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Article type : Commentary

Title: Diabetic Medicine
Created by: Maria Davie
Email proofs to: Mike.sampson@nnuh.nhs.uk
Article no.: DME-2018-00262
Article type: Commentary
Figures:2; Tables:2; Equations:0; References: 9
Short title/*Authors running head*: Commentary • Commentary

## Commentary

# Joint British Diabetes Societies for Inpatient Care: clinical guidelines and improving inpatient diabetes care

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This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/dme.13672

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The Joint British Diabetes Societies (JBDS) for Inpatient Care is a clinically led collaboration between Diabetes UK, the Association of British Clinical Diabetologists (ABCD), the UK Diabetes Inpatient Specialist Nurse (DISN) group, and clinicians with an interest in inpatient diabetes care (Appendix 1). The aim of the JBDS group, which began in 2008, is to improve inpatient diabetes care through standard setting and clinical guidelines development in all UK Trusts. Since 2010, JBDS has produced a suite of 13 clinical guidelines covering all aspects of inpatient diabetes care and more than 150 UK diabetes specialists and clinicians have contributed to these guidelines (Appendix 1).

We are grateful to *Diabetic Medicine* for publishing these summaries of the more recent JBDS guidelines. The full versions are available at www.diabetes.org.uk/joint-british-diabetes-society or https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group. Earlier JBDS guidelines have also been published [1–4]. The six JBDS guidelines published in this issue are mostly those released (or updated) in the last 18 months.

Over the last decade, the importance of inpatient diabetes care has been increasingly recognized, as have the gaps in quality and safety that people with diabetes experience during a hospital stay, and with which clinicians are very familiar [5,6]. At the time the JBDS group began 10 years ago, ABCD funded a UK survey of inpatient diabetes care provision in 259 UK Trusts [7], which showed that 48.5% of UK Trusts did not have a DISN service, 13.9% had no peri-operative diabetes care guidelines, 29.9 % had no day surgery diabetes management guidelines, and, overall, only 22.5% of 259 UK Trusts had a full suite of inpatient diabetes management guidelines covering all areas of inpatient diabetes care [7]. In addition, people with diabetes admitted with diabetic ketoacidosis or in a hyperosmolar hyperglycaemic state were not referred to the diabetes team on the day of admission in 36.2% and 45.7% of UK Trusts respectively, and were managed in the critical first few hours of admission by non-specialist teams, often by junior doctors with little confidence or training in diabetes care [8]. There was also wide variance between UK Trusts in diabetes care guidelines for the same condition. We reviewed 50, then current, UK diabetic ketoacidosis guidelines as part of the JBDS guidelines development process (2010–2013), and found no UK guidelines consensus even on the diagnostic criteria for diabetic ketoacidosis, let alone initial diabetic ketoacidosis management, and there was a similar extreme

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variance in UK variable rate insulin infusion guidelines for peri-operative diabetes care (Fig. 1). In this context, there seemed a real need for a full suite of UK inpatient diabetes care guidelines on all aspects of inpatient care. Many of these have now been completed (Table 1).

There is no point in producing national guidelines that are not used or valued by clinicians, but the JBDS guidelines have now been widely adopted into UK clinical practice, and are felt to have improved clinical outcomes and patient safety. Since 2010, the JBDS guidelines have been viewed 857 942 times via the ABCD website (Table 1) with more than 54 000 downloads from the Diabetes UK site, and are being integrated widely into clinical practice in UK Acute Trusts. We surveyed all UK Trusts in 2013 about local use and perceived clinical value of the five earliest JBDS guidelines (2010–2013). Of the 118 responding UK Trusts (through 'SurveyMonkey'), ~90% had adopted or adapted the 2010 JBDS guidelines on diabetic ketoacidosis or hypoglycaemia, and 50% had already adopted or adapted the later 2012 guidelines into use. Clinical teams rated these guidelines very highly on their clinical quality, their impact on patient safety, and clinical outcomes (Fig. 2). We repeated (in 2018) a similar, but much simpler, survey of UK diabetes teams about the adoption of the later JBDS guidelines (2013–2018), and again found that ~90% of responding UK diabetes teams ($n$ = 50), had adopted the more recent guidelines, or were in the process of adopting those released only a few months ago (Table 2). Some of the guidelines published in this issue of *Diabetic Medicine* were only released in the last few months, but with regard to the JBDS guidelines published between 2010 and 2016 (Tables 1 and 2), the majority of responding teams (2018) felt that they had improved clinical outcomes (57.6%) or improved patient safety (58.7%) in their Trust (435 responses from 50 teams), and only 1.6% (7/435) of responses rated any JBDS guideline as poor.

