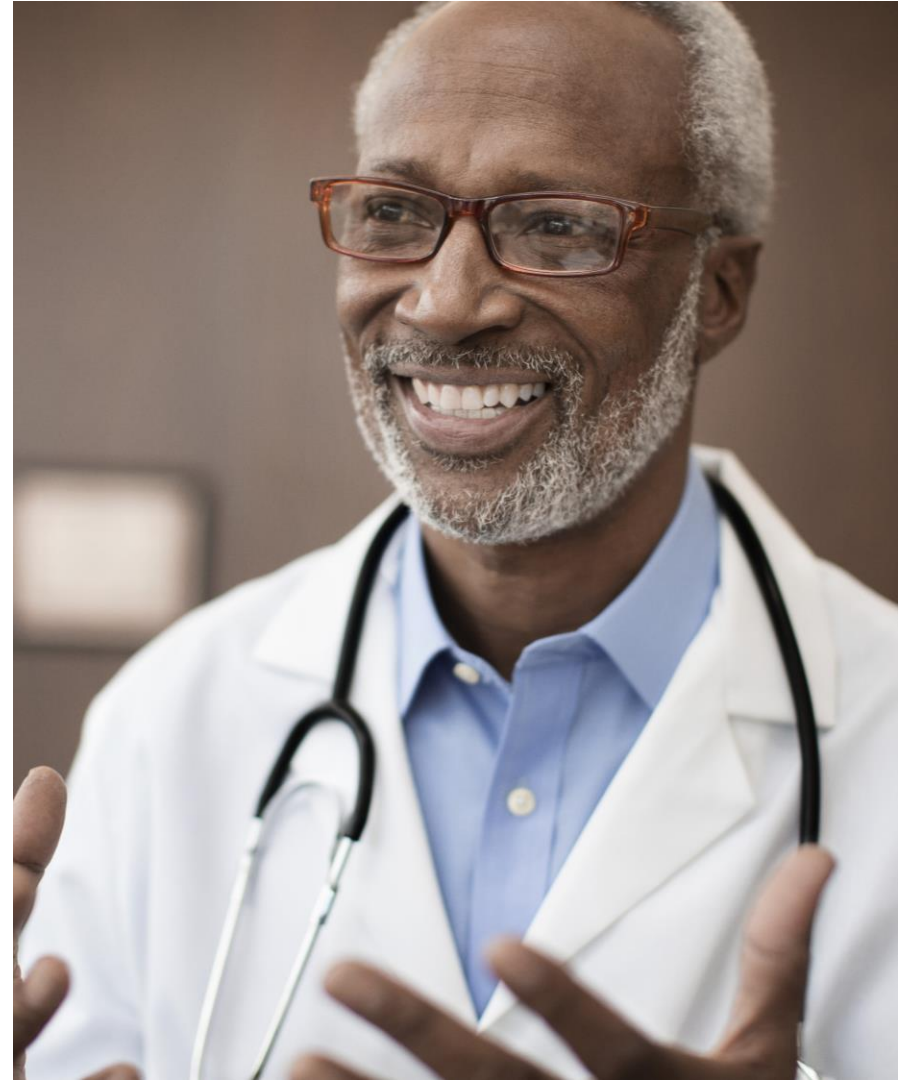
Where teledermatology was used as part of A&G from third party providers, there was also evidence that a proportion of patients could be discharged or managed in primary care – although there was not always evidence to demonstrate what proportion of patients would have otherwise been referred to secondary care if A&G had not been sought. For example:

- In N&W where A&G is provided by a third party provider, evaluation showed that 65% of cases were retained in primary care and 19% of cases required referral to the 2WW pathway - although no significant change in the number of patients being referred to the 2WW pathway was observed over time.
- In a separate (now defunct) N&W pathway, where A&G was provided to primary care clinicians by a third-party provider, an independent evaluation calculated 90-127 patients in two control practices would have been referred to the teledermatology platform for A&G instead of directly to secondary care, saving between £7,641-£10,782 on the initial appointment. Of these, an average of 45% (n=41-57) would have been recommended to be referred to secondary care by the third-party provider on an urgent or standard referral at a cost of £4,125-£7,125; the remaining 55% (n=49-70) would have been discharged to primary care (Norfolk and Suffolk Primary and Community Care Research Office, 2021).
- In MSE, where AI decision support was used in primary care, the ICS looked at the number of 2WW referrals made from practices that have the platform versus those that do not. It found that between April and October 2022, practices that had the device had a 2WW referral rate of 19 per 1,000 patient population and practices without a SA device had a referral rate of 34 per 1,000 patient population. This should be interpreted with caution as the analysis did not account for uptake and use of the platform or overall cancer prevalence within the locality.

