Published in final edited form as:

Endocr Pract. 2016 June ; 22(6): 689–698. doi:10.4158/EP151080.OR.

IMPROVEMENTS IN METABOLIC CONTROL IN ADULTS WITH TYPE 2 DIABETES FOLLOWING REFERRAL TO A DIABETES CENTER, 2005-2010

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Abstract

Objective: We aimed to compare metabolic control in adults with diabetes in the general population to those newly referred to a diabetes center and after 1 year of specialty care.

Methods—We performed a retrospective comparison of adults with diabetes aged ≥20 years data from the National Health and Nutrition Examination Survey (NHANES, n = 1,674) and a diabetes center (n = 3,128) from 2005–2010. NHANES participants represented the civilian, non-institutionalized U.S. population. Diabetes center referrals lived primarily around eastern Massachusetts. The proportion attaining targets for glycated hemoglobin A1c (A1c), blood pressure (BP), low-density lipoprotein (LDL) cholesterol, or all 3 (ABC control) and the proportion prescribed medications to lower A1c, BP, or cholesterol were evaluated.

Results—Compared to the general sample, a smaller proportion of new diabetes center referrals had A1c <7% (<53 mmol/mol, 24% vs. 53%, $P<.001$), BP <130/80 mm Hg (38% vs. 50%, $P<.001$), and ABC control (5.6% vs. 17%, $P<.001$) but not LDL <100 mg/dL (<2.6 mmol/L, 54% vs. 53%, $P=.65$). After 1 year, more diabetes center referrals attained targets for A1c (40%), BP (38%), LDL (67%), and ABC control (15%) ($P<.001$ for all versus baseline). ABC control was not different between the general sample and diabetes center referrals at 1 year ($P=.16$). After 1 year, a greater percentage of diabetes center referrals compared to the general sample were prescribed

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DISCLOSURE

A.G. served on the Endocrine and Metabolic Advisory Panel of the Food and Drug Administration and the Practice Guideline Committee of the American Diabetes Association. She receives grant support from the National Institute of Health and the American Diabetes Association, and Diachi Saynko. She has received support as a Lecturer from the American Diabetes Association, Japanese Diabetes Society, American Association of Clinical Endocrinologists, and Paradigm, and served as a consultant for Novo Nordisk and Partner's Healthcare. She receives supplies for investigator initiated work from Caraco Pharmaceuticals, Amneal Pharmaceuticals, Novo Nordisk, Lifescan (a Division of Johnson and Johnson), Nestle Inc, and Mercodia. Patents: Reducing Risk of Type 2 Diabetes, JDP-106; Treatment of Cardiovascular Disease with Salicylates, JDP-109; and Inhibiting Serum Response Factor (SRF) to Improve Glycemic Control, JDP-129. M.A. served as consultant for Novo Nordisk, Janssen Pharmaceuticals, Inc., Web MD Health Services, and Amgen. L.L. has served as a consultant for Sanofi, Novo Nordisk, Inc, Eli Lilly and Company, Bristol-Myers Squibb Company, Boehringer Ingelheim Pharmaceuticals, Inc, Johnson & Johnson, Roche Pharmaceuticals, Menarini, and Dexcom, Inc. The other authors have no multiplicity of interest to disclose.

medications to lower glucose (95% vs. 72%), BP (79% vs. 64%), and cholesterol (77% vs. 54%) (all $P<.001$).

Conclusion—Compared to the general population, glycemic control was significantly worse for adults newly referred to the diabetes center. Within 1 year of specialty care, ABC control increased 270% in the setting of significant therapy escalation. (**Endocr Pract.** 2016;22:000–000)

INTRODUCTION

Today, 29 million American adults have diabetes (1). Health costs attributable to diabetes were \$245 billion in 2012—a 47% increase from 2007 (2). Physician services such as outpatient visits to primary care providers (PCPs) and endocrinologists and medication prescriptions, account for 20% of diabetes-related costs (2), establishing the need for clinically effective outpatient care delivery models. The role of specialists in type 2 diabetes management remains an area of study due to the shortage of endocrinologists and uncertain effectiveness of specialty care (3,4).

