Club de Lecture: Revue de l'année

FRED 10e Symposium des Professionnels

25 Novembre 2022

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FONDATION RESSOURCES POUR LES ENFANTS DIABÉTIQUES

Hôpital de Montréal pour enfants
Centre universitaire de santé McGill

Montreal Children's Hospital
McGill University Health Centre

Conflits d’intérêt

Je n’ai aucun conflit d’intérêts réel ou potentiel en lien ou non avec le contenu de cette présentation.

Objectifs

1. Mettre l'emphase sur 3 sujets de diabète pédiatrique discutés dans la littérature en 2022.
    - Technologies de diabète
    - Diabète de type 1 et COVID-19
    - Traitement du diabète de type 2
2. Tirer des conclusions pertinentes pour la prise en charge clinique de nos patients.
3. Identifier les lacunes restantes des connaissances.

Technologies de diabète:

Les lecteurs de glycémie en continu

Continuous Glucose Monitoring Initiation Within First Year of Type 1 Diabetes Diagnosis Is Associated With Improved Glycemic Outcomes: 7-Year Follow-Up Study

Anagha Champakanath, Halis Kaan Akturk, G. Todd Alonso, Janet K. Snell-Bergeon, and Viral N. Shah

Diabetes Care 2022;45:750–753 | https://doi.org/10.2337/dc21-2004

Design

- Extension d'une étude observationnelle
- Patients 1-35 ans avec DT1 (n=372 < 18 ans)
- 3 groupes:
  - CGM pendant 1ère année du diagnostic
  - Jamais de CGM
  - Nouveau-CGM 3 ans après le diagnostic
- Suivi pendant 7 ans

Champakanath A. et al. Diabetes Care. 2022 Mar 1;45(3):750-753

Table 1: Patient Characteristics

	Characteristics at the baseline (2013-2015)			Characteristics at the last visit		
	CGM users (n=81)	**CGM non-users (n=315)**	**P-value**	**CGM users**	**CGM non-users**	**P-value**
Age at diagnosis (years)	10.4 ± 7.0	10.2 ± 4.7	0.84	NA	NA	
Sex (N [%] male)	48 (60)	162 (52)	0.18	NA	NA	
Race/Ethnicity (N [%])			<0.0001	NA	NA	
Hispanic	4 (5)	73 (23)				
Non-Hispanic Black	1 (1)	20 (6)				
Non-Hispanic White	65 (81)	187 (60)				
Other	10 (13)	34 (11)				
Insurance type (N [%])			<0.0001			<0.0001
Private	77 (96)	175 (56)		74 (92)	167 (53)	
Medicaid	3 (4)	133 (42)		3 (4)	137 (44)	
Other	0 (0)	6 (2)		3 (4)	9 (3)	
Presence of autoimmune diseases#, N (%)	4 (5)	6 (2)	0.1492	13 (16)	47 (15)	0.8
A1c at diagnosis (%)	11.5 ± 2.3	11.6 ± 2.3	0.52	NA	NA	
Number of visits	-	-		24 ± 7	24 ± 7	0.9
Follow-up interval (years)	-	-		5.8 ± 1.0	6.0 ± 1.2	0.045

Autoimmune diseases included were hypothyroidism, hyperthyroidism, and celiac disease.

Champakanath A. et al. Diabetes Care. 2022 Mar 1;45(3):750-753

Résultat principal

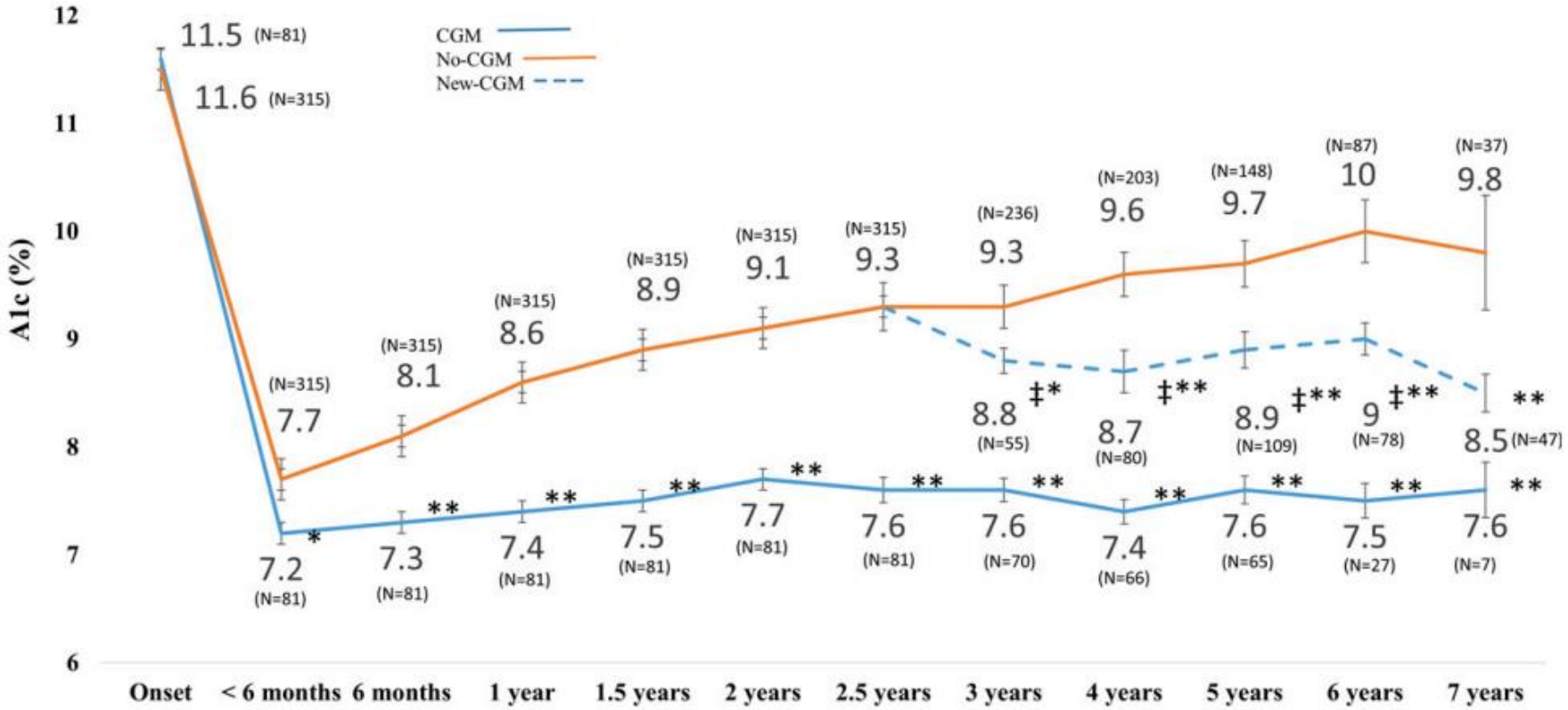


Figure 1—Change in A1c over 7 years in patients with type 1 diabetes who initiated CGM (solid blue line) compared with those who did not initiate CGM (no-CGM group; solid orange line) within the first year of diabetes diagnosis. Effect of late initiation of CGM (dotted blue line; new-CGM group) on A1c is also shown. Data presented as least square mean and standard errors adjusted for age at onset, sex, and insulin delivery method (insulin pump vs. multiple daily injections). Number in parenthesis indicates sample size. Reduced participant numbers in the CGM group (and new-CGM during year 6 and 7) due to variable length of follow-up. *$P < 0.05$, **$P < 0.001$ between CGM (or new-CGM) vs. no-CGM group, ‡$P < 0.001$ between new-CGM vs. early CGM group.

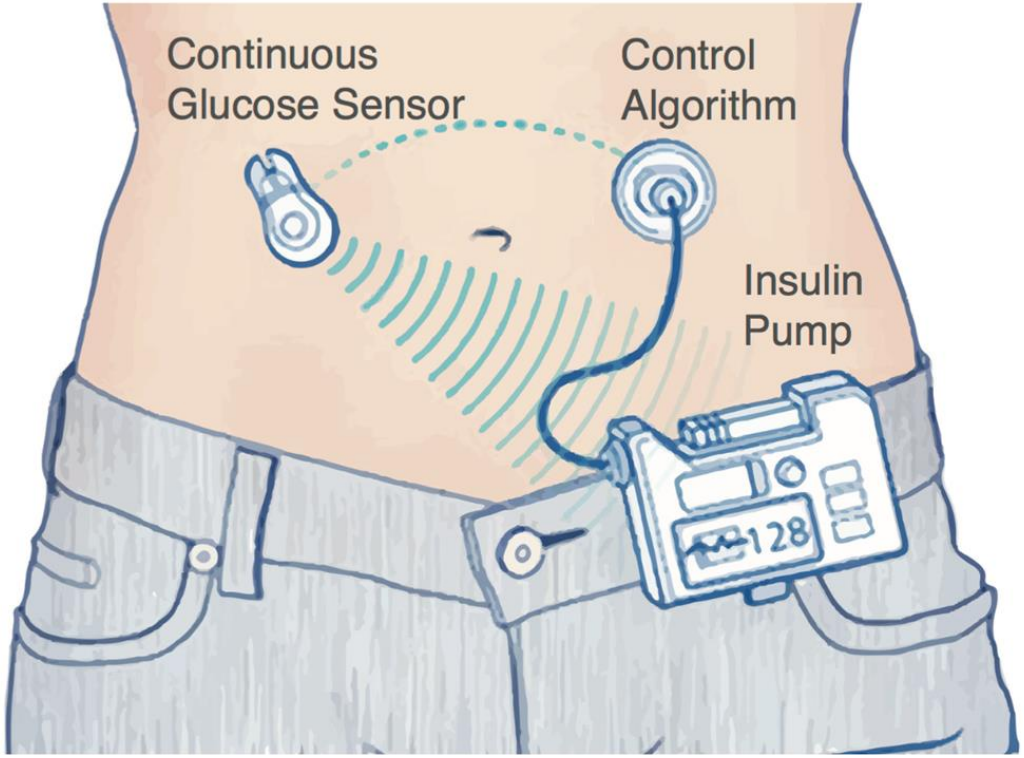
Champakanath A. et al. Diabetes Care. 2022 Mar 1;45(3):750-753

Conclusions

- 1ère étude à démontrer une amélioration de l'A1c sur 7 ans avec CGM initié pendant la première année après le diagnostic
- Amélioration de l'A1c indépendamment du moment de l'initiation du CGM MAIS l'amélioration est significativement meilleure chez ceux qui ont initié le CGM dans la première année.
- Ceci est indépendant de l'âge, sexe, régime d'insuline, ethnicité, statut socio-économique.