Impact on system efficiencies, including referrals (3)

Where A&G was provided in primary care by local consultants, patients could also avoid an outpatient appointment. In SNEE, where A&G was provided to primary care clinicians by consultants in East Suffolk and North Essex Foundation Trust (ESNEFT) 41% of patients in Colchester and 36% of patients in Ipswich could be retained in primary care. This is the only example of this model that we found in the East of England, although we did not conduct case studies on the eRS, whereby local consultants are providing A&G across the region.

Systems had not assessed levels of re-presentation in primary care after patients were discharged. However, the Norfolk and Waveney evaluation outlined above found that only 0.45% of discharged patients re-presented to primary care within six months of the initial teledermatology request (Norfolk and Suffolk Primary and Community Care Research Office, 2021).



Cost-effectiveness

None of the East of England sites we looked at had conducted a formal economic evaluation to assess cost-effectiveness (aside from the cost-effectiveness calculations outlined on slide 12 in relation to the defunct A&G pathway in Norfolk and Waveney).

However, a number of benefits were identified with cost implications including reduced face-to-face outpatient activity; reduced time needed for consultants to review images versus conduct face-to-face appointments; and a reduction in the need for employed and locum consultants.

Rough calculations of savings made as a result of reduced referrals can be made using NHS unit costs – although any calculation needs to be offset by the time it takes for consultants to review images, the cost of the teledermatology platform, additional staff and admin time, any duplication of work, re-presentation of patients in primary care, and any additional work. It is important that

the whole patient pathway is assessed when measuring cost-effectiveness.

See slides 33 and 34 for evaluation principles, including assessing cost-effectiveness.



Impact on staff experience

Where data had been collected from staff across the East of England their views were mixed. Staff commented on the ease of use of various platforms and the quick response times of systems and pathways providing A&G and decision support. For example:

- In N&W, where A&G is provided to GPs by a third-party provider, 37 survey respondents (82%) were either very satisfied or had no negative feelings towards the new pathway. Main benefits identified in 25 free text responses were the speed of responses (60% and learning opportunities (20%).
- In SNEE, where an A&G pathway drawing on local consultants is used in primary care, a survey of GP practices found that 17 of 18 respondents felt the A&G was good or excellent, and 18 of 19 respondents felt the response time for A&G was good or excellent.

Negative views tended to be context-specific – for example in relation to inadequate training and poor WiFi speeds.

See slides 33 and 34 for evaluation principles, including running surveys.



Impact on patient experience

There had been very limited collection of data relating to patient experience, although where it had been collected it was generally positive. For example:

- In BLMK, where a secondary care-led clinic takes images that are then triaged by consultants, all of the patients surveyed (N=51) were satisfied with having their photos reviewed by a dermatology consultant following the nurse-led clinic; 96% of patients strongly agreed or agreed that they were happy to see a dermatology nurse for assessment in the skin clinic; and 96% of patients would also recommend the nurse assessment clinic to their friends and family. Similarly, an evaluation of a secondary care-led skin clinic in Northampton General Hospital found that only 19% (N=65) of patients would prefer to have their photo taken at their GP practice (Goel, no date).
- However, while 60% (N=111) of patients attending a medical photography clinic in Cambridgeshire and Peterborough rated their overall experience as excellent, and 38% rated it good, the majority (69%) stated they would prefer to have their appointment at a GP practice – citing ease of access and parking as primary reasons.
- In Norfolk and Waveney where A&G is provided by a third-party provider via the Cinapsis platform, patient satisfaction surveys were deployed with nine responses received. All patients reported very positive experiences with the system with no patient complaints. Patients commented on the speed of the service, and a reduction in their anxiety after using the service.

See slides 33 and 34 for evaluation principles, including running surveys.

Impact on health outcomes

No evaluation of health outcomes had been conducted in any of the sites we looked at.

