


## ORIGINAL PAPER

# Assessing the quality of primary care referrals to surgery of patients with diabetes in the East of England: A multi-centre cross-sectional cohort study

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## Summary

**Aim:** Peri-operative hyperglycaemia is associated with an increased incidence of adverse outcomes. Communication between primary and secondary care is paramount to minimise these harms. National guidance in the UK recommends that the glycated haemoglobin (HbA1c) should be measured within 3 months prior to surgery and that the concentration should be less than 69 mmol/mol (8.5%). In addition, national guidance outlines the minimum dataset that should be included in any letter at the time of referral to the surgeons. Currently, it is unclear how well this process is being carried out. This study investigated the quality of information being handed over during the referral from primary care to surgical outpatients within the East of England.

**Methods:** Primary care referrals to nine different NHS hospital Trusts were gathered over a 1-week period. All age groups were included from 11 different surgical specialties. Referral letters were analysed using a standardised data collection tool based on the national guidelines.

**Results:** A total of 1919 referrals were received, of whom 169 (8.8%) had previously diagnosed diabetes mellitus (DM). However, of these, 38 made no mention of DM in the referral letter but were on glucose-lowering agents. Only 13 (7.7%) referrals for patients with DM contained a recent HbA1c, and 20 (11.8%) contained no documentation of glucose-lowering medication.

**Conclusion:** This study has shown that the quality of referral letters to surgical specialties for patients with DM in the East of England remain inadequate. There is a clear need for improving the quality of clinical data contained within referral letters from primary care. In addition, we have shown that the rate of referral for surgery for people with diabetes is almost 50% higher than the background population with diabetes.

## 1 | INTRODUCTION

Diabetes mellitus (DM) is the most commonly occurring metabolic disorder in the UK. In 2013, data suggested that the prevalence of patients with diagnosed DM in England among all age groups was 5.9%, a figure that had risen 31% since 2009.<sup>1</sup> In addition, it has been estimated that DM accounts for 10% of the entire budget of the UK National Health Service.<sup>2</sup> The 2015 National Diabetes Inpatient Audit (NaDIA) showed that 16.8% of all UK inpatient hospital beds were occupied by someone with diabetes, a relative increase of 15% since 2010.<sup>3</sup> This is not to say that they were in hospital *because* of their diabetes, but happened to have it *in addition* to their primary underlying diagnosis—no matter what the speciality. However, surgical patients with DM have increased peri-operative morbidity, longer hospital length of stay and greater use of healthcare resources.<sup>4-8</sup>

The process of managing a patient with DM undergoing surgery can be subdivided, following the patient journey. This journey starts with a primary care referral to the surgeon. The next step is the surgical outpatient appointment, and once the decision has been made that an elective procedure is required, the patient is often seen in a preoperative assessment clinic. Soon afterwards, the patient is admitted to hospital to have their procedure when they are in the operating theatre, the recovery room and possibly on the wards. After their postoperative recovery, they are discharged home.<sup>9</sup>

Previous work has shown that standards of in-hospital care for patients with DM during their peri-operative journey remain suboptimal and that there is room for substantial improvement.<sup>10</sup> To try and improve things, there are national recommendations for the minimum dataset that should be included in the primary care referral for a patient with DM who is being considered for surgery. These are listed in Table 1.<sup>9</sup> However, to date there are no data to assess whether part of the suboptimal care could be because of a lack of information passed from primary to secondary care.

The present study was aimed at the first step in this process to assess the quality of information contained in referral letters from primary care to surgical outpatients.

## 2 | MATERIALS AND METHODS

We collected data on every primary care surgical referral sent to nine National Health Service Trusts in the East of England between 28 July 2014 and 3 August 2014. These hospitals are listed in Table 2. Data were collected using a standardised form (Figure 1). This was designed to reflect whether the specified minimum information was provided according to the UK national guideline on the management of adults with DM undergoing surgery and elective procedures.<sup>9</sup> All general surgical subspecialties (gastrointestinal, vascular, endocrine and breast) as well as trauma and orthopaedics, obstetrics and gynaecology, ear, nose and throat (ENT), plastic surgery, neurosurgery, paediatric and maxillofacial surgery were included. All GP referral letters

