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Image-based digital post-discharge surveillance in England: measuring patient enrolment, engagement, clinician response times, surgical site infection, and carbon footprint

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Background: Surgical site infections (SSIs) can have a significant impact on patients, their families and healthcare providers. With shortening inpatient periods, the post-discharge element of surveillance is becoming increasingly important. Proactive surveillance, including digital wound images using patient smartphones, may be an efficient alternative to traditional methods for collecting post-discharge surveillance (PDS).

Aim: To determine success in patient enrolment and engagement including reasons for non-response, the time for clinicians to respond to patients, SSI rates, and carbon emissions when conducting PDS using patient smartphones.

Methods: An evaluation was undertaken for a one-month period (June 2022) in two adult cardiac surgery services which routinely used patient smartphones for PDS, using the secure Islacare (Isla) system.

Findings: The initial patient response rate for Isla was 87.3%, and the majority of patients (73%) remained engaged throughout the 30-day period. There was no significant difference in age, gender, operation type or distance to hospital between Isla responders or non-responders, or if the hospital provided a photo at discharge or not. Patients using Isla had a shorter post-discharge stay ($P = 0.03$), although this was not attributed to the platform. Patients not owning a smartphone and a technical issue were the main barriers to participation. Overall, nine SSIs were recorded, eight through the Isla surveillance and one through a hospital transfer readmission. The carbon emission associated with the SSI ranged from 5 to 2615 kg CO2e.

Conclusion: In a real-world setting, using patient smartphones is an effective method to collect PDS, including wound images.

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Introduction

The World Health Organization reports surgical site infections (SSIs) as one of the most frequent healthcare-associated infections, affecting up to one-third of surgical patients [1]. SSIs are a significant health burden on patients and healthcare providers [2]. Once infection takes hold, there is an increased risk of prolonged antibiotic treatment, hospital stay, outpatient and emergency visits, surgical reoperation, readmission, and sepsis [1]. Costs, including staffing, treatment, and diagnostics increase with the severity of infection and these may be compounded in SSIs complicated by antibiotic-resistant bacteria [3,4]. Alongside increased mortality and morbidity, patients with SSIs may experience financial losses, and reduced quality of life affecting mental health [5,6]. Litigation in high-income countries is an issue. For example, in England, litigation costs associated with SSIs between 2012 and 2017 were reported to be £35.2 million [7].

There are two forms of SSI surveillance data as outlined by the US Centres for Disease Control and Prevention; inpatient and readmission surveillance data, and post-discharge surveillance (PDS) data, both of which continue for 30 days after surgery (90 days if implant was used). Various methods are recommended for PDS including systematic review of patients attending clinics or patient-completed wound healing questionnaires at 30 days [8]. SSI surveillance in England is mixed, with most but not all hospitals reporting inpatient and readmission data for mandatory surgical procedures, while voluntary inpatient and readmission SSI reporting is around 25% [9]. Fewer hospitals participate in PDS, which is reported to be time-consuming and expensive [1,9]. This is unfortunate, as post discharge is the time when many, if not most, SSIs present [10]. Depending on the surgical category, an estimated 60% of SSIs may be missed if PDS is not undertaken [11]. The post-discharge period is set to increase following the post-COVID-19 pandemic drive for safe early discharges, shortened length of stay, and one-day surgery. This reduced surveillance at the peak SSI presentation time is clinically important, as the problems arising from SSIs can be prevented or reduced if caught and treated early. Increasing PDS should improve the patient experience and reduce treatment costs to the UK National Health Service.

No gold standard exists regarding the best way to measure SSIs after patients leave hospital, and telemedicine for SSI diagnoses is an emerging area of interest [12,13]. Post COVID-19, hospitals are embracing online technologies, and remote platforms are being introduced as an additional or alternative method of direct communication between patients and hospitals [14]. Telemedicine seems promising for post-discharge SSI follow-up, especially in low-income countries where attending hospitals may be difficult and postal services for paper-based questionnaires may be unreliable, although internet service may be inconsistent [15]. Digital surveillance has the additional benefit that numerous wound images can be submitted and reviewed during the discharge period rather than one summary review at 30 days.

