A National Survey of Physicians' Views on the Importance and Implementation of Deintensifying Diabetes Medications

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ABSTRACT

BACKGROUND: Guidelines recommend deintensifying hypoglycemia-causing medications for older adults with diabetes whose hemoglobin A1c is below their individualized target, but this rarely occurs in practice.

OBJECTIVE: To understand physicians' decision-making around deintensifying diabetes treatment.

DESIGN: National physician survey.

PARTICIPANTS: US physicians in general medicine, geriatrics, or endocrinology providing outpatient diabetes care.

MAIN MEASURES: Physicians rated the importance of deintensifying diabetes medications for older adults with type 2 diabetes, and of switching medication classes, on 5-point Likert scales. They reported the frequency of these actions for their patients, and listed important barriers and facilitators. We evaluated the independent association between physicians' professional and practice characteristics and the importance of deintensifying and switching diabetes medications using multivariable ordered logistic regression models.

KEY RESULTS: There were 445 eligible respondents (response rate 37.5%). The majority of physicians viewed deintensifying (80%) and switching (92%) diabetes medications as important or very important to the care of older adults. Despite this, one-third of physicians reported deintensifying diabetes medications rarely or never. While most physicians recognized multiple reasons to deintensify, two-thirds of physicians reported barriers of short-term hyperglycemia and patient reluctance to change medications or allow higher glucose levels. In multivariable models, geriatricians rated deintensification as more important compared to other specialties (p=0.027), and endocrinologists rated switching as more important compared to other specialties (p<0.006). Physicians with fewer years in practice rated higher importance of deintensification (p<0.001) and switching (p=0.003).

CONCLUSIONS: While most US physicians viewed deintensifying and switching diabetes medications as important for the care of older adults, they deintensified infrequently. Physicians had ambivalence about the relative benefits and harms of deintensification and viewed it as a potential source of conflict with their patients. These factors likely contribute to clinical inertia, and studies focused on improving shared decision-making around deintensifying diabetes medications are needed.

KEY WORDS: diabetes mellitus, type 2; aging; deprescriptions; hypoglycemia; drug-related side effects and adverse reactions

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INTRODUCTION

Guidelines for the care of older adults with diabetes emphasize individualizing the intensity of glycemic control by patients' health and function.[1–4] It takes years to realize benefits from tighter glycemic control, which become minimal where life expectancy is limited.[5, 6] Susceptibility to adverse effects of diabetes medications increases with aging.[7, 8] Therefore, optimizing the balance of diabetes treatment in older adults will often require deintensifying (decreasing or stopping) diabetes medications.

Deintensification is especially important for the classes of diabetes medications that cause hypoglycemia: insulin, sulfonylureas, and meglitinides. Hypoglycemia is a major cause of hospitalization for older adults and contributes to morbidity and lower quality of life.[8–19] There is broad consensus that hypoglycemia-causing medications should be deintensified for older adults with hemoglobin A1c (HbA1c) below their individualized target.[1–4, 20] Despite this, deintensifying

diabetes therapy occurs infrequently in outpatient practice, even among patients with low HbA1c levels and limited life expectancy.[21]

While some research has explored patient perspectives on deintensifying diabetes medications, there are little data examining the perspectives and decision-making of physicians.[22] To fill this gap, we conducted a national survey of physicians examining the decision to deintensify diabetes therapy for older adults with type 2 diabetes. In a previous report from this survey, we described how a minority of physicians deintensified hypoglycemia-causing medications in clinical scenarios of older adults with HbA1c below their individualized target.[23] Here we analyze physicians' responses about their perspectives and practices on deintensification to investigate the motivations for their decision-making.

METHODS

This study is a national survey of US physicians practicing in general medicine (internal medicine, family medicine/general practice, or medicine-pediatrics), geriatrics, or endocrinology. Physicians were excluded if they were trainees or did not routinely provide outpatient care to older adults with type 2 diabetes by self-report. Physicians were identified using the American Medical Association (AMA) Physician Masterfile, a list of all practicing US physicians (not just AMA members) maintained through medical education and physician certification data.[24] The survey was sent to 1950 physicians: 525 in general medicine, 525 in geriatrics, and 900 in endocrinology. The total sample size was chosen based on feasibility, and to achieve sufficient response from each specialty to facilitate comparisons. Endocrinologists were oversampled due to lower response rates on prior surveys.[25–28] A random sample of physicians was selected from all US physicians in each specialty category practicing in the outpatient setting. Details of physician sampling can be found in our prior publication.[23]

A paper survey was mailed on June 7, 2021, and responses were received between June 2021 and March 2022. We used multiple methods to maximize response rates including hand-addressed envelopes, a $10 Amazon gift card in the first mailing, two additional mailings and three emails to non-respondents, and the option to respond via stamped return envelope or online.[29–31] We placed phone calls to nonrespondents' offices to ascertain eligibility. The Johns Hopkins University School of Medicine Institutional Review Board determined that this study qualifies as exempt research.