➢ ***Démarrage au plus vite pour TOUS au Québec?***

Champakanath A. et al. Diabetes Care. 2022 Mar 1;45(3):750-753



Technologies de diabète:

Le « pancréas artificiel »

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JANUARY 20, 2022 VOL. 386 NO. 3

Randomized Trial of Closed-Loop Control in Very Young Children with Type 1 Diabetes

J. Ware, J.M. Allen, C.K. Boughton, M.E. Wilinska, S. Hartnell, A. Thankamony, C. de Beaufort, U. Schierloh, E. Fröhlich-Reiterer, J.K. Mader, T.M. Kapellen, B. Rami-Merhar, M. Tauschmann, K. Nagl, S.E. Hofer, F.M. Campbell, J. Yong, K.K. Hood, J. Lawton, S. Roze, J. Sibayan, L.E. Bocchino, C. Kollman, and R. Hovorka, for the KidsAP Consortium*

Design:

- Essai contrôlé randomisé croisé multicentrique ouvert
- CamAPS FX app (Samsung 8) + Dana Diabecare pompe + Dexcom 6
- 16 semaines boucle fermée hybride
- 16 semaines pompe + capteur

Ware J. et al. NEJM 2022;386(3):209-219

Safety and Glycemic Outcomes With a Tubeless Automated Insulin Delivery System in Very Young Children With Type 1 Diabetes: A Single-Arm Multicenter Clinical Trial

*Jennifer L. Sherr,[1] Bruce W. Bode,[2] Gregory P. Forlenza,[3] Lori M. Laffel,[4] Melissa J. Schoelwer,[5] Bruce A. Buckingham,[6] Amy B. Criego,[7] Daniel J. DeSalvo,[8] Sarah A. MacLeish,[9] David W. Hansen,[10] and Trang T. Ly,[11] for the Omnipod 5 in Preschoolers Study Group**

Diabetes Care 2022;45:1907–1910 | https://doi.org/10.2337/dc21-2359

Design

- Étude monobras, multicentrique, prospective clinique
- Système Omnipod 5 + Dexcom 6 + Android
  - Microbolus Q5min, cible ajustable de 6.1 – 8.3 mmol/l
- 14 jours phase de thérapie standard
- 13 semaines boucle fermée
- Visites de suivi Q2 semaines (95% virtuelles)

Sherr J. et al. Diabetes Care. 2022 Aug 1;45(8):1907-1910

Received: 11 July 2021 | Revised: 17 November 2021 | Accepted: 4 January 2022
DOI: 10.1111/pedi.13312

CLINICAL CARE AND TECHNOLOGY

ISPAD WILEY

Glycemic outcomes of children 2–6 years of age with type 1 diabetes during the pediatric MiniMed™ 670G system trial

Gregory P. Forlenza[1] | Laya Ekhlaspour[2] | Linda A. DiMeglio[3] | Larry A. Fox[4] | Henry Rodriguez[5] | Dorothy I. Shulman[5] | Kevin B. Kaiserman[6] | David R. Liljenquist[7] | John Shin[8] | Scott W. Lee[8] | Bruce A. Buckingham[2]

Design

- Étude monobras, multicentrique, prospective
- Système de boucle fermée
  - MiniMed 670G + Guardian 3 (2-week run-in period with open-loop)
- 2 semaines de run-in (mode manuel)
- 3 mois de boucle fermée (mode automatique)

Forlenza GP et al. Pediatr Diabetes. 2022 May;23(3):324-32

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 SEPTEMBER 8, 2022 VOL. 387 NO. 10

Open-Source Automated Insulin Delivery in Type 1 Diabetes

Mercedes J. Burnside, M.B., Ch.B., Dana M. Lewis, B.A., Hamish R. Crocket, Ph.D., Renee A. Meier, Ph.D., Jonathan A. Williman, Ph.D., Olivia J. Sanders, R.N., Craig A. Jefferies, M.D., Ann M. Faherty, R.N., Ryan G. Paul, Ph.D., Claire S. Lever, M.N., Sarah K.J. Price, M.N., Carla M. Frewen, R.N., Shirley D. Jones, Tim C. Gunn, B.I.T., Christina Lampey, B.Sc., Benjamin J. Wheeler, Ph.D., and Martin I. de Bock, Ph.D.

Design:

- Étude randomisée contrôlée, ouverte, multicentrique
- OpenAPS 0.7.0 algorithm + DANA-i insulin pump + Dexcom G6
- 4 semaines run-in, étude de 24 semaines
- 3 rencontres cliniques + 2 revues par téléphone (AID seulement)
- Accès à une communauté en ligne (Tribe Technologies) + staff

Burnside MJ et al. N Engl J Med. 2022 Sep 8. 387:869-881

Positive Impact of the Bionic Pancreas on Diabetes Control in Youth 6–17 Years Old with Type 1 Diabetes: A Multicenter Randomized Trial

Bionic Pancreas Research Group*
Author Group: Laurel H. Messer, PhD, MPH, RN,[1] Bruce A. Buckingham, MD,[2] Fran Cogen, MD,[3] Mark Daniels, MD,[4] Greg Forlenza, MD,[1] Rabab Z. Jafri, MD,[5] Nelly Mauras, MD,[6] Andrew Muir, MD,[7] R. Paul Wadwa, MD,[1] Perrin C. White, MD,[8] Steven J. Russell, MD, PhD,[9] Edward R. Damiano, PhD,[10,11] Firas H. El-Khatib, PhD,[10,11] Katrina J. Ruedy, MSPH,[12] Courtney A. Balliro, RN, CDCES, CRN-BC,[9] Zoey Li, MS,[12] Martin Chase Marak, MS,[12] Peter Calhoun, PhD,[12] Roy W. Beck, MD, PhD[12]

Design:

- Étude randomisée contrôlée, multicentrique
- iLet Bionic Pancreas + Dexcom 6
  - Basé sur le poids seulement
  - Annonce de repas seulement (pas de décompte de glucide!)
  - Cible de 6.7 mmol/L adjustable +/- 0.56 mmol/L
- Randomisation 2:1 (iLet vs. standard)
- 13 semaines
  - Suivi téléphonique à 1-2j, 7j, suivis en personne à 2,6,10,13 semaines

Messer L et al. Diabetes Technol Ther. 2022 Oct;24(10):712-725.

Système	Design	N	Caractéristiques	A1c / TIR	Utilisation
CamAPS	RCT	74	• 89% Caucasiens • Tous sur pompe	• A1c 7.3% • TIR 61%	95% mode boucle fermée
Omnipod 5	Étude prosp.	80	• 83.3% Caucasiens • Pompe 85%, Injections 15%	• A1c 7.4% • TIR 58%	97.8% mode auto
670G auto mode	Étude prosp.	46	• ?Ethnicité • Tous sur pompe	• A1c 8.0% • TIR 55.7%	87.1% mode auto
Open-Source APS	RCT	48	• 19% Maori, 76% Européen • 43% au 1er quintile SSE • Tous sur pompe	• A1c 7.5% • TIR 57%	?
Ilet Bionic Pancreas	RCT	165	• 64% White, 12% Black, 14% Hispanic • 49% revenu de 100,000$+ • Pompe et injections	• A1c 8.1% (6.1-12.2%) • TIR 57%	96% dosage automatisé

Système	Design	Contrôle	N	Âge	HbA1c / TIR	HbA1c	TIR	TBR	Effets Adv.
CamAPS	RCT	Pompe + CGM	74	1-7 ans (5.6 ± 1.6)	<11% (7.3%; TIR 61%)	-0.4%	+8.7%	-0.4%	1 HS Hypers
Omnipod 5	Étude prosp.	14 jours baseline	80	2-5.9 ans (4.7 ± 1.0)	<10% (7.4%; TIR 57.2%)	-0.55%	+10.9%	-0.27%	Hypers
670G auto mode	Étude prosp.	14 jours mode manuel	46	2 à <7 ans (4.6 ± 1.4)	<10% (8.0%; TIR 55.7%)	-0.5%	+8.1%	NS	Hypers
Open-Source APS	RCT	Pompe + CGM	48	7-18 ans (13)	<10.5% (7.5%; TIR 56.1%)	-0.5%	+9.9%	-1.5%	Hypers
Ilet Bionic Pancreas	RCT	Standard (pompe, inejctions)	165	6-18 ans (12 ± 3)	sans restriction (8.1%)	-0.5%	+10%	-0.3%	3 vs. 1 HS Hypers

Résultats sélectionnés

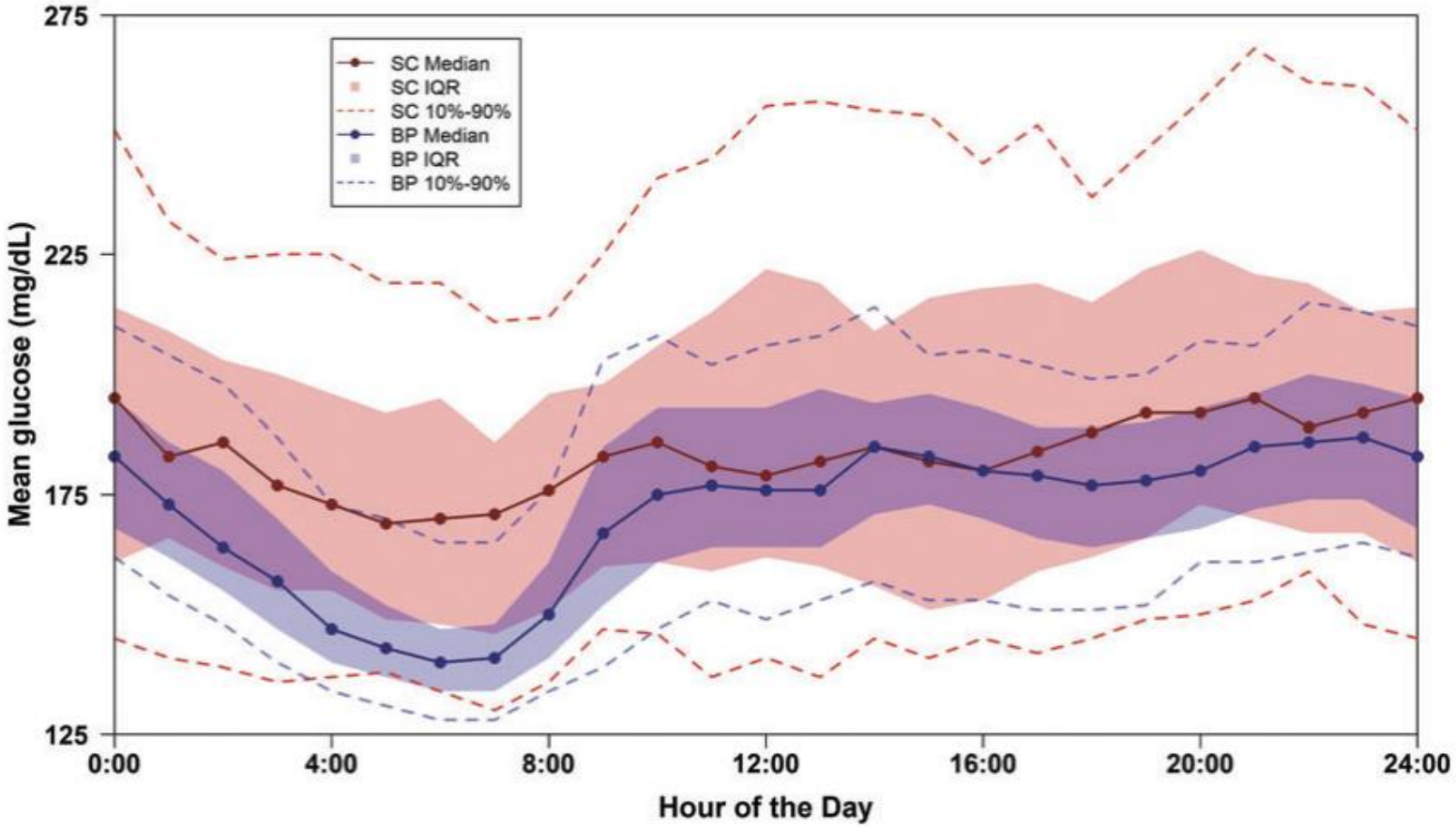


FIG. 3. Mean glucose by hour of the day over 13 weeks. Dots represent the median mean glucose. The shaded area represents the IQR and dashed curves represent the 10th and 90th percentiles over each hour of the day. BP, bionic pancreas; SC, standard care; IQR, interquartile range.

