

Better BMI Associated with Better Diabetic Control

Team A: Joel Jones, RPh; Adrianna Teriakidis, PhD; Ryan Bohochik

Team B: Dave Little, MD; Eric Barkley

Last updated 20 August 2021 • Check for updates at EHRN.org

Abstract: For patients with diabetes, incremental improvements in BMI are associated with better A1C levels 12 months after diagnosis.

More than 32 million Americans have type 2 diabetes, with an estimated 1.8 million new cases diagnosed each year. An elevated BMI is a known risk factor for the development of type 2 diabetes. We investigated whether a patient's BMI was associated with greater diabetic control, as indicated by an A1C of less than 7% one year from initial diagnosis.

Our data show that as BMI increases, diabetic control decreases. However, a patient doesn't have to have a normal BMI to benefit; even patients who are overweight (BMI 25-30) were 25% more likely than patients who are obese to have diabetic control.

Body Mass Index (BMI) and A1C Control

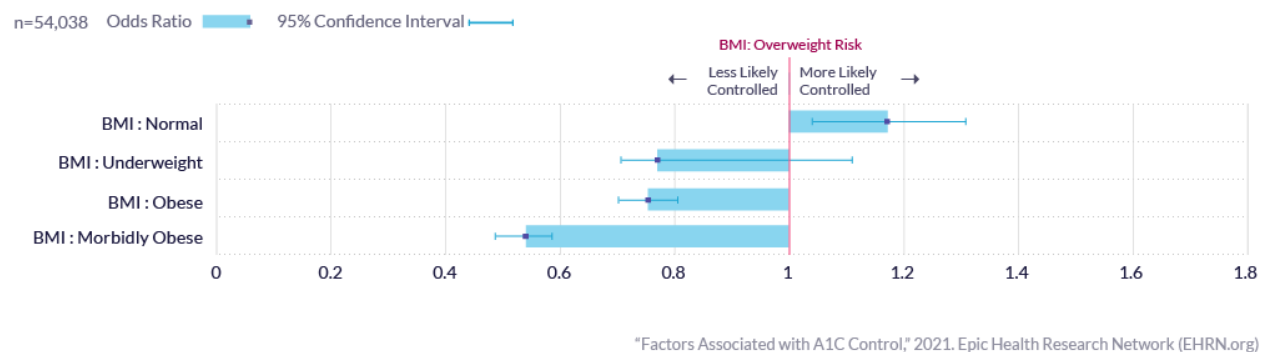


Figure 1. BMI levels and their association with A1C control by the end of the patient's first year after being diagnosed with type 2 diabetes.

These findings suggest that improved diabetic control can be seen even with stepwise decreases to patient BMI for newly diagnosed type 2 diabetics. This is encouraging for those who might feel overwhelmed by the need to lose a certain amount of weight. Even those with an overweight BMI (25-30) have an increased likelihood of having their diabetes well controlled.

These data come from Cosmos, a HIPAA Limited Data Set of more than 113 million patients from Epic customers. This study was completed by two teams, comprised of clinicians and data scientists, that independently acquired and analyzed data. Overall, the two teams came to similar conclusions. Data are pooled from 99 healthcare organizations representing 496 hospitals that span 48 states and 69 million patients who have had at least one face-to-face encounter since 2017.

