Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

National Survey of the JBDS-IP/UK SACT board guidelines on the management of glycaemia

Dola Awoyemi
Royal Marsden NHS Foundation Trust
Pinkie Chambers
p.chambers@ucl.ac.uk

University College London
Daniel Morganstein
Royal Marsden NHS Foundation Trust
Ketan dhatariya
Norfolk and Norwich University Hospitals NHS Foundation Trust
Ruth Board
Lancashire Teaching Hospitals NHS Foundation Trust
Nalinie Joharatnam Hogan
Royal Marsden NHS Foundation Trust
Elaine Tomlins
Royal Marsden NHS Foundation Trust

Research Article

Keywords: Hyperglycaemia, Cancer, Management

Posted Date: February 24th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-8652042/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Introduction: Systemic anti-cancer therapy (SACT) is reported to be associated with hyperglycaemia, in those people with or at risk of diabetes. Causes for the association can be a resultant effect of corticosteroids used both as part of treatment and in antiemetic protocols. Additionally, some SACT may cause hyperglycaemia[1].

The Joint British Diabetes Societies (JBDS) and UK SACT board guideline on the management of glycaemic control in people with cancer, recommends monitoring of blood glucose and prompt management of glycaemia. However, the implementation of these guidelines has not been evaluated, and it is not known whether oncologists have the capacity to undertake this work.

Method: A survey was developed to explore participant's awareness of the national guidelines, the implementation model adopted (full/partial), implementation challenges and measures to overcome these. The average content validity index for the instrument was assessed by an expert panel of four clinicians, and a snowball-sampling technique was used to target healthcare professional across the country. The survey was administered to clinicians working at an institution delivering systematic anticancer therapy to adult cancer between 18th November 2024 and 6th January 2025.

Results: Responses were received from 174 clinicians from 67 institutions, covering 27% of hospitals providing cancer services in the UK. 45% of clinicians were aware of the JBDS/UK SACT board guidelines, with 18% finding their implementation very important. However, only 30 out of 67 hospitals surveyed had implemented national guidance: 13 fully and 17 partially. In institutions with partial adoption, monitoring was restricted to cancer patients with the highest risk of hyperglycaemia; symptoms of hyperglycaemia without known diabetes (43%,9/21) or with pre-existing diabetes (9%, 2/21). Organisational barriers included gaps in diabetes training, inability to supply glucose testing equipment, staff shortages, and poor governance. External factors were difficulty agreeing a pathway with community providers of diabetes care, implementation costs (such as monitoring, and recruitment) and an evidence gap for embedding diabetes clinics in cancer centres. Strategies to overcome these challenges included staff training on diabetes, establishing a pathway with primary care & improved governance.

Conclusion: Most institutions have not implemented national guidance although some have adopted measures to target those most at risk of hyperglycaemia. However, as the UK population ages the prevalence of multi-morbidity, especially diabetes and cancer will increase, and we advocate for a national implementation strategy.

Background

Systemic anti-cancer therapy (SACT) can result in hyperglycaemia, in those people with or at risk of diabetes [1]. Glucocorticoids (often referred to as "steroids") given alongside chemotherapy or to treat toxicities of immunotherapy are a frequency cause. Additionally, some SACT itself may cause hyperglycaemia. Checkpoint inhibitors can cause checkpoint inhibitor associated diabetes, with severe insulin deficiency that closely resembles type 1 diabetes [2]. Furthermore, targeted therapies cause insulin resistance by disrupting insulin-signalling pathways including, phosphoinositide 3 Kinase inhibitors, tyrosine kinase inhibitors, and mammalian target of rapamycin inhibitors. In contrast, certain cytotoxic agents (such as cisplatin & 5 -fluorouracil) and somatostatin analogues have been reported to impair insulin secretion [1–4].

