**T1D Exchange Quality Improvement (T1DX-QI) Adult Quality Metrics 2023-2025**

This document outlines quality measures for Adult Centers in the T1DX-QI network. Numerators and denominators for each measure have been defined below. We acknowledge that centers may not be able to report all the measures outlined in this document, report available data on Smart Sheet. These data reported allow for benchmarking and quality improvement projects. For questions, email qi@tqdechange.org or a T1DX-QI Coach.

**Aim Statement for 2022-2025**
Among people ages 18-75 with T1D, increase proportion of patients achieving glycemic targets in an equitable manner

1. Optimize glycemic outcomes as measured by A1c
    a. Increase % of patients with A1c <8 by 5%
    b. Decrease % of patients with A1c >9 by 5%
2. Optimize glycemic outcomes as measured by TIR
    a. Increase % of patients with Time in Range >70% by 5%
    b. Increase % population with Time in Range >50% by 10%
    c. Decrease % population with Time Below Range (<70mg/dL) by 5%

**Key Driver Diagram**

**Global Aim**

Among people ages 18-75 with TlD, increase proportion of patients achieving glycemic targets from baseline in 2 years in an equitable manner

*Duration > 1 year, ages 18-75, with at least one in-person or telemedicine visit in the last 12 months

**Primary Drivers**

- Use of Data
- Health Equity
- Diabetes Comorbidities and Complications
- Medication Management and Device use
- Access to Care
- Shared Decision Making
- Whole Person Health

**Secondary Drivers**

- Map Data
- EMR templates, flowsheets, registries

- Culturally Competent Care
- Social Determinants of HealthTrack data for equitable

- Glucose Monitoring and Testing
- Hybrid Closed Loop Adopting
- Shared Decision Making
- Insulin and Medication Therapy

- Patient Centered Care
- Identifying Patient Priorities and Goals

- Quality of Life Measures
- Mental Health Screening and Referrals
- Diabetes Distress Screening
- Track co-morbidities and needs

**Denominator (A):** Patients with type 1 diabetes[1] (ages 18-75) with a minimum duration of diabetes ≥ 12 months with at least 1 A1c in the preceding 12 months, and an endocrinology related visit (in person or virtual) in the reporting month.

**Numerators:**

1. A1c
    a. Number of patients in (A) with A1c <8% (Most recent A1c)
    b. Number of patients in (A) with A1c >9% (Most recent A1c)
    c. Median A1c value from all patients
2. Continuous Glucose Monitor (CGM)[2] Use: Number of patients in (A) using CGM at using at least 14 days in the reporting month at the most recent clinic encounter.
3. Ambulatory Glucose Profile (AGP): Number of patients in (2)
    a. Time in Range (70-180 mmol/dL) >50%
    b. Time in Range (70-180 mmol/dL) >70%
    c. Time in Hypoglycemia (<70 mmol/dL) <4%
    d. Time in Severe Hypoglycemia (<54 mmol/dL) < 1%
4. Insulin Delivery: The number of patients in (A) with evidence of use
    a. Sensor augmented insulin pump users[3]
    b. Hybrid closed loop users on automated delivery mode
    c. Smart Insulin pen users
5. Depression Screening
    a. Number of patients in A who have not had depression screening in the last 12 months.
    b. Number of eligible patients in (5a) who have been screened for depression (PHQ-2, 4, 8 or 9)
    c. Number of patients in (5b) that screened positive for depression (PHQ8/PHQ-9 score above 10)
    d. Number of patients in (5c) that received a behavioral health referral.
    e. Number of patients in (5d) who received referral and kept their behavioral health visit.
6. Social Determinant of Health Screening
    a. Food Insecurity: Number of patients in (A) asked at least one of the questions below or similar questions
        1. Within the past 12 months we worried whether our food would run out before we got money to buy more."
        2. Within the past 12 months the food we bought just didn't last and we didn't have money to get more."

        i. Number of patients in (6a) who answered Yes to 6a 1 or 2.
        ii. Number of patients in (6a i) who received a referral for food resources
    b. Economics:
        i. Number of patients who have been screened for financial needs: How hard is it for you to pay for the very basics like food, housing, medical care, and heating? [Sample Responses: Very hard, Hard, somewhat hard, not very hard, Not hard at all, Patient refused, Not asked]
        ii. The number of eligible patients for the reporting month who have been screened for medication affordability. Are you able to afford your medication?

1. Yes; 2. No

c. Transportation
    i. Number of eligible patients who have been screened for transportation needs. In the past 12 months, has lack of transportation kept you from medical appointments or from getting medication?
        1. Yes; 2. No
    ii. In the past 12 months, has lack of transportation kept you from meetings, work or from getting things needed for daily life?
    1. Yes; 2. No

d. Housing
    1. Number of eligible patients for the reporting month who have been screened for housing needs. What is your housing situation today?
        1. I have a steady place to live
        2. I have a stead place to live today, but I am worried about it in the future
        3. I do not have a steady place to live (I am temporarily staying with others, in a hotel, in a shelter, living outside on the street, on a beach, in a car, abandoned building, bus or train station, or in a park)
        4. Unknown
    2. In the last 12 months, was there a time when you were not able to pay the mortgage or rent on time?
        1. Yes 2. No

7. Diabetic Ketoacidosis (DKA)[4] Hospitalization: Number of patients in (A) with at least one DKA hospitalizations in the last 12 months.
8. Severe Hypoglycemia (SHE) Hospitalization: Number of patients in (A) with at least one SHE hospitalizations in the last 12 months.

