Type 1 Diabetes Screening in Canada: Building the Evidence, Shaping the Future

About Us

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Case Study

Patient Information:
- Female
- 3 years old

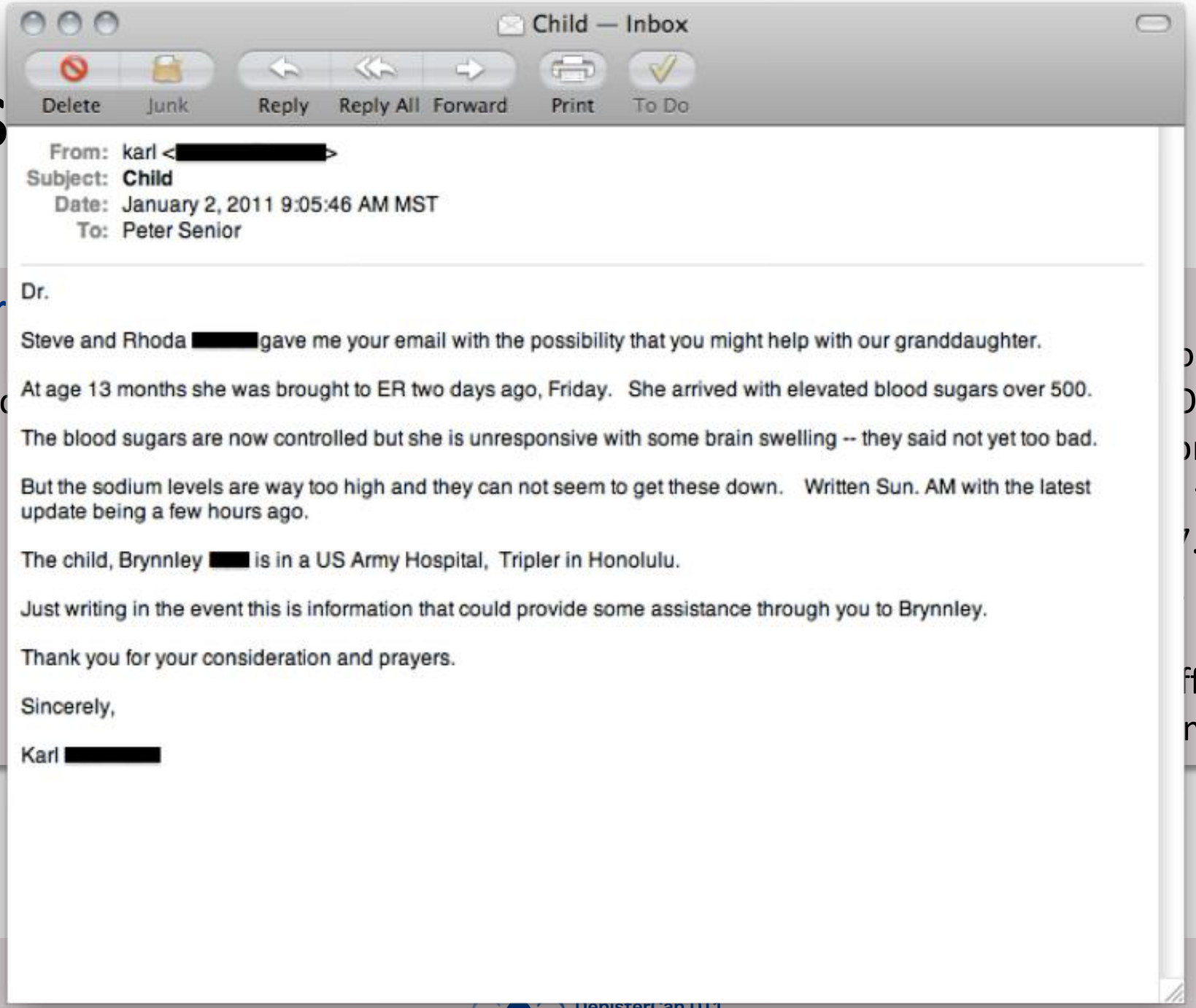
Background:
- 2 weeks of general malaise, irritable and upset
- Wetting the bed
- Pale
- Very thin

Now:
- Presenting to the ER with decreased LOC (GCS 5)
- Rapid deep breathing, hypotensive, tachycardic
- pH 6.9 (7-3-7.5), glucose 38.4mmol/L, creatinine 285µmol/L
- CT head – diffuse cerebral edema

