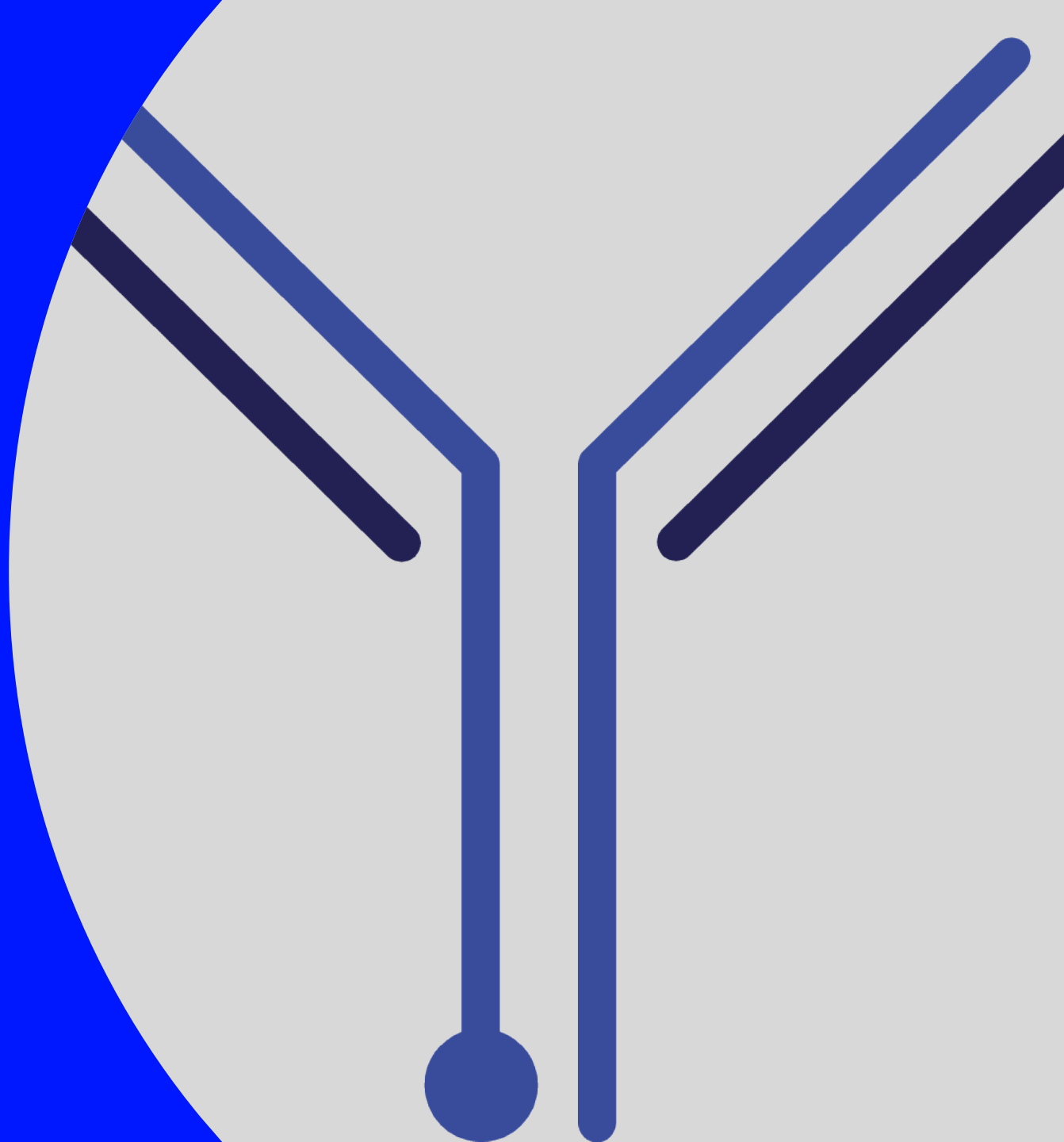
The emerging consensus for population screening to detect early-stage type 1 diabetes

Chair: Anastasia Albanese-O'Neill, PhD

Breakthrough T1D™
Formerly JDRF



Conflicts of interest

Breakthrough T1D received unrestricted grant support from Sanofi.

© 2024 BreakthroughT1D. All rights reserved.

