Who should we screen, at what age, and how often?

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Conflicts of interest

BF: none

AGZ: Serves or has served on the advisory panel for Provention Bio, Sanofi, and Novo Nordisk, and DMC for Provention Bio, Sanofi, and ITB-Med. Received education grants and research grants from Sanofi. Holds patent on screening for genetic risk.

Recommendations on population to be screened

Where **policy** and **infrastructure** is in place, IAb screening for early-stage T1D should be offered to the **general population**.[C]

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Risk of Developing Stage 3 T1D by 20 y of Age

Can they be identified at stage 1 or 2?

First-degree relatives	1/20 (5%)	10 – 15% of all cases
General population	1/300 (0.3%) USA	85 – 90% of all cases

Pathways to be screened

Clinical decision-making

- Capillary or venous draw
- Screening at pediatric clinics

labcorp

Quest Diagnostics™

MAYO CLINIC LABORATORIES

ENABLE BIOSCIENCES

Research (informed consent)

- Laboratory or a finger poke kit to mail

Autoimmunity Screening for Kids ask FREE

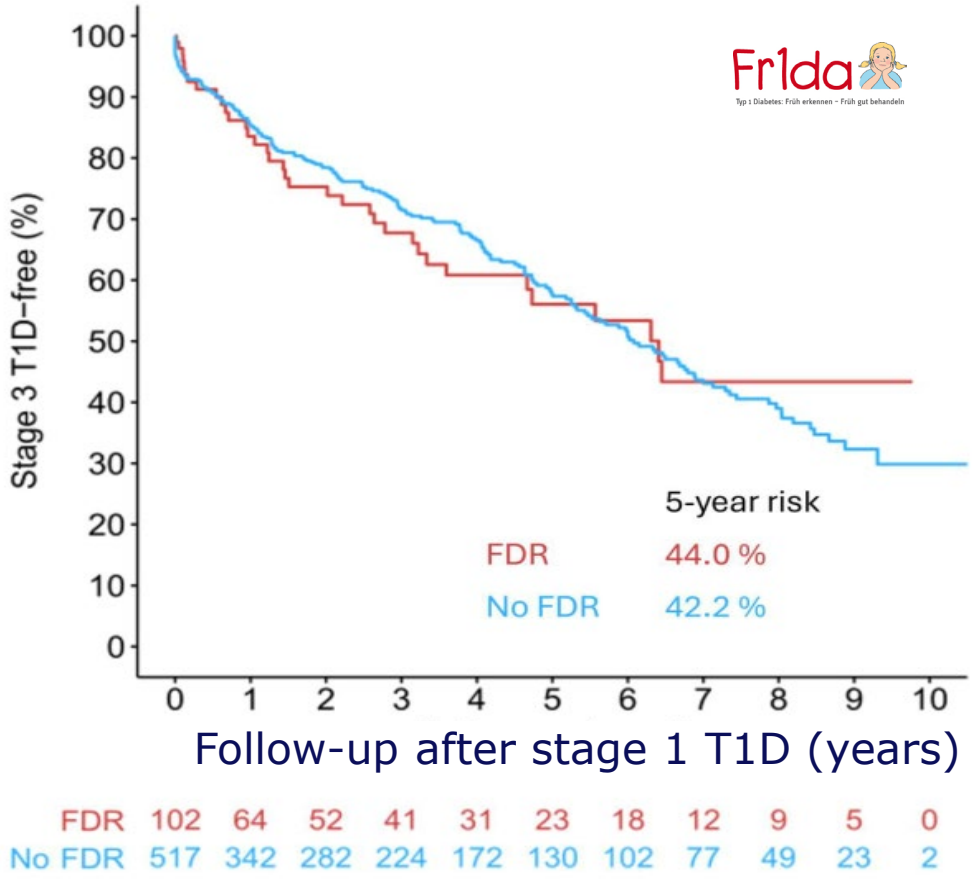
Type 1 Diabetes TrialNet

AsktheExperts

Recommendations on population to be screened

Targeted screening of individuals who are at increased risk due to personal or family history of autoimmune disease may be a practical starting point for screening, **but the ultimate goal is general population screening**.[C]