A systematic review and meta-analysis to determine the diagnostic accuracy of telemedicine for SSI identification included a randomized trial and a feasibility study that explored the use of smartphones and photographs in SSI surveillance [13,16,17]. Both the trial and the feasibility study reported comparatively low rates for full adherence of 26% and 45%, respectively. Outside of research settings, no publications have described large-scale, systematically collected SSI data using patient smartphones in a 'real-world' setting in the UK. Smart technology opens up a new strategy for SSI prevention, i.e. proactive continuous PDS to detect problems early and intervene [16]. By improving on the retrospective 30-day outcome measure of the traditional surveillance model, there is an exciting opportunity to align PDS surveillance with inpatient surveillance, i.e. reporting, monitoring, and actively managing SSI rates to minimize occurrence.

The aim of this study was to evaluate an image-based PDS system using patient smartphones to determine success in patient enrolment and response including reasons for non-response, the time for clinicians to respond to patients, and the identification of SSIs. Carbon emissions associated with the SSIs detected was a secondary measure.

Methods

The Isla digital post-operative surveillance platform was implemented in 2020 at two London-based cardiothoracic tertiary referral centres; Royal Brompton hospital ('RBH') and Harefield hospital ('HH'), both part of Guy's and St Thomas' NHS Foundation Trust. After Isla had been embedded within the clinical pathway, data from all adult patients having cardiac surgery in June 2022 was collected to assess this new surveillance method. Appropriate permissions were obtained (CIRIS ID: 5395).

Isla is a visual medical record platform, used for SSI surveillance to review patients' wounds following surgery. Patients receive a secure SMS text at pre-programmed intervals asking them to upload images (photographs) of their wound and provide information on wound healing. Patients can also upload wound images/information at any time if they have a concern. Most patients are discharged without a dressing; however, if patients have a dressing in place, they are instructed via text to take a photo during the dressing change — but not to disturb dressings. Wound healing information includes the national surveillance programme post-discharge questions — for example, asking patients to self-assess non-visual signs and symptoms such as incisional pain and warmth, as well as documenting any wound treatments received (see Supplementary Appendix). Images are reviewed by clinicians, and treatment can be initiated, or patients can be followed up if more detailed information is required to aid diagnosis. Isla is a progressive web application, which means that it can be accessed via any device with internet access. Patients do not need to install, download, or register for Isla.

All patients aged $\geq$18 years who were discharged home after having coronary artery bypass graft (CABG) surgery and/or cardiac surgery involving valves or septum (as per national surveillance protocol) were enrolled on to the Isla platform. At RBH, patients were enrolled on to the Isla platform after discharge by the surveillance team. At HH, the nurse takes a photo at discharge of each patient's wounds, and this automatically enrols the patient for PDS with the Isla platform. Patients' language skills were not routinely assessed prior to enrolment.

After enrolment, the process was the same for patients at both hospitals. Patient weekly submissions to Isla were reviewed daily by one of three registered nurses who made up the surveillance team. All submissions received a reply from a surveillance nurse using a template response and/or free text advice, as appropriate, depending on the wound healing.

For patients who were not enrolled on Isla for any reason, PDS follow-up was via telephone using the same questions as used on Isla.

Data collection and analysis

All surveillance data at each hospital were collected by the experienced and trained surveillance staff.

Patient enrolment, engagement, and adherence with Isla

Patient engagement was defined as at least one patient submission to the Isla platform up to 30 days after their operation. Patient adherence was defined as patients responding to two Isla requests, at least one week apart. Engagement is presented as a percentage of the total number of patients enrolled on the Isla platform. After testing for normality, comparisons between groups who did or did not engage for numeric data were done using unpaired t-test and χ^2-test for categorical data. Significance was set at $P < 0.05$. Data were presented as a percentage of respondents in a table where appropriate.

The surveillance team attempted to contact non-responders and patients not eligible for Isla enrolment by telephone, on up to three different occasions. For patients who could be reached and had been enrolled on to Isla, the team recorded reasons why they did not respond to SMS texts. The hospitals' electronic patient records system (Lorenzo) was checked retrospectively for any 'Admin Alerts' which may have impacted on engagement, such as limited English, or partial or full blindness flags.

