DETECT 1D

From Awareness to Action:

Driving Multidisciplinary Application of Screening and Disease Modifying Therapies in EARLY STAGE T1D

MED LEARNING GROUP

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DETECT - From Awareness to Action: Driving Multidisciplinary Application of Screening and Disease Modifying Therapies in Early Stage T1D

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PROGRAM OVERVIEW

The DETECT T1D Live Summit series has been designed to bring together multidisciplinary faculty and a type 1 diabetes (T1D) patient advocate to discuss practical considerations in screening, follow-up, early referral, and treatment to delay T1D progression, as well as how to address both clinician and patient challenges to optimize early identification and patient selection. In addition, the program will feature small group breakout discussions to analyze relevant cases and offer an opportunity to access a learning gallery featuring additional educational aids and resources to reinforce engagement and boost understanding of evolving concepts in early-stage T1D.

TARGET AUDIENCE

This activity is designed to meet the educational needs of multidisciplinary clinicians who refer, treat or see patients with or at high risk for T1D is needed, including primary care clinicians, pediatricians, pediatric & adult endocrinologists, diabetes educators, infusion professionals and other allied healthcare professionals.

LEARNING OBJECTIVES

Upon completion of this activity, attendees will have improved ability to:

1. Identify criteria for T1D screening, focusing on high-risk patients to facilitate timely referral and monitoring
2. Incorporate evidence-based strategies for presymptomatic T1D screening into routine clinical practice to improve early detection
3. Develop workflows to appropriately monitor, follow-up, or refer individuals who are screened for T1D.
4. Interpret T1D screening results and effectively communicate next steps to support patient education and inform treatment decisions.
5. Develop strategies for establishing referral pathways and enhancing collaboration with specialists in order to enable earlier application of disease-modifying therapies for early stage T1D.
6. Identify appropriate patients who would benefit from treatment with disease-modifying therapies for delaying T1D progression based on clinical evidence
7. Implement protocols to support safe and efficient administration of disease-modifying therapies for T1D according to guidance and patient-specific factors.

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Faculty Member	Disclosures
Jay Shubrook, DO	Consulting fee: Abbott, Bayer, Eli Lilly, Insulet, Mardigal, Novo Nordisk and Sanofi Fees for Non-CME/CE Services: Corcept Contracted Research: Breakthrough T1D
Emily Sims, MD	Consulting fee: Diamond, Sanofi, Wink Therapeutics
Kim Pfotenhauer DO, FACOFP, DABOM	Receives consulting fees from Novo Nordisk & has ownership interest in ROMTech
Brooke Anderson, MD	Has nothing to disclose
Hersheeta Rana	Has nothing to disclose

All relevant financial relationships have been mitigated.

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Introduction and Housekeeping

Type 1 Diabetes: Overview

Screening and Early Detection of T1D

Caregiver Perspective & Panel discussion: Screening for T1D

Informal discussion with faculty and Kathyrn, sample questions/conversation starters:

- ***How did you find out about T1D screening?***
- ***What was yours and your family's experience with screening?***
- ***Did you or your family have any concerns about T1D screening? (also bring up the positive piece/experience of screening)***

How and Whom to Screen for T1D

Case #1 & Group Breakout Discussion

Follow-up & monitoring after T1D screening

Caregiver Perspective & Panel discussion: Follow-up After Screening Results –

Informal discussion with faculty and Kathryn, sample questions/conversation starters:

- ***What were the results of T1D screening?***
- ***What questions did you or your family have about the results? Were the steps after screening explained adequately?***
- ***How was the monitoring after screening handled?***

Advances in Delaying T1D Progression

BREAK

Caregiver Perspective & Panel discussion: Teplizumab for T1D

Informal discussion with faculty and Kathryn, sample questions/conversation starters

- ***If things were to change, would you consider (be open) to a disease-modifying therapy that can delay progression? (to get Jeselyn's thoughts on this)***

On the Horizon: DMTs in New Onset (Stage 3) T1D

Case #2 & Group Breakout Discussion

Implications & Practice Takeaways

Audience Q & A and Concluding Remarks

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Disclosures

- **Dr. Pfotenhauer** discloses that she receives consulting fees from Novo Nordisk & has ownership interest in ROMTech
- **Dr. Anderson** has nothing to disclose.
- **Hersheeta Rana** has nothing to disclose.

During this lecture the faculty may mention the use of medications for both US Food and Drug Administration (FDA)-approved and non-FDA-approved indications.

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Learning Objectives

- Identify criteria for type 1 diabetes (T1D) screening, focusing on high-risk patients to facilitate timely referral and monitoring
- Incorporate evidence-based strategies for presymptomatic T1D screening into routine clinical practice to improve early detection
- Develop workflows to appropriately monitor, follow-up, or refer individuals who are screened for T1D
- Interpret T1D screening results and effectively communicate next steps to support patient education and inform treatment decisions.
- Develop strategies for establishing referral pathways and enhancing collaboration with specialists in order to enable earlier application of disease-modifying therapies for early stage T1D
- Identify appropriate patients who would benefit from treatment with disease-modifying therapies for delaying T1D progression based on clinical evidence
- Implement protocols to support safe and efficient administration of disease-modifying therapies for T1D according to guidance and patient-specific factors

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The Insights to Action Collaboration Platform

- **Connect with our T1D experts & peers in your region**
- **Explore various resources & support around screening, early detection, and treatment of T1D**

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Polling Question

Currently, how do you approach screening for type 1 diabetes (T1D) with autoantibodies?

a) I use autoantibodies for T1D *primarily or uniquely to distinguish T1D from T2D*
b) I use autoantibodies to *proactively screen for T1D in individuals without symptoms* (family history of T1D, family or personal history of autoimmune conditions)
c) *I wait for symptoms or dysglycemia* before ordering a T1D autoantibody test
d) *I do not use autoantibodies* to screen for T1D
e) *I primarily screen with glycemic parameters* (e.g. HbA1c, fasting glucose)

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Type 1 Diabetes: Overview

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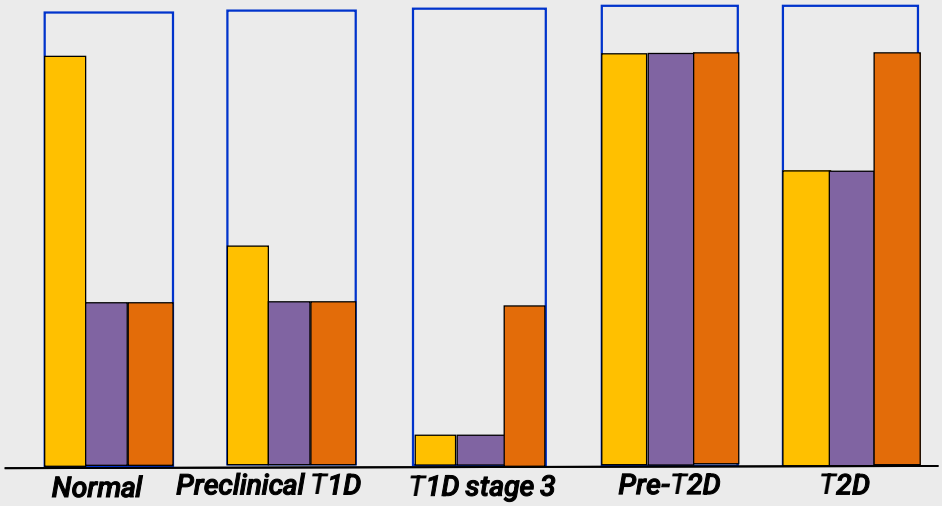
What Is Diabetes?
A Mismatch of Insulin Supply and Demand



Insulin production capacity vs secretion vs requirement

T1D = type 1 diabetes; T2D = type 2 diabetes.

Slide courtesy of Jay Shubrook, DO.

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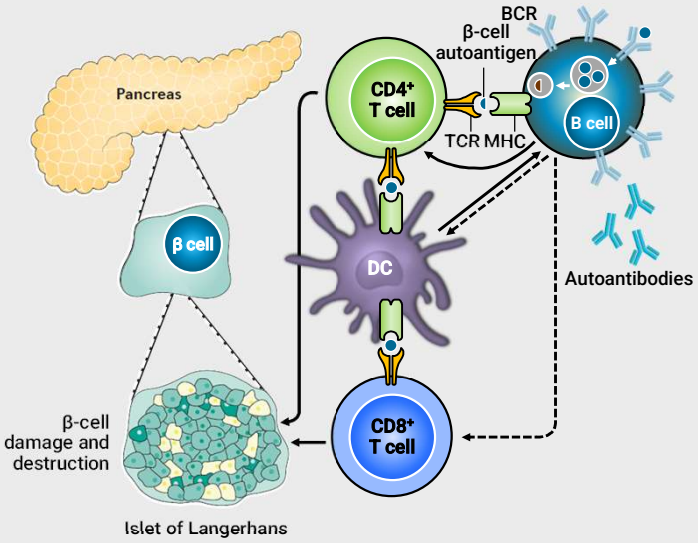
T1D Is a Chronic Autoimmune Disease



- Normal T cells recognize β-cell antigens as "self" and ignore them (tolerance)
- T cells that have lost tolerance attack and destroy β cells
- Multiple genetic and environmental factors contribute to the loss of tolerance to β-cell antigens
- IAbs are made in response to this autoimmune attack; ***measuring these autoantibodies is used to detect autoimmunity***

APC = antigen-presenting cell; BCR = B-cell receptor; DC = dendritic cell; IAb = islet autoantibody; MHC = major histocompatibility complex; TCR = T-cell receptor.

Atkinson MA, Mirmira RG. *Cell Metab.* 2023;35:1500-1518. Katsarou A, et al. *Nat Rev Dis Primers.* 2017;3:17016.

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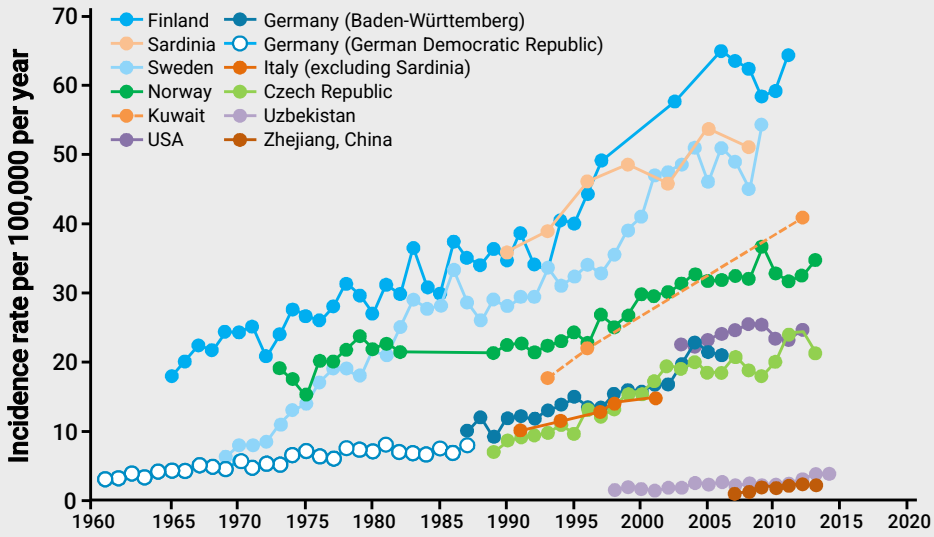
The Incidence of T1D Is Dramatically Increasing Worldwide for Unknown Reasons



Norris JM, et al. *Lancet Diabetes Endocrinol.* 2020;8:226-238.

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Genetic Susceptibility Is Important, But Not All of Those Who Are Susceptible Develop T1D

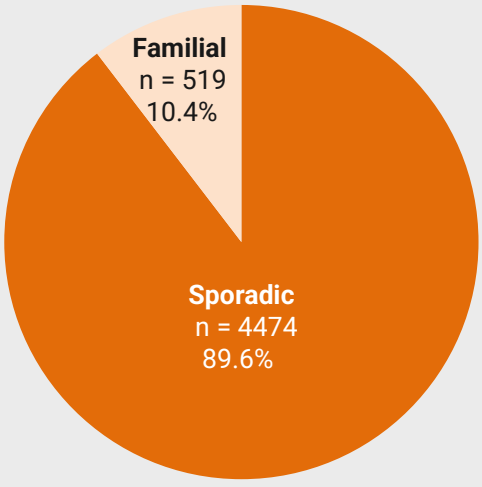
T1D risk in individuals who have an affected relative

	Risk of T1D	
General population	**0.4%**	**1/250**
Mother with T1D	1.5%–3%	1/67–1/33
Father with T1D	4%–7%	1/25–1/14
Sibling with T1D	6%–7%	1/17–1/14
Identical twin with T1D	30%–70%	1/3–1/1.4

DiMeglio LA, et al. *Lancet*. 2018;391:2449-2462. Parkkola A, et al. *Diabetes Care*. 2013;36:348-354.