Outpatient diabetes care addresses lifestyle and medication-based strategies to improve glycemic control (glycated hemoglobin A1c [A1c]), blood pressure (BP), and low-density lipoprotein (LDL) cholesterol, aiming to prevent or slow the progression of diabetes-related complications and cardiovascular disease (5). According to the results of the 2010 National Health and Nutrition Examination Survey (NHANES) less than half of adults with diabetes attained control of either A1c, BP, or LDL cholesterol (6). Only 18.8% of adults with diabetes simultaneously met targets for all 3 metabolic goals (7).

PCPs deliver over 80% of outpatient diabetes care in the U.S (8). Thus, epidemiologic evaluations of population samples, like NHANES cohorts, disproportionately reflect primary care experiences. Limited data describe metabolic outcomes attained in specialty settings, like endocrinology practices or multidisciplinary diabetes centers (9,10). Specialty care delivered in a community-based endocrinology practice from 2000 through 2004 was associated with greater goal attainment for A1c, BP, and LDL cholesterol compared to NHANES 1999–2000 (7,10). In a cohort of newly diagnosed Canadian adults, specialty care was not superior to primary care in improving long-term survival; however, there were more comorbidities in patients receiving specialty care (9). Other studies demonstrate favorable or neutral impact of specialist care on mortality (11,12). Current focus on high-value care places greater scrutiny on specialty providers and services where clinical effectiveness remains uncertain.

The objective of this study was to compare metabolic control of adults with diabetes newly referred to a multi-disciplinary diabetes center to adults with diabetes in the general U.S. population assessed by NHANES. Analyses of both data sets were limited to 2005 through 2010 to limit the impact of changes in clinical practice guidelines (13–17). We also evaluated longitudinal changes in metabolic control (A1c, BP, and LDL cholesterol) after 1 year of care at the diabetes center.

METHODS

Study Participants

Eligible persons were aged 20 years or older and had type 2 diabetes. Individuals were either newly referred to the diabetes specialty practice (“diabetes referrals”) or identified from the general population between 2005 and 2010. Persons diagnosed with diabetes under the age of 20 years were excluded to potential cases of type 1 diabetes. Individuals with diabetes duration <1 year were categorized as newly diagnosed.

Persons receiving specialty diabetes care were identified using Joslin Diabetes Center (Boston, MA) electronic health record (EHR), internally customized using the NextGen Ambulatory EHR, version 5.6 (NextGen Healthcare Information Systems, LLC, Horsham, PA). The EHR database includes administrative, demographic, clinical, and prescribing data since 2004. For diabetes referrals, type 2 diabetes was identified using a customized “diabetes type” field validated against diabetes-specific International Classification of Diseases, 9th revision codes in the EHR.

Data for adults with diabetes in the general population were obtained from NHANES, conducted by the National Center of Health Statistics (NCHS; Centers for Disease Control and Prevention, Atlanta, GA) (6). NHANES uses a stratified, multistage probability sampling design for a representative civilian, noninstitutionalized U.S. population as previously described (6). NHANES participants with diagnosed diabetes replied “Yes” to the question “Other than during pregnancy, have you ever been told by a doctor or health professional that you have diabetes or sugar diabetes?”

This study was approved by the Joslin Diabetes Center’s Committee on Human Studies and was determined to meet the definition of research not requiring informed consent.

Clinical Outcomes

Primary outcome measures were A1c, BP, and LDL cholesterol. BP was measured seated using a single reading from an automated BP device for diabetes referrals and an average of 3 to 4 mercury sphygmomanometer readings (excluding the first) for NHANES participants. A1c, total cholesterol, high-density lipoprotein cholesterol, and triglycerides were measured enzymatically; nonfasting and indirect LDL cholesterol levels were included (details in Methods Supplement)

Metabolic goals were based on targets set by the American Diabetes Association between 2005 and 2010: A1c <7% (<53 mmol/mol), BP <130/80 mm Hg, and LDL <100 mg/dL (<2.6 mmol/L). A composite outcome was defined as simultaneous attainment of A1c, BP, and LDL goals (“ABC control”). Weight status was based on body mass index (BMI); overweight and obesity were defined as BMI 25.0 to 29.9 kg/m² and BMI ≥30 kg/m², respectively.