Diabetes mellitus as a primary diagnosis is common amongst patients diagnosed with cancer, affecting around 20% of individuals [1,5]. In addition, in cancer patients' diabetes is associated with more frequent emergency department

attendance [6,7]and hospital admission [7,8]. In one study, breast cancer patients with and without diabetes who developed hyperglycaemia during chemotherapy had increased healthcare utilisation, adverse effects, and treatment modifications[8]. Additionally, a meta-analysis demonstrated that hyperglycaemia decreased overall and disease-free survival independently of diabetes [9]. Therefore, it is important to screen and manage hyperglycaemia during anti-cancer therapy.

In 2023, the Joint British Diabetes Societies (JBDS) and UK SACT Board produced guidelines on the management of glycaemic control in people with cancer. These recommended self-monitoring of capillary blood glucose during SACT in people with or at -risk of diabetes and that glucose management takes place in diabetes clinics in the community setting or general practice.[1] Risk factors for steroid induced diabetes include pre-existing or a family history of diabetes, obesity, increasing age, ethnicity, impaired fasting glucose, impaired glucose tolerance, HbA1c of 42–47 mmol/mol, polycystic ovarian syndrome, previous gestational diabetes or steroid -induced hyperglycaemia[1].

The JBDS/UK SACT board guidelines recommend specialist diabetes input and clear lines of communication between the oncology and diabetes teams for prompt management of hyperglycaemia [1]. However, since the publication of these guidelines their implementation has not been evaluated. It remains unclear whether clinicians in oncology have the capacity to undertake this work or whether cancer patients prefer to have SACT-induced hyperglycaemia managed by primary care physicians or oncologists.

We sought to understand the implementation of the guidelines. Our key objectives were to identify the proportion of hospitals that have adapted the guideline and the determinants to implementation (i.e. enablers and barriers) at organisational level. These lessons would enable iterative development of the guidance and the development of effective implementation strategies.

Method

Survey characteristics

A questionnaire containing 14 questions providing quantitative and qualitative data on; participant's awareness of the national guidelines, the implementation model adapted (full/partial), the allocation of roles and responsibilities to each staff group, the setting that supplies blood glucose testing meters and test strips, implementation challenges and measures to overcome these, availability of local guidelines or procedures and their opinion on the importance of guideline implementation in their setting (Appendix 2 -Supplement).

Survey development

The questionnaire was kept short to encourage completion. Participant information details were collected in the first part, including the institution post code to identify multiple responses from the same hospital. The remaining questions (10 items) documented practice relating to the JBDS-IP/UK SACT board guidelines. Most of these had multiple choice answers but a free text option was included to enable clinicians to expand on the challenges encountered, the strategies used to overcome barriers or explain a healthcare model. Closed questions were used to establish a participant's awareness of the guidelines, and whether a hospital had local documents to support implementation.

Content validity

An expert panel of four clinicians with clinical expertise in diabetes, chemotherapy treatment and experience in survey design were invited by e-mail to assess the content validity of the questionnaire. The experts rated each item for relevance and clarity using a 4-point scale. In addition, they were to evaluate and comment on the comprehensiveness of the entire survey [10]. For questions requiring minor alterations (e.g. wording) a comment suggesting improvements in clarity or alignment with the survey objectives was to be included. The average content validity index (Ave-CVI) for the instrument was computed using the method recommended by Polit et al.[11] The Ave-CVI was 0.97, indicating that the panel unanimously agreed the questionnaire was clear and relevant. The Item CVI was 1 for all items except one, which scored 0.78 and required a minor wording revision.

Recruitment and sampling

Eligible participants were healthcare professionals working in hospitals that deliver systemic anticancer therapy to adult cancer patients. A snowball sampling technique was used to recruit clinicians across the UK. This approach involved multiple contacts and widespread circulation of the study survey through professional bodies, institutional websites, social media, and personal networks.

The study population was healthcare professionals representing their respective cancer centres, with each hospital represented by at least one healthcare professional. Nationally there are 247 hospitals providing cancer services; the survey was completed by 67 of these institutions, resulting in a 27% response rate.