Case S

Patient Infor

- Female
- 3 years old



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creatinine

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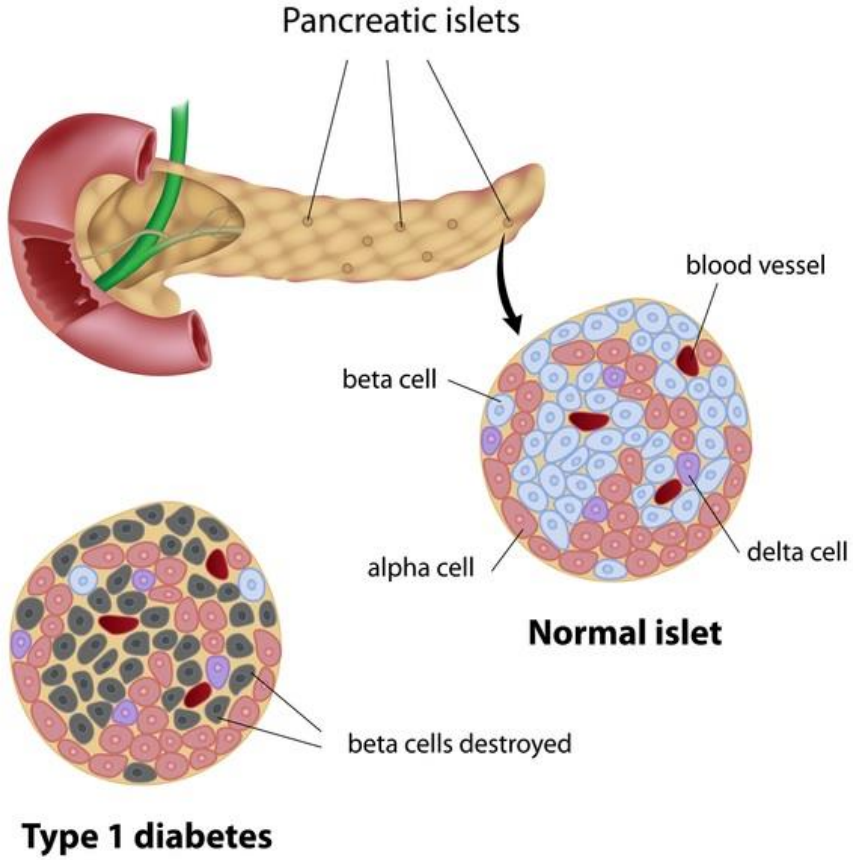
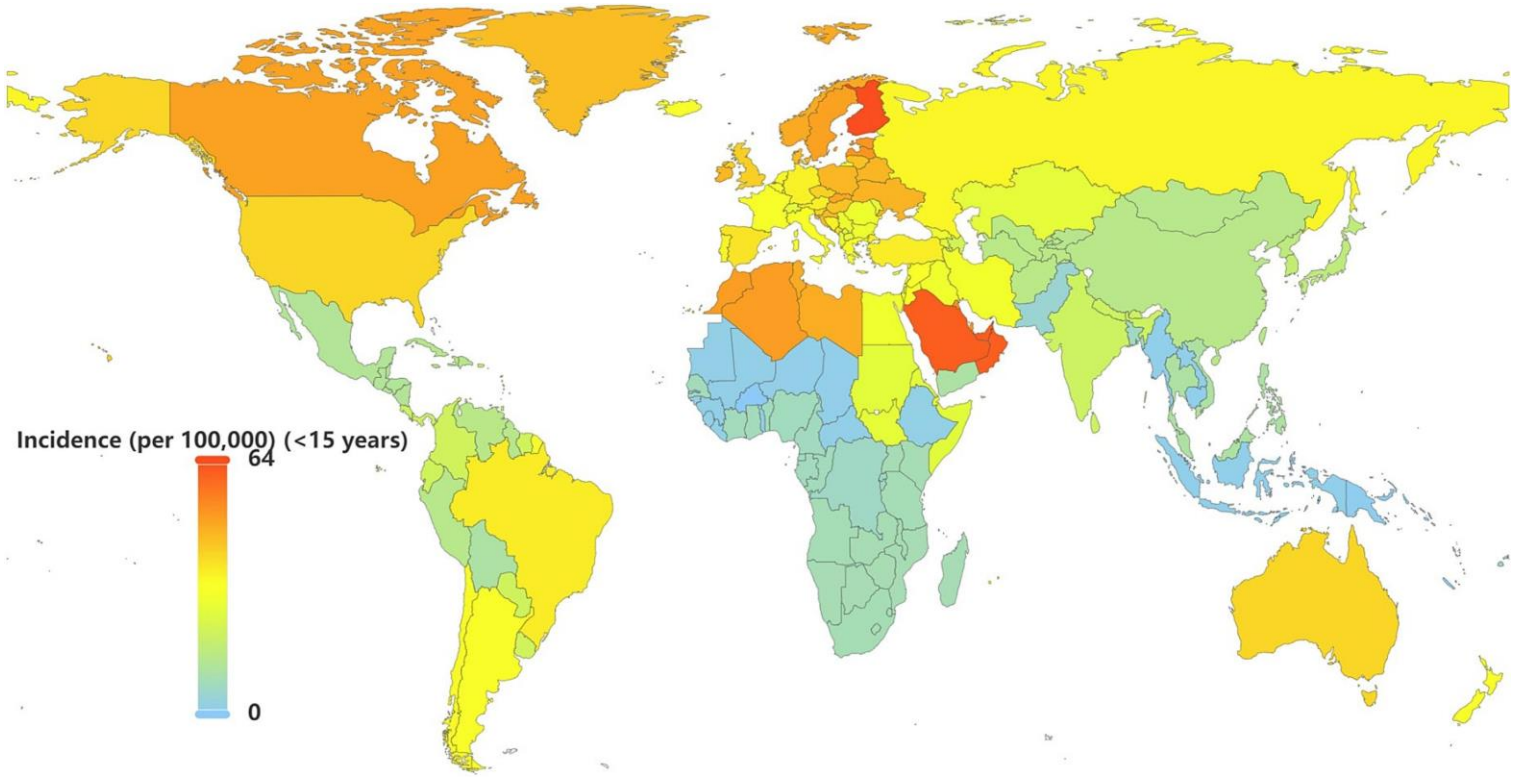
What is Type 1 diabetes (T1D)?