Children from the general population have similar rate of disease progression compared to relatives



- Children from the general population have similar rate of disease progression compared to relatives and people at genetic risk: BABYDIAB, DIPP, DAISY: 43.5% at 5-year follow-up.(JAMA 2013, JAMA 2020, Diabetologia 2022, Diabetes Care 2025)
- Children with no family history of T1D have a higher risk of DKA (Diabetes Care 2022)
- Children from the general population benefit from early detection (JAMA 2022, Diabetologia 2023)

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Many autoimmune conditions in a parent are associated with increased risk of T1D in the child

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Adapted from: *Cell Genomics*. 2025 Apr 25;100854.

Bidirectional association between T1D and other autoimmune diseases

Lancet 2023

- Celiac disease
- Addison's disease
- Autoimmune thyroiditis
- Polymyalgia rheumatica
- Myasthenia gravis
- Multiple sclerosis
- Vitiligo
- Pernicious anemia
- Systemic lupus erythematosus (SLE)

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(Adapted from Conrad et al.)

Recommendations on population to be screened

Screening awareness communications should emphasize the benefits of timely detection of early-stage T1D.[B]
Prior to starting general population screening for early-stage T1D, there must be a developed infrastructure for: (i) confirmation of positive results; and (ii) monitoring for those with early stage T1D, including referral pathways between primary and secondary care, and between pediatric and adult services, as needed.[C].

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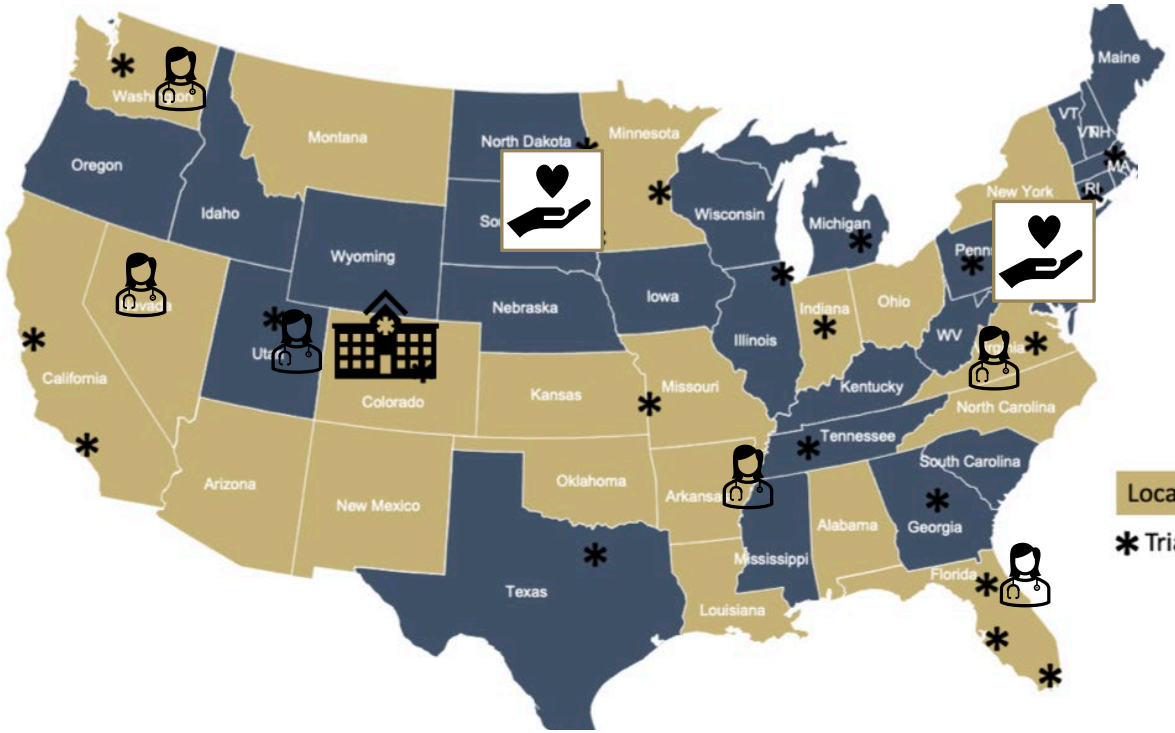

Where to turn when your patient or child has screened positive for type 1 diabetes or celiac.

