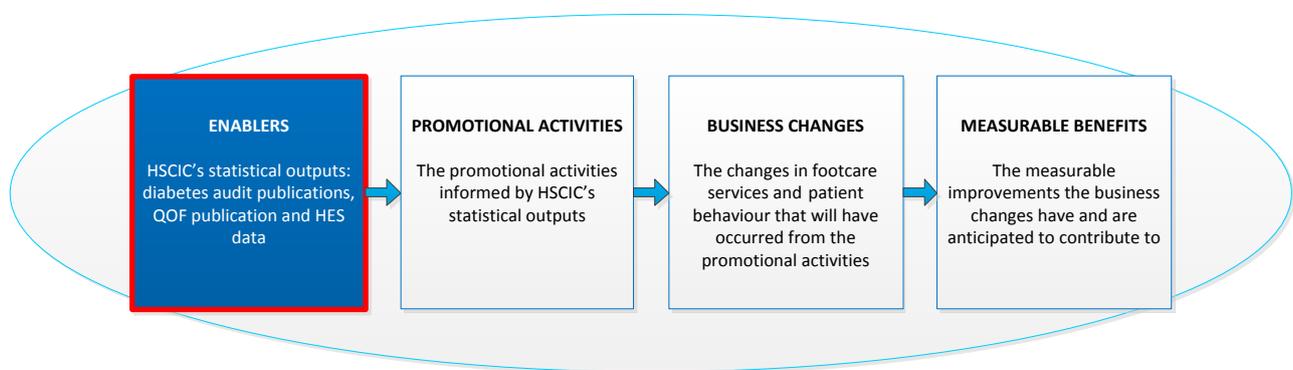


# Benefits case study

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## Use of health care data by Diabetes UK

Informing Diabetes UK's *Putting Feet First* campaign,  
which aims to reduce the rate of lower limb amputations  
in people with diabetes by 50%



**Author:** Mohammed R. Bassar

**Date:** 02/12/2015

**Version:** 1.0

## 1 Version History

Version	Date	Summary of key changes
1.0	02/12/2015	First release.

## 2 Introduction

### 2.1 Purpose of case study

In March 2012, Diabetes UK launched the Putting Feet First campaign, which aims to reduce the rate of lower limb amputations in people with diabetes by 50%, by 2017.<sup>1</sup>

The primary purpose of this case study is to describe:

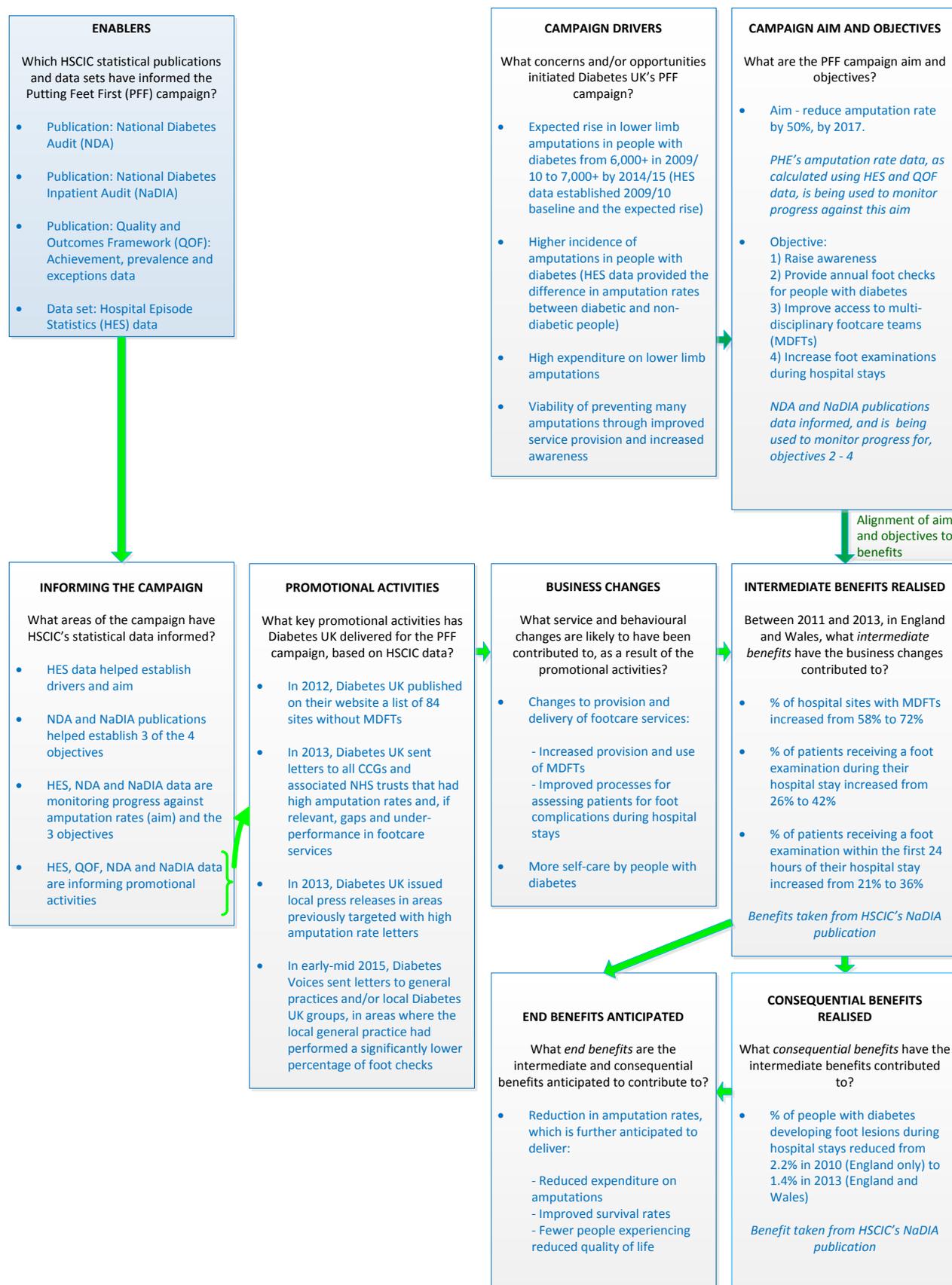
- how Diabetes UK used Health and Social Care Information Centre's (HSCIC's) statistical data to inform and drive forward the Putting Feet First campaign
- the promotional activities Diabetes UK and other stakeholders have carried out as part of the campaign
- the business changes that are likely to have resulted from the promotional activities
- the improvements (measurable benefits) in care services and health outcomes that the business changes have and are anticipated to contribute to.

### 2.2 Alignment between HSCIC's statistical data and measurable benefits

HSCIC's statistical data has enabled Diabetes UK and other stakeholders to identify priority areas for the Putting Feet First campaign, monitor progress against campaign aim and objectives and inform promotional activities. The business changes that stem from the promotional activities help deliver benefits. In the form of a benefits dependency network (BDN) map, the diagram below sets out the alignment between HSCIC's statistical data and the realised and anticipated benefits. For completeness, the map also shows how HSCIC's statistical data links to the campaign's overarching drivers and objectives.

# Informing Diabetes UK's Putting Feet First campaign, which aims to reduce the rate of lower limb amputations in people with diabetes by 50%

Figure 1: Alignment of HSCIC statistical data to intermediate and end benefits, as based on a BDN map



### **3 Putting Feet First campaign drivers**

#### **3.1 Campaign drivers**

Diabetes UK established the Putting Feet First campaign as a result of concerns over the high rates of lower limb amputations in people with diabetes, the anticipated increase in amputation rates in people with diabetes, the associated expenditure on lower limb amputations and the viability of preventing many amputations through changes in care services and increased awareness of the impact of diabetes on feet.<sup>2</sup>

#### **3.2 How the campaign drivers were informed by health care data**

Holman, Young and Jeffcoate (2011) used HSCIC's Hospital Episode Statistics (HES) and Quality and Outcomes Framework (QOF) data to report that, for hospital admissions between April 2007 and March 2010, the incidence rate of lower limb amputations in people with diabetes was 2.51 per 1,000 person-years. In people without diabetes, the incidence rate was 0.11 per 1,000 person-years.<sup>1 3</sup> Two-year survival rate following amputation in people with diabetes is only 50 per cent.<sup>4</sup>

The Yorkshire and Humber Public Health Observatory (YHPHO), which is now part of Public Health England (PHE), used HSCIC's Hospital Episode Statistics (HES) data to establish that, in 2009/10, there were more than 6,000 lower limb amputations in people with diabetes.<sup>ii</sup> At the launch of the Putting Feet First campaign (March 2012), Diabetes UK:

- projected that, by 2014/15, lower limb amputations in people with diabetes would reach 7,000+.<sup>5</sup>
- estimated that 80% of amputations could potentially be preventable through access to good quality structured care and improved awareness among people with diabetes about their risk status and the actions they should take.<sup>6</sup>

Foot Care for People with Diabetes: The Economic Case for Change (NHS Diabetes, 2012) reported that 2010-11 NHS expenditure on diabetic foot ulceration and amputation was estimated to be between £639m and £662m (0.6%-0.7% of NHS budget)<sup>7</sup>. The total inpatient expenditure on amputations was estimated to be between £43.5m and £48.9m.<sup>iii</sup>

An elaborated description on the campaign drivers is available in [Appendix A](#).

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<sup>i</sup> The number of procedures of lower limb amputations includes traumatic amputations and those due to malignancy.

<sup>ii</sup> YHPHO did not publicly release the 2009/10 lower limb amputation data. The data was shared with Diabetes UK.

