



Published in final edited form as:

JAMA Intern Med. 2016 November 01; 176(11): 1714–1716. doi:10.1001/jamainternmed.2016.5046.

Inclusion of Hypoglycemia in Clinical Practice Guidelines and Performance Measures in the Care of Patients With Diabetes

Rene Rodriguez-Gutierrez, MD, MSc, Naykky Singh Ospina, MD, MSc, Rozalina G. McCoy, MD, MS, Kasia J. Lipska, MD, Nilay D. Shah, PhD, Victor M. Montori, MD, MSc, and for the Hypoglycemia as a Quality Measure in Diabetes Study Group

Health care organizations use publicly reported performance measures for quality measurement and improvement and pay-for-performance initiatives.¹ These measures should ideally promote high-quality care that is evidence based and congruent with clinical practice guidelines. However, they should also reward patient-centered care that yields optimal outcomes with the lowest risk of harm.² For patients with both type 1 and type 2 diabetes, high-quality care should therefore minimize the risk of hypoglycemia.² The degree to which existing performance measures are aligned with guidelines, particularly in regard to hypoglycemia avoidance, is uncertain. We therefore conducted an environmental scan to assess the inclusion and prioritization of hypoglycemia in contemporary clinical guidelines and performance measures for patients with diabetes.

Methods

A 2-step environmental scan process was used to identify contemporary guidelines and performance measures from January 1, 2010, to March 15, 2016. The terms *diabetes*, *guidelines*, and *standards of care* were used to identify clinical guidelines about diabetes. This search was strengthened with a search in the National Guideline Clearinghouse. *Diabetes*, *quality*, *performance measures*, *quality-metric*, and *quality measure* were used to identify quality measures initiatives. A comprehensive search was also performed in the National Quality Measures Clearinghouse. Chance-adjusted agreement for selection of guideline and performance measures initiatives between reviewers working independently

Author Contributions: Drs Montori and Rodriguez-Gutierrez had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: Rodriguez-Gutierrez, Singh Ospina, Lipska, Montori.

Acquisition, analysis, or interpretation of data: Rodriguez-Gutierrez, Singh Ospina, McCoy, Montori.

Drafting of the manuscript: Rodriguez-Gutierrez.

Critical revision of the manuscript for important intellectual content: Rodriguez-Gutierrez, Singh Ospina, McCoy, Lipska, Montori.

Statistical analysis: Singh Ospina.

Obtaining funding: Rodriguez-Gutierrez.

Administrative, technical, or material support: Rodriguez-Gutierrez, Singh Ospina, Montori.

Study supervision: Rodriguez-Gutierrez.

Conflict of Interest Disclosures: Dr Lipska reported receiving support from the Centers for Medicare & Medicaid Services to develop and maintain publicly reported quality measures. No other disclosures were reported.

Group Members: The members of the Hypoglycemia as a Quality Measure in Diabetes Study Group are as follows: Yogish C. Kudva, MBBS, Kasia J. Lipska, MD, Rozalina G. McCoy, MD, MS, Victor M. Montori, MD, MSc, Rene Rodriguez-Gutierrez, MD, MSc, Nilay D. Shah, PhD, Naykky Singh Ospina, MD, MSc, and Henry H. Ting, MD, MBA.

Additional Contributions: Patricia Erwin, MLS, expert librarian from the Mayo Clinic, provided valuable assistance with the search strategy. She was not financially compensated for this service.

was excellent ($\kappa = 0.83$ and $\kappa = 0.91$, respectively). Disagreements were resolved by consensus. Eligible guidelines and performance measures were the latest published full-text versions of systematically developed statements produced under the auspices of medical specialty or professional associations or public or private organizations at a federal, state, or local level. Neither institutional review board approval nor patient consent was required.

Results

We identified 18 diabetes practice guidelines and 23 performance measures initiatives. All practice guidelines advocated for hypoglycemia ascertainment and treatment, although supported by evidence at varying risk of bias (Table 1). However, only 2 organizations, the National Institute of Health Excellence and the National Information Diabetes Service in the United Kingdom, had issued corresponding performance measures that addressed hypoglycemia. These measures addressed severe not mild hypoglycemia (Table 2), defined as hypoglycemic events that required assistance of others for treatment. The remaining 21 performance measures did not address hypoglycemia ascertainment, treatment, or prevention. In contrast, 80% to 90% of diabetes care performance measure initiatives included multiple surrogate outcome or process measures, such as hemoglobin A_{1c} measurement and target level; low-density lipoprotein cholesterol target level; blood pressure control; nephropathy, retinopathy, and neuropathy screening; smoking cessation; and aspirin use for patients with atherosclerotic cardiovascular disease.

Discussion

The goals of diabetes care are to increase the patients' longevity, decrease the risk of acute and chronic complications, and increase the health-related quality of life. Considering the substantial morbidity, associated mortality, and decreased quality of life caused by hypoglycemia,³⁻⁶ its prevention is an integral part of patient-centered diabetes care along with hemoglobin A_{1c} control, as reinforced by clinical practice guidelines. However, it remains surprising that less than 10% of the initiatives included a corresponding hypoglycemia performance measure. Efforts are under way to develop reliable, measurable, actionable, and meaningful hypoglycemia measures. These measures may include documentation of hypoglycemic events at each visit, hypoglycemia awareness and management education programs, prescription and patient use of diabetes medical alerts, or prescriptions of glucagon and/or glucose tablets. Engagement of patients to identify and address precipitating causes of hypoglycemia, including treatment regimen change, can also be recorded. When carefully constructed and implemented, a hypoglycemia-focused performance measure would serve as a counterbalance for the current measures. It would be a paradigm shift in the care for patients with diabetes because it would facilitate a holistic approach that prioritizes not only efficacy but also safety and patient-centeredness of diabetes care.

