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DIABETIC Medicine

POSITION STATEMENT

Optimal staffing for a good quality inpatient diabetes service

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Abstract

Introduction: Increasing numbers of people admitted to hospital have diabetes and need specialist support. To date, there is no mechanism which can help teams estimate the number of health care professionals they need to provide optimal care for people with diabetes in hospitals.

Methods: The Joint British Diabetes Societies (JBDS) for Inpatient Care Group organised a survey of specialist inpatient diabetes teams in the UK for current staffing and the perception of optimal staffing using mailing lists available through their representative organisations. The results were verified and confirmed by one-to-one conversations with individual respondents and discussed in multiple expert-group meetings to agree on the results.

Results: Responses were received from 17 Trusts covering 30 hospital sites. Current diabetes specialist staffing level per 100 people with diabetes in hospital (Median, IQR) for consultants was 0.24 (0.22–0.37), diabetes inpatient specialist nurses was 1.94 (1.22–2.6), dieticians was 0.00 (0.00–0.00), podiatrists was 0.19 (0.00–0.62), pharmacists was 0.00 (0.00–0.37), psychologists was 0.00 (0.00–0.00). The teams also reported that for optimal care the total staff needed for each group (Median, IQR) was much higher; consultants 0.65 (0.50–0.88), specialist nurses 3.38 (2.78–4.59), dieticians 0.48 (0.33–0.72), podiatrists, 0.93 (0.65–1.24), pharmacists, 0.65 (0.40–0.79) and psychologists 0.33 (0.27–0.58). Based on the results of the survey, the JBDS expert group produced an Excel calculator to estimate staffing needs of any hospital site in question just by populating a few of the cells.

Conclusion: Current inpatient diabetes staffing is much lower than needed in most Trusts who responded to the survey. The JBDS calculator can provide an estimate of the staffing needs of any hospital.

KEYWORDS

diabetes, inpatient care, Joint British Diabetes Society, staffing

1 | INTRODUCTION

The National Diabetes Inpatient Audit (NaDIA) report showed an increase in inpatient prevalence of diabetes over time from 14.5% in 2010 to 18.1% in 2019.[1] Moreover, the management of diabetes has become more complex with complex treatment regimens and increasing use of wearable technology.[2]

The presence of diabetes in hospitalised patients adversely affects outcomes compared to those without diabetes.[3] The NaDIA report has shown several improvements in the care of people with diabetes in hospitals in England and Wales.[1] The data, however, have also raised many concerns in relation to care, compliance with the recommendations of National Confidential Enquiry into Patient Outcome and Death (NCEPOD) in the perioperative care[4] and referrals as per ThinkGlucose criteria.[5] Similarly, the more recent National Diabetes Inpatient Safety Audit (NDISA)[6] has also found gaps in compliance with the recommendations of Getting it Right First Time (GIRFT)[7] (Table 1).

Among various factors that can hinder attainment of safe and optimal glycaemic outcomes for inpatients with diabetes,[8–10] lack of adequate specialist diabetes staffing remains a major one. The NDISA report[6] showed significant gaps in staffing provisions in addition to the gaps that were already known from NaDIA[1] (Table 2). This current staffing level is not compliant with the requirements and recommendations from NHS Long Term Plan,[11] NaDIA,[1] GIRFT,[7] NCEPOD,[4] Centre for Perioperative Care (CPOC)[12] or NaDIA – Harms.[13] Improved specialist diabetes staffing levels[14–18] and the resultant interventions from a multi-disciplinary team can improve care for people with diabetes.[19–27] Efforts to ascertain optimal staffing have been limited and have likely significantly underestimated the time and staffing required for the current workload associated with the increasing prevalence of inpatients with diabetes and the complexity of diabetes care.[28,29]

NaDIA showed that 41% of people with diabetes in hospital were referrable to the diabetes team as per ThinkGlucose criteria.[5] Although diabetes teams would like to support all inpatients with diabetes, increasing workload of general medicine, staffing gaps and vacancies might account for the 25% of people with diabetes in hospital who were not seen during the 2019 audit week even though they qualified for referral[1] The data from NaDIA 2017 has previously been used for an estimated calculation of the DISN requirement while acknowledging that some people will require more time and some less depending upon the complexity [diabetic ketoacidosis (DKA), HHS, enteral feeding, end of life care, new diagnosis, etc][16] but did not include any estimation of need for other members of the wider core team (consultants, dieticians, podiatrists, pharmacists and psychologists).