The survey instrument was developed using a participatory action research process in which we recruited the following stakeholders to form a survey design team: three older adults with diabetes, two caregivers for older adults with diabetes, two internal medicine physicians, two geriatricians, one endocrinologist, and one pharmacist.[32] The survey design team met by video conference to review relevant diabetes guidelines, define survey objectives, and iteratively develop and refine the survey content.[6, 33] We then pilot-tested the survey for clarity among three physicians using cognitive interviewing, and minimal changes were needed.[34]

The final survey was six pages and took approximately 10 min to complete. Physicians were asked to consider patients aged 65 years or older with type 2 diabetes that they manage in their practice, and were asked about their decision to (1) deintensify (decrease or stop) diabetes medications, and (2) switch to a different diabetes medication class. Physicians were asked to rate the importance of each of these actions on 5-point Likert scales, from "not at all important" to "very important." Physicians were also asked how often they took these actions for the patients they have seen in the last 3 months: "never," "rarely (<5% of patients)," "sometimes (~25% of patients)," "about half the time (~50% of patients)," or "more than half the time." We did not ask physicians about their practices for patient subgroups with different HbA1c levels and health status because we considered these questions to have too high of a cognitive burden. Physicians were then asked to select, from a list of potential barriers to deintensifying diabetes medications (identified from the literature and survey design team experience), which they felt were important with the option of a free-text entry.[27, 35] They were asked to select important reasons for deintensification in the same fashion.

Physicians self-reported their demographics, primary specialty, and professional and practice characteristics at the end of the survey. The AMA Masterfile also provided data on physicians' age, years in practice, and practice location; self-reported data were used, rather than data from the AMA Masterfile, when both were available (Appendix Table 1). Physicians' practice type was analyzed in categories of hospital-affiliated outpatient, private solo or group, government, or other/no response. Physicians reported the percent of patients at their practice with private insurance as free-text.

The response rate was calculated by dividing the number of responding physicians by the total who received the survey. We compared physicians' responses about the importance and frequency of deintensifying versus switching diabetes medications using the Wilcoxon sign rank test. We compared physicians' responses about importance and frequency across specialties using the Kruskal-Wallis test. We compared barriers and reasons to deintensify diabetes medications across specialties using Chi-squared tests. We analyzed the independent association between physicians' professional and practice characteristics and their Likert scale ratings of the importance of deintensification using a multivariable ordered logistic regression model. Ordered logistic regression examines the effects of each predictor on a single-unit change in

monotonic outcome categories (in this case, Likert scale responses).[36] Ordered logistic models were deemed appropriate as all predictors met the proportional odds assumption (i.e., their effects were consistent across levels of the outcome).[36] We analyzed the association between physicians' characteristics and the importance of switching diabetes medications using a separate ordered logistic model. All analyses were conducted in Stata version 14, and a two-sided p-value <0.05 was considered statistically significant.

RESULTS

Survey Respondents

Of 1623 delivered surveys, 608 physicians responded and 445 were eligible. The response rate was 37.5% overall, and 38.3%, 30.0%, and 40.8% from physicians in general medicine, geriatrics, and endocrinology, respectively. Respondents and nonrespondents had no significant differences in age, gender, years in practice, or the metropolitan statistical area of their practice. Respondents completed on average 98% of survey content questions. A detailed flow diagram of survey responses and reasons for ineligibility can be found in our previous report.[23]

The mean age of eligible physicians was 52 years with 21 years in practice (Table 1). Half of physicians were female, 65% were white, 24% Asian, 5% Black or African American, and 6% Hispanic. Physicians of different specialties had similar demographics and years in practice, but different practice types and locations.