Survey administration

The cross-sectional design and survey questionnaire was approved by the Royal Marsden Clinical Audit and Quality Improvement Committee (CAQIC)(PHR200). The survey was administered in the online platform Qualtrics between 18th November 2024 and 6th January 2025. National organisations and professional bodies that approved the survey invited their members to participate via email. The organisations included were: United Kingdom Association of Supportive Care in Cancer (UKASCC), British Oncology Pharmacy Association (BOPA), United Kingdom Oncology Nursing Society (UKONS), UK Medicines information (UKMI) Association of Cancer Physicians (ACP), and the Association of British Clinical Diabetologists (ABCD). Additionally, the survey was shared at the National UK SACT board conference and on social media. Participants who initiated the survey were provided with a brief synopsis of the study and informed that participation in the survey is implied as consent.

Data analysis

Quantitative data from the closed questions were analysed using Microsoft Excel, with results presented as counts or percentages. Respondents were permitted to leave questions unanswered, as forced responses were not enabled in the Qualtrics platform; therefore, missing data are reported and analysed in the results section. Qualitative data from free-text responses was analysed for themes. Descriptive statistics were used to characterise participants and to explore agreement among multiple responses to the same question when four or more respondents were from the same institution. However, measuring the degree of agreement, was less effective when the number of responses per institution was small (e.g. when using ordered categorical answers). In such cases, agreement was not computed.

Results

The survey was started by 232 healthcare professionals, 174 of these responses were completed. Participants were mostly from hospitals in the London region (24%), South West (17%) and South East of England (16%) and Scotland (9%). The highest response was amongst nurses (44%), followed by pharmacists (36%), then doctors (18%) [Table 1].

Table 1
Overview of Participants

Parameter	
Number of participants (N)	174
Professional group	
Nurse	76 (43.7%)
Pharmacist	62 (35.6%)
Doctor	32 (18%)
Radiographer	3 (2%)
Other	1 (0.6%)
Hospital Region	
London	42 (24.14%)
South West of England	30 (17.2%)
South East of England	28 (16.1%)
Scotland	16 (9.2%)
Wales	13 (7.5%)
North East and Yorkshire	14 (8.05%)
North West of England	13 (7.5%)
Midlands	10 (5.8%)
East of England	7 (4.02)
Northern Ireland	1 (0.57%)
Institution type	
Tertiary Centre	76 (43.7%)
District general hospital	87 (50%)
Private Hospital	3 (1.72%)
Other	8 (4.6%)
Total number of Institutions	67

A total of 174 participants from 67 institutions took part in the survey, representing 27% of hospitals providing cancer services in the UK. Amongst respondents, 45% (78/174) of clinicians from 42 institutions were aware of the JBDS/UK SACT board guidelines, and 18% (32/174) from 24 institutions considered their implementation to be very important. Only, 10% (17/174) of clinicians, representing 13 institutions, reported that their organisation had fully

implemented the national guidance by establishing a clinical pathway to monitor and treat glycaemia in high-risk patients.

In institutions with partial implementation (12%,21/174; 17 institutions), monitoring tended to be limited to either cancer patients with symptoms of hyperglycaemia but no known diabetes (43%, 9/21) or to those with pre-existing diabetes (9%, 2/21). In contrast, 29% (50/174) of clinicians across 30 institutions reported that the guidelines had not been implemented, and 37% (65/174) from 35 hospitals were unsure whether the guideline had been adopted in their setting.

The most commonly agreed-upon barriers to guideline implementation were difficulty in establishing a pathway to collaborate with specialist diabetes teams in the community (11%, 19/174), implementation costs (9%,15/174) (such as funding for diabetes specialist staffing, and $HbA1_C$ or blood and capillary glucose testing) and the need for staff training (8%, 14/174) [Figure 1]. Additional challenges included time constraints and insufficient staffing.

Access to essential equipment was also limited; only 17% (29/174) of respondents, representing 23 hospitals, had access to blood glucose meters, testing strips or ability to request supplies from community services.

Across the 30 hospitals that had partially or fully implemented the guidelines, reported implementation strategies included staff training on diabetes, establishing a formal pathway with primary care physicians and strengthening governance processes [Figure 2].