### What's known

- Previous work has shown that, in the hospital setting, effective communication between the healthcare professionals, and between the healthcare professionals and the people with diabetes helps to improve outcomes.
- There are UK national guidelines on the management of adult patients with diabetes undergoing surgery. These include a recommended amount of information that should be passed from primary care to the surgeons at the time of referral. No work has been done looking at the quality of this communication

### What's new

- Our data show that the quality of referral letters could be improved with appropriate clinical information, to facilitate better clinical care, and that a lot of information that should be in the letter (including that the patient has diabetes) is not included. Thus, at the very first stage of the patients' surgical journey, there is room for improvement in the communication between primary and secondary care.
- In addition, we have shown that the rate of referral for surgery for people with diabetes is almost 50% higher than the background population with diabetes.

of patients with previously diagnosed DM or treated with glucose-lowering agents were identified.

## 3 | RESULTS

Across the nine centres that participated in this study, data were collected for 1919 primary care referrals to surgery (Table 2). They included 1053 women, 851 men and 15 patients with gender not documented. The median age was 53 years (range 6 weeks to 98 years).

The number of referrals received for each surgical specialty, including the number of patients with DM, is shown in Table 3. The majority of referrals were to trauma and orthopaedics, followed by general surgery and ENT. The highest proportion of patients with DM was referred to the vascular surgeons, reflecting the increased cardiovascular disease burden in the population with DM.

One hundred and sixty-nine referrals (8.8% of all referrals) were for patients with DM. As can be seen in Table 4, 117 (69.2%) were documented as having type 2 DM, 24 (14.2%) were documented as having type 1 DM and in 38 (22.5%), there was no documentation of the type of DM in the referral letter but were on glucose-lowering agents. In addition, there were several key biochemical and physical examination findings that were not included in the referral letter, including almost half (49.7%) containing no documentation of DM-related comorbidities such as pre-existing hypertension, ischaemic heart disease,

**TABLE 1** Minimum dataset recommended for GP letter with recommendations for referral of patients with DM for surgery

Up to date current DM care	Duration and type of DM Place of usual DM care (primary or secondary care) Other comorbidities Treatment <ul style="list-style-type: none"> <li>• For DM: Oral agents/insulin doses and frequency</li> <li>• For other comorbidities</li> </ul>
Specific complications of DM	At risk foot Renal impairment Cardiac disease
Recent values for	Body mass index (BMI) Blood pressure Glycated haemoglobin (HbA1c) Estimated glomerular filtration rate (eGFR)

DM, diabetes mellitus. Taken from reference.<sup>9</sup>

**TABLE 2** Number of surgical referrals by hospital Trust

Hospital	Number of surgical referrals received (%)
Addenbrooke's Hospital NHS Trust	135 (7.0)
Bedford Hospital NHS Trust	93 (4.8)
Hinchingbrooke Health Care NHS Trust	113 (5.9)
Luton and Dunstable University Hospital NHS Trust	44 (2.3)
Norfolk and Norwich University Hospitals NHS Trust	751 (39.1)
Queen Elizabeth Hospital Kings Lynn NHS Trust	189 (9.8)
West Suffolk NHS Foundation Trust	155 (8.1)
Mid Essex Hospital Services NHS Trust	360 (18.8)
Peterborough City Hospital NHS Trust	79 (4.1)

neuropathy, foot disease or renal disease. Furthermore, in 11.8% of referrals, no documentation of oral hypoglycaemic or insulin-based medication was provided.

## 4 | DISCUSSION

This study has shown that the quality of referral letters from primary care to all surgical specialties for people with DM across the East of England could be improved with appropriate clinical information to facilitate better clinical care. Most letters did not contain the information recommended by the UK national guideline on the management of adults with DM undergoing surgery and elective procedures.<sup>9</sup> We have also shown that the prevalence of DM among patients referred for elective surgery was almost 50% higher than the prevalence in the general UK population (8.8% vs 5.9%).

The many stages of the patient journey from primary care referral to discharge home after an operation are fraught with difficulties for the patients with long-term conditions such as diabetes. There are many studies that demonstrate the association between poor peri-operative glycaemic control and adverse outcomes after all forms of surgery in patients with DM.<sup>11-16</sup> What is currently lacking however, is the data to show that intervention is associated with a reduction in harms.<sup>17</sup> However, the premise is that the achievement of good glucose control is likely to be associated with better outcomes. Key to achieving this is appropriate, timely and accurate communication between the relevant parties at each stage of the journey. Recent work has been done looking at parts of this journey within the hospital, in particular looking at developing a more patient centred approach to care.<sup>10</sup> This was because it was felt that this approach would contribute to a more positive patient experience, as well as delivering high-quality inpatient DM care.<sup>10,18,19</sup> Hommel et al. showed that the lack of appropriate handover of clinically important information related to DM was not limited to primary care, and that other parts of the patient journey also required improvement to increase peri-operative safety.<sup>10</sup> However, this work was done looking at communication within the hospital, but none has been done looking at the first stage in the patient journey, the referral from primary care to the surgeons.