We conducted a very brief scan of literature (not a systematic literature review). Three papers we found in relation to health outcomes were as follows:

- A recent review found that several studies report a moderate to high degree of diagnostic and management concordance between teledermatology and face-to-face models – ranging from 60-100% for dermatologic disorders and cutaneous malignancies (Wang et al., 2020).
- A 2017 systematic review reported that the diagnostic accuracy of face-to-face consultations (67%-85% agreement with reference standard) remains higher than teledermatology (51%-85% agreement with reference standard). •

- However, some studies do report high accuracy of teledermatology diagnoses. What's more, studies of health service outcomes found teledermatology reduced waiting times and could result in earlier assessment and treatment (Finnane et al., 2017).
- The BAD case study on teledermatology use in Chelsea and Westminster Hospital NHS Foundation Trust found an increased pick-up rate of squamous cell carcinoma and melanoma despite fewer biopsies (Murphy et al., 2019).

The most recent of these articles was written in 2020, since when technology has developed.

Impact on health inequalities

No evaluation of health inequalities had been conducted in any of the sites we looked at, although a number of sites had carried out health inequalities impact assessments at the outset of their projects, to identify potential risk of inequality and mitigating actions. In the broader literature it has been identified that images of dark skin are under-represented in datasets used to train AI algorithms (Wen et al., 2021). This may mean that AI is less accurate for darker skin.

Systems should consider health inequalities when selecting and implementing a teledermatology pathway, and ideally ensure data is collected to monitor (and if needed address) the impact on inequalities locally.

See slides 33 and 34 for evaluation principles, including how to assess health inequalities.



Impact on healthcare inequalities

Our case studies highlighted a number of factors that have implications for healthcare inequalities and thus may affect the impact of the pathways.

Firstly, WiFi was highlighted as an issue in a number of case studies. This is more likely to be an issue in remote, rural locations – with 7% of rural premises lacking acceptable internet access, compared to just 1% of urban premises (see Hayre et al., 2021). Slow WiFi speeds can make it difficult to upload images in a timely way during pressurised GP appointments, and this has the potential to reduce uptake in primary care – meaning the service is not provided equitably.

More generally, our case studies highlighted inconsistent practice within and between primary care settings due to a range of reasons impeding embedding dermoscopy in primary care. This variation may mean that patients are not receiving the same standard of care across the board.