Importance of Deintensifying and Switching Diabetes Medications

The majority of physician (80%) rated deintensifying diabetes medications as important (48%) or very important (31%) for the care of older adults (Fig. 1). Nearly all physicians (92%) rated switching diabetes medications as important (48%) or very important (44%). Physicians' ratings of importance were significantly higher for switching diabetes medications than for deintensifying (p<0.001). Geriatricians were more likely than other specialties to rate deintensifying diabetes medications as very important, and endocrinologists were more likely to rate switching medications as very important (Appendix Table 2).

Frequency of Deintensifying and Switching Diabetes Medications

Most physicians (57%) reported deintensifying diabetes medications for older adults with type 2 diabetes "sometimes," i.e., for approximately 25% of the patients they have seen in the past 3 months (Fig. 1). Approximately one-third of physicians deintensified diabetes medications rarely (<5% of patients) or never. Regarding switching diabetes medications, most physicians (57%) switched sometimes (~25% of their patients). One-third of physicians switched medications for ≥50% of their patients, and 17% switched medications rarely or never. Physicians reported switching diabetes medications significantly more often than they deintensified diabetes medications (p<0.001). Geriatricians deintensified diabetes medications significantly more often than other specialties, and endocrinologists switched diabetes medications significantly more often than other specialties (Appendix Table 2).

Barriers and Facilitators of Deintensification

Physicians reported a mean of 3.8 barriers to deintensification. Two of the top three barriers were related to physicians' views of their patients' preferences (Table 2). Approximately two-thirds of physicians were concerned that patients and/or their families were reluctant to let their blood glucose run higher, or reluctant to change their current diabetes medications. The other most common barriers were related to potential health consequences of deintensifying: 65% of physicians were concerned about increasing the risk for clinically significant hyperglycemia in the short-term, and 38% were concerned about causing long-term diabetes complications. A substantial minority (20–30%) of physicians reported barriers to deintensification of causing patients to feel abandoned, a lack of clear practice guidelines, negatively affecting diabetes performance metrics, or insufficient time in patient visits. Of the 7% of physicians who included a free-text barrier, the majority responded that newer diabetes medications had prohibitive cost.

Physicians reported a mean of 5.8 reasons for deintensification, and all of the reasons asked were selected by the majority of physicians as important (Table 3). The top three reasons were reducing the risk for hypoglycemia (98% of physicians), reducing medication cost (79%), and reducing the risk for other adverse drug effects (76%). Approximately two-thirds of physicians selected the following reasons: the patient had limited life expectancy, the patient had HbA1c below guidelines, reducing burdens of administering medications, and reducing polypharmacy. The 8% of physicians who included a free-text reason gave a variety of responses including changes in patients' health, adding a medication with cardiovascular or renal benefits, and following patients' wishes.

There were significant differences in barriers and reasons to deintensify by physician specialty (Tables 2 and 3). Notably, endocrinologists were the most likely, and geriatricians the least likely, to select short-term hyperglycemia as an important barrier. General medicine physicians were more likely than both other specialties to select causing long-term diabetes complications or affecting diabetes quality metrics. Geriatricians were more likely to select medication burden, polypharmacy, and limited life expectancy as important reasons for deintensification.