13

Yet, Most New Cases Do Not Occur in Families With a First-Degree T1D Relative



- Risk of T1D is highest in family members of people with T1D (10x to 15x higher)
- Yet family history alone is insufficient as >85% of patients diagnosed with T1D do not have a family history of T1D
- General population screening is needed to identify the majority of people who are at risk of T1D development

Turtinen M, et al. *Diabetologia*. 2019;62:2025-2039. Sims EK, et al. *Diabetes*. 2022;71:610-623.

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Who Gets T1D? It Is Thought of as a Pediatric Disease, But It Is Actually Diagnosed More Frequently in Adulthood

- The median age at T1D diagnosis is ~35 years *(*global population estimates, with considerable variation)*
- There is considerable information about the development of diabetes in children; much less is known in adults
- In adults T1D is often misdiagnosed as T2D
- In children the reverse is sometimes true, with other forms of diabetes misdiagnosed as T1D
- No single clinical feature confirms T1D—not age, not body mass index, not DKA
- Misdiagnosis can lead to DKA due to prescribing the wrong therapy

DKA = diabetes-related ketoacidosis.

Thomas NJ, et al. *Diabetes Care*. 2023;46:1156-1163. Gregory GA, et al. *Lancet Diabetes Endocrinol*. 2022;10:741-760.

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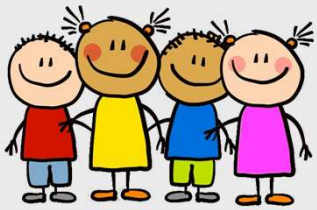
Clinical Presentation of T1D Differs Between Children and Adults



- Acute presentation typical
- Classic symptoms of polyuria, polydipsia
- Usually significant weight loss
- 30% to 50% present in DKA

- The autoimmune process is slower
- Presentation variable
- Eventually presents with polyuria, polydipsia, and weight loss
- Lower rates of DKA at presentation

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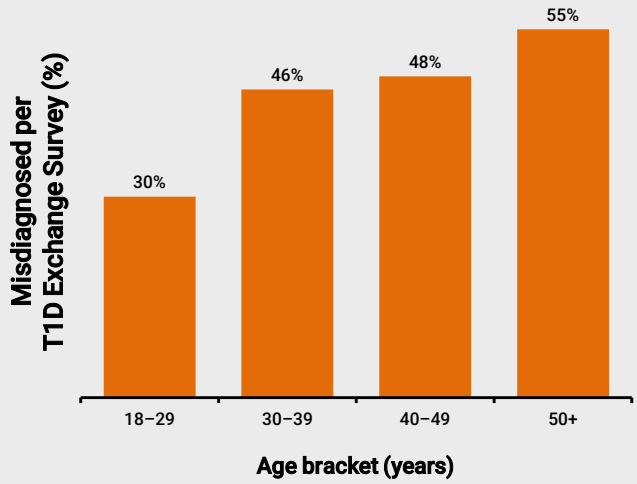
Misdiagnosis in Adults Is Common and Often Mistaken for T2D



Misdiagnosed conditions

	Adult diagnosis (n = 856)	Pediatric diagnosis (n = 1670)
T2D*	76.8%	4.1%
Other	18.4%	38.2%
Flu/viral infection*	8.6%	53.7%
Urinary tract infection†	6.3%	7.7%
Dehydration	3.5%	10.6%
Strep/bacterial infection†	2.5%	19.1%
Psychiatric condition	2.9%	5.3%
Mononucleosis	0.3%	4.5%

*$P < .001$; †$P < .05$. Boldface type indicates statistical significance.

>40% of those developing T1D after age 30 years are initially treated as T2D.

Muñoz C, et al. *Clin Diabetes*. 2019;37:276-281.

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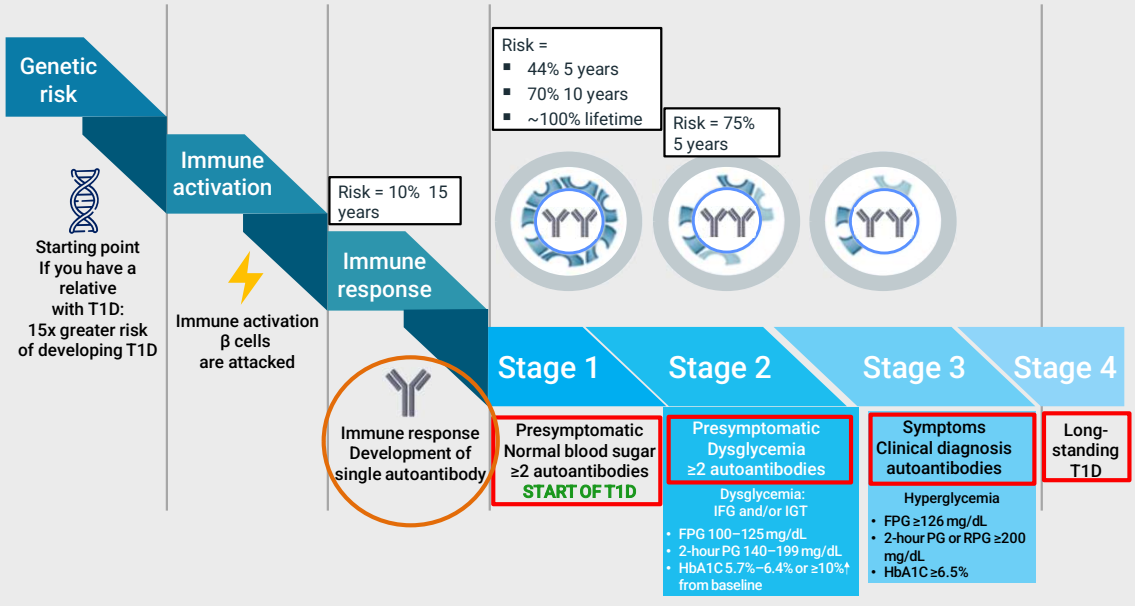
T1D Develops in Predictable Stages Related to Risk



FPG = fasting plasma glucose; HbA1C = glycosylated hemoglobin; IFG = impaired fasting glucose; IGT = impaired glucose tolerance; PG = plasma glucose; RPG = random plasma glucose.

American Diabetes Association (ADA) Professional Practice Committee. *Diabetes Care*. 2026;49(suppl 1):S27-S49. Haller MJ, et al. *Horm Res Paediatr*. 2024:1-17. Insel RA, et al. *Diabetes Care*. 2015;38: 1964-1974. Sims EK, et al. *Diabetes*. 2022;71:610-623. Phillip M, et al. *Diabetologia*. 2024;67:1731-1759.

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Screening and Early Detection of T1D

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Polling Question

What are your biggest barriers in screening for early stage T1D?
Select all that apply.

a) Lack of knowledge/evidence about screening
b) Lack of knowledge on when to screen
c) Lack of knowledge on how to screen
d) Uncertainty about how to identify whom to screen
e) Difficulty with interpreting screening results and next steps
f) Addressing patient/caregiver anxiety about screening in the absence of symptoms
g) Concerns about the cost of screening
h) These barriers don't apply to me

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Terminology

- **IAbs** = Islet autoantibodies

Insulin (IAA)	Glutamic acid decarboxylase (GAD65)	Islet antigen-2 (IA-2)	Zinc transporter 8 (ZnT8)	Islet cell antibodies (ICA)*

*Has largely been replaced by the 4 more specific biochemical autoantibodies.

- **Screening** = Testing for IAbs
- **Monitoring** = Following individuals who are IAb+ for progression
- **Prevention**
  - Primary prevention: Aim to prevent development of positive IAbs (stage 1) in genetically at-risk individuals
  - Secondary prevention: Aim to prevent progression to hyperglycemia (stage 3) in individuals with IAb
  - **New-onset studies:** Aim to preserve the remaining 15% to 30% of β cells and prolong the time of endogenous insulin production ("the honeymoon")

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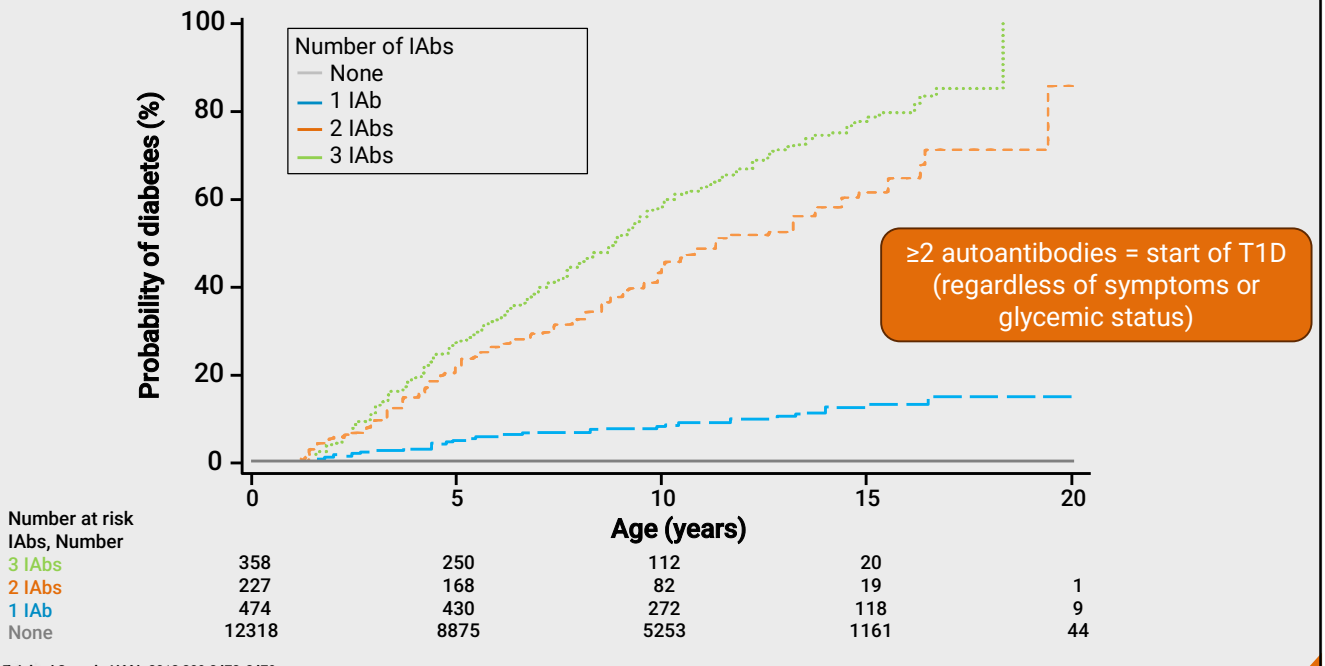
We Can Identify Asymptomatic T1D With Autoantibody Screening



Zeigler AG, et al. *JAMA*. 2013;309:2473-2479.

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Why Screen? What's in It for Patients?

- Gives patients and family members time to emotionally prepare for a T1D diagnosis
- Less likelihood of DKA or need for hospitalization at diagnosis
- Potential for improved glycemic control and thus reduced risk of long-term complications
- Identifies patients who may benefit from approved therapies or want to enroll in clinical trials to delay disease progression

DKA = diabetes-related ketoacidosis.

Sims EK, et al. *Diabetes.* 2022;71:610-623.