Persons without any baseline data were excluded as were diabetes referrals without 1-year follow-up data. For diabetes referrals, baseline measures were assessed within 3 months of

initial visit; >90% occurred at first visit. One-year data were based on values 9 to 15 months following the initial assessment.

Medication Use

Medications approved by the Food and Drug Administration to lower A1c, BP, or cholesterol level were evaluated. Medication reconciliation was performed for diabetes center patients and documented in the EHR (details in Methods Supplement). Medication use by NHANES participants was assessed using standardized procedures. Medications not otherwise classified (e.g., Cycloset®) and used by <5% of persons were included in the respective “Any” category.

Statistical Analysis

Demographic and clinical information were assessed for diabetes referrals and NHANES participants overall and within three 2-year intervals (2005–2006, 2007–2008, and 2009–2010). Means, SEs, and percentages were calculated for continuous and categorical variables, respectively. Sample weights provided by NCHS were employed for statistical reductions to account for stratification and clustering in the NHANES sampling design. Comparisons between diabetes referrals and NHANES participants were conducted with unadjusted, independent *t* tests, and χ^2 analyses for continuous and categorical variables. Unadjusted paired *t* tests and the McNemar test for correlated proportions were used to compare diabetes referrals at the time of referral and after 1 year of specialty care. Tests for linear trend were assessed using 2-year intervals (2005–2006, 2007–2008, and 2009–2010) treated as a class variable in normal regression models. Data were analyzed using SAS software (V9.2, SAS Institute, Cary, NC).

Comparisons of metabolic data and medication use are sequentially presented for: (1) diabetes referrals at baseline and the general diabetes population, (2) diabetes referrals at baseline and after 1 year, and (3) diabetes referrals after 1 year of specialty care and the general diabetes population.

RESULTS

Figure 1 summarizes the populations. In absolute numbers, A1c and BP data were available for twice as many diabetes referrals compared to the general population, with similar numbers for LDL and composite ABC control data.

Table 1 summarizes characteristics for both samples. The mean ages for the diabetes referrals and general sample were similar (58.1 vs. 59.1 years, *P* = .08). A larger percentage of the general diabetes sample were female (51% vs. 43%, *P* < .001) and had private insurance (58% vs. 53%, *P* < .001) compared to the diabetes referrals.

Diabetes duration was more than 2 years longer in the general sample compared to diabetes referrals (9.8 vs. 7.5 years, *P* < .001). A greater proportion of diabetes referrals had newly diagnosed diabetes compared to the general sample (25% vs. 6%, *P* < .001). In both samples, 88% were overweight or obese, but obesity was more common in the general population (63% vs. 57%, *P* < .001).

Glycemic Control

The mean A1c was higher for diabetes referrals at base-line than for the general sample overall (8.5% [69 mmol/mol] vs. 7.2% [55 mmol/mol], $P<.001$) and in comparisons between each of three 2-year cohorts (Table 1). A smaller proportion of diabetes referrals at baseline had an A1c $<7\%$ (<53 mmol/mol) compared to the general sample (24% vs. 53%, $P<.001$ Fig. 2 A).

Diabetes referrals attained lower mean A1c levels after 1 year of care (8.5% [69 mmol/mol] to 7.6% [60 mmol/mol], $P<.001$). The greatest A1c reduction occurred in those with baseline A1c $\geq 9\%$ (≥ 75 mmol/mol); A1c decreased from 10.8% (95 mmol/mol) to 8.4% (68 mmol/mol) ($P<.001$). After 1 year, the proportion with an A1c $\geq 9\%$ (≥ 75 mmol/mol) decreased by 53% (32% to 15%, $P<.001$), and the percentage of diabetes referrals attaining an A1c $<7\%$ (<53 mmol/mol) increased by 67% (24% to 40%, $P<.001$).