T1D Disease Progression

Type 1 Diabetes TrialNet

AT RISK

Genetic Risk

Immune Activation

Immune Response

EARLY-STAGE T1D
PRESYMPTOMATIC T1D

The Stages of Type 1 Diabetes

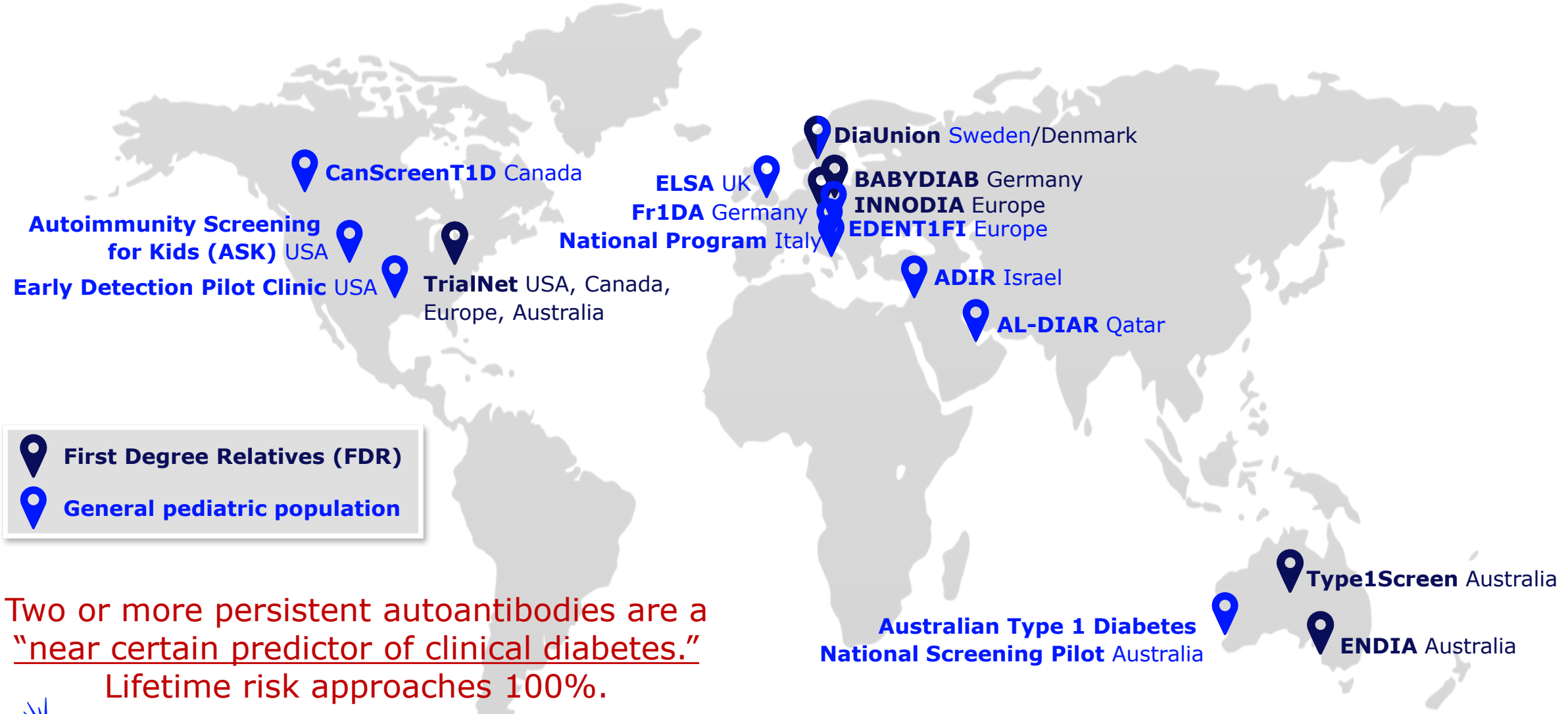
Starting Point
If you have a relative:
15x greater risk of developing T1D

Immune Activation
Beta cells are attacked

Immune Response
Development of single autoantibody

STAGE 1	STAGE 2	STAGE 3	STAGE 4
Normal Blood Sugar	**Abnormal Blood Sugar**	**Clinical Diagnosis**	**Long-standing T1D**
≥ 2 autoantibodies	Autoimmunity	Autoimmunity	
Normoglycemia	Dysglycemia	Hyperglycemia	
No symptoms	No symptoms	Usually symptoms	

A powerful evidentiary base for population screening



Two or more persistent autoantibodies are a "near certain predictor of clinical diabetes." Lifetime risk approaches 100%.