<sup>iii</sup> The inpatient expenditure is based on major amputations, lower amputations and procedures on amputation stumps.

## 4 Putting feet first campaign aim and objectives

### 4.1 Campaign aim and objectives

The aim of the Putting Feet First campaign is to reduce the rate of lower limb amputations in people with diabetes by 50%, by 2017, as measured against the April 2009 – March 2012 baseline of 2.6 annual lower limb amputations per 1,000 adults<sup>iv</sup> with diabetes<sup>v 9</sup>.

The campaign aim is supported by four key objectives:

- Raise awareness with people with diabetes, healthcare professionals and the public of the seriousness of amputations and the impact of diabetes on feet
- Improve standards of care by ensuring people with diabetes have annual foot checks and know how to look after their feet
- Improve access to multidisciplinary foot care teams (MDFT) by ensuring these teams are available in all areas
- Increase foot examinations for people with diabetes admitted to hospitals.<sup>10 11</sup>

### 4.2 How HSCIC's health data has been used to inform the campaign's objectives

HSCIC is commissioned by the Healthcare Quality Improvement Partnership (HQIP) to annually deliver various diabetes-related audits. The two audits that have informed the Putting Feet First campaign objectives are:

- National Diabetes Audit (NDA)
- National Diabetes Inpatient Audit (NaDIA).

The specific audit findings that have informed the campaign objectives are set out in the table below.

Table 1: Alignment of HSCIC's statistical data to campaign objectives

Putting Feet First campaign objective	Audit finding informing objective
Raise awareness	None
Improve standards of care by providing annual foot checks to people with diabetes	The NDA 2009-10 reported that, in England, 32.2% of patients with type 1 diabetes <sup>12</sup> and 14.8% of patients with type 2 diabetes <sup>13</sup> did not receive foot examinations.
Improve access to MDFTs	The NaDIA 2011 <sup>vi</sup> reported that, of the 185 sites in England that provided a response on hospital characteristics, 75 sites (40.5%) did not have MDFTs <sup>14</sup> .
Increase foot examinations for patients during hospital	The NaDIA 2011 <sup>vii</sup> reported that only 26.8% of patients in England

<sup>iv</sup> Adults is defined as people aged 17 and over

<sup>v</sup> The lower limb amputation rate data in Public Health England's (PHE) diabetes footcare activity profiles is based on episodes with OPCS codes between X09-X12 and ICD-10 codes between E10-E14.

<sup>vi</sup> Although NaDIA 2011 was published by the HSCIC after the launch of the Putting Feet First campaign, campaign material was disseminated in stages. As a consequence, Diabetes UK used NaDIA 2011 to inform the campaign objectives.

Putting Feet First campaign objective	Audit finding informing objective
stays	had a documented foot examination during their hospital stay <sup>15</sup> .

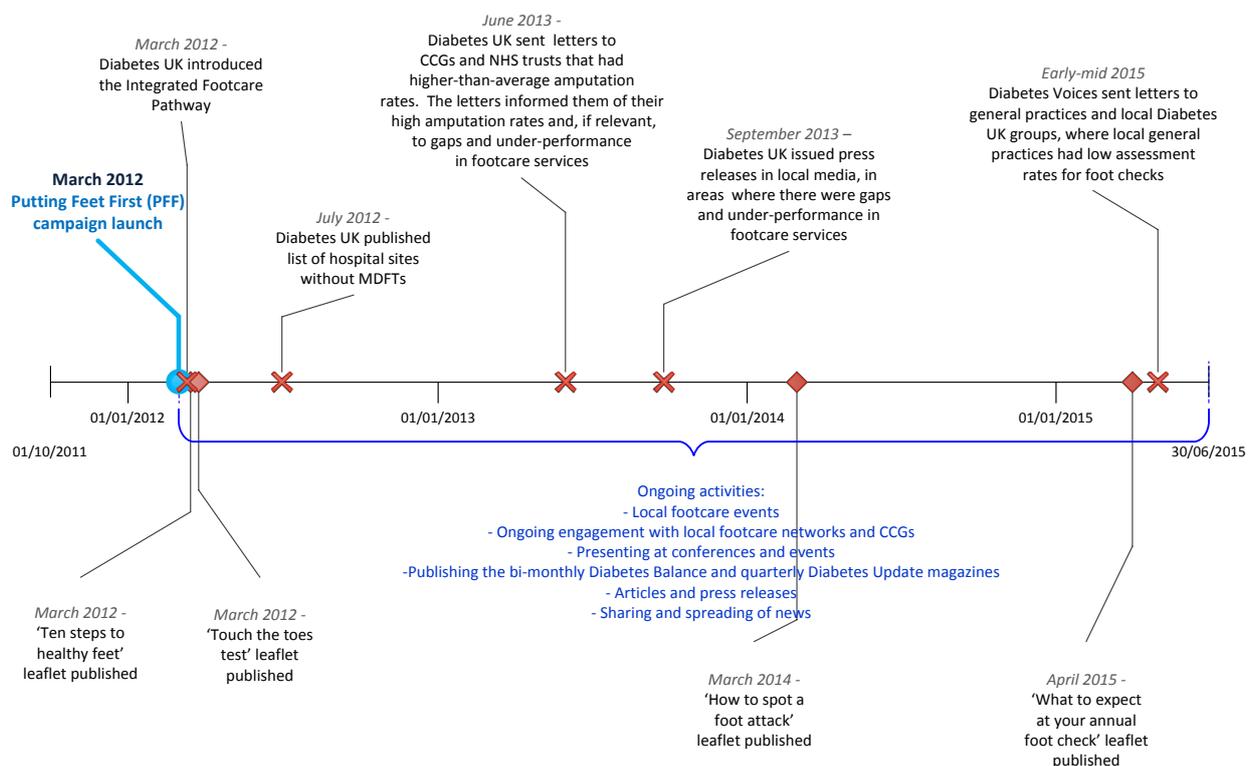
For reference purposes, the NDA and NaDIA publications that have been released since 2009/10 are shown as a timeline in [Appendix B](#).

## 5 Promotional activities

Diabetes UK and stakeholders have carried out promotional various activities for the Putting Feet First campaign. These activities are set out as a timeline, and described in more detail, below.

### 5.1 Timeline of key promotional activities

Figure 2: Timeline of awareness raising activities



<sup>vii</sup> Although NaDIA 2011 was published by the HSCIC after the launch of the Putting Feet First campaign, campaign material was disseminated in stages. As a consequence, Diabetes UK used NaDIA 2011 to inform the campaign objectives.

## 5.2 Description of key promotional activities

### 5.2.1 Publishing promotional material related to foot care

Diabetes UK has published various foot care management leaflets to help people with diabetes take better care of their feet. To November 2015, these consisted of:

1. 'Ten steps to healthy feet'<sup>16</sup>, published in March 2012
2. 'Touch the toes test'<sup>17</sup>, published in March 2012
3. 'How to spot a foot attack'<sup>18</sup>, published in March 2014<sup>19</sup>
4. 'What to expect at your annual foot check'<sup>20</sup>, published in April 2015.

The leaflets have been promoted through various channels such as conferences, healthcare professionals, local footcare networks, Diabetes UK members and local diabetes groups. Specific promotional examples include:

- In April 2014, Diabetes UK sent postal letters to all clinical commissioning groups (CCGs) to signpost them to the foot care management leaflets and the Integrated Footcare Pathway (see [Section 5.2.3](#) for further details on Integrated Footcare Pathway).
- In May 2014, Diabetes UK sent the foot care management leaflets and the Integrated Footcare Pathway, via mail-shot, to all general practices in England
- In August 2015, Diabetes UK sent the 'What to expect at your annual foot check' leaflet, with reminders about the previous leaflets, to all CCGs by post.

### 5.2.2 Promoting improvements in foot care services

- In July 2012, Diabetes UK issued a national press release on their website, which highlighted the lack of MDFTs in 84 hospital sites in England and Wales, in 2011. As part of this release, Diabetes UK also published a list of the 84 sites in (75 in England)<sup>21</sup>.

*NaDIA 2011 was the basis for this list, which the HSCIC supplied to Diabetes UK through a bespoke data extract.*

- In England, between April 2009 and March 2012, there were 2.6 annual lower limb amputations for every 1,000 adults<sup>viii</sup> with diabetes<sup>22</sup>. In June 2013, Diabetes UK sent letters to chief executives of the 50 CCGs that, when compared to the England lower limb amputation rate, had significantly higher amputation rates. The letters informed the CCGs about their high lower limb amputations rates and, where relevant, about gaps and concerns in the provision and delivery of local NHS trusts' foot care services. References were made to local NHS trusts' foot care services if the trust displayed one or more of the following characteristics:
  - did not contain an MDFT within their service delivery model

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<sup>viii</sup> Adults is defined as people aged 17 and over

- allocated an MDFT as part of the provision of services, but referrals to MDFTs within 24 hours were low
- had performed a low percentage of foot examinations on people with diabetes who were admitted as inpatients.

The letters also sought to gain feedback and commitments from CCGs and trusts on their plans for improving foot care services.