Although mean A1c level declined 1 year after referral, it remained higher than the general sample (7.6% [60 mmol/mol] vs. 7.2% [55 mmol/mol], $P<.001$) such that a smaller proportion of diabetes referrals attained an A1c $<7\%$ (<53 mmol/mol) compared to general sample (40% vs. 53%, $P<.001$).

Glucose-Lowering Medications

Diabetes referrals at baseline were less likely to be prescribed glucose-lowering medications compared to the general sample (72% vs. 82%, $P<.001$; Fig. 3 A). Over the 6-year period, prescriptions for glucose-lowering medications increased in the general population (79% to 84%, $P<.001$) but decreased among adults with diabetes at the time of referral for specialty care (75% to 64%, $P<.001$). After 1 year of specialty care, 95% of diabetes referrals had been prescribed a glucose-lowering medication.

Insulin use was modestly higher in diabetes referrals at baseline compared to the general sample (24% vs. 22%, $P=.02$), but nearly doubled after 1 year (24% to 45%, $P<.001$). For diabetes referrals, the use of all other glucose-lowering medication classes also increased after 1 year. A greater proportion of diabetes referrals were prescribed each of the glucose-lowering medication classes after 1 year and compared to the general sample ($P<.001$ for all comparisons).

Blood Pressure Control

Diabetes referrals at baseline had higher mean systolic BP (SBP) (132 vs. 130 mm Hg, $P<.001$) and diastolic BP (DBP) (76 vs. 69 mm Hg, $P<.001$) compared to the general sample (Table 1). Mean SBP and DBP decreased in the general sample across the three 2-year periods ($P<.001$ for both) but not in diabetes referrals at baseline ($P=.37$ and $.82$, respectively). A smaller proportion of diabetes referrals at baseline had a BP $<130/80$ compared to the general sample (38% vs. 50%, $P<.001$; Fig. 2 B).

Diabetes referrals attained lower SBP after 1 year of specialty care (132 to 130 mm Hg, $P<.001$); DBP modestly decreased ($P=.02$). After 1 year, diabetes referrals with BP $<130/80$ rose by 16% (38% to 44%, $P<.001$) while those with BP $>140/90$ fell by 20% (30% to 24%, $P<.001$).

After 1 year, the mean SBP for diabetes referrals was not different than the general sample (130 vs. 130 mm Hg, $P = .76$), but DBP remained higher than the general sample (75 vs. 69 mm Hg, $P < .001$). A smaller proportion of diabetes referrals had BP $< 130/80$ after 1 year compared to the general sample (44% vs. 50%, $P < .001$).

Antihypertensive Medications

Diabetes referrals at baseline were less likely to be prescribed anti-hypertensive medications compared to the general sample (64% vs. 73%, $P < .001$; Fig. 3 B). Over the 6-year interval, the prescription of anti-hypertensive medications increased in the general sample (67% to 79%, $P < .001$), but not in diabetes referrals at baseline. A greater proportion of diabetes referrals were prescribed antihypertensive medications after 1 year and compared to the general sample (79% vs. 64%, $P < .001$).

The use of angiotensin-converting enzyme inhibitors (ACEis) or angiotensin receptor blockers (ARBs) was modestly higher in diabetes referrals at baseline compared to the general sample (49% vs. 47%, $P = .02$), but increased by 40% after 1 year (49% to 68%, $P < .001$). After 1 year of specialty care, a diabetes referrals were more likely to be prescribed any class of antihypertensive medication compared to the general sample ($P < .001$ for all comparisons) except for calcium channel blockers ($P = .71$).

Lipid Control

Mean LDL concentrations (99 vs. 101 mg/dL [2.6 mmol/L vs. 2.6 mmol/L], $P = .15$) and the proportion with LDL at goal (54% vs. 53%, $P = .65$; Fig. 2 C) were not different between diabetes referrals at baseline and the general sample. Over the three 2-year periods, the proportion with LDL at goal increased in the general sample ($P < .001$) but not among diabetes referrals at baseline ($P = .06$, Table 1).