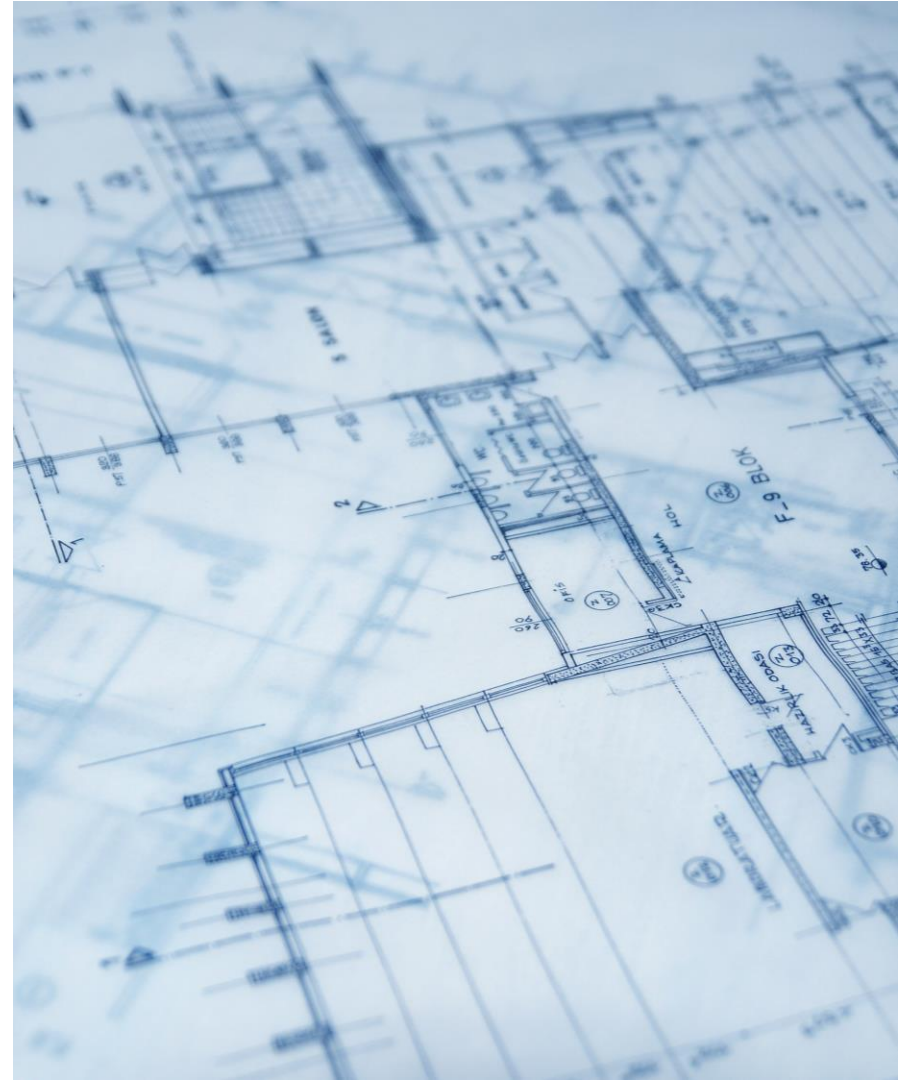


Unintended consequences

The unintended consequences of introducing teledermatology pathways were wide-ranging. In several cases, the pathways identified a need for further training and support in primary care. For example, the pilot to support dermoscopy in primary care in HWE revealed that further training was needed – and this resulted in the ongoing provision of bi-annual training from the trust dermatology team.

In one case there was an uneasiness about the use of AI from secondary care colleagues.

And several case studies also highlighted a lack of standardised practice within and between settings in primary care. An unintended consequence of this is an inequitable offer for patients, which may impact inequalities and mean that patient experience varies between geographies.





**Our recommendations for selecting and implementing a
tele dermatology model**

Introduction

This work highlighted a number of factors that systems need to be aware of when selecting and implementing a teledermatology model. Important to several of these learnings is whether it is preferable for the pathway to be initiated in primary care (i.e. the GP requests A&G or uses a decision support tool) or secondary care (i.e. triage and image taking takes place in secondary care-led skin clinics). There are benefits and drawbacks of both approaches, and much depends on level of resource in each setting – including availability of space and consultant time – as well as clinical engagement.

This section sets out 7 learnings and implications for models initiated in primary and secondary care:



Consider quality of images and dermoscopy use



Consider availability of consultant time



Ensure appropriate infrastructure and estate



Ensure there are clinical leads to support clinical buy-in



Support change management



Consider patient experience



A note on cost

Consider quality of images and dermoscopy use

A number of our case studies highlighted that quality of images can be an issue when making teledermatology requests. Dermoscopic images are recommended for a conclusive diagnosis of cancer and mandated for 2WW pathways. One option is for primary care staff to take high quality images - including dermoscopic images where required.

Training in taking high quality images and the use of dermatoscopes is needed to do this – as well as funding to purchase dermatoscopes in primary care. Barriers to embedding this model include lack of mandate or financial incentive (for non-2WW); lack of time/capacity for primary care staff; poor WiFi – lengthening the process to upload large files; difficult integration with IT systems and variation in clinician confidence.

Another option is for images to be taken in secondary care-led skin clinics by medical photographers or other trained staff. This can improve image quality, reduce variation and reduce the burden on primary care staff but it is another step in the pathway for patients and it depends on the availability of space and resource for clinics, as well as the availability of appropriate trained staff.



Consider availability of consultant time

A 2021 Getting It Right First Time (GIRFT) Programme National Specialty Report found that in the East of England there were 26 WTE vacant posts and 25.5 WTE locum posts in 2018/19. It also found that consultant and locum vacancies equated to 51% of total demand – making the East the region with the second highest staff shortfall against demand, and the region with the highest number of vacancies per 100,000 population (Levell, 2021).

If local consultants are not available one option is for primary care clinicians to request A&G via a third-party provider for non-2WW pathways, or use a decision support tool. In these models, primary care clinicians seek A&G from consultants employed by a teledermatology provider/other third-party provider or use a decision support tool and triage the patient based on feedback received. Turnaround times for these models tends to be quick (from a few seconds for AI-enabled decision support to 2-3 days for consultant review) and primary care staff in

our case studies have reported a positive experience in using these models. (However, evidence for AI is currently limited - and safety-netting via consultant review is needed, and was present in all of the AI-enabled models we reviewed). What's more, accessing staff via a national consultant network is more costly than accessing local consultants, and this should be considered in any business case. Another option is for a GP with an Extended Role (GPwER) to review images prior to referral.