*The annual amputation rates in adults with diabetes at CCG and national-levels were based on PHE's diabetes footcare activity profiles, which PHE calculates annually from HSCIC's HES and QOF data.*

*NaDIA 2012 was the basis for the list of hospitals without MDFTs, which the HSCIC supplied to Diabetes UK through a bespoke data extract. Publicly released NaDIA 2012 data file<sup>23</sup> was the basis for determining which NHS trusts made low referrals to MDFTs within 24 hours and performed a low percentage of foot examinations.*

- In parallel to sending letters to CCGs, Diabetes UK also sent letters to associated NHS trusts. The purpose of these letters was to inform the trusts about the awareness raising exercise Diabetes UK had initiated with CCGs and to also encourage them in delivering improvements in foot care services.
- In September 2013, in areas that Diabetes UK targeted with high amputation rate letters, Diabetes UK issued local press releases. These press releases were aimed at raising awareness with local people and local stakeholders about the high amputation rates the local area was experiencing and, where relevant, about the gaps and concerns in the provision and delivery of local foot care services and the subsequent commitments the CCGs and NHS trusts had made in improving foot care services.

### **5.2.3 Introducing the Integrated Footcare Pathway**

As part of the Putting Feet First campaign launch in March 2012, Diabetes UK introduced the Integrated Footcare Pathway<sup>24</sup>. The pathway, which is aimed at people with diabetes, describes a stratified model of care, based on a person's risk of contracting a diabetes-related foot disease. The pathway has been promoted with CCGs and general practices through e-mail and postal letters (see [section 5.2.1](#) for further detail on these activities) and with people with diabetes through local footcare networks.

### **5.2.4 Local foot care events**

Between April 2012 and June 2015, Diabetes UK delivered seven local foot care events, which primarily targeted people with diabetes who did not have obvious foot problems. The events, which continue to be delivered on an ongoing basis, are prioritised in areas with high amputation rates and aimed at educating people on how to maintain good 'foot health'. Further detail on the foot care events is available in [Appendix C](#).

### 5.2.5 Promoting foot care examinations with general practitioner (GP) practices

PHE's 'Healthier Lives' tool<sup>25</sup> uses QOF data to report the national, CCG and GP practice level data for percentage of people with diabetes that received a foot check. Diabetes UK used this indicator to identify that, in 2013/14, and when compared to the England average (of 82.1%)<sup>ix</sup>, 86 general practices had delivered a significantly lower percentage of foot checks in people with diabetes<sup>x</sup>.

In early-mid 2015, Diabetes Voices, a network of people who campaign locally to improve diabetes care in their communities, used the Diabetes UK analysis as the basis for sending out letters to local Diabetes UK groups operating in these areas or to the general practices themselves. The letters signposted the local groups/general practices to the 'What to expect at your annual foot check' leaflet and also informed them of the general practice's performance on foot check assessments.

### 5.2.6 Ongoing promotional activities

- Diabetes UK's seven England-based regional offices continually engage with local footcare networks and CCGs to develop stronger relationships with these stakeholders and understand what local opportunities, threats and issues are affecting, or can affect, improvements in foot care services.
- Diabetes UK regularly presents at diabetes-related conferences and events to help stakeholders deliver improved foot care services. For example, the annual Diabetes UK Professional Conference aims to inform healthcare professionals on the latest developments in care, treatment and research and to inform them on the current state of play with regards to foot care services, with a view to enabling improvements in treatment and services.
- Diabetes UK publishes the bi-monthly Diabetes Balance magazine<sup>26</sup>, which is aimed at people with diabetes, and the quarterly Diabetes Update magazine, which is aimed at healthcare professionals<sup>27</sup>. Although both magazines provide their own specialist advice, such as exclusive recipes in Diabetes Balance and latest news on research and clinical studies in Diabetes Update, the magazines also encourage better foot care management through the promotion of foot care leaflets, case studies and diabetes audit findings.
- Diabetes UK releases articles and press releases in specialist press, such as The Pharmaceutical Journal and the Journal of Primary Care and Community Health.
- Diabetes UK shares and spreads diabetes foot care-related news and advice via social media outlets, such as Twitter and Facebook. In August 2015, Diabetes UK hosted an online chat session answering questions from people with diabetes about foot care management.

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<sup>ix</sup> The 2013/14 QOF indicator used for this assessment is:

DM012: The percentage of patients with diabetes, on the register, with a record of a foot examination and risk classification: 1) low risk (normal sensation, palpable pulses), 2) increased risk (neuropathy or absent pulses), 3) high risk (neuropathy or absent pulses plus deformity or skin changes in previous ulcer) or 4) ulcerated foot within the preceding 12 months, NICE 2010 menu ID: NM13

<sup>x</sup> The criteria that resulted in 86 general practices is as follows: practice identified as 'lower' than their area average on the PHE tool AND practice with more than 100 patients AND practice with percentages of foot checks below 55.0%

- Diabetes UK shares good practice and case studies with healthcare professionals and commissioners via Diabetes UK's Shared Practice and Innovation team.

**Quote**

“Data from the National Diabetes Audit, National Diabetes Inpatient Audit, HES and QOF is a vital part of our Putting Feet First campaign. Data has helped to inform us about the scale of diabetes-related amputations and the variation across the country. It has helped shape the aim and objectives of the campaign and allowed us to measure the progress made. The information has helped us to engage with local providers and raise awareness of diabetes foot care.”

Diabetes UK

**6 Business changes**

The promotional activities are likely to have contributed to the following service and behavioural changes:

- Increased provision and use of MDFTs within NHS trusts
- Improved processes within NHS trusts for assessing patients for foot complications during hospital stays
- Increased self-care by people with diabetes

**7 Changes in performance**

The tables below highlight how, over time, performance has changed in indicators relating to the campaign aim and objectives.

Table 2: Progress against campaign aim

<b>Data source: PHE's Diabetic foot disease profiles</b>					
<b>Aim</b>	<b>Indicator</b>	<b>Apr 08 – Mar 11</b>	<b>Apr 09 – Mar 12</b>	<b>Apr 10 – Mar 13</b>	<b>Apr 11 – Mar 14</b>
Reduce rate of lower limb amputations in people with diabetes by 50%, by 2017	Annual amputations per 1,000 adults with diabetes	2.7 <sup>28</sup>	2.6 <sup>29</sup>	2.6 <sup>30</sup>	2.6 <sup>31</sup>

**Informing Diabetes UK's Putting Feet First campaign, which aims to reduce the rate of lower limb amputations in people with diabetes by 50%**

**Table 3: NDA indicators monitoring progress against campaign objectives**

<b>Data source: NDA</b>					
<b>Objective</b>	<b>Indicator</b>	<b>2010/11 (England only)</b>	<b>2010/11 (England and Wales)</b>	<b>2011/12 (England and Wales)</b>	<b>2012/13 (England and Wales)</b>
Improve standards of care by providing annual foot checks to people with diabetes	% of patients with diabetes receiving a foot examination (foot surveillance).	84.4% <sup>32</sup>	84.3% <sup>33</sup>	85.3% <sup>34</sup>	85.1% <sup>35</sup>
	% of patients with type 1 diabetes receiving a foot examination (foot surveillance).	71.9% <sup>36</sup>	71.5% <sup>37</sup>	72.8% <sup>38</sup>	72.3% <sup>39</sup>
	% of patients with type 2 diabetes receiving a foot examination (foot surveillance).	86.2% <sup>40</sup>	86.1% <sup>41</sup>	87.0% <sup>42</sup>	86.7% <sup>43</sup>

**Table 4: NaDIA indicators monitoring progress against campaign objectives**

<b>Data source: NaDIA</b>					
<b>Objective</b>	<b>Indicator</b>	<b>Oct 2011 (England only)</b>	<b>Oct 2011 (England and Wales)</b>	<b>Sep 2012 (England and Wales)</b>	<b>Sep 2013 (England and Wales)</b>
Improve access to MDFTs	% of sites with a MDFT	59.5% <sup>44</sup>	58.3% <sup>45</sup>	68.1% <sup>46</sup>	71.8% <sup>47</sup>
	% of patients admitted with active foot diseases seen by a member of the MDFT within the first 24 hours of their hospital stay	61.9% <sup>48</sup>	61.3% <sup>xi xii</sup>	53.3% <sup>xiii</sup>	61.1% <sup>49</sup>
Increase foot examinations for patients during hospital stays	% of patients that had a documented foot examination during their hospital stay	26.8% <sup>50</sup>	25.8% <sup>51</sup>	34.1% <sup>52</sup>	42.4% <sup>53</sup>
	% of patients that had a documented foot examination within the first 24 hours of their hospital stay <sup>xiv</sup>	Data not captured	21.3% <sup>54</sup>	28.8% <sup>55</sup>	36.3% <sup>56</sup>

The England-only position for 2010/11 and 2011 is only included in tables 3 and 4 to aid cross-referencing against the [Section 4.2](#) data. Thus, this data is shown in grey font.

<sup>xi</sup> The 2011 and 2012 England and Wales combined data has not been reported previously within the NaDIA publications. The England and Wales combined data has been specifically calculated by the HSCIC for this benefits case study.

<sup>xii</sup> The 2011 definition is slightly different to 2012 and 2013 definitions. The 2011 denominator excludes "unsure" values, in order that the 2011 data is consistent with NaDIA 2011 methodology.

<sup>xiii</sup> The 2011 and 2012 England and Wales combined data has not been reported previously within the NaDIA publications. The England and Wales combined data has been specifically calculated by the HSCIC for this case study.

<sup>xiv</sup> The denominator is number of patients in the inpatient audit i.e. same denominator as indicator '% of patients that had a documented foot examination during their hospital stay'

## 8 Measurable benefits

### 8.1 Lower limb amputation rates

Table 2 in [Section 7](#) shows that the annual lower limb amputation rate per 1,000 adults with diabetes, when measured in the three-year periods between 2009-12 and 2011-14, has stayed static at 2.6. Consequently, no measurable benefit has been realised in this area yet. However, lower limb amputation rate did reduce between 2008-11 and 2009-12, which indicates that factors external to the Putting Feet First campaign have already positively impacted the national amputation rate.