Diabetes referrals attained lower LDL levels after 1 year (99 to 89 mg/dL [2.6 mmol/L vs. 2.3 mmol/L], $P < .001$). After 1 year, the proportion of diabetes referrals with LDL at goal rose by 24% (54% to 67%, $P < .001$), and the proportion with LDL > 130 mg/dL (> 3.4 mmol/L) decreased by 53% (15% to 7%, $P < .001$).

After 1 year of specialty care, the mean LDL for diabetes referrals was lower compared to the general sample (89 vs. 101 mg/dL [2.3 mmol/L vs. 2.6 mmol/L], $P < .001$), and a greater proportion of diabetes referrals had LDL at goal compared to the general sample (67% vs. 53%, $P < .001$).

Lipid-Lowering Medications

Lipid-lowering medication prescriptions were not different between diabetes referrals at baseline and the general sample (54% vs. 53%, $P = .24$) (Fig. 3 C). Across the three 2-year periods, the prescription of lipid-lowering medications increased in the general sample (51% to 56%, $P < .001$) but not in diabetes referrals at baseline ($P = .07$). After 1 year, 77% of diabetes referrals were prescribed lipid-lowering medication ($P < .001$ compared to baseline and general sample).

Statin use was more common in diabetes referrals at baseline compared to the general sample (51% vs. 46%, $P<.001$) and increased by 43% following 1 year (51% to 73%, $P<.001$). After 1 year, all lipid-lowering medication classes were prescribed more frequently to diabetes referrals compared to the general sample ($P<.01$ for all comparisons).

ABC Control

ABC control was over 3-fold higher in the general sample compared to diabetes referrals at baseline (17.1% vs. 5.6%, $P<.001$; Fig. 2 D). ABC control increased in the general sample over the three 2-year periods (12.2% in 2005–2006 to 23.2% in 2009–2010, $P<.001$), but not among diabetes referrals at baseline (4.2% in 2005–2006 to 7.1% in 2009–2010, $P=.55$).

The proportion of diabetes referrals with ABC control increased 270% after 1 year (5.6% to 14.9%, $P<.001$). Overall, the proportion of diabetes referrals with ABC control after 1 year of specialty care was not different from the general sample (14.9% vs. 17.1%, $P=.16$).

DISCUSSION

Most outcomes evaluations for adults with diabetes are reported from primary care settings and the general population, emphasizing demographic and socioeconomic differences (7,18–23). This report extends previous findings by comparing adults in the general population to new referrals to a diabetes specialty center. The analyses also extend prior cross-sectional reports by evaluating changes in prescribing patterns and metabolic outcomes after 1 year of specialty care.

The new referrals to the diabetes center had worse metabolic control compared to similarly aged adults in the general population; only 1 in 5 diabetes center referrals compared with 1 in 2 from the general sample had A1c $<7\%$ (<53 mmol/mol). Baseline BP control but not LDL control was also worse among new diabetes referrals compared to the general sample. Since 1988, the proportion of patients with ABC control in the general population has risen (21,23,24). The introduction of new treatments, attention to cardiovascular risk factors, and revised practice guidelines have contributed to these trends (7,13,14,25). However, ABC control remained stable and less optimal among new diabetes referrals. By 2009–2010, 1 in 4 adults with diabetes in the general population achieved ABC control compared to 1 in 16 referred to the diabetes center. ABC control was reported between 4 and 7% at 2 other diabetes clinics (26). These data suggest that PCPs are likely referring higher risk patients for specialty services (27,28).

Diabetes referrals were also less commonly prescribed glucose-lowering medications, in particular, second-line therapies. Metformin was prescribed to the majority of adults. Notably, insulin use was similar in both populations despite differences in glycemic control. Previous studies reported delays in insulin initiation in the primary care setting, but more recent data suggest barriers to insulin intensification (27,29–34). PCPs appear more likely to refer to specialists once initial therapies fail and advanced insulin treatment and other therapies are needed to achieve glycemic targets.