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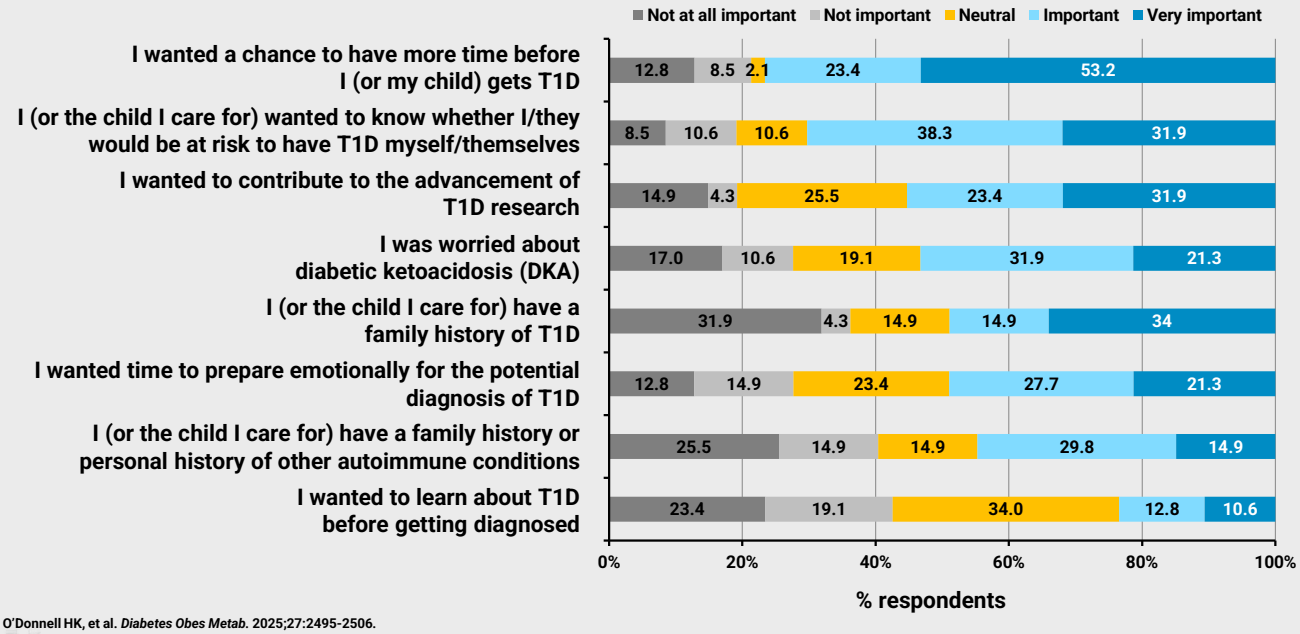
Reasons to Get Screened for T1D: Responses From a Patient Survey



O'Donnell HK, et al. *Diabetes Obes Metab.* 2025;27:2495-2506.

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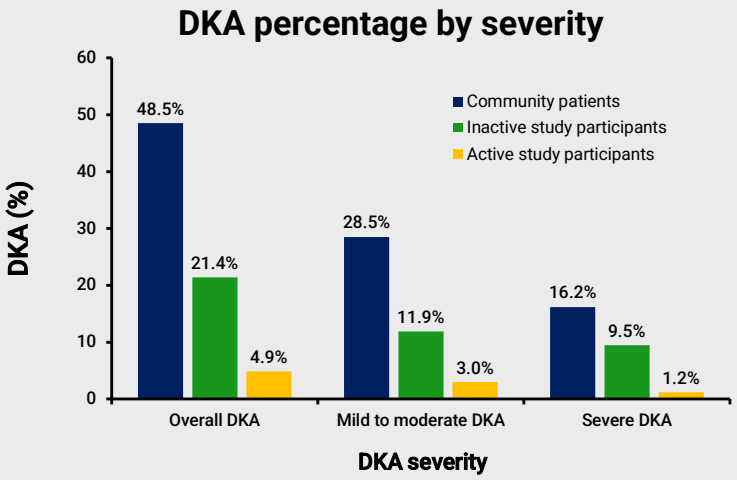
Screening and Routine Follow-Up Reduces the Risk of DKA at Stage 3

- In Colorado youth, individuals diagnosed in the community between 2005 and 2021 presented in DKA 48.5% of the time; DKA decreased to 21.4% in youth screened before diagnosis and to 4.9% in those participants who actively engaged in research monitoring and follow-up visits

Similar DKA reductions were seen in other T1D screening and follow-up studies (DAISY, TEDDY, BABYDIAB, DIPP, TRIGR).



Barker JM, et al. *Diabetes Care*. 2004;27:1399-1404. Elding Larsson H, et al. *Pediatr Diabetes*. 2014;15:118-126. Winkler C, et al. *Pediatr Diabetes*. 2012;13:308-313. Hekkala AM, et al. *Pediatr Diabetes*. 2018;19:314-319. Nakhla M, et al. *JAMA Pediatr*. 2021;175:518-520. Sooy M, et al. *J Clin Endocrinol Metab*. 2024;110:e80-e86.

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Caregiver Perspective and Panel Discussion: Screening for T1D

Vanessa and Chloe

T1D Patient Advocate

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What Are the Concerns About Screening?

- > 70% of caregivers of T1D autoantibody-positive children in the general population reported high anxiety about their child's T1D risk
  - 45%–70% of autoantibody positive 10- to 15-year-olds reported high anxiety about developing T1D
- Disease risk is a difficult concept to understand for HCP and the community
- Negative lifestyle behaviors (e.g., severe carbohydrate restriction, excessive exercise, over-supplementation) may occur

O'Donnell HK, et al. *Diabetes Care*. 2023;46:2155-2161. Phillip M, et al. *Diabetes Care*. 2024;47:1276-1298; Johnson SB, et al. Diabetes Care. 2017;40(9):1167-1172.

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How Do We Address Those Concerns?

- Listen and acknowledge concerns
- Be clear in communication of risk and timeline
- Make sure the patient and family are involved in all decisions that are made
- Link them to other people who have had similar experiences
- Bring behavioral health in as part of your team when necessary

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How and Whom to Screen for T1D

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T1D Screening is Recommended in Major National & International Guidelines

American Diabetes Association (ADA)

Screen for presymptomatic T1D by testing autoantibodies against IA, GAD, IA-2, or ZnT8. B

Autoantibody-based screening for presymptomatic type 1 diabetes should be offered to those with a family history of type 1 diabetes or otherwise known elevated genetic risk. B

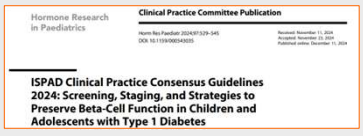

2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2026

American Diabetes Association Professional Practice Committee for Diabetes*

Diabetes Care 2026;49(Suppl. 1):S27–S49 | https://doi.org/10.2337/dc26-S002

International Society of Pediatric and Adolescent Diabetes (ISPAD)

Screening and follow-up should be completed to identify people with Stages 1, 2, and 3a T1D, reduce the incidence of diabetic ketoacidosis (DKA) and hospitalization, and to direct individuals toward interventions or studies seeking to delay or prevent ongoing beta-cell loss. A


Hormone Research in Paediatrics

Clinical Practice Committee Publication

ISPAD Clinical Practice Consensus Guidelines 2024: Screening, Staging, and Strategies to Preserve Beta-Cell Function in Children and Adolescents with Type 1 Diabetes

ADA. 2026. *Diabetes Care*; 49(Suppl 1): S27–S49. Haller MJ, et al. *Horm Res Paediatr*. 2024;97(6):529-545.

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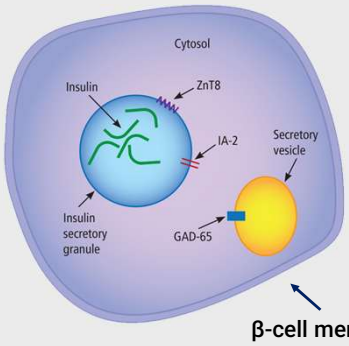
How Do We Screen for T1D?

IAb screening is the cornerstone; testing for all 4 recommended IAbs increases the chance of detecting T1D

- IAA
- GAD65/GADA
- IA-2A
- ZnT8A



- Some studies first screen populations for high-risk *HLA* genes (sometimes in addition to other genes to calculate a genetic risk score), then test autoantibodies
- Some studies first screen populations using autoantibodies

Sims EK, et al. *Diabetes*. 2022;71:610-623.

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IAb Testing: In Whom?

To ***screen*** for T1D in

- **Relatives of a person with T1D**
- Person with history of other autoimmune disease(s)
- Relatives of a person with other autoimmune disease(s)
- Elevated genetic risk score (if tested)
- Population screening in organized programs

To ***clarify diagnosis*** of T1D

- History of hyperglycemia (misdiagnosis is possible)
  - Illness, stress, or steroid-induced hyperglycemia
  - Gestational diabetes
- Persons with new-onset diabetes to evaluate for T1D vs other forms of diabetes

In all IAb+ patients, a full venous IAb panel should be done within 3 months of the first test to confirm.

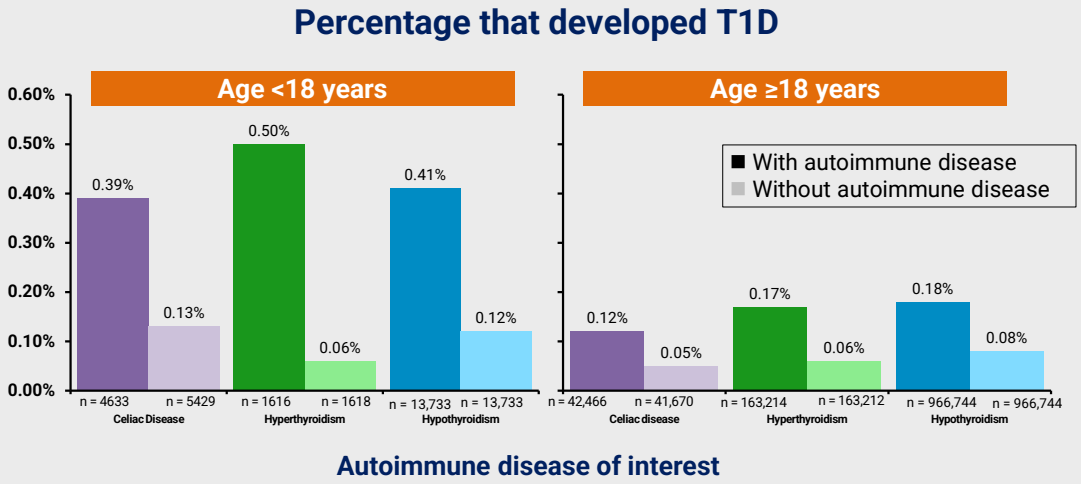
Education, especially for a patient with abnormal or high glucose levels, should not be delayed while waiting for confirmation.

Diabetes Care. American Diabetes Association.
Consensus Guidance for Monitoring Individuals With Islet Autoantibody–Positive Pre-Stage 3 Type 1 Diabetes

ADA Professional Practice Committee. *Diabetes Care*. 2026;49(suppl 1):S27-S49. Phillip M, et al. *Diabetologia*. 2024;67:1731-1759. Philip M, et al. *Diabetes Care*. 2024;47:1276-1298.

32

Risk of Developing T1D in Individuals with Other Autoimmune Conditions



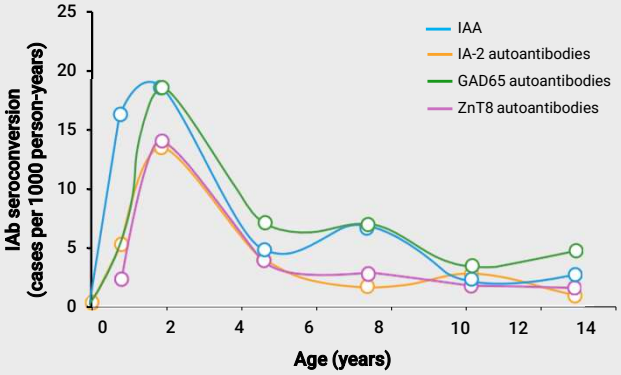
Edelman SV, et al. *Diabetes Obes Metab*. 2025;27:4229-4238.

33

Screening for Islet Autoimmunity Should Occur at Multiple Times During Childhood

- In genetically at-risk individuals, T1D autoantibody seroconversion peaks **between 9 months and 2 years of age**
- Insulin autoantibodies may develop **earlier than GAD65, IA-2, or ZnT8 autoantibodies**
- **Screening at ages 2 and 6 years** may optimize sensitivity and positive predictive value for predicting T1D during childhood, while an additional testing at age 10 years may aid in predicting T1D during adolescence but **guidance may evolve**

Incidence of specific T1D autoantibodies by age



Ziegler A-G, et al. *Diabetologia*. 2012;55:1937-1943. Ghalwash M, et al. *Lancet Diabetes Endocrinol*. 2022;10:589-596. Ghalwash M, et al. *Lancet Child Adolesc Health*. 2023;7:261-268.