Clinician response times

Data on time from patient image submission to a response from a member of the surveillance team was recorded via the Isla platform. The range and median data are presented in hours and minutes.

Surgical site infections

UK Health Security Agency (UKHSA) definitions and classifications were used for SSI, including the PDS element. PDS uses a different definition for SSI than for those detected on primary and readmission. Criteria for PDS SSI were: pus discharge plus antibiotics; two signs of clinical inflammation (heat, swelling, pain, redness) plus antibiotics, two signs of clinical inflammation and dehiscence [8]. SSIs detected post discharge were not classified according to depth, which is also in keeping with the UKHSA protocol.

Local additions to the patient post-discharge questionnaire were made to aid clinical review. These included: (i) patients were asked to complete the entire form, rather than discontinuing the form after one question on healing; (ii) extra information to flag sepsis was added, including rigors, general malaise, and specialty-specific concerns; (iii) a numerical rating score was added for the question on pain; and (iv) branching questions were added to gather more details on clinical signs and symptoms as per McLean *et al.* (see Supplementary Appendix for the Isla Patient Remote Surgical Wound Assessment form) [16].

Post-discharge SSIs for patients submitting to Isla were identified after review of the images and information provided by the patient. Post-discharge SSIs for patients not enrolled or not submitting to Isla were collected via telephone using the UKHSA post-discharge questionnaire.

Delayed wound healing

It was possible to collect data on delayed wound healing for Isla responders only as there was a photo available to cross-check findings. If the wound was not healing as expected – e.g. evidence of gaping, new or worsening inflammation, or systemic signs (fever, rigors, unstable sternum) – the surveillance nurse telephoned the patient for further assessment. Assessment information was referred to the surgical team and the surveillance nurse recorded the number and outcomes of referrals.

Carbon footprint associated with SSI

Anonymized data for clinic appointments, associated travel to GP or hospital, antibiotic treatment, bed-days (including stay in intensive care), and further surgery for patients with SSI were entered into the Sustainable Healthcare Coalition tool to identify associated carbon emissions [18]. Antibiotics for treating SSIs used in-hospital were confirmed with the pharmacist and antibiotics prescribed for SSIs detected post discharge were confirmed with the patient's GP (as per UKHSA protocol). Carbon footprint data for patients without an SSI were not sought.

Results

A total of 181 adult patients had cardiac surgery during the study period in June 2022 (80 patients at RBH, 101 at HH).

Patient enrolment and engagement

Figure 1 shows enrolment with Isla. One hundred and fifty-eight patients (86.8% of all patients) were actively enrolled on Isla for PDS, leaving 23 patients who were not enrolled on Isla. The most common reason stated by patients for not responding to Isla requests was not having a smartphone ($N = 5$) (Figure 1). Two patients within the one-month cohort had limited English and did not engage. No admin alerts were identified on the organization's electronic patient system. The surveillance team attempted to telephone the 23 patients who were not enrolled plus the 20 patients who had not responded to Isla SMS messages, successfully contacting 32 patients. Thus, PDS coverage using a combination of Isla and telephone follow-up was 95% (171/181).

The response rate for patients submitting at least one image to Isla was 87.3% (138/158). Seventy-three percent (119/158) of patients adhered to the full protocol throughout the 30-day period, submitting at least two images. The overall total number of images submitted by the patients was 633, a range of 1–36 images per patient with a median of 3. Nineteen patients submitted on only one occasion; however, the median day of response for these patients was day 20 (average day 24), which seemed suitable for surveillance purposes.