Table 1 Characteristics of Included Physicians, Overall and by Specialty

Characteristic	All physicians (*N*=445)	General medicine (*N*=133)	Geriatrics (*N*=73)	Endocrinology (*N*=239)	*p*-value*
Age, years, mean (SD)†	51.8 (11.9)	53.3 (11.5)	50.9 (10.7)	51.3 (12.5)	0.19
Gender					0.36
Female	227 (51.0)	59 (44.4)	41 (56.2)	127 (53.1)	
Male	215 (48.3)	73 (54.9)	31 (42.5)	111 (46.4)	
Other gender	3 (0.7)	1 (0.8)	1 (1.4)	1 (0.4)	
Race					0.45
American Indian or Alaskan Native	1 (0.2)	0	0	1 (0.4)	
Asian	107 (24.0)	31 (23.3)	22 (30.1)	54 (22.6)	
Black or African American	20 (4.5)	9 (6.8)	2 (2.7)	9 (3.8)	
Native Hawaiian or other Pacific Islander	1 (0.2)	0	1 (1.4)	0	
White	290 (65.2)	86 (64.7)	45 (61.6)	159 (66.5)	
Other race or multiple	9 (2.0)	3 (2.3)	0	6 (2.5)	
No response	17 (3.8)	4 (3.0)	3 (4.1)	10 (4.2)	
Ethnicity					0.76
Hispanic or Latino	27 (6.1)	6 (4.5)	5 (6.9)	16 (6.7)	
Not Hispanic or Latino	402 (90.3)	124 (93.2)	65 (89.0)	213 (89.1)	
No response	16 (3.6)	3 (2.3)	3 (4.1)	10 (4.2)	
Years in practice, mean (SD)†	21.0 (12.2)	22.2 (12.3)	18.9 (11.9)	21.0 (12.2)	0.11
Years in practice categories					0.10
<10	82 (18.4)	20 (15.0)	15 (20.6)	47 (19.7)	
10–19	136 (30.6)	37 (27.8)	30 (41.1)	69 (28.9)	
20+	227 (51.0)	76 (57.1)	28 (38.4)	123 (51.5)	
Hours per week in direct clinical care					0.25
<20	72 (16.2)	21 (15.6)	18 (24.7)	33 (13.8)	
20–29	88 (19.8)	22 (16.5)	17 (23.3)	49 (20.5)	
30–39	148 (33.3)	49 (36.8)	23 (31.5)	76 (31.8)	
40+	127 (28.5)	39 (29.3)	13 (17.8)	75 (31.4)	
No response	10 (2.3)	2 (1.5)	2 (2.7)	6 (2.5)	
Type of practice					0.001
Private solo or group practice	168 (38.8)	49 (36.8)	16 (21.9)	103 (43.1)	
Hospital-affiliated outpatient practice	207 (46.5)	60 (45.1)	34 (46.6)	113 (47.3)	
Health maintenance organization	19 (4.3)	8 (6.0)	8 (11.0)	3 (1.3)	
Community health center	15 (3.4)	8 (6.0)	4 (5.5)	3 (1.3)	
Non-federal government clinic	8 (1.8)	1 (0.8)	3 (4.1)	4 (1.7)	
Federal government clinic	16 (3.6)	5 (3.8)	5 (6.9)	6 (2.5)	
No response	12 (2.7)	2 (1.5)	3 (4.1)	7 (2.9)	
Practice location					<0.001
Urban	183 (41.1)	45 (33.8)	33 (45.2)	105 (43.9)	
Suburban	199 (44.7)	57 (42.9)	27 (37.0)	115 (48.1)	
Rural	47 (10.6)	27 (20.3)	9 (12.3)	11 (4.6)	
No response	16 (3.6)	4 (3.0)	4 (5.5)	8 (3.4)	
% of patients with insurance type, mean (SD)†					
Private	38.2 (21.8)	36.7 (22.6)	17.9 (19.6)	44.9 (17.8)	0.001
Medicare	41.1 (20.3)	38.3 (21.9)	57.1 (27.3)	38.1 (14.0)	0.001
Medicaid, Medicare, or other state program	16.2 (18.5)	18.3 (19.7)	21.4 (23.0)	13.5 (15.7)	0.027
Uninsured or self-pay	4.5 (9.6)	6.7 (14.5)	3.6 (6.7)	3.5 (6.0)	0.004

Data are *n* (% of column) or mean (SD) where indicated

*p-value compares characteristic across specialties by Chi-squared test or Kruskal-Wallis test