34

Major T1D Screening Programs in the United States

Research-based screening programs (no HCP order required)

	Age to participate
ASK (Autoimmunity Screening for Kids)	Children and adults aged 1–99 years (no family history of T1D required)
Type 1 Diabetes TrialNet	Aged 2–45 years with a parent, brother/sister, or child with T1D; or have tested positive for ≥ 1 T1D autoantibody outside of TrialNet *OR* Aged 2–20 years with aunt/uncle, cousin, grandparent, niece/nephew, or half-sibling with T1D

Clinical Laboratory	
Quest Diagnostics, LabCorp, ARUP, or Mayo Clinic Laboratories	All ages, HCP order required. CPT codes* ▪ 86341 (GAD65, IA-2, ZnT8 antibodies) ▪ 86337 (insulin antibody)

Relevant ICD10 Codes	
Z83.3	Family history of T1D
Z86.2	History of autoimmune disease
Z83.2	Family history of autoimmune disease
E10.A0	T1D, Presymptomatic, Unspecified
E10.A1	T1D, Presymptomatic, Stage 1
E10.A2	T1D, Presymptomatic, Stage 2

Not a comprehensive list of available screening programs; may be subject to change.
*CPT codes may be subject to change, and specific codes may differ between laboratories. Not all antibodies may be available under a specific laboratory or under a CPT code.

CPT = Current Procedural Terminology; HCP = healthcare provider.

ASK (https://www.askhealth.org). TrialNet. Pathway to prevention (https://www.trialnet.org/our-research/risk-screening). Breakthrough T1D (formerly JDRF) (https://www.breakthrought1d.org/early-detection/). Ask the Experts (https://www.asktheexperts.org/for-providers). URLs accessed 7/14/2025.

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Case #1 and Group Breakout Discussion

36

Case #1: Challee (introduction)

- Challee is a 10-year-old girl who presents to the office for an ED follow-up
- She was playing soccer and developed an ankle sprain and went to the ED
- In the ED they checked her glucose as part of metabolic panel, and it was 212 mg/dL
- Ankle pain is improving with ankle support
- No systemic signs or symptoms; no symptoms from hyperglycemia
- Past medical history: None, normal developmental milestones
- Family history: Dad has celiac disease
- Medications/allergies: None
- Physical examination: Unremarkable

ED = emergency department.

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Now we will break out for case discussion.

The selected delegate person at each table should answer the question discussed by your group.

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Challee Patient Case Group Breakout Discussion (15 mins)

Please select 1 delegate person for your table to answer the questions below.

1. Individually read the case *(1 mins)*
2. Discuss as a group your answer and write them on the piece of paper on each of the following:
   - What do you recommend to follow-up on the glucose value from the ED? *(2 mins)*
   - Does she have any risk factors for T1D, and if so, how would you screen for T1D? *(2 mins)*
   - How would you confirm T1D diagnosis, and what would be your next steps? *(2 mins)*

The moderator will call on some teams to hear your group's answers.

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Follow-Up and Monitoring After T1D Screening

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Polling Question

To whom do you usually refer patients for confirmation of T1D staging and specialized management? ***Select all that apply.***

a) Endocrinologist/diabetologist
b) Pediatric endocrinologist
c) Immunologist
d) Diabetes specialty nurse
e) Diabetes educator
f) None, I don't know whom to refer to or don't have the resources
g) Other

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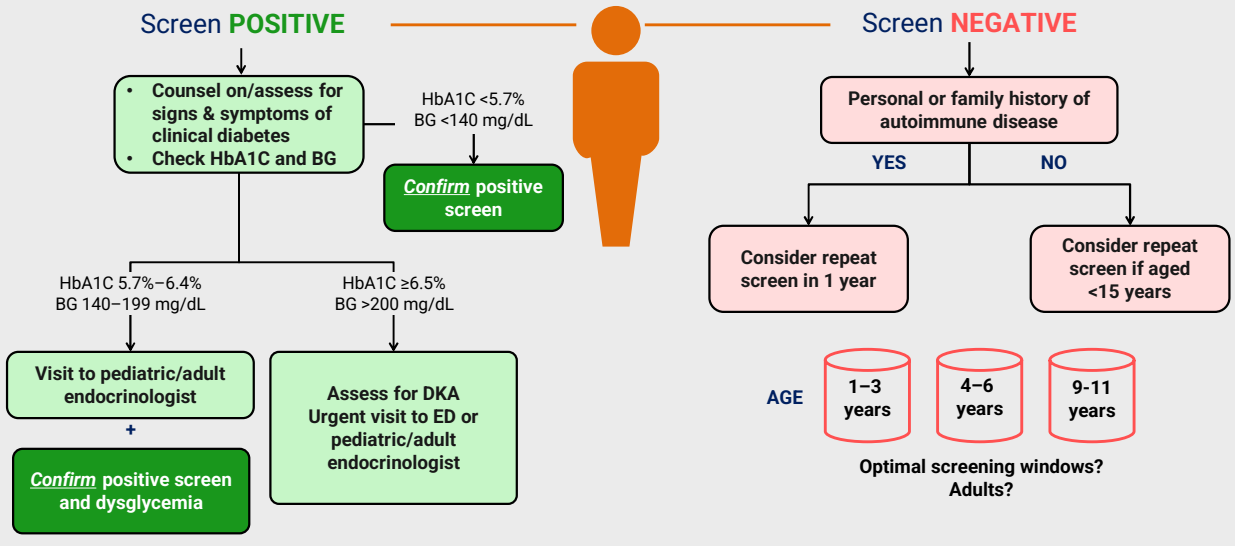
If a Patient Has Positive Autoantibodies, Rule Out Clinical T1D



BG = blood glucose.

Modified from Simmons KMW, et al. *Diabetes Technol Ther*. 2023;25:790-799.

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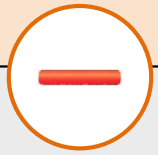
How to Interpret T1D Screening Results

0 autoantibodies

- Lower risk for developing T1D
- Rescreening may be considered in individuals with family history of T1D or in children <15 years of age



1 autoantibody

After **confirming** a single autoantibody:

- Higher risk for developing T1D than those with no autoantibodies
- Glucose and HbA1c along with symptom evaluation
- Referral to specialist for monitoring

≥2 autoantibodies

After **confirming** multiple autoantibodies:

- Already in early-stage T1D
- Glucose and HbA1c along with symptom evaluation
- Referral to specialist for monitoring and possible disease-modifying therapy (e.g. teplizumab), or clinical trials

DMT = disease-modifying therapy.

ADA Professional Practice Committee. *Diabetes Care.* 2026;49(suppl 1):S27-S49. Simmons KMW, et al. *Diabetes Technol Ther.* 2023;25:790-799.

43

Follow-Up After Screening and Strategies for Monitoring

Monitoring tools

- OGTT -- gold standard to differentiate stage 1, stage 2, and stage 3 T1D

Follow-up with monitoring

- HbA1C, and/or
- SMBG, and/or
- CGM, and/or
- Periodic OGTTs

Education

- Educate on need for monitoring, symptoms of DKA
- Provide written instructions, give SMBG meters/strips

Multidisciplinary care

- Collaboration is needed between the primary care provider, pediatric and adult endocrinologist, and individuals who are antibody positive
- Consider referring to a behavioral health provider to give patients and caregivers appropriate psychosocial support

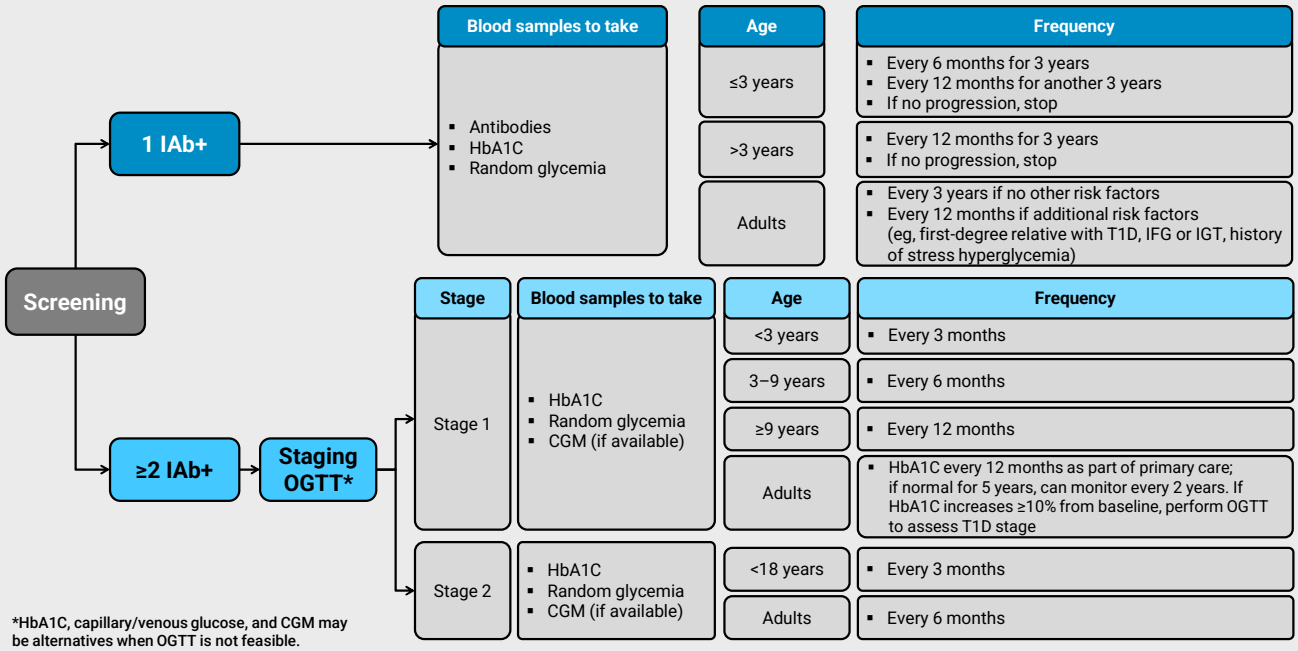
More frequent monitoring in children is needed due to increased risk and faster rate of T1D progression. Detailed monitoring and follow-up can be found in the international consensus monitoring guidance.

CGM = continuous glucose monitor; OGTT = oral glucose tolerance test; SMBG = self-monitoring blood glucose.

Adapted from Phillip M, et al. *Diabetes Care.* 2024;47:1276-1298.

44

Monitoring Individuals With Confirmed IAb+



*HbA1C, capillary/venous glucose, and CGM may be alternatives when OGTT is not feasible.

Modified from Phillip M, et al. *Diabetes Care*. 2024;47:1276-1298 and Haller MJ, et al. *Horm Res Paediatr*. 2024:1-17.

45

The Primary Goals of Education for Care of Antibody-Positive People and Their Families

1	2	3	4	5	6	7
To prevent DKA, promote safe monitoring practices, and reduce occurrence of symptoms of T1D	To minimize the requirement for emergency care, hospital admission, and need for intensive care at diagnosis of T1D	To improve appropriate risk perception at each monitoring milestone	To understand specific outcomes (eg, prevention of DKA, initiation of insulin therapy)	To understand available interventions	To explore and understand the benefits of individual participation in research studies	To provide education that supports psychosocial interventions to optimize general health and mental health for affected individuals and their families

Phillip M, et al. *Diabetes Care*. 2024;47(8):1276-1298.

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Caregiver Perspective and Panel Discussion: Follow-Up After Screening Results

Vanessa and Chloe
T1D Patient Advocate

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Advances in Delaying T1D Progression

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Polling Question

What are your biggest barriers in treating early-stage T1D to delay progression to clinical disease? ***Select all that apply.***

a) Difficulty identifying eligible patients (eg, patients with stage 2 T1D)
b) Lack of knowledge/evidence about teplizumab or other DMTs for T1D
c) Lack of knowledge about where or how to refer for teplizumab treatment
d) Lack of available infusion programs (in my practice or in my area)
e) Uncertainty about the safety profile of teplizumab and/or how to manage AEs
f) Insurance and patient access issues
g) Uncertainty about where teplizumab infusions should take place
h) Lack of nursing support
i) Lack of support from leadership within your practice/institution
j) Weekend availability for 14-day consecutive infusions

AE = adverse event.

