

BMJ Open Quality Nurse-led sustainable plastic surgery trauma service transformation: a positive COVID-19 legacy

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ABSTRACT

The aim of this quality improvement was to develop a sustainable nurse-led 'See and Treat' service in a regional plastic surgery unit in England for patients requiring plastic surgery under local anaesthetic following traumatic injury. Trauma-related injuries are a substantial part of the workload in the plastic surgery department in question; with people with the most minor injuries requiring surgery under local anaesthetic accounting for 17%. COVID-19 threatened the continuation of any minor surgery service, but the initial crisis-driven response to the pandemic provided the opportunity to develop a new, more effective, nurse-led service for this patient group. The Model for Improvement was used and four 'Plan, Do, Study, Act' cycles deployed over an 8-week period, involving 102 patients. Routine quantitative and qualitative data in the form of a semistructured patient feedback proforma were used to guide the improvement process, optimising the new service design and delivery. The results demonstrated that 98% (n=100) of patients received same-day surgery via the new 'See and Treat' service. Staff and patient satisfaction remained high throughout; all patients preferred same-day surgery. No negative unintended consequences, for example, postoperative infections, were identified. One positive unintended consequence was the reduction in carbon footprint achieved by decreasing clinical waste and patient travel.

Improvement methodology was successfully used by a nurse-led team to enable the continuation and enhancement of surgical services for trauma patients during COVID-19-driven service disruption. This service transformation has resulted in the retention of the revised service delivery model as the 'new normal' approximately 2 years later. The COVID-19 pandemic challenged the resilience of the trauma surgery service but led to a positive long-term legacy that sustainably improved waiting times and patient experience while maintaining safety.

PROBLEM

Trauma-related injuries are a substantial part of the workload in plastic surgery departments; with people with the most minor injuries requiring surgery under local anaesthetic (LA) comprising 17% in the unit in question. Prior to the COVID-19 pandemic, the regional plastic surgery trauma service concerned spanned two National Health

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ A See and Treat minor surgery service has the potential to improve the delivery of high-quality care by providing timely, safe, person-centred, same-day surgery.

WHAT THIS STUDY ADDS

⇒ This study demonstrates the feasibility and acceptability of a nurse-led See and Treat service for surgical repair of minor injuries in a regional plastic surgery unit.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ It demonstrates the impact nurse-led improvement and advanced practice can have in optimising the use of healthcare resources for the benefit of key stakeholders.

Service (NHS) sites in a major English city. The unpredictable nature of demand on trauma services meant the plastic surgery team often had difficulty determining exact service requirements. This resulted in care delivery that was not always person centred and patients waiting longer for surgery than advised by UK guidelines, threatening care quality.^{1 2}

In 2018, WHO defined high-quality care as person centred, timely, efficient, effective, integrated, equitable and safe,³ but despite best efforts this is often not the norm. Hospital systems and structures can be insufficiently aligned to enable delivery of person-centred care.⁴ Delays, waits and cancellations are commonplace, along with assumptions that waiting is an inevitable though regrettable part of care processes.⁵ In the host unit, approximately 2900 emergency procedures were undertaken annually¹ from a catchment of 2.8 million people within 493 square miles, requiring significant travel by some patients.

Before pandemic, plastic surgery following an injury was undertaken in a day-case facility of an NHS hospital where people with injuries to the hand or face requiring surgery under LA were allocated an evening



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appointment. These theatre lists ran four evenings per week with surgery undertaken by a senior trainee doctor who was also on call for the entire plastic surgery department. As these lists followed the daytime general anaesthetic (GA) theatre list, cancellations often occurred with patients rescheduled to meet service needs. In addition, the on-call responsibilities of the designated surgeon could create further delays. A prepandemic audit (December 2019 to February 2020) identified that of 80 patients consented for surgery under LA, only 1% received same-day surgery. The data indicated the average 4.9-day wait for surgery presented scope for improvement, COVID-19 threatened the very continuation of any minor surgery service.