One of the outstanding achievements in inpatient diabetes care in the UK over the last few years has been the annual UK National Diabetes Inpatient Audit (NaDIA), which is now in its seventh year [5] and recently reported the 2017 data from 208 UK hospital sites and 16 010 inpatients with diabetes. These data show that, since 2011, diabetes inpatient teams and patients have reported a reduction in harms attributable to inpatient medication errors, to inpatient hypoglycaemia, to ‘rescue’ treatments for inpatient hyperglycaemia, and to potentially unnecessary insulin infusions. We hope that these JBDS Inpatient Care (JBDS–IP) clinical guidelines, which are now widely used and integrated into UK practice and which inpatient

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teams feel have improved safety and clinical outcomes, have played their part in this improvement since 2011.

Some JBDS–IP guidelines have been more difficult to produce than others because of lack of an evidence base, and we have tried to produce clinical guidelines that have clinical validity, and which have had substantial peer review in development from experienced clinicians working in inpatient diabetes care. These guidelines now allow clinical teams to audit their own practice against these standards, and allow us all to start benchmarking and building a better evidence base for improving inpatient diabetes care [9]. Later in 2018, we will complete current work on four further guidelines on managing frail elderly inpatients with diabetes, on managing complicated diabetes at the 'front door' of acute hospitals, on screening for and managing undiagnosed inpatient hyperglycaemia, and finally a guideline that integrates all JBDS guidance into a summary document for clinicians and commissioners, on what a good inpatient diabetes service should look like.

The JBDS guidance is part of a wider improvement strategy for inpatient diabetes care, and Diabetes UK is committed to improving hospital care for people living with diabetes, as too many people with diabetes are afraid of staying in hospital and do not always feel those caring for them understand their needs. Diabetes UK will publish a Roadmap in 2018, developed with the inpatient care community and people with diabetes, outlining the state of inpatient diabetes care, what needs to improve, and offering service improvement tools to help teams improve inpatient diabetes care. A new Improving Inpatient Care Collaborative will be a vehicle for producing dramatic change in inpatient care for people with diabetes; if you would like to be part of the collaborative please e-mail inpatientcare@diabetes.org.uk.

**Acknowledgements**

We are grateful for the institutional and clinical support Diabetes UK, ABCD and the UK DISN group have offered over the last decade. We are also grateful for the time that more than 150 UK clinicians have contributed to the JBDS programme, either as group members past and present, or in writing contributions (Appendix 1).We are grateful to all members of the writing groups

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who contributed to these guidelines, and particularly would like to thank Dr Maggie Sinclair-Hammersley who started this collaborative JBDS programme in 2008.

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FIGURE 1 Wide variability in blood glucose thresholds for starting, or increasing, the insulin infusion rates included in the inpatient variable rate insulin infusion guideline (2011) in 30 UK Trusts. Data are for each of 30 UK inpatient guidelines and show the blood glucose level at which an insulin infusion rate would be started (first column for each infusion rate) or increased to the next insulin infusion rate (second column for each infusion rate).

FIGURE 2 Survey of 118 UK clinical diabetes teams (2013) on local adoption of the early Joint British Diabetes Societies Inpatient Care (JBDS–IP) guidelines (a), clinical perception of their value (b), their clinical quality (c), and their impact on patient safety (d). Data shown as % of responding teams, for each of five early JBDS–IP guidelines. Data in some subcategories are <100% because of a small number of incomplete returns. HHS, hyperosmolar hyperglycaemic state; HYPO, inpatient hypoglycaemia; DKA, diabetic ketoacidosis.