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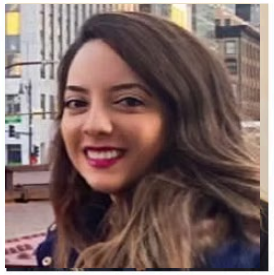

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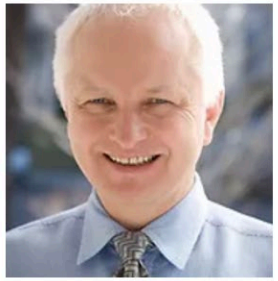

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FOR EARLY T1D ANSWERS AND GUIDANCE

Recommendations on age and cadence of screening (Youth)

General population screening:

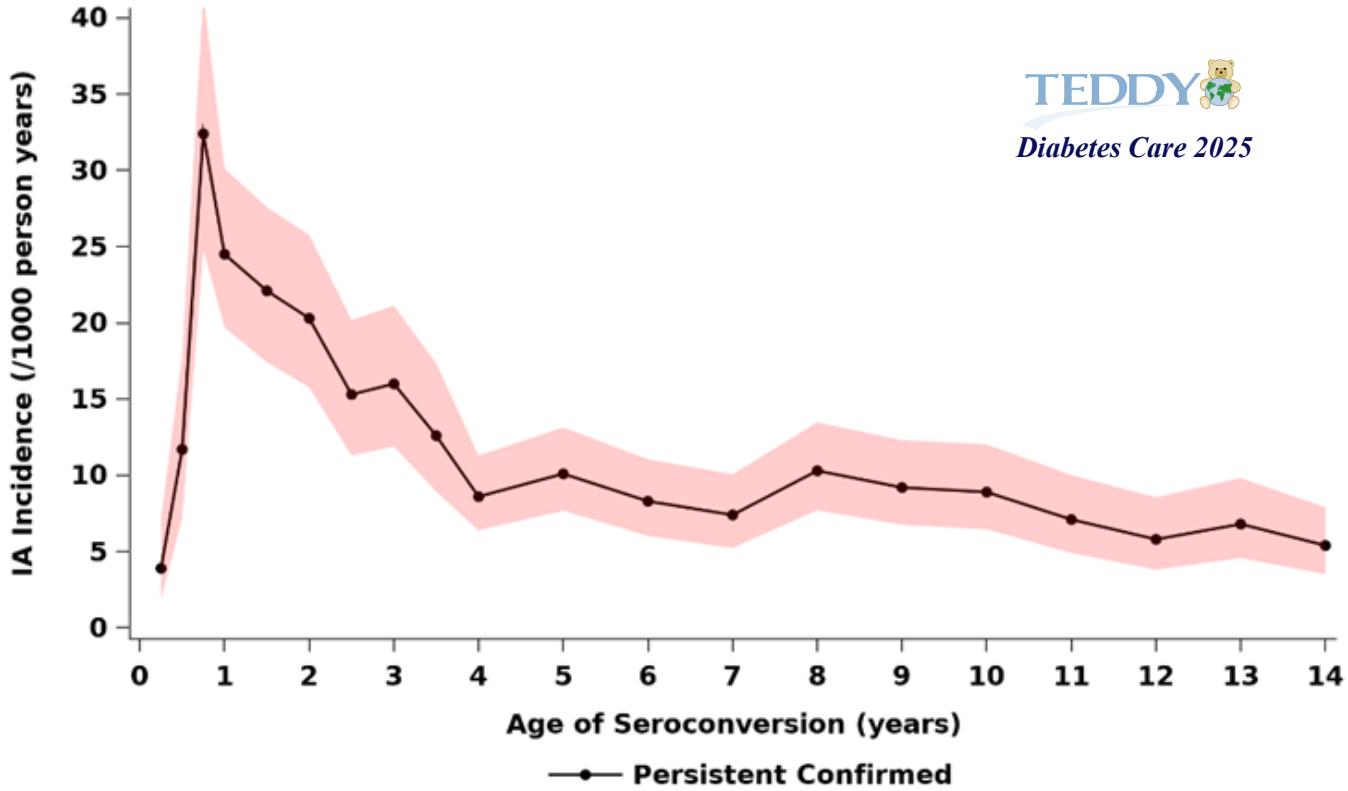
- at age 2-4 years and, if IAb negative, again
- at age 6-8 years, and
- at age 10-15 years