To maintain service continuity during the pandemic-driven disruption, including loss of anaesthetist cover, the ambulatory plastic surgery trauma service was temporarily relocated to a community hospital and adopted a new two-pathway service design. Both pathways were undertaken by consultant plastic surgeons. This included technical improvements, for example: (1) wide-awake local anaesthetic and no tourniquet surgery which was used for complex patients, to provide safe service continuity for these clients, who would otherwise have required GA in the main theatre area, which was not sustainable during the pandemic; and (2) a new See and Treat service for patients requiring plastic surgery for minor injuries. The development of this new service model for minor injuries was led by a trainee advanced clinical practitioner (tACP) (specialist nurse) and is reported here.

Initially, the See and Treat service was provided by a consultant plastic surgeon three afternoons a week, operating in a clinic room following the morning trauma clinic. This new way of working demonstrated significant benefits but was not viable long term. It nevertheless provided the tACP with an opportunistic, extended learning opportunity. During this time, competencies were developed and in situ experiential training to undertake minor surgical procedures under direct consultant supervision was completed. Although this approach to service delivery was not viable long term due to the isolated location and limited senior medical staff availability for oversight, it did appear to provide a much-improved service for this patient group.

Positive anecdotal staff feedback on the temporary service relocation was confirmed by an audit of the COVID-19 period (March 2020 to March 2021). This indicated that during this time, 433 patients with minor trauma injuries had undergone surgery under LA and 82% (n=355) of these received same-day surgery. This outcome met the local and national guidelines² for surgery within 4 days of injury and far surpassed the prepandemic service delivery outcomes. The data demonstrated that the introduction of the See and Treat model in response to the threat to the service caused by the pandemic had inadvertently demonstrated the short-term effectiveness and potentially significant benefits of this new way of working.

The aim of the quality improvement reported here was therefore to implement a nurse-led See and Treat minor surgery LA service that provided same-day surgery to 90% of patients with minor traumatic injuries.

BACKGROUND

The experience of the pandemic-driven revision to the prepandemic service model indicated that a nurse-led See and Treat service for those patients with minor injuries requiring surgery under LA could provide substantial benefit for patients and was potentially viable long term.

Four published papers reporting similar service delivery models for patients requiring plastic surgery under LA were identified. One described a same-day, elective plastic surgery service model.⁶ The other three were retrospective audits of same-day surgery,^{7–10} one of which was at national level⁷ and one spanned a 10-year period.⁸ Therefore, although limited, available evidence indicated a See and Treat service had the potential to improve patient safety, particularly as fewer staff are needed to deliver prompt, efficient and safe care.^{6–9} Any service reconfiguration must also consider the possibility of inadvertently introducing new safety risks; increased infection rates are particularly relevant for surgical services like this. However, a systematic review indicated that some types of hand surgery could be performed in a non-operating theatre setting without increasing the risk of infection.¹⁰ Thus, the available evidence supported the positive local audit findings, patient and staff feedback and initial evaluation of the temporary See and Treat service developed as a crisis-driven response to the pandemic. This reinforced the potential benefits of sustaining the significant improvements already demonstrated for this trauma patient group in the longer term.

In addition to improving waiting times, it seemed possible that a See and Treat service as envisaged also held potential to reduce the carbon footprint by minimising the waste associated with the surgical care process. The NHS emits 4% of the total carbon footprint in England (5% of which involves patient travel) and has committed to becoming carbon neutral by 2040.¹¹ It was calculated that a See and Treat service for this regional plastic surgery service had the potential to reduce emissions by decreasing multiple patient visits by 13800 km and 1.9 tonnes of CO₂ per year.¹²

A decision was therefore made to increase the See and Treat service from 3 to 5 days/week and relocate for a second time. This addressed the limitations of the temporary location by moving the service to the treatment centre within the community hospital. This setting provided the trauma clinic staff with a minor surgery operating room and facilities to deliver the nurse-led See and Treat service on a potentially permanent basis. We therefore aimed to use a continuous improvement approach to further evaluate and refine this new service delivery model.

MEASUREMENT

Mixed methods evaluation based on a basket of measures was used to assess the change while monitoring its impact throughout. All measures were linked to the project aim.¹³

The main outcome measure was the number of patients who met the criteria for the See and Treat service and underwent same-day surgery, by mode of service delivery (full details of modes 1 and 2 in following Strategy section). Data were recorded daily on a proforma, transferred on a weekly basis to a master record by the project lead and used to inform ongoing evaluation against the project aim.