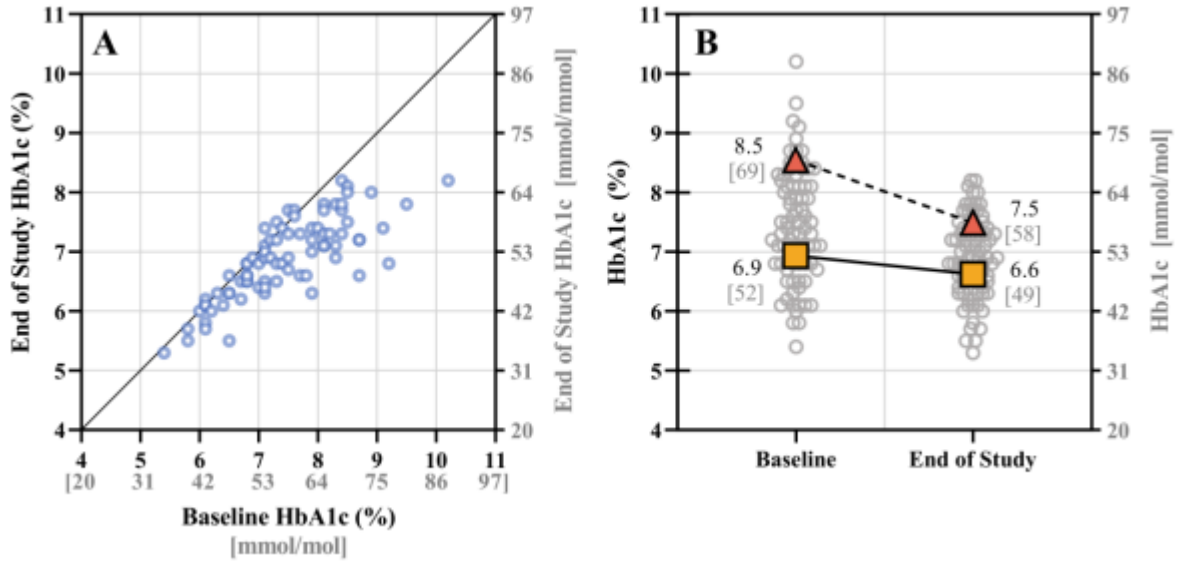
Messer L et al. Diabetes Technol Ther. 2022 Oct;24(10):712-725.

Résultats sélectionnés

Table S7. Subgroup analyses of mean glycemic outcomes at baseline or during the standard therapy phase and the 3-months of automated insulin delivery phase ("AID phase"), stratified by baseline characteristics

	% Time in range 70-180mg/dL	% Time below 70mg/dL[§]	% Time above 180mg/dL	HbA1c (%) [mmol/mol]
Parameter	standard therapy/AID phase, p-value	standard therapy/AID phase, p-value	standard therapy/AID phase, p-value	baseline/follow-up, p-value
Overall (N=80)	57/68, <0.0001†	2.19/1.94, 0.0204†	39/30, <0.0001†	7.4[57]/6.9[52], <0.0001†
Standard Therapy				
Multiple daily injections (n=12)	48/62, 0.0009‡	1.45/1.48, 0.5693†	48/36, 0.0084‡	8.4[68]/7.5[58], 0.0005‡
Pump (n=68)	59/69, <0.0001†	2.44/2.00, 0.0258†	38/28, <0.0001†	7.3[56]/6.8[51], <0.0001†
Gender				
Female (n=34)	56/68, <0.0001†	1.72/1.43, 0.0996†	42/31, <0.0001†	7.5[58]/6.9[52], <0.0001‡
Male (n=46)	59/69, <0.0001†	2.37/2.39, 0.0938†	38/29, <0.0001†	7.4[57]/6.9[52], <0.0001†
Race				
White* (n=72)	58/68, <0.0001†	1.97/1.83, 0.0819†	39/30, <0.0001†	7.4[57]/6.9[52], <0.0001†
Non-white (n=8)	54/70, 0.0078†	5.51/4.43, 0.1094†	39/26, 0.0078†	7.5[58]/6.9[52], 0.0313†

To convert the values for glucose to millimoles per liter, multiply by 0.05551.
*Includes those who responded with more than one race and included "white" as one of the responses
†p-value determined using two-sided Wilcoxon signed rank tests.
‡p-value determined using two-sided paired t-tests.
§Values presented for % Time below 70mg/dL are medians, the remaining values in the table are means.



Panel A: HbA1c at follow-up plotted versus HbA1c at baseline, with each circle representing a single participant.

Panel B: Mean HbA1c (%) values at baseline and follow-up when stratified into two groups by baseline HbA1c

Sherr J. et al. Diabetes Care. 2022 Aug 1;45(8):1907-1910

Résultats sélectionnés

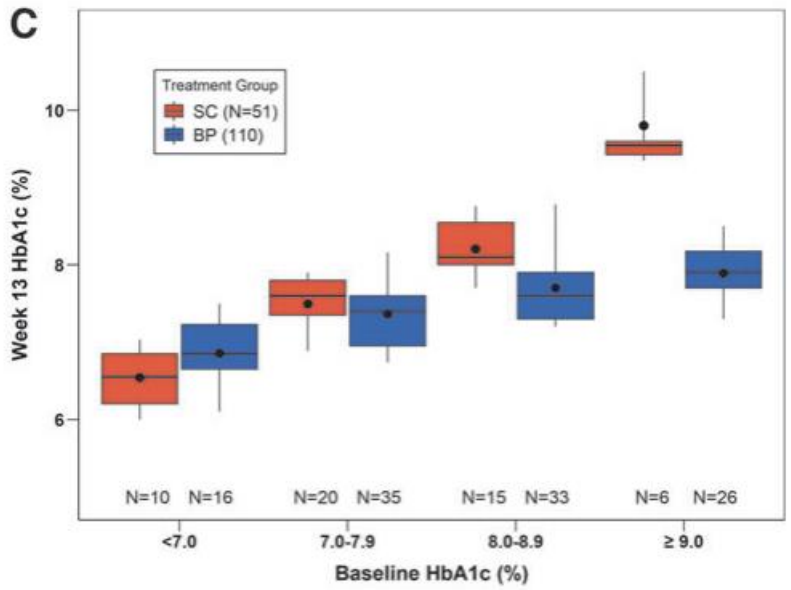


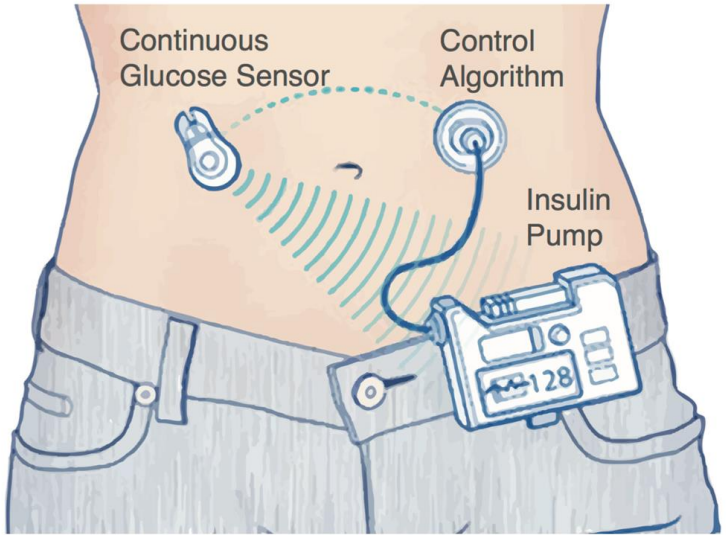
TABLE 4. EFFICACY OUTCOMES FOR PARTICIPANTS WITH BASELINE HBA1C ≥9.0%

	Baseline		*Follow-up (at or over 13 weeks)*			
	BP group (n = 27)[a]	*SC group (n = 7)*[a]	*BP group (n = 27)*[a]	*SC group (n = 7)*[a]	*Adjusted difference BP minus SC (95% CI)*[b]	P[b]
Overall						
HbA1c (%), mean ± SD	9.7 ± 0.8	9.7 ± 0.5	7.9 ± 0.6	9.8 ± 0.8	−2.1 (−2.7 to −1.4)	<0.001
Mean glucose (mg/dL), mean ± SD	241 ± 32	257 ± 33	182 ± 12	247 ± 18	−64 (−75 to −53)	<0.001
Time 70–180 mg/dL, mean ± SD	28% ± 11%	22% ± 10%	56% ± 6%	25% ± 5%	31% (26% to 37%)	<0.001
Time >180 mg/dL, mean ± SD	71% ± 11%	76% ± 11%	43% ± 6%	74% ± 5%	−32% (−37% to −26%)	<0.001
Time >250 mg/dL, median (IQR)	43.1% (32.5%, 52.4%)	54.8% (34.0%, 63.8%)	15.9% (12.6%, 21.2%)	46.9% (44.6%, 54.7%)	−30% (−36.1% to −25.0%)	<0.001
Time <70 mg/dL, median (IQR)	0.5% (0.0%, 1.3%)	0.8% (0.1%, 3.3%)	1.6% (0.9%, 2.4%)	1.4% (0.6%, 1.8%)	0.7% (0.2% to 1.4%)	0.02
Time <54 mg/dL, median (IQR)	0.07% (0.00%, 0.30%)	0.10% (0.00%, 0.84%)	0.32% (0.16%, 0.51%)	0.15% (0.04%, 0.54%)	0.13% (−0.04% to 0.32%)	0.11
SD (mg/dL), mean ± SD	86 ± 14	90 ± 12	73 ± 10	91 ± 9	−15 (−23 to −8)	<0.001
Coefficient of variation (%), mean ± SD	36% ± 6%	35% ± 5%	40% ± 4%	37% ± 3%	3.1% (0.7% to 5.4%)	0.01

Messer L et al. Diabetes Technol Ther. 2022 Oct;24(10):712-725.

