

In this article...

- Why most surgical site infections occur after discharge from hospital
- How photo at discharge supports wound monitoring after surgery
- The ways in which the approach can reduce patient readmissions and costs

Digital photo at discharge: a way of monitoring surgical wounds

Key points

Surgical-site infection makes up a significant proportion of healthcare-associated infections

Photo at discharge has been shown to reduce readmissions for surgical-site infection

Using digital images for wound care evaluation can also help improve clinical outcomes, staff experience and efficiency

A pilot of Isla, a web-based platform which supports submission of images, proved to be an effective way to implement photo at discharge

Isla can support surveillance and enable wound monitoring after discharge

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Abstract Many healthcare-associated infections are caused by surgical-site infection. Research shows that using a photo at discharge can help reduce readmissions for surgical-site infection. A three-month pilot of a digital web-based platform called Isla was carried out at Liverpool Heart and Chest Hospital NHS Foundation Trust to test whether it could support photo at discharge. The results indicated that Isla is a useful platform for supporting implementation of the model, as well as enabling real-time wound monitoring after discharge. The approach has the potential to identify patients who develop infections or delayed wound healing after they go home, so early advice and treatment can be offered.

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Surgical-site infection (SSI) is a problem. It has been shown to account for up to 20% of all healthcare-associated infections and data has indicated that at least 5% of surgical patients develop an SSI (National Institute for Health and Care Excellence (NICE), 2019). A systematic study across surgical specialties confirmed that most SSIs are identified after discharge from hospital (Woelber et al, 2016), yet early detection is crucial to reduce their severity and duration.

Background

Rochon et al (2016) introduced the concept of photo at discharge (sometimes shortened to PaD) and showed that it led to a reduction in readmissions for SSI and avoided some of the associated costs. Badia et al (2017) highlighted the financial costs related to SSIs, which can lead to extended hospital stays for patients, additional interventions and treatments, and even readmission to hospital and further surgery. The cost of an SSI in cardiac surgery was

reported to be £11,003 (Jenks et al, 2014); as a result of these high costs, funding for initiatives that reduce even a small number of infections can often be recouped.

The idea behind photo at discharge is that, when patients are ready to go home, they are given:

- A photograph of their surgical wounds;
- A wound assessment;
- Additional advice about monitoring their wound for signs of infection.

This gives a baseline that can help when identifying whether a wound is improving or deteriorating. The scheme adheres to NICE (2017) guidance on providing information to patients to reduce SSI.

Testing the concept

Patients at Liverpool Heart and Chest Hospital NHS Foundation Trust receive a cardiac surgery post-discharge information booklet that contains a section on wound care, including the signs of infection they should look out for after they leave hospital. However, provision of the booklet is not audited, so it cannot be said with

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accuracy that all patients receive it or how useful patients find it. It also does not contain tailored wound information for individual patients.

In 2020, the trust tested the concept of photo at discharge. Images of the patient's surgical wounds on the day of discharge were uploaded to the electronic patient record (EPR) and a copy was printed and given to the patient. It included contact details for the tissue viability service at Liverpool Heart and Chest Hospital if the patient had any concerns about the wounds. For the purposes of the pilot, all patients included in the study were contacted by telephone 30 days after surgery to capture details on the wounds after discharge.

The study was successful at:

- Testing the photo at discharge approach;
- Familiarising staff with the concept;
- Developing an implementation system and a process (albeit in paper form).

Most patients (90%) found it a useful tool when asked about it as part of the 30-day follow-up telephone call.