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**Table 1** Summary of Joint British Diabetes Societies Inpatient Care guidelines since 2010 with release year (including later revisions and amendments) and number of times viewed

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| No. | Year | Title | Times viewed* |
|---|---|---|---|
| 01 | 2010 and 2013 | Hospital management of hypoglycaemia | 166 105 |
| 02 | 2010 and 2013 | Management of diabetic ketoacidosis | 106 921 |
| 03 | 2011 and 2013 | Management of adults with diabetes undergoing surgery | 181 957 |
| 04 | 2012 | Self-management of diabetes in hospital | 9264 |
| 05 | 2012 and 2017 | Glycaemic management and enteral feeding of stroke patients. | 36 936 |
| 06 | 2012 | Management of HHS | 170 883 |
| 07 | 2013 | Admissions avoidance in diabetes | 14 962 |
| 08 | 2014 and 2017 | Management of hyperglycaemia and steroid therapy | 81 755 |
| 09 | 2014 | VRII in medical inpatients | 85 917 |
| 10 | 2015 | Discharge planning for adult inpatients with diabetes | 11 997 |
| 11 | 2016 | Management of adults with diabetes on the haemodialysis unit | 8603 |

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| | | | |
|---|---|---|---|
| 12 | 2017 | Management of glycaemic control in pregnant women with diabetes | 539[†] |
| 13 | 2017 | Inpatient management of diabetes and psychiatric disorders | 103[†] |

HHS, hyperosmolar hyperglycaemic state; VRII, variable rate insulin infusion.

Full guidelines at: http://www.diabetes.org.uk/joint-british-diabetes-society or https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group.

*From Association of British Clinical Diabetologists (ABCD) website (with thanks to Dr Bob Ryder; last counted 14 March 2018).

[†]These recent guidelines were only released recently (end of 2017).

**Table 2** UK Adoption of Joint British Diabetes Societies Inpatient Care clinical guidelines (2010–2018) and clinical teams' perception of quality, based on a survey of 50 UK clinical teams (2018)

| **Guideline** | | **Adopted*, %** | **Quality good/very good, %** |
|---|---|---|---|
| 01 | Hospital management of hypoglycaemia | 92 | 96 |
| 02 | Management of diabetic ketoacidosis | 92 | 91 |
| 03 | Management of adults with diabetes undergoing surgery | 93 | 85 |
| 04 | Self-management of diabetes in hospital | 74 | 78 |
| 05 | Glycaemic management and enteral feeding | 73 | 82 |
| 06 | Management of HHS | 96 | 84 |
| 07 | Admissions avoidance in diabetes[†] | - | - |
| 08 | Management of hyperglycaemia and steroid therapy | 86 | 78 |

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| 09 | VRIII and medical inpatients | 88 | 88 |
|---|---|---|---|
| 10 | Discharge planning for adult inpatients with diabetes | 41 | 67 |
| 11 | Diabetes on the haemodialysis unit | 23 | 67 |
| 12 | Glycaemic control in pregnant women with diabetes | 63‡ | 93 |
| 13 | Inpatient management of diabetes and psychiatric disorders | 25‡ | 78 |

HHS, hyperosmolar hyperglycaemic state; VRII, variable rate insulin infusion.

Full guidelines at : http://www.diabetes.org.uk/joint-british-diabetes-society or https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group.

*Includes responses of adopted for use, adapted for use, planning to adopt for use in own Acute Trust.

†Not a clinical guideline for Trust adoption.

‡These later guidelines were only released at end of 2017.

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## Appendix 1

### Contributors: JBDS–IP core members past and present

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Temple, Toral Thomas, Karen Turner, Grace Vanterpool, Debbie Voigt, Maureen Wallymahmed, Dionne Wamae, Dr Bev Watson, Lara Wessels, Joy Williams, Karen Williams, Lyndi Wiltshire, Tony Winston, Julie Worthington.