- An autoimmune condition where the insulin producing beta cells in the islet are mistakenly destroyed by the immune system
- Once most of the beta cells are destroyed, the body cannot make enough insulin
- Immune system activity can be identified by diabetes antibodies



Incidence of T1D

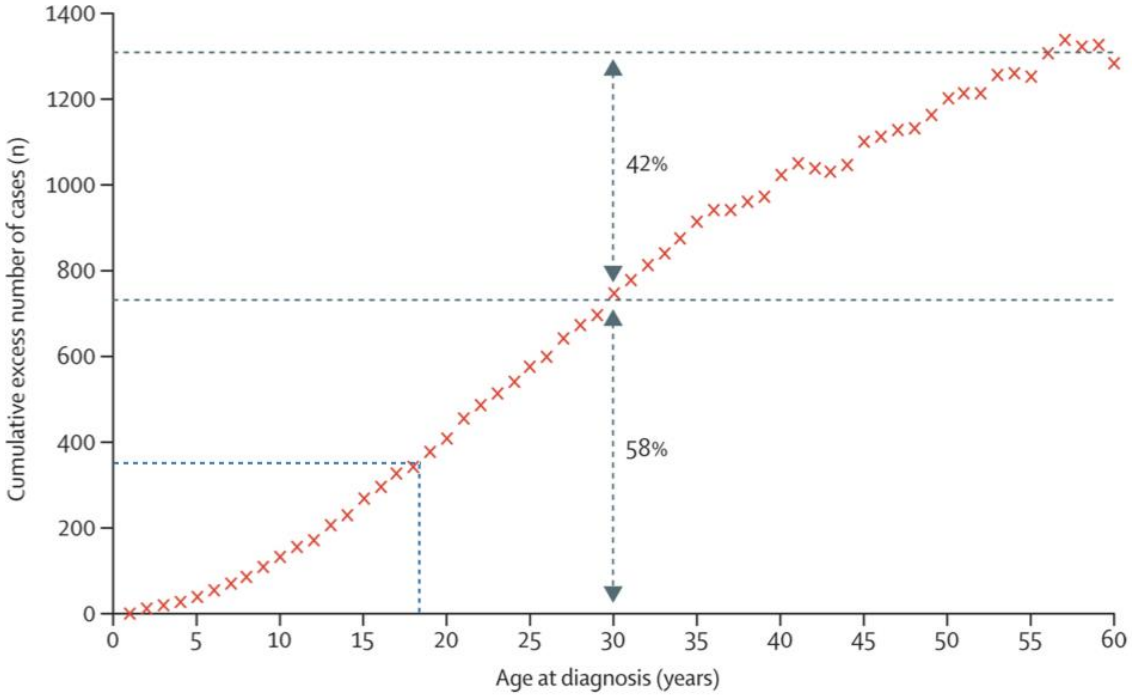


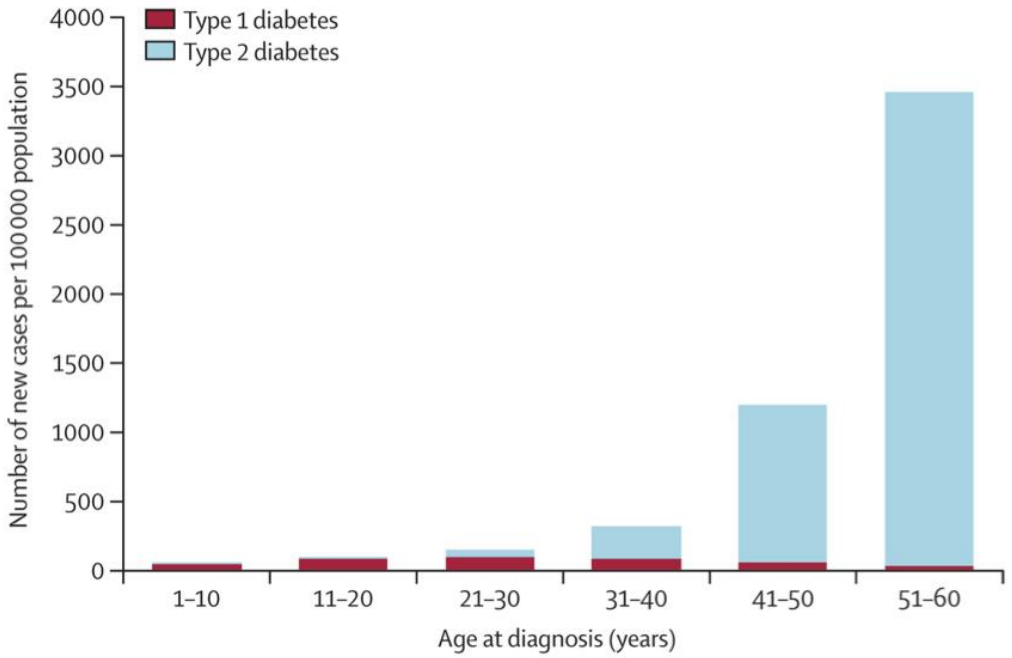
Modelled Type 1 Diabetes incidence < 15 years by country (2025).