### 8.2 Intermediate benefits realised

[Section 7](#) show that, when compared to the 2010/11 and 2011 baselines, the service changes have delivered marked improvements (measurable intermediate benefits) in three areas. These three areas (intermediate benefits) and their associated objectives are shown in the table below.

Table 5: Progress against campaign objectives

Putting Feet First campaign objective	Intermediate benefit realised
Raise awareness	Not relevant – HSCIC statistical data did not inform campaign objective.
Improve standards of care by providing annual foot checks to people with diabetes	No marked improvements realised yet. Performance has stayed fairly consistent.
Improve access to MDFTs	<ul style="list-style-type: none"> <li>In Sep 2013, 71.8% of hospitals sites had MDFTs. In comparison to Oct 2011, this is an increase of 13.5 percentage points.</li> </ul> <p><i>Oct 2011 and Sep 2013 outturns are based on NaDIA data.</i></p>
Increase foot examinations for patients during hospital stay	<ul style="list-style-type: none"> <li>In Sep 2013, 42.4% of patients received foot examinations during hospital stays. In comparison to Oct 2011, this is an increase of 16.6 percentage points.</li> <li>In Sep 2013, 36.6% of patients received foot examinations within the first 24 hours of hospital stays. In comparison to Oct 2011, this is an increase of 15 percentage points.</li> </ul> <p><i>Oct 2011 and Sep 2013 outturns are based on NaDIA data.</i></p>

The stated intermediate benefits are based on foot care service changes implemented between 2011 and 2013. The key promotional activities that have been delivered in this period and, therefore, likely to have contributed to the service changes are as follows:

- In July 2012, Diabetes UK published on their website a list of 84 sites in England and Wales that did not have a MDFTs in 2011.
- In June 2013, Diabetes UK sent letters to CCGs and NHS trusts that, when compared to the England average, had high amputation rates in adults with diabetes. Where

relevant, the letters also made references to gaps and under-performance in the provision and delivery of foot care services.

- Diabetes UK delivered various local foot care events. These events educate people with diabetes who do not have obvious foot problems on how to maintain good foot health and the opportunity for them to access local services.
- All ongoing activities stated in [Section 5.2.6](#), such as engagement between Diabetes UK regional offices and local footcare networks/CCGs, periodic publication of the *Diabetes Balance* and *Diabetes Update* magazines, articles and press releases in specialist press and sharing good practice and case studies with people with diabetes, healthcare professionals and commissioners.

See [Section 5](#) for further detail on these activities.

### **8.3 Consequential benefit realised**

The improvements (intermediate benefits) in MDFTs and foot examinations during hospital stays, as highlighted in [Section 8.2](#), have contributed to the following improvement (consequential benefit):

- A reduction of 0.8 percentage points in percentage of patients developing a foot lesion during hospital stays, as measured between 2010 and 2013.<sup>57</sup> The table below details the annual outturns on foot lesions, which are based on NaDIA data.

**Table 6: Consequential benefit – annual improvement in percentage of patients developing foot lesions during hospital stay**

<b>NaDIA audit period</b>	<b>Percentage of patients developing foot lesions during hospitals stays<sup>58</sup></b>
Oct 2010	2.2% (England only)
Oct 2011	Corresponding question not included in 2011 NaDIA
Sep 2012	1.6% (England and Wales)
Sep 2013	1.4% (England and Wales)

### **8.4 End benefits anticipated**

#### **8.4.1 Reduction in amputation rates**

Although table 1 in [Section 7](#) shows that the annual amputation rate per 1,000 adults with diabetes, when measured in the three-year periods between 2009-12 and 2011-14, has stayed static at 2.6, a reduction in amputation rates is anticipated in the future. This is because of two key factors:

- recent increase in MDFTs - the increase in MDFTs, as documented in [Section 8.2](#), is anticipated to contribute to the promotion of faster healing after a foot attack and a reduction in lower limb amputations<sup>59</sup>. There is evidence to show that, where hospitals have introduced MDFTs and promoted rapid access to such teams, amputations have reduced by over 50%<sup>60</sup>. For example, James Cook University

Hospital in Middlesbrough reduced lower-extremity amputation rates (a synonym for lower limb amputations) by two-thirds through the introduction of an MDFT.<sup>61</sup>

- high rate of annual foot care examinations - people with diabetes do not always feel the beginnings of an ulcer or even a foot attack, as the nerves in their feet and legs may be damaged, which can subsequently lead to a loss of sensation and numbness in the feet (neuropathy).<sup>62</sup>

The high rate of foot examinations in people with diabetes (85.1% in 2012/13), as documented in Table 3 [Section 7](#), will enable more people to be assessed by a healthcare professional, and this, in turn, will enable healthcare professionals to identify early-on any underlying issues that can lead to foot complications. As per the Integrated Footcare Pathway and National Institute for Health and Care Excellence (NICE) guideline NG19<sup>63</sup>, people with diabetes will also be assigned a risk status (for developing a diabetes-related foot problem) and provided with advice on how to take care of their feet. Those categorised as being moderate or high risk should then be referred to specialist foot protection services for preventive treatment and advice.

#### **8.4.2 [Reduction in amputation expenditure](#)**

Foot Care for People with Diabetes: The Economic Case for Change (NHS Diabetes, 2012) reported that, in 2010/11, NHS expenditure on diabetic foot ulceration and amputation<sup>64</sup> was estimated to be between £639m and £662m (0.6%-0.7% of NHS budget). The same report specified that, in 2010/11:

- the lower estimate for total inpatient care expenditure for lower limb amputations for people with diabetes was £44m (£43,546,901)<sup>65 xv</sup>
- the lower estimate for post-amputation expenditure for lower limb amputations for people with diabetes was £76m (£75,807,423)<sup>66</sup>.

In 2010/11, there were 6,232 non-trauma-related major and minor amputations of the lower limb<sup>67 xvi xvii</sup>. Using these figures as the basis, the 2010/11 average unit amputation expenditure on inpatient care was £6,988. For post-amputation, it was £12,164. If we take a simplistic approach and apply the 2010/11 average unit expenditures to the 2014/15 projection, which for the purposes of this calculation will be 7,100, then the 2014/15 total inpatient and post-amputation expenditure will be £136m (£135,979,200). In comparison to 2010/11, this is an increase of £17m (£119m in 2010/11).

With the anticipation that the four improvements highlighted across sections [8.2](#) and [8.3](#) will lower amputations rates, there is a consequential anticipated benefit of a reduction in amputation expenditure.

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<sup>xv</sup> The total inpatient cost is based on major amputations (lower estimate - £24,716,787), minor amputations (lower estimate - £17,353,138) and procedures on amputation stumps (lower estimate - £1,476,976).

<sup>xvi</sup> The 6,232 total is based on major amputations (2,608), minor amputations (3,309) and procedures on amputation stumps (315).

<sup>xvii</sup> The 2010/11 total for lower limb amputations (6,232) is derived from *The Economic Case for Change* report. This is not comparable to the lower limb amputation data reported by the HSCIC through its Indicator Portal (6,208 amputations in 2010/11). This is because, although both figures use HES data, the definitions are slightly different. HSCIC's Indicator Portal data –'Hospital procedures: lower limb amputations in diabetic patients (OPCS4 codes X09-X11 with ICD 10 codes E10-E14)' – can be accessed from (<https://indicators.ic.nhs.uk/webview/index.jsp?v=2&submode=ddi&study=http%3A%2F%2Fhg-l-app-472.ic.green.net%3A80%2Fobj%2FStudy%2FP00295&mode=documentation&top=yes>).

### 8.4.3 Improved survival rates

There is evidence to show that people with diabetes have higher mortality rates than people without diabetes. For example:

- The HSCIC reported in the NDA 2012-2013 report that people in the 2011-12 audit were 34.4% more likely to die between 1 January 2013 and 31 December 2013, as compared to their peers in the general population.<sup>68</sup>
- The Department of Health (DH) reported in the *National Service Framework for Diabetes* (2001) that, on average, life expectancy is reduced by more than 20 years in people with type 1 diabetes and up to 10 years in people with type 2 diabetes.<sup>69</sup>

There is also evidence to show that survival rate in people with diabetes is impacted by lower limb amputations. For example:

- *One-year mortality:* Foot Care for People with Diabetes: The Economic Case for Change (NHS Diabetes, 2012) refers to a study, which used HES and Office for National Statistics (ONS) mortality data to report that, one-year mortality rate for patients with diabetes who underwent non-traumatic major lower limb amputation (amputation above the ankle) in 2004-05 was 32.7%. For minor lower limb amputations (amputations below the ankle), the one-year mortality rate was 18.3%.<sup>70</sup>
- *Two-year mortality:* Diabetes UK reported that only 50% of people with diabetes who have a lower limb amputation survive for two years.<sup>71</sup>
- *Five-year mortality:*
  - NICE has reported that mortality rate after a non-traumatic lower limb amputation in people with diabetes at five years is 70%.<sup>72</sup>
  - Foot Care for People with Diabetes: The Economic Case for Change (NHS Diabetes, 2012) reported that five-year cumulative mortality for patients with diabetes undergoing a first major amputation has been estimated to be between 68% and 78.7%.<sup>73</sup>
  - Diabetes UK reported that the relative likelihood of death within five years following amputation is greater than that for colon, prostate and breast cancer.<sup>74</sup>

Based on these pieces of evidence, it is anticipated that the reduction in amputation rates will improve survival rates in people with diabetes.