Process measures included patient and staff feedback on the change and suggestions for improvement. Taking the views of both groups into account was most likely to ensure overall success, and was essential for solving problems and sustaining the change,¹⁴ particularly as the service redesign required staff to work differently. Each patient who underwent surgery in the See and Treat service (n=100) was invited to complete a feedback proforma on discharge, with an 88% response rate. This proforma was adapted from the pre-existing 'Friends and Family Test' widely used across the host organisation. The proforma yielded discreet ordinal data using a 5-point Likert scale for questions about patients' overall service experience and whether they preferred same-day surgery, and qualitative data from open questions inviting additional comments and suggestions for improvement. These data were analysed using descriptive statistics and content analysis. Clinical and clerical staff feedback was sought verbally throughout in the weekly staff huddle as part of normal clinical practice and analysed using content analysis. All staff also had the opportunity to provide 1:1 feedback at any other time.

Balance measures involved assessing whether the See and Treat service had resulted in additional burden, unanticipated untoward patient outcomes or other unintended consequences. To achieve this, the project lead reviewed patient records for all patients who underwent surgery through the new See and Treat service and required postoperative follow-up in the dressing or therapy clinic (n=92) for evidence of wound breakdown, surgical site infections and any other postoperative complications.

DESIGN

The Model for Improvement¹⁵ was used as illustrated in figure 1 to enable a data-guided, iterative study design involving small-scale cyclical testing in practice.¹³ The project consisted of four Plan-Do-Study-Act (PDSA) cycles over 8 weeks. The aim of PDSA 1 was to provide same-day surgery 5 days/week by asking patients to return for surgery the same afternoon. PDSA 2 introduced 'do as we go' surgery where patients were operated on immediately following assessment. PDSA 3 tested a more dynamic mode 1 (do as we go) and mode 2 (patients return for surgery in the afternoon) models, as determined by the number of patients waiting in the department. PDSA 4 further enhanced patient flow by making more effective use of administration staff.

To ensure patient safety, a standard operating procedure (SOP) was developed by the project lead and consultant plastic surgeon and used to triage patients into the new See and Treat service. Patients who met the criteria for the service were then assessed in the morning trauma clinic and same-day surgery. Prior to surgery, they were admitted into the minor operations room and preoperative safety checks completed. Throughout the procedure, patients were monitored by senior specialist nurses. On