is recommended for detecting individuals with early-stage T1D.

Children who have never been screened should catch up by joining this schedule at the earliest opportunity. [B]

For any screening, the age ranges indicated can be adapted to the screening opportunities provided within established public health activities.[E]

Islet Autoantibodies Develop Throughout Childhood



TEDDY

Diabetes Care 2025

Fr1da

Typ 1 Diabetes: Früh erkennen – Früh gut behandeln

Lancet Diabetes and Endocrinol 2024

First screen at 2 yrs

0·21%

Rescreen age 6 yrs

0·19%

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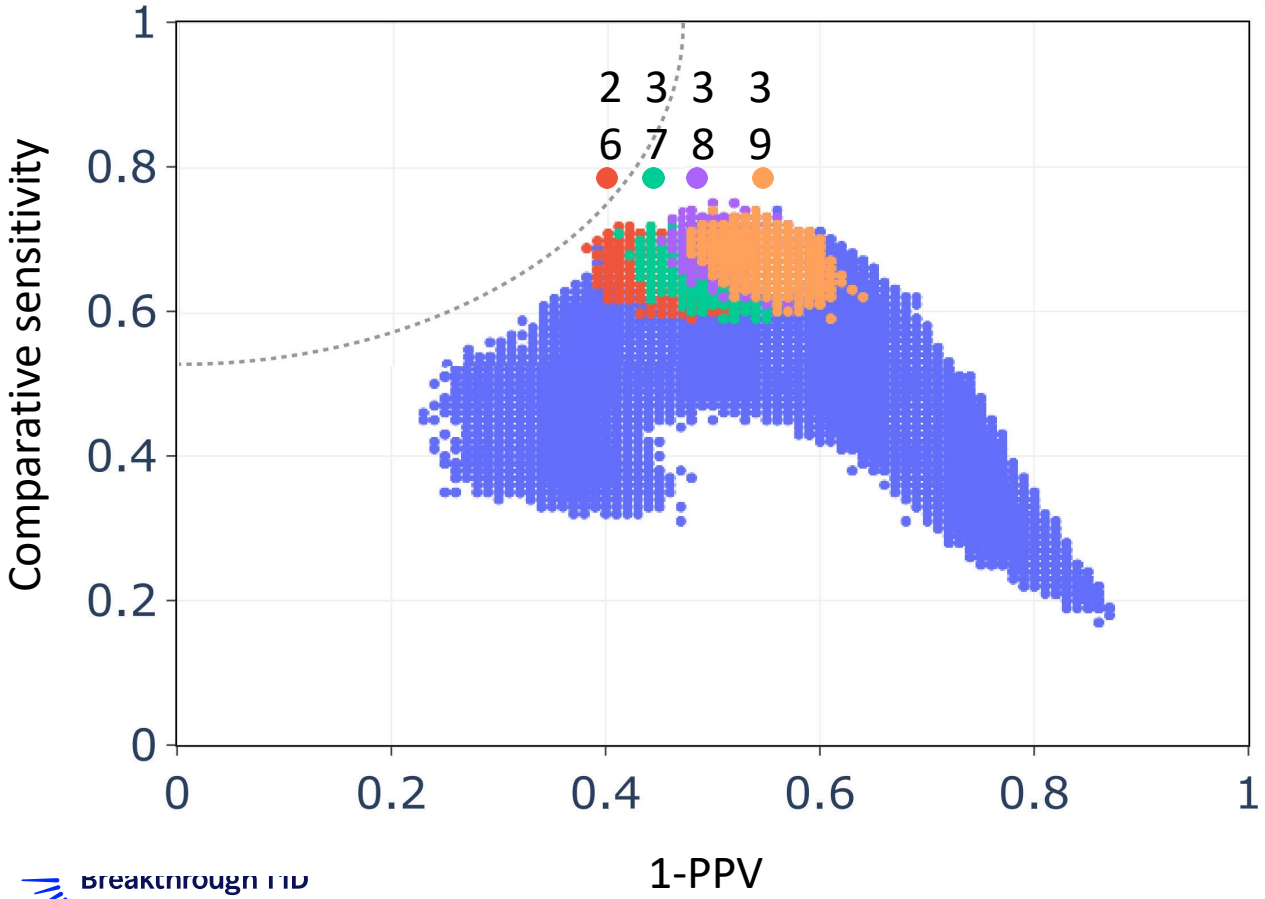
Screening for islet autoantibodies at 2 and 6 years can detect 82% of future T1D cases