Our data showed that in over 20% of cases, people with DM (identified by the medications they were taking), had no mention of the condition in their referral letter. The use of the electronic referral letter, with the past history and current drug list automatically generated should help to reduce this lack of data, but currently is not universally used. Anaesthetists and surgeons are aware that this information materially affects preoperative planning of elective surgery, eg, placing a person with diabetes at the start of an operating list to minimise their starvation time, and minimises the risk of inpatient management errors.<sup>20</sup> With the extensive data now showing that peri-operative hyperglycaemia is associated with harm, and that the awareness that someone has diabetes prior to their procedure helps to minimise any potential harms, HbA1c should be part of this standard information.<sup>21</sup> Ideally, all of this information should be transferred at the time of referral and not left to be collected in the few days prior to the operation at the time of the preoperative assessment clinic. This also dovetails with the principles of enhanced recovery programmes in surgery, which aim to optimise preoperative health prior to surgery, thereby minimising hospital length of stay.<sup>22</sup> In the current study, only 31.4% of the referred patients with DM had a recent blood pressure reading recorded in the referral letter, 27% had a recent BMI and only 7.7% had a documented recent HbA1c reading (ie, checked within the 3 months prior to referral). Recently published guidelines by NICE in the UK state that "people with diabetes who are being referred for surgical consultation from primary care should have their most recent HbA1c test results included in their referral information", also that "if the patient has not been tested in the last 3 months then HbA1c testing should be offered".<sup>21</sup>

Previous work has shown that people with diabetes were already being inappropriately refused day case surgery.<sup>23,24</sup> But it is not just poor glycaemic control that leads to last minute cancellations

**Data Collection Tool for  
Audit of Primary Care Referrals to Surgery for Patients with Diabetes across East Anglia**

*Please tick the relevant boxes*

**NHS Trust**..... **Hospital number** .....

**Gender**  Female  Male **Age** .....years

**1. Referral speciality (please tick)**  a) General surgery  b) Orthopaedic  
 c) Gynaecology  d) Other (*please state*) .....

**2. Please state anticipated procedure**  
 .....

**3. Is the diagnosis of diabetes mentioned in the referral letter?**  Yes  No  
*If 'No' is the patient taking any diabetes drugs (check 'cheat sheet')?*  Yes  No

<b>4. Type of diabetes</b>	<input type="checkbox"/> a) Type 1	<input type="checkbox"/> b) Type 2	<input type="checkbox"/> c) Not provided
<b>5. Place of usual diabetes care</b>	<input type="checkbox"/> a) Primary	<input type="checkbox"/> b) Secondary	<input type="checkbox"/> c) Not provided

<b>6. Duration of diabetes</b> ..... <input type="checkbox"/> months / <input type="checkbox"/> years <input type="checkbox"/> Not provided	<b>8. BMI</b> .....kg/m <sup>2</sup> <input type="checkbox"/> Not provided	<b>9. BP</b> ___/___ mm Hg <input type="checkbox"/> Not provided
<b>7. Comorbidity</b>		<b>10. HbA1c (within the last 3 months)?</b>
a) <input type="checkbox"/> IHD	d) <input type="checkbox"/> Foot disease	a) <input type="checkbox"/> No <input type="checkbox"/> Yes <i>If 'Yes' what was the result?</i>
b) <input type="checkbox"/> ↑BP	e) <input type="checkbox"/> Neuropathy	b) .....% or ..... mmol/mol <input type="checkbox"/> Not provided
c) <input type="checkbox"/> Renal disease	f) <input type="checkbox"/> Not provided	<b>11. eGFR</b> ..... <input type="checkbox"/> Not provided