- In Canada, the rate of T1D is growing at **4.4% each year,** compared with 4.6% for Type 2 diabetes
- Canada is among the **top 10** countries in the world in terms of incidence

Ogle et al., (2025); Breakthrough T1D (2022)

T1D is not a pediatric disease

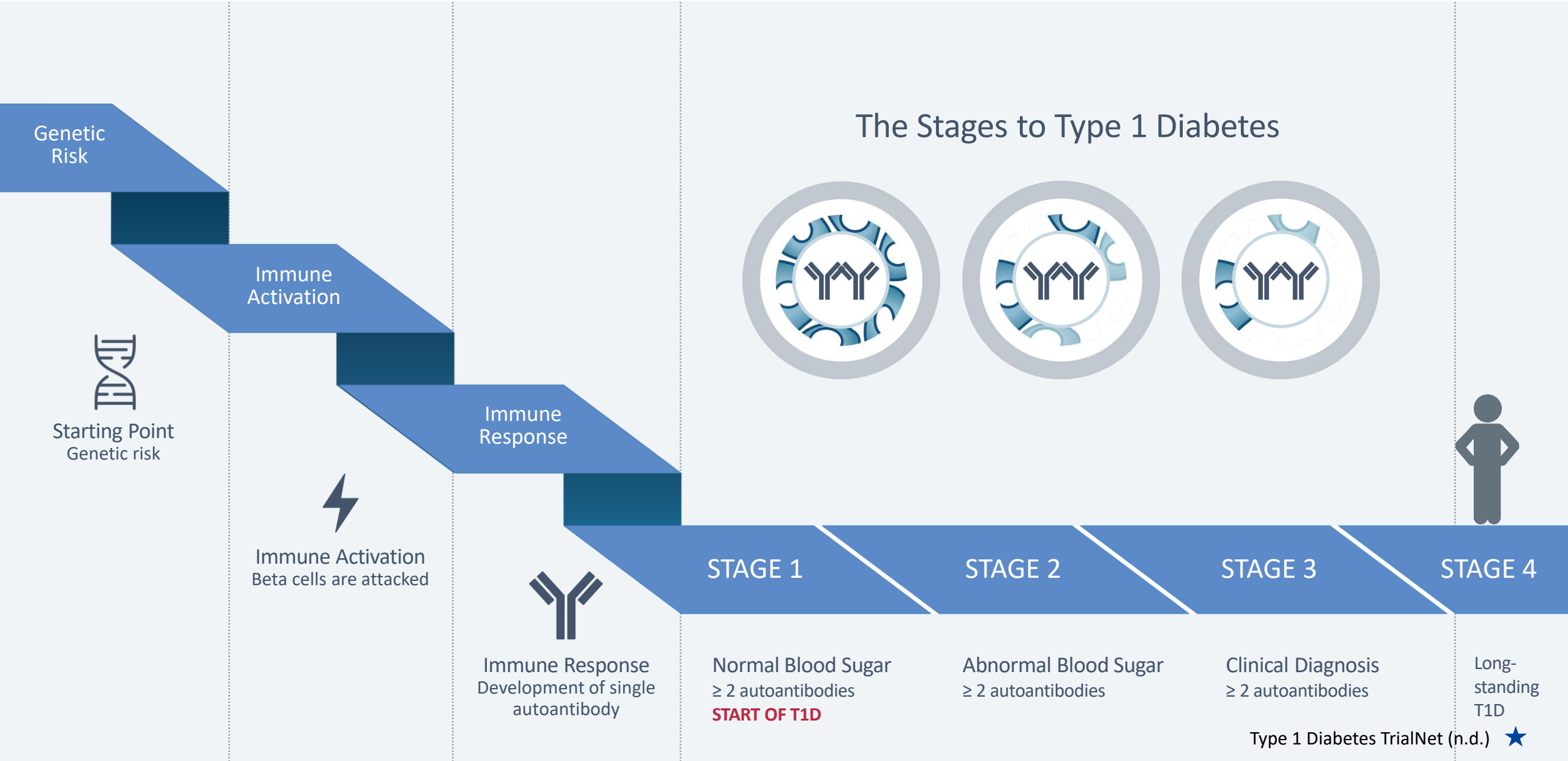




< one third of T1 is diagnosed in childhood

Thomas et al, Lancet Diabetes Endocrinol 2017

T1D disease progression



Type 1 Diabetes TrialNet (n.d.) ★

How has T1D risk screening been done?

- Largely done as part of research with direct relatives of those with T1D
  - Antibody testing in family members due their increased risk, e.g., Type 1 Diabetes TrialNet
- In the general population, a genetic risk score >90th centile identifies >77% of those who will develop T1D
- Antibody testing in the general population at defined ages 2 3, 5-6, +/- age 10
  - Current most predictive test is diabetes autoantibodies
  - GAD, insulin, IA-2, ZnT8, (islet cell antibodies)
  - 2+ antibodies indicate a very high risk for developing diabetes

Bonifacio & Ziegler (2025)

Why screen?