From 10,000 run bootstrap set for each screening-age pair



Test ages, y	Screening outcome	T1D dx, y	Sensitivity
2	≥ 1 autoAb	2 - 15	54% (50-58)
2 and 6	≥ 1 autoAb	2 - 15	82% (79-86)
2 and 6	≥ 2 autoAb	2 - 15	63% (59-67)

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Ghalwash M. et al for T1DI Study. Lancet Diabetes Endocrinol 2022

Islet Autoantibodies Develop Throughout Childhood:

2-3 Screens Are Optimal For High Sensitivity

	Sensitivity
One screening: age 3-4 years (BABYDIAB, TEDDY, T1DI):	**40% - 54%**
Two screenings: age 2-3 and 6-7 years (TEDDY, T1DI, Fr1da):	**65% - 82%**
Three screenings: age 2-3 and 6-7 and 10 years (T1DI, Fr1da):	**80% - 87%**

BMJ open 2016
Diabetes Care 2019
Lancet Diabetes and Endocrinol 2022
Lancet Child Adolesc Health. 2023
Diabetologia 2025
DOM 2025

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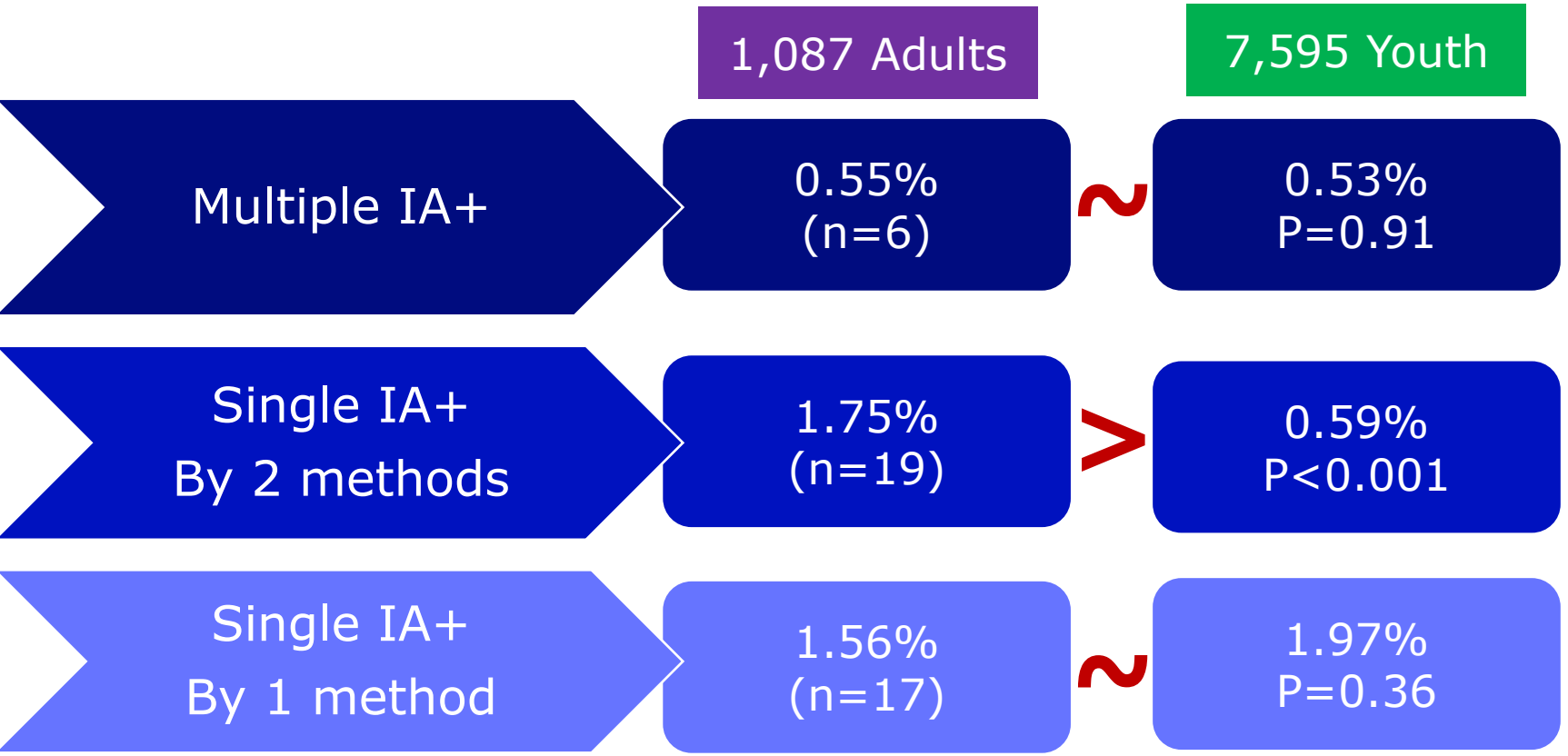
Recommendations on age and cadence of screening (Adults)

Less is known about early-stage T1D progression in the general population older than 15 years.

If not done earlier, a one-time screening after 15 years of age may be considered in conjunction with established public health activities.[E]

J. Endo Soc 2025

Colorado population screening: Rate of multiple IA+ similar in adults and youth



- 4 antibody screen:
  - IAA, IA2A, GADA, ZnT8A
- Adult mean age 41y (20-64)
- Youth mean age 9.3y (1-18)
- Frequency matched:
  - FDR
  - Race/ethnicity
  - Sex