**Diabetes Treatment. Please tick the drugs that the patient is on**  Not known

<input type="checkbox"/> a) Acarbose	<input type="checkbox"/> e) Glibenclamide	<input type="checkbox"/> i) Linagliptin	<input type="checkbox"/> m) Nateglinide	<input type="checkbox"/> q) Sitagliptin
<input type="checkbox"/> b) Dapaglifozin	<input type="checkbox"/> f) Gliclazide	<input type="checkbox"/> j) Liraglutide	<input type="checkbox"/> n) Pioglitazone	<input type="checkbox"/> r) Tolbutamide
<input type="checkbox"/> c) Exenatide	<input type="checkbox"/> g) Glimeperide	<input type="checkbox"/> k) Lixisenatide	<input type="checkbox"/> o) Repaglinide	<input type="checkbox"/> s) Vildagliptin
<input type="checkbox"/> d) <b>INSULIN</b>	<input type="checkbox"/> h) Glipizide	<input type="checkbox"/> l) Metformin	<input type="checkbox"/> p) Saxagliptin	<input type="checkbox"/> t) <b>NONE</b>

**FIGURE 1** The data collection tool used

**TABLE 3** Number of surgical referral and proportion of referrals with DM by specialty

Subspecialties	Number of referrals	Patients with DM (%)
Vascular surgery	54	13 (24.1%)
General surgery	419	53 (12.6%)
Maxillofacial surgery	9	1 (11.1%)
Trauma and orthopaedics	459	47 (10.2%)
Urology	195	16 (8.2%)
Plastic surgery	126	7 (5.6%)
Obstetrics and Gynaecology	205	10 (4.9%)
Breast surgery	84	4 (4.8%)
Ear, nose and throat	353	13 (3.7%)
Neurosurgery	1	0 (0%)
Paediatric surgery	7	0 (0%)
No data	7	0 (0%)

of elective surgery. A recent paper highlighted the importance of preoperative medical optimisation for hypertension to avoid such cancellations.<sup>25</sup>

Information on hypertension, other DM-related comorbidities and medical management of glycaemic control was also lacking in many referral letters. Almost half of all referrals had no documentation of DM-related comorbidities such as hypertension, ischaemic heart disease, neuropathy, foot disease and renal disease. This may well have been for two reasons: Firstly, because the patients did not have any comorbidities, but there were a number of people who did have significant comorbidities which were picked up because of the medication they were on. These comorbidities were not listed in the referral letters. Secondly, we feel that this is one of those situations when a mention should be made of 'relevant negatives'. Several comorbidities are much more common in people with diabetes, and these can make a material difference to how the patients are managed by the surgeon, the anaesthetist and the nursing staff.

Also 11.8% of referrals had no documentation of insulin or oral hypoglycaemic medication usage. It is possible that these were people with diet-controlled diabetes. The individual patient notes were not examined to see if this was the case. However, all patients with diabetes should be regarded as high risk and therefore appropriate peri-operative measures should be taken to minimise risk and anticipate potential complications such as hyper or hypoglycaemia, misuse of insulin and errors associated with converting i.v. insulin infusion to regular oral hypoglycaemic medication.<sup>9</sup> Previous work has shown that patients with DM often require referral to critical care for postoperative management.<sup>26</sup> They also require input from the specialist DM team because polypharmacy and complicated insulin regimes can put patients with DM at risk if not appropriately monitored.

Agents that are used to treat diabetes are very rarely used to treat any other conditions. An exception to this is metformin for polycystic ovarian syndrome but the numbers of people with this condition were

likely to be very small. Thus, when a diabetes drug was listed, it was assumed to be because the patient had diabetes.

Our data also highlight the need for increased awareness about the importance of DM among primary and secondary care teams. The recent decision by the UK National Institute for Health and Care Excellence (NICE) to ensure that a recent HbA1c for people with diabetes is available preoperatively,<sup>21</sup> means that they recognise that there is an onus on primary care teams and surgeons to ensure that (1) they know who has diabetes, and (2) that this information is passed on between stages in the patient journey, not just at the time of referral.

The higher rate of referrals for patients with diabetes when compared with the background population is consistent with previous studies which demonstrated an over-representation of patients with DM undergoing surgery.<sup>20,22</sup> The phenomenon was more pronounced in referrals to vascular surgery where 24.1% of referrals were for patients with DM, possibly reflecting the higher cardiovascular disease burden these patients carry.