Conclusions

- Les systèmes de boucle fermée sont sécuritaires et efficaces – y inclus pour les plus jeunes enfants.
  - Le temps dans la cible augmente, surtout pendant la nuit. Le temps en hyperglycémie est réduit.
  - Les systèmes deviennent de plus en plus automatisés (e.g. annonce de repas au lieu de décompter les glucides).
  - Les problèmes techniques restent fréquents et le système reste dépendant de la gestion des parents et cliniciens.
- La formation des familles et le contact clinique fréquent sont primordiaux.
- Il manque l'inclusion de résultats rapportés par les familles (qualité de vie, de sommeil, peur d'hypoglycémie, anxiété, détresse etc.)



Technologies de diabète:

Le « pancréas artificiel »

Bénéfices autre que glycémiques

Improvements in Parental Sleep, Fear of Hypoglycemia, and Diabetes Distress With Use of an Advanced Hybrid Closed-Loop System

Erin C. Cobry,[1] Alessandro Bisio,[2] R. Paul Wadwa,[1] and Marc D. Breton[2]

Diabetes Care 2022;45:1292–1295 | https://doi.org/10.2337/dc21-1778

Design

- Étude randomisée multicentrique
- 101 Enfants/parents 6-13 ans avec DT1 ≥ 1an, dose ≥ 10 unités/j
- Tandem CIQ vs. Tandem + Dexcom 6
- 4 mois

Issues rapportés par les patients

- Pittsburgh Sleep Quality Index (parents)
- Hypoglycemia Fear Survey (parents et enfants)
- Problem Areas in Diabetes (PAID – enfants et parents)

Cobry E et al. Diabetes Care 2022;45:1292–1295

Table 1—Pre- and postintervention analysis for parents with PSQI score >5 (poor sleepers) at baseline (n = 49)

	Preintervention	Postintervention	*P*
Child PROs			
HFS-C total score	57 (51–67)	55 (48–67)	**0.025**
HFS-C behavior subscale score	30 (26–33)	30 (24–32)	0.144
HFS-C worry subscale score	27 (23–34)	27 (21–33)	0.096
PAID score	23 (17–32)	21 (17–31)	0.153
Parent PROs			
PSQI score	7 (6–10)	5 (3–8)	**<0.001**
HFS-P total score	73 (63–81)	65 (54–74)	**<0.001**
HFS-P behavior subscale score	33 (29–37)	29 (24–33)	**<0.001**
HFS-P worry subscale score	37 (34–47)	33 (29–40)	**0.011**
PAID score	44 (36–56)	35 (26–43)	**<0.001**
Nocturnal CGM (12:00 A.M.–6:00 A.M.)			
Mean glucose, mg/dL	182.16 ± 38.94	148.80 ± 19.11	**<0.001**
Glucose SD, mg/dL	64.00 ± 16.66	51.16 ± 14.51	**<0.001**
% time with glucose <54 mg/dL	0.00 (0.00–0.20)	0.10 (0.00–0.40)	**0.040**
% time with glucose <70 mg/dL	0.50 (0.00–2.70)	0.80 (0.40–1.60)	0.703
% TIR (70–180 mg/dL)	54.43 ± 20.85	78.53 ± 11.09	**<0.001**
% time with glucose >180 mg/dL	43.92 ± 21.08	20.35 ± 11.17	**<0.001**
HbA_{1c}, %, mmol/L	7.55 (6.9–8.3), 59 (52–67)	7.05 (6.6–7.6), 54 (49–60)	**<0.001**

Data are mean ± SD or median (interquartile range). Bold values indicate significance ($P < 0.05$).

Cobry E et al. Diabetes Care 2022;45:1292–1295

JAMA Pediatrics | Original Investigation

Effect of a Hybrid Closed-Loop System on Glycemic and Psychosocial Outcomes in Children and Adolescents With Type 1 Diabetes
A Randomized Clinical Trial

Mary B. Abraham, PhD; Martin de Bock, PhD; Grant J. Smith, MPsych; Julie Dart, RN; Janice M. Fairchild, MBBS; Bruce R. King, PhD; Geoffrey R. Ambler, MD; Fergus J. Cameron, MD; Sybil A. McAuley, PhD; Anthony C. Keech, MSc; Alicia Jenkins, MD; Elizabeth A. Davis, PhD; David N. O'Neal, MD; Timothy W. Jones, MD; for the Australian Juvenile Diabetes Research Fund Closed-Loop Research group

Design

- Étude randomisée multicentrique
- 135 adolescents 12-25 ans (âge moyen 15.1), DT1 x1 ans, HbA1c <10.5%
- Minimed 670G vs. pompe ou MDI +/- CGM x 26 semaines

Issues psychosociaux:

- Qualité de vie (Peds QL DM)
- Détresse de diabète (PAID)
- Satisfaction de traitement (DTSQ)
- Anxiété (State-Trait Anxiety Inventory)

Abraham MB et al. JAMA Pediatrics 2022

Table 2. Clinical, Glycemic, and Psychosocial Outcomes

Outcome	Baseline		Study end		HCL-control	*P* value
	HCL (n = 67)	Control (n = 68)	HCL (n = 58)	Control (n = 53)		
Clinical and glycemic outcomes						
Primary outcome, % time						
70-180 mg/dL[a]	53.1 (13.0)	54.6 (12.5)	62.5 (12.0)	56.1 (12.2)	6.7 (2.7 to 10.8)	.002
Secondary outcomes, %						
HbA_{1c}[a]						
%[d]	7.8 (1.0)	7.7 (0.8)	7.5 (1.1)	7.6 (0.8)	−0.3 (−0.5 to 0.0)	.045
mmol/mol	62 (11)	60 (9)	58 (12)	60 (9)	−2.9 (−5.8 to −0.1)	
Psychosocial outcomes						
Diabetes-specific PedsQL V3[a]	70.7 (13.5)	69.3 (14.6)	72.3 (14.8)	67.7 (13.6)	4.4 (0.4 to 8.4)	.03
Diabetes distress PAID score, points[a]	30.3 (19.7)	28.9 (18.9)	27.9 (21.8)	31.1 (20.7)	−4.5 (−10.6 to 1.6)	.14
Fear of hypoglycemia HFS-II worry[a]	16.2 (9.8)	16.9 (9.3)	14.0 (9.7)	16.4 (11.4)	−1.8 (−4.9 to 1.3)	.24
Hypoglycemia awareness Gold score[b]	2 (1 to 3)	2 (2 to 3)	2 (1 to 3)	2 (2 to 3)	0 (0 to 0)	.45
Diabetes treatment satisfaction, DTSQ[a]						
Child	21.3 (7.5)	20.4 (7.2)	17.6 (7.3)	19.8 (7.2)	−3.3 (−6.0 to −0.6)	.02
Adult	13.9 (5.2)	14.9 (5.1)	8.8 (2.8)	14.5 (6.1)	−5.2 (−9.2 to −1.2)	.01
State, STAI-S[a]						
Child	29.0 (5.9)	28.6 (4.6)	29.5 (5.2)	28.7 (5.4)	−0.8 (−3.6 to 2.0)	.57
Adult	16.2 (7.7)	19.3 (8.4)	15.6 (10.1)	19.8 (10.2)	−1.1 (−4.5 to 2.2)	.51
Trait, STAI-T[a]						
Child	31.3 (8.1)	29.7 (7.0)	30.1 (9.8)	27.9 (6.1)	−1.8 (−6.4 to 2.7)	.76
Adult	16.6 (9.1)	21.3 (9.4)	16.2 (10.2)	20.3 (10.7)	0.5 (−2.7 to 3.7)	.42

Abraham MB et al. JAMA Pediatrics 2022

Conclusions

- Les systèmes de boucle fermée améliorent plusieurs issues rapportés par les patients / familles.
  - Qualité de vie
  - Sommeil
  - Peur d'hypoglycémies
- Les résultats ne sont pas consistents pour tous les issues
  - Détresse
  - Anxiété
- Tous les études de boucle fermée devraient inclure des issues pertinents pour les patients et familles.

nature communications

Article

https://doi.org/10.1038/s41467-022-32289-x

A Pilot randomized trial to examine effects of a hybrid closed-loop insulin delivery system on neurodevelopmental and cognitive out-comes in adolescents with type 1 diabetes

Design

- Étude randomisée, contrôlée
- Intervention:
  - Minimed 670G (CL) vs. ‘standard care’ (SC)
  - Utilisation de senseur habituel OU senseur iPro2 aveugle (à 0,3,6 mois)
- Évaluations
  - Clinique, cognitive et imagerie à 0, 3, 6 mois

Reiss AL et al. Nat Commun. 2022 Aug 30; 13:4940

Protocole

- Participants
  - 42 adolescents 14-17 ans
  - DT1 depuis avant l’âge de 8 ans, injections multiples ou pompe
- Hypothèses:
  - Plus grande réduction de l'hyperglycémie dans le groupe CL entraînera:
    - Plus grande amélioration des paramètres clés du cerveau indicatifs du développement neurotypique pendant l'adolescence
    - Activité cérébrale fonctionnelle plus indicative de développement neurotypique
  - Groupe CL montrera des scores plus élevés sur les tests QI standardisés

Reiss AL et al. Nat Commun. 2022 Aug 30; 13:4940

Résultats

Table 1 | Changes in glycemic variables from baseline to 6 months and intention-to-treat (ITT) effects on these changes (all estimated based on mixed-effects modeling)

	Standard care				Closed loop				Group difference in change			
	Baseline	6 months	Change	*P* value	Baseline	6 months	Change	*P* value	Change	95% CI	Effect size*	*P* value
HbA1c%	8.45	8.13	−0.32	0.100	8.70	8.13	−0.57	0.022	−0.25	−0.87, 0.37	−0.25	0.424
% TIR	42.72	44.45	1.72	0.543	39.60	57.75	18.15	0.000	16.43	8.58, 24.28	1.28	0.000
% TIR nighttime	40.09	43.00	2.91	0.449	39.95	64.11	24.16	0.000	21.24	10.71, 31.78	1.23	0.000
Glucose mean (mg/dl)	196.35	195.78	−0.57	0.920	205.84	173.09	−32.75	0.000	−32.18	−49.27, −15.09	−1.15	0.000
% Glucose >250 mg/dl	25.81	26.37	0.56	0.830	29.12	14.26	−14.87	0.000	−15.42	−23.60, −7.24	−1.15	0.000
% Glucose >250 mg/dl nighttime	24.73	25.49	0.75	0.808	23.71	12.20	−11.52	0.000	−12.27	−21.02, −3.52	−0.86	0.006
% Glucose <70 mg/dl	3.70	3.35	−0.35	0.664	3.34	3.88	0.54	0.385	0.89	−1.10, 2.88	0.27	0.381
% Glucose <70 mg/dl nighttime	7.02	5.74	−1.28	0.368	5.50	2.85	−2.65	0.044	−1.37	−5.19, 2.45	−0.22	0.481
% Glucose CV	41.19	42.48	1.29	0.243	39.98	37.67	−2.31	0.101	−3.61	−7.12, −0.09	−0.63	0.044
% Glucose CV nighttime	41.13	42.37	1.24	0.474	40.39	35.58	−4.81	0.035	−6.05	−11.69, −0.41	−0.66	0.036

Time in range, mean glucose, and glucose coefficient of variation values are presented as pertaining to the entire day or limited to nighttime hours only. Glucose concentrations are in mg/dl (to convert to mmol/L, divide by 18). HbA1c% glycated hemoglobin, TIR time in range (70–180 mg/dl), CV coefficient of variation, CI confidence interval. *Effect sizes (in Cohen d) were approximately calculated as two times t value divided by the square root of (sample size − 1), where t values were calculated as point estimates of the group difference from mixed-effects modeling divided by their robust maximum likelihood standard errors.