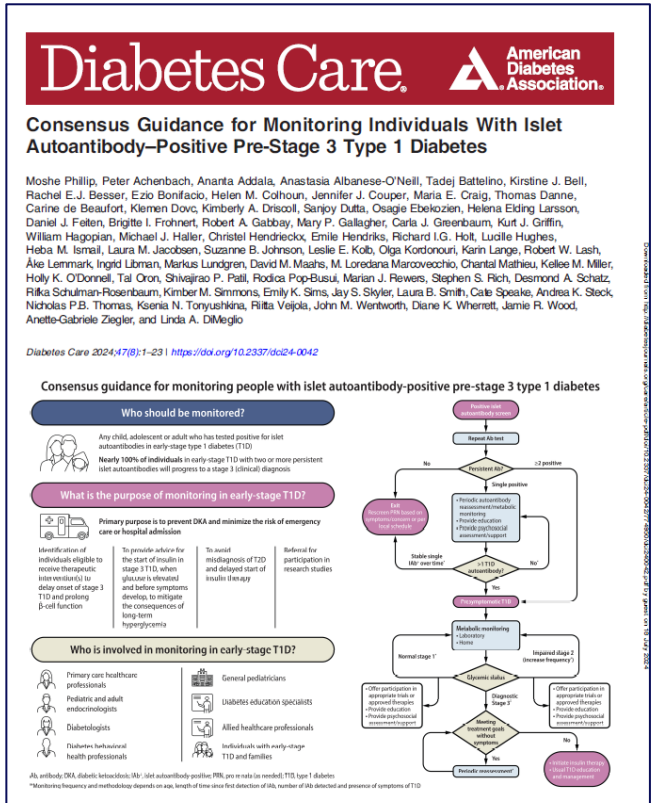
Breakthrough T1D™ Formerly JDRF

American Diabetes Association Professional Practice Committee. 2. Diagnosis and Classification of Diabetes: Standards of Care-In Diabetes-2025. Diabetes Care. 2025 Jan 1;48(Supplement_1):S27-S49. doi: 10.2337/dc25-S002. PMID: 39651986; PMCID: PMC11635041.

© 2024 BreakthroughT1D. All rights reserved.

Demonstrated demand for guidance in early stage T1D

- International consensus monitoring guidance for early stage T1D was published in *Diabetologia* and *Diabetes Care* in June 2024
- Representation from 4 continents and endorsed by leading diabetes societies
- Accessed >35,000 times at *Diabetologia* and *Diabetes Care.*



Diabetes Care

American Diabetes Association.

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

Moshe Phillip, Peter Achenbach, Ananta Addala, Anastasia Albanese-O'Neill, Tadej Battelino, Kirstine J. Bell, Rachel E.J. Besser, Ezio Bonifacio, Helen M. Colhoun, Jennifer J. Couper, Maria E. Craig, Thomas Danne, Carine de Beaufort, Klemen Dovc, Kimberly A. Driscoll, Sanjoy Dutta, Osagie Ebekozien, Helena Elding Larsson, Daniel J. Feiten, Brigitte I. Frohnert, Robert A. Gabbay, Mary P. Gallagher, Carla J. Greenbaum, Kurt J. Griffin, William Hagopian, Michael J. Haller, Christel Hendrieckx, Emile Hendriks, Richard I.G. Holt, Lucille Hughes, Heba M. Ismail, Laura M. Jacobsen, Suzanne B. Johnson, Leslie E. Kolb, Olga Kordonouri, Karin Lange, Robert W. Lash, Åke Lernmark, Ingrid Libman, Markus Lundgren, David M. Maahs, M. Loredana Marcovecchio, Chantal Mathieu, Kellee M. Miller, Holly K. O'Donnell, Tal Oron, Shivajirao P. Patil, Rodica Pop-Busui, Marian J. Rewers, Stephen S. Rich, Desmond A. Schatz, Rifka Schulman-Rosenbaum, Kimber M. Simmons, Emily K. Sims, Jay S. Skyler, Laura B. Smith, Cate Speake, Andrea K. Steck, Nicholas P.B. Thomas, Ksenia N. Tonyushkina, Riitta Veijola, John M. Wentworth, Diane K. Wherrett, Jamie R. Wood, Anette-Gabriele Ziegler, and Linda A. DiMeglio

Diabetes Care 2024;47(8):1–23 | https://doi.org/10.2337/dci24-0042

Consensus guidance for monitoring people with islet autoantibody-positive pre-stage 3 type 1 diabetes

Who should be monitored?

Any child, adolescent or adult who has tested positive for islet autoantibodies in early-stage type 1 diabetes (T1D)

Nearly 100% of individuals in early-stage T1D with two or more persistent islet autoantibodies will progress to a stage 3 (clinical) diagnosis

What is the purpose of monitoring in early-stage T1D?