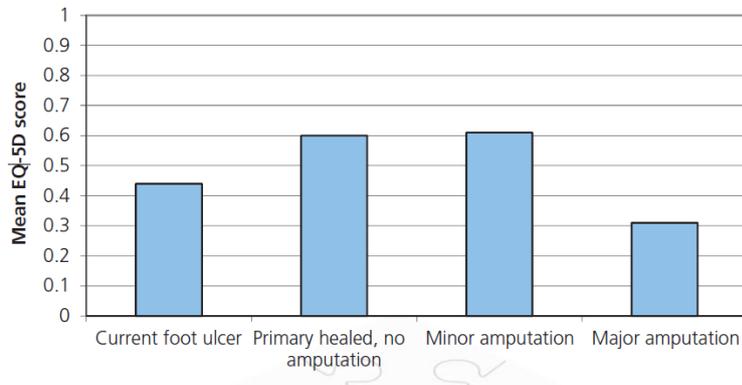
### 8.4.4 Fewer people experiencing reduced quality of life

EQ-5D<sup>TM</sup> is a standardised self-reporting tool that asks patients to report their health status against five dimensions (mobility, self-care, usual activities, pain/discomfort and anxiety/depression). The responses are combined and weighted to provide a single health-related quality of life (HQOL) index value. An index value of one represents full health and an index value of zero represents death.

A Norwegian study (Solli et al, 2010) reported that, for individuals without any reported complications, the mean EQ-5D<sup>TM</sup> index scores were 0.90 for people with type 1 diabetes

and 0.85 for people with type 2 diabetes.<sup>75</sup> Foot Care for People with Diabetes: Economic Case for Change (NHS Diabetes, 2012) refers to the Ragnarson and Apelqvist (2000) study<sup>76</sup>, which reported that EQ-5D<sup>TM</sup> score is lower in patients experiencing major amputations (see graph below).

**Figure 3: EQ-5D scores reported by Ragnarson and Apelqvist (2000)<sup>77</sup>, as illustrated in Foot Care for People with Diabetes: The Economic Case for Change (NHS Diabetes, 2012)<sup>78</sup>**



Using the above studies as evidence, the anticipated reduction in lower limb amputation rates in people with diabetes will result in fewer people experiencing reduced quality of life. More people with diabetes will be able to continue with the activities they're currently undertaking, thus sustaining their quality of life.

## **9 Contributions**

This case study has had contributions from, and been reviewed by:

- Ajay Basra, Senior Information Analyst, Diabetes UK
- Nikki Joule, Policy Manager, Diabetes UK

## 10 Appendix A – Expanded information on the campaign drivers

### 10.1 Overview of the key factors that have driven the Putting Feet First campaign

Diabetes UK has established the Putting Feet First campaign as a result of concerns over the high rates of lower limb amputations in people with diabetes, the expected increase in amputation rates in people with diabetes, the associated expenditure on lower limb amputations and the viability of preventing many amputations through changes in care services and increased awareness of the impact of diabetes on feet.<sup>79</sup>

### 10.2 Health care data informing campaign drivers and providing context to the clinical domain

#### Diabetes prevalence

HSCIC's Quality and Outcomes Framework (QOF) data reported that, in 2013/14, diabetes prevalence in people aged 17 and over was 6.21% (2.8m)<sup>80 xviii</sup>. By 2025, it is estimated that more than 5 million people in the UK will have diabetes.<sup>81</sup> The table below highlights how diabetes prevalence in people aged 17 and over has increased between 2010/11 and 2013/14.

Table 7: Annual diabetes prevalence between 2010/11 and 2013/14

Indicator	2010/11 <sup>82</sup>	2011/12 <sup>83</sup>	2012/13 <sup>84</sup>	2013/14 <sup>85</sup>
Diabetes prevalence in people aged 17 and over	5.54%	5.76%	6.01%	6.21%
Total number of people aged 17 and over and with a diabetes diagnosis (numerator)	2,455,937	2,566,436	2,703,044	2,814,004
Total number of people aged 17 and over registered with a general practice (denominator)	44,291,915 <sup>xx</sup>	44,569,825 <sup>xx</sup>	44,950,726	45,326,285

#### Causes of lower limb amputations

Worldwide, diabetes is one of the leading causes of lower limb amputations.<sup>86</sup> The majority of lower limb amputations in people with diabetes are caused by 'foot attacks' – a foot ulcer<sup>xxi</sup> (open wound on a foot) or an infection failing to heal.<sup>87</sup> Diabetic foot ulcers, in fact, precede more than 80% of lower limb amputations in people with diabetes.<sup>88</sup>

<sup>xviii</sup> The QOF data only considers patients aged 17 and over for calculating diabetes prevalence, hence the prevalence data is for this group of people

<sup>xix</sup> Calculation:  $2,455,937 / 5.5448878631 * 100 = 44,291,914.56$

<sup>xx</sup> Calculation:  $2,566,436 / 5.758236701 * 100 = 44,569.824.64$

<sup>xxi</sup> NICE has defined a foot ulcer as 'a localised injury to the skin and/or underlying tissue, below the ankle in a person with diabetes'.

Reference:

National Institute for Health and Care Excellence, 2015. *Diabetic foot problems: prevention and management, NICE guidelines [NG19]* [Online] Available at: <https://www.nice.org.uk/guidance/ng19/chapter/introduction> [Accessed 27 August 2015]

## **Lower limb amputation numbers in England**

In England, about half of all major lower limb amputations are in people with diabetes.<sup>89</sup> The Yorkshire and Humber Public Health Observatory (YHPHO), which is now part of Public Health England (PHE), used HSCIC's Hospital Episode Statistics (HES) data to report that, in 2009/10, there were more than 6,000 lower limb amputations in people with diabetes.

HSCIC also used HES data, albeit with a slightly different definition, to report through its Indicator Portal, that, in England, in 2009/10, there were 5,785 lower limb amputations in people with diabetes. Changes in annual lower limb amputation numbers between 2007/08 and 2011/12, as based on HSCIC's Indicator Portal, are shown in the table below.

**Table 8: Annual lower limb amputations in people with diabetes between 2007/08 and 2011/12**

<b>Indicator</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>	<b>2010/11</b>	<b>2011/12</b>
Number of lower limb amputations in people with diabetes <sup>90 xxii</sup>	5,306	5,720	5,785	6,208	6,298

The NDA 2012-2013 reported that, from the people in England and Wales who were included in NDA 2011-2012 and who were still alive on 31 March 2012 (2,460,261 people<sup>91</sup>), 1,834 people (0.07%) underwent a major amputation and 3,699 (0.15%) underwent a minor amputation<sup>92</sup> (participation in the NDA is voluntary). To provide context to these figures, the participation rate, when compared to QOF, which is also voluntary, but with a high participation rate<sup>93</sup>, 71.1% of the people diagnosed with diabetes in England and 69.3% diagnosed with diabetes in Wales were included in the 2012-13 audit<sup>94</sup>.

## **Lower limb amputations rates – people with diabetes versus people without diabetes**

Holman, Young and Jeffcoate (2011) used HSCIC's HES and QOF data to report that, for hospital admissions between April 2007 and March 2010, incidence rate of lower limb amputations in people with diabetes was 2.51 per 1,000 person-years. In people without diabetes, incidence rate was 0.11 per 1,000 person-years.<sup>95 xxiii</sup> This infers that people with diabetes, when compared to people without diabetes, are 23.3 times more likely to undergo a lower limb amputation procedure<sup>xxiv</sup>.

The NDA 2012-2013 reported that, for people in England, the crude risk of people with diabetes experiencing major and minor lower limb amputation is 20.65 and 43.68 times greater, when compared to people without diabetes.<sup>96</sup> Khanolkar, Bain and Stevens (2008) reported that lower limb amputations in people with diabetes occurs 10-30 times more often than in the general population.<sup>97</sup>

<sup>xxii</sup> The lower limb amputation rate data published by the HSCIC through its Indicator Portal is based on episodes with OPCS codes between X09-X11 and ICD-10 codes between E10-E14 (OPCS code X12 is not included in the definition). In contrast, the YHPHO data includes procedures coded with X12. This is the key definitional difference between the two sources.

<sup>xxiii</sup> Amputations include traumatic amputations and those due to malignancy.

<sup>xxiv</sup> Although  $2.51/0.11 = 22.8$ , the journal paper uses a figure of 23.3, hence the case study uses 23.3. The difference in numbers is likely to be because the numerator (2.51) and the denominator (0.11) are rounded up/down in the journal paper.

For CCGs in England, the relative risk of major lower limb amputation among people in the NDA with Type 1 and Type 2 diabetes compared with people without diabetes ranged from 0.0 to 17.76.<sup>98</sup>

### **Lower limb amputation projection**

Diabetes UK projected that, by 2014/15, lower limb amputations in people with diabetes will reach 7,000+.<sup>99</sup> The charity also estimated that 80% of amputations can potentially be preventable through access to good quality structured care and improved awareness among people with diabetes about their risk status and the actions they should take.<sup>100</sup>

### **Survival rate after lower limb amputation**

Only 50% of people with diabetes who have an amputation survive for two years. The relative likelihood of death within five years following amputation is greater than that for colon, prostate and breast cancer.<sup>101</sup> Further detail on survival rates is available in [Section 8.4.3](#).