Participants reported that oncology doctors were the professional group most likely to monitor plasma glucose (34%,60/174) and initiate glucose lowering treatment (43%,75/174). Hyperglycaemia was also managed in primary care (19%, 33/174) and by non-medical prescribers in secondary care (13%,23/174). Other professional groups reported to monitor glycaemia included chemotherapy nurses (29%,51/174), non-medical prescribers (24%,41/174) and clinical nurse specialists (22%, 39/174).

Among the institution surveyed,10% (7/67) had four or more responders. Agreement between clinicians within the same setting was measured as a percentage, with higher percentages indicating greater agreement. Questions on guideline implementation showed the greatest variability, with the percentage agreement ranging from14% – 43% for full implementation and 11% – 29% for partial implementation. In contrast, staff awareness of national guidelines showed the highest levels of agreement, with institutions achieving over 50% agreement. However, small sample sizes and a substantial proportion of missing responses limited the ability to identify consistent trends in inter-institution agreement (see Supplementary Table of Inter-rater Variability for Institutions with Multiple Responses).

Discussion

Individuals undergoing cancer treatment are at increased risk of developing hyperglycaemia or new onset diabetes, which can contribute to treatment modifications, increased toxicity, and unplanned hospital admissions. To manage this risk, the JBDS and UK SACT board guidelines on glycaemic control in people with cancer recommend the early identification of patients with pre-existing diabetes or those risk of treatment -related hyperglycaemia.[1]

This is the first study to evaluate the implementation of these guidelines in the UK. 22% of healthcare professionals worked at institutions that had adopted these guidelines to all high-risk cancer patients (full adoption) or restricted implementation to individuals with the highest risk (partial adoption). Our key finding was that only 17 out of 67 hospitals (25%) had implemented national guidance; causing concern and a need for a national implantation strategy.

One implementation barrier identified at the clinician level was the perception that oncology doctors were primarily responsible for monitoring and managing hyperglycaemia. Although this survey did not explore how hyperglycaemia management is shared across professional groups, it is possible that oncology doctors felt more confident making prescribing decisions. Conversely, non-medical prescribers may not feel comfortable to initiate glucose lowering medication within their scope of practice. Similar findings have been reported in a survey of oncology doctors in the United States (US), where the main barrier to managing hyperglycaemia during chemotherapy was limited confidence in prescribing insulin (e.g., starting, titrating or selecting the type of insulin). In addition, US oncology guidelines, unlike JBDS/UK SACT board guidance, do not provide specific recommendations for hyperglycaemia management during chemotherapy. Consequently, oncologists in the US perceived diabetes management as outside their remit and the responsibility of endocrinologists, or primary care physicians. [12]

Organisational barriers were gaps in diabetes training, inability to supply glucose testing equipment, staff shortages, poor governance and the unavailability of procedures for glucose monitoring. Disagreement amongst responders from the same hospital regarding whether national guidance had been implemented, combined with the finding that nearly 40% of responders were unaware of these guidelines suggests an inconsistent approach. External barriers included challenges in agreeing on a pathway with community physicians and a lack of evidence for the preferred model for diabetes care in cancer outpatients.

Strategies to overcome these challenges include staff training on diabetes, improved pathways with primary care and stronger governance. This may involve simple measures such as developing a hyperglycaemia algorithm based on JBDS guidelines until a formal pathway for identifying and managing hyperglycaemia in individuals receiving steroids is established.[13,14] Additionally, as cost was identified as a barrier to implementation, removing post-day 1 dexamethasone from the SACT protocol of moderately emetogenic chemotherapy regimens may help reduce both the cost of blood glucose monitoring and the associated workload. Dexamethasone is associated with a greater degree of hyperglycaemia compared with other corticosteroids, although JBDS guidelines do not differentiate between corticosteroid types. [15] Once- daily monitoring is recommended for individuals receiving corticosteroids without diabetes, with more frequent testing for those with pre-existing diabetes. The adoption of steroid-sparing anti-emetic regimens would facilitate the implementation of JBDS and UK SACT Board guidelines by reducing the hyperglycaemic risk of supportive treatment.[16]