Primary purpose is to prevent DKA and minimize the risk of emergency care or hospital admission

Identification of individuals eligible to receive therapeutic intervention(s) to delay onset of stage 3 T1D and prolong β-cell function

To provide advice for the start of insulin in stage 3 T1D, when glucose is elevated and before symptoms develop, to mitigate the consequences of long-term hyperglycemia

To avoid misdiagnosis of T2D and delayed start of insulin therapy

Referral for participation in research studies

Who is involved in monitoring in early-stage T1D?

Primary care healthcare professionals

Pediatric and adult endocrinologists

Diabetologists

Diabetes behavioral health professionals

General pediatricians

Diabetes education specialists

Allied healthcare professionals

Individuals with early-stage T1D and families

Positive islet autoantibody screen

Repeat Ab test

Persistent Ab?

No

≥2 positive

Single positive

Stable single IAb⁺ over time?

≥1 T1D autoantibody?

Yes

No

Pre-symptomatic T1D

Metabolic monitoring

Laboratory

Home

Normal stage 1*

Impaired stage 2 (increase frequency*)

Glycemic status

Diagnostic Stage 3

Meeting treatment goals without symptoms

Periodic assessment

Ab, antibody; DKA, diabetic ketoacidosis; IAb⁺, islet autoantibody-positive; PRN, pro re nata (as needed); T1D, type 1 diabetes

*Monitoring frequency and methodology depends on age, length of time since first detection of IAb, number of IAb detected and presence of symptoms of T1D

Diabetologia
https://doi.org/10.1007/s00125-024-06205-5

CONSENSUS REPORT

Consensus guidance for monitoring individuals with islet autoantibody-positive pre-stage 3 type 1 diabetes

Moshe Phillip[1,2] · Peter Achenbach[3,4] · Ananta Addala[5,6] · Anastasia Albanese-O'Neill[7] · Tadej Battelino[8,9] · Kirstine J. Bell[10] · Rachel E. J. Besser[11,12] · Ezio Bonifacio[13,14] · Helen M. Colhoun[15,16] · Jennifer J. Couper[17,18,19] · Maria E. Craig[10,20] · Thomas Danne[21] · Carine de Beaufort[22,23,24] · Klemen Dovc[8,9] · Kimberly A. Driscoll[25,26,27] · Sanjoy Dutta[28] · Osagie Ebekozien[29] · Helena Elding Larsson[30,31] · Daniel J. Feiten[32] · Brigitte I. Frohnert[25] · Robert A. Gabbay[33] · Mary P. Gallagher[34] · Carla J. Greenbaum[35] · Kurt J. Griffin[36,37] · William Hagopian[38] · Michael J. Haller[27,39] · Christel Hendrieckx[40,41,42] · Emile Hendriks[43] · Richard I. G. Holt[44,45] · Lucille Hughes[46] · Heba M. Ismail[47] · Laura M. Jacobsen[39] · Suzanne B. Johnson[48] · Leslie E. Kolb[49] · Olga Kordonouri[21] · Karin Lange[50] · Robert W. Lash[51] · Åke Lernmark[30] · Ingrid Libman[52] · Markus Lundgren[30,53] · David M. Maahs[54] · M. Loredana Marcovecchio[24] · Chantal Mathieu[55] · Kellee M. Miller[29] · Holly K. O'Donnell[22] · Tal Oron[1,2] · Shivajirao P. Patil[56] · Rodica Pop-Busui[57] · Marian J. Rewers[25] · Stephen S. Rich[58] · Desmond A. Schatz[59] · Rifka Schulman-Rosenbaum[60] · Kimber M. Simmons[25] · Emily K. Sims[61] · Jay S. Skyler[62] · Laura B. Smith[63] · Cate Speake[35] · Andrea K. Steck[25] · Nicholas P. B. Thomas[64] · Ksenia N. Tonyushkina[65] · Riitta Veijola[66] · John M. Wentworth[67,68] · Diane K. Wherrett[69] · Jamie R. Wood[70] · Anette-Gabriele Ziegler[3,4] · Linda A. DiMeglio[46]

© American Diabetes Association and European Association for the Study of Diabetes 2024

Abstract

Given the proven benefits of screening to reduce diabetic ketoacidosis (DKA) likelihood at the time of stage 3 type 1 diabetes diagnosis, and emerging availability of therapy to delay disease progression, type 1 diabetes screening programmes are being increasingly emphasised. Once broadly implemented, screening initiatives will identify significant numbers of islet autoantibody-positive (IAb⁺) children and adults who are at risk of (confirmed single IAb⁺) or living with (multiple IAb⁺) early-stage (stage 1 and stage 2) type 1 diabetes. These individuals will need monitoring for disease progression; much of

This consensus report was endorsed by the European Society for the Study of Diabetes (EASD), American Diabetes Association (ADA), American Association of Clinical Endocrinology (AACE), American College of Diabetology (ACD), Association of Diabetes Care & Education Specialists (ADCES), Australian Diabetes Society (ADS), the International Society for Pediatric and Adolescent Diabetes (ISPAD), Advanced Technologies & Treatments for Diabetes (ATTD), DiaUnion, the Endocrine Society and JDRF International.

