A case control study of use of the Failed Access Score for determination of failed access to structured diabetes care: the WICKED project

Abstract
Failure of access to structured diabetes care is associated with adverse outcome. There is no known validated data tool to identify access failure and thus we have developed a Failed Access Score (FAS) and have examined its associations.

The FAS is part of the WICKED project (Wolverhampton Interface Care, Knowledge Empowered Diabetes), and consists of three key care processes in diabetes: namely HbA1c, urinary albumin:creatinine ratio and retinal screening. A retrospective case control study in a single GP practice was undertaken on all the patients (n=478) failing two or more parameters over 15 months. They were compared to those with no access failure matched for age, gender, ethnicity and type of diabetes.

Among the 51 cases with a FAS ≥2, two or three process measures were absent in 84% and 16% respectively. Excluding service failure, this was due to non-attendance in 35% but otherwise associated with other clinical constraints in 41% (mental health, house bound, palliative care, multi-morbidity) and their deprivation index was significantly higher (p<0.01). Extrapolating to the whole health economy (n=16 644), 2362 (14%) would have a FAS of ≥2 of whom 968 (6%) would have failed access in association with these constraints.

In conclusion, it is possible to identify people who are failing access to structured diabetes care using readily available data calculated as the FAS score. Failed access is not usually due to patient default or disengagement but rather, in almost 65%, either due to significant clinical disadvantage or pure failure of service. Copyright © 2014 John Wiley & Sons.

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Key words
access; diabetes; care delivery

Introduction
Diabetes care is a growing concern in a financially challenged NHS.1 To achieve the benefits of structured diabetes care, patients must access it.2 Despite heavy diabetes expenditure,3 the National Diabetes Audit shows4 that diabetes processes are not being fully delivered. Lack of access to diabetes care is a crucial component of that failure.5 Access, and equity of access, to care is not only a fundamental ethical principle in any health care system,6,7 but failure of access is associated with adverse outcome.8,9 Access to health care has been defined in various ways ranging from a narrow concept of service entry10 to the multi-dimensional concept of uptake, process, quality, availability and utilisation of the service.11 Determining and addressing factors resulting in poor patient access might improve health care delivery and outcomes. Significant variables associated with failed access are well recognised and include ethnicity11 and deprivation.12 However, mechanisms for targeting individuals with access failure, over and above simple call–recall systems, and understanding and addressing crucial constraints are not systematically in place.

There is no known validated tool to identify failed patient access to diabetes health care. Within the validation process of our local diabetes data set,13 a scoring system was used to assess the level of access of patients to diabetes services – predominantly as a mechanism to determine those who were or were not still active participants in local diabetes care in order to maintain the epidemiological accuracy of the local diabetes register. We have now undertaken a case control study of patients with diabetes, identifying and comparing those with complete or incomplete access criteria according to this score, the Failed Access Score (FAS).
The objective of this study is to determine whether this score identifies access failure that can be attributed to identifiable factors among individuals with diabetes.

**Methods**

**The Failed Access Score**

The FAS consists of three key care processes in diabetes: namely HbA1c, urinary albumin:creatinine ratio (ACR) and retinal screening. This maps to all domains of diabetes care processes in the form of: a blood test (HbA1c) — meaning that all blood tests could have been done; a urine test (ACR) — meaning that the patient attended a clinical appointment so that all clinical measures could have been completed; and a retinal screening test — confirming that the patients are in receipt of communication and able to engage in self-care. Each of these parameters is universally captured in the central database wherever undertaken, whereas others may not be (e.g. weight, blood pressure etc.). Completion of all three processes is indicative that the patient has access to the service and engaged to the extent that enough opportunity existed for the health services to complete all nine key care processes in diabetes. Failure of any one parameter over the preceding 15 months was scored 1. A score of zero meant that all three parameters were completed, while a score of 3 meant maximal failure of access such that none of the three parameters were completed and there was no access to the service.

**Study sample**

The study was undertaken in a single, large inner city GP practice. A retrospective case control study was undertaken on all the patients in this practice who failed more than one FAS parameter in the last 15 months meaning they had a FAS of 2 or 3. They were compared to those with no access failure (FAS = 0) matched for age, gender, ethnicity and type of diabetes as controls. All data were extracted from EMIS-Web primary care computer system. All identified factors were categorised either as patient or service related. Patient related factors were further subdivided into: those related to non-attendance, care refusal or unavailability (moved away); or clinical and social issues that were a barrier to the patient attending (palliative care, house bound, mental health issues, multiple comorbidities, language barrier). Service related factors simply represent pure service failure in otherwise attending patients.