Options which require more time from local consultants include requesting A&G from local consultants sometimes with images attached so that direct triage can occur through the advice and referral route. Where local consultants are providing A&G and triaging patients based on images, time should be built into their job plans. BAD has developed guidance on how to construct an appropriate job plan for dermatologists, which includes teletriage and teledermatology work, including advice and guidance (British Association of Dermatologists, 2022).

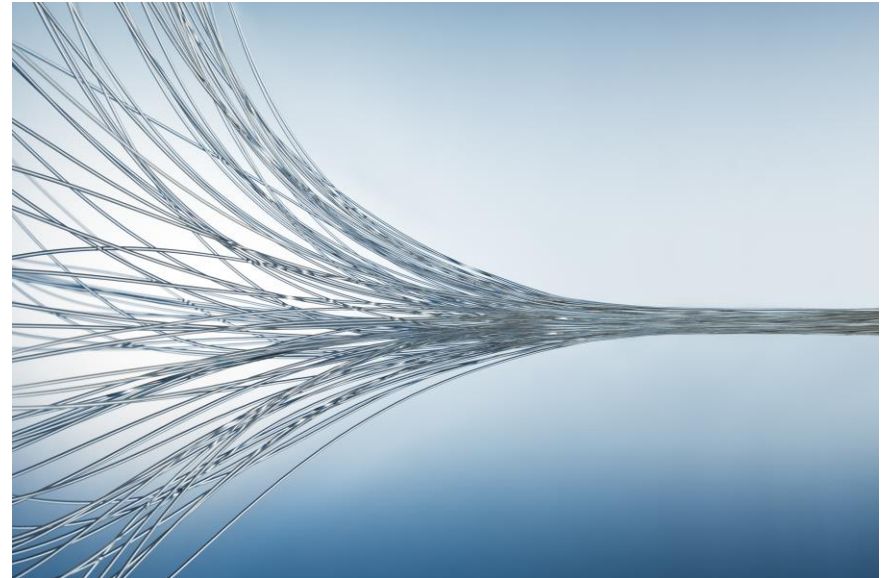
Ensure appropriate infrastructure and estate – including WiFi and interoperability

A number of our case studies highlighted issues with adequate WiFi in GP practices and secondary care-led clinics to upload and send images as well as complications around integrating teledermatology platforms with existing IT systems.

Where WiFi is not adequate, the cost of upgrading existing WiFi infrastructure in primary and secondary care settings should be explored. WiFi may be poorer in rural areas, and therefore if a central skin clinic could be held in a geographic location with better WiFi access, this may be preferable to updating the infrastructure in rural primary care settings – costs of both options should be weighed up. Our limited data suggests patients are generally happy with secondary care-initiated clinics, but this should also be tested locally.