Demographics for patients who were enrolled on to Isla and who did or did not engage were compared. There was no significant difference in enrolment by hospital, age, gender, type of surgery or distance from the hospital, although patients who engaged with Isla had a shorter length of stay (median 6 days vs 9 days, $P = 0.03$) (Table I). There were no significant differences in the proportion of patients only providing one

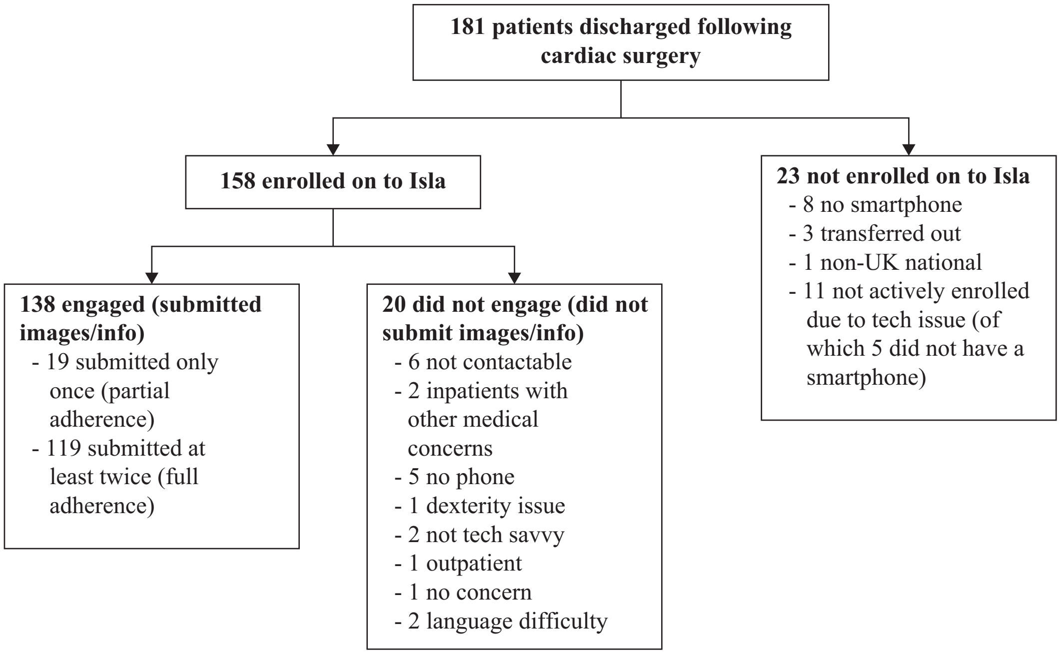

Figure 1. Overview of Isla enrolment numbers and number of patient-reported reasons for non-response to Isla (actively enrolled patients only).

submission ($P = 0.76$) or overall PDS completed ($P = 0.69$) (data not shown in Table I).

Clinician response times and referrals

The surveillance team reviewed 633 images from 138 patients on Isla and provided 336 unique responses (multiple images sent on the same day required only one response). The median time for staff to respond to patients was 46 min (range: 40 s to 26 h). Most responses to patients were provided by the surveillance team using SMS. On 18 occasions, the team telephoned the patient following Isla review, to facilitate further flexible questioning. The team made seven referrals for wound concerns to the surgical team following Isla review; this resulted in two patients being readmitted for SSI and four patients being seen in outpatients. One of the patients seen in outpatients required antibiotics and the other three required no treatment.

Surgical site infections

A total of nine SSIs were detected during the data collection month: an overall SSI rate (including PDS) for CABG surgery of 5.5% (6/109) and an SSI rate for non-CABG surgery (national protocol definitions) of 3.2% (3/94). Table II shows the breakdown of SSIs per site and by surgical procedure, as per UKHSA protocol. Eight out of the nine patients with SSIs were identified via Isla, including two patients who required readmission. One patient, not enrolled on Isla, was identified with an SSI. This patient was transferred to their local hospital for rehabilitation and was transferred back to the operating hospital after developing a wound infection. Three additional infections were identified within the Isla group, but these were excluded as per the UKHSA protocol (one drain site and two bypass wounds).

Twelve of the 138 patients whose wounds were reviewed using Isla showed evidence of delayed healing – that is, they had one or more of the following clinical signs: redness, gaping, or exudate during the 30-day follow-up – but did not fulfil the criteria for an infection. Fourteen and a half percent (20/138) had incisional dehiscence/gaping, 8.7% (12/138) of the images had evidence of redness, 2.9% had evidence of exudate (any type), and 7.2% (10/138) had an issue with suture material. Nineteen patients self-reported treatment with antibiotics for their wound.