**Whole population analysis**

Further analysis was undertaken on the whole district population using data in our local integrated diabetes information system. This did not contain sufficient detail to drill down to constraints identifiable at the individual level as identified in the single practice survey.

**Statistical analysis**

This was undertaken on SPSS version 20. Statistical tests were considered significant at p<0.05.

**Results**

From a practice size of 6322, there were 478 registered with diabetes (prevalence 7.6%) of whom 51 were identified with partial or complete access failure by a FAS score of 2 or 3 (n=43 [84%] and n=8 [16%] respectively). Among the 51 cases; ACR was missing in 72%; HbA1c in 42%; retinal screening in 34%. The demographic characteristics of the cohorts are presented in Table 1. The groups were matched for all a-priori selected demographic criteria but in post-hoc analysis the failed access group had a higher deprivation score.

Reasons for access failure are given in Table 2.

The service failed to complete the processes of diabetes in those who were regularly attending in 12 patients (24%).

Eighteen (35%) patients had not attended despite documented multiple recall communications or had moved away, and we judged the practice could not have done more about these.

However, 21 (41%) patients were constrained from access because of poor mobility, mental health issues, palliative or end of life care or comorbidities. Excluding those where service failure caused access failure, among 59 patients compared to controls, there was a significant difference in the proportional distribution of those constraints (χ²=49.9, p<0.001) with a greater number of those house bound, with mental health issues, or in palliative care, although multiple morbidity in its own right was not associated with access failure.

In the whole local health economy (Wolverhampton Clinical Commissioning Group), there were 16 644 registered patients with diabetes and their demographic and other data are given in Table 3. With increasing FAS there were significant rises in age, male gender
and deprivation score and a decrease in the prevalence of type 2 diabetes or, conversely, an increase in the prevalence of type 1 diabetes. Ethnicity data were incompletely recorded, but where known the association with increasing failures of access was nevertheless significant and the prevalence of non-Caucasian ethnicity rose to 36% with a FAS of 3 from a baseline of 18% in those with a FAS of zero and/or in the whole population. In regression analysis these factors were all significantly associated with the FAS ($\chi^2=303.9, p<0.001$) but they explained very little of the variance in FAS – about 2% ($r^2=0.018$) – such that the model was incapable of predicting individual access failure (<1% accuracy). Extrapolating the findings from a single practice to the 2362 patients across Wolverhampton with FAS of 2 or 3, there would have been 567, 827, and 968 patients with access failure due to service failure, repeated non-attendance, or co-existing clinical or social issues, respectively.

**Discussion**

We have demonstrated that readily available data can be easily used to identify people with diabetes who have failed access to structured diabetes care. Having flagged this risk, we have proposed a framework for the categorisation of the primary factors leading to access failure: service failure, non-attendance or patient related clinical and social issues. In the latter category, a further classification substructure emerges that indicates the prime reasons that might well require a specific individualised care plan.

To execute this process requires a model of care that is integrated across NHS providers, and organisational and care pathway divides. The WICKED (Wolverhampton Interface Care, Knowledge Empowered Diabetes) project aspires to be a system of structured diabetes care that is patient centric. This shifts the

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**Table 2. Constraints to access to diabetes care identified in cases and control groups (number [%])**

<table>
<thead>
<tr>
<th>Category</th>
<th>Controls</th>
<th>Cases</th>
<th>Service failure</th>
<th>Non-attenders</th>
<th>Identified clinical or social issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>No constraint</td>
<td>51</td>
<td>51</td>
<td>12 (24%)</td>
<td>18 (35%)</td>
<td>21 (41%)</td>
</tr>
<tr>
<td>Process failure</td>
<td>0</td>
<td>0</td>
<td>12 (24%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Process non-responder</td>
<td>0</td>
<td>0</td>
<td>13 (25%)</td>
<td>13 (72%)</td>
<td>13 (72%)</td>
</tr>
<tr>
<td>Moved</td>
<td>0</td>
<td>0</td>
<td>5 (10%)</td>
<td>5 (28%)</td>
<td>5 (28%)</td>
</tr>
<tr>
<td>Language barrier</td>
<td>0</td>
<td>0</td>
<td>1 (2%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>House bound</td>
<td>0</td>
<td>0</td>
<td>6 (12%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Multi-morbidity</td>
<td>2 (4%)</td>
<td>1 (2%)</td>
<td>1 (2%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mental health</td>
<td>7 (14%)</td>
<td>1 (2%)</td>
<td>6 (12%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Palliative care</td>
<td>3 (6%)</td>
<td>8 (16%)</td>
<td>5 (10%)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Table 3. Whole district analysis of factors associated with the Failed Access Score (FAS). (Mean ± SD or number [%])**