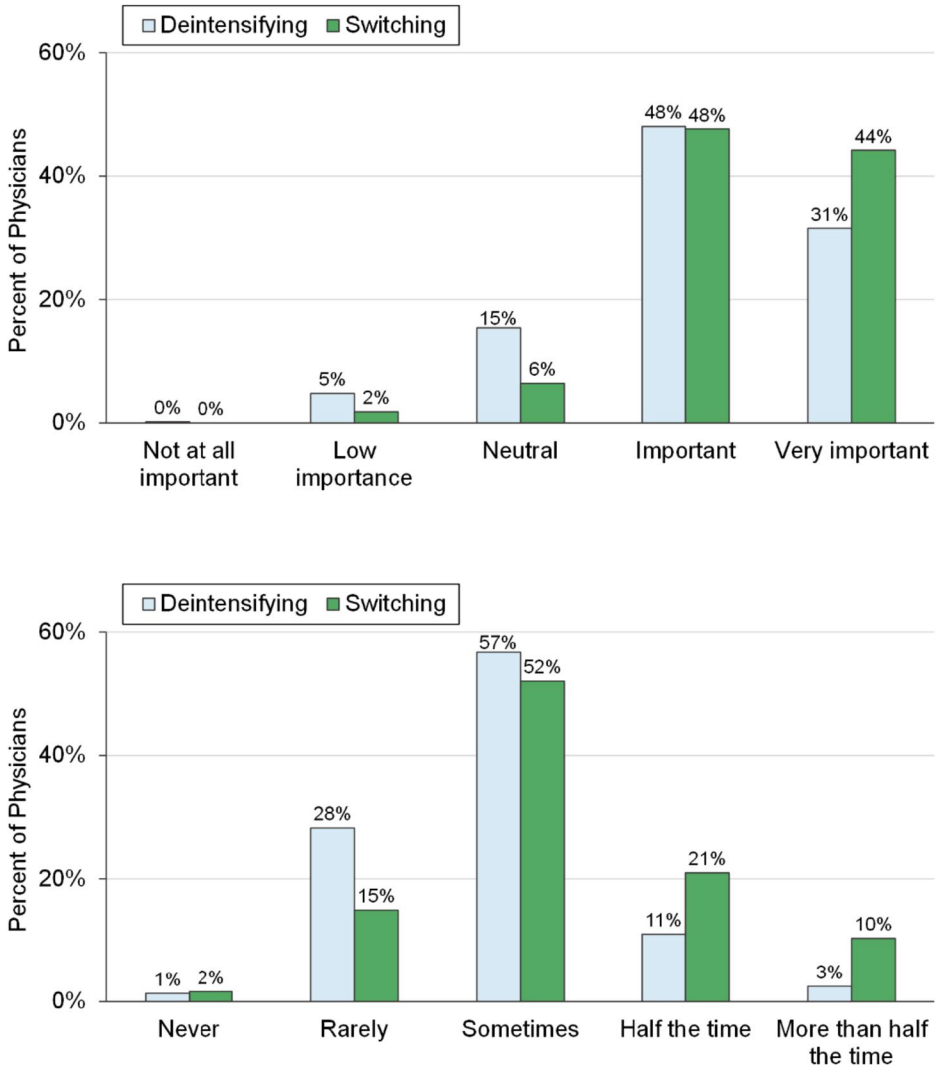
†There were 7.4% missing data for insurance type, and no missing data for age or years in practice, which used data from the AMA Masterfile if not reported by survey respondents

Physician Characteristics Associated with Deintensifying and Switching Diabetes Medications

In multivariable models, physicians' primary specialty and years in practice were the only characteristics independently associated with their ratings of the important of deintensifying/switching diabetes medications (Fig. 2, Appendix Table 3). Physicians' specialty and years in practice were also independently associated with the frequency of deintensifying and switching diabetes medications, in a similar pattern as their ratings of importance (Appendix Figure 1 and Appendix Table 4).

DISCUSSION

In this national survey, the vast majority of US physicians viewed both deintensifying and switching diabetes medications as important for the care of older adults. Despite



Physicians were asked to think about their patients aged 65 years or older for whom they manage type 2 diabetes and have seen in the last three months. Deintensifying was described as reducing or stopping a diabetes medication. For question about frequency (lower panel), "rarely" was described as "<5% of patients", "sometimes" as "~25% of patients", and "half the time" as "~50% of patients."

Fig. 1 Physicians' self-reported importance (upper panel) and frequency (lower panel) of deintensifying or switching diabetes medications for older adults with type 2 diabetes.

Table 2 Physicians' Barriers to Deintensifying Diabetes Medications, Overall and by Specialty