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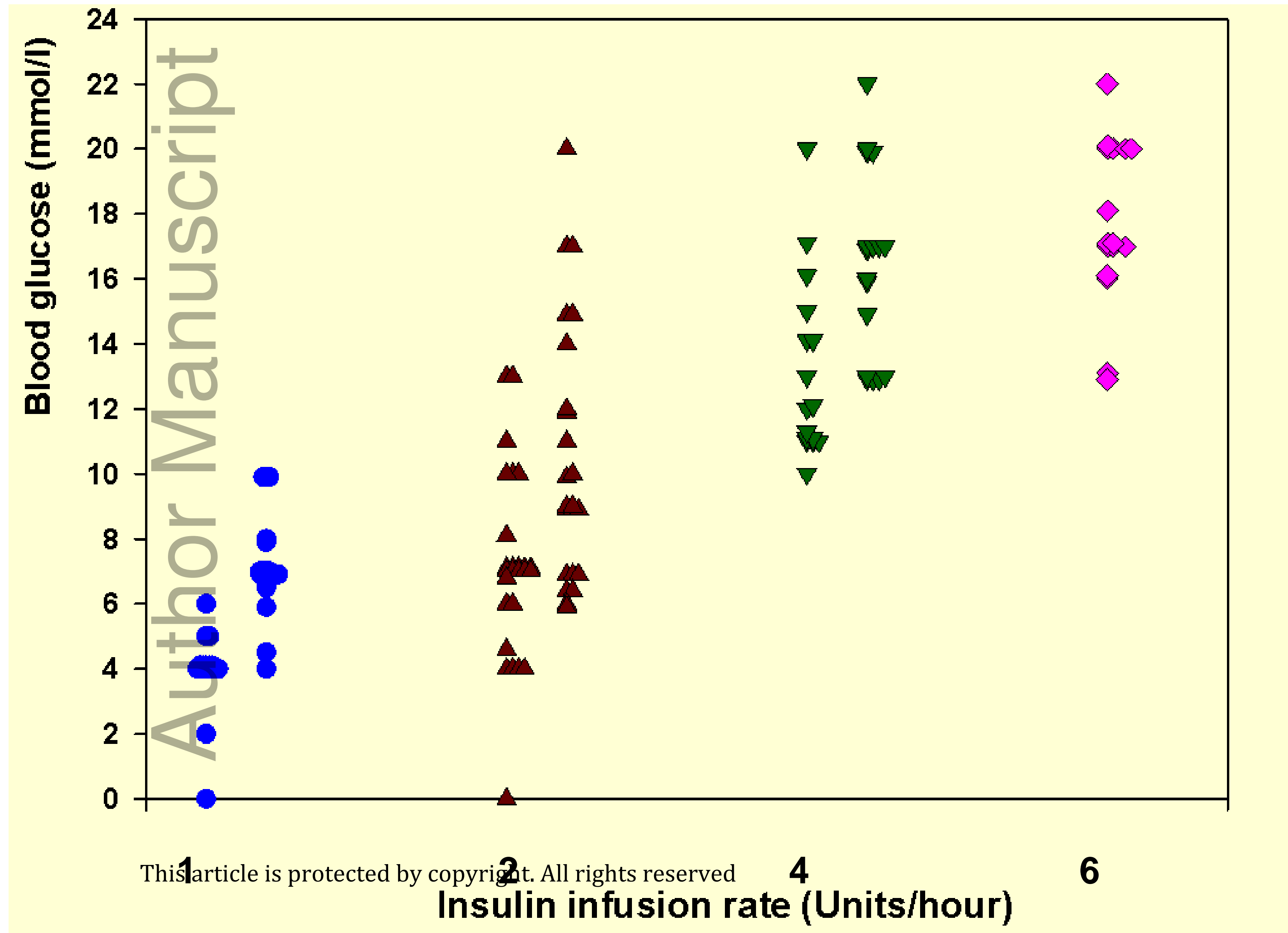
Figure 1