Reiss AL et al. Nat Commun. 2022 Aug 30; 13:4940

Résultats

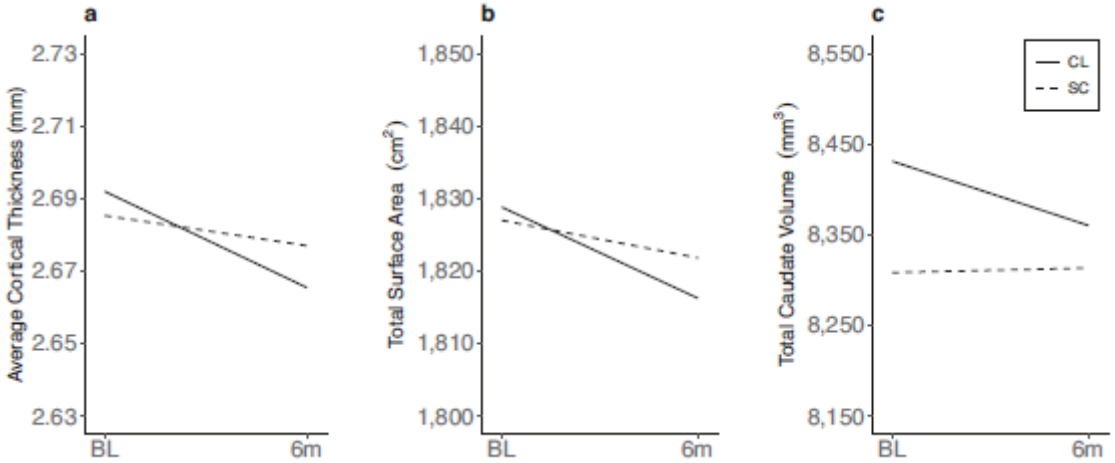


Fig. 1 | Group differences in brain structure over time. Trajectories for

(a) average cortical thickness (mm)

(b) total surface area (cm2)

(c) caudate volume (mm3)

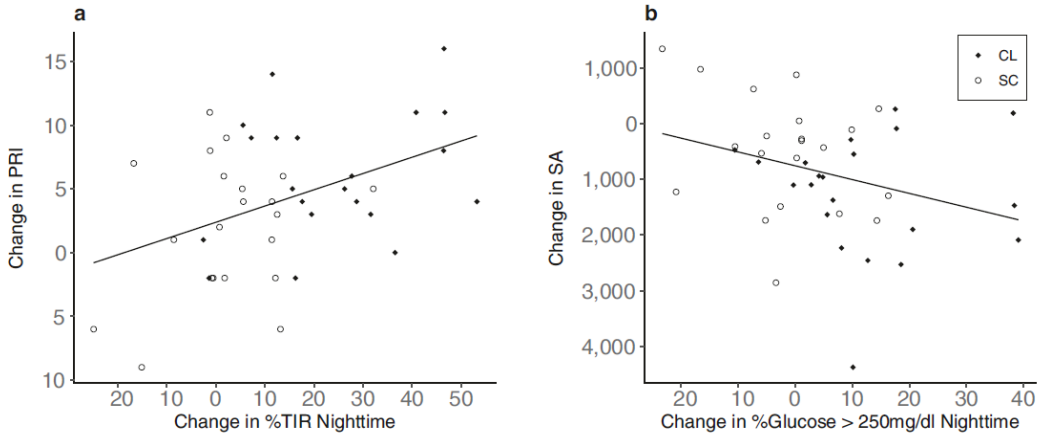


Fig. 6 | Correlation between change in glucose sensor values and change in cognitive and imaging metrics over time.

Association of change from baseline to 6 months in

(a) Perceptual Reasoning Index (PRI) with % time in range (TIR) nighttime and

(b) Cortical surface area (SA) with % glucose >250mg/dl nighttime.

Closed Loop (CL) group shown by solid diamonds, Standard Care (SC) groups by open circles

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Résultats

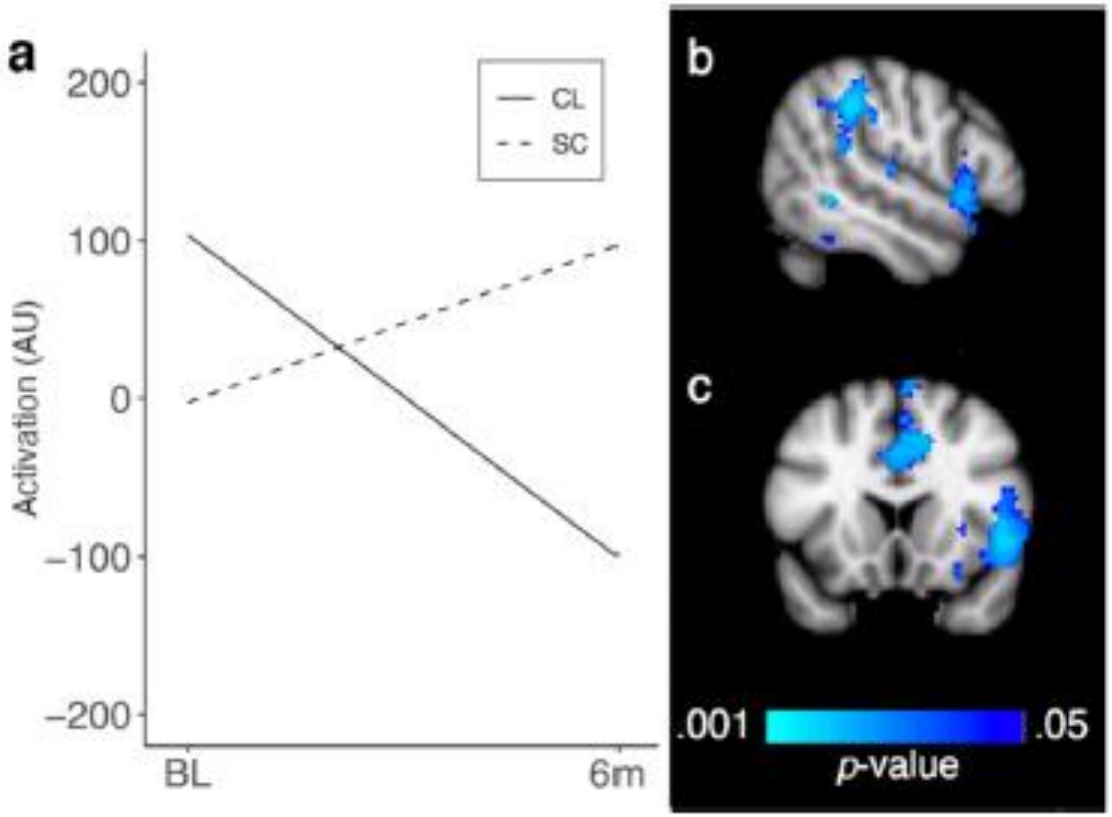


Fig. 4 | Longitudinal differences in brain activation between groups.

Results from fMRI analyses showing a greater reduction in activation over time in the Closed Loop (CL) relative to the Standard Care (SC) group.

The right panel (b, c) shows brain areas that exhibited a significant interaction of group by time in voxel-wise Linear mixed effects controlling for age.

Cool colors indicate reduced activation over time in the CL relative to the SC group.

Group by time differences were predominantly located in subregions of the executive function network, including the right inferior frontal gyrus and right parietal cortex as well as the dorsal anterior cingulate cortex.

Reiss AL et al. Nat Commun. 2022 Aug 30; 13:4940

Fonction Cognitive

- Groupe CL: Plus grande amélioration au fil du temps du score de l'indice de raisonnement perceptuel (PRI) WASI-II (d de Cohen = 0,82, P = 0,009)
- Aucune différence significative entre les groupes pour le changement des scores de l'indice de compréhension verbale (VCI) ou du QI complet (FSIQ)

Table 2 | Changes in IQ scores from baseline to 6 months and intention-to-treat (ITT) effects on these changes (all estimated based on mixed-effects modeling)

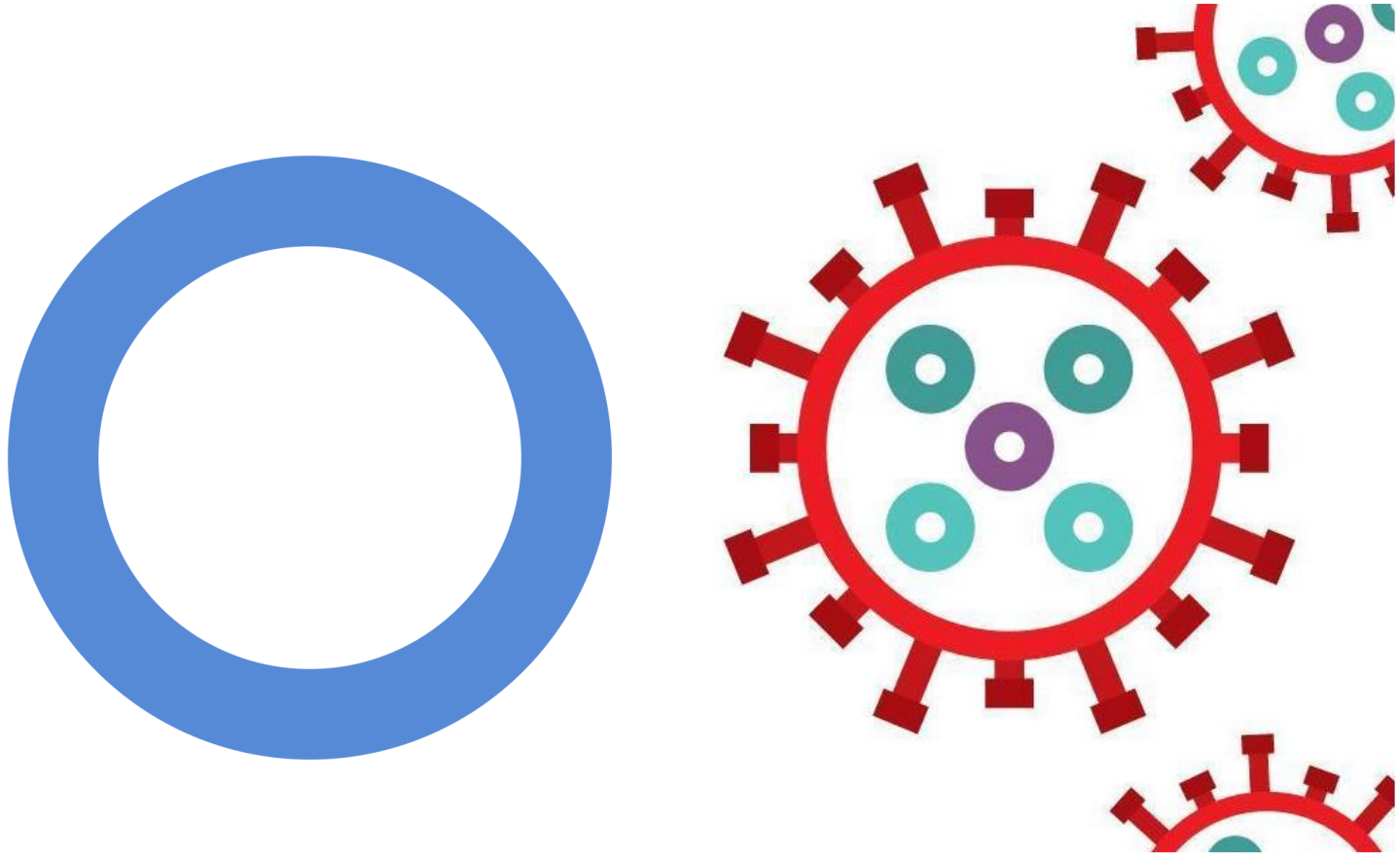
	Standard care				Closed loop				Group difference in change			
	Baseline	6 months	Change	*P* value	Baseline	6 months	Change	*P* value	Change	95% CI	Effect size*	*P* value
Perceptual Reasoning Index	109.29	111.33	2.05	0.070	108.05	114.14	6.10	0.000	4.05	1.03, 7.07	0.82	0.009
Verbal Comprehension Index	112.38	112.67	0.29	0.860	110.24	111.71	1.48	0.217	1.19	−2.76, 5.14	0.18	0.555
Full-Scale IQ	111.81	113.76	1.95	0.078	110.19	114.24	4.05	0.000	2.10	−0.90, 5.09	0.43	0.171