Use of antihypertensive and lipid-lowering medications was similar between the diabetes referrals and general population. Management of hypertension and dyslipidemia may not contribute substantially to complexity of care for adults with diabetes; in one study, “complex” patients had higher A1c levels, greater insulin use, and more comorbid conditions such as psychiatric illness or cardiovascular disease (28). However, the proportion of diabetes referrals prescribed these medications increased significantly after 1 year and surpassed rates in the general population. Glucose-lowering medications, antihypertensives, and lipid-lowering medications were prescribed to 95%, 79%, and 75% of diabetes referrals after 1 year, respectively. Insulin use doubled within 1 year of specialty care. Medication intensification has been reported among endocrinologists practicing in the Veterans Health Administration and a community-based specialty practice (10,35). Future evaluations of BP and lipid management may inform the potential impact of value-based reimbursement in primary and specialty care settings.

Improvements in A1c, BP, and LDL result from therapy escalation during the first year of specialty care. The magnitude of these improvements has been associated with reductions in diabetes-related complications and cardiovascular disease (36). The gap in percentage of diabetes referrals attaining A1c, BP, or LDL goals compared to the general population was reduced after 1 year of specialty care. Overall, ABC control was 3-fold higher in the general sample compared to new diabetes referrals; after 1 year of specialty care, there was no difference in ABC control between populations. Overall, less than 20% of adults with diabetes in the general or specialty care populations achieved ABC control, highlighting the need for more clinically effective interventions targeting high-risk populations.

There were differences between adults in the general population and diabetes referrals. A greater percentage of diabetes referrals were newly diagnosed with diabetes compared to the general population. Newly diagnosed patients may have higher A1c levels given less time to optimize therapies. Obesity was also more prevalent in the general population (23). Higher A1c (indicating uncontrolled diabetes) in the diabetes referrals may have contributed to lower rates of obesity. Geographic differences may have also contributed to differences in obesity rates as most diabetes referrals lived near eastern Massachusetts—a region with relatively lower rates of obesity (37). Medication doses and patient adherence were not assessed. Prescriptions to improve A1c, BP, or LDL control during the first year of specialty care were attributed to the endocrinologist, but the PCP could have been comanaging these conditions. The impact of lifestyle counseling and support provided by diabetes educators, dietitians, and mental health staff was also not assessed. Blood glucose meter data were not available for either cohort.

CONCLUSION

In conclusion, new referrals for diabetes specialty care demonstrated worse metabolic control and notably higher A1c levels compared to adults with diabetes in the general population. After 1 year of specialty care, there were improvements in A1c, BP, and LDL control, and a 2.7-fold improvement in simultaneous ABC control. Metabolic improvements were found in the context of significant medication intensification. Sustained improvements in metabolic control have been associated with reductions in diabetes complications and

overall healthcare expenditures (38). These data support the role of endocrinologists and multidisciplinary specialty practices in the care of adults with uncontrolled type 2 diabetes, as well as those with multiple comorbid cardiovascular risk factors. Additional evaluations of adults with diabetes in diverse practice settings will support identification of clinically effective outpatient care models that optimize utilization of limited available specialty care to improve diabetes outcomes (3,4,39,40).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

ACKNOWLEDGMENT

This research was supported by the Joslin Diabetes Center's Diabetes and Endocrinology Research Center (NIH P30DK036836). An abstract from the preliminary analysis was presented at the 73rd Scientific Sessions of the American Diabetes Association held June 21–25, 2013 in Chicago, Illinois.

Abbreviations:

A1c	glycated hemoglobin A1c
ABC	composite of A1c, blood pressure, and cholesterol
ACEi	angiotensin-converting enzyme inhibitor
ARB	angiotensin receptor blocker
BMI	body mass index
BP	blood pressure
EHR	electronic health record
LDL	low-density lipoprotein
NCHS	National Center for Health Statistics
NHANES	National Health and Nutrition Examination Survey
PCP	primary care provider

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Fig. 1.