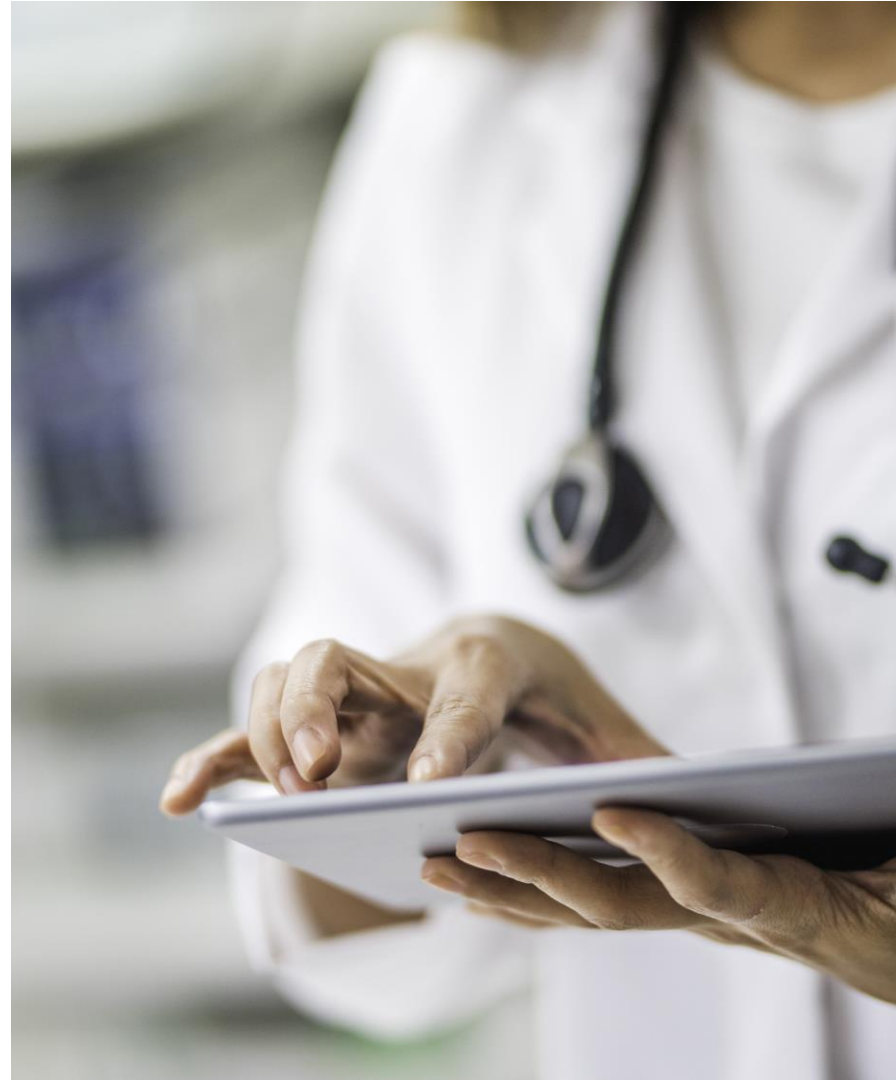
It is important to assess how integration with primary or secondary care IT systems would work, and weigh up which would be less complex.

Involving Trust and ICS Information Technology and Information Governance teams at an early stage was an important lesson in several of our case studies.



Ensure there are clinical leads to support clinical buy-in

Implementing a new pathway requires significant change management. Several of our case studies highlighted the importance of clinical leads in supporting and embedding implementation. Leads that can span both primary and secondary care are particularly beneficial.



Support change management

As above, clinical leads in primary and secondary care (and leads that span both) are important in embedding the pathway change and securing buy-in from relevant clinicians. Appropriate training and ongoing support is also important – both in terms of using new equipment (such as dermatoscopes in primary care) and the specifics of the pathway (including referral criteria).

Time will be needed for set-up and training activities, as well as managing the transition.

However, our case studies revealed that the teledermatology platforms themselves are usually considered intuitive and easy to use, with minimal support required for engaging with the technology itself.



Consider patient experience

Different teledermatology models have different implications for patients. Where dermoscopy is carried out in primary care as opposed to a skin clinic, there is the potential for the overall number of patient visits to be reduced.

However, the limited data we identified in relation to patient experience of secondary care-initiated models was generally positive.



A note on cost

Inevitably the cost of systems will have a bearing on procurement decisions. However, due to commercial sensitivities we were unable to gain comparable cost data for the teledermatology platforms we explored. Therefore, we are unable to provide learning on cost, other than to say system leads should have conversations with technology suppliers regarding cost implications for their locality and chosen pathway – and bear in mind lessons outlined above regarding cost implications of training, WiFi, physical infrastructure (including any required IT integration), and consultant and other staff time. When assessing cost-effectiveness, it is important that the whole patient pathway is considered.





**Our recommendations for making the most of
tele dermatology**

Increase consistency of practice

As teledermatology models become more widely adopted, we believe that ICBs could usefully follow up on this report by working with providers and service managers to understand, where relevant, the barriers to full and consistent adoption of a technology as set out in the case studies in this report. This work has found that barriers to full adoption include lack of primary care staff confidence with dermoscopy; lack of financial incentive to take dermoscopic images for non-2WW pathways in primary care; and additional time the process requires – compounded by poor WiFi leading to slow image upload. Lack of advocacy or a formal service evaluation (see below) could also be an issue. ICBs could investigate whether clinical leadership could help to support implementation across a whole ICB geography (ensuring more consistent practice whilst acknowledging differences in pathways and service providers) or peer networks set up to support more consistent adoption of these new models.

As a minimum, we recommend that system leads request updates from service providers on their plans for operation of these models over the next two years through a short template or questionnaire. This would be a basis for assessing how support could be arranged, and would also give system leads an early insight into any delivery risk for 2023-24 and 2024-25. This, combined with monitoring how well teledermatology pathways are complied with (for example through monitoring the proportion of 2WW referrals made with appropriate dermoscopic images) may help target on-going support. The NHS England requirement to report the percentage of suspected skin cancers managed through teledermatology pathways via a two-week audit in quarter one and quarter three of 23/24 may also help with this.