JBDS therefore felt that there was a need for urgent action to provide up to date estimates of the staffing needs to be able to provide a good quality inpatient diabetes service.

TABLE 1 Concerns regarding diabetes inpatient care from NaDIA 2019 data and NDISA 2022.

Concern	%	Source
Medications/insulin errors		
• Charts with at least one medication error	30%	NaDIA 2019
• Charts with one or more insulin errors	18%	NaDIA 2019
Harms		
• People with hospital acquired diabetic ketoacidosis	3.6%	NaDIA 2019
• People with type 1 diabetes having severe hypoglycaemia in hospital	27%	NaDIA 2019
Identification of at risk situations or patients		
• Hospitals where CBG was not being monitored as per recommendation of the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) in the perioperative period[4]	60%	NaDIA 2019
• Hospitals not identifying diabetes on admission and ensuring rapid referral as per recommendation 7 of GIRFT[7]	73%	NDISA 2022
Experience of people with diabetes		
• People with diabetes not satisfied with the staff awareness of diabetes	19%	NaDIA 2019
Care and training standards		
• Hospitals not providing training for safe insulin administration to all the relevant staff as per recommendation 8 of GIRFT[7]	28%	NDISA 2022
• People with diabetes in hospital not being seen by a member of diabetes team, even though considered appropriate on ThinkGlucose criteria. [Please see ThinkGlucose criteria[5]]	25%	NaDIA 2019
• Hospitals that have remote CBG monitoring but do not fully utilise it	18%	NaDIA 2019
• Hospitals that do not hold diabetes specific mortality and morbidity meetings	36%	NaDIA 2019
• Hospitals without any clear audited perioperative pathways in line with NCEPOD report as per recommendation 9 of GIRFT[7]	36%	NDISA 2022
• Hospitals with no policy or guidelines for self-administration of diabetes medications as per recommendation 10 of GIRFT[7]	28%	NDISA 2022

Note: National Diabetes Inpatient Audit (NaDIA) report– 2019.[1]
NDISA 2022 (from the 100 of the 145 providers submitting data).[6]
Abbreviations: CBG, capillary blood glucose; GIRFT, getting it right first time; NaDIA, national diabetes inpatient audit.

TABLE 2 Diabetes staffing levels in hospitals as per NaDIA[1] and NDISA[6] (Percentage of hospitals in England and Wales without specialists in different disciplines).

Staff/service	% of hospitals
No diabetes inpatient specialist nurses (DISNs)[1]	18
No inpatient dietetic provision[1]	65
No inpatient podiatry service[1]	18
No inpatient pharmacy service[1]	74
No access to 7-day diabetes inpatient specialist nurse provision[1]	83
No access to 7-day diabetes physicians' access[1]	76
No dedicated multi-disciplinary inpatient diabetes team (MDiTs) provision for weekend cover whether actual or even planned as per recommendation 5 of GIRFT[6]	41
No dedicated MDiTs meeting and reporting as per recommendation 6 of GIRFT[6]	66

2 | METHODS

JBDS convened a working group of 10 members including consultant doctors, specialist nurses, dieticians, podiatrists, pharmacists, psychologists, and users of service through Diabetes UK with others co-opted. The group met every month for 6 months (with electronic communication among members in-between) and reached a consensus informed by data collected from teams involved in inpatient care of people with diabetes. Where appropriate, the data were also discussed with other team members in different Trusts and further refined.

