

# Implementation of a new foot assessment tool for people with diabetes in hospital

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**Citation:** Charlton R, Murchison R, Gooday C, Dhatariya K (2017) Implementation of a new foot assessment tool for people with diabetes in hospital. *The Diabetic Foot Journal* 20(1): 24–8

## Article points

1. All patients with diabetes should be screened on admission to hospital to identify those at risk of diabetic foot complications.
2. An audit was carried out to determine the benefits of staff training and implementation of a foot assessment form.
3. Training increased staff knowledge, the forms were used and the number of foot assessments carried out increased as a result of the pilot.

## Key words

- Audit
- Foot assessment
- Screening
- Staff training

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**Diabetes accounts for approximately 16% of the inpatient population in the UK. Regular foot checks are recommended by national guidance as a way of screening for the presence of foot lesions, however, these are often not carried out due to a lack of an assessment tool. The authors describe the process of developing and implementing such a tool. A foot assessment form and training package were developed and piloted over a 4-week period on two wards within the authors' hospital. A short questionnaire evaluating staff knowledge was conducted before and after the education session. The foot assessment form was audited for compliance weekly. Attendance at the training sessions significantly increased staff knowledge of foot disease and led to an increased number of patients receiving a foot examination during their hospital stay. The number of foot assessments being completed within 24 hours of a patient with diabetes being admitted to hospital improved, as did knowledge of foot disease and screening among nurses.**

Data from the 2015 National Diabetes Inpatient Audit (NaDIA) showed that 16.6% of the hospital beds at our 928-bed institution were occupied by a person with diabetes (Health and Social Care Information Centre (HSCIC), 2016). The NaDIA also suggested that across the UK diabetes-related foot disease was the most common cause of diabetes-related acute hospital admission, with 8.9% of patients with diabetes admitted to hospital with active foot disease (HSCIC, 2016).

Diabetic foot ulcers and amputations often involve lengthy stays in hospital (McInnes, 2012). A UK economic analysis estimated that 417,804 excess bed days — the equivalent of £2.6 million to £2.7 million — were spent per year per 10,000 people with diabetes on diabetic foot ulceration and amputation (Kerr, 2012). With this in mind, it is important that all patients with diabetes are screened on admission to hospital to identify those who are at risk of developing a diabetic foot complication (National Institute for Health and Care Excellence (NICE), 2015; Bus et al, 2016). Despite these guidelines being

in place, and the abundant evidence to support early detection of active foot disease and early referral to a multidisciplinary foot team (MDFT) to reduce amputation rates, the most recent NaDIA data suggest that 71.3% of inpatients did not receive the recommended diabetic foot examination within 24 hours of hospital admission (HSCIC, 2016). It was also reported that, on average, 42% of patients admitted with active foot disease were not referred to or seen by a member of the MDFT within 24 hours (HSCIC, 2016). Data from the Norfolk and Norwich University Hospitals NHS Foundation Trust showed that 46.2% of inpatients were not seen by a member of the MDFT within 24 hours and 81.9% had not received an appropriate foot assessment within 24 hours.

## Aims

Based on these results, the authors identified areas for improvement and the following objectives were set:

- To ensure all clinical staff members involved in the admission of a person with diabetes to hospital have an awareness of the relevant NICE guidance

- To ensure that staff members can carry out a diabetic foot assessment and understand the findings
- To ensure all clinical staff members involved in the admission of a person to hospital can identify an at-risk patient and refer him/her appropriately to the MDFT
- To design and implement a simple foot assessment form for all patients with diabetes being admitted to hospital.

### Methods

In 2014, Norfolk and Norwich University Hospitals NHS Foundation Trust introduced a care pathway for the management of feet for people with diabetes being admitted to hospital. However, ward staff members still lacked the training to perform an appropriate foot examination and identify an at-risk patient.

The first step in addressing this issue was to adopt a simple foot-screening tool that staff could use across the whole hospital. To identify a suitable tool, a literature search was conducted using the following terms: simple foot screening tool; diabetic foot screening tool; and diabetic foot screening in hospital. From these results, the 'Ipswich touch test' was identified as the most appropriate simple foot-screening tool (Rayman et al, 2011). This now-familiar test involves the examiner lightly touching the tips of the first, third and fifth toes. The results of the study showed that the test had excellent concordance when compared with the other methods of sensory testing. Following the publication of the paper by Rayman et al, Diabetes UK adopted this method of sensory testing, renaming it the 'Touch the Toes test'. This test formed part of its 'Putting Feet First' campaign (Diabetes UK, 2013).

Given that the Ipswich touch test (now nationally known as the 'Touch the Toes test') is simple, reliable, easily taught and requires no equipment, it was agreed locally that this would be the screening tool adopted for this project.