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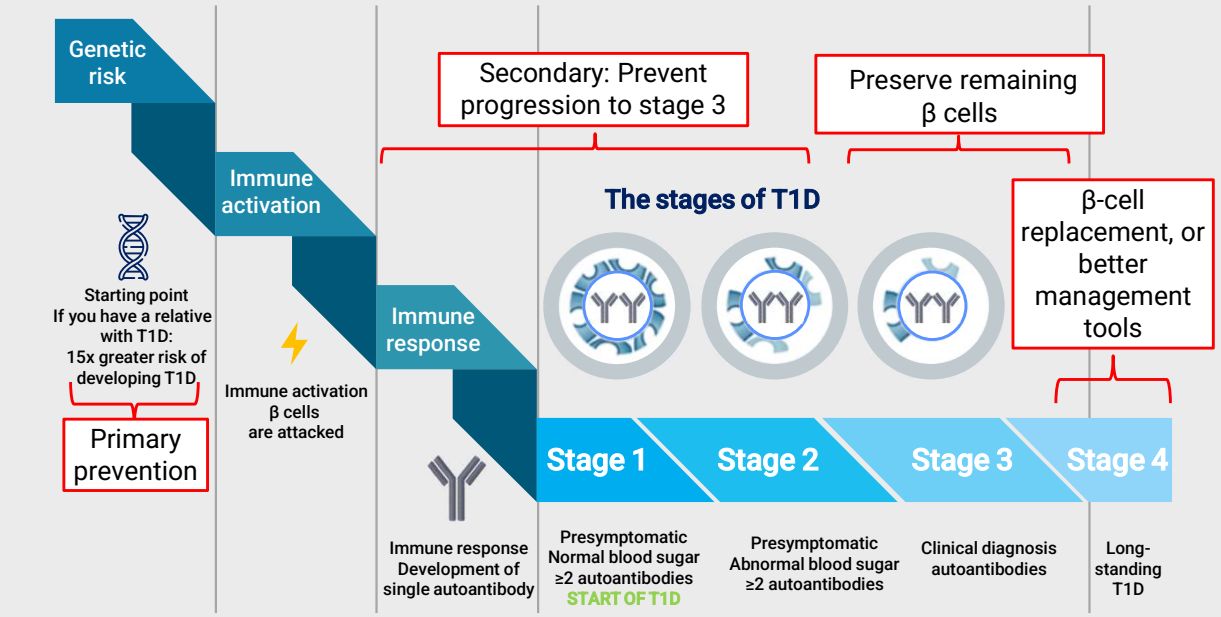
Why Try to Delay T1D Progression?

1. High disease burden
2. We are not doing a good job in achieving the tight metabolic control we know is necessary to prevent complications
3. Maintaining even some β-cell function (measured as stimulated C-peptide) improves glycemia, reduces risk of hypoglycemia, and reduces complications

Chua K-P, et al. *JAMA Intern Med.* 2020;180:1012-1014. Crossen SS, et al. *Pediatr Diabetes.* 2020;21:644-648. Miller KM, et al. *Diabetes Care.* 2015;38:971-978. Lachin JM, et al. *Diabetes*. 2014;63:739-748.

50

The Stages of T1D Inform Our Therapy Approach—Most Studies Focus on T1D Stages 1 and 2 Where Risk of Progression Is Highest

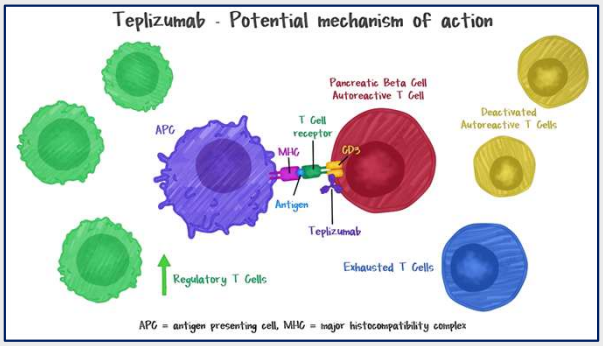


Insel RA, et al. *Diabetes Care.* 2015;38:1964-1974. Sims EK, et al. *Diabetes.* 2022;71:610-623.

51

TrialNet TN10 Study—Teplizumab Slowed Progression From Stage 2 to Stage 3 T1D

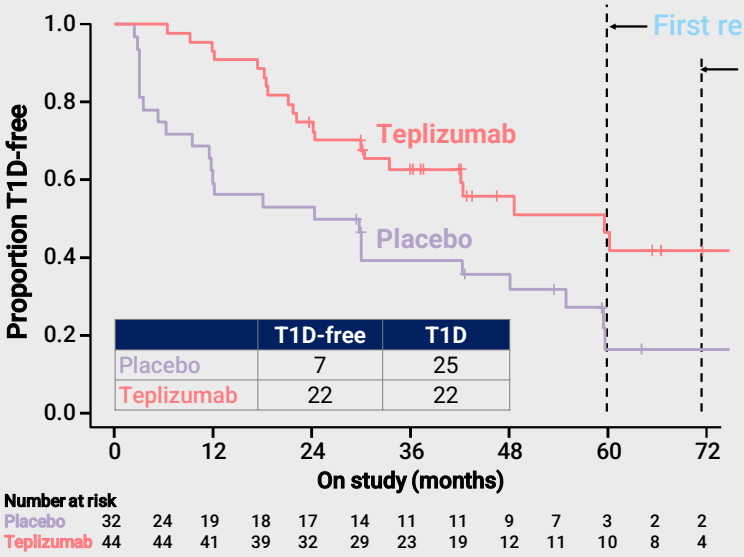
- Humanized anti-CD3 monoclonal antibody that binds to the T-cell receptor-CD3 complex, inhibiting immune attack on β cells
  - Autoreactive $CD8^+$ T-effector cells become "exhausted" (disabled)
- It was first studied in stage 3 T1D where it slows β-cell loss and is well tolerated; this set the stage for the TrialNet TN10 stage 2 prevention trial
- November 2022: FDA approved teplizumab as the first drug that can delay onset of clinical T1D for individuals aged ≥8 years with stage 2 T1D



Herold KC, et al. *N Engl J Med.* 2019;381:603-613. Sims EK, et al. *Sci Transl Med.* 2021;13:eabc8980. Thakkar S, et al. *touchREV Endocrinol.* 2023;19:22-30.

52

TN10 Results: Effect of Teplizumab in Children and Adolescents With Stage 2 Diabetes



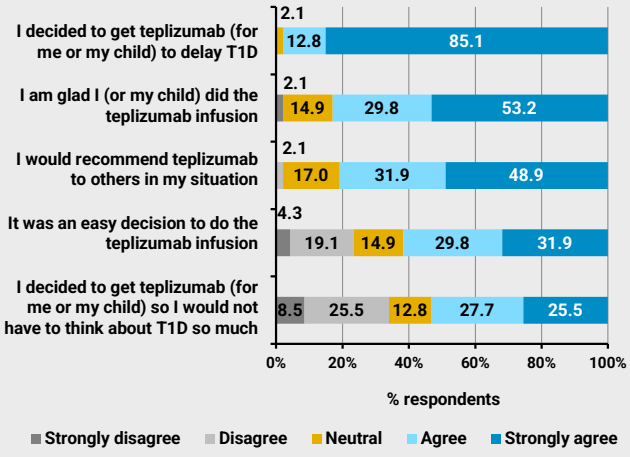
- In the first report (5 years), the time to stage 3 was delayed by 2 years with teplizumab
- 12 months later there was a 32.5-month delay
- By 6 years 50% of teplizumab-treated subjects were diabetes-free compared with 22% of those in the placebo group

Herold KC, et al. *N Engl J Med*. 2019;381:603-613. Sims EK, et al. *Sci Transl Med*. 2021;13:eabc8980.

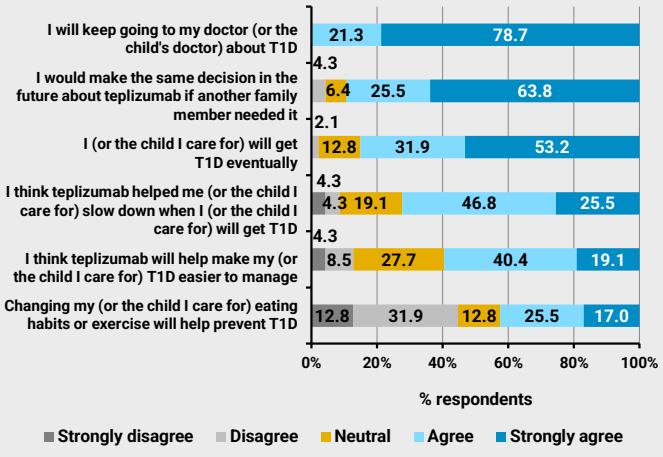
53

Real-World Experience With Teplizumab: *Survey Results of Individuals Treated With Teplizumab for Stage 2 T1D*

Views and expectations associated with teplizumab



Outlook after teplizumab treatment



O'Donnell HK, et al. *Diabetes Obes Metab*. 2025;27:2495-2506.

54

TN10 Results: Teplizumab AEs

AE category	Teplizumab		Placebo	
	Events, n	Subjects, n (%)	Events, n	Subjects, n (%)
Blood/bone marrow*	45	33 (75)	2	2 (6.2)
Dermatology/skin*	17	16 (36.4)	1	1 (3.1)
Pain	11	5 (11.4)	5	3 (9.4)
Infection	8	5 (11.4)	5	3 (9.4)
Gastrointestinal	5	4 (9.1)	3	3 (9.4)
Metabolic/laboratory	7	4 (9.1)	2	2 (6.2)
Pulmonary/upper respiratory	6	4 (9.1)	0	0 (0)
Constitutional symptoms	3	2 (4.5)	0	0 (0)
Allergy/immunology	2	2 (4.5)	0	0 (0)
Cardiac/general	1	1 (2.3)	1	1 (3.1)
Endocrine	0	0 (0)	2	2 (6.2)
Vascular	1	1 (2.3)	1	1 (3.1)
Neurology	1	1 (2.3)	0	0 (0)
Ocular/visuals	1	1 (2.3)	0	0 (0)
Musculoskeletal/soft tissue	2	1 (2.3)	0	0 (0)
Hepatobiliary/pancreas	0	0 (0)	1	1 (3.1)
Syndromes	1	1 (2.3)	0	0 (0)
Hemorrhage/bleeding	1	1 (2.3)	0	0 (0)
Total/events and subjects	12	44 (100)	23	32 (100)

*$P < .001$ teplizumab vs placebo.

- AEs were primarily related to cytokine release syndrome (CRS) in the first few days of infusions
- With premedication therapy (acetaminophen, diphenhydramine, ondansetron), most AEs were not severe and resolved without other intervention
- Most common AEs included lymphopenia, rash, and headache

Herold KC, et al. *N Engl J Med*. 2019;381:603-613.

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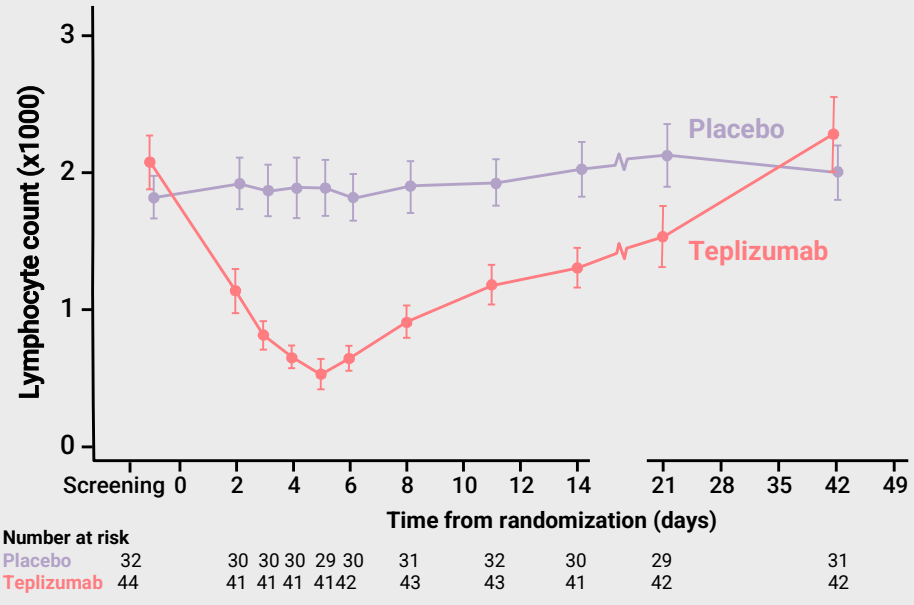
TN10 Results: Lymphocytes Are Transiently Suppressed



Herold KC, et al. *N Engl J Med*. 2019;381:603-613.