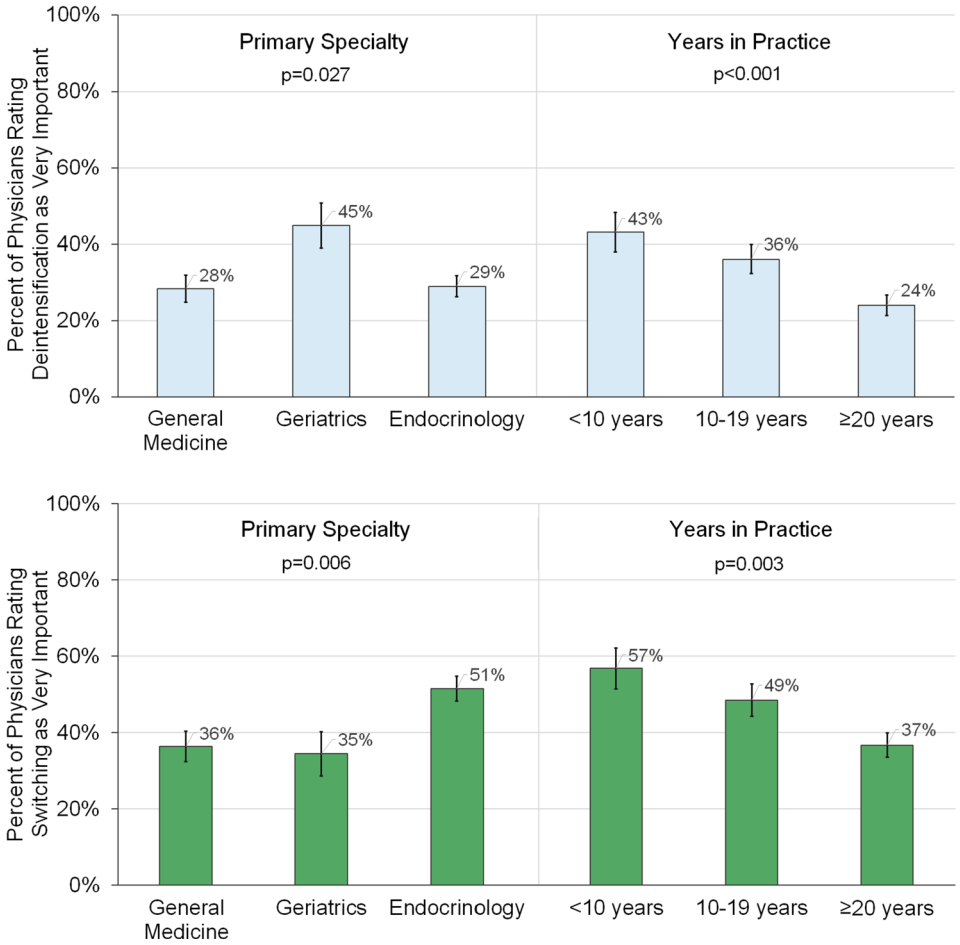
Barriers to deintensifying diabetes medications	*N* (%) selecting as important barrier				*p*-value*
	Overall	General medicine	Geriatrics	Endocrinology	
Patients and/or their family are reluctant to let their blood sugar run higher	302 (67.9)	81 (60.9)	54 (74.0)	167 (69.9)	0.10
Increasing the risk for clinically significant hyperglycemia in the short-term	290 (65.2)	79 (59.4)	35 (48.0)	176 (73.6)	<0.001
Patients and/or their family are reluctant to change their current medications	272 (61.1)	82 (61.7)	54 (74.0)	136 (56.9)	0.032
Increasing the risk for diabetes complications in the long-term	168 (37.8)	61 (45.9)	19 (26.0)	88 (36.8)	0.018
Causing patients and/or their family to feel that you have given up on them	128 (28.8)	49 (36.8)	19 (26.0)	60 (25.1)	0.048
A lack of clear practice guidelines for when and how to deintensify	123 (27.6)	41 (30.8)	20 (27.4)	62 (25.9)	0.60
Negatively affecting diabetes quality metrics	117 (26.3)	50 (37.6)	21 (28.8)	46 (19.3)	0.001
Insufficient time or competing clinical demands in patient visits	98 (22.0)	39 (29.3)	15 (20.6)	44 (18.4)	0.049
Interfering with another provider's treatment plan	80 (18.0)	25 (18.8)	24 (32.9)	31 (13.0)	0.001
Causing a negative patient outcome with medico-legal implications	65 (14.6)	27 (20.3)	11 (15.1)	27 (11.3)	0.06
Other barrier	32 (7.2)	6 (4.5)	3 (4.1)	23 (9.6)	0.10

*p-value compares responses across specialties by Chi-squared test

Table 3 Physicians' Reasons for Deintensifying Diabetes Medications, Overall and by Primary Specialty