This article is being simultaneously published in *Diabetes Care* (https://doi.org/10.2337/dci24-0042) and *Diabetologia* (https://doi.org/10.1007/s00125-024-06205-5) by the ADA and the EASD.

A consensus report of a particular topic contains a comprehensive examination and is authored by an expert panel and represents the panel's collective analysis, evaluation and opinion. Consensus reports are reviewed for EASD by its Committee for Clinical Affairs (CCA). The CCA may, at their discretion, enlist further external expert reviewers.

Extended author information available on the last page of the article

"This article is in the **99th percentile** … **of the 337,295** tracked articles of a similar age in all journals **and the 98th percentile (ranked 1st) of the 62 tracked articles of a similar age in *Diabetologia*.** (as of September 13, 2025)

Article Metrics | Consensus guidance for monitoring individuals with islet autoantibody-positive pre-stage 3 type 1 diabetes | Diabetologia

An urgent need for consensus screening guidance

- Global incidence of T1D is rising
- The global burden of DKA remains unacceptably high
- Screening and monitoring have been shown to mitigate DKA at a stage 3 diagnosis

- Universal screening was legislated in Italy for all children ages 1 to 17 years in 2023
- The American Diabetes Association recommends screening for family members of all ages

Breakthrough T1D™
Formerly JDRF

© 2024 BreakthroughT1D. All rights reserved.

Thank you to the working group members

Peter Achenbach
Anastasia Albanese-O'Neill
Kirstine Bell
Rachel Besser
Ezio Bonifacio
Emanuele Bosi
Linda DiMeglio
Sanjoy Dutta
Brigitte Frohnert
Kurt Griffin
William Hagopian
Laura Jacobsen
Karin Lange
Helena Larsson
Roberto Mallone

Chantal Mathieu
Parth Narendran
Tal Oron
Marian Rewers
Steve Rich
Caitrin Rowe McDonough
Darja Smigoc-Schweiger
Zdenek Sumnik
Agnieszka Szypowska
Riitta Veijola
Jurgen Vercauteren
John Wentworth
Diane Wherrett
Anette Ziegler

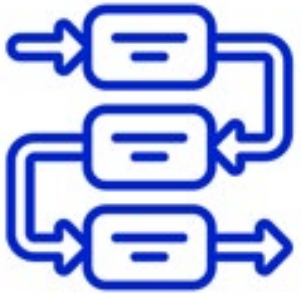
Breakthrough T1D™
Formerly JDRF

Process and methodology

Kick Off Meeting

Methodology: Nominal Group Technique

Subgroup formation and meetings



Iterative drafts

Final vote

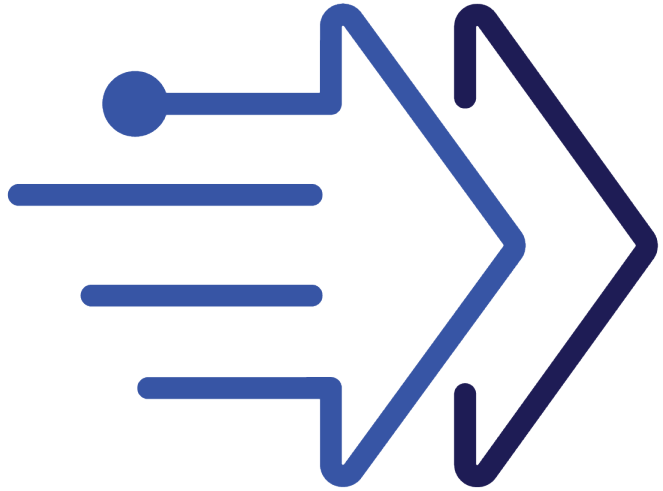
Delbecq, A. L., & Van de Ven, A. H. (1971). A group process model for problem identification and program planning. *Applied Behavioural Science*, **7**, 466–491. https://doi.org/10.1177/002188637100700404

© 2024 BreakthroughT1D. All rights reserved.

Next steps and timeline

Peer Review with EASD and ADA

Public comment and endorsement from global diabetes societies and organizations



Implementation and research to fill the evidentiary gaps

Breakthrough T1D™
Formerly JDRF

© 2024 BreakthroughT1D. All rights reserved.