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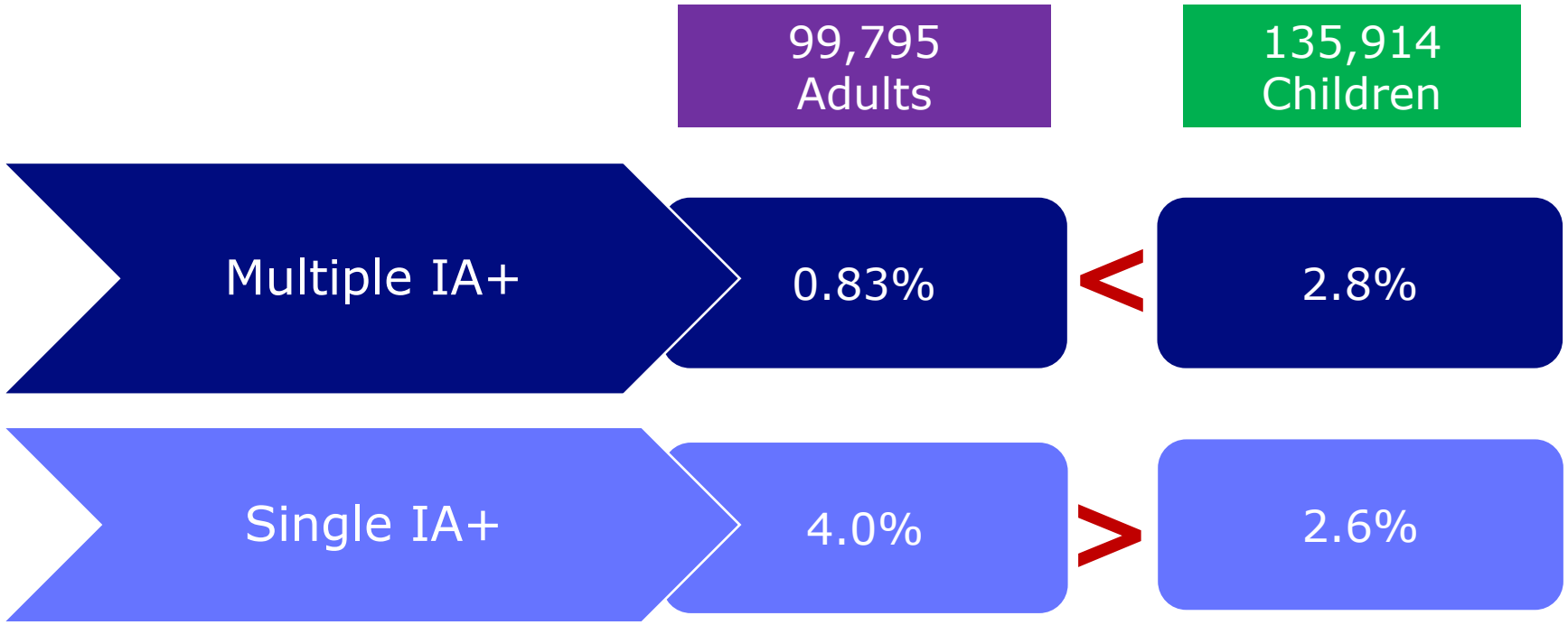
TrialNet Screening of relatives: Adults were less likely mIA+, more likely sIA+

Diabetes Care 2025



- 4 antibody screen:
  - IAA, IA2A, GADA, ZnT8A
- Adults more likely first-degree

- *J. Endo Soc 2025*

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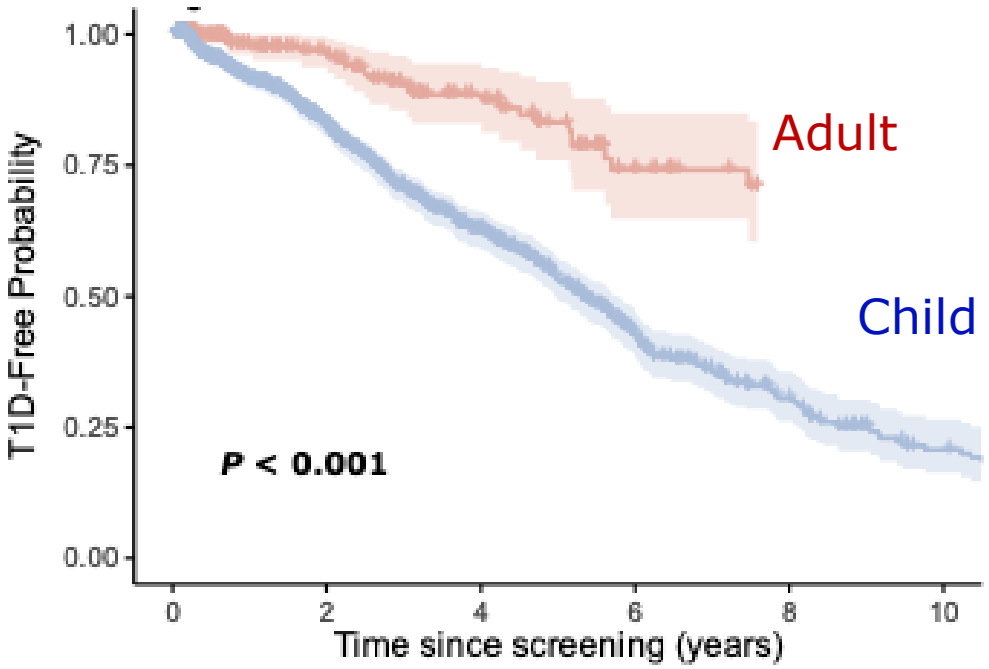
T1D progression in people older than 15 years.