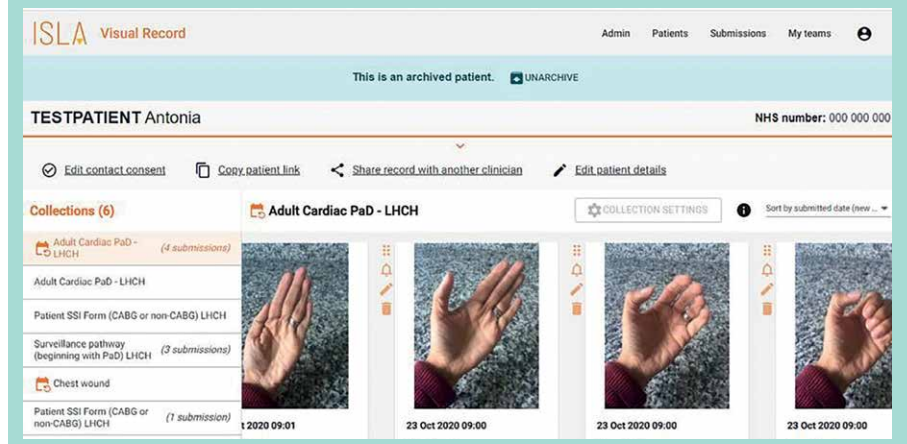
Isla digital pilot study

As part of collaborative working with Royal Brompton and Harefield NHS Foundation Trust (which has since merged with Guy's and St Thomas' NHS Foundation Trust), we were invited to pilot a digital web-based platform called Isla. Isla provides a visual component to the patient's healthcare record, which enables images to be received, reviewed and stored; Fig 1 shows how images are displayed on the Isla platform. This fits in with the National Wound Care Strategy Programme's (2021) recommendations, which state that: "The use of digital images as part of wound care assessment and evaluation can help improve clinical outcomes, staff experience and efficiency. Digital images are more accurate than written notes or memory for recording healing progress and guiding care decisions."

Between February and April 2021, a three-month pilot study was carried out on a surgical ward at Liverpool Heart and Chest Hospital, to implement photo at discharge using Isla. The project team included tissue viability nurses (TVNs), the infection prevention team, the digital IT team project manager, the EPR integration team, clinical governance team, our own ward staff, our surgical team and an Isla team.

All cardiac surgical patients during this period were included in the study. Patient records were manually created on the Isla

Fig 1. The Isla platform: how images are displayed



platform by entering the patient's first name and surname, mobile telephone number and NHS number.

Two digital cameras were provided so staff could take the photographs when patients were ready for discharge. Images were manually uploaded and added onto the photo-at-discharge document, which was also given to the patient. A patient information leaflet with details of the pilot was provided, along with verbal information; a discussion about the study with nursing staff also took place. Written patient consent was gained before photographs were taken.

The potential benefits of Isla were considered to be:

- Supporting photo at discharge, which has been shown to lead to earlier detection of potential SSI, thereby reducing the severity and duration of such infection and preventing hospital readmissions;
- Improving the quality of information provided to patients about wound care after discharge;
- Enabling better monitoring of patients' wounds post discharge by giving access to images and information in one place for TVNs and other health professionals, including the surgical team;
- Aiding patient assessment and triage to determine whether verbal advice or a face-to-face review is necessary;
- Enhancing surgical-site surveillance through text message follow-up 30 days after the operation;
- Offering greater efficiency by reducing reliance on manual processes. Outcome measures included:
 - Patient outcome data and compliance with submitting photographs and forms after text-message requests;
 - Patient feedback;

- Staff survey responses on their experience of using Isla;
- A comparison of the current process versus Isla for the review of patients' wounds by TVNs post discharge.

Results and analysis

Patient outcome data and compliance

For patient outcomes, some data was provided by Isla and data was also collected locally. According to the Isla records, there were 35 users, 173 patients and 309 entries in the system. Of those 35 users who accessed Isla during the pilot study, four were from the tissue viability and infection prevention teams, and >30 were surgical ward staff.

Local data showed that 107 patients participated in the study and had photo at discharge completed; the other 66 did not have it completed, potentially due to nursing time or constraints on the ward.

After TVNs reviewed patients' initial photographs, 23 patients were asked to submit another photograph for review (after discharge), as the TVN had identified a potential problem with the wound.

Six of the 23 patients were followed up by TVNs, either face-to-face in clinic or remotely (via telephone consultation and/or additional photograph requests). Three patients had SSIs (superficial donor leg wounds) and three had wound-healing problems without infection. Advice and treatment were provided.