Reiss AL et al. Nat Commun. 2022 Aug 30; 13:4940

Conclusions

- Les adolescents utilisant CL par rapport à SC montrent:
  - Réductions significatives de l'hyperglycémie et des mesures de la variation du glucose.
  - Gains dans les scores de QI standardisés et de multiples mesures du développement et de la fonction cérébrales.
- Ceci indique fortement une tendance à la « normalisation » du développement neurocognitif dans le groupe CL par rapport au groupe SC.

Reiss AL et al. Nat Commun. 2022 Aug 30; 13:4940



Diabète de type 1 et COVID-19

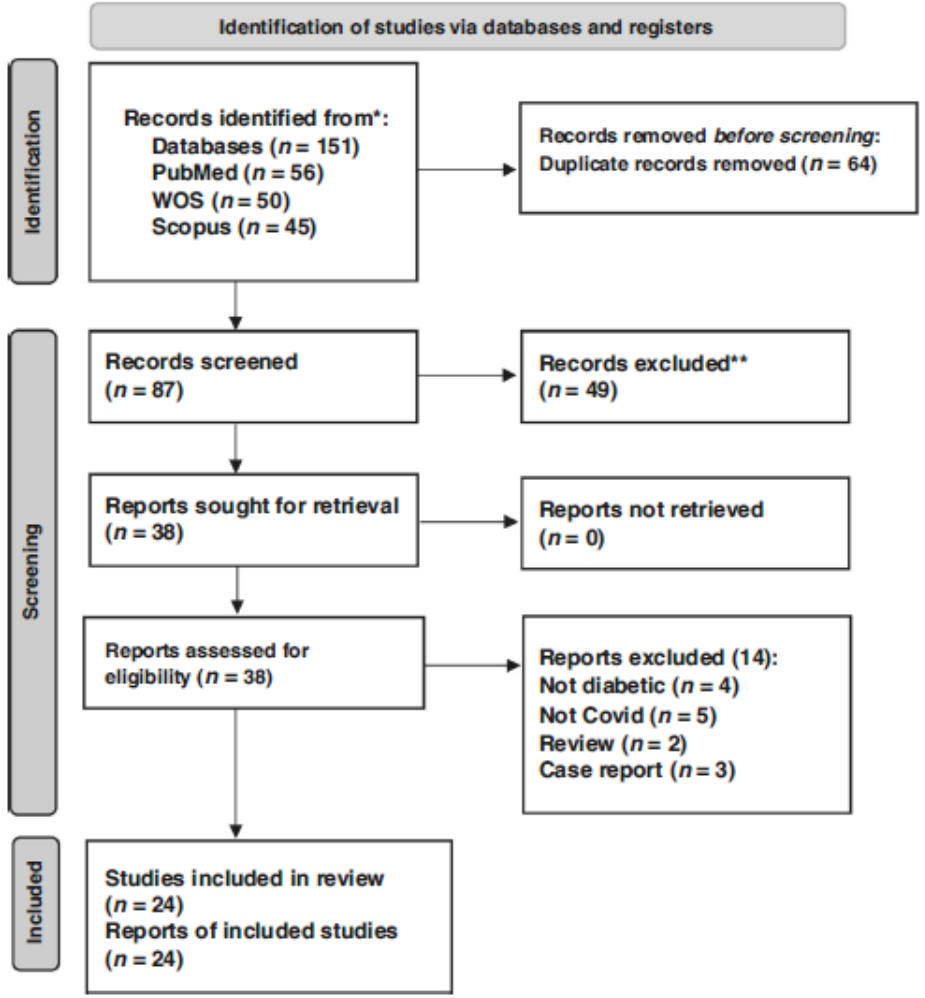
SYSTEMATIC REVIEW

www.nature.com/pr

Incidence of diabetic ketoacidosis during COVID-19 pandemic: a meta-analysis of 124,597 children with diabetes

Anas Elgenidy[1,8], Ahmed K. Awad[2,8], Khaled Saad[3]✉, Mostafa Atef[1], Hatem Helmy El-Leithy[1], Ahmed A. Obiedallah[4], Emad M. Hammad[3], Faisal-Alkhateeb Ahmad[3], Ahmad M. Ali[3], Hamad Ghaleb Dailah[5], Amira Elhoufey[6,7] and Samaher Fathy Taha[3]

- Revue systématique
- Stratégie de recherche:
  - PubMed, Web of Science, Scopus
  - «diabetic ketoacidosis», «COVID-19», «child»
  - Dates: jusqu'à Octobre 2021
- Critères d'éligibilité
  - Évaluation du développement de l'ACD pendant la pandémie de COVID-19
  - Publication dans des revues internationales indexées dans Scopus, WOS, PubMed
  - Pas de limites de langue



Elgenidy et al. Pediatr Res. 2022 Aug 11;1-12

Résultats

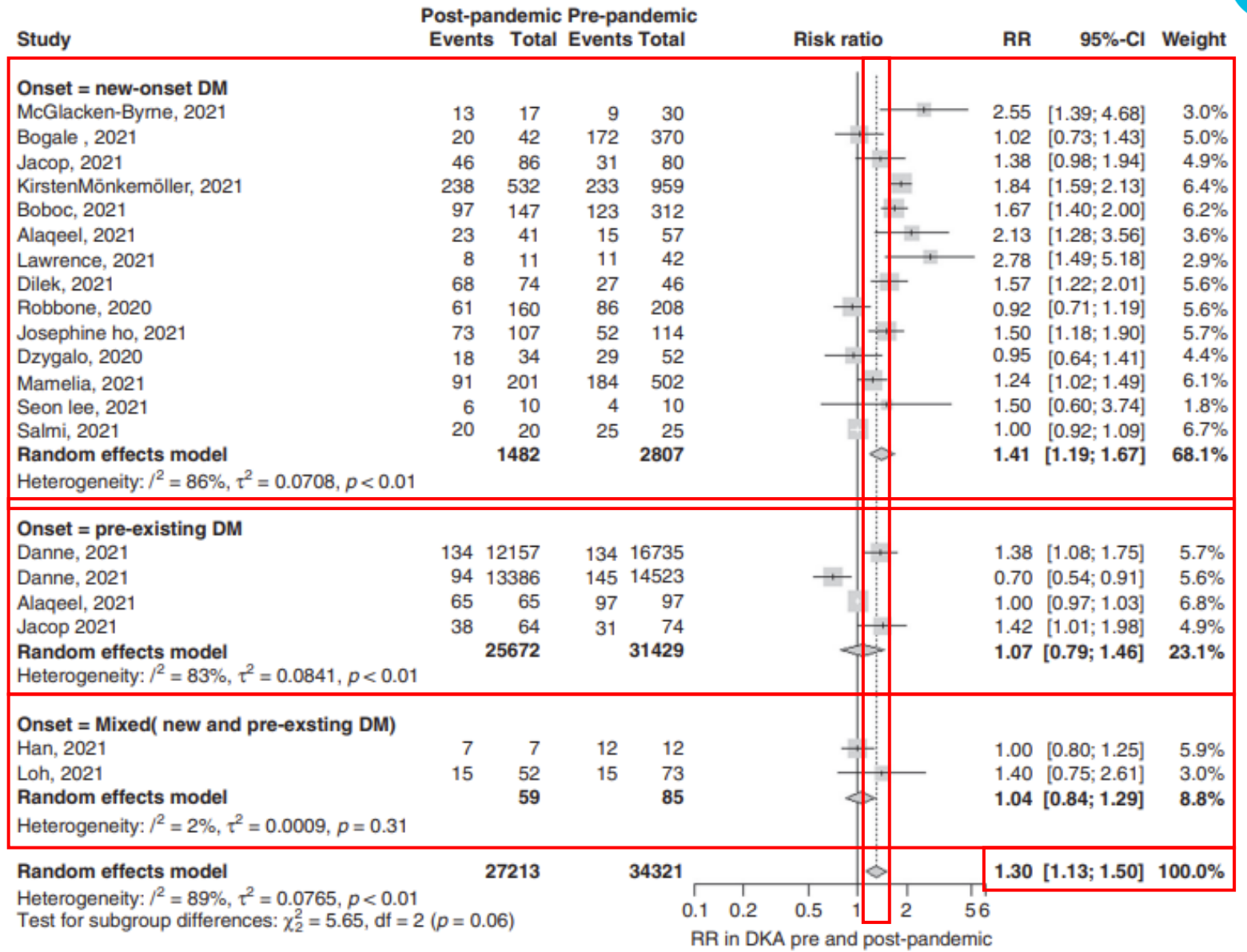


Fig. 2 Forest for DKA. Forest plot summarizing the risk ratio of DKA in pre-pandemic and post-pandemic stratified by the onset of diabetes (new-onset, pre-existing or mixed of both). SD standard deviation, CI confidence interval.