**<u>Optional Measures. These elective measures should only be done after completing measures 1-8</u>**

9. Foot Exam: Number of patients in (A) who received a foot exam (visual inspection with either a sensory exam or pulse exam) in the last 12 months.
10. Eye Exam: Number of patients in (A) who received a retinal or dilated eye exam during the measurement year or a negative retinal or dilated eye exam in last 12 months.
11. Missing Appointments: Number of patients in (A) who have not been seen within the last 180 days based on days between visits and care
12. Angiotensin-Converting Enzyme) Inhibitors and Angiotensin Receptor Blockers (ACE-I/ARB) prescription
    a. Number of patients in (A) with a diagnosis of hypertension or blood pressure <140/90 mmHg
    a. Number of patients in (12a) who prescribed ACE-I or ARBs in the measurement year are
13. Statin prescription
    a. Number of patients in (A) with hyperlipidemia or an LDL >130 mg/dL
    b. Number of patients in (13a) who are prescribed a statin for cholesterol in last 12 months
14. Tobacco The number of patients in (A) seen in the reporting month who have been screened for tobacco use in the past year
    i. Never; ii. Current (within past month); iii. Past (ever); iv. Tried once

15. Number of patients in (A) seen in the reporting month who have been screened for distress in the past year. Do you feel stressed – tense, restless, nervous, or anxious, or unable to sleep at night because your mind is troubled all the time – these days?
    i. Not at all; ii Only a little; iii to some extent; iv Rather much; v Very much
16. Number of patients in (A) seen in the reporting month who have been screened for isolation in the past year. Social: how often do you feel isolated from others?
    i. Never, ii Rarely; iii Sometimes; iv Often; v Always

**Appendix: Variable Definition**

**T1D Inclusion Criteria: Type 1 Diabetes Diagnosis Inclusion criteria**
Eligible patients meet one of more of the following criteria [1]:

- Positive for autoimmune marker:
  - GAD (GAD65)
  - Tyrosine Phosphatases IA-2 and IA-2β
  - ZnT8, OR
- T1D diagnosis determined using clinical judgment, OR

- Idiopathic Type 1 diabetes (negative autoantibodies but with permanent insulinopenia and prone to ketoacidosis)

| (Inclusion) Test or condition | Type of code | ICD/LOINC Code |
|---|---|---|
| GAD65 autoimmune marker | LOINC | 13926-1; 56540-8; 58451-6; 81725-4; 72523-4 |
| Idiopathic Type 1 Diabetes (Type 1 diabetes mellitus without complications | ICD-10 | E10.9 |
| Tyrosine Phosphatases IA-2 and IA-2β autoimmune marker | LOINC | 31209-0; 56718-0; 81155-4; 32636-3; 70253-0; 70252-2 |
| ZnT8 autoimmune marker | LOINC | 76651-9 |

**T1D Exclusion criteria**

1. Patients are excluded from the T1D population if they meet any of the below criteria. However, if a patient with T1D is later diagnosed with one of these criteria, they remain included.

    - Cystic Fibrosis related diabetes (CFRD)
    - Steroid induced/Glucocorticoid
    - Genetic evidence of Monogenic Diabetes (MODY)/neonatal diabetes
    - Gestational diabetes
    - Type 2 diabetes

| (Exclusion) Test or condition | Type of code | ICD/LOINC Code |
|---|---|---|
| Cystic Fibrosis | ICD-10 | E84.* |
| Steroid induced/glucocorticoid | ICD-10 | E09* |
| Gestational diabetes | ICD-10 | 024.* |
| Monogenic Diabetes (MODY; neonatal diabetes) | ICD-10 | P70.2 |
| New Onset of Diabetes Mellitus in Pediatric Patient | ICD-10 | E10.9 |
| Type 2 Diabetes | ICD-10 | E11.* |

2. *CGM use can be patient reported or confirmed through device data download and can be report/measured in multiple ways, including but not limited to:*
    - *CGM in the medication list within the last 12 months, **OR***
    - *CGM in flow sheet as Yes/No, **OR***
    - *CGM company models updated in the last 12 months (see Table 2 for examples), **OR***
    - *CGM data available (Yes/No, for example from Abbott Libre, Dexcom Clarity, Glooko, or Tidepool, **OR***
    - *Site-specific measure that is accurate and frequently updated*

3. Insulin pump use can be patient reported or confirmed through device data download and can be reported/measured in multiple ways, including but not limited to:

i. Pump prescribed in the medication list within the last 12 months, OR
ii. Pump use in flow sheets, OR
iii. Pump company models updated in the last 12 months (see Table 2 for examples), OR
iv. Pump data available (Yes/No, e.g., from Tandem t:connect, Medtronic Carelink, Glooko, or Tidepool, OR
v. Data download from Medtronic CareLink, Tandem, Glooko, Tidepool, OR
vi. Site-specific measure that is accurate and frequently updated

4. DKA can be measured as:
    - EHR or patient reported and confirmed by lab result**, OR**
        - Elevated serum or urine ketones (greater than the upper limit of the normal range), **AND**
        - Serum bicarbonate below 15 mmol/L, **OR**
        - Blood pH below 7.3.
    - DKA recorded in problem list during reported month