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Teplizumab Treatment for Stage 2 T1D in Real-World Practice

A real-world evaluation of metabolic and immunological outcomes

Early real-world experience with teplizumab supports its safe use and potential to improve glycemic outcomes, while molecular biomarkers measuring TCRs may help guide future monitoring and treatment decisions.

Teplizumab treatment In real-world practice

	Teplizumab treated (n = 30)	Untreated (n = 10)
Oral glucose tolerance test	Improved within the first year after teplizumab treatment	
Continuous glucose monitoring	Time above 7.8 mmol/l (140 mg/dl) reduced	
T-cell receptor sequences	Preproinsulin T-cell receptor sequences were reduced after teplizumab treatment and correlated with C-peptide levels	

Karakus KE, et al. *Diabetologia*. 2026 (https://doi.org/10.1007/s00125-025-06646-6). Accessed 2/4/2026.

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PETITE-T1D Study Results

Teplizumab in children less than 8 years of age with stage 2 type 1 diabetes

Safety and pharmacokinetics of teplizumab in children <8 years of age with stage 2 type 1 diabetes

Background

Teplizumab is approved in the United States to delay stage 3 T1D in individuals 28 years of age with stage 2 T1D

Methods

23 children with an average age of 4.8 years who met criteria for stage 2

14-day course of teplizumab → **2-year study**

Off-treatment observation phase

Objective

Investigate the safety and tolerability of teplizumab in children <8 years of age

Interim analysis findings

- Adverse events were consistent with previous studies
- No new safety risks were identified
- Probability of not progressing to stage 3 T1D was 89.6%

Teplizumab was safe and well-tolerated in children <8 years of age.

PETITE-T1D = Teplizumab in Pediatric Stage 2 Type 1 Diabetes; T1D = type 1 diabetes.

NCT05757713 (https://clinicaltrials.gov/study/NCT05757713). Accessed 2/4/2026. Gitelman SE, et al. *Diabetologia*. 2026;69(2):330-342.

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Teplizumab Challenges

- Cost for drug plus infusion center/staff (premedications, laboratory tests, registered nurse [RN], medical doctor [MD])
  - Public vs private insurance coverage
- Length of treatment (14 consecutive days)
- Identifying stage 2 T1D (screening) and monitoring of these patients before and after treatment
- While the drug has an excellent safety record, it was given under protective research conditions; community users may not be able to be as thorough, or unanticipated problems might become evident with larger numbers
- How are we going to track safety and efficacy now that it is no longer part of a study?

*Gitelman SE, et al. Diabetologia. 2025 doi: 10.1007/s00125-025-06586-1

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Practical Tips for Teplizumab Therapy Based on TrialNet Protocol and Experience

Locale for drug administration—ideally, an infusion center with an onsite provider comfortable with cytokine release syndrome/drug reactions (eg, chemotherapy/rheumatology centers); emergency medications on hand in case of hypersensitivity reaction

- Particularly important during the first 5 days as dose is ramping up
- While infusions can be given at clinic or in the home via home health, infusion centers with trained staff is the safest way to provide the availability of rapid and experienced emergency care
- For additional information—including preinfusion vaccine recommendations, premedications, and drug withholding criteria—refer to the 2024 PES guidance statement on teplizumab treatment

ICD-10 = *International Classification of Diseases, Tenth Revision*.

PES = Pediatric Endocrine Society.

Adapted from Mehta S, et al. *Horm Res Paediatr*. 2024:1-12.

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Teplizumab Eligibility

Aged ≥8 years with stage 2 T1D confirmed by

- ≥2 T1D relevant antibodies (GAD65, IA-2, IAA, ZnT8, ICA)
- Dysglycemia
  - The OGTT is the gold standard test, with dysglycemia defined as
    - Fasting glucose: 100–125 mg/dL, OR
    - OGTT 30-, 60-, 90-minute postprandial glucose: ≥200 mg/dL, OR
    - 2-hour postprandial glucose: 140–199 mg/dL, OR
    - HbA1C: 5.7%–6.4% or ≥10% increase in HbA1C even in the normal range

- No symptoms associated with T1D (eg, increased urination, excessive thirst, weight loss)
- Ensure that the patient's clinical history and diagnostic codes do not suggest overt hyperglycemia (FPG ≥126 mg/dL or 2-hour postprandial glucose ≥200 mg/dL)
- Ensure that the clinical history of the patient does not suggest T2D

- All age-appropriate vaccinations were administered prior to starting teplizumab
- Screenings for active CMV, EBV infection, hepatitis, HIV, and tuberculosis are negative
- Discussed potential risks and benefits and potential AEs with patient and family

ICD-10 diagnostic codes specific to early stage T1D
- E10.A0 = T1D, presymptomatic, unspecified
- E10.A1 = T1D, presymptomatic, stage 1
- E10.A2 = T1D, presymptomatic, stage 2

ICA = islet cell antibody; ICD-10 = *International Classification of Diseases, Tenth Revision*.

Adapted from Mehta S, et al. *Horm Res Paediatr.* 2024:1-12 and Teplizumab (Tzield®) prescribing information (PI) 2023 (https://products.sanofi.us/tzield/tzield.pdf). Accessed 7/16/2025.

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Considerations for Infusion Setting With Teplizumab

Infusion setting*	Pros	Cons
Doctor's office	Supervised by provider	Limited scheduling flexibility, limited personal attention in a busy clinic setting
Infusion centers	Specialized staff and equipment, experience with immunotherapy infusions	Possible travel required
At home with nurse	Convenience	Lack of immediate medical assistance, especially during the first 5 days when cytokine release syndrome is common

*For insurance purposes, infusion setting must be determined prior to starting therapy. In-home infusions for a pediatric population should be ideally avoided and limited to adult patients. Infusions for pediatric patients are recommended to be done in a controlled clinical setting with nurses who are trained in PALS.

- This can vary based on resources and experience of the team
- Careful balance of accessibility to medication and optimizing patient care and monitoring

Type 1 Diabetes TrialNet Centers of Excellence Locations
https://www.trialnet.org/locations

National Infusion Center Association – Infusion Center Locator (can sort by medication type, including teplizumab)
https://locator.infusioncenter.org/

DETECT-T1D Infusion Portal
https://infusion.detect-t1d.com/

PALS = Pediatric Advanced Life Support.

Mehta S, et al. *Horm Res Paediatr.* 2024:1-12.

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BREAK

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Caregiver Perspective and Panel Discussion: Treatment With Disease Modifying Therapies for T1D

Vanessa and Chloe
T1D Patient Advocate

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Case #2 and Group Breakout Discussion

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Case #2: Robert (introduction)

- Robert is a 32-year-old man who presents to you for a diabetes recheck; he was diagnosed 3 years ago at his time-of-work physical for the police force and was not feeling well at the time; was urinating a lot and had lost weight (~10 lbs over 3 months); and then started metformin, which was increased to 1000 mg twice a day, and sitagliptin 100 mg daily
- Not sure how well the medications work, but he has gone on a ketogenic diet, which prevents his sugars from spiking so high
- He has no family history of diabetes; he has only had sports-related injuries in the past
- No tobacco, alcohol, or recreational drug use; single—lots of exercise at work
- Initial HbA1C was 8.7%

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Case #2: Robert (follow-up)

- Physical examination
  - Blood pressure: 116/82 mm Hg, pulse: 64 beats/minute, respiratory rate: 12 breaths/ minute, body mass index: 24 kg/m^2
  - Physical
    - Normal examination
  - HbA1C 7.5% (3 months into ketogenic diet)
- Total cholesterol: 184 mg/dL
- High-density lipoprotein: 54 mg/dL
- Low-density lipoprotein: 105 mg/dL
- Triglycerides: 78 mg/dL
- Basic metabolic panel: Normal
- Thyroid-stimulating hormone: Normal
- Complete blood count: Normal

67

Now we will break out for case discussion.

The selected delegate person at each table should answer the question discussed by your group.

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Robert Patient Case Group Breakout Discussion (15 mins)

Please select 1 delegate person for your table to answer the questions below.

1. Individually read the case *(1 mins)*
2. Discuss as a group your answer and write on the piece of paper on each of the following:
   - Given his history and presentation, what laboratory tests would you order next for Robert? *(2 mins)*
   - Would you screen Robert for T1D, and if so, why? (*2 mins*)
   - If Robert screened positive for ≥2 IAbs and his glucose level was 165 mg/dL, what would be your next steps for treatment? (*2 mins*)

The moderator will call on some teams to hear your group's answers.

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On the Horizon: Advances in Delaying Disease Progression in New Onset (Stage 3) T1D

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Disease-modifying Therapies in All Stages of T1D

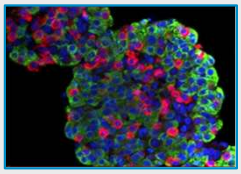
Rationale for disease-modifying therapy in T1D:

- Maintaining endogenous insulin secretion
- Reducing the need for exogenous insulin
- Prolonging the honeymoon period

DCCT entry stimulated C-peptide 0.2-0.5 nmol/L vs <0.2 nmol/L

Per 50% increase in C-peptide*, you had
8.9% lower severe hypoglycemia risk (p<0.0001)
24% reduced risk of sustained retinopathy (p=0.0030)

So, talk about research to your new-onset stage 3 T1D patients early in the initial education process!



*Adjusted for entry A1c and status of complications at entry
Lachin JM, et al. Diabetes. 2014 Feb;63(2):739-48.

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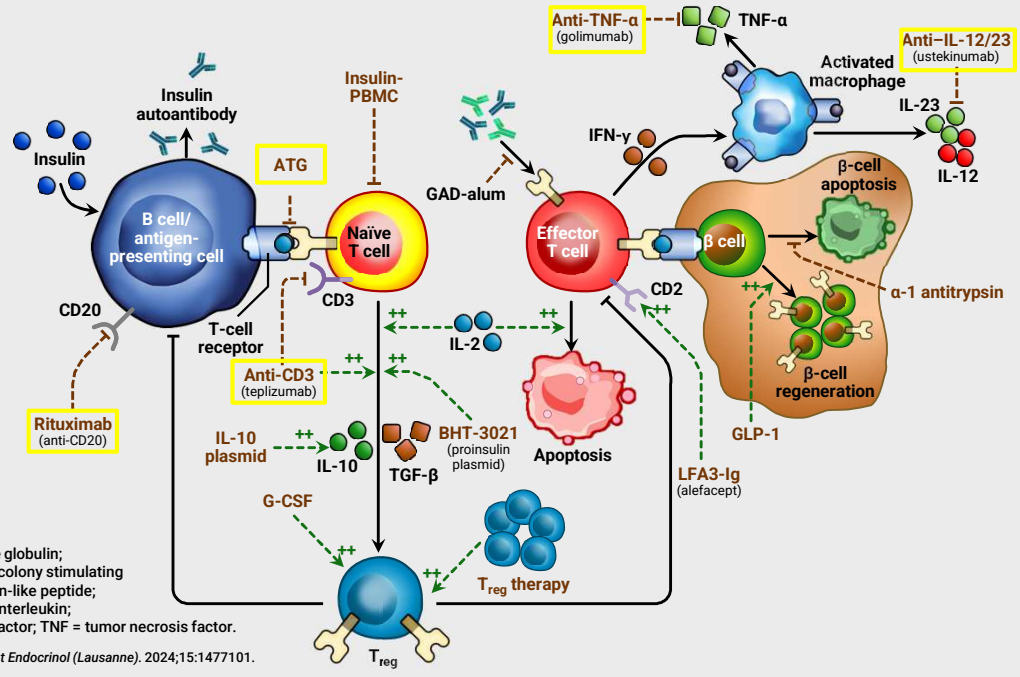
Several Treatment Targets Are Being Investigated in New-Onset T1D



ATG = anti-thymocyte globulin;
G-CSF = granulocyte-colony stimulating factor; GLP = glucagon-like peptide;
IFN = interferon; IL = interleukin;
TGF = tumor growth factor; TNF = tumor necrosis factor.