Elgenidy et al. Pediatr Res. 2022 Aug 11;1-12

REVIEW

JOURNAL OF MEDICAL VIROLOGY WILEY

The global impact of COVID-19 pandemic on the incidence of pediatric new-onset type 1 diabetes and ketoacidosis: A systematic review and meta-analysis

Masoud Rahmati[1] | Maryam Keshvari[1] | Shahrzad Mirnasuri[2] | Dong K. Yon[3] | Seung W. Lee[4,5] | Jae Il Shin[6] | Lee Smith[7]

- Revue Systématique
- Stratégie de recherche:
  - Medline/Pubmed, CINAHL, Scopus, EMBASE
  - (“COVID-19”) and (“type 1 diabetes mellitus”)
  - Dates: jusqu’à Mars 2020
- Critères d’éligibilité
  - Étude évaluant DT1 de novo pendant la pandémie en 2020 vs. la même période en 2019
  - Étude rapporte au moins 1 de:
    - N enfants avec DT1 de novo;
    - N enfants avec ACD parmi DT1 de novo;
    - N enfants avec ACD sévère parmi DT1 de novo
  - Évaluation d’HbA1c et d’hyperglycémie au diagnostic

Rahmati M et al., J Med Virol. 2022 Nov;94(11):5112-5127

Résultats

Taux d'événement logit de:

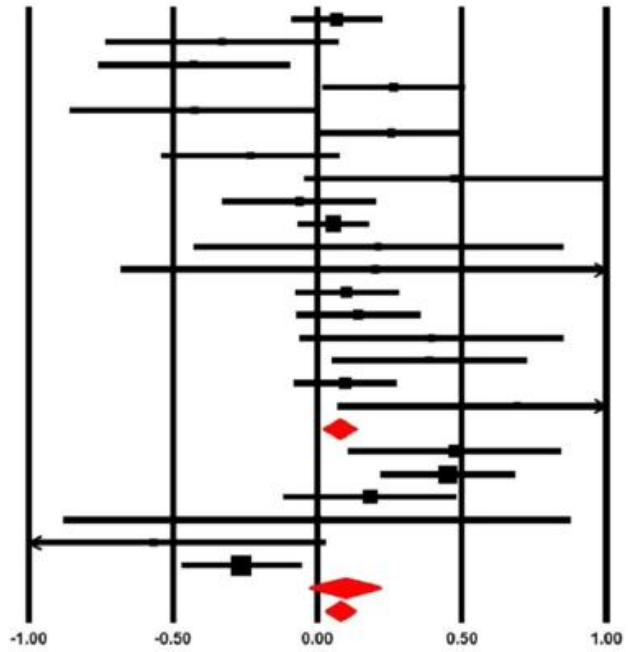
(A) Nombre

(B) Incidence

Du DT1 de novo avant vs. après la pandémie

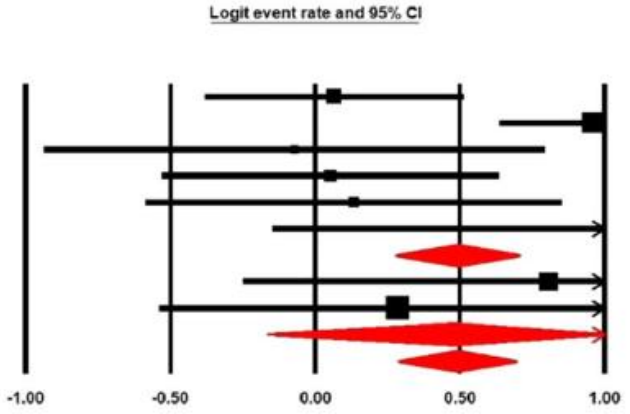
(A)

Study name	Subgroup within study	Logit event rate	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Al-Abdulrazzaq, 2021	Cohort	0.067	0.080	0.006	-0.090	0.224	0.839	0.402
Alaqeel, 2021	Cohort	-0.329	0.205	0.042	-0.731	0.072	-1.609	0.108
Atlas, 2020	Cohort	-0.428	0.169	0.028	-0.759	-0.097	-2.537	0.011
Boboc, 2021	Cohort	0.263	0.125	0.016	0.018	0.508	2.103	0.036
Dzygalo, 2020	Cohort	-0.425	0.221	0.049	-0.857	0.007	-1.926	0.054
Goldman, 2022	Cohort	0.256	0.125	0.016	0.011	0.502	2.045	0.041
Hawkes, 2021	Cohort	-0.231	0.157	0.025	-0.539	0.076	-1.476	0.140
Herrero, 2020	Cohort	0.475	0.266	0.071	-0.045	0.996	1.790	0.073
Ho, 2021	Cohort	-0.063	0.135	0.018	-0.327	0.200	-0.471	0.638
Kamrath, 2020	Cohort	0.056	0.062	0.004	-0.066	0.178	0.901	0.367
Kostopoulou, 2021	Cohort	0.211	0.326	0.106	-0.428	0.851	0.648	0.517
Lawrence, 2021	Cohort	0.201	0.449	0.202	-0.680	1.082	0.446	0.655
Mameli, 2021	Cohort	0.103	0.091	0.008	-0.075	0.281	1.132	0.257
Marks, 2021	Cohort	0.141	0.109	0.012	-0.072	0.355	1.300	0.193
Modarelli, 2022	Cohort	0.395	0.232	0.054	-0.061	0.850	1.698	0.089
Salmi, 2022	Cohort	0.388	0.172	0.029	0.051	0.724	2.260	0.024
Sellers, 2021	Cohort	0.097	0.090	0.008	-0.079	0.273	1.077	0.281
Unsworth, 2020	Cohort	0.693	0.316	0.100	0.073	1.313	2.192	0.028
		0.076	0.030	0.001	0.018	0.135	2.582	0.010
Dilek, 2021	Cross-sectional	0.475	0.188	0.035	0.107	0.843	2.532	0.011
Gottesman, 2022	Cross-sectional	0.452	0.117	0.014	0.222	0.682	3.854	0.000
Jacob, 2021	Cross-sectional	0.182	0.151	0.023	-0.114	0.479	1.204	0.228
Lee, 2022	Cross-sectional	0.000	0.447	0.200	-0.877	0.877	0.000	1.000
McGlacken-Byrne, 202	Cross-sectional	-0.568	0.304	0.092	-1.163	0.027	-1.871	0.061
Rabbone, 2020	Cross-sectional	-0.262	0.105	0.011	-0.468	-0.056	-2.495	0.013
		0.097	0.063	0.004	-0.026	0.221	1.541	0.123
		0.080	0.027	0.001	0.028	0.133	2.992	0.003



(B)

Study name	Subgroup within study	Logit event rate	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Al-Abdulrazzaq, 2021	Cohort	0.067	0.227	0.051	-0.378	0.512	0.295	0.768
Herrero, 2020	Cohort	0.956	0.163	0.027	0.637	1.275	5.871	0.000
Ho, 2021	Cohort	-0.071	0.442	0.195	-0.937	0.794	-0.162	0.872
Kamrath et al. 2020	Cohort	0.053	0.296	0.088	-0.528	0.633	0.178	0.859
Mameli et al. 2021	Cohort	0.134	0.366	0.134	-0.584	0.851	0.365	0.715
Salmi, 2022	Cohort	1.174	0.673	0.453	-0.145	2.493	1.745	0.081
		0.494	0.110	0.012	0.279	0.709	4.510	0.000
Dilek, 2021	Cross-sectional	0.806	0.538	0.289	-0.248	1.861	1.499	0.134
Vlad, 2021	Cross-sectional	0.285	0.419	0.175	-0.535	1.106	0.681	0.496
		0.482	0.330	0.109	-0.166	1.129	1.459	0.145
		0.493	0.104	0.011	0.289	0.697	4.740	0.000



Rahmati M et al., J Med Virol. 2022 Nov;94(11):5112-5127

Résultats

Risque de

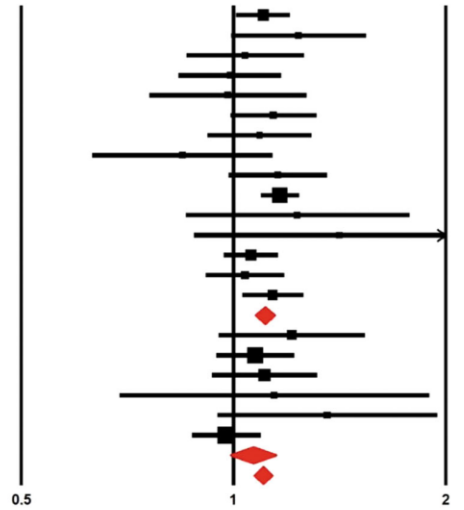
(A) ACD en general

(B) ACD sévère

Avant vs. après la pandémie

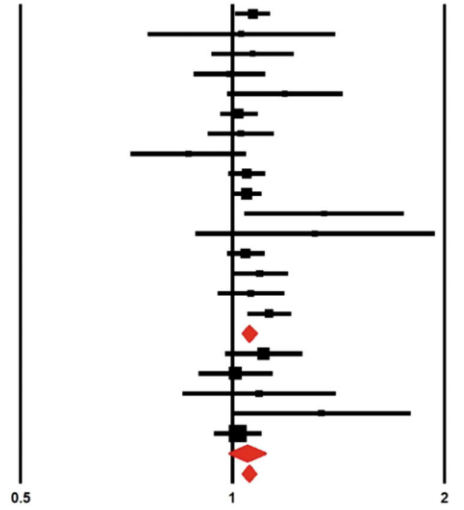
(A)

Study name	Subgroup within study	Risk ratio	Lower limit	Upper limit	Z-Value	p-Value
Al-Abdulrazzaq, 2021	Cohort	1.102	1.010	1.201	2.194	0.028
Alaqeel, 2021	Cohort	1.236	0.993	1.537	1.900	0.057
Atlas, 2020	Cohort	1.039	0.859	1.256	0.391	0.695
Boboc, 2021	Cohort	0.988	0.837	1.167	-0.138	0.890
Dzygalo, 2020	Cohort	0.982	0.760	1.268	-0.140	0.888
Goldman, 2022	Cohort	1.139	0.991	1.308	1.838	0.066
Hawkes, 2021	Cohort	1.089	0.921	1.288	0.996	0.319
Herrero, 2020	Cohort	0.846	0.631	1.134	-1.119	0.263
Ho, 2021	Cohort	1.155	0.986	1.354	1.785	0.074
Kamrath, 2020	Cohort	1.163	1.094	1.236	4.844	0.000
Kostopoulou, 2021	Cohort	1.232	0.856	1.772	1.125	0.261
Lawrence, 2021	Cohort	1.413	0.880	2.270	1.430	0.153
Mameli, 2021	Cohort	1.058	0.970	1.154	1.265	0.206
Marks, 2021	Cohort	1.038	0.915	1.178	0.579	0.562
Sellers, 2021	Cohort	1.136	1.030	1.253	2.553	0.011
		1.108	1.073	1.145	6.223	0.000
Dilek, 2021	Cross-sectional	1.209	0.955	1.531	1.577	0.115
Gottesman, 2022	Cross-sectional	1.073	0.946	1.218	1.099	0.272
Jacob, 2021	Cross-sectional	1.106	0.933	1.312	1.162	0.245
Lee, 2022	Cross-sectional	1.143	0.691	1.891	0.519	0.603
McGlacken-Byrne, 202	Cross-sectional	1.357	0.950	1.940	1.678	0.093
Rabbone, 2020	Cross-sectional	0.977	0.876	1.090	-0.412	0.680
		1.067	0.989	1.150	1.677	0.093
		1.102	1.069	1.135	6.380	0.000



(B)