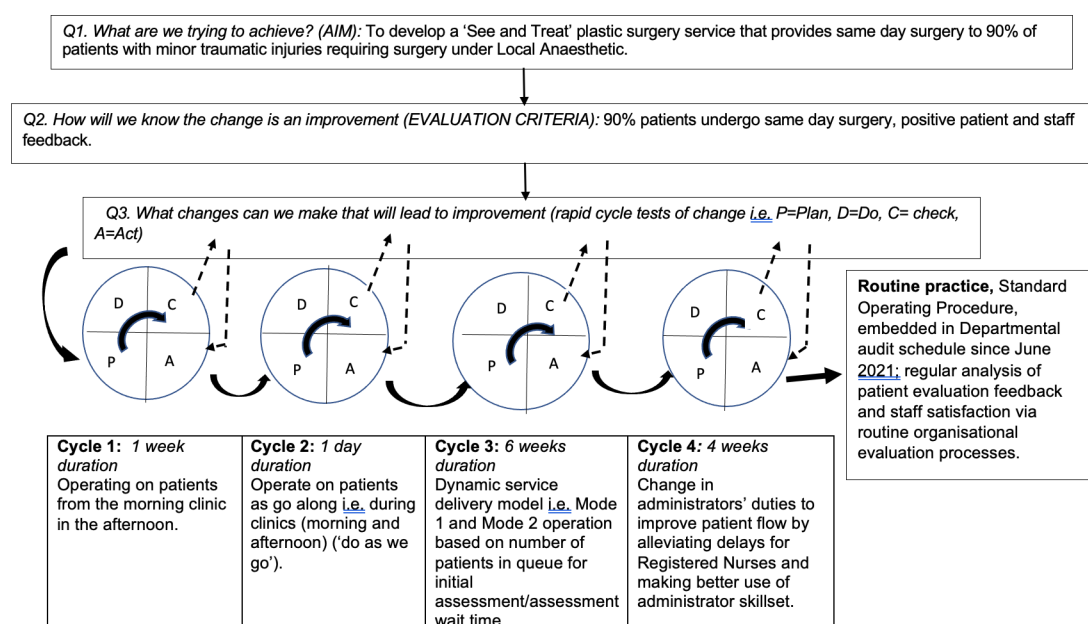


Figure 1 Developing a sustainable 'See and Treat' plastic surgery service: project overview—application of adapted Model For Improvement.²⁰

discharge patients were given verbal and written information on operation details, postoperative advice and wound care plus contact details should problems occur. Follow-up was arranged in line with the SOP, normally involving departmental dressing or therapy clinic follow-up.

To give the initiative the best chance of success it was important to involve the whole team, as staff involvement is a key factor in the long-term success of any project.¹⁴ This is particularly important as approximately 70% of change initiatives fail.¹⁶ Including people with various job roles provides different perspectives, adding greater depth and understanding to the problem and possible solutions. As the clinical team was small and well established, members were likely to provide open and frank feedback as their relationship was built on trust and open communication, a commonly valued feature of the working of this team. This supported psychological safety for team members based on the shared belief they were safe to take interpersonal risks.¹⁷ A psychologically safe working environment is one rich in trust and where risk taking is encouraged, without concern for repercussions.¹⁸

STRATEGY

The project comprised four PDSA cycles over an 8-week period. Evaluation data from the preceding PDSA cycle were used to inform each subsequent intervention cycle.

PDSA cycle 1: The aim was to provide the See and Treat service to 90% of suitable patients. The strategy was to operate on patients seen in the morning trauma clinic who needed surgical intervention and met the See and Treat service criteria, in the afternoon, Monday to Friday rather than the current 3 days/week. The change hypothesis was that this would enhance the patient experience and service efficiency by delivering the timeliest care every weekday. The surgery was undertaken by a senior trainee doctor and tACP with support from the trauma clinic staff. This See and Treat service ran alongside a consultant operating list which provided senior medical support if needed. This cycle lasted 1 week and was evaluated using continuous ratio data (ie, daily clinic numbers) plus discrete nominal data (ie, whether patients underwent same-day surgery). The results indicated that undertaking surgery in the afternoon sometimes had a negative impact on staff and patients. For example, although on Monday there were gaps in the clinic that could have been filled by offering patients surgery there and then, on Thursday there were five patients requiring surgery, which led to them waiting in the department for several hours and staff finishing shift late. However, for the rest of the week, this approach was successful with 15 of 16 eligible patients receiving same-day surgery and patient satisfaction remained high throughout despite some delays. Of these, 12 were male and three were female, and the procedures undertaken are detailed in [figure 2](#). This demonstrated that providing same-day surgery 5 days/week was feasible and beneficial. PDSA cycle 1

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	TOTAL
NAILBED REPAIR TO DIGIT	9	1	4	4	5	3	3	9	38
EXTENSOR TENDON REPAIR TO HAND/DIGIT	2	2	1	0	1	1	2	2	11
REPAIR FACIAL LACERATION	1	0	0	0	1	1	0	2	5
WASHOUT OF BITES (ANIMAL/HUMAN)	0	2	1	1	0	1	2	0	7
WASHOUT AND CLOSURE WOUNDS WITH NO STRUCTURAL DAMAGE OTHER	2	6	5	2	1	5	6	2	29
TOTAL	15/16	12/12	11/11	8/8	12/12	13/14	13/13	16/16	

See and Treat service delivery – Mode 1 or Mode 2

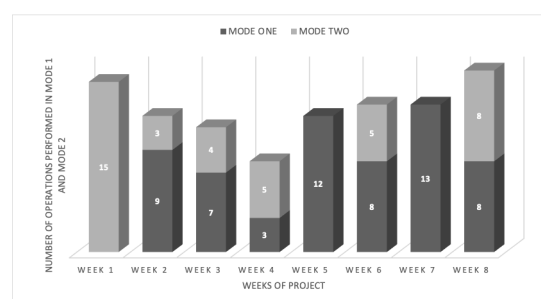


Figure 2 Patients who met See and Treat criteria and those who underwent surgery including procedures undertaken.

also highlighted inefficient use of registered nurse time during the patient pathway which was addressed during PDSA cycle 4.