SSI forms on Isla

A record of forms sent and received was collected locally. SSI forms with questions about the appearance of the wound were sent to all patients who participated in the pilot 30 days after surgery. In total, 84 patients had been sent a form (23 patients were not yet 30 days post-surgery; they

Table 1. Patient feedback (n=15)

Question	Overall response ^a
Do you feel this service is delivered for you as conveniently as possible?	4.6
Do you feel the service respected the privacy of delivering NHS services?	100%
Do you feel connected with your care?	4.5
How do you rate the quality of care received?	4.9
Do you feel that the service runs effectively?	4.6
Would you use the service again for another health issue?	93%
Would you recommend this service to friends or family?	93%

^a Percentages are for 'yes' answers to questions where 'yes' or 'no' is selected; other figures are an average of scores on a scale from 0-5 (with 5 being the most positive).

were excluded as the trial was for a set period of time). Of these, 79 had a mobile telephone number listed and, among this group, 48 (61%) patients returned the form. Reminders were not sent and no further forms were received.

Among the 31 (39%) patients who did not return the form, six patients contacted the TVNs by telephone to say they could not open the link and some patient records had their home telephone number, not a mobile telephone number, recorded, perhaps as they did not have a smartphone. Others may have just ignored the message.

The intention was that all patients should receive a patient information leaflet but, unfortunately, there was no record to support whether this happened, which was perhaps an oversight in the design of the study. It was noted that it would have been beneficial to include a copy of the patient information leaflet with the printed information patients receive when the photo at discharge was taken by ward staff. Patients would be reminded that they should expect a text link requesting a submission of a photograph, potentially improving compliance.

One of the fields on the SSI form asked patients whether antibiotics were needed after discharge; according to Isla data, 81 patients responded. Of those, 13 (16%) replied 'yes', suggesting they sought advice from a health professional after discharge.

Data provided by the Isla team was, at times, confusing and ambiguous when trying to capture patient outcomes. It was highlighted that data requirements for the trust would need to be carefully considered and discussed with the Isla team to see whether the platform could meet our needs should it be implemented.

Patient feedback

The Isla platform did provide a link to a patient feedback survey, but completion was optional. Only 15 patients completed the survey; overall, the patient feedback received was positive, with 14 patients saying that they would use Isla again (Table 1).

Staff feedback

An online survey to gather information about staff experiences was created. The questions and responses are shown in Table 2.

Users said creating each patient record manually was very time consuming. It was discussed that, if Isla were to be implemented in the trust for wound monitoring, an interface would be needed so patient records could be automatically created in Isla. Images had to be manually uploaded and staff reported that this was also a time-consuming process. However, around 90% of staff also said that if demographic data was automatically pulled into the platform, they would like to continue using Isla.

Training was provided by Isla staff before the pilot was launched and verbal feedback was sought from staff about this. Most staff said the training was disjointed and confusing. It was agreed that, if the

Isla platform were to be implemented in the future, staff training would need be tailored to specific needs.

Comparing existing process and Isla

TVNs routinely reviewed patients' wounds post discharge. Patients might contact the service directly or a GP, district nurse or consultant can request a review. With the existing system, the patient is telephoned and a request made for a photograph of the wound to be attached in an email. This involves a further telephone conversation with the patient or a face-to-face review is arranged. A new document recording the phone conversation is added to the EPR and the photograph is saved and uploaded.

Using Isla, a text link can be sent to the patient, who can take the photograph when prompted so health professionals can review it through Isla. A text message can be sent to the patient; if a phone call is needed, details can be added on Isla. For the pilot, photographs were saved manually as, at the time, an automatic save was not possible as there was no interface between Isla and the EPR.

A small exercise showed that using Isla would be more time efficient in supporting remote reviews (Tables 3a and 3b).

Discussion

This was a successful pilot of the Isla platform, with several users accessing it to complete photo at discharge and monitor wounds. The platform received some positive feedback from staff and patients. As well as being a platform for TVNs to triage patients and their wounds after discharge, it has a potential for time efficiencies.