Cohort description of the general diabetes population and diabetes center referrals. *ABC* = composite of A1c <7% (<53 mmol/mol), BP <130/80 mm Hg, and LDL cholesterol <100 mg/dL (<2.6 mmol/L); *BP* = blood pressure; *LDL* = low-density lipoprotein cholesterol.

Fig. 2.

Percentage of adults with diabetes with metabolic outcomes at target level. *ABC* = composite of A1c <7% (<53 mmol/mol), BP <130/80 mmHg, and LDL cholesterol <100 mg/dL (<2.6 mmol/L); *BP* = blood pressure; *LDL* = low-density lipoprotein cholesterol.

Fig. 3.

Percentage of adults with diabetes prescribed glucose, blood pressure, or cholesterol medications. Glucose-lowering medications were classified as orals (*excluding DPP-4 inhibitors), incretins (GLP-1 agonists and DPP-4 inhibitors), and insulin. Antihypertensive medications were classified as ACEi/ARBs, diuretics, BBs, and CCBs. Lipid-lowering medications were classified as statins (HMG-CoA reductase inhibitors), fibrates, or ezetimibe. Medications not otherwise classified included in the respective “Any” category. *ACEi* = angiotensin-converting enzyme inhibitor; *ARB* = angiotensin II receptor blocker; *BB* = beta blocker; *CCB* = calcium channel blocker; *DPP-4* = dipeptidyl peptidase-4; *GLP-1* = glucagon-like peptide 1.

Table 1

Baseline Characteristics of Adults with Diabetes in the General Population and New Diabetes Center Referrals^a

Demographic variables	2005–2006		2007–2008		2009–2010	
	General diabetes population	Diabetes center referrals	General diabetes population	Diabetes center referrals	General diabetes population	Diabetes center referrals
Age, y	58.8 (0.6)	58.0 (0.4)	58.5 (0.5)	58.5 (0.4)	60.0 (0.5)	57.8 (0.4)
Female sex, %	54	44	50	43	49	40
Private insurance, %	57	51	62	52	55	56
Diabetes history						
Diabetes duration, y	9.6 (0.4)	6.5 (0.2)	9.8 (0.3)	7.8 (0.2)	10.1 (0.4)	8.2 (0.3)
New-onset (<1 y), %	6	28	5	25	7	23
Established (≥ 1 y), %	94	72	95	75	93	77
Medication use						
Glucose-lowering medications, %	79	75	82	76	84	64
Antihypertensive medications, %	67	63	71	65	79	63
Lipid-lowering medications, %	51	52	53	57	56	54
Physical measurements						
Body mass index, kg/m ²	32.6 (0.4)	32.5 (0.2)	33.5 (0.3)	32.8 (0.2)	33.7 (0.5)	33.0 (0.3)
Overweight, %	31	33	22	30	23	29
Obese, %	56	55	66	58	67	58
Systolic blood pressure, mm Hg	131 (1.0)	132 (0.6)	130 (0.8)	133 (0.5)	127 (0.8)	132 (0.6)
Diastolic blood pressure, mm Hg	70 (0.7)	76 (0.3)	70 (0.5)	76 (0.3)	68 (0.5)	76 (0.3)
Laboratory measurements						
Hemoglobin A1c, %	7.2 (0.1)	8.2 (0.1)	7.2 (0.1)	8.7 (0.1)	7.3 (0.1)	8.6 (0.1)
Hemoglobin A1c, mmol/mol	55 (1.2)	66 (0.8)	56 (0.9)	71 (0.7)	56 (1.1)	70 (0.7)
LDL cholesterol, mg/dL ^b	105 (2.7)	103 (2.0)	97 (2.0)	100 (1.6)	103 (2.0)	93 (2.2)

Abbreviations: LDL = low-density lipoprotein; NHANES = National Health and Nutrition Examination Survey; NHW = non-Hispanic White.

^aGeneral diabetes population data are presented as weighted mean (SE) or weighted proportion; Diabetes center referrals data presented as mean (SE) or percentage.

^bTo convert LDL cholesterol to mmol/L, multiply by 0.0259.