- Nearly **85%** of diagnoses occur in people **who have no family members with the condition**
- Symptoms are usually present for a few weeks before diagnosis and are often attributed to other causes
- Up to **45%** of children develop **diabetic ketoacidosis (DKA)** at the time of diagnosis
- Blood sugars can go from normal to high only weeks before diagnosis, so blood sugar testing to screen for T1D is not effective
- Possibility of connecting patients to clinical trials aimed at delaying or preventing disease onset

Cherubini & Chiarelli (2023); Bonifacio & Ziegler (2025)

Follow up for those with 2+ antibodies

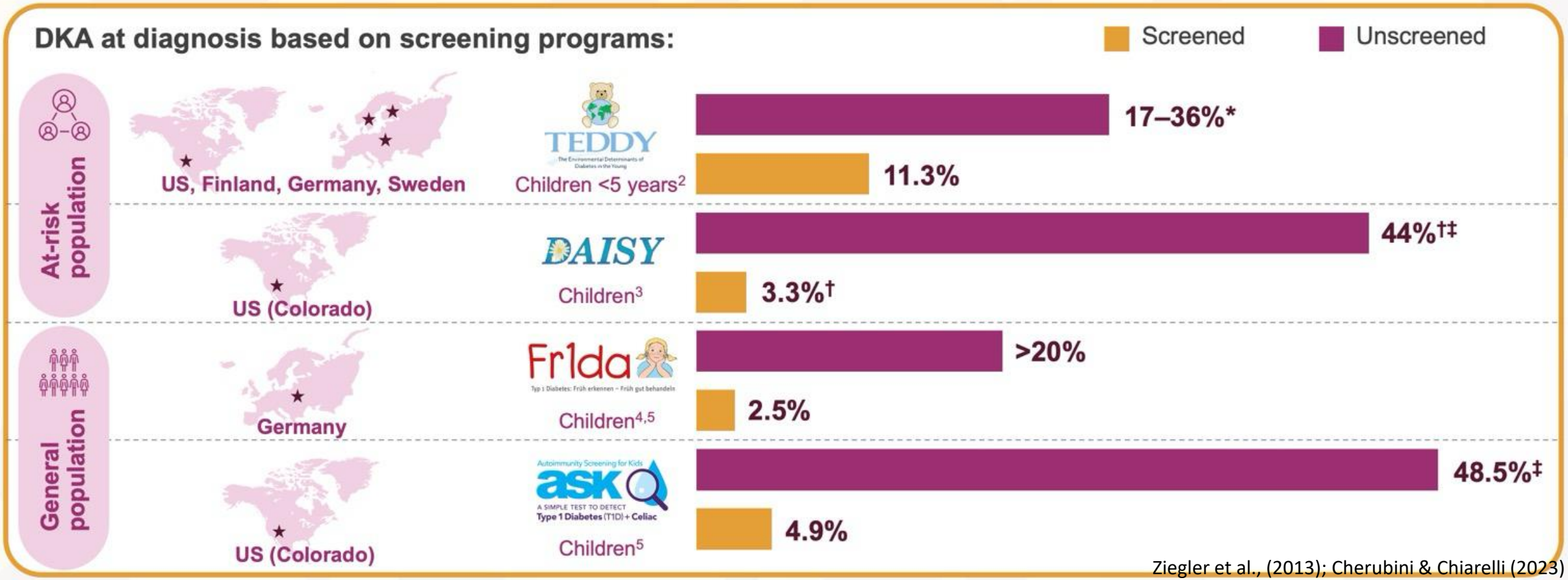
Why is it important that individuals with 2+ antibodies receive follow up?

- Children who test positive for 2+ T1D autoantibodies are at very high risk of developing T1D – often approaching a near **100% lifetime risk**

Ziegler et al., (2013); Cherubini & Chiarelli (2023)

DKA at diagnosis can be prevented

Screening, combined with close monitoring and education, can prevent 80–90% of DKA[1]



Ziegler et al., (2013); Cherubini & Chiarelli (2023)

* Based on DKA in national population-based registers; † Based on hospitalization for DKA; ‡ Based on community cases.
DKA: diabetic ketoacidosis.

1. Duca LM, et al. *Diabetes Care*. 2017;40(9):1249-1255; **2.** Elding Larsson H, et al. *Diabetes Care*. 2011;34(11):2347-2352; **3.** Barker JM, et al. *Diabetes Care*. 2004;27(6):1399-1404; **4.** Hummel S, et al. *Diabetologia*. 2023;66(9):1633-1642; **5.** Sooy M, et al. *J Clin Endocrinol Metab*. 2024;110(1):e80-e86; **6.** Simmons KM, Sims EK. *J Clin Endocrinol Metab*. 2023;108(12):3067-3079.

