

Web appendix: Supplementary materials

Appendix 1

The following Current Procedural Terminology (CPT) codes were used to identify laboratory studies using administrative data:

- Glucose: 82947, 82948, 82949, 82950, 82951, 82961, 82962.
- Lipids: 80061, 82465, 82470, 83700, 83701, 83704, 83705, 83718, 83721, 84478, 83719, 83715, 83716, 0026T, S2120.
- Creatinine: 82565, 82575
- Urine microalbumin: 82042, 82043, 82044
- HbA_{1c}: 83036, 83037

Appendix 2

Recommendations from professional societies are quoted directly from the referenced guideline.

Professional Society/ Guideline Issuing Body	Testing frequency for non-pregnant adults
American Diabetes Association (ADA); 2015¹	“Perform the A1C test at least two times a year in patients who are meeting treatment goals (and who have stable glycemic control). Perform the A1C test quarterly in patients whose therapy has changed or who are not meeting glycemic goals.”
American Association of Clinical Endocrinologists (AACE) & American College of Endocrinology (ACE); 2015²	“A1C should be measured at least twice yearly in all patients with DM and at least 4 times yearly in patients not at target.”
Institute for Clinical Systems Improvement (ICSI); 2012³	<i>Not explicitly discussed. Section on glycemic targets includes the following:</i> “Regular follow-up with the health care team (via office visit, e-visit, telephone, labs, etc.) should be scheduled yearly. More frequent visits may be necessary if treatment goals are not achieved.”
National Institute for Health and Care Excellence (NICE); 2009⁴	“2–6-monthly intervals (tailored to individual needs) until the blood glucose level is stable on unchanging therapy; use a measurement made at an interval of less than 3 months as a indicator of direction of change, rather than as a new steady state. 6-monthly intervals once the blood glucose level and blood

	glucose-lowering therapy are stable.”
United States Veterans Affairs Administration (VA); 2010⁵	“HbA1c should be measured in patients with diabetes at least annually, and more frequently (up to 4 times per year) if clinically indicated, to assess glycemic control over time.”
International Diabetes Federation (IDF); 2012⁶	“Measure HbA1c every 2 to 6 months depending on level, stability of blood glucose control and changes in therapy”
Canadian Diabetes Association (CDA); 2013⁷	“A1C is a valuable indicator of treatment effectiveness and should be measured every 3 months when glycemic targets are not being met and when diabetes therapy is being adjusted. Testing at 6-month intervals may be considered in situations where glycemic targets are consistently achieved .”

Appendix 3

Medications used to treat diabetes were identified in pharmacy claims data using National Drug Codes (NDC) and grouped into therapeutic classes as shown below. SGLT2 inhibitors (dapagliflozin, empagliflozin, canagliflozin) were not included as there were no patients in the study population on these medications. DPP-4, dipeptidyl peptidase-4. GLP-1, glucagon-like peptide-1. NPH, neutral protamine Hagedorn.

Medication class	Included agents
Biguanides	Metformin
Sulfonylureas	Acetohexamide, chlorpropamide, glimepiride, glipizide, glyburide, tolazamide, tolbutamide
Glitazones	Pioglitazone, rosiglitazone, troglitazone
DPP-4 inhibitors	Alogliptin, linagliptin, sitagliptin, saxagliptin
GLP-1 analogs	Exenatide, liraglutide
Glinides	Nateglinide, repaglinide
Amylin analogs	Pramlintide
α-Glucosidase inhibitors	Acarbose, meglitol
Insulin	NPH, regular, aspart, lispro, detemir, glargine, glulisine, isophane, powder

References:

1. American Diabetes Association. Standards of Medical Care in Diabetes—2015. *Diabetes Care* 2015;38(Supplement 1).
2. Garber AJ, Abrahamson MJ, Barzilay JI, Blonde L, Bloomgarden ZT, Bush MA, et al. AACE/ACE comprehensive diabetes management algorithm 2015. *Endocrine Practice* 2015;21(4):438-47.
3. Reithof M, Flavin PL, Lindvall B, Michels R, O'Connor PJ, Redmon B, et al. Institute for Clinical Systems Improvement. Diagnosis and Management of Type 2 Diabetes Mellitus in Adults. <http://bit.ly/Diabetes0412>. Updated April 2012., 2012.
4. National Institute for Health and Care Excellence. Type 2 diabetes: The management of type 2 diabetes: National Institute for Health and Care Excellence, 2009.
5. Department of Veteran Affairs, Department of Defense. VA/DoD clinical practice guideline for the management of diabetes mellitus. Washington (DC): Department of Veteran Affairs, Department of Defense. 2010.
http://www.healthquality.va.gov/guidelines/CD/diabetes/DM2010_FUL-v4e.pdf
6. International Diabetes Federation Clinical Guidelines Task Force. Global Guidelines for Type 2 Diabetes, 2012.
<https://www.idf.org/sites/default/files/IDF%20T2DM%20Guideline.pdf>
7. Berard LD, Blumer I, Houlden R, Miller D, Woo V. Monitoring glycemic control. *Can J Diabetes* 2013;37 Suppl 1:S35-9.