O'Donovan AJ, et al. *Front Endocrinol (Lausanne).* 2024;15:1477101.

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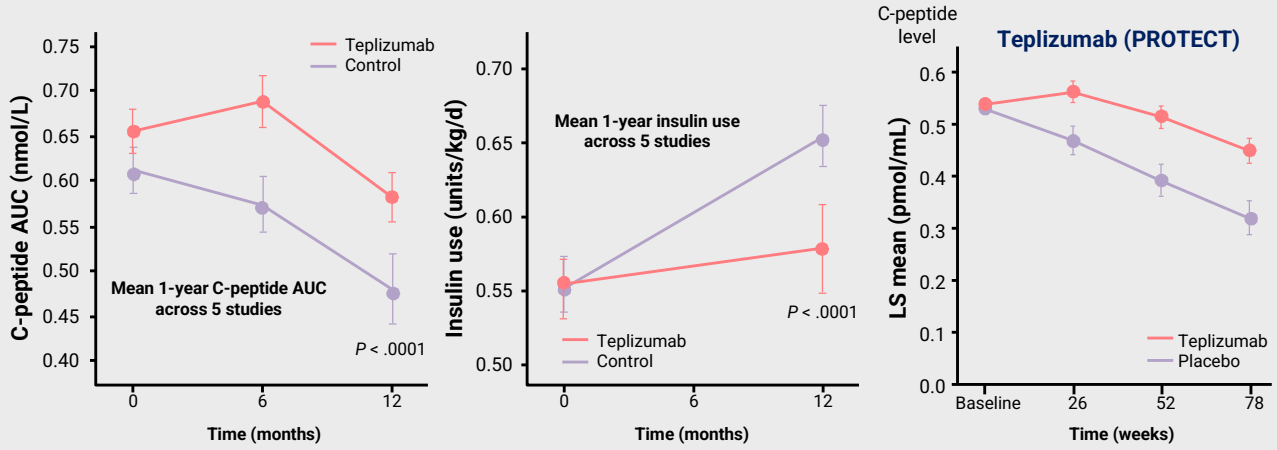
Stimulated C-Peptide and Insulin Use Were Significantly Improved in Stage 3 Participants With T1D Treated With Teplizumab



AUC = area under the curve; LS = least squares.

Herold KC, et al. *Diabetes Care*. 2023;46:1848-1856. Ramos EL, el al. *N Engl J Med*. 2023;389:2151-2161.

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Positive Outcomes in Stage 3 New-Onset T1D Human Trials

- Teplizumab (anti-CD3)
- Abatacept (CTLA4 immunoglobulin)
- Rituximab (anti-CD20)
- Alefacept (LFA3 Ig)
- ATG, low-dose ATG (anti-thymocyte)
- Golimumab (anti-TNFα)
- Anti–IL-21/liraglutide
- Verapamil (calcium channel blocker)
- Baricitinib (JAK inhibitor)
- Ustekinumab (anti-IL-12/23)
- Imatinib (tyrosine kinase inhibitor)

<u>Select ongoing trials awaiting results:</u>

- Iscalimab (anti-CD40)
- Frexalimab (anti-CD40L)
- Rituximab + abatacept
- JAK inhibitor (abrocitinib, ritlecitinib)

** Not a complete list of trials or agents under investigation or ongoing trials.*

JAK = Janus kinase.

O'Donovan AJ, et al. *Front Endocrinol (Lausanne)*. 2024;15:1477101. Jacobsen LM, Schatz D. *Horm Res Paediatr*. 2024;1-10.

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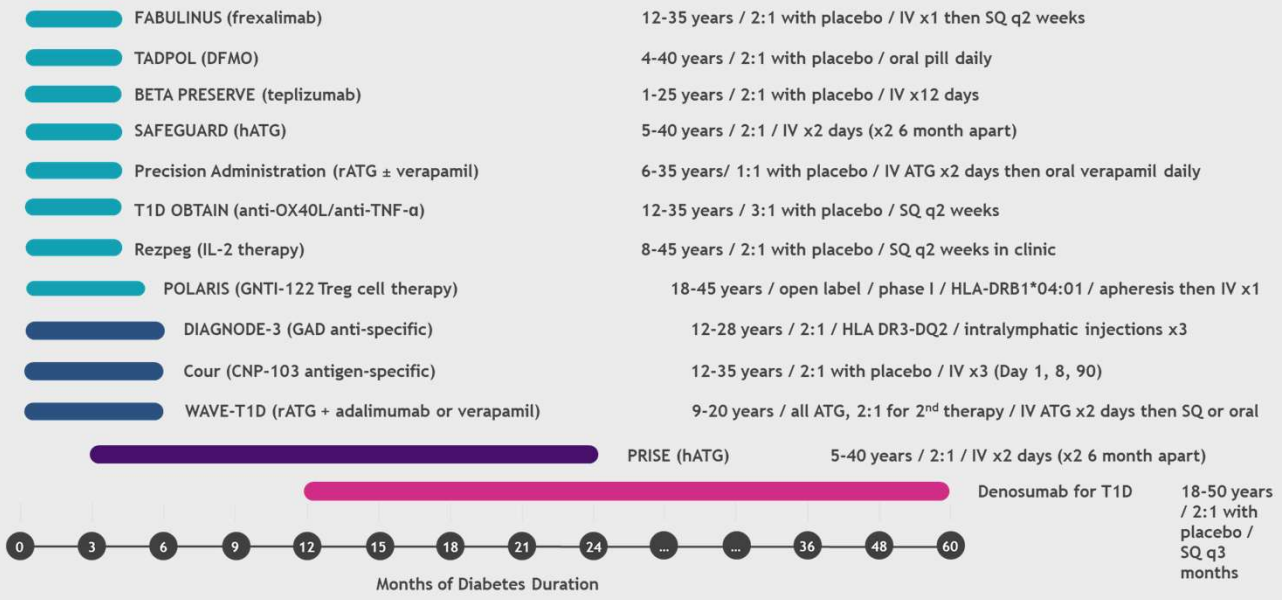
A Quick Look at the Currently Recruiting Stage 3 New-Onset T1D Trials



DFMO = difluoromethylornithine; hATG = human anti-thymocyte globulin; rATG = rabbit anti-thymocyte globulin; TNF = tumor necrosis factor; IL-2 = interleukin 2; Treg = regulatory T cell; IV intravenous; SQ = subcutaneous

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Implications and Practice Takeaways

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Roles of Providers in the Management of T1D Screening, Monitoring, and Treatment

- Primary HCPs should understand the stages of T1D as well as screening and monitoring recommendations
- Some HCPs with a specific interest can serve as local referral sources
- The primary care provider, specialist, and the person who is IAb+ should determine who will have primary responsibility and what degree of collaboration is needed; this may shift over time
- The electronic medical record must reflect IAb status as well as the plan for monitoring and for urgent evaluation if needed

Phillip M, et al. *Diabetes Care*. 2024;47:1276-1298. Phillip M, et al. *Diabetologia*. 2024;67:1731-1759.

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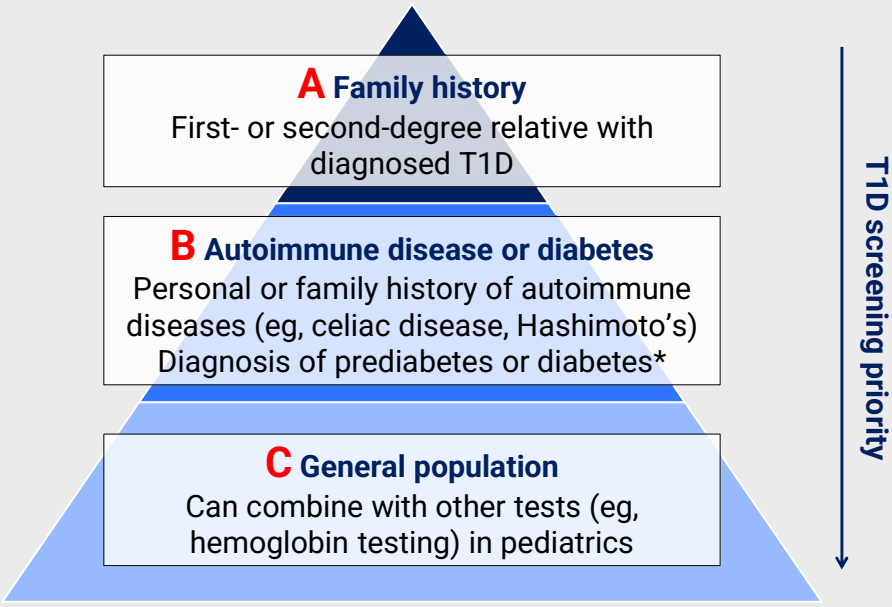
Suggested Risk Stratification Approach for Autoantibody Screening Programs for Presymptomatic Type 1 Diabetes



*For patients without typical features of T2D.

Modified from Leichter SB, et al. *J Clin Endocrinol Metab*. 2025;dgaf194.

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Establishing A Clinical T1D Autoantibody Screening Program

Process Considerations

Communication
- Benefits of screening
- Differences between T1D and T2D
- Options for screening, monitoring, and treatment
- Consent for screening
- Cost(s)

Reaching family members
- Discuss screening of family members with T1D patients.
- Provide informational handout about screening options, including information on free IAb screening through research programs

Timing of screening
- From 9 months of age
- Can combine with other routine testing, e.g.:

1–2 years – hemoglobin
4–6 years – vaccinations
9–11 years – lipid screening

ICD-10 diagnostic codes

Screening:
Z13.1 – encounter for screening for diabetes
Z83.3 – family history T1D
Z83.49 – family history endocrine, nutritional, metabolic
E34.9 – endocrine, unspecified

Monitoring (presymptomatic T1D):
E10.A0 – unspecified
E10.A1 - stage 1
E10.A2 - stage 2

Ordering IAb panels

Streamline ordering for clinical IAbs:

GAD IAA IA-2 ZnT8

Quest Diagnostics: 13621
Labcorp: 504050

CPT codes: 86341 (GAD65, IA-2, ZnT8) & 86337 (IAA)

Modified from Leichter SB, et al. *J Clin Endocrinol Metab*. 2025;dgaf194.

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Teplizumab—Considerations for Establishing a Clinical Infusion Program

- It takes some effort to set this up---if you are only planning to treat one or two patients it may make more sense to refer them to an established center with a larger case volume

Work closely with hospital and nursing leadership to create a protocol, determine logistics, and address prior authorization and billing. Seek mentorship from experienced centers

Do you have a plan/set-up to perform confirmatory eligibility screening including OGTTs?

Where and when will a long-arm (midline or PICC) IV line be placed?

Where will the infusion take place?
- For a least the first 5 days, close nursing supervision must be available, with nurses experienced in hypersensitivity reactions and cytokine release syndrome (usually chemotherapy/ rheumatology infusion centers).
- Are they open on weekends? A crash cart and an emergency response team should be available. There must be capacity for STAT pre-infusion labs. Someone must assess the pre-infusion labs and the patient's health daily to ensure the infusion can proceed.

The pharmacy needs a protocol for teplizumab and other study meds including those the patient will be sent home with.

Who is available to check in or to trouble-shoot problems with the patient overnight?

Slide courtesy of Antoinette Moran, MD.

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Conclusions

- There are practical benefits in diagnosing preclinical T1D
- Autoantibody screening identifies individuals at high risk for progression to clinical stage 3 T1D; this can be done locally or through established programs such as TrialNet
- If ≥2 IAbs are present, the next step is an OGTT for staging, then close follow-up
- Stage 1 or 2 T1D: May be eligible for therapy (teplizumab in stage 2, other drugs as they become available) or may be eligible to participate in a prevention study
- Patients with new-onset T1D may be eligible for a study, but this usually needs to be initiated within the first couple months of diagnosis
- Information can be found through Breakthrough T1D or TrialNet

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Local Resources

Name	***Description***	***Contact***
Screening/Presymptomatic T1D clinic		
Dallas and Plano Campuses	- 8 slots/ month in each campus and additional if needed - Staffed by APP, PA,MD - Separate triage process for this clinic - If there are 2 or more IAA- soon appointment available	Call/ send referrals to "Presymptomatic T1D clinic" Phone#: 214-456-5959 Fax#: 214-456-5963
TrialNet	Screening in person – - family members of individuals with T1D - 4th Tuesday of every month AM(Plano) and PM(Dallas) - FREE	Families can call clinic and schedule appointments OR Order kit online: Participate | TRIALNET Type 1 Diabetes TrialNet
Disease Modifying agents		
FDA approved: Teplizumab – stage 2 T1D Plano campus	- special procedure unit (14 days) - Vascular access team for IV access - Specialized nurse team who has experience with immunomodulator therapy	
Research studies – new onset stage 3 T1D (ages 12 and up)	JAK POT (TN 31)- Abrocitinib and Ritlecitinib Fabulinus/DRI17476 (Frexalimab)- CD40 L antagonist monoclonal Ab Rituximab/Abatacept – T1D relay(completed)	

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Polling Question (*Open-Ended*)

Based on what you have heard today, what is ONE change you plan to implement in your practice?