Teplizumab

- **First disease-modifying therapy for Stage 2 autoimmune Type 1 diabetes** – approved by Health Canada in May 2025

Teplizumab delayed progression to clinical T1D in high-risk individuals, based on TN10 study findings

TN10 was a phase 2, randomized, placebo-controlled, double-blind trial involving relatives of patients with T1D[1]

Study participants

- Age 8–45 years
- Confirmed ≥2 islet autoantibodies
- Relative with T1D

N=76

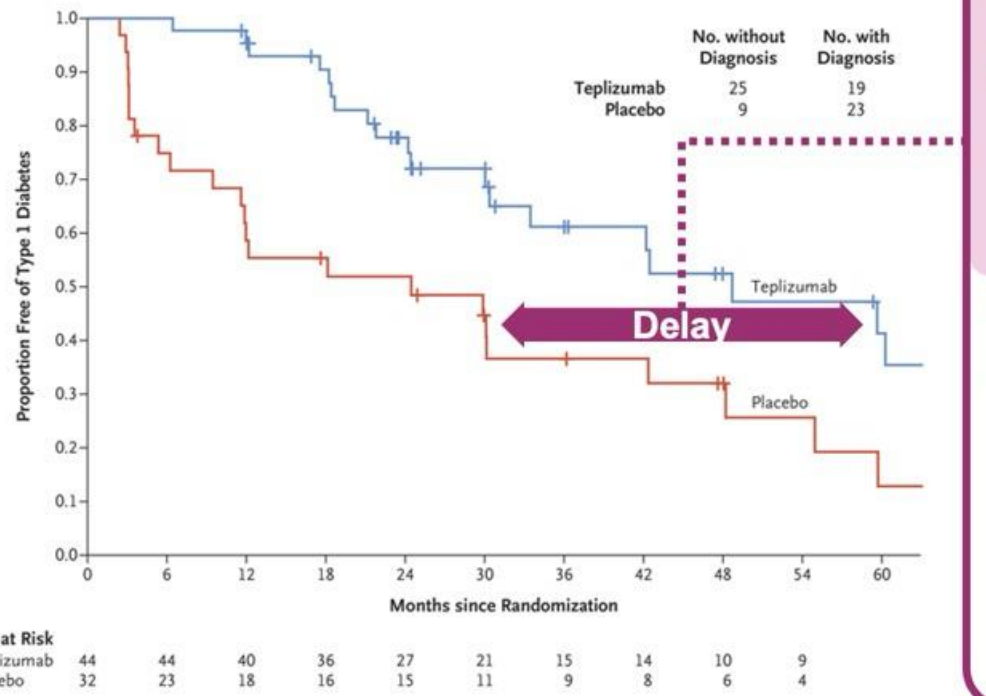
- Teplizumab (14-day course of IV infusion), n=44
- Placebo, n=32

Safety

Most common AEs were transient:†

- Lymphopenia (73%)
- Rash (36%)
- Leukopenia (21%)
- Headache (11%)

Efficacy



Teplizumab significantly delayed the onset of clinical stage 3 T1D by ~2 years

Median time to clinical T1D diagnosis:*

48.4 months teplizumab

24.4 months placebo

Did you know?

In an extended follow-up§ of TN10:[2]

- Median time to clinical T1D diagnosis was 59.6 months for teplizumab vs. 27.1 months for placebo‡
- 50% of teplizumab-treated vs. 22% of placebo-treated

* Hazard ratio=0.41; 95% confidence interval 0.22 to 0.78; two-sided p=0.006; † >10% of study participants; ‡ Hazard ratio=0.457, p=0.01; § 923-day median.
IV: intravenous.

1. Herold KC, et al. *N Engl J Med*. 2019;381(7):603-613; **2.** Sims EK, et al. *Sci Transl Med*. 2021;13(583):eabc8980.
Image adapted from: Herold KC, et al. *N Engl J Med*. 2019;381(7):603-613.

Equity considerations

- Access to Screening and Follow Up
- Cultural Sensitivity and Self-Determination
- Psychosocial Impacts
- Data Privacy and Security

Challenges to screening

Healthcare capacity and infrastructure

Awareness of T1D

Provincial / Territorial Coordination

What is the CanScreen T1D Consortium?

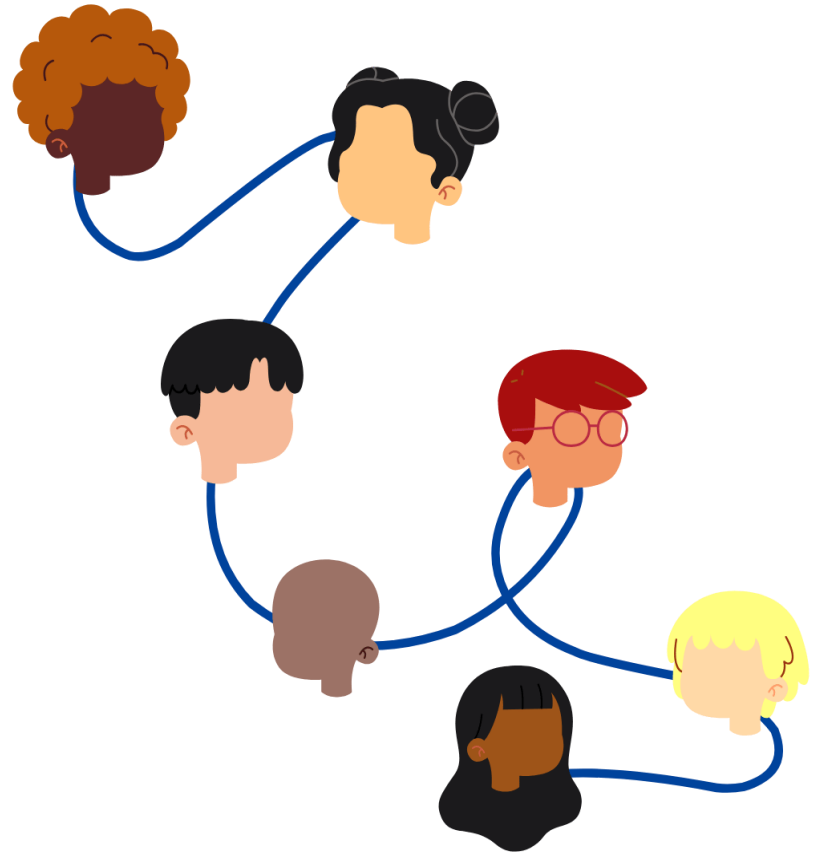
- Funded by Breakthrough T1D and CIHR
- Launched in 2023, ending in 2029
- **Mission:** Design a pilot general population T1D risk screening program for newborns and children that is **culturally sensitive**, **easy to use**, and **accessible** to families from diverse backgrounds
- Nine research projects are informing the pilot's development across three themes: **acceptability**, **feasibility**, and **follow up/monitoring**