Reasons for deintensifying diabetes medications	*N* (%) selecting as important reason				*p*-value*
	Overall	General medicine	Geriatrics	Endocrinology	
Reducing the risk for hypoglycemia	434 (97.5)	128 (96.2)	72 (98.6)	234 (97.9)	0.49
Reducing the cost of medications to the patient	350 (78.7)	111 (83.5)	54 (74.0)	185 (77.4)	0.22
Reducing the risk for medication side effects other than hypoglycemia	336 (75.5)	106 (79.7)	56 (76.7)	174 (72.8)	0.32
Reducing the burdens of administering medications (e.g., injections)	312 (70.1)	89 (66.9)	62 (84.9)	161 (67.4)	0.010
The patient's HbA1c is lower than the target recommended in guidelines	301 (67.6)	99 (74.4)	59 (80.8)	143 (59.8)	<0.001
The patient has a limited life expectancy (<5 years)	286 (64.3)	76 (57.1)	63 (86.3)	147 (61.5)	<0.001
Reducing the total number of medications the patient is taking	279 (62.7)	84 (63.2)	59 (80.8)	136 (56.9)	0.001
The patient is not taking the medication as prescribed	245 (55.1)	71 (53.4)	48 (65.8)	126 (52.7)	0.13
Other reason	35 (7.9)	10 (7.5)	6 (8.2)	19 (8.0)	0.98

*p-value compares responses across specialties by Chi-squared test



Each figure shows the results of a separate multivariable ordinal logistic regression models containing covariates for physicians' specialty, years in practice, hours per week in direct clinical care, practice type, practice location, and percentage of patients with private insurance. The model outcomes were responses to the importance of deintensifying (upper panel) and switching (lower panel) diabetes medications. The data shown are marginal effects estimates (with 95% confidence intervals) from the statistically significant predictors in each model, and the global p-value for each predictor. Predictors that were not statistically significant are not shown.

Fig. 2 Physicians' professional and practice characteristics independently associated with the importance of deintensifying (upper panel) or switching (lower panel) diabetes medications.

this, physicians reported deintensifying diabetes medications infrequently in practice. The most common barriers to deintensification, reported by approximately two-thirds of physicians, were concerns about causing hyperglycemia and that deintensification would be counter to their patients' wishes. These findings suggest that the majority of physicians view deintensifying diabetes medications as a potential source of conflict with their patients, and addressing this challenge will be critical to optimizing diabetes treatment for older adults.

While this study is the first to our knowledge exploring physicians' views on deintensifying and switching diabetes medications, we found that physicians perceived similar challenges as occur with deescalating care in other areas. For example, clinicians are often hesitant to discuss ceasing cancer screening when it is no longer indicated, and defer to patients' requests in these decisions.[37, 38] Caution is justified in these discussions as many older adults want to be screened for longer than recommended in guidelines and respond negatively to the suggestion that limited life expectancy guides screening decisions.[39, 40] However, most older adults are amenable to discussing screening cessation in the context of balancing benefits and harms, and patient education interventions can reduce rates of unnecessary screening.[40–42]

Concordantly, limited studies in diabetes suggest that patients and physicians can successfully partner around deintensifying therapy, despite physicians' concerns. A qualitative study of older adults with tight glycemic control found that while the majority feared higher glucose levels, they also wanted to discuss deintensification with a trusted provider.[22] Similar to findings in cancer screening, these older adults responded negatively to the idea of deintensifying diabetes medications for limited life expectancy, but responded positively to reducing adverse drug effects such as hypoglycemia. Together, these findings suggest that physicians are avoiding deintensification discussions unnecessarily, and can have these discussions successfully if they do so with care and empathy. There are currently limited tools to promote shared decision-making around deintensifying diabetes medications, and our findings suggest that more research in this area is sorely needed.[43]

We found that approximately one-third of physicians deintensified diabetes medications rarely or never. Deintensification is a complex clinical decision and rates will vary depending on the patient population served, so the optimal deintensification rate is uncertain. However, in our previous report from this survey, physicians were presented with clinical scenarios of older adults for whom deintensification was indicated according to guidelines.[23] Physicians deintensified diabetes medications infrequently in these scenarios, and at similar rates to their self-reported frequency of deintensification. Therefore, it is reasonable to extrapolate that physicians do not routinely deintensify diabetes medications when indicated according to guidelines, which translates into infrequent deintensification in their clinical practice.