The second step was to design a foot assessment form for patients with diabetes that incorporated the Touch the Toes test. A small team consisting of a podiatrist and diabetes specialist nurse created a first draft of the assessment form. This draft was then circulated to the wider diabetes team and the tissue viability lead for their comments before the final draft was created (Figure 1). It was decided that the

Date of admission.....

Affix patient label here

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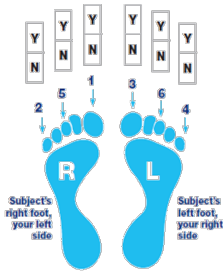
**Initial foot examination for people with diabetes to be carried out within 24 hours of admission**

**Neurological assessment** – The Ipswich touch test. **Risk Factors** – Y indicates a risk factor (please circle)

Ask patient to close their eyes for the whole test. **LIGHTLY** touch the tips of the toes in order of 1-6


Ask the patient to say 'yes' if they can feel the touch. Circle as appropriate

Current ulceration/pressure area	Y	N
Previous ulceration	Y	N
Toe, foot or leg amputation	Y	N
Neuropathy (refer to neurological assessment)	Y	N
Peripheral arterial disease	Y	N
Renal haemodialysis	Y	N



**Ensure the patient is at a minimum on an airflow mattress if a risk factor is present and follow care guidance for skin and tissue viability.**

Document any broken/ulcerated areas on the feet below.



**If you have noted any foot/heel ulcerations please refer to the diabetic foot clinic on ICE.**

(If you have circled more than 1 'N' then neuropathy is present)

Print name..... Sign..... Date..... Time.....

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**Daily foot examination for people with diabetes**

Remove socks and shoes and examine feet and heels for any new ulceration/pressure areas.

Date / time	Ulceration/pressure area		Name / signature
	Yes	No	
	Yes	No	
	Yes	No	
	Yes	No	
	Yes	No	
	Yes	No	
	Yes	No	

**If any new ulceration/pressure areas are noted please complete another initial diabetic foot examination (as above) and refer to the diabetic foot clinic on ICE. Please complete a Datix report for all newly identified pressure ulcers and refer to a tissue viability nurse if pressure ulcer identified as grade 3 or above. Ensure the patient is at a minimum on an airflow mattress.**

**If any new ulceration/pressure areas are noted please complete another initial diabetic foot examination (as above) and refer to the diabetic foot clinic on ICE. Please complete a Datix report for all newly identified pressure ulcers and refer to a tissue viability nurse if pressure ulcer identified as grade 3 or above. Ensure the patient is at a minimum on an airflow mattress.**

Figure 1. The final foot assessment form on the back of the blood glucose monitoring chart.

assessment form would be put on the reverse of the local blood glucose monitoring chart.

Following this, a training package was developed to help roll out the foot assessment form into practice. The training package consisted of a 10-minute slide presentation on the rationale for developing the assessment tool, followed by a 10-minute practical session that covered the Touch the Toes test and how to complete the foot assessment form for patients with diabetes.



**Pre/Post education session evaluation form**

**Prior to the education session on foot screening to prevent hospital acquired diabetic foot ulcerations, please take a few minutes to complete this evaluation form on your current knowledge in the following areas. Please circle your answer.**

	1= No knowledge	2= Little knowledge	3= Some knowledge	4= Good knowledge
NICE guidance for the admission of a patient with diabetes to hospital	1	2	3	4
Completing a diabetic Foot Examination	1	2	3	4
Identifying a patient at risk of diabetic foot ulceration	1	2	3	4
Who and when to refer to the multi-disciplinary foot team	1	2	3	4

**At the end of the education session on foot screening to prevent hospital acquired diabetic foot ulcerations, please take a few minutes to re-evaluate your knowledge in the following areas. Please circle your answer**

	1= No knowledge	2= Little knowledge	3= Some knowledge	4= Good knowledge
NICE guidance for the admission of a patient with diabetes to hospital	1	2	3	4
Completing a diabetic Foot Examination	1	2	3	4
Identifying a patient at risk of diabetic foot ulceration	1	2	3	4
Who and when to refer to the multi-disciplinary foot team	1	2	3	4

Figure 2. Questionnaire used to evaluate knowledge before and after the education session.

The next stage was to pilot the new assessment form and training package on two wards: an older person’s medicine and a general medical ward. An education nursing sister was brought on board to help facilitate the pilot and the senior sisters on the wards were encouraged to persuade their staff members to attend the sessions.