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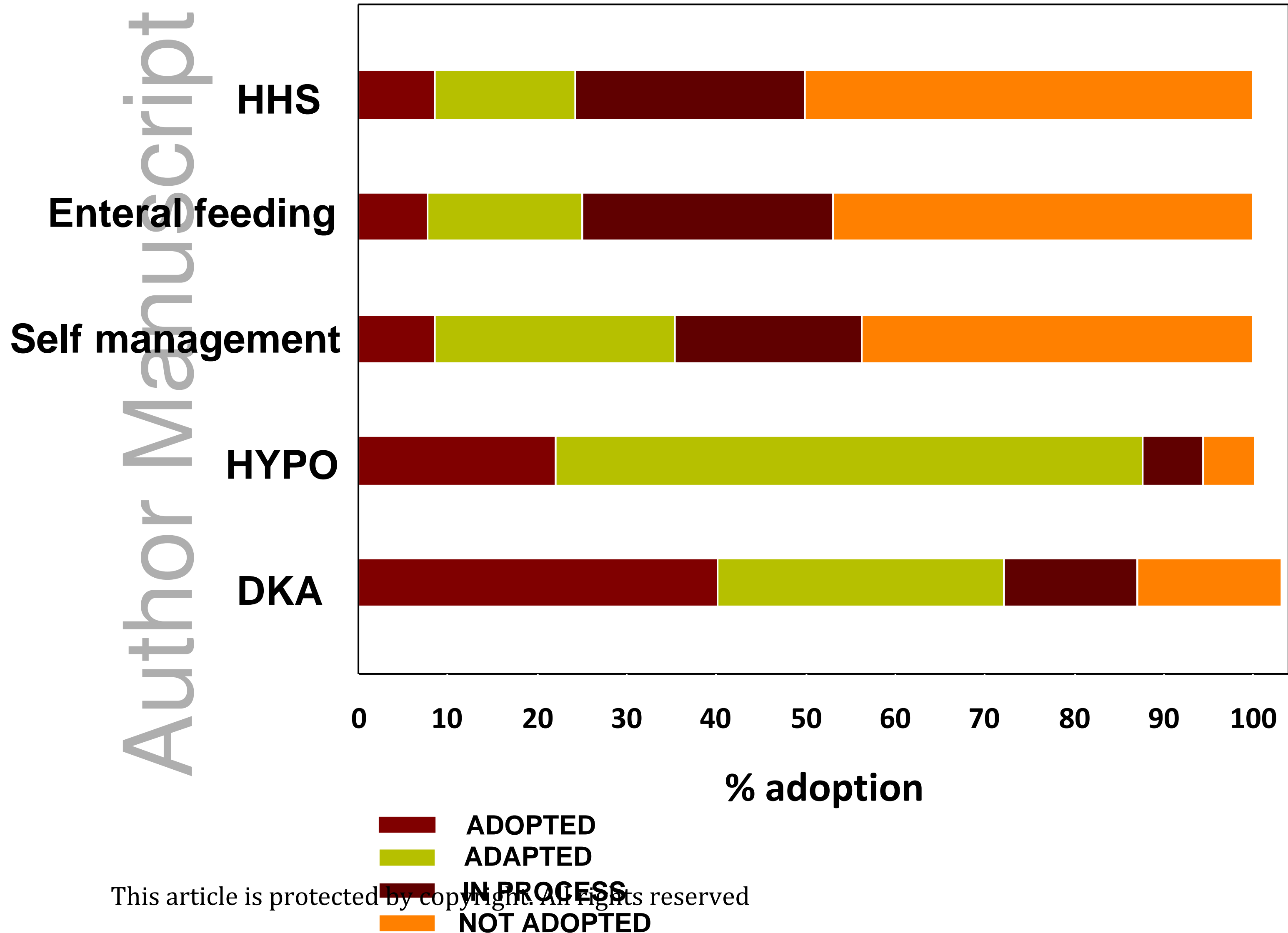
## Figure 2a  Adoption