Actions and decisions taken during meetings:

1. An agreement of the importance of the question – "What is the optimal level of multidisciplinary staff needed to deliver a good quality inpatient diabetes service".
2. Agreement and then subsequent development of a schematic representation of the possible activities that different teams might be undertaking across the UK (See Figure 1).
3. Agreement and development of an Excel spreadsheet designed to help estimate the number of whole-time equivalent staff needed in different categories of staff, based on the average number of people with inpatient diabetes seen by different staff (See Appendices S1 and S2 which are a blank Excel calculator and a worked example Excel calculator).
4. Agreement and dissemination of the Word file text sent to different diabetes teams across the UK through all the available mailing lists of JBDS, Diabetes Times, Association of British Clinical Diabetologists, Diabetes UK and Young Diabetologists and Endocrinologists' Forum (Appendix S3).
5. Initial compilation of the data collected from various Trusts as a Word document or by using the Excel calculator that was sent as an example from a Trust.
6. Data analysis using Microsoft Excel descriptive statistics.
7. One-to-one Microsoft Teams meetings between the lead author and a member of the team from each Trust which submitted the data to clarify details and record the current number of staff and the number of staff needed in each category.
8. Alignment of the data collected with the existing JBDS calculator for diabetes inpatient specialist nurses[16] which has been used successfully in several areas for securing transformational funding from NHS England. In the East of England, the calculator had been used by each Trust to estimate their DISN requirements following which all Trusts received the required funding from transformation funds for any shortfall in DISNs. To date all Trusts, have their full complement of DISNs.
9. Development of a calculator to estimate the number of staff needed based on the responses from all the Trusts who submitted their data and aligning it with the already tested calculator for diabetes inpatient specialist nurses from JBDS.

3 | RESULTS

1. We sent our survey to all the Trusts and England and Wales. We presume that 145 Trusts must have received the survey.
2. We received responses from 17 Trusts covering 30 sites either in the Word format or using the Excel calculator that was sent as an example.
3. Some Trusts had more than one site and the responses covered all the sites.
4. The lead author clarified all the information understanding with all the respondents through a one-to-one Microsoft Teams meeting to develop consistency in responses.
5. The responses were entered into an Excel calculator comparing the current staffing (shown in red) of different Trusts who responded and the ideal staffing that they need (shown in green) (Appendix S4).
6. Summary results showing the current number of diabetes staff and the perceived number of staff need are included in Table 3.
7. Our results showed that all Trusts have less staff than they feel they require for optimal service. All Trusts

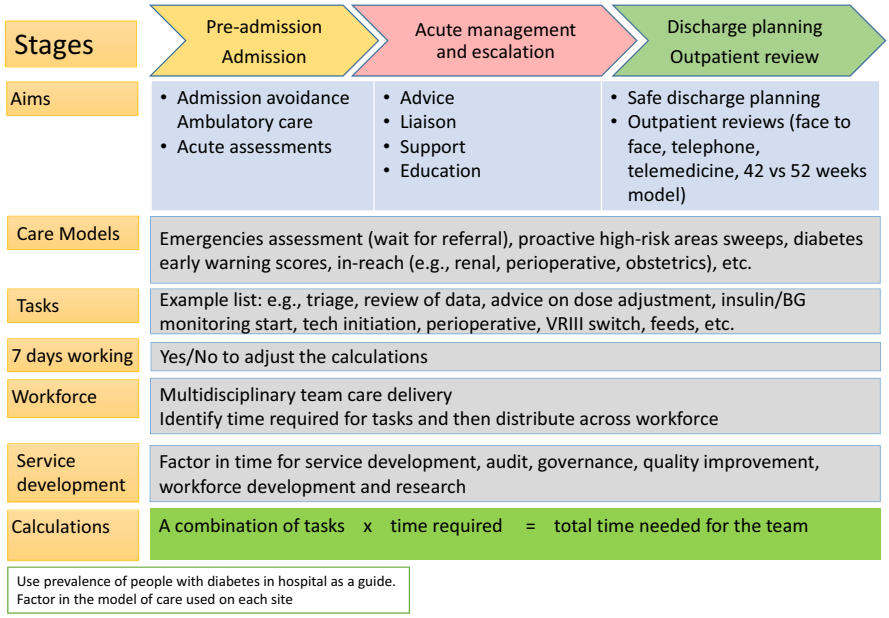


FIGURE 1 JBDS inpatient diabetes staffing requirements.