The pilot was run over a 4-week period with three education sessions per ward running prior to the pilot commencing. During the education session the attendees were asked to complete a short questionnaire consisting of two sections (Figure 2). The first section was to be completed prior to the session. Attendees were asked to evaluate their existing knowledge on current NICE guidelines for the admission of a patient with diabetes to hospital;

completing a foot examination; identifying a patient at risk of developing a diabetic foot ulceration; and finally who and when to refer to the MDFT. Following their participation in the education and practical sessions, attendees were asked to complete the second section of the questionnaire, in which they were given the same questions but asked to re-evaluate their knowledge. This allowed evaluation of prior knowledge and the success of the training package.

Following the education sessions on each of the wards, the assessment forms were entered into the notes of all patients with diabetes. The completed forms were to be audited for compliance every week. The answers to the following four questions (aspects of care being measured) were determined:

- Had the patient received a diabetic foot assessment within 24 hours of admission?
- Had the patient received a diabetic foot assessment after 24 hours of admission?
- Had the patient received a daily foot examination?
- Were there any data missing on the assessment forms?

In addition to this, staff members were asked to leave feedback so the form could be modified as necessary prior to its submission to the Policies, Procedures and Guidelines Committee. Once the assessment form had been approved by this committee, it was submitted to procurement for printing and distributed for use in all inpatient areas. The overall success of this project will be evaluated through re-auditing the number of foot examinations being carried out within and after 24 hours of a patient with diabetes being admitted to hospital in 1 years’ time during the 2017 NaDIA, due in September 2017.

### Results

Thirty-two members of nursing staff attended the pilot education sessions. They were each given the pre/post education session questionnaire. Prior to the sessions, staff members assessed themselves as having no or very little knowledge in all subject areas, whereas afterwards they considered themselves to have some or good knowledge. These data are shown in Figure 3.

During the 4-week pilot, 51 beds on the two wards were occupied by a person with diabetes. The results for each of the four aspects of care being audited are shown in Figure 4.

## Discussion

The number of foot assessments being completed within 24 hours of a patient with diabetes being admitted to hospital improved as a result of the pilot scheme (from less than 20% to 65%), as did knowledge of foot disease and screening among ward nurses (From less than 40% to over 90%). The results from this work show that there was a significant increase in knowledge of foot assessments (from less than 40% to over 90%). This is in line with initial work that showed that the Touch the Toes test was simple and easily taught (Rayman et al, 2011).

The combination of diabetes and neuropathy, with or without peripheral vascular disease, increases the risk of ulceration and subsequent infection. In addition, peripheral neuropathy can lead to loss of protective sensation, which creates an environment in which repetitive tissue injury can occur without painful feedback, putting patients at a much higher risk of developing foot ulcerations (Armstrong et al, 1998). A 2012 report commissioned by NHS Diabetes estimated that between 5% and 7% of the population with diabetes will develop a diabetes-related foot ulcer during their lifetime (Kerr, 2012), although others have put this percentage as high as 25% (Singh et al, 2005). Furthermore, it has been reported that up to 28% of ulcerations may result in some form of amputation (Armstrong et al, 1998). Patients with diabetes who are in hospital are at an even higher risk of developing diabetic foot ulceration because they are largely bed-bound and have more comorbidities (Rayman et al, 2011), a fact supported by the 2015 NaDIA data, which calculated that 1.1% of inpatients with diabetes develop a new foot complication during their hospital stay (HSCIC, 2016).

The International Working Group on the Diabetic Foot recommend that a foot examination should be carried out to identify whether a patient is at risk of developing ulceration (Bus et al, 2016). This examination should screen for peripheral neuropathy, peripheral arterial disease and history of ulceration, amputation and active foot disease. Early foot screening allows the clinician to assign a risk classification score (Singh et al, 2005). NICE has advised that foot risk should be stratified as low, moderate or high, or as an active diabetic foot problem (NICE, 2015). This allows for the early identification of patients at high risk of developing

