

# THE USE OF ELECTRONIC DATA CAPTURE DEVICES IN WOUND CARE SETTINGS

## Key words

- ▶▶ Electronic data
- ▶▶ Patient information
- ▶▶ Record keeping
- ▶▶ Treatment planning
- ▶▶ Wound outcomes

The current strategic vision of the NHS focuses on improving practice, increasing productivity, improving wound care documentation and attaining efficient information flow, all of which enhance the quality of patient care. This article looks at the specifications and efficacy of a new electronic data and image capture system, Silhouette™ (ARANZ Medical). Early experience with the Silhouette system indicates promising potential for use within a range of care settings to improve the delivery and reporting of care for patients with wounds.

Over the past 15 years the government has encouraged the use of information technology to improve and streamline healthcare within the NHS, stating that:

*'Better care for patients, and improved health for everyone depend on the availability of good information, which is accessible when and where it is needed'* (Department of Health [DH], 1998).

More recently they have published an update: *The Power of Information* (DH 2012a), which has three key ambitions:

- ▶▶ That information will be used to drive integrated care — within and between organisations, and across the health, care and social sector as a whole
- ▶▶ That electronic care records progressively become the source for core information used to improve care and services and to inform research — reducing bureaucratic data collections and enabling clinicians to measure quality
- ▶▶ That information will only be recorded once, at first contact, and shared securely between those providing care — supported by consistent use of information standards that enable data to flow while keeping confidential information safe and secure.

In many areas wound care practice could be said to fall short of these challenges. A range of studies have reviewed and audited the quality of wound assessment documentation (Sterling, 1996; Hon and Jones, 1996; Carville and Smith, 2004; Gartlan et al, 2010; Cook 2011; Nichols, 2012). The majority of these identify poor documentation, which results in inadequate information being available. Even where it is available, information is often documented in a range of sources and, therefore, inaccessible, even where electronic patient records exist and are supposedly in use.

Current strategy focusing on quality, innovation, productivity and prevention (QIPP) (DH, 2010), highlights the need to deliver high-quality care within an economically and resource-constrained environment and this must be considered when introducing any new technologies, even if they are believed to be supportive of practice. This drive to deliver 'better care for better value' forms a core part of the DH's corporate plan for 2012 /2013 (DH, 2012b).

As the number of patients with chronic wounds grows, clinicians are becoming increasingly aware of the cost of caring for these patients. It is important that clinicians are able to demonstrate that patients receive a good assessment followed by an appropriate plan of care,

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Figure 1: SilhouetteStar camera for digital wound imaging and 3D wound measurement.

which is regularly evaluated. This makes it possible to determine whether best practice was followed, helps keep the patient's journey time to a minimum, avoids many complications of care and also audits the outcomes of the care received.

This is reflected in the QIPP programme which is intended to improve quality of care while making £20bn savings by 2014–2015 (NHS Improvement, 2012). Emerging technology solutions such as the use of portable image and data capture systems appear to be one way of resolving some of the issues mentioned and also allowing healthcare providers to meet Key Performance Indicators by evidencing both the care that was given and the outcomes of that care.

### WOUND CARE DATA

It is suggested in the best practice statement, *Optimising Wound Care* (Best Practice Statement, 2008), that in order to provide a good standard of care, a structured approach is required to the assessment, diagnosis and management of patients with wounds, and that assessment is fundamental to planning care. The authors maintain that:

*'A thorough patient assessment should be carried out by a skilled and competent practitioner adhering to local and national guidelines, when appropriate, at all levels in the service.'*

However, assessment (and recording of the assessment) is an area of practice which is often poorly or sporadically carried out (Dowsett, 2009). Dowsett (2009), in a study of community nurses' knowledge and practice, identified that at baseline only 42% of patients had a wound assessment form completed, which is consistent with audit findings elsewhere (Ashton and Price, 2006; McIntosh and Ousey, 2008).

As shown by the evidence above, previous documentation of wound assessment and care delivery is frequently poor and incredibly subjective. For example, many areas do not routinely measure wounds (Stewart et al, 2009; Nichols, 2012), despite the existence of good data and core measures, which indicate that reduction in a wound's size is a good indicator of its potential to heal. Indeed, wound size has been included as an indicator of potential to heal within recent government publications

such as *Extension of Choice of Any Qualified Provider: Venous Leg Ulcer & Wound Healing* (NHS, 2012). However, despite existing evidence, using these outcome measures routinely has proved challenging due to lack of tools, which allow collection and collation of robust and reliable information in a time-saving, easy-to-use manner. The availability of new electronic wound assessment and information management systems changes this and makes it possible to update current practice to drive improvements in care.