Community Engagement in CanScreen T1D

- **Community Engagement Network:** Includes people living with T1D, parents of children with T1D and parents from the general population with no relation to T1D.

- **Health Disparities, EDI & SGBA+ Committee:** Dedicated to addressing and mitigating health disparities and enhancing EDI within the consortium's research activities.

"It's been great getting to meet the team. I truly appreciate the opportunity to contribute to this work."



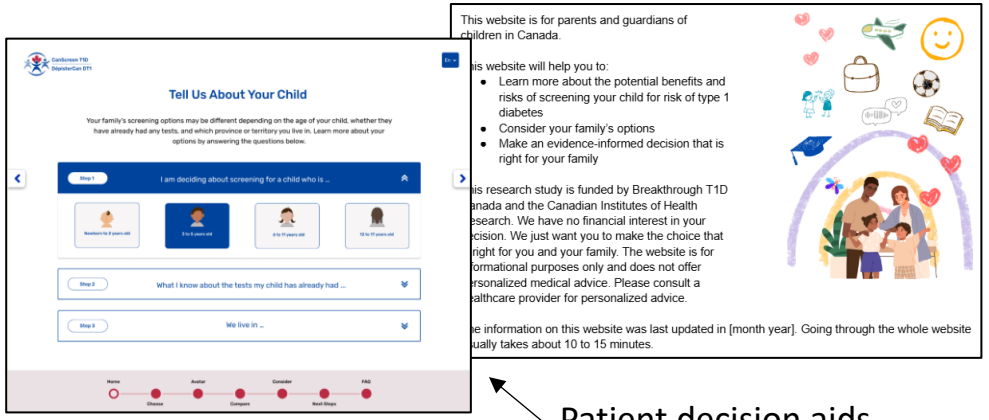
Projects

Theme 1: Acceptability	Theme 2: Feasibility	Theme 3: Follow Up & Monitoring
1. Citizen Engagement & Stakeholder Dialogue 2. Self-Determined Indigenous Research about T1D Screening 3. Patient Decision Aids for Screening, Follow Up & Enrolment in Trials 4. Developing a Core Outcome Set (COS)	5. Establishment of a Canadian Clinical Autoantibody Laboratory 6. Creation of a Canadian T1D genetic data repository to validate a trans-ethnic genetic risk score (GRS)	7. Establishing an integrated network for clinical follow up and intervention trials in Canada 8. Genetic counselling and education materials for GRS/Ab screen-positive individuals 9. Metabolic Monitoring

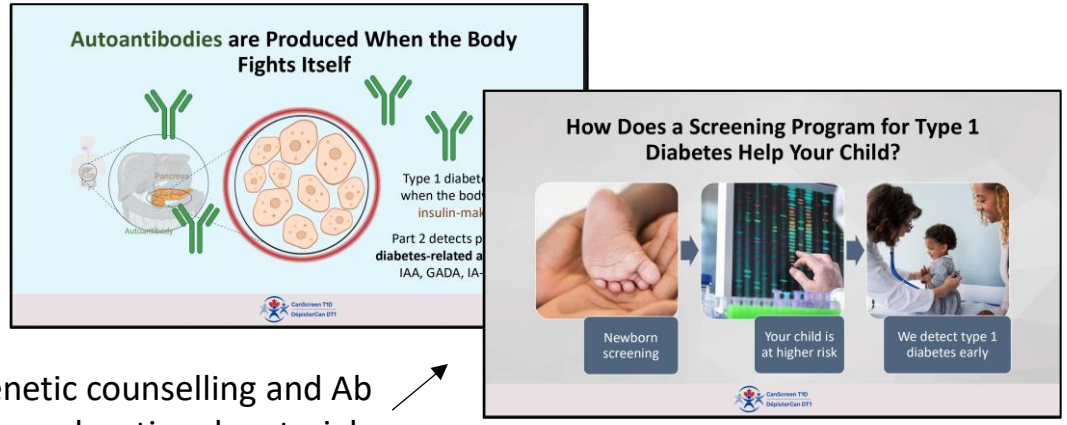
Pilot T1D Screening Program

Pilot T1D Screening Program

- Launching in 2026, ending in 2029
- **Main objective**: Further assess the acceptability and feasibility of screening for the risk of T1D and its impacts on families
- **Secondary objectives:** Implement patient decision aids, genetic counselling/Ab educational materials & assess costs and adherence to protocols