Table I
Patient demographics

Variable	Responders ($N = 138$)	Non-responders ($N = 20$)	P-value
Royal Brompton Hospital	61	10	0.63
Harefield Hospital	77	10	
Age (years), mean (range)	62.8 (23–84)	66.9 (51–83)	0.12
Male	113 (81.9%)	17 (81%)	0.73
CABG surgery only	67 (48.6%)	13 (61.9%)	0.17
Postoperative length of stay (days), median (range)	6 (3–23)	9 (3–44)	0.03
Distance (km) to hospital (one-way only), median (range)	16.7 (0.3–172.5)	17.5 (0.3–161.8)	0.77

CABG, coronary artery bypass graft.

Table II
Surgical site infections (SSIs) per site and by surgical procedure

Variable	Royal Brompton Hospital	Harefield Hospital	Combined
Total CABG[a]	42	67	
SSI detected primary admission	0	0	
SSI detected on readmission	0	3	
Post-discharge SSI	2	1	
CABG SSI rate (%)	4.8%	6.0%	
Total CABG SSI rate (%)			5.5%
Total cardiac (non-CABG)[a]	48	46	
SSI detected on primary admission	0	0	
SSI detected on readmission	0	0	
Post-discharge SSI	2	1	
Cardiac (non-CABG) SSI rate (%)	4.2%	2.2%	
Total cardiac SSI rate (%)			3.2%

CABG, coronary artery bypass graft.
[a] Defined as per UK Health Security Agency protocol.

Carbon footprint of SSIs

Table III provides information on the nine SSIs detected and highlights the carbon emissions associated with them. The three readmissions for SSI resulted in 88 bed days. A total of 198 days' worth of antibiotics were needed to treat the nine SSIs detected as per UKHSA protocol. Four patients with an SSI had positive cultures. Table IV lists the SSI micro-organisms detected, and agents to treat the SSIs.

Discussion

This evaluation is different from other published studies of digital imaging for wound surveillance, as it refers to established practice. Since its implementation within cardiac surgery at the two hospital sites, more than 3000 unique patients have submitted to Isla over the last two years. This is the largest non-pilot evaluation of SSI surveillance using patient smartphones in practice, and the first published 'real-world' service evaluation involving smartphones for SSI at multiple hospital sites in the UK.

In this study, patient engagement rate with Isla (87.3%) was comparable to, or higher than, other published studies; 85% and 42% [16,17]. Our engagement rate also compares favourably with the national PDS return rate of approximately 80% which uses a combination of postal questionnaires and telephone follow-up [9]. Although PDS coverage did not achieve 100%, it increased to 95% with adjunct telephone follow-up. Additionally, our patient adherence rate with Isla of 73% was also higher over the 30-day period compared with other studies of digital imaging. One study conducted in the USA found that 18 out of 47 patients (45%) supplied daily images for a two-week period, whereas in a study in the UK 58 out of 223 patients (26%) adhered to submissions on days 3, 7, and 15 [16,17].

Not having a mobile phone was the main reason for not enrolling a patient on to the Isla platform — as was also found in the largest randomized control trial for using smartphones in SSI surveillance in the UK [16]. To address this in clinical practice, we involved family members or carers who did have phones to assist in responding. In 2018, three-quarters of the UK population owned a mobile phone [19]. However, mobile phone ownership and network coverage continues to increase and improve, making this approach more accessible. In this real-world evaluation, the main cause of non-response was a technical issue (Isla did not deploy the automatic scheduled messages linked to enrolment via the photo at discharge) which affected 6% of patients (11/181) [20]. Reasons stated by patients for not responding to Isla did not appear to be linked to their longer inpatient stay in hospital; however, six patients were not contactable, thus their reasons are unknown. Of note, two patients did not submit due to language difficulties, although their communication issues were not documented on their electronic patient records. The number of non-English-speaking patients in England is unknown but in London, where the study was conducted, more than 300 different languages are spoken [21]. Communication barriers in healthcare can lead to several consequences, including issues with diagnosis and treatment, and increasing inclusivity warrants further attention [22]. If implemented well, using images may be advantageous to overcome language barriers.