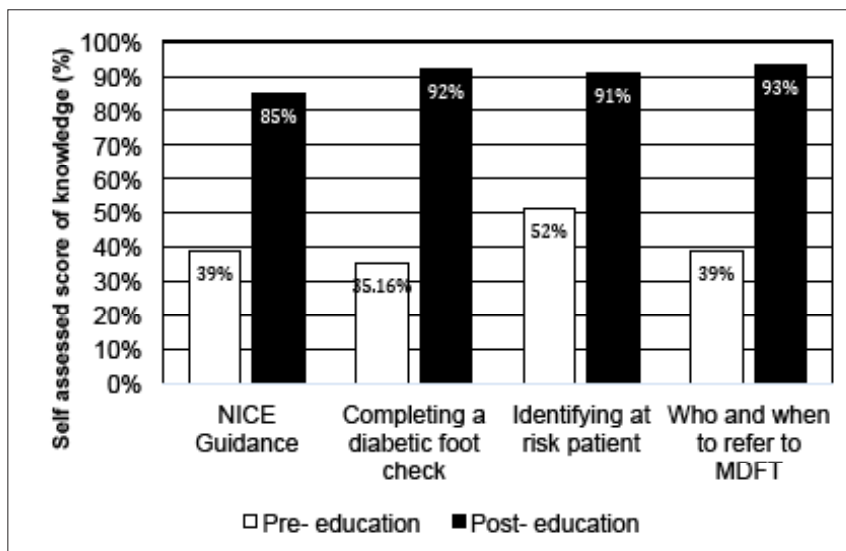


Figure 3. Comparison of attendees' self-reported knowledge as scored by a 3 or 4 on the questionnaire before and after the education session.

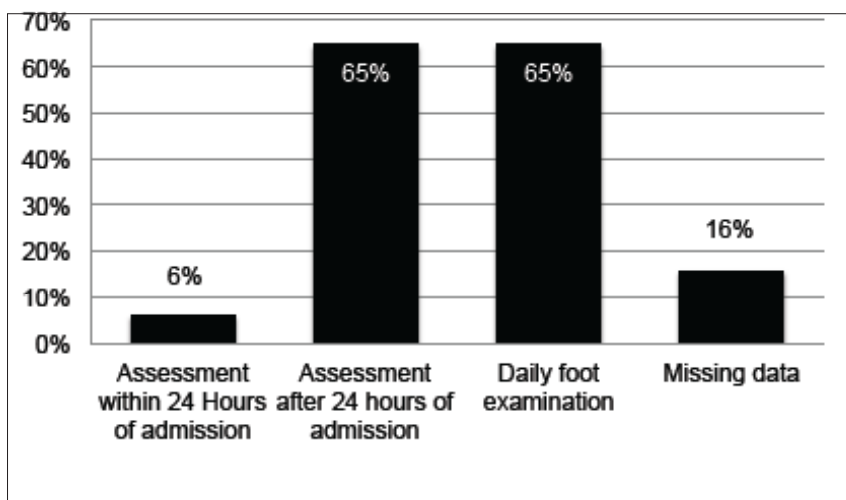


Figure 4. Audit results following the 4-week pilot.

ulceration and enables early referral to the MDFT for those patients admitted with active foot disease. The MDFT will be able to assess peripheral perfusion, optimise diabetes management, debride the wound as necessary, and offer any appropriate offloading (Vowden and Vowden, 2015).

The use of such a multidisciplinary approach has proven successful, with teams reporting significant reductions in amputation rates (Edmonds et al, 1986; Krishnan et al, 2008). Diabetic foot ulcers are mostly preventable (Pham et al, 2000; NICE, 2015); by identifying those people at risk of ulceration early, preventative measures can be put in place to protect the feet from harm while in hospital.



National guidance in the UK recommends that the risk of developing a diabetic foot complication should be assessed within 24 hours of any admission to hospital, and if there is any change to the patient's status while they are in hospital (NICE, 2015). Those patients who are identified as being at high or moderate risk should be given a pressure redistribution device to offload heel pressure and, hopefully, prevent any new ulceration.

NICE guideline NG19 (2015) states: "If a person has a diabetic foot ulcer, assess and document the size, depth and position of the ulcer." Standard nursing documentation used across the authors' Trust prior to the start of this project consisted of only a small section on foot assessment, asking the clinician to tick if a diabetic foot assessment had been completed. There was no space to document any findings or the risk status assigned to the patient. The newly-designed foot assessment form includes space to document any ulcerated areas, allowing staff to identify patients who are at risk of developing new diabetic foot ulcerations, and give details of any action that may need to be taken.

Disappointingly, the results from the pilot showed that following the introduction of the foot assessment form, 94% of inpatients with diabetes still did not receive the recommended foot assessment within 24 hours. It became clear, however, that those patients who did not receive a diabetic foot assessment within this time period had been an existing inpatient prior to the pilot commencing or had not been an inpatient on the piloted wards for the first 24 hours of their admission. This section of the audit was, therefore, deemed unreliable and the data not a true representation of the success of the foot assessment form.

There was an increased number of patients receiving a foot examination 24 hours after admission. The NaDIA data showed an increase

of 28.2% (HSCIC, 2016) to 65% of patients following the pilot of the foot assessment form.

## Conclusion

The overall objectives for this project were met, with staff reporting a substantial increase in knowledge in all four learning outcomes. Work is continuing to see whether the overall aim was met. The foot assessment form is now available to all inpatient areas throughout the hospital, and the authors will continue to drive the education programme forward. ■

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