### **Expenditure on lower limb amputations**

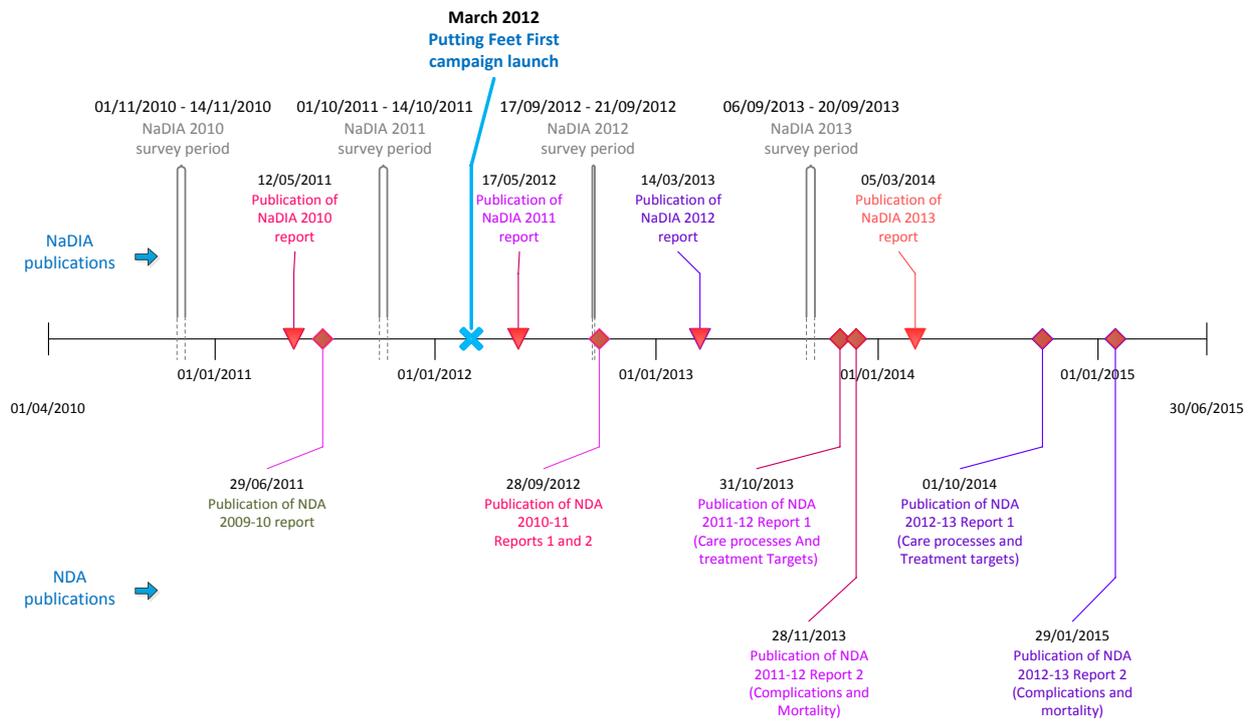
Foot Care for People with Diabetes: The Economic Case for Change (NHS Diabetes, 2012) reported that 2010-11 NHS expenditure on diabetic foot ulceration and amputation<sup>102</sup> was estimated to be between £639m and £662m (0.6%-0.7% of NHS budget). The total inpatient expenditure on amputations was estimated to be between £43.5m and £48.9m.<sup>103 xxv</sup>

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<sup>xxv</sup> The inpatient expenditure is based on major amputations, lower amputations and procedures on amputation stumps.

## 11 Appendix B – Timeline of NDA and NaDIA publications

Figure 4: Timeline of NDA and NaDIA publications



## **12 Appendix C – Expanded information on local foot care events**

Between April 2012 and June 2015, Diabetes UK delivered seven local foot care events, which were primarily targeted at people with diabetes who did not have obvious foot problems. The events were prioritised in areas with high amputation rates and were aimed to educate people on how to maintain good 'foot health'.

Each event was generally structured in the following way:

- Talks and workshops on diabetes and foot care, including information on the annual foot examination
- An 'expert workshop' whereby a person who has experienced amputation or serious foot problems talks about their situation
- The provision of a podiatrist for foot examinations and advice.

The foot care events were promoted through various channels, such as general practices, pharmacies and media releases. The media releases helped promote the importance of good foot care, but, also, where relevant, highlighted gaps and concerns in provision and delivery of local foot care services.

As mentioned, the foot care events, which continue to be delivered on an ongoing basis, are primarily aimed at people with diabetes, but, the April 2012 event in Portsmouth was targeted at healthcare professionals.

## 13 References

- <sup>1</sup> Diabetes Update. 2012. *Feature, Putting Feet First* [Online] Available at: <https://www.diabetes.org.uk/upload/professionals/publications/spring%202012/footcare.pdf> [Accessed 12 June 2015]
- <sup>2</sup> Diabetes UK. *Putting feet first* [Online] Available at: <https://www.diabetes.org.uk/Documents/campaigning/Putting-feet-first-campaign.0213.pdf> [Accessed 12 June 2015] p.2
- <sup>3</sup> Holman, N., Young, R. J., Jeffcoate, W.J., 2011. 'Variation in the recorded incidence of amputation of the lower limb in England', *Diabetologia* [Online], 55 (7), p.1920 Available at: [http://download.springer.com/static/pdf/301/art%253A10.1007%252Fs00125-012-2468-6.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs00125-012-2468-6&token2=exp=1441903598~acl=%2Fstatic%2Fpdf%2F301%2Fart%25253A10.1007%25252Fs00125-012-2468-6.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs00125-012-2468-6\\*~hmac=067de5175ee48d42832de91b57dc260b897c75d84eeb22204764bdeba0052dc2](http://download.springer.com/static/pdf/301/art%253A10.1007%252Fs00125-012-2468-6.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%2Fs00125-012-2468-6&token2=exp=1441903598~acl=%2Fstatic%2Fpdf%2F301%2Fart%25253A10.1007%25252Fs00125-012-2468-6.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs00125-012-2468-6*~hmac=067de5175ee48d42832de91b57dc260b897c75d84eeb22204764bdeba0052dc2) [Accessed 10 June 2015]
- <sup>4</sup> Diabetes UK, 2013. *Putting Feet First, Fast track for a foot attack: Reducing amputations* [Online] Available at: <https://www.diabetes.org.uk/Documents/Reports/putting-feet-first-foot-attack-report022013.pdf> [Accessed 2 Jul 2015] p.3
- <sup>5</sup> Diabetes UK. *Putting feet first* [Online] Available at: <https://www.diabetes.org.uk/Documents/campaigning/Putting-feet-first-campaign.0213.pdf> [Accessed 12 June 2015] p.1
- <sup>6</sup> Diabetes Update. 2012. *Feature, Putting Feet First* [Online] Available at: <https://www.diabetes.org.uk/upload/professionals/publications/spring%202012/footcare.pdf> [Accessed 12 June 2015] p.20
- <sup>7</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 7
- <sup>8</sup> Ibid
- <sup>9</sup> Public Health England, 2013. *Diabetic Foot Disease Profile: NHS North Kirklees CCG* [Online] Available at: [http://www.yhpho.org.uk/diabetesprofilesfoot/ccg\\_pdfs/03J\\_Diabetes\\_Footcare\\_Profile\\_201112.pdf](http://www.yhpho.org.uk/diabetesprofilesfoot/ccg_pdfs/03J_Diabetes_Footcare_Profile_201112.pdf) [Accessed 10 Sep 2015] p.1
- <sup>10</sup> Diabetes UK. *Putting Feet First* [Online] Available at: <https://www.diabetes.org.uk/Documents/campaigning/Putting-feet-first-campaign.0213.pdf> [Accessed 12 June 2015]
- <sup>11</sup> Diabetes Update. 2012. *Feature, Putting Feet First* [Online] Available at: <https://www.diabetes.org.uk/upload/professionals/publications/spring%202012/footcare.pdf> [Accessed 12 June 2015] p.25
- <sup>12</sup> NHS Information Centre, 2011. *National Diabetes Audit Executive Summary 2009-2010* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB02573/nati-diab-audi-09-10-exec-sum.pdf> [Accessed 12 June 2015] p. 11
- <sup>13</sup> Ibid
- <sup>14</sup> HQUIP, NHS Information Centre and Diabetes UK, 2012. *National Diabetes Inpatient Audit 2011: Report* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB06279/nati-diab-inp-audi-11-nat-rep.pdf> [Accessed 17 June 2015] p. 21
- <sup>15</sup> Ibid
- <sup>16</sup> Diabetes UK 2012. *Ten steps to healthy feet, for people with diabetes* [Online] Available at: <https://www.diabetes.org.uk/Documents/Guide%20to%20diabetes/monitoring/Ten-tips-healthy-feet.0212.pdf> [Accessed 29 Jun 2015]
- <sup>17</sup> Diabetes UK, 2012. *Touch the toes test* [Online] Available at: <https://www.diabetes.org.uk/Documents/Guide%20to%20diabetes/monitoring/Touch-the-toes-test.0812.pdf> [Accessed 29 Jun 2015]
- <sup>18</sup> Diabetes UK, 2014. *New booklet for people at increased risk of a foot attack* [Online] Available at: [https://www.diabetes.org.uk/Get\\_involved/Volunteer/Involve-Newsletter/New-booklet-for-people-at-increased-risk-of-a-foot-attack/](https://www.diabetes.org.uk/Get_involved/Volunteer/Involve-Newsletter/New-booklet-for-people-at-increased-risk-of-a-foot-attack/) [Accessed 29 Jun 2015]
- <sup>19</sup> Diabetes UK, 2014. *Position Statement* [Online] Available at: <https://www.diabetes.org.uk/Documents/Position%20statements/Putting%20feet%20first%20position%20statement%20Nov%202014.pdf> [Accessed 18 June 2015] p.4
- <sup>20</sup> Diabetes UK, 2015. *What to expect at your annual foot check* [Online] Available at: <https://www.diabetes.org.uk/Documents/What-to-expect-at-annual-foot-check.pdf> [Accessed 29 Jun 2015]
- <sup>21</sup> Diabetes UK, 2012. *Over 80 hospitals lack specialist footcare teams* [Online] Available at: [https://www.diabetes.org.uk/About\\_us/News\\_Landing\\_Page/Over-80-hospitals-lack-specialist-footcare-teams/](https://www.diabetes.org.uk/About_us/News_Landing_Page/Over-80-hospitals-lack-specialist-footcare-teams/) [Accessed 29 Jun 2015]
- <sup>22</sup> Public Health England, 2013. *Diabetic Foot Disease Profile, North Kirklees CCG* [Online] Available at: [http://www.yhpho.org.uk/diabetesprofilesfoot/ccg\\_pdfs/03J\\_Diabetes\\_Footcare\\_Profile\\_201112.pdf](http://www.yhpho.org.uk/diabetesprofilesfoot/ccg_pdfs/03J_Diabetes_Footcare_Profile_201112.pdf) [Accessed 10 Sep 2015] p.1
- <sup>23</sup> Health and Social Care Information Centre, 2013. *National Diabetes Inpatient Audit (NaDIA) – 2012 – Comparative hospital-level analysis for England and Wales 2010-2012* [Online] Available at: <http://www.hscic.gov.uk/searchcatalogue?productid=11321&q=%22National+Diabetes+Inpatient+Audit%22&sort=Most+recent&size=10&page=1#top> [Accessed 16 September 2015]
- <sup>24</sup> Diabetes UK, 2013. *Putting Feet First, Fast track for a foot attack: Reducing amputations* [Online] Available at: <https://www.diabetes.org.uk/Documents/Reports/putting-feet-first-foot-attack-report022013.pdf> [Accessed 2 Jul 2015] p.6
- <sup>25</sup> Public Health England. *Healthy Lives: Diabetes* [Online] Available at: <http://healthierlives.phe.org.uk/> [Accessed 20 August 2015]
- <sup>26</sup> Diabetes UK. *Supporting membership* [Online] Available at: [https://www.diabetes.org.uk/How\\_we\\_help/Membership/](https://www.diabetes.org.uk/How_we_help/Membership/) [Accessed 16 September 2015]
- <sup>27</sup> Diabetes UK. *Diabetes Update* [Online] Available at: <https://www.diabetes.org.uk/Professionals/Diabetes-Update/> [Accessed 16 September 2015]
- <sup>28</sup> Yorkshire and Humber Public Health, Observatory, 2012. *Diabetic Foot Disease Profile, NHS Kirklees* [Online] Available at: [http://www.yhpho.org.uk/diabetesprofilesfoot/pdfs2012/5N2\\_Diabetes\\_Footcare\\_Profile.pdf](http://www.yhpho.org.uk/diabetesprofilesfoot/pdfs2012/5N2_Diabetes_Footcare_Profile.pdf) [Accessed 10 Sep 2015] p.1
- <sup>29</sup> Public Health England, Diabetes, 2013. *Diabetic Foot Disease Profile, NHS North Kirklees CCG* [Online] Available at: [http://www.yhpho.org.uk/diabetesprofilesfoot/ccg\\_pdfs/03J\\_Diabetes\\_Footcare\\_Profile\\_201112.pdf](http://www.yhpho.org.uk/diabetesprofilesfoot/ccg_pdfs/03J_Diabetes_Footcare_Profile_201112.pdf) [Accessed 10 Sep 2015] p.1
- <sup>30</sup> Public Health England, Diabetes, 2014. *Diabetic Foot Disease Profile, NHS North Kirklees CCG* [Online] Available at: [http://www.yhpho.org.uk/diabetesprofilesfoot/ccg\\_pdfs14/03J\\_Diabetes\\_Footcare\\_Profile\\_2014.pdf](http://www.yhpho.org.uk/diabetesprofilesfoot/ccg_pdfs14/03J_Diabetes_Footcare_Profile_2014.pdf) [Accessed 10 Sep 2015] p.1
- <sup>31</sup> Public Health England, Diabetes, 2015. *Diabetic Foot Disease Profile, NHS North Kirklees CCG* [Online] Available at: [http://www.yhpho.org.uk/diabetesprofilesfoot/ccg\\_pdfs15/03J\\_Diabetes\\_Footcare\\_Profile\\_2015.pdf](http://www.yhpho.org.uk/diabetesprofilesfoot/ccg_pdfs15/03J_Diabetes_Footcare_Profile_2015.pdf) [Accessed 10 Sep 2015] p.1