<table>
<thead>
<tr>
<th>Category</th>
<th>All</th>
<th>FAS = 0</th>
<th>FAS = 1</th>
<th>FAS = 2</th>
<th>FAS = 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>64±15</td>
<td>65±14</td>
<td>63±16</td>
<td>61±18</td>
<td>58±17</td>
</tr>
<tr>
<td>Male</td>
<td>9030 (54%)</td>
<td>5558 (54%)</td>
<td>2121 (53%)</td>
<td>815 (53%)</td>
<td>475 (58%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>4550 (27%)</td>
<td>2954 (29%)</td>
<td>1069 (27%)</td>
<td>367 (24%)</td>
<td>160 (20%)</td>
</tr>
<tr>
<td>Asian</td>
<td>2104 (13%)</td>
<td>1307 (13%)</td>
<td>456 (11%)</td>
<td>186 (12%)</td>
<td>155 (19%)</td>
</tr>
<tr>
<td>Black</td>
<td>699 (4%)</td>
<td>427 (4%)</td>
<td>147 (4%)</td>
<td>76 (5%)</td>
<td>49 (6%)</td>
</tr>
<tr>
<td>Other</td>
<td>216 (1%)</td>
<td>49 (1%)</td>
<td>37 (1%)</td>
<td>41 (3%)</td>
<td>89 (11%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>9075 (53%)</td>
<td>5546 (54%)</td>
<td>2290 (57%)</td>
<td>877 (57%)</td>
<td>362 (44%)</td>
</tr>
<tr>
<td>Type 2 diabetes</td>
<td>15675 (94%)</td>
<td>9720 (95%)</td>
<td>3746 (94%)</td>
<td>1454 (94%)</td>
<td>755 (93%)</td>
</tr>
<tr>
<td>Deprivation score</td>
<td>35±16</td>
<td>34±16</td>
<td>35±16</td>
<td>37±16</td>
<td>37±16</td>
</tr>
<tr>
<td>HbA1c missing</td>
<td>1838 (11%)</td>
<td>286 (7%)</td>
<td>737 (48%)</td>
<td>815 (100%)</td>
<td>815 (100%)</td>
</tr>
<tr>
<td>Urinary albumin:creatinine ratio missing</td>
<td>4616 (28%)</td>
<td>2372 (59%)</td>
<td>1429 (92%)</td>
<td>815 (100%)</td>
<td>815 (100%)</td>
</tr>
<tr>
<td>Retinal screening missing</td>
<td>3084 (18%)</td>
<td>1341 (34%)</td>
<td>928 (60%)</td>
<td>815 (100%)</td>
<td>815 (100%)</td>
</tr>
</tbody>
</table>

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notion of integration of care provision from between services to integration around the patient.15–17 Crucial to this is data integration17 and the effective use of those data to target patients at risk. Achieving access is a key objective.10 In simplistic terms, process and outcome cannot be delivered without access. Access failure may relate to service structure, capacity, accessibility, availability and efficiency,10 or a number of patient related factors such as language, culture, social capital, social status and deprivation as well as physical and mental health.18–20 What is clear is that it is not easy to predict access failure.21 Yet failure of access is clearly associated with adverse outcomes,21,22 although whether enhancing access improves outcome is not clear. As a single measure, we demonstrate that the FAS can be used to identify and target actual access failure. This permits access attainment to become a hard outcome that can be subject to review, audit, governance and performance management.

Further simple data drill down can determine those in whom service failures have occurred and those who do not wish to access the service.23 Regarding the latter, it is the choice of an informed and competent adult as to whether to engage or disengage with health care services. This choice may be influenced by many factors, but any such choice should be respected.25 We emphasise that a health care service must ensure that a person is fully aware of the consequences of disengagement before labelling them as having informed disengagement, and that it is not the intention of the FAS to simply identify those who are to be exempted from care. The FAS can identify such patients and help get beyond the simple concept of ‘default’.

The FAS particularly applies to those identified with associated social and medical problems. Mental health problems were found to be the most common of these constraints as is well known.18,24 The other important groups were the house bound, those with comorbidities or those in palliative care. It was interesting to note that, when compared with the control group, comorbidities alone did not affect access until it was associated with dependency,25 and it is clear that such patients require an individualised care plan.20

**Conclusion**

We demonstrate that it is possible to identify people who are failing access to structured diabetes care using readily available data as the FAS score. The cause of access failure can then be determined. Failed access is not usually due to patient default but rather, in almost 65%, either due to significant clinical disadvantage or pure failure of service.

**Declaration of interests**

There are no conflicts of interest declared. Funding source: none.

**References**