Furthermore, the JDBS guidelines identify increasing age as a risk factor for glucocorticoid induced diabetes. With an aging UK population, the number of older people with diabetes and cancer is expected to increase, creating a growing need for new models of care to manage SACT- induced hyperglycaemia.[17–18]

The strength of this study is that it included clinicians from 67 institutions with good geographical representation across the UK. A limitation is that we used responses from healthcare professionals to represent their institution, and in 10% of cases, contradictory answers were received from the same site. Another limitation was the difficulty in identifying trends within institutions due to missing data. Finally, we acknowledge that responses were limited to oncology clinicians, and the perspectives of hospital and community providers of diabetes care were not captured in this survey.

Conclusion

Most institutions have not implemented the national guidance, although some have introduced measures aimed at patients at highest risk of hyperglycaemia. The main barriers to implementation include difficulties in establishing shared pathways with primary care physicians, the financial cost associated, and limited clinician knowledge of

diabetes management. However, as the UK population ages, the prevalence of multimorbidity, particularly coexistence of diabetes and cancer is expected to rise, as will the number of patients receiving steroids as part of their cancer therapy. Given the increasing pressures on primary care, including workforce shortages, we advocate for the development of a new model for diabetes care during SACT and a national strategy for implementation to support consistent practice across cancer centres.

Declarations

Funding:

This work did not receive funding support from any organisation for the submitted work.

Conflicts on Interests: DM has nothing to report, RB has nothing to report, NJH has nothing to report. ET has nothing to report. Ketan Dhatariya received research honoraria, travel, fees for speaking or advisory boards from Abbott Diabetes, AstraZeneca, Boehringer-Ingelheim, Eli Lilly, Menarini, Novo Nordisk, Roche. Sanofi Diabetes. Pinkie Chambers received research funds from Gilead, GSK and Pfizer. DA received medical fellowship funds from MSK outside the submitted work.

Inform consent was obtained from all individual participants included in the study. We did not seek ethics approval because it did not involve patients, and participants were health care professionals.

Author Contribution

Conflicts on Interests: DM has nothing to report, RB has nothing to report, NJH has nothing to report. ET has nothing to report. Ketan Dhatariya received research honoraria, travel, fees for speaking or advisory boards from Abbott Diabetes, AstraZeneca, Boehringer-Ingelheim, Eli Lilly, Menarini, Novo Nordisk, Roche. Sanofi Diabetes. Pinkie Chambers received research funds from Gilead, GSK and Pfizer. DA received medical fellowship funds from MSK outside the submitted work.

Acknowledgement

I would like to acknowledge the Royal Marsden Clinical Audit and Quality Improvement Committee, namely Angela Halley and Sylvia Tan and the participants of this survey who shared t their time and effort.

Data Availability

Survey data available upon request.

References

1. Joharatnam-Hogan N, Chambers P, Dhatariya K, Board R, on behalf of the Joint British Diabetes Societies for Inpatient Care group and UKCB. A guideline for the outpatient management of glycaemic control in people with cancer. Diabet Med. 2022;39(1): e14636.
2. Wu L, Tsang V, Menzies AM *et al*. Risk Factors and Characteristics of Checkpoint Inhibitor Associated Autoimmune Diabetes Mellitus (CIADM): A systematic review and delineation from Type 1 diabetes. Diabetes

Care.2023; 46: 1292–1299.