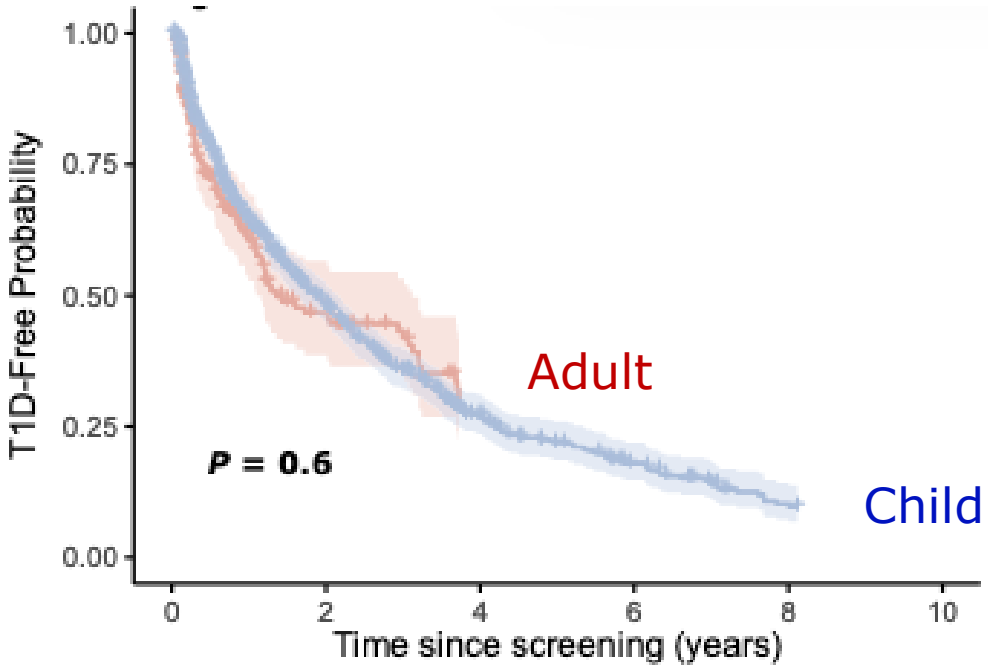
Progression from stage 2 to stage 3 is similar in children and adults with family history of T1D.

Diabetes Care 2025

Progression from Stage 1 to Stage 3



Progression from Stage 2 to Stage 3



T1D prevalence and progression in people older than 15 years.

- Prevalence of islet Abs may be similar or lower
- Little information about positive predictive values to clinical diabetes
  (Diabetologia 1999, Diabetes 2023, Diabetes Care 2025, J Endocrine Soc)
- Adults have a considerable prevalence of DKA at diagnosis

  (Diabetes Care 2022, Diabetologia 2024)

Conclusions

- All children should be screened 2-3 times during childhood:
  - 2-3, 6-7 and 10-15 years
- Targeted screening of at-risk groups may be a reasonable first step.
- For those older than 15 years, a one-time screening should be considered
- Screening program requires infrastructure for:
  - Confirmation
  - Monitoring