Data Definitions

Term	Definition
Patient Population	Initial study population of more than 3 million patients who had an onset of type 2 diabetes from 2017 onward, limited to those patients who had an A1C lab test at the time of diagnosis, had another A1C a year later, and who were established patients at a health system.
A1c lab	Resulted lab component documented to LOINC code 17856-6 or 4548-4. It is considered elevated if 6.5% or higher and in control if under 7%.
Type 2 diabetes diagnosis	A problem list, encounter diagnosis, or final billing diagnosis mapped to ICD-10 codes E11% or SNOMED codes 44054006 or 422014003. Any of those diagnoses also mapped to type 1 diabetes ICD codes E10% or gestational diabetes ICD-10 codes O24.4% or gestational diabetes SNOMED codes 11687002, 46635009, or 420868002 are not included.
DKA diagnosis	A problem list, encounter diagnosis, or final billing diagnosis mapped to SNOMED code 111556005.
Type 2 diabetes onset date	For any patients with a type 2 diabetes diagnosis, this is the earliest date of an elevated A1C lab, type 2 diabetes diagnosis, or DKA diagnosis.
Type 2 diabetes one year mark date	The date one year after a patient's type 2 diabetes onset date.
Prior established care	Patients who have evidence of comprehensive care six months or more prior to their type 2 diabetes onset date. The evidence is an encounter of type Allied health, Ancillary procedure, Anticoagulation visit, Appointment, Audiology, Case management, Clinical support, Confidential, Diagnostic services, Education, Emergency, Fetal care consult, Fetal procedure, Follow-up, Genetics, Home care visit, Hospice F2F visit, Hospital, Hospital encounter, Immunization, Induction, Infusion, Initial prenatal, Injection, Lactation consult, Lactation encounter, Multidisciplinary visit, NST, Nurse only, Nursing home, Nutrition, Office visit, Oncology survivorship, Ophth exam, Occupational/Physical Therapy, Postpartum visit, Procedural consult, Procedure visit, Radiology appointment, REI, Research encounter, Routine prenatal, Sleep study, Social work, Speech therapy, Surgery, Surgical consult, Telemedicine, Transplant evaluation, Transplant follow up, Treatment, Urgent care, or Walk-in with a provider who has a specialty of Adult Health, Adult Medicine, Bariatrics, Diabetes Educator, Diabetes Services, Endocrinology, "Endocrinology, Diabetes & Metabolism," Endodontics, Family Health, Family Medicine, General Care, General Practice, Geriatric Medicine, Gerontology, Gynecology, Internal Medicine, Internist, Obstetrics, Obstetrics and Gynecology, Pediatric Endocrinology, Pediatric Internal Medicine, Pediatrics, or Primary Care.
A1C result at onset	A patient's first valid A1C lab value documented from the type 2 diabetes onset date or in the following two months.
One year mark A1C result	A patient's valid A1C lab value documented within two months prior to the type 2 diabetes one year mark date through two months after it. Of those, the valid lab result closest to the type 2 diabetes one year mark date is counted for the patient.
BMI in normal range	Patients whose BMI documented closest to their type 2 diabetes one year mark date was in the range [18.5-25).

BMI in overweight range	Patients whose BMI documented closest to their type 2 diabetes one year mark date was in the range [25–30).
BMI in obese range	Patients whose BMI documented closest to their type 2 diabetes one year mark date was in the range [30–40).
BMI in morbidly obese range	Patients whose BMI documented closest to their type 2 diabetes one year mark date was 40 or above.
Term	Definition
RSV Lab Test	Finalized labs categorized to LOINC codes 14129-1, 17520-8, 30075-6, 30076-4, 31949-1, 31950-9, 32040-8, 33045-6, 40987-0, 40988-8, 49037-5, 50329-2, 55100-2, 5874-3, 5875-0, 5876-8, 5877-6, 60271-4, 68966-1, 72885-7, 76088-4, 76089-2, 77022-2, 77023-0, 77389-5, 77390-3, 80597-8, 80598-6, 82176-9, 85479-4, 88202-7, 88204-3, 88527-7, 88528-5, 88595-4, 88597-0, 88909-7, 91133-9, 91782-3, 91785-6, 91794-8, 91795-5, 92131-2, 92880-4, 92881-2, 92957-0 with a result value that is discernably positive or negative.
Adult Patient	Non-pregnant patients aged 19 or older.
Measurement	Documentation of weight in pounds for a patient during an encounter. If there are multiple measurements in a single encounter, we use the final measurement.
Pandemic Baseline Period	The “lookback” period we use to find patients’ pandemic baseline weight measurements. Weight measurements documented on or after March 14, 2019, and before March 13, 2020, are included. March 13, 2020, was the date of the emergency declaration of the COVID-19 crisis in the U.S.