3. Chowdhury TA, Jacob P. Challenges in the management of people with diabetes and cancer. Diabeti Med, 2019; 36(795–802).
4. Campbell N, Poole R. Immune Checkpoint inhibitors and Diabetes. Practical Diabetes.2020; 37(3):96–100.
5. Diabetes and cancer. Accessed May 25, 2025. https://www.diabetes.org.uk/about-diabetes/looking-after-diabetes/related-conditions/diabetes-and-cancer.
6. Kurteva S, Tamblyn R, Meguerditchian AN (2023) Predictors of frequent emergency department visits among hospitalized cancer patients: a comparative cohort study using integrated clinical and administrative data to improve care delivery. BMC Health Serv Res 23:887. https://doi.org/10.1186/s12913-023-09854-1
7. Phillips, A.L., Reeves, D.J. & Storey, S (2023) Impact of diabetes (type 2) and glycemic control on health-related outcomes of patients receiving chemotherapy for non-metastatic breast cancer: a retrospective analysis. Support Care Cancer 31, 114. https://doi.org/10.1007/s00520-022-07563-9
8. Kiburg KV, Ward GM, Vogrin S, Steele K, Mulrooney E, Loh M, et al (2020) Impact of type 2 diabetes on hospitalization and mortality in people with malignancy. Diabet Med. 37(2):362–8. https://doi.org/10.1111/dme.14147
9. Barua R, Templeton AJ, Seruga B et al (2018) Hyperglycaemia and Survival in Solid Tumours: A Systematic Review and Meta-analysis. Clinical Oncology 30:215–224. doi: 10.1016/j.clon.2018.01.003
10. Grant JS, Davis LL (1997) Selection and Use of Content Experts for Instrument Development. Res. Nurs. Heal.20:269–74. https://doi.org/10.1002/(SICI)1098-240X(199706)20:3%3C269:AID-NUR9%3E3.0.CO;2-G
11. Polit DF, Beck CT, Owen S V (2007) Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. Res Nurs Health 30(4):459–67. 10.1002/nur.20199
12. Salgado, T.M., Radwan, R.M., Hickey Zacholski, E. *et al.* (2023) Oncologists' responsibility, comfort, and knowledge managing hyperglycemia in patients with cancer undergoing chemotherapy: a cross-sectional study. Support Care Cancer 31, 450. https://doi.org/10.1007/s00520-023-07927-9.
13. Roberts A, James J, and Dhatariya K (2018) 'Management of hyperglycaemia and steroid (glucocorticoid) therapy: a guideline from the Joint British Diabetes Societies (JBDS) for Inpatient Care group', Diabetic medicine: a journal of the British Diabetic Association, 35(8), pp. 1011–1017. doi:10.1111/dme.13675.
14. Sinaga G, Koeijer E. Management of dexamethasone -induced hyperglycaemia in patients undergoing chemotherapy in an outpatient setting: a best practice implementation project. JBI Database of Systematic Reviews and implementation Report. The Joanna Briggs Institute.2018;16(4).1068–1078. Sinaga G, de Koeijer E (2018). Management of dexamethasone-induced hyperglycemia in patients undergoing chemotherapy in an outpatient setting: a best practice implementation project. JBI Database System Rev Implement 16(4):1068–1078. doi: 10.11124/JBISRIR-2017-003466. PMID: 29634519.
15. Limbachia L, Nunney I, Page DJ et al (2024) The effect of different types of oral or intravenous corticosteroids on capillary blood glucose in hospitalized inpatients with or without diabetes. Clinical Therapeutics 46 (2): E59-E63. doi: 10.1016/j.clinthera.2023.11.013
16. Jordan K, Azambuja E, del Barrio MAG *et al.* Going beyond the 2023 MASCC and ESMO guideline update for the prevention of chemotherapy and radiotherapy-induced nausea and vomiting. European Journal of Cancer.2025; 222: 115451. Jordan K, de Azambuja E, García Del Barrio MÁ, Jahn F, Di Palma M, Scotté F, Molassiotis A, Aapro M (2025) Going beyond the 2023 MASCC and ESMO guideline update for the prevention of chemotherapy- and radiotherapy-induced nausea and vomiting. Eur J Cancer 3;222:115451. doi: 10.1016/j.ejca.2025.115451. Epub 2025 Apr 19. PMID: 40288116.

17. Kingston A, Robinson L, Booth H, Knapp M, Jagger C (2018) MODEM project. Projections of multi-morbidity in the older population in England to 2035: estimates from the Population Ageing and Care Simulation (PACSim) model. Age Ageing 1;47(3):374–380. doi: 10.1093/ageing/afx201.
18. Diabetes UK (2023) Diabetes and cancer. What causes type 2 diabetes? | Diabetes UK. Accessed December 10, 2025.