- <sup>32</sup> NHS Information Centre and Diabetes UK, 2012. *National Diabetes Audit 2010-2011, Report 1: Care processes and Treatment Targets* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB06325/nati-diab-audi-10-11-care-proc-rep-V4.pdf> [Accessed 12 June 2015] p. 13
- <sup>33</sup> Health and Social Care Information Centre (HSCIC), 2014. *National Diabetes Audit 2012-2013, Report1: Care Processes and Targets* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB14970/nati-diab-audi-12-13-care-proc-rep.pdf> [Accessed 17 June 2015] p. 17
- <sup>34</sup> Ibid
- <sup>35</sup> Ibid
- <sup>36</sup> NHS Information Centre and Diabetes UK, 2012. *National Diabetes Audit 2010-2011, Report 1: Care processes and Treatment Targets* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB06325/nati-diab-audi-10-11-care-proc-rep-V4.pdf> [Accessed 12 June 2015] p. 15
- <sup>37</sup> Health and Social Care Information Centre (HSCIC), 2014. *National Diabetes Audit 2012-2013, Report1: Care Processes and Targets* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB14970/nati-diab-audi-12-13-care-proc-rep.pdf> [Accessed 17 June 2015] p. 17
- <sup>38</sup> Ibid
- <sup>39</sup> Ibid
- <sup>40</sup> NHS Information Centre and Diabetes UK, 2012. *National Diabetes Audit 2010-2011, Report 1: Care processes and Treatment Targets* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB06325/nati-diab-audi-10-11-care-proc-rep-V4.pdf> [Accessed 12 June 2015] p. 16
- <sup>41</sup> Health and Social Care Information Centre (HSCIC), 2014. *National Diabetes Audit 2012-2013, Report1: Care Processes and Targets* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB14970/nati-diab-audi-12-13-care-proc-rep.pdf> [Accessed 17 June 2015] p. 17
- <sup>42</sup> Ibid
- <sup>43</sup> Ibid
- <sup>44</sup> NHS Information Centre and Diabetes UK, 2012. *National Diabetes Inpatient Audit 2011* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB06279/nati-diab-inp-audi-11-nat-rep.pdf> [Accessed 17 June 2015] p. 21
- <sup>45</sup> Health and Social Care Information Centre (HSCIC), 2014. *National Diabetes Inpatient Audit 2013* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB13662/nati-diab-inp-audi-13-nat-rep.pdf> [Accessed 17 June 2015] p.43
- <sup>46</sup> Ibid
- <sup>47</sup> Ibid
- <sup>48</sup> HQUIP, NHS Information Centre and Diabetes UK, 2012. *National Diabetes Inpatient Audit 2011* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB06279/nati-diab-inp-audi-11-nat-rep.pdf> [Accessed 17 June 2015] p. 25
- <sup>49</sup> Health and Social Care Information Centre (HSCIC), 2014. *National Diabetes Inpatient Audit 2013* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB13662/nati-diab-inp-audi-13-nat-rep.pdf> [Accessed 17 June 2015] p.43
- <sup>50</sup> HQUIP, NHS Information Centre and Diabetes UK, 2012. *National Diabetes Inpatient Audit 2011* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB06279/nati-diab-inp-audi-11-nat-rep.pdf> [Accessed 17 June 2015] p. 21
- <sup>51</sup> Health and Social Care Information Centre (HSCIC), 2014. *National Diabetes Inpatient Audit 2013* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB13662/nati-diab-inp-audi-13-nat-rep.pdf> [Accessed 17 June 2015] p.26
- <sup>52</sup> Ibid
- <sup>53</sup> Ibid
- <sup>54</sup> Ibid
- <sup>55</sup> Ibid
- <sup>56</sup> Ibid
- <sup>57</sup> Health and Social Care Information Centre (HSCIC), 2014. *National Diabetes Inpatient Audit 2013* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB13662/nati-diab-inp-audi-13-nat-rep.pdf> [Accessed 17 June 2015] p.27
- <sup>58</sup> Ibid
- <sup>59</sup> Diabetes UK, 2013. *Fast track for a foot attack: Reducing amputations* [Online] Available at: [https://www.diabetes.org.uk/About\\_us/What-we-say/Specialist-care-for-children-and-adults-and-complications/Fast-Track-for-a-Foot-Attack-reducing-amputations/](https://www.diabetes.org.uk/About_us/What-we-say/Specialist-care-for-children-and-adults-and-complications/Fast-Track-for-a-Foot-Attack-reducing-amputations/) [Accessed 2 Jul 2015] p.3
- <sup>60</sup> Ibid
- <sup>61</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 8
- <sup>62</sup> Diabetes.co.uk. *Diabetes and Foot Care* [Online] Available at: <http://www.diabetes.co.uk/diabetes-footcare.html> [Accessed 24 July 2015]
- <sup>63</sup> National Institute for Health and Care Excellence, 2015. *Diabetic foot problems: prevention and management* [Online] Available at: <http://www.nice.org.uk/guidance/ng19/chapter/1-Recommendations#assessing-the-risk-of-developing-a-diabetic-foot-problem-2> [Accessed 16 November 2015]
- <sup>64</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 7
- <sup>65</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] pp. 7 and 43
- <sup>66</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 7
- <sup>67</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 43
- <sup>68</sup> Health and Social Care Information Centre, 2015. *National Diabetes Audit 2012-2013, Report 2: Complications and Mortality* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB16496/nati-diab-audi-12-13-rep2.pdf> [Accessed 27 July 2015] p. 23
- <sup>69</sup> Department of Health, 2001. *National Service Framework for Diabetes: Standards* [Online] Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/198836/National\\_Service\\_Framework\\_for\\_Diabetes.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/198836/National_Service_Framework_for_Diabetes.pdf) [Accessed 13 October 2015] p.10