PDSA cycle 2 aimed to eliminate clinical treatment delays by making better use of the free staff capacity during the morning clinics identified in PDSA 1. To test this, the team trialled a 'do as we go' process of performing surgery immediately following clinical assessment for all patients needing surgical intervention and meeting the See and Treat service criteria. This approach commenced in week 2 but only involved four patients (comprising three males and one female) and the procedures undertaken are detailed in [figure 2](#) before being stopped after 1 day as the balance measures (ie, staff feedback) indicated negative impact on patient flow in the clinic, with some patients waiting over 2 hours for assessment. This was deemed unacceptable by the team so an alternative approach was identified then tested in PDSA cycle 3.

PDSA cycle 3 introduced a more dynamic two-mode approach to delivering the new See and Treat service. The aim was to further enhance patient flow and improve the patient experience by reducing the remaining treatment delays identified from the evaluation of cycle 2. Mode 2 involved providing surgery as the trauma clinic continued ('do as we go'). However, if because of service demand, two or more patients were waiting to be assessed in the trauma clinic, the team switched to mode 1 delivery. This involved asking patients to return for surgery in the afternoon. Unlike PDSA 1, when all patients were rescheduled to return in the afternoon, this was a more flexible approach that involved switching between mode 1 and mode 2 working depending on patient numbers and service demand. This aimed to maximise efficiency

and reduce delays for patients whenever possible, while simultaneously managing real-time service demands to minimise initial patient assessment wait times. This approach proved successful as it provided a mechanism for preventing and dealing with clinic bottlenecks while maintaining effective patient flow and maximising service capacity. Mode 1 was generally most effective as it allowed the team to assess and treat immediately, reducing patient waiting time. Mode 2, however, offered the clinical team flexibility, enabling them to maximise resources and patient flow in response to service demand when required. PDSA cycle 3 enabled two-thirds of eligible patients to have surgery in mode 1, that is, 'do as we go' (comprising 17 males and 10 females), and the procedures undertaken are detailed in figure 2, but still indicated ineffective use of registered nurse time, which was addressed in PDSA 4.

PDSA cycle 4 tested a suggestion from the trauma clinic administrator that with minimal training she could help address a remaining bottleneck. This bottleneck resulted from delays for registered nurses in liaising with the trauma coordinator who was based at another hospital. The clinic administrator volunteered to do the preoperative administrative tasks involved in the treatment process to free up nursing staff to provide patient care. Patient numbers during this cycle were 41 males and 13 females, and the procedures undertaken are detailed in figure 2. The results were evaluated informally in the staff huddle and all staff feedback indicated this change was positive. The trauma clinic administrator reported that the change did not negatively impact her workload and the nursing staff reported it had increased their capacity to deliver timelier patient care. The staff continued to review this change in the weekly staff huddles before it was formally incorporated into the trauma clinic administrator's job description, based on positive evaluation by the administrator and the nursing staff.

Project results were disseminated to the plastic surgery team at the departmental audit meeting. Regular review and evaluation of this way of working has continued to demonstrate positive results; therefore, the service continues to operate in this way approximately 2 years later.