Figures

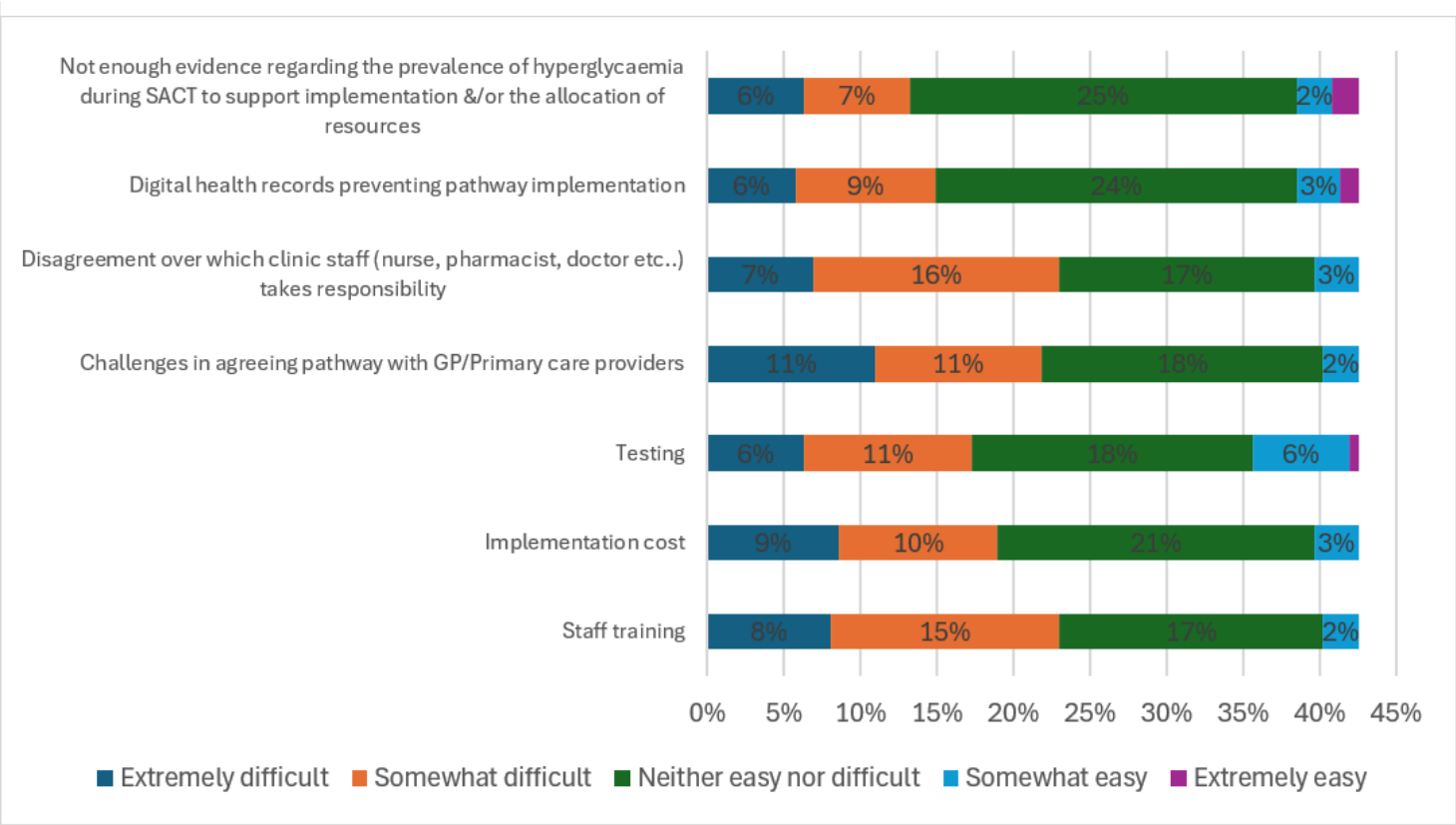


Figure 1

Implementation Barriers (n=74, missing n=100 [57%])