### Electronic data

Electronic data and image capture systems such as Silhouette™ (ARANZ Medical) aim to improve the quality, objectivity and consistency of data captured and recorded and, by simplifying the management of information, encourage staff to better evaluate the care provided, both to individual patients and groups within a service.

### Silhouette system

The Silhouette wound assessment and information management system comprises a wound assessment device and application software for patient-side assessment, supported with a wound information database:

- ▶ SilhouetteStar+SilhouetteConnect wound assessment device — the SilhouetteStar camera is used with SilhouetteConnect application software, which allows the user to capture digital wound images and generate area, depth and volume measurements. SilhouetteConnect software runs on Windows PC/laptop/tablet and also supports creation of electronic clinical notes and wound assessment reports (Figure 1)
- ▶ SilhouetteCentral — data collected by the SilhouetteStar+SilhouetteConnect devices is downloaded to SilhouetteCentral as a master database. This means all Silhouette wound assessment data is organised as a patient record on SilhouetteCentral and available for review, reporting and population-level analysis for the care team from an NHS networked location.

The Silhouette wound assessment device allows the user to capture one or multiple images of the wound, which can then be 'traced' on the interactive computer screen to give accurate surface area, depth and volume measurements. Data about a patient's wound are then entered into the

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Figure 2a: Step 1: the SilhouetteStar camera allows users to capture digital wound image and 3D wound measurement to support non-contact, quantitative, objective wound assessment.



Figure 2b: Step 2: the user draws wound boundary on interactive SilhouetteConnect software screen to generate area, depth and volume data for wound.

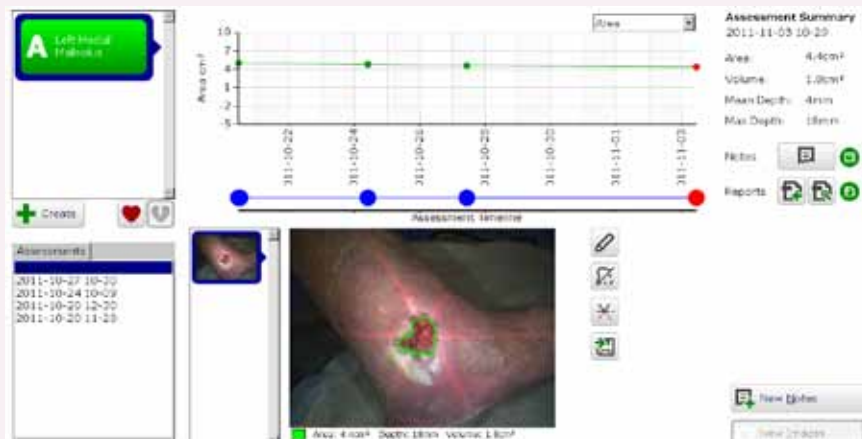


Figure 2c: Users can review wound measurement data and wound progress chart on SilhouetteConnect Patient Dashboard.

data capture system and information can be held as a log of an individual assessment, or built into a report, profiling the care and outcomes of care for that patient (Figure 2 a,b,c) or even into a report for all patients cared for within the service.

The obvious benefits of the computerised system focus on the issue of missing data, where practitioners fail to record crucial clinical information. Using the Silhouette system, it is possible to set up the data entry criteria so that the user cannot progress to the next screen unless certain information is completed, therefore, making it impossible to skip stages.

The data collection screen can be easily customised to suit the needs of individual organisations, including locally by key users who have specific access permissions. Once collected, the data are uploaded to a secure server onto a database that allows storage and sharing of information. Here information can be automatically organised from multiple point-of-care devices. Data security for health information is a primary consideration and the Silhouette system includes data encryption features, controlled user access and system access audit log to meet Information Governance requirements. The system also has the capability to interface with many existing health information systems.

Evidence

Nixon at al (2009) demonstrated the improved accuracy and repeatability of wound measurement achieved with an electronic hand-held Silhouette laser-assisted imaging and measurement device

compared to conventional transparent film tracing, based on wound models.

Ongoing development by ARANZ Medical of laser-assisted wound imaging and 3D measurement has led to the availability of the new generation SilhouetteStar + SilhouetteConnect wound assessment device.

A validation and reliability study of the new SilhouetteStar+SilhouetteConnect device by Nixon at al (2012) demonstrated good repeatability, based on 60 unique measurements made by three raters of four wound models. Inter-rater variability and intra-rater variability were both <1% for area and perimeter and <2% for average depth and volume.

Researchers did, however, acknowledge minor limitations around measurements in wounds with undermining or inconsistencies being introduced depending on the patient's position, the latter which can be addressed with standardisation of imaging protocol.