References

1. National Quality Forum. [Accessed March 15, 2016] Endocrine measures. <http://www.qualityforum.org/projects/endocrine/?section=CandidateConsensusStandardsReview2013-12-092014-04-02>. Published 2014.

2. Rodriguez-Gutierrez R, Lipska KJ, McCoy RG, Ospina NS, Ting HH, Montori VM. Hypoglycemia as a Quality Measure in Diabetes Study Group. Hypoglycemia as an indicator of good diabetes care. *BMJ*. 2016; 352:i1084. [PubMed: 26951142]
3. McCoy RG, Van Houten HK, Ziegenfuss JY, Shah ND, Wermers RA, Smith SA. Increased mortality of patients with diabetes reporting severe hypoglycemia. *Diabetes Care*. 2012; 35(9):1897–1901. [PubMed: 22699297]
4. Goto A, Arah OA, Goto M, Terauchi Y, Noda M. Severe hypoglycaemia and cardiovascular disease: systematic review and meta-analysis with bias analysis. *BMJ*. 2013; 347:f4533. [PubMed: 23900314]
5. Zoungas S, Patel A, Chalmers J, et al. ADVANCE Collaborative Group. Severe hypoglycemia and risks of vascular events and death. *N Engl J Med*. 2010; 363(15):1410–1418. [PubMed: 20925543]
6. McCoy RG, Van Houten HK, Ziegenfuss JY, Shah ND, Wermers RA, Smith SA. Self-report of hypoglycemia and health-related quality of life in patients with type 1 and type 2 diabetes. *Endocr Pract*. 2013; 19(5):792–799. [PubMed: 23757608]

Table 1

Clinical Practice Guidelines for Patients With Diabetes

Guideline Author, Year	Country
American Diabetes Association, 2016	United States
American Association of Clinical Endocrinologist and American College of Endocrinology, 2016	United States
National Institute for Health Excellence, 2015	United Kingdom
American Diabetes Association and the European Association for the Study of Diabetes, 2015	United States and Europe
Royal Australian College of General Practitioners and Diabetes Australia, 2014–2015	Australia
Health Technology Assessment Section Medical Development Division Ministry of Health Malaysia, 2015	Malaysia
Joslin Diabetes Center Guidelines, 2014	United States
Institute for Clinical Systems Improvement Guidelines, 2014	United States
Canadian Diabetes Association, 2013	Canada
Association Latinoamericana de Diabetes, 2013	Multiples countries (approximately 30)
Health Improvement Scotland, SIGN	Scotland
The Japan Diabetes Society, 2013	Japan
International Diabetes Federation, 2012	160 Countries
Society for Endocrinology, Metabolism and Diabetes of South Africa, 2012	South Africa
Society of Endocrinology, Metabolism and Diabetes in South Africa, 2012	South Africa
University of Michigan Health System, 2012	United States
Kidney Disease Outcomes Quality Initiative	United States
Veterans Affairs Guideline and Department of Defense, 2010	United States

^aAll of the guidelines include a recommendation on hypoglycemia. Most guidelines state that a less stringent glucose goal should be considered (hemoglobin A_{1c}, 7%–8% [to convert to proportion of hemoglobin, multiply by 0.01]) in patients with a history of severe hypoglycemia, limited life expectancy, advanced renal disease or macrovascular complications, extensive comorbid conditions, or long-standing diabetes mellitus in which the hemoglobin A_{1c} goal has been difficult to attain despite intensive efforts as long as the patient remains free of polydipsia, polyuria, polyphagia, and other hyperglycemia-associated symptoms.

Table 2

Performance Measures Initiatives for Patients With Diabetes

Institution, Year	Country	Hypoglycemia as Quality Measure
National Institute for Health and Care Excellence, 2011	United Kingdom	Yes
National Diabetes Information Service, 2011	United Kingdom	Yes
Health Resources and Services Administration, 2012	United States	No
International Diabetes Federation, 2012	170 Countries and 230 national diabetes associations	No
Australian Institute of Health and Welfare, 2013	Australia	No
Centers for Medicare & Medicaid Services electronic health records, 2014	United States	No
National Quality Forum, 2014	United States	No
Institute of Clinical Systems Improvement, 2014	United States	No
American Board of Family Medicine, 2014	United States	No
Ministerio de Salud Resolucion No. 1156/2014, 2014	Argentina	No
National Committee for Quality Assurance, 2015	United States	No
Pharmacy Quality Alliance, 2015	United States	No
Minnesota Health Scores, the D5 for Diabetes, 2015	United States	No
Diabetes Collaborative Registry, 2015	United States	No
BlueCross BlueShield, 2015	United States	No
Wisconsin Collaborative Health Care, 2015	United States	No
Accountable care organizations, 2015	United States	No
Physician Quality Reporting System, 2015	United States	No
Sharp Rees-Stealy Medical Group D-9, 2015	United States	No
Health Technology Assessment Section Medical Development Division Ministry of Health Malaysia, 2015	Malaysia	No
Ministry of Health Singapore, 2015	Singapore	No
University of Michigan Health System, 2015	United States	No
The Healthcare Effectiveness Data and Information Set, 2016	United States	No