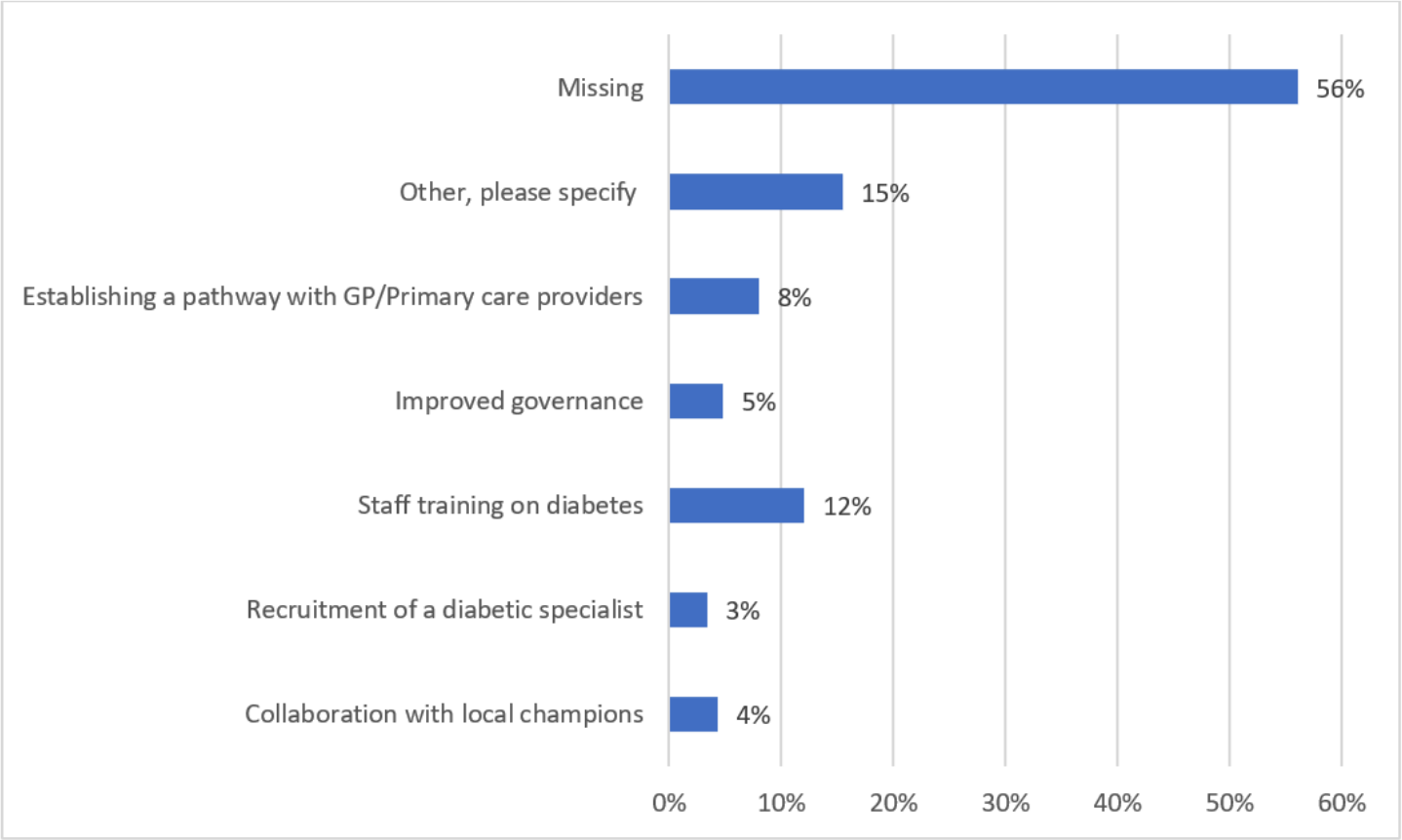


Figure 2

Strategies to overcome implementation challenges (n=58, missing n=116 [67%], percentages of responses are reported)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- NationalSurveyoftheJBDSIPUKSACTboardguidelinesonthemanagementofglycaemiasupplementarymaterial.docx