TABLE 3 Inpatient diabetes staffing (current vs ideal).

Staff group diabetes specialists	Number of staff per 100 people with diabetes in hospital	
	Current position, Median (IQR)	Numbers needed, Median (IQR)
Consultants	0.24 (0.22–0.37)	0.65 (0.50–0.88)
Specialist nurses	1.94 (1.11–2.6)	3.38 (2.78–4.59)
Dieticians	0.00 (0.00–0.00)	0.48 (0.33–0.72)
Podiatrists	0.19 (0.00–0.62)	0.93 (0.65–1.24)
Pharmacists	0.00 (0.00–0.37)	0.65 (0.40–0.79)
Psychologists	0.00 (0.00–0.00)	0.33 (0.27–0.58)

have fewer consultants and diabetes inpatient specialist nurses than they need.

8. Dedicated inpatient dieticians, podiatrists, pharmacists and psychologists are nearly non-existent despite all teams feeling that they are essential for the service and should be part of the diabetes inpatient team.
9. Some centres may have a higher proportion of inpatients with diabetes by being regional/national centres for example of vascular, renal, cardiac or liver services. It might also be the case that the communities served by some centres have a higher % of diabetes and/or wider determinants of health. This may explain higher need of staffing in the survey results from these centres.
10. Based on the individual results obtained from these Trusts and after discussion within the JBDS writing group, a calculator was designed and agreed upon to estimate the staffing needs of different hospitals.