The strength of these data is that they were collected from a very wide geographical area across the East of England, from nine different hospitals. These included large teaching hospitals as well as much smaller district general hospitals. The data were collected based on the UK national guidelines and included data on referrals made to all surgical specialities, and thus should be applicable to most situations in the UK and further afield.

The limitations of the data are that the data collection period was only for one week. While we tried to ensure that all the referrals were captured, and we had several mechanisms in place to ensure this was the case (including interrogating the electronic databases of each institution), there may have been some that we missed. However, we believe that this is unlikely to have made a material difference to our findings. It is also worth noting that a substantial proportion of surgical referrals resulted in conservative management or surgery was deemed inappropriate. For those that did go on to have surgery, we did not have outcome data on these individuals. However, that was not the intention of this study. In addition, there are conflicting data on the significance of poor peri-operative glycaemic control and surgical outcomes. A recent systematic review of 20 studies including 19 514 patients with DM showed no association between elevated preoperative HbA1c and increased postoperative morbidity and mortality.<sup>27</sup> The authors of the study did, however, state that analysis was difficult because of the heterogeneity of the studies included. Nevertheless, UK national guidance recommends that primary care teams should be aiming for an HbA1c less than 69 mmol/mol where it is possible to achieve.<sup>9</sup>

These findings are not to be taken as a criticism of primary care teams. As healthcare professionals whose primary concern is the common goal of the well-being and safety of the patients under our care, this service improvement exercise was just that—an attempt to identify where the gaps in care lie along this initial part of the patient journey. The next logical stage would be to try and improve the communication gap we have identified. We are aware that many referrals are now made electronically, with much of the data that is recommended to

	Number of referrals with information included in referral letter about DM (%)	Median (range)
Type of DM		
Type 1	14 (8.3)	-
Type 2	117 (69.2)	-
Not documented	38 (22.5)	-
Place of care for DM management		
Primary care	24 (14.2)	-
Secondary care	7 (4.1)	-
Not documented	138 (81.7)	-
DM related clinical information		
Systolic blood pressure	53 (31.4)	134 mm Hg (101-169 mm Hg)
Body mass index	46 (27.0)	31.3 kg/m <sup>2</sup> (19-45.8)
HbA1c	13 (7.7)	64 mmol/mol (43-98 mmol/mol) <sup>a</sup>
eGFR	11 (6.5)	64 mL/mol (20-90 mL/mol)
Comorbidities <sup>b</sup>		
One comorbidity	44 (26.0)	-
Two comorbidities	27 (16.0)	-
Three comorbidities	12 (7.1)	-
Four comorbidities	2 (1.2)	-
Not documented in referral letter	84 (49.7)	-
Treatment		
Oral hypoglycaemics alone	88 (52.1)	-
Insulin alone	19 (11.2)	-
Insulin and oral hypoglycaemics	18 (10.7)	-
None	24 (14.2)	-
Not provided	20 (11.8)	-

<sup>a</sup>64 mmol/mol (43–98 mmol/mol)=8.0% (6.1%–11.1%). <sup>b</sup>Comorbidities include one or more of hypertension, ischaemic heart disease, neuropathy, foot disease and renal disease.

be included now being so. However, this still relies on up to date biochemistry being done.

Another reason why early identification of people with diabetes is important is because of data showing that it is those people with previously diagnosed diabetes who do better than those who have previously unidentified hyperglycaemia.<sup>28,29</sup> Thus, the very knowledge that someone has diabetes, regardless of glycaemic control, makes a material difference to outcomes.

This study is the first to examine the quality of care at the start of the patient journey. It is one of the many steps along the way where appropriate, and comprehensive communication can reduce peri-operative morbidity and mortality. The next step in evaluating the management of peri-operative surgical patient with DM would be the assessment of processes carried out in surgical outpatients, the preoperative assessment clinic to determine the degree of

**TABLE 4** Summary of minimum dataset information for the 169 patients referred with diabetes mellitus

glycaemic optimisation of the patient with DM undergoing elective surgery.

## 5 | CONCLUSION

In summary, we have shown that the quality of diabetes-related information in letters from primary care teams for patients with diabetes referred for elective surgery in all specialities could be improved, with appropriate clinical information, to facilitate better clinical care. In addition, we have found that the proportion of patients with diabetes referred for surgery is almost 50% higher than would be expected if the rates were the same as the general population.

Further work needs to be done to improve the peri-operative care of the patient with diabetes undergoing a surgical procedure.



## DISCLOSURE

None.

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