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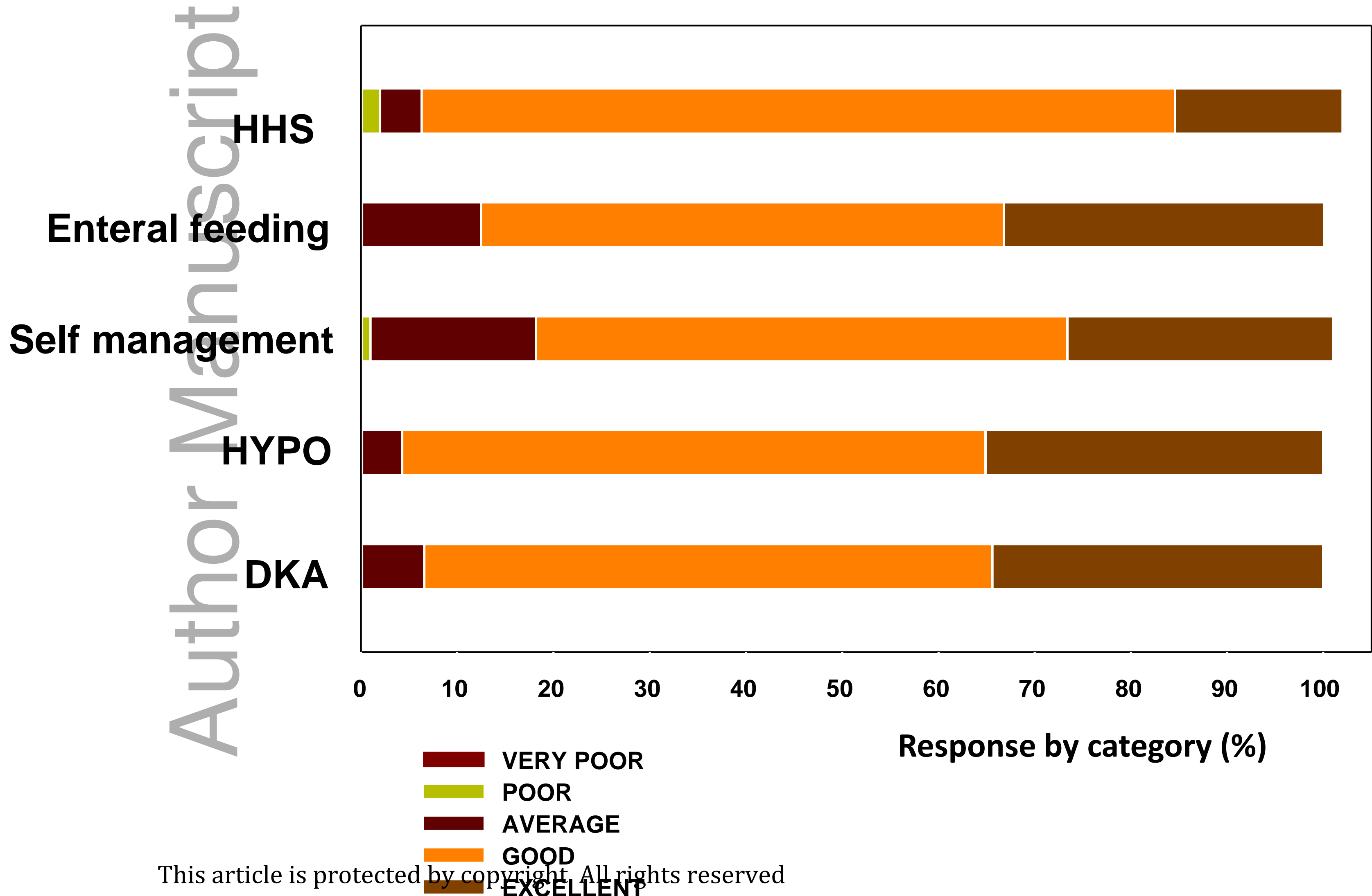
## Figure 2b Value