3.1 | JBDS calculator for estimating staffing need

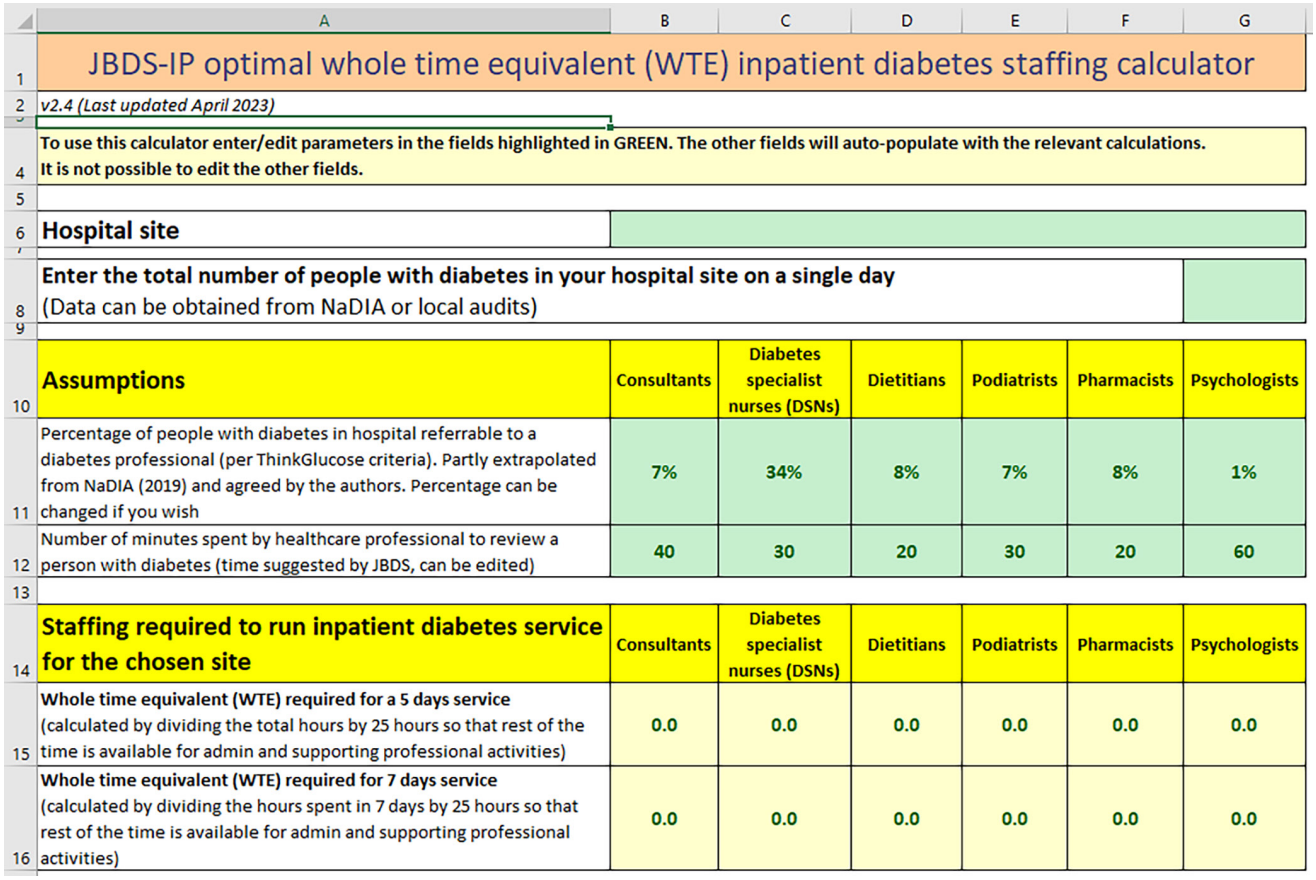
3.1.1 | How to use the calculator

The calculator is designed using Microsoft Excel. For best results the number of people with diabetes should be entered into the calculator. This in turn will generate the whole-time equivalent of staffing required to run 5-day and 7-day services. JBDS recommends keeping the same timings for individual staff although the calculator can be flexibly modified by teams as per their needs and practices if desired. The calculator is best accessed online, however, a screen shot is shown in Figure 2.

4 | DISCUSSION

JBDS has created a calculator to help inpatient diabetes teams estimate their multi-disciplinary staffing requirements according to the prevalence of diabetes in their individual institutions. In the creation of this calculator, it was clear that the majority of responding teams were understaffed to be able to provide the range of services necessary, including professional development, service development, teaching, 5 or 7 day per week cover, or the myriad of other services the teams deliver.

Inpatient diabetes care in the UK is improving year by year but there are several areas where further refinements are possible and urgently needed. To improve services, adequate numbers of health care professionals providing care is critical. To date, we do not have a method to assess staffing needs of any hospital based on the number of people with diabetes in hospital. NaDIA 2019 data gave us an



JBDS-IP optimal whole time equivalent (WTE) inpatient diabetes staffing calculator

v2.4 (Last updated April 2023)

To use this calculator enter/edit parameters in the fields highlighted in GREEN. The other fields will auto-populate with the relevant calculations. It is not possible to edit the other fields.

Hospital site

Enter the total number of people with diabetes in your hospital site on a single day
(Data can be obtained from NaDIA or local audits)

Assumptions	**Consultants**	**Diabetes specialist nurses (DSNs)**	**Dietitians**	**Podiatrists**	**Pharmacists**	**Psychologists**
Percentage of people with diabetes in hospital referrable to a diabetes professional (per ThinkGlucose criteria). Partly extrapolated from NaDIA (2019) and agreed by the authors. Percentage can be changed if you wish	7%	34%	8%	7%	8%	1%
Number of minutes spent by healthcare professional to review a person with diabetes (time suggested by JBDS, can be edited)	40	30	20	30	20	60