Anecdotal evidence

Recent evaluations of the Silhouette system include the Diabetic Foot Clinic at King's College Hospital NHS Trust in London, the University Hospitals Birmingham NHS Trust Tissue Viability Service based at Queen Elizabeth Hospital and Eastbourne Wound Healing Centre. These clinical evaluations suggest that the Silhouette system provides critical wound information that can help to monitor the effectiveness of patient management plans and enables adjustment of wound treatment plans where necessary, enabling clinicians to potentially improve healing times and patient risk status (see Box 1 for summary of comments from Diabetic Foot Clinic, King's College Hospital, London).

Users commented on how the use of photographic evidence and wound dimension data generated by Silhouette enabled clinicians to better understand what colleagues observed at previous assessments and understand treatment decisions based on the previous image/wound data.

All users also commented favourably upon the ease of use of the Silhouette system, as

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well as valuing the system's ability to access the data from a secure NHS networked site, allowing sharing of information between clinicians.

productivity, improving wound care documentation and attaining efficient information flow, all of which enhance the quality of patient care.

**CONCLUSION**

Overall it seems that the inclusion of a reliable user-friendly data and image capture and reporting system meets the current strategic vision of the NHS, which focuses on improving practice, increasing

Clinicians, managers and clinical commissioners will be interested in considering these systems as important tools to improve delivery, reporting of care and outcomes for patients with wounds, in a range of care settings. **WUK**

**Box 1: Silhouette user perspectives (Diabetic Foot Clinic, King's College Hospital NHS Trust)**

▶▶ **How would you describe your clinical setting and key patient goals?**

The diabetic foot clinic is a busy multidisciplinary clinic with combined diabetic foot/vascular/orthopaedic clinics running weekly and a Charcot clinic weekly. The patients are high-risk with complex wounds and deformities associated with the complications of diabetes including neuropathy, ischaemia and infection.

▶▶ **What motivated you to look at Silhouette in the first place?**

Silhouette is easy to use and gives immediate access to size of wound circumference, depth and volume. It also enables the clinician to easily compare wounds from one visit to the next. The idea of being able to capture images and compare or discuss them remotely is good.

▶▶ **What are you currently using Silhouette for?**

We are using Silhouette in a randomised control trial.

▶▶ **What advantages does this give you over previous method/approaches?**

Previously we have used clinical terminology to describe the depth and size of a wound and patients in a clinical trial would have a photograph taken, which would need to be downloaded and labelled. The wound circumference would then be measured using opsite grids and a marker pen. The advantages of Silhouette are that less time is needed, it's more accurate, there are no infection control issues as Silhouette does not touch the wound and the camera can be easily cleaned. In addition, patients can see their wound size instantly and see changes from one week to the next.

▶▶ **What have you found most valuable about adopting Silhouette?**

It is easy to use and is quick and instant. We found its accuracy in capturing subtle changes especially in wound depth very helpful. Ideally we would like to incorporate Silhouette into our clinic for all our patients with wounds.

▶▶ **In your view, why should the trust consider funding Silhouette?**

It brings wound management into the 21st century rather than being in the dark ages, with significant clinical benefits.

*The following images demonstrate the case of a diabetic foot ulcer (DFU) patient (MC) followed with Silhouette system as part of kadfut clinical study, showing wound images and wound progress chart.*



Figure 3a: Patient MC, DFU assessment 1 June, 2012.

Figure 3b: Patient MC, DFU assessment 17 August, 2012.

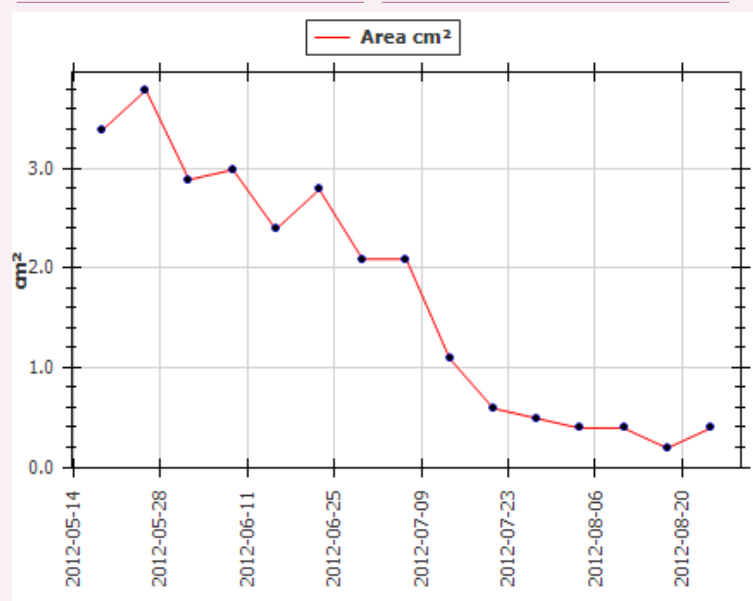


Figure 3c: Patient MC, DFU Wound Progress Chart.