Our findings also reveal that physicians are ambivalent about the relative benefits and harms of deintensifying diabetes medications, which may lead to therapeutic inertia. Nearly all physicians surveyed recognized multiple reasons for deintensification, especially to prevent hypoglycemia and other adverse drug events. In a prior survey, physician at two medical centers reported reasons they would discuss deintensification that were similar to our findings.[44] At the same time, substantial numbers reported that the risk of short-term hyperglycemia and long-term diabetes complications were major barriers. Based on our findings of low deintensification rates, the balance of these factors for most physicians leans heavily towards inaction. We previously reported that physicians selected more aggressive HbA1c targets than recommended in guidelines for older adults with complex and poor health status.[23] Together, these findings suggest that physicians are reluctant to sacrifice tighter glycemic control to achieve benefits of deintensification in medically complex older adults. As clinical trials have demonstrated that deintensifying hypoglycemia-causing medications can be achieved without causing significant hyperglycemia, concerns about short-term hyperglycemia may be unfounded.[45–47] However, studying the long-term effects of deintensification on clinical outcomes is a major challenge and there are currently minimal data.[48] Furthermore, while there is expert consensus that medically complex older adults should have permissive HbA1c targets, this population is highly heterogeneous in health and life expectancy, making these guidelines challenging to implement.[6, 49, 50] Therefore, more long-term data and actionable recommendations in guidelines are needed to guide physicians' decisions to deintensify diabetes therapy.

Another contributor to inertia against deintensification may be physicians' concerns about impacting their diabetes performance metrics. We found that one in four physicians overall, and more than one in three general medicine physicians, listed this as an important barrier. The widely used Healthcare Effectiveness Data and Information Set (HEDIS) measures include a diabetes control measure of HbA1c <8.0% that applies to most adults with diabetes, although institutions may adopt different metrics.[51, 52] The HEDIS measure for diabetes control excludes older adults in hospice or with frailty and advanced illness, although physicians may not be aware of these exclusions. In a prior survey, 42% of Veterans Affairs (VA) providers reported being concerned about performance metrics if a patient's HbA1c increased above 7.0%, although the VA had no such metric.[53] Therefore, reducing physicians' inertia towards deintensifying diabetes medications will likely require optimizing existing diabetes performance metrics

to not inappropriately penalize physicians, and increasing physicians' awareness of existing metrics and their exclusions.

We found that physicians' specialty and years in practice were independently associated with the frequency and importance of deintensification. Geriatricians rated the importance of deintensification higher than other specialties and were more likely to list polypharmacy and end of life issues as important reasons to deintensify. Endocrinologists were more likely to switch diabetes medications than other specialties and to list hyperglycemia as a major barrier to deintensification. Physicians with fewer years in practice reported higher importance and frequency of deintensifying and switching diabetes medication.[54] Overall, these findings suggest that diabetes deintensification practices may be affected by physician training and experience, and thus amenable to being optimized through medical education.

Strengths of this study include its national physician sample and survey development through collaboration with key stakeholders including older adults and caregivers. Limitations include a response rate of 37.5% with a lower response rate from geriatricians than other specialties, which may cause response bias. However, the overall pattern of responses was similar across specialties, so specialty differences did not drive the interpretation of the main findings. Survey responses may be subject to social desirability bias, which may have contributed to high ratings of deintensification importance; nevertheless, self-reported deintensification rates were low. Specialty differences in physicians' deintensification practices are likely affected by differences in clinical characteristics of the patients seen by different specialties, which we could not account for.[54]

In conclusion, this study identified that the patient physician relationship is central to deintensification decisions, and should thus be the target of interventions to promote evidence-based diabetes care for older adults. Tools to facilitate shared decision-making, optimizing diabetes quality metrics, and medical training that emphasizes individualized glycemic targets are all needed to increase rates of appropriate deintensification and avoid unnecessary harms of diabetes care.

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Author Contribution *S.J.P contributed to the study design, data acquisition, analysis, and discussion, and wrote the manuscript. R.J. contributed to data acquisition and background research, and reviewed and edited the manuscript. N.L.S., C.M.B., N.N.M., and N.M.M. contributed to study design, analysis, and discussion, and reviewed and edited the manuscript. O.T. and M.P.B. contributed to analysis and discussion, and reviewed and edited the manuscript. All the authors approved the final version of the manuscript. S.J.P. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.*

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Data Availability *The datasets used in the current study will be available from the corresponding author on reasonable request, after the primary manuscripts are published.*

Declarations

Conflict of Interest *Dr. Pilla received honoraria from the American Diabetes Association (ADA) for speaking at the ADA 2022 Scientific Sessions, the ADA 2023 Clinical Update Conference; for authoring the ADA Making Technology Work module on hypoglycemia; and for reviewing the ADA Diabetes Is Primary CE Certificate program. Dr. Boyd received honoraria for writing a chapter on Multiple Chronic Conditions for UpToDate, and a chapter on Falls in Older Adults for DynaMed.*

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