Table III
Carbon emissions associated with surgical site infections (SSIs) detected

Isla	Hospital	Time of SSI detection	Reoperation for SSI	GP visit	OPA	Ward bed-days	ITU bed-days	ABx days	ABx cost (£)	Total footprint (kg CO_2e)
Yes	HH	PD		3	0	0	0	14	4.60	7.61
Yes	RBH	PD		3	1	0	0	7	1.72	7.73
Yes	RBH	PD		3	1	0	0	14	4.09	8.16
Yes	RBH	PD		1	0	0	0	7	2.88	2.78
Yes	RBH	PD		2	0	0	0	14	3.44	5.14
Yes	HH	PD		1	1	0	0	7	2.88	5.68
No	HH	R	1	0	4	51	2	61	2082.07	2614.86
Yes	HH	R	2	0	1	17	0	30	745.56	783.21
Yes	HH	R	0	0	7	15	0	44	242.27	819.1

Isla, responder (Yes) or non-responder (No); OPA, outpatient appointment; ITU, intensive therapy unit; ABx, antibiotics; CO_2e, carbon dioxide equivalent; HH, Harefield Hospital; RBH, Royal Brompton Hospital; PD, post discharge; R, readmission.

Table IV
Surgical site infection micro-organisms and treatments

Hospital	Wound	Micro-organism(s) cultured	Antibiotic therapy
HH	Leg	Nil	Clarithromycin (o), flucloxacillin (o)
RBH	Thoracotomy	*Citrobacter koseri*	Clarithromycin (o)
RBH	Sternal	N/A	Doxycycline (o), flucloxacillin (o)
RBH	Sternal	Nil	Flucloxacillin (o)
RBH	Sternal	Nil	Clarithromycin (o)
HH	Sternal	Nil	Flucloxacillin (o)
HH	Sternal	*Klebsiella pneumoniae*	Tigecycline, meropenem, cefuroxime, teicoplanin, ciprofloxacin (o)
HH	Sternal	*Pseudomonas aeruginosa*	Gentamicin, cefuroxime, piperacillin–tazobactam, vancomycin, ciprofloxacin (o), doxycycline (o)
HH	Sternal	*Staphylococcus epidermidis*	Piperacillin–tazobactam, vancomycin, ciprofloxacin (o), linezolid (o)

HH, Harefield Hospital; RBH, Royal Brompton Hospital; o, oral.

After excluding the three SSIs which did not meet the national surveillance inclusion protocol, a total of nine SSIs were identified. Without PDS, six of these SSIs would have been missed. Furthermore, the two SSI readmissions facilitated via Isla identification may have also gone undetected if they had been readmitted to their local hospital, rather than to our specialist cardiac hospitals where their surgery was carried out, as is the case for approximately a quarter of surgical readmissions [23]. The national rates for CABG and non-CABG surgery based on inpatient and readmission data, excluding PDS data, are 2.6% and 1.2% (five-year aggregate) [9]. Our SSI rates, which included PDS, were 5.5% and 3.19%, respectively. One strength of using frequent proactive patient-reported health data combined with digital images is the ability to fast-track readmission for patients. As many SSIs present after discharge, an efficient method for monitoring is relevant and provides value via data completeness.

Resources are frequently cited as a reason for not implementing surveillance programmes [1]. Tyrer recently reported on a pilot experience of deploying Isla in practice, involving 173 patients, finding that using Isla was approximately three times faster than using the telephone [24]. In our evaluation, the surveillance team reviewed and responded to 336 patient submissions in a median time of 46 min. The surveillance team was well resourced (three nurses working across two hospitals). No additional resources were used, that is, the three staff members had existing workloads and Isla was incorporated into this, which may not be practicable at other hospitals. A digital post-discharge approach may be helpful where staffing resources are prohibitive to surveillance.