Staffing required to run inpatient diabetes service for the chosen site	**Consultants**	**Diabetes specialist nurses (DSNs)**	**Dietitians**	**Podiatrists**	**Pharmacists**	**Psychologists**
Whole time equivalent (WTE) required for a 5 days service (calculated by dividing the total hours by 25 hours so that rest of the time is available for admin and supporting professional activities)	0.0	0.0	0.0	0.0	0.0	0.0
Whole time equivalent (WTE) required for 7 days service (calculated by dividing the hours spent in 7 days by 25 hours so that rest of the time is available for admin and supporting professional activities)	0.0	0.0	0.0	0.0	0.0	0.0

FIGURE 2 Screen shot of the online calculator.

average number of people in hospital on any single day and that indicated 41% of these people were eligible for referral to the diabetes team. This information gives us a unique opportunity to estimate the staffing needs of any hospital based on diabetes prevalence.

The current calculator estimates slightly higher numbers for inpatient diabetes nurses than the previous JBDS specialist nurse calculator as the management of diabetes has become more challenging and time consuming and our aspiration is to improve on the deficiencies in existing inpatient care. With increasing use of technology and diabetes, the amount of data for inpatient diabetes team has increased exponentially although many teams are not using the data due to time constraints and poor staffing.[1] With more realistic allocation of time and staff the advantages of technology can be better harnessed.

All the hospital teams who responded had lower numbers of staff than they perceived would be their requirement in each category for an optimal inpatient diabetes service. Pharmacy and inpatient psychology were strikingly low in number in all the entries received. This is in keeping with the observations made in NaDIA and NDISA.[1,7]

We could not find a similar work in the literature which considers the hospital diabetes prevalence to estimate hospital inpatient staffing needs; therefore, comparison is difficult.

As this is the first and novel attempt to assess diabetes team staffing needs, it may not be perfect, but it will hopefully provide a structure to adequately staff inpatient teams across the UK.

JBDS assessed the inpatient diabetes staffing needs through a mix of opinions and advice from the working group meeting monthly, survey of hospitals and Trusts in the UK, one-to-one virtual meetings with the respondent teams to clarify the data submitted, triangulating the information with the experience of the expert group and finally generating an Excel calculator for easy use by health professionals. The process involved diabetes consultants, specialist nurses, podiatrists, dieticians, pharmacists, psychologists and a voice from people with diabetes through Diabetes UK, and is therefore reasonably robust. Allowance was made in the calculator for various activities that an ideal inpatient diabetes team should perform in addition to direct person-facing time (Table 4).

TABLE 4 Activities outside direct contact with the person with diabetes.[16]

Administration (Clinical)
GP letters and communication
Multi-disciplinary Inpatient Diabetes team liaison
Review of electronic data from different wards
Pre- ward round and post-ward round huddles
Discharge communication
Immediate post discharge follow-up
Acting on abnormal results flagged up by hospital staff
Queries from family members
Queries from hospital staff
Administration (Non-Clinical)
Electronic communications
Personnel management (assisting with)
Meetings (departmental, management, Trust, clinical governance, Point of Care Testing etc.)
Patient safety
Investigating serious incidents
Datix management
Complaints (assisting with)
Insulin safety initiatives
Service improvement
Audit (preparation and participation)
Service development
Clinical governance
Research
Participation, presentations and publications
Raising awareness initiative
Education
Training for other health care professionals (including mandatory and ad hoc)
Participation in appraisal requirements
Continued professional development
Personal development plans
Job planning
Specialist services
Transplant, vascular, liver, renal and others