RESULTS

The project ran for 8 weeks, involved four PDSA cycles of 16, 4, 27 and 55 patients, respectively, 102 in total. Of these, 72 were male (mean age 43 years, range 16–83 years) and 30 were female (mean age 44 years, range 17–81 years). These results broadly reflect the normal patient population. This type of minor trauma is more prevalent in males due to the nature of their occupations, that is, manual workers. The baseline for same-day surgery patients with minor injuries requiring surgery under LA was 82% preproject. Throughout the project period, the data indicated the team provided same-day surgery for 98% (n=100), or all but two, of all suitable

patients in this client group via the See and Treat service. This meant that only two patients returned for surgery at a later date. In week 1, one patient was intoxicated and therefore unable to provide informed consent, and in week 6, one patient did not undergo surgery as the junior doctor in the clinic was not confident to undertake the surgical procedure required (figure 2). The procedures undertaken during the project (n=100) comprised: nail bed repair (n=38), extensor tendon repair (n=11), repair of facial lacerations (n=5), washout of bites: animal and human (n=7), washout and closure of wounds with no structural damage (n=29) and other (n=10).

Eighty-eight per cent (n=88) of the 100 patients who received same-day surgery provided feedback on their experience of the See and Treat service at discharge. Of these, 98% (n=86) reported the service was excellent with 2% (n=2) rating it as good. All patients preferred same-day surgery though we have no way of differentiating patient experience by mode 1 ('do as we go') and mode 2 (return for surgery later the same day) as these data were not collected. This indicates we can be confident that the results are truly representative of service users' perspectives as the response rate significantly exceeded the 50% response rate considered appropriate⁵ (figure 3).

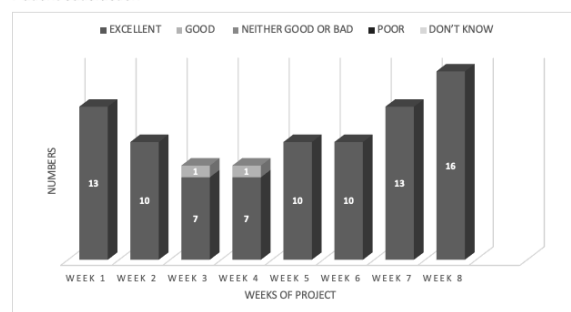
Qualitative patient feedback was obtained from the open questions in the patient evaluation proforma. All these verbatim responses were categorised into three groups, namely perceptions of staff, perceptions of the service and suggested improvement (figure 3). Patients' perceptions of both the staff and service were all very positive though included three suggested service improvements. In response, staff were able to source a coat hook for the clinic room; however, the suggested increase in staff establishment and physical clinic space to enable continuous mode 2 service delivery (ie, surgery straight after clinical assessment) to minimise wait times were not achievable at the project team level; further investment by the organisation would be required to achieve these. One example was a patient comment regarding the waiting times between clinic and surgery. It is likely this patient underwent surgery via mode 1 but would have preferred the surgery earlier in the day. Due to limited space, surgery could not run alongside the clinic for all patients; however, this will be addressed with the organisation's management team outside this project as part of ongoing service development.

Based on de Berker¹² calculation of a CO₂ emission reduction of 40 km of travel per patient and 5.6 kg of CO₂ per patient based on the same See and Treat service, we estimate a reduction in patient travel of 4000 km and 560 kg of CO₂ based on the 100 patients reported in this project.

LESSONS AND LIMITATIONS

Quality improvement methodology enabled the team to gain insight into the identified problem and test potential solutions involving the whole team, to deliver sustainable

Patient satisfaction



Prefer same day surgery or not

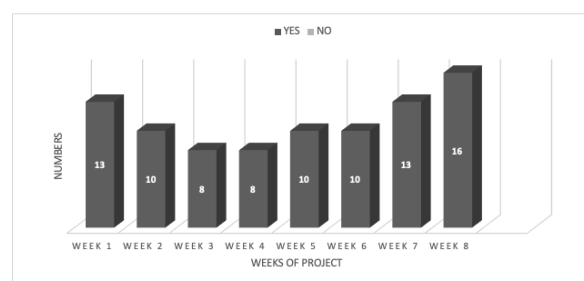


Figure 3 Patient satisfaction. NHS, National Health Service.

change at pace using a trial and learning approach. This meant the project aim was exceeded, with same-day surgery being delivered to 98% of plastic surgery trauma patients with minor injuries and requiring surgery under LA. Further, this was achieved while maintaining patient safety, enhancing patient and staff experience while simultaneously optimising healthcare resource usage. The incidental reduction in carbon footprint achieved also made a valuable contribution to the NHS commitment to become carbon neutral by 2040.¹¹

The primary limitation is that the project was undertaken in the throes of a global pandemic. The team were therefore unable to ascertain whether the number of patients seen in the trauma clinic and the new See and Treat service were a true representation of a non-pandemic context. Routine data indicate there appeared to be fewer patients seen in the clinic in the same period in 2019 (ie, prepandemic); however, this could be due to different referral systems into the specialty at that time. The wait time patients experienced was not recorded but could have provided additional insight to inform further enhancement of patient flow.