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Q & A

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Thank you!

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From Awareness to Action: Driving Multidisciplinary Application of Screening and Disease-Modifying Therapies in Early-Stage T1D

Toolkit

Guidelines and Practice Parameters

Resource	Address
American Diabetes Association Professional Practice Committee. 2. Diagnosis and classification of diabetes: Standards of care in diabetes—2025. *Diabetes Care*. 2025;48(suppl 1):S27-S49.	https://diabetesjournals.org/care/article/48/Supplement_1/S27/157566
American Diabetes Association Professional Practice Committee. 3. Prevention or delay of diabetes and associated comorbidities: Standards of care in diabetes—2025. *Diabetes Care*. 2025;48(suppl 1):S50-S58.	https://diabetesjournals.org/care/article/48/Supplement_1/S50/157550
Besser REJ, Bell KJ, Couper JJ, et al. ISPAD Clinical Practice Consensus Guidelines 2022: Stages of type 1 diabetes in children and adolescents. *Pediatr Diabetes*. 2022;23:1175-1187.	https://onlinelibrary.wiley.com/doi/10.1111/pedi.13410
Haller MJ, Bell KJ, Besser RE, et al. ISPAD Clinical Practice Consensus Guidelines 2024: Screening, staging, and strategies to preserve beta cell function in children and adolescents with type 1 diabetes. *Horm Res Paediatr*. 2024;97:529-545.	https://karger.com/hrp/article/doi/10.1159/000543035/917924/ISPAD-Clinical-Practice-Consensus-Guidelines-2024
Mehta S, Ryabets-Lienhard A, Patel N, et al. Pediatric Endocrine Society statement on considerations for the use of teplizumab in clinical practice. *Horm Res Paediatr*. 2024;Apr 30:1-12.	https://karger.com/hrp/article/doi/10.1159/000538775/906682/Pediatric-Endocrine-Society-Statement-on
Philip M, Achenbach P, Addala A, et al. Consensus guidance for monitoring individuals with islet autoantibody-positive pre-stage 3 type 1 diabetes. *Diabetes Care*. 2024;47:1276-1298.	https://diabetesjournals.org/care/article-lookup/doi/10.2337/dci24-0042

References/Reading List

Resource	Address
Atkinson MA, Mirmira RG. The pathogenic "symphony" in type 1 diabetes: A disorder of the immune system, β cells, and exocrine pancreas. *Cell Metab*. 2023;35:1500--1518.	https://www.cell.com/cell-metabolism/fulltext/S1550-4131(23)00228-0
Bogun MM, Bundy BN, Goland RS, Greenbaum CJ. C-peptide levels in subjects followed longitudinally before and after type 1 diabetes diagnosis in TrialNet. *Diabetes Care*. 2020;43:1836-1842.	https://diabetesjournals.org/care/article-lookup/doi/10.2337/dc19-2288
Calhoun P, Spanbauer C, Steck AK, et al. Continuous glucose monitor metrics from five studies identify participants at risk for type 1 diabetes development. *Diabetologia.* 2025;68:930–939.	https://link.springer.com/article/10.1007/s00125-025-06362-1#citeas
Felton JL, Tuttle A, Sims EK. Teplizumab-mzwv: perspective on clinical practice use at a single institution. SMART-MD *J Precision Med*. 2025;2:e149-e157.	https://smart-md.org/index.php/jpm/article/view/20

Resource	Address
Fyvie MJ, Gillespie KM. The importance of biomarker development for monitoring type 1 diabetes progression rate and therapeutic responsiveness. *Front Immunol*. 2023;14:1158278.	https://www.frontiersin.org/journals/immunology/articles/10.3389/fimmu.2023.1158278/full
Galderisi A, Sims EK, Evans-Molina C, et al. Trajectory of beta cell function and insulin clearance in stage 2 type 1 diabetes: Natural history and response to teplizumab. *Diabetologia*. 2025;68:646-661.	https://link.springer.com/article/10.1007/s00125-024-06323-0#citeas
Galderisi A, Carr ALJ, Martino M, et al. Quantifying beta cell function in the preclinical stages of type 1 diabetes. *Diabetologia*. 2023;66:2189-2199.	https://link.springer.com/article/10.1007/s00125-023-06011-5
Greenbaum CJ, Nepom GT, Wood-Heickman LK, et al. Evolving concepts in pathophysiology, screening, and prevention of type 1 diabetes: Report of diabetes mellitus interagency coordinating committee workshop. *Diabetes*. 2024;73:1780-1790.	https://diabetesjournals.org/diabetes/article-lookup/doi/10.2337/dbi24-0020
Herold KC, Bundy BN, Long SA, et al. An anti-CD3 antibody, teplizumab, in relatives at risk for type 1 diabetes. *N Engl J Med*. 2019;381:603-613.	https://www.nejm.org/doi/10.1056/NEJMoa1902226
Herold KC, Gitelman SE, Gottlieb PA, Knecht LA, Raymond R, Ramos EL. Teplizumab: A disease-modifying therapy for type 1 diabetes that preserves β-Cell function. *Diabetes Care*. 2023;46:1848-1856.	https://diabetesjournals.org/care/article-lookup/doi/10.2337/dc23-0675
Holt RIG, DeVries JH, Hess-Fischl A, et al. The management of type 1 diabetes in adults. A consensus report by the American Diabetes Association (ADA) and the European Association for the Study of Diabetes (EASD). *Diabetes Care*. 2021;44:2589-2625.	https://diabetesjournals.org/care/article-lookup/doi/10.2337/dci21-0043
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Jacobsen LM, Schatz D. Immunotherapy-based strategies for the treatment of type 1 diabetes. *Horm Res Paediatr*. 2024;1-10.	https://karger.com/hrp/article/doi/10.1159/000542002/914841/Immunotherapy-Based-Strategies-for-Treatment-of
Katsarou A, Gudbjörnsdottir S, Rawshani A, et al. Type 1 diabetes mellitus. *Nat Rev Dis Primers*. 2017;3:17016.	https://www.nature.com/articles/nrdp201716
Leichter SB, Felton JL, Rasmussen CG, et al. Establishing screening programs for presymptomatic type 1 diabetes: practical guidance for diabetes care providers *J Clin Endocrinol Metab.* 2025;2:dgaf194.	https://academic.oup.com/jcem/advance-article/doi/10.1210/clinem/dgaf194/8103687
Leslie RD, Evans-Molina C, Freund-Brown J, et al. Adult-onset type 1 diabetes: Current understanding and challenges. *Diabetes Care*. 2021;44:2449-2456.	https://diabetesjournals.org/care/article-lookup/doi/10.2337/dc21-0770
O'Donovan AJ, Gorelik S, Nally LM. Shifting the paradigm of type 1 diabetes: A narrative review of disease modifying therapies. *Front Endocrinol (Lausanne).* 2024;15:1477101.	https://www.frontiersin.org/journals/endocrinology/articles/10.3389/fendo.2024.1477101/full

Resource	Address
O'Donnell HK, Rasmussen CG, Dong F, et al. Anxiety and risk perception in parents of children identified by population screening as high risk for type 1 diabetes. *Diabetes Care*. 2023;46:2155-2161.	https://diabetesjournals.org/care/article-lookup/doi/10.2337/dc23-0350
O'Donnell HK, Simmons KM, Gitelman SE, et al. Real-world experiences of adult individuals or caregivers of children who received teplizumab treatment in stage 2 type 1 diabetes. *Diabetes Obes Metab*. 2025.	https://dom-pubs.pericles-prod.literatumonline.com/doi/10.1111/dom.16246
Ospelt E, Hardison H, Rioles N, et al. Understanding providers' readiness and attitudes toward autoantibody screening: A mixed-methods study. *Clin Diabetes*. 2024;42:17-26.	https://diabetesjournals.org/clinical/article-lookup/doi/10.2337/cd23-0057
Mader JK, Wong JC, Freckmann G, et al. The use of continuous glucose monitoring to diagnose stage 2 type 1 diabetes. *J Diabetes Sci Technol*. 2025;30:19322968251333441.	https://pubmed.ncbi.nlm.nih.gov/40444471/
Marzinotto I, Pittman DL, Williams AJK, et al. Islet Autoantibody Standardization Program: interlaboratory comparison of insulin autoantibody assay performance in 2018 and 2020 workshops. *Diabetologia*. 2023;66:897-912.	https://pubmed.ncbi.nlm.nih.gov/36759347/
Ramos EL, Dayan CM, Chatenoud L, et al. Teplizumab and β-Cell function in newly diagnosed type 1 diabetes. *N Engl J Med*. 2023;389:2151-2161.	https://www.nejm.org/doi/10.1056/NEJMoa2308743
Simmons KM, Sims EK. Screening and prevention of type 1 diabetes: Where are we? *J Clin Endocrinol Metab*. 2023;108:3067-3079.	https://academic.oup.com/jcem/article/108/12/3067/7192350
Simmons KMW, Frohnert BI, O'Donnell HK, et al. Historical insights and current perspectives on the diagnosis and management of presymptomatic type 1 diabetes. *Diabetes Technol Ther*. 2023;25:790-799.	https://www.liebertpub.com/doi/10.1089/dia.2023.0276
Sims EK, Besser REJ, Dayan C, et al. Screening for type 1 diabetes in the general population: A status report and perspective. *Diabetes*. 2022;71:610-623.	https://diabetesjournals.org/diabetes/article-lookup/doi/10.2337/dbi20-0054
Sims EK, Bundy BN, Stier K, et al. Teplizumab improves and stabilizes beta cell function in antibody-positive high-risk individuals. *Sci Transl Med*. 2021;13:eabc8980.	https://www.science.org/doi/10.1126/scitranslmed.abc8980
Sims EK, Cuthbertson D, Ferrat LA, et al. IA-2A positivity increases risk of progression within and across established stages of type 1 diabetes. *Diabetologi*a. 2025;68: 993-1004.	https://pubmed.ncbi.nlm.nih.gov/40016443/
Sooy M, Pyle L, Alonso GT, et al. Lower prevalence of diabetic ketoacidosis at diagnosis in research participants monitored for hyperglycemia. *J Clin Endocrinol Metab.* 2024;110:e80-e86.	https://pubmed.ncbi.nlm.nih.gov/38470864/

Resources and Societies

Resource	Address

American Diabetes Association®. Summary of the American Diabetes Association® Type 1 Diabetes Screening & Awareness Roundtable. December 15, 2023.	https://diabetes.org/sites/default/files/2024-04/ADA-T1D-Screening-and-Awareness-Roundtable-Report.pdf
ASK (Autoimmunity Screening for Kids). T1D screening program.	https://www.askhealth.org/
Breakthrough T1D™. Enrolling in Clinical Trials.	https://www.breakthrought1d.org/clinical-trials/
Breakthrough T1D. Type 1 Diabetes Early detection.	https://www.breakthrought1d.org/early-detection/
CASCADE Research Study. Type 1 diabetes and celiac disease screening for children in the state of Washington.	https://cascadekids.org/
Sanford Research. PLEDGE Pediatric Screening Study.	https://research.sanfordhealth.org/fields-of-research/diabetes/pledge
Type 1 Diabetes TrialNet. For Healthcare Providers: TrialNet Recommendations for Clinicians.	https://www.trialnet.org/healthcare-providers
Type 1 Diabetes TrialNet. Resources for T1D screening & national T1D screening program.	https://www.trialnet.org/
University of Colorado – Barbara Davis Center for Diabetes. Ask the experts for early T1D answers and guidance.	https://www.asktheexperts.org/
University of Colorado – Barbara Davis Center for Diabetes. Screen TO Prevent Type 1 Diabetes – stopT1D.	https://www.stopt1dprogram.org/

All URLs accessed July 22, 2025