Undertake formal service evaluations

Our case studies found that very few systems have commissioned a formal, independent evaluation of their tele dermatology pathways. In most cases, data had been collected locally by the system to assess effectiveness – although no data had been collected on cost-effectiveness, health outcomes or health or healthcare inequalities.

We recommend that systems ringfence funding for evaluation of different types of models, particularly collecting primary data on cost-effectiveness, health outcomes health inequalities and healthcare inequalities. This will lead to more insightful commissioning, particularly when selecting and monitoring a model.



Evaluation principles (1)

Any assessment of cost-effectiveness should account for all costs of the pathway, as well as any savings from, for example, reduced referrals. Things to consider when developing an economic model are:

- Set-up costs including time for training, cost of IT integration and WiFi upgrades and any one-off technology costs
- On-going costs including on-going technology costs and cost of the pathway – including the cost of each patient encounter; support staff time and clinical staff time – including to capture and send images; if a new clinic is set up, all clinic costs including all staff time, infrastructure and physical space
- Impact on referral numbers
- Impact on secondary care resource requirements including consultant staff and number of clinics required

- Re-presentations in primary care within 6 months for those discharged following triage

We recommend that economic modelling is carried out by a skilled team who can build an appropriate model.

Assessment of health outcomes can be assessed via examining the number and stage of diagnoses over a 6-12 month period either pre and post-implementation or by comparing to an appropriate control group. You might expect to see diagnoses stay the same, whilst number of referrals goes down – demonstrating that reduced referral numbers reflect appropriate referrals taking place rather than missed patients/cancers.

If numbers are large enough, health inequalities can be assessed as part of this analysis, by assessing number and stage of diagnoses for different age, gender and ethnicities over time.

Evaluation principles (2)

Where surveys are used to gather data on patient and staff experience, it is important to ensure they are distributed and promoted widely, with an appropriate response rate. Factors to consider in gaining a good response rate from patients include engaging 'hard-to-reach' populations; survey content and length; and mode of administration (see Booker et al., 2021).



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References

Reference list (1)

- Barton, S. and Chandler, J. (2022) The Dermicus Teledermatology Platform Isle of Wight Primary Care Final Evaluation Report. Wessex Academic Health Science Network. Available at: https://wessexahsn.org.uk/img/insight_reports/Dermicus%20Evaluation%20Final%20Report%202022.pdf [Last accessed 3rd March 2023]/
- British Association of Dermatologists (2023) Clarification on the challenge to the BAD 2WW letter and use of AI. Available at: <https://www.bad.org.uk/clarification-on-the-challenge-to-the-bad-2ww-letter-and-use-of-ai/> [Last accessed: 16th March 2023]
- British Association of Dermatologists (2020) COVID-19: Clinical guidelines for the management of dermatology patients remotely. Available at: https://www.bad.org.uk/covid_19/covid-19-clinical-guidelines-for-the-management-of-dermatology-patients-remotely/ [Last accessed: 15th February 2023].
- British Association of Dermatologists (2022) British Association of Dermatologists Position Statement on Artificial Intelligence (AI) Interventions. Available at: <https://cdn.bad.org.uk/uploads/2022/05/05083421/Position-Statement-on-Artificial-Intelligence.pdf#:~:text=Artificial%20intelligence%20%28AI%29%20collectively%20describes%20computer%20algorithms%20that,and%20by%20enhancing%20patient%20experience%20without%20compromising%20safety.> [Last accessed: 3rd March 2023]
- Booker, Q.S., Austin, J.D., Balasubramanian, B.A. (2021) Survey strategies to increase participant response rates in primary care research studies, *Family Practice*, 38(5), 699–702, <https://doi.org/10.1093/fampra/cmab070>.
- Finnane A., Dallest K., Janda M., Soyer H.P., (2017) Teledermatology for the Diagnosis and Management of Skin Cancer: A Systematic Review. *Journal of American Academy of Dermatology*, 153(3), 319-327. doi:10.1001/jamadermatol.2016.4361. PMID: 27926766.