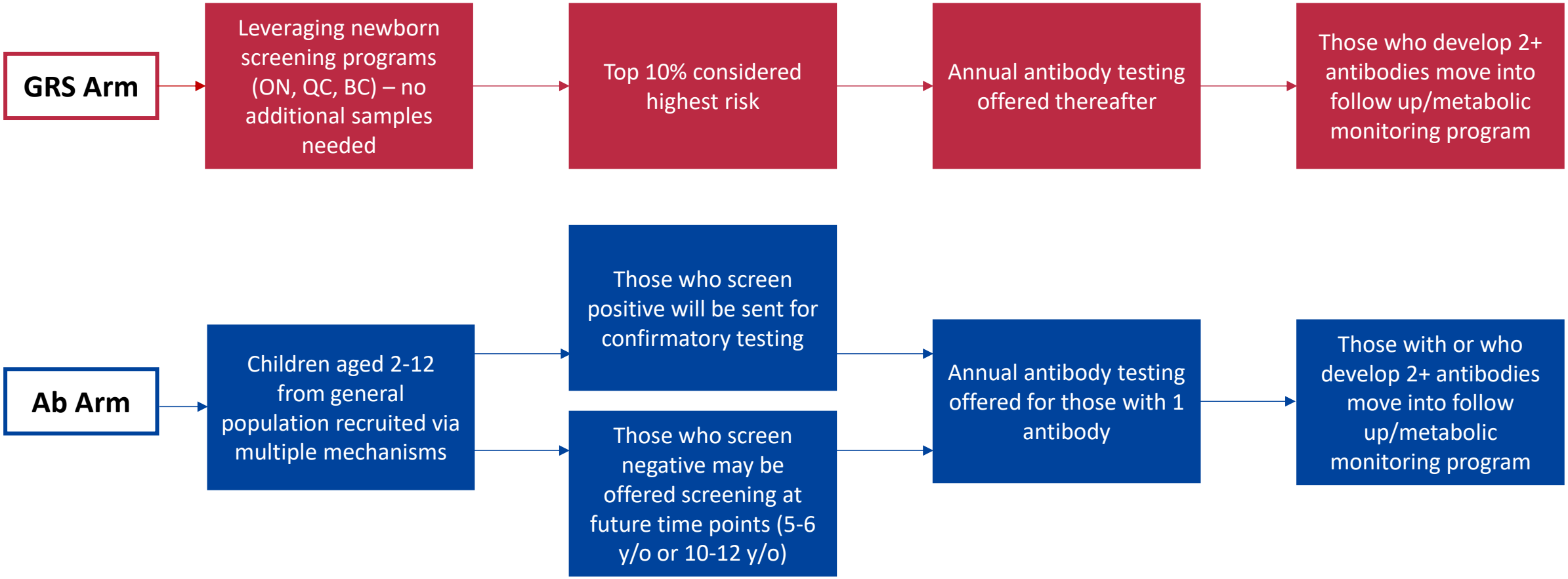


Patient decision aids



Genetic counselling and Ab educational materials

Pilot T1D Screening Program - Methods



Get Involved!

Join the Integrated Network for Clinical Follow Up & Intervention Trials!

Stay Tuned for the Pilot T1D Screening Program

Follow us on:

- Instagram
- X (Formerly Twitter)
- LinkedIn

Check out our webpage:

- Pilot T1D Screening Program

Subscribe to our Newsletter!

Discussion

1. What has surprised you today?

2. How do you feel about screening for the risk of T1D?

3. What advice would you give to improve awareness and engagement among primary care providers regarding T1D screening?

Contact Information & Additional Information

Email: canscreen.t1d@sickkids.ca

Additional Information:

- About CanScreen T1D
- Our Research
- Publications

References

1. Ogle et al. (2025). Global type 1 diabetes prevalence, incidence, and mortality estimates 2025: Results from the International diabetes Federation Atlas, 11th Edition, and the T1D Index Version 3.0. *Diabetes Research and Clinical Practice, 225*(112277). https://doi.org/10.1016/j.diabres.2025.112277
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3. Thomas, N.J., Jones, S.E., Weedon, M.N., Shields, B.M., Oram, R.A., and Hattersley, A.T. (2018). Frequency and phenotype of type 1 diabetes in the first six decades of life: a cross-sectional, genetically stratified survival analysis from UK Biobank. *Lancet Diabetes Endocrinol, 6*(2), 122-129. https://doi.org/10.1016/s2213-8587(17)30362-5
4. Type 1 Diabetes TrialNet. (n.d.). T1D facts. https://www.trialnet.org/t1d-facts
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6. Cherubini V. and Chiarelli F. (2023). Autoantibody test for type 1 diabetes in children: are there reasons to implement a screening program in the general population? A statement endorsed by the Italian Society for Paediatric Endocrinology and Diabetes (SIEDP-ISPED) and the Italian Society of Paediatrics (SIP). *Ital J Pediatr, 49*(1):87. https://doi.org/10.1186/s13052-023-01438-3