A systematic review found that standalone digital images provided good sensitivity (mean: 63.9%; 95% confidence interval (CI): 30.4–87.8) and high specificity (mean: 92.6%; 95% CI: 89.9–94.5) for diagnosing SSIs [13]. A recent randomized control trial using smartphones for SSI surveillance after abdominal surgery found that when patient-reported symptoms were combined with wound images, specificity significantly improved from 84.4% (95% CI: 80.5–88.3) to 93.6% (95% CI: 90.9–96.2) [16]. Although accuracy was part of this evaluation, three wound infections (two bypass incisions and one drain site) were excluded from SSI rates (in line with the national surveillance protocol) based on presentation of concerns identified in the digital images. This would not have been possible if post-discharge questions excluding wound images had been used. Whereas combining patient-reported symptoms with photos improves sensitivity as compared to the use of photos alone, there is a risk that some post-discharge SSIs were missed by the digital imaging system and that these could have been picked up via standard care pathways [16].

As discussed by Sawyer *et al.*, surveillance for clinical care and surveillance to detect changes in disease over time have different purposes and data requirements [25]. Our approach was to balance these requirements by using the UKHSA 2022 protocol in combination with some questions to help inform patient management (e.g. adding questions for sepsis and pain), and to use Mclean *et al.*'s approach for branching questions [16]. The modifications took into account Sawyer *et al.*'s recommendations to help inform clinical care, as well as the importance of efficiency (e.g. not have too many questions) and standardization across the partner hospitals [25]. An additional benefit was the production of a series of images of infected non-healing and healing wounds, which can be used to visualize information and analyse over time to learn more about healing after discharge [25].

The data regarding carbon emissions can help to inform local practices. Here, the impact of the nine SSIs was examined using an online sustainability tool. In the UK, the National Health Service has a considerable carbon footprint and is responsible for 25% of public sector emissions [26]. Grinberg *et al.* examined the mean greenhouse gas emissions in operating theatres during cardiac surgery and reported 124.3 kg of carbon dioxide equivalent (CO_2e) for each cardiac procedure [27]. This study used an online tool to determine the carbon emission associated with post-discharge and readmission SSIs, which ranged from 5 to 2615 kg CO_2e. Readmissions due to SSI may produce the same (or higher) greenhouse gas emissions as the original heart surgery. To our knowledge, this is the first work to include information on the carbon footprint of SSI in the UK. As part of the calculation, data on antibiotic usage, outpatient and hospital attendances, surgical revision, and length of stay were used. Organizations may have published sustainability strategies, and data here may be used to help inform infection prevention programmes achieve their green ambitions.

An important limitation of this study is the difference in practice regarding the photo at discharge. Although the difference in response rates was not significant between patients enrolled via photo at discharge, or not, this fundamental difference may have introduced confounding variables not adjusted for in the statistical analysis used in this evaluation. A further limitation of this work was the technical issue encountered, which has since been resolved but would have prevented a small proportion of patients at one hospital from receiving the Isla SMS texts. No SSIs were detected on primary admission during the study; this is not surprising as both hospitals maintain SSI rates lower than the national benchmarks for CABG and non-CABG cardiac surgery, likely due to proactive surveillance with dedicated teams and multidisciplinary working for the prevention of SSI. Although findings suggest that there is good clinical application for the Isla digital wound surveillance platform and provide some baseline data, results should be interpreted with caution.

In conclusion, since the introduction of smartphone technology (Isla) for SSI surveillance in cardiac surgery in 2020, the evaluation of this now fully embedded practice shows high patient response rates and continued engagement. This study suggests that the use of Isla fits well within the cardiac patient pathway as SSIs are typically detected after the patient leaves hospital. The addition of an image helped to apply the UKHSA protocol appropriately by excluding non-reportable SSIs. Access to a mobile phone continues to be the main obstacle to digital wound surveillance. An original finding, collected via Isla data, highlights the high carbon footprint associated with SSIs.

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Conflict of interest statement

J.A.O. is a consultant to Gama Healthcare. M.R. is an unpaid Clinical Advisor to Isla Care Ltd. No other conflicts of interest are declared by the authors.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jhin.2023.01.001.

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