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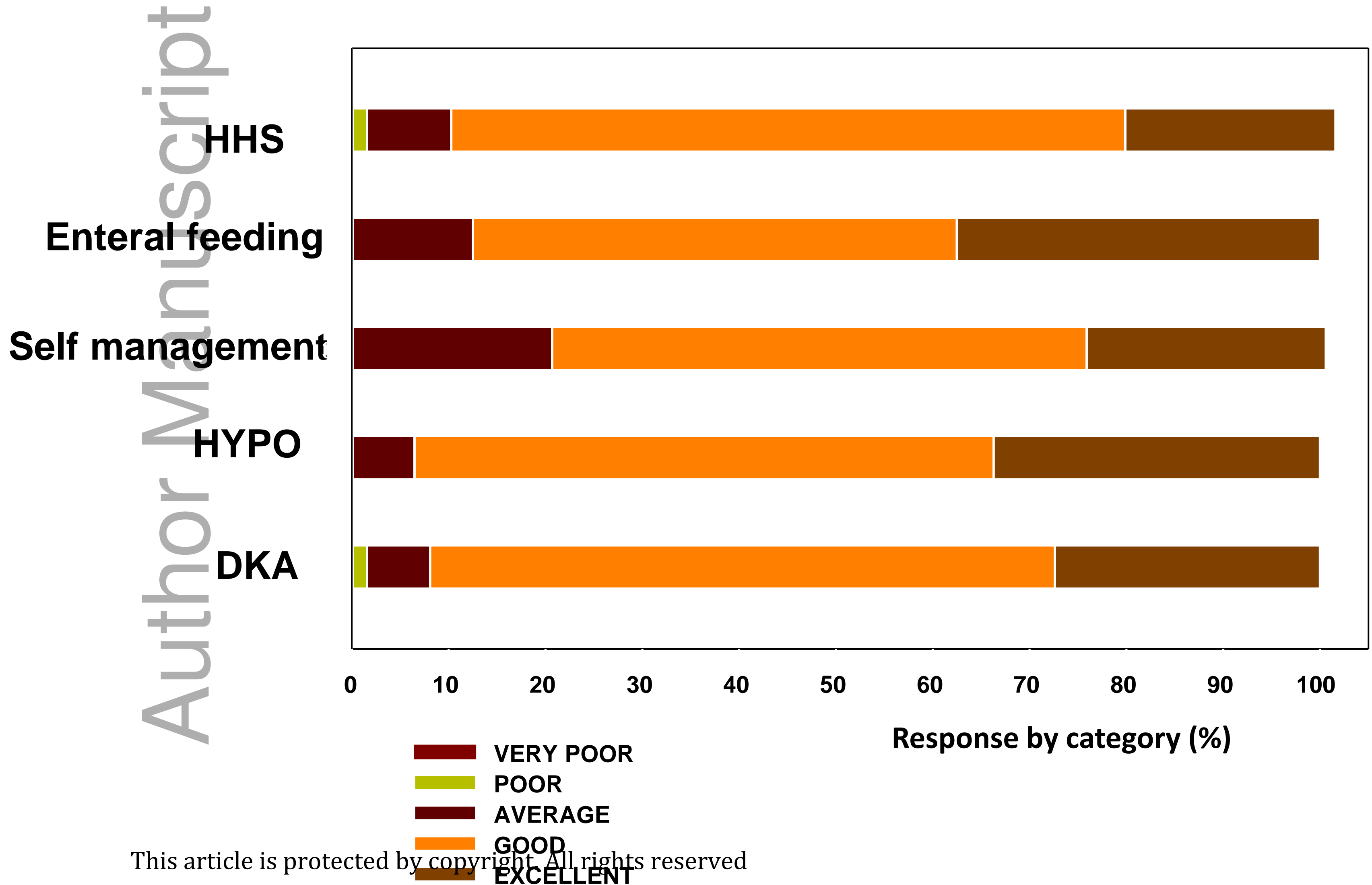
# Figure 2c Clinical perception of quality