Reference list (2)

- Goel, R. (No date). Teledermatology. NGH. PowerPoint presentation supplied to project team. Not published.
- Hayre J., Cirelli C., Sharma M., (2021) Teledermatology for the many, not the few: Tackling the racial health divide in a digital world. *EClinicalMedicine*, 37:101007. doi: 10.1016/j.eclinm.2021.101007. PMID: 34278278; PMCID: PMC8267535.
- Health Innovation Network, (2022) South West London Teledermatology Pilot Evaluation. Supplied to project team. Not published.
- Levell N., (2021) Dermatology GIRFT Programme National Specialty Report. NHS, Available at: <https://cdn.bad.org.uk/uploads/2022/05/06132904/DermatologyReport-Sept21o-FINAL-15.9.21-3.pdf> [Last accessed: 3rd March 2023]
- Mehrtens, S.H., Shall L. and Halpern, S.M. (2019) A 14-year review of a UK teledermatology service: experience of over 40,000 teleconsultations. *Clinical and Experimental Dermatology*, 44(8), 874-881.
- Murphy, R. Goad N., Gass M., Benham M., Tong A., et al. (2019), Delivering care, and training a sustainable multi-specialty and multi-professional workforce: Dermatology Outpatient Case Studies December 2019. British Association of Dermatologists, Available at: <https://cdn.bad.org.uk/uploads/2022/04/13115956/Delivering-Care-and-Training-a-Sustainable-Multi-Specialty-and-Multi-Professional-Workforce-OUTPATIENT-CASE-STUDIES-2020.pdf> [Last accessed 3rd March 2023]
- NHS England and British Association of Dermatologists (2022) Implementing a timed skin cancer diagnostic pathway: Guidance for local health and care systems. Available at: https://www.england.nhs.uk/wp-content/uploads/2018/04/B1350_Skin-cancer-timed-diagnostic-pathway.pdf [Last accessed 17th March 2023]
- NHS England (2020) A Teledermatology Roadmap for 2020-21 v1.0. Available at: [https://qna.files.parliament.uk/qna-attachments/1472712/original/NOTP%20Teledermatology%20Roadmap%20202021%20v10%20FINAL%20\(1\).pdf](https://qna.files.parliament.uk/qna-attachments/1472712/original/NOTP%20Teledermatology%20Roadmap%20202021%20v10%20FINAL%20(1).pdf) [Last accessed: 15th February 2023].

Reference list (3)

- NHS England (2019) The NHS Long Term Plan. Available at: <https://www.longtermplan.nhs.uk/wp-content/uploads/2019/08/nhs-long-term-plan-version-1.2.pdf> [Last accessed: 17th March 2023]
- NHS England (2022) National Teledermatology Investment Programme Impact Report. June 2022. Available at: <https://future.nhs.uk/OutpatientTransformation/view?objectId=137723813> [Last accessed 3rd April 2023]
- NHS England (2022) Referral optimisation for people with skin conditions: Ensuring patients are seen in the right place at the right time. Available at: <https://www.england.nhs.uk/wp-content/uploads/2022/09/B1149-referral-optimisation-for-people-with-skin-conditions.pdf> [Last accessed: 17th March 2023]
- Norfolk and Suffolk Primary and Community Care Research Office, (2021) Evaluation of the Teledermatology service provided by Skin Analytics in Norwich Primary Care Network; April 2019-March 2020. Available at: <https://www.easternahsn.org/wp-content/uploads/2022/01/Skin-Analytics-Teledermatology-Pilot-Evaluation.pdf> [Last accessed 3rd March 2023].
- Smyth, R. (2019) NCL STP Dermatoscope Teledermatology evaluation report. North London Partners in Health and Care. Supplied to project team. Not published.
- Wang, R.H., Barbieri J.S., Nguyen H.P., Stavert R., Forman H.P., Bologna J.L., Kovarik C. Group for Research of Policy Dynamics in Dermatology (2020) Clinical effectiveness and cost-effectiveness of teledermatology: Where are we now, and what are the barriers to adoption?, *Journal of American Academy of Dermatology*, 83(1), 299-307.
- Wen D., Khan S.M., Antonio J.X., Ibrahim H., Smith L., et al. (2021) Characteristics of publicly available skin cancer image datasets: a systematic review, *The Lancet Digital Health*, 4(1), E64-E74, DOI: [https://doi.org/10.1016/S2589-7500\(21\)00252-1](https://doi.org/10.1016/S2589-7500(21)00252-1)

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