The TVNs have further considered how Isla could improve wound monitoring and the team recognises that the platform has even greater potential than was used during the pilot. For example, Isla has an option to set a schedule of requests for patients to submit photographs. This could be requested 15 days post operation, which is a time when wound infections may be presenting, then at 30 days as a final check

Table 2. Staff (n=10) feedback from online staff survey

Question	Response, %	
	Yes	No
Did you find it easy to learn to use Isla?	60	40
Would you be happy to use Isla to support photo at discharge in the trust in the future?	70	30
If demographic data was automatically pulled into the platform and patient collection already created, would you like to continue using the Isla platform?	90	10

Table 3a. Photo at discharge: process before use of Isla

Step	Time spent (minutes)	
	Patient 1	Patient 2
Wound concerns raised via consultant secretary (email) or GP, district nurse or patient (telephone)	5	4
Tissue viability nurse contacts the patient directly by phone, discusses the wound and current issues, and asks the patient to photograph the wound and attach the photo in an email	1	1
Tissue viability nurse reviews the photo and replies with advice or phones the patient again to arrange date for face-to-face review in wound clinic	3	3
A telephone note (new document) is completed on the electronic patient record	5	5
The photograph is saved in Unity Client	2	1
Total	16	14

of the wound, supporting improved SSI surveillance. Even when wounds are not infected, patients can still experience wound-healing problems, and this facility could identify such issues so appropriate advice and treatment can be given.

Other health professionals could be asked to access the patient record on Isla to view photographs, rather than the usual process of attaching them in an email, followed by telephone calls or emails back and forth to discuss the wound and treatment. For example, for a patient who may need a course of antibiotics, their GP could log in and view the wound photograph.

During the three-month pilot, using Isla was found to:

- Improve the quality of information given to patients at discharge;
- Enable better monitoring of patients;
- Reduce reliance on manual processes;
- Support surgical-site surveillance.

New developments

As Liverpool Heart and Chest Hospital NHS Foundation Trust is rolling out Isla across its surgical wards, key developments have been made. Tablets can now be used to complete the photo at discharge form on Isla and take the photograph, which automatically embeds it into the document. This will simplify and speed up the process for staff, avoiding the manual task of uploading images from a digital camera. Work has been done to create interfaces between Isla and the EPR; patient details can now be pulled through to Isla and staff need not create a new patient record.

One of the reasons for limiting the use of Isla during the pilot was the need to save all entries made on it to the EPR, to make sure all patient information was captured. It was difficult to keep track of so much activity and it was time consuming. An automatic

save of each patient or staff submission/entry has now been created, and a clinical governance officer has been involved to provide assurance around data protection.

This new dynamic approach to post-surgical care will include photo at discharge and wound assessment follow-up at 15 days and 30 days post discharge. This not only supports SSI surveillance, but also means proactive real-time surgical wound surveillance, identifying patients who may have infected wounds or other wound-healing problems. Patients are offered timely review, be it remote or face to face, and appropriate advice or treatment.

The Isla platform is also being used in other NHS organisations and other services, including: Guy's and St Thomas' NHS Foundation Trust to support SSI surveillance; Chelsea and Westminster Hospital NHS Foundation Trust to support dermatology, plastics, physiotherapy and sexual health services; Alder Hey Children's Hospital to support ophthalmology, physiotherapy and speech and language therapy; and the James Paget University Hospitals NHS Foundation Trust, where it is being piloted for breast cancer screening.

Conclusion

Isla has undoubtedly improved the quality of information about wound care that is provided to patients at discharge – it facilitates a discussion with them about signs to look out for and who to contact if they have any concerns. Ultimately, it aims to promote better outcomes and experiences for our patients. The team involved in this project is excited to see the impact of implementing Isla and will be monitoring it closely. **NT**

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Table 3b. Photo at discharge: process using Isla

Step	Time spent (minutes)	
	Patient 1	Patient 2
Wound concerns raised via consultant secretary (email) or GP, district nurse or patient (telephone)	4	2
Patient with Isla log-in details: select patient, request photo submission (text message)	1	0
Patient without Isla log-in details: create new collection, request photo submission (text message)	0	2
Notification to say new submission made, log in, review photo and text patient back	1	1
Photo saved in Unity Client during pilot (now automatically saved on electronic patient record)	0	0
Total	6	5