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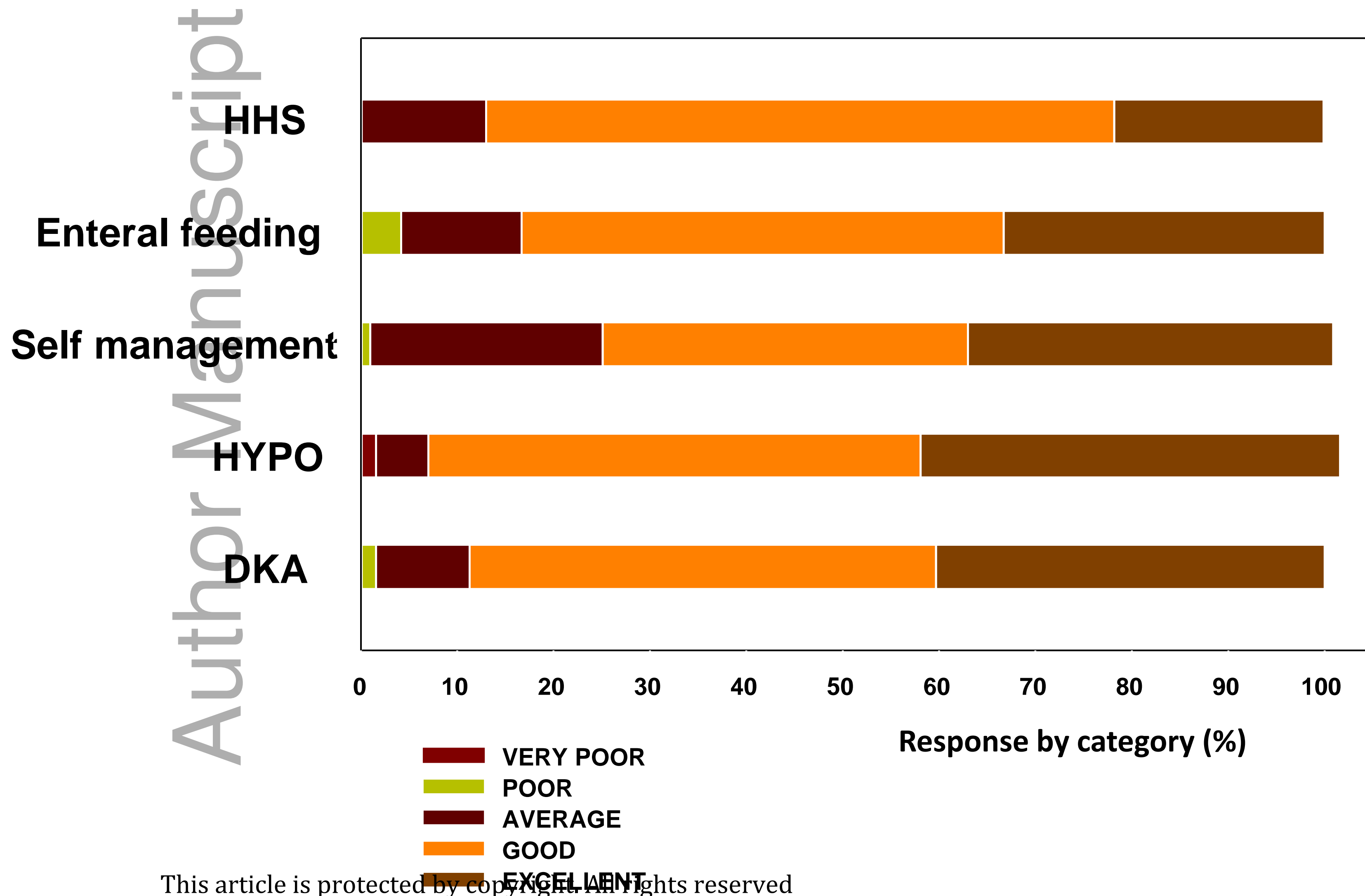
## Figure 2d Impact on patient safety

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Title:
Joint British Diabetes Societies for Inpatient Care: clinical guidelines and improving inpatient diabetes care.

Date:
2018-08

Citation:
Sampson, M., Jones, C. & Joint British Diabetes Societies (JBDS) for Inpatient Care, (2018). Joint British Diabetes Societies for Inpatient Care: clinical guidelines and improving inpatient diabetes care.. Diabet Med, 35 (8), pp.988-991. https://doi.org/10.1111/dme.13672.

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