The 8 weeks over which this project was undertaken is a relatively short timescale and relatively small numbers of patients were involved which could limit understanding of the impact of the See and Treat service in the long term. For example, postoperative complications were not identified during the project but may become apparent in the longer term. However, this limitation must be judged within the context that this new service has been operating for approximately 2 years now, with continuing

Verbatim comments from patient feedback forms

STAFF	SERVICE	IMPROVEMENTS
Helpful Friendly Professional Informative Knowledgeable Calm Patient Fantastic Polite Competent Reassuring Kind Caring Amazing Brilliant Supportive	Quick Reduced waiting times All done same day Efficient Less travel times Convenient Amazing Excellent Clean environment NHS at its best	More staff Nothing Perfect Small waiting times between clinic and surgery. If surgery could be done straight away would improve service

positive evaluations and no indication of negative impact, including long-term surgical complications. A further limitation could be that the vast majority of patients were male; however, this broadly reflects the normal patient population as this type of minor trauma is more prevalent in males due to the nature of their hobbies/occupations, that is, DIY (home improvements) and manual work.

Patients and the public were not involved in project development although ideally this would have been the case, as they can provide a unique viewpoint based on actual first-hand experience of how quality could and should be improved.¹⁹ However, due to pandemic restrictions and the pace of change initially required this was not feasible although patient/family evaluation of the service is now in place with routine ongoing continuous development of the service based on this.

Finally, the duration of each procedure and total theatre time was not collected but could have provided useful additional insight.

CONCLUSION

To conclude, this project represents a positive COVID-19 legacy for patients, staff and the healthcare organisation concerned. This pandemic-driven, new nurse-led service model has enabled the team to meet the WHO definition of quality care³ by providing safe, efficient, timely, integrated, equitable and person-centred care, increasing the percentage of patients undergoing same-day surgery from a baseline of 82% to 98% over a period of 8 weeks. The team are extremely proud of what they have achieved.

Using a quality improvement approach empowered and enabled team members to demonstrate agency which also boosted morale during a very difficult time. Working together, they have demonstrated how a nurse-led clinical team can have a significant impact on delivering person-centred change at the front line for patient and wider benefit.

The project has also demonstrated how the See and Treat service has contributed to reducing the organisation's carbon footprint in line with the NHS commitment to become carbon neutral by 2040¹¹ by generating less clinical waste and reducing patient travel for multiple hospital visits. Based on the results of this project, an annual reduction in patient travel of 2400 km and 3.36 tonnes of CO₂ is expected.

It is now almost 2 years since completion of the project and over 1450 patients have been treated via the See and Treat service. Ongoing evaluation indicates the team continue to provide same-day surgery to 98% of eligible patients and routine audit ensures standards are monitored and maintained. The measures and outcomes continue to be appropriate and demonstrate the continued benefits of the service.

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Contributors CF was involved in the design, implementation, data collection, analysis and evaluation of this quality improvement initiative. GJ provided guidance on the overall project design and implementation in a supervisory capacity. Both authors assisted in the drafting and editing of the manuscript. Both authors have had the opportunity to draft and revise the manuscript and have both approved it for publication.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Judged a service evaluation using the NHS Health Research Authority tool, the project did not require ethical approval but was scrutinised and approved by the supervising university (Project ID: Ethos 32119) and registered and approved by the host audit department in accordance with routine organisational processes. Project approvals designated active patient consent unnecessary as seeking patient feedback on all services is standard practice in the host organisation, with completion of the feedback proforma deemed consent. Project information, however, was provided for all patients and data collection and reporting was anonymous. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement All data relevant to the study are included in the article or uploaded as supplementary information.

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