- <sup>70</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 16
- <sup>71</sup> Diabetes UK, 2013. *Putting Feet First, Fast track for a foot attack: Reducing amputations* [Online] Available at: <https://www.diabetes.org.uk/Documents/Reports/putting-feet-first-foot-attack-report022013.pdf> [Accessed 2 Jul 2015] p.3
- <sup>72</sup> National Institute for Health and Care Excellence, 2015. *Diabetic foot problems: prevention and management, NICE guidelines [NG19]* [Online] Available at: <https://www.nice.org.uk/guidance/ng19/chapter/introduction> [Accessed 27 August 2015]
- <sup>73</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 16
- <sup>74</sup> Diabetes UK, 2013. *Putting Feet First, Fast track for a foot attack: Reducing amputations* [Online] Available at: <https://www.diabetes.org.uk/Documents/Reports/putting-feet-first-foot-attack-report022013.pdf> [Accessed 2 Jul 2015] p.3
- <sup>75</sup> Solli, O., Stavem, K., Kristiansen, I. S. (2010) 'Health-related quality of life in diabetes: The associations of complications with EQ-5D scores', *Health and Quality of Life Outcomes*, 8:18. [Online] Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2829531/> [Accessed 30 September 2015]
- <sup>76</sup> Ragnarson, G., Apelqvist, J. (2000) 'Health-related quality of life in patients with diabetes mellitus and foot ulcers', *Journal of Diabetes and its Complications*, 14 (5), pp. 235-241
- <sup>77</sup> Ragnarson, G., Apelqvist, J. (2000) 'Health-related quality of life in patients with diabetes mellitus and foot ulcers', *Journal of Diabetes and its Complications*, 14 (5), pp. 235-241
- <sup>78</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 13
- <sup>79</sup> Diabetes UK. *Putting feet first* [Online] Available at: <https://www.diabetes.org.uk/Documents/campaigning/Putting-feet-first-campaign.0213.pdf> [Accessed 12 June 2015] p.2
- <sup>80</sup> Health and Social Care Information Centre, 2014. *QOF 2013-14: Prevalence achievements and exceptions at region and national level for England* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB15751> [Accessed 21 October 2015]
- <sup>81</sup> National Institute for Health and Care Excellence, 2015. *Diabetic foot problems: prevention and management, NICE guidelines [NG19]* [Online] Available at: <https://www.nice.org.uk/guidance/ng19/chapter/introduction> [Accessed 27 August 2015]
- <sup>82</sup> Health and Social Care Information Centre, 2011. *Quality and Outcomes Framework - 2010-11. England level: prevalence data tables* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB05673> [Accessed 21 October 2015]
- <sup>83</sup> Health and Social Care Information Centre, 2012. *Quality and Outcomes Framework - 2011-12. England level: prevalence data tables* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB08661> [Accessed 21 October 2015]
- <sup>84</sup> Health and Social Care Information Centre, 2014. *QOF 2013-14: Prevalence achievements and exceptions at region and national level for England* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB15751> [Accessed 21 October 2015]
- <sup>85</sup> Ibid
- <sup>86</sup> Diabetets.co.uk. *Diabetes and Amputation* [Online] Available at: <http://www.diabetes.co.uk/diabetes-and-amputation.html> [Accessed 29 Jun 2015]
- <sup>87</sup> Diabetes UK, 2013. *Putting Feet First, Fast track for a foot attack: Reducing amputations* [Online] Available at: <https://www.diabetes.org.uk/Documents/Reports/putting-feet-first-foot-attack-report022013.pdf> [Accessed 2 Jul 2015] p.3
- <sup>88</sup> National Institute for Health and Care Excellence, 2015. *Diabetic foot problems: prevention and management, NICE guidelines [NG19]* [Online] Available at: <https://www.nice.org.uk/guidance/ng19/chapter/introduction> [Accessed 27 August 2015]
- <sup>89</sup> Public Health England, 2015. *The NHS Atlas of Variation in Healthcare: Reducing unwarranted variation to increase value and improve quality* [Online] Available at: [http://www.rightcare.nhs.uk/atlas/RC\\_nhsAtlas3\\_HIGH\\_150915.pdf](http://www.rightcare.nhs.uk/atlas/RC_nhsAtlas3_HIGH_150915.pdf) [Accessed 30 September 2015] p. 115
- <sup>90</sup> Health and Social Care Information Centre, 2014. Dataset: Hospital procedures: lower limb amputations in diabetic patients: indirectly standardised rate, all ages, annual trend, P: *Period 2002/03 to 2011/12: Version 12 V1: Data file 27b 060ISR70P 12 V1 D.xls* [Online] Available at: <https://indicators.ic.nhs.uk/webview/index.jsp?v=2&submode=ddi&study=http%3A%2F%2Fhg-i-app-472.ic.green.net%3A80%2Fobj%2FStudy%2FP00295&mode=documentation&top=yes> [Accessed 17 June 2015]
- <sup>91</sup> Health and Social Care Information Centre, 2015. *National Diabetes Audit 2012-2013, Report 2: Complications and Mortality* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB16496/nati-diab-audi-12-13-rep2.pdf> [Accessed 30 September 2015] P. 11
- <sup>92</sup> Ibid
- <sup>93</sup> Health and Social Care Information Centre, 2014. *Quality and Outcomes Framework (QOF) – 2013-14* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB15751> [Accessed 14 October 2015]
- <sup>94</sup> Health and Social Care Information Centre, 2015. *National Diabetes Audit 2012-2013, Report 2: Complications and Mortality* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB16496/nati-diab-audi-12-13-rep2.pdf> [Accessed 30 September 2015] P. 9
- <sup>95</sup> Holman, N., Young, R. J., Jeffcoate, W.J., 2011. 'Variation in the recorded incidence of amputation of the lower limb in England', *Diabetologia*, 55 (7), p. 1920 [Online] Available at: <http://download.springer.com/static/pdf/301/art%253A10.1007%252Fs00125-012-2468-6.pdf?originUrl=http%3A%2F%2Flink.springer.com%2Farticle%2F10.1007%252Fs00125-012-2468-6&token2=exp=1441903598~acl=%2Fstatic%2Fpdf%2F301%2Fart%25253A10.1007%25252Fs00125-012-2468-6.pdf%3ForiginUrl%3Dhttp%253A%252F%252Flink.springer.com%252Farticle%252F10.1007%252Fs00125-012-2468-6~hmac=067de5175ee48d42832de91b57dc260b897c75d84eeb22204764bdeba0052dc2> [Accessed 10 June 2015]
- <sup>96</sup> Health and Social Care Information Centre, 2015. *National Diabetes Audit 2012-2013, Report 2: Complications and Mortality* [Online] Available at: <http://www.hscic.gov.uk/catalogue/PUB16496/nati-diab-audi-12-13-rep2.pdf> [Accessed 30 September 2015] P. 13
- <sup>97</sup> Khanolkar, M. P., Bain, S. C., Stephens, J. W., 2008. 'The diabetic foot', *Q J Med* [Online], 101 (9), p.626 Available at: <http://qjmed.oxfordjournals.org/content/qjmed/101/9/685.full.pdf> [Accessed 11 September 2015]
- <sup>98</sup> Public Health England, 2015. *The NHS Atlas of Variation in Healthcare: Reducing unwarranted variation to increase value and improve quality* [Online] Available at: [http://www.rightcare.nhs.uk/atlas/RC\\_nhsAtlas3\\_HIGH\\_150915.pdf](http://www.rightcare.nhs.uk/atlas/RC_nhsAtlas3_HIGH_150915.pdf) [Accessed 30 September 2015] p. 115
- <sup>99</sup> Diabetes UK. *Putting feet first* [Online] Available at: <https://www.diabetes.org.uk/Documents/campaigning/Putting-feet-first-campaign.0213.pdf> [Accessed 12 June 2015] p.1
- <sup>100</sup> Diabetes Update. 2012. *Feature, Putting Feet First* [Online] Available at: <https://www.diabetes.org.uk/upload/professionals/publications/spring%202012/footcare.pdf> [Accessed 12 June 2015] p.20
- <sup>101</sup> Diabetes UK, 2013. *Putting Feet First, Fast track for a foot attack: Reducing amputations* [Online] Available at: <https://www.diabetes.org.uk/Documents/Reports/putting-feet-first-foot-attack-report022013.pdf> [Accessed 2 Jul 2015] p.3

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<sup>102</sup> NHS Diabetes, 2012. *Foot Care for People with Diabetes: The Economic Case for Change* [Online] Available at: <https://www.diabetes.org.uk/Documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> [Accessed 2 Jul 2015] p. 7

<sup>103</sup> Ibid