Assumptions made in the methods

1. The calculator is based on the total number of inpatient beds occupied by people with diabetes; the proportion of those people who should be seen by a member of the diabetes team as per ThinkGlucose criteria,[5] and the average amount of time needed by different staff per week to support those people as agreed by the authors. These can all vary from between Trusts and Teams.
2. Some people may not require any support and may have come to hospital with problems not related to diabetes whereas others might have come with significant complications of diabetes for example, DKA and may require much more time than average used for calculation.
3. The time used per person with diabetes in hospital is an estimation based on the wider consensus in the JBDS committee, responses obtained from different hospital Trusts and the data collected in the NaDIA audit. This time is needed to go round to different wards and units in the hospital, finding case notes, discussing with the ward nurses and ward doctors in addition to the actual contact with the person with diabetes (Table 4 and Figure 1).
4. Some staff groups on some days may require more time with people with diabetes (e.g. diabetes inpatients specialist nurse starting insulin for a newly diagnosed person or a podiatrist debriding a foot ulcer) but may cover fewer people whereas others (e.g. consultants reviewing follow-up patients) may require less time but may cover more people while supervising and providing advice.
5. All Trusts have a different skill-mix and staffing mix, with some Trusts depending more on diabetes inpatient specialist nurses whereas others have consultants supporting inpatients. Specialist registrars support inpatient teams variably depending upon their other commitments and have not been considered for the purpose of this staffing calculation.
6. While calculating the whole-time equivalent we have used the figure of 25 h rather than 37.5 h to allow for administration time, staff education and professional development activities of various individuals. This is based on the already existing JBDS specialist nurse calculator which allows one third of DISN time on activities which are not directly in contact with person with diabetes[16] (Table 4 and Figure 1). This type of supporting professional activities is well recognised in the Royal College guidance for consultants' job planning.[30] Flexible arrangements for job planning and additional support for administrative burden might also help alleviate the staffing crisis that the NHS is currently facing.[31,32]
7. Most Trusts were providing a 5-day service. JBDS have also suggested staffing requirement for 7-day service in the calculator. If the weekend service is not the same as weekday service, then appropriate reduction in the staffing number should be calculated depending upon what service the Trust wants to provide.

Limitations and adjustments:

Although the calculator will work for most hospitals, some adjustments may be needed to adjust for the nature of the service and the type of hospital.

1. Many Trusts may have staff in different categories contributing to research, national roles and/or publications (posters or papers). JBDS suggests adding 5–10% of time to allow for these worthwhile roles for the wider NHS benefit.
2. Some Trusts will be providing regional or national service (renal, vascular, andrology etc). JBDS suggests adding 5% for specialist services.

3. Smaller Trusts require proportionately more time as some activities, for example, the insulin safety group need similar amounts of time regardless of the patient population. JBDS suggests an increase of 5% of time to protect smaller Trusts from being penalised.
4. Some Trusts may require travelling between sites to provide care and that is not included in this calculation.
5. The calculator may have to be adjusted depending upon the seniority and expertise level available for different staff group (more experience staff vs a new joiner).
6. The calculator has not formally allowed for annual, and study leave.

The process as well as the output, however, had additional limitations. Our work was heavily dependent on the experiences of the expert group and the number of health care professionals who responded. The resultant output and conclusion, therefore, may not accurately reflect the needs of every single hospital as some may have more community-based services whereas others may be a tertiary care hospital with different kind of needs.

We acknowledge that there are already staffing shortages in many NHS hospitals, with gaps in staffing levels. We appreciate that it will be difficult to fill posts that are identified by using this calculator. However, we hope that the numbers generated can be used as a starting point by teams to strengthen the case for better staffing when discussing this with their management.

5 | CONCLUSIONS

The prevalence of diabetes is increasing in the community as well as in hospitals. Management of diabetes has become more complex and challenging with increasing number of medications, devices and technology tools. The JBDS survey suggests that the median (IQR) of health care professionals needed per 100 people with diabetes in hospital for a 5-day service is as follows. Consultants 0.65 (0.50–0.88), diabetes inpatient specialist nurses 3.38 (2.78–4.59), dieticians 0.48 (0.33–0.72), podiatrists 0.93 (0.65–1.24), pharmacists 0.65 (0.40–0.79) and psychologists 0.33 (0.27–0.58).

JBDS has also developed a calculator to flexibly estimate different health care professionals needed based on the staffing and skill-mix available in different teams and time they spend with each person with diabetes in hospital. This may not be a perfect solution but will hopefully help hospital diabetes teams plan their composition and structure to provide a good quality inpatient diabetes service.

CONFLICT OF INTEREST STATEMENT

None.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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