Study name	Subgroup within study	Risk ratio	Lower limit	Upper limit	Z-Value	p-Value
Al-Abdulrazzaq, 2021	Cohort	1.069	1.011	1.130	2.343	0.019
Alaqeel, 2021	Cohort	1.030	0.759	1.397	0.189	0.850
Atlas, 2020	Cohort	1.068	0.935	1.220	0.973	0.331
Boboc, 2021	Cohort	0.990	0.882	1.111	-0.173	0.863
Dzygalo, 2020	Cohort	1.187	0.983	1.432	1.786	0.074
Goldman, 2022	Cohort	1.021	0.962	1.084	0.687	0.492
Hawkes, 2021	Cohort	1.028	0.924	1.143	0.504	0.614
Herrero, 2020	Cohort	0.866	0.718	1.044	-1.506	0.132
Ho, 2021	Cohort	1.047	0.988	1.110	1.559	0.119
Kamrath, 2020	Cohort	1.048	1.001	1.097	1.995	0.046
Kostopoulou, 2021	Cohort	1.349	1.041	1.749	2.261	0.024
Lawrence, 2021	Cohort	1.309	0.887	1.933	1.355	0.175
Mameli, 2021	Cohort	1.044	0.984	1.108	1.413	0.158
Marks, 2021	Cohort	1.093	0.999	1.197	1.936	0.053
Salmi, 2022	Cohort	1.062	0.953	1.182	1.090	0.276
Sellers, 2021	Cohort	1.127	1.051	1.208	3.352	0.001
		1.056	1.032	1.081	4.567	0.000
Dilek, 2021	Cross-sectional	1.106	0.977	1.253	1.597	0.110
Jacob, 2021	Cross-sectional	1.009	0.896	1.137	0.154	0.878
Lee, 2022	Cross-sectional	1.091	0.850	1.400	0.683	0.495
McGlacken-Byrne, 202	Cross-sectional	1.337	1.001	1.786	1.964	0.050
Rabbone, 2020	Cross-sectional	1.017	0.942	1.098	0.435	0.663
		1.050	0.988	1.117	1.568	0.117
		1.055	1.033	1.079	4.825	0.000



Rahmati M et al., J Med Virol. 2022 Nov;94(11):5112-5127

Résultats

Risque de

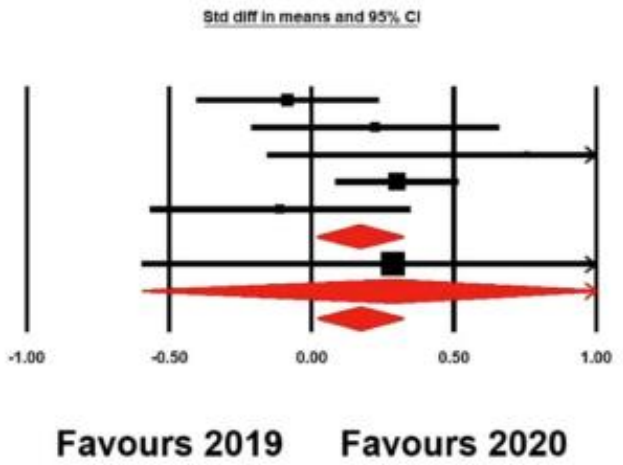
(A) Hyperglycémie

(B) HbA1c élevé

Avant vs. après la pandémie

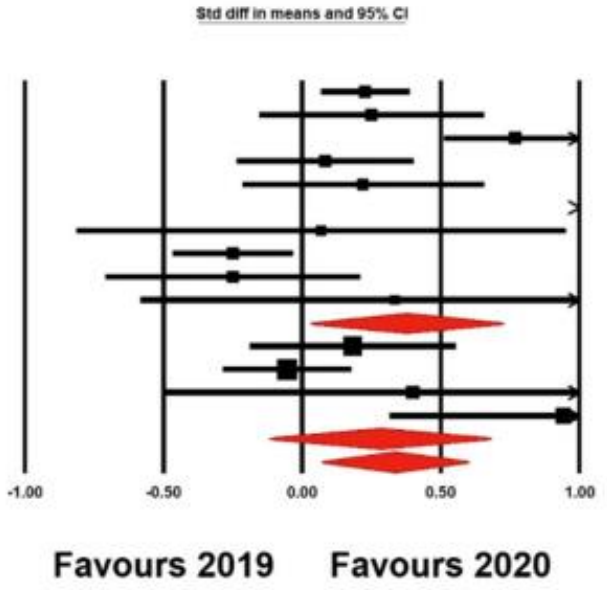
(A)

Study name	Subgroup within study	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Bogale, 2021	Cohort	-0.084	0.162	0.026	-0.401	0.234	-0.518	0.605
Dzygalo, 2020	Cohort	0.224	0.221	0.049	-0.209	0.658	1.013	0.311
Lawrence, 2021	Cohort	0.756	0.465	0.216	-0.155	1.668	1.626	0.104
Marks, 2021	Cohort	0.301	0.109	0.012	0.086	0.515	2.750	0.006
Modarelli, 2022	Cohort	-0.111	0.233	0.054	-0.567	0.345	-0.478	0.632
		0.169	0.078	0.006	0.017	0.322	2.176	0.030
Lee, 2022	Cross-sectional	0.286	0.450	0.202	-0.595	1.168	0.637	0.524
		0.286	0.450	0.202	-0.595	1.168	0.637	0.524
		0.173	0.077	0.006	0.022	0.323	2.253	0.024



(B)

Study name	Subgroup within study	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
Al-Abdulrazzaq, 2021	Cohort	0.227	0.080	0.006	0.069	0.384	2.825	0.005
Alaqeel et al. 2021	Cohort	0.250	0.206	0.042	-0.153	0.653	1.217	0.224
Boboc, 2021	Cohort	0.769	0.130	0.017	0.515	1.023	5.932	0.000
Bogale, 2021	Cohort	0.084	0.162	0.026	-0.234	0.401	0.517	0.605
Dzygalo, 2020	Cohort	0.219	0.221	0.049	-0.214	0.653	0.991	0.322
Kostopoulou, 2021	Cohort	4.118	0.574	0.330	2.993	5.244	7.173	0.000
Lawrence, 2021	Cohort	0.068	0.450	0.202	-0.813	0.949	0.152	0.879
Marks, 2021	Cohort	-0.250	0.109	0.012	-0.464	-0.036	-2.290	0.022
Modarelli, 2022	Cohort	-0.250	0.233	0.054	-0.707	0.207	-1.072	0.284
Salmi, 2022	Cohort	0.335	0.468	0.219	-0.582	1.252	0.716	0.474
		0.378	0.177	0.031	0.030	0.725	2.131	0.033
Dilek, 2021	Cross-sectional	0.183	0.188	0.035	-0.186	0.552	0.972	0.331
Gottesman et al. 2022	Cross-sectional	-0.054	0.117	0.014	-0.284	0.176	-0.464	0.643
Lee, 2022	Cross-sectional	0.398	0.452	0.204	-0.487	1.284	0.882	0.378
McGlacken-Byrne, 202	Cross-sectional	0.941	0.319	0.102	0.317	1.566	2.954	0.003
		0.282	0.204	0.041	-0.117	0.681	1.383	0.167
		0.336	0.134	0.018	0.074	0.598	2.515	0.012



Rahmati M et al., J Med Virol. 2022 Nov;94(11):5112-5127

Hypothèses du lien COVID-19 et DT1

- Dommage direct des cellules β par le virus ARN portant la COVId-19.
- Accélération du processus auto-immun déjà en cours.
- Maladie virale avec fièvre précipite la présentation clinique pendant la dernière étape du DT1 de stade 2.

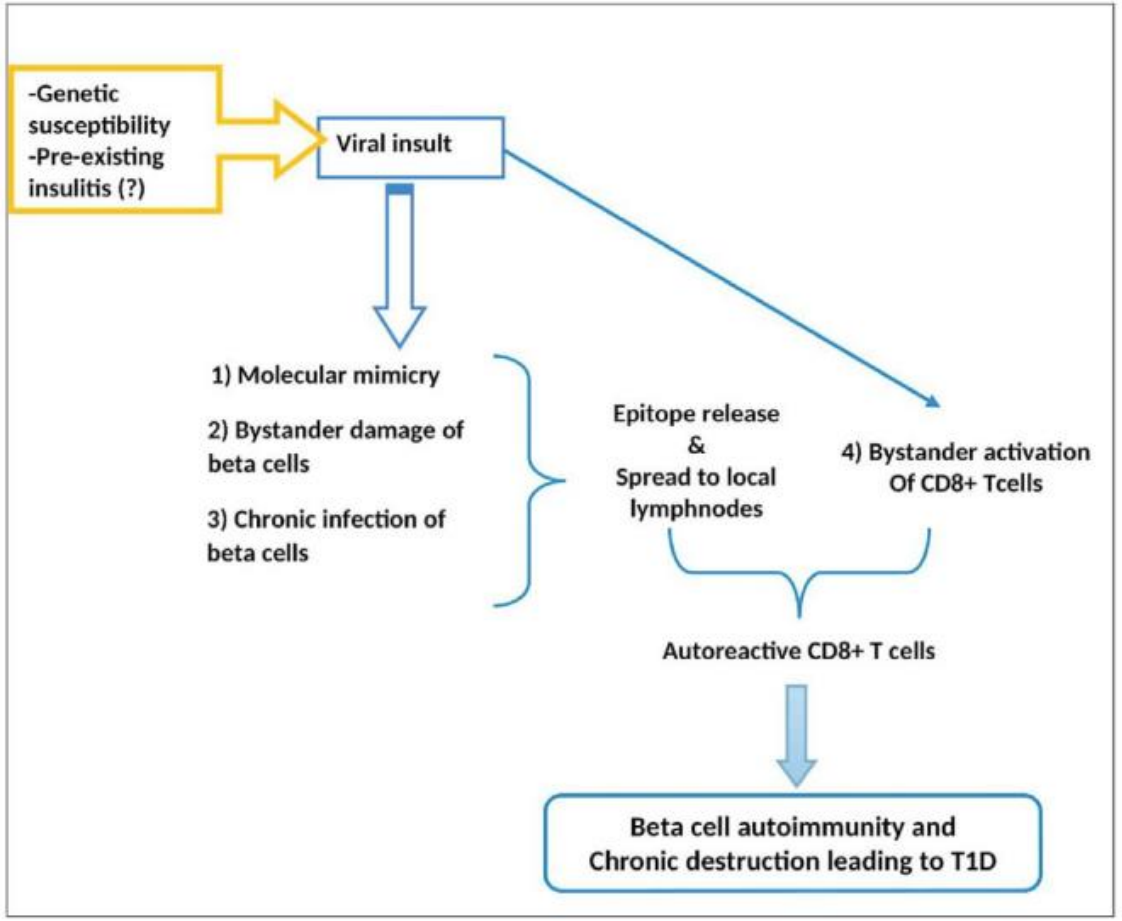


Fig. 1. Immuno-pathogenesis of beta cell destruction and type 1 diabetes.

Rahmati M et al., J Med Virol. 2022 Nov;94(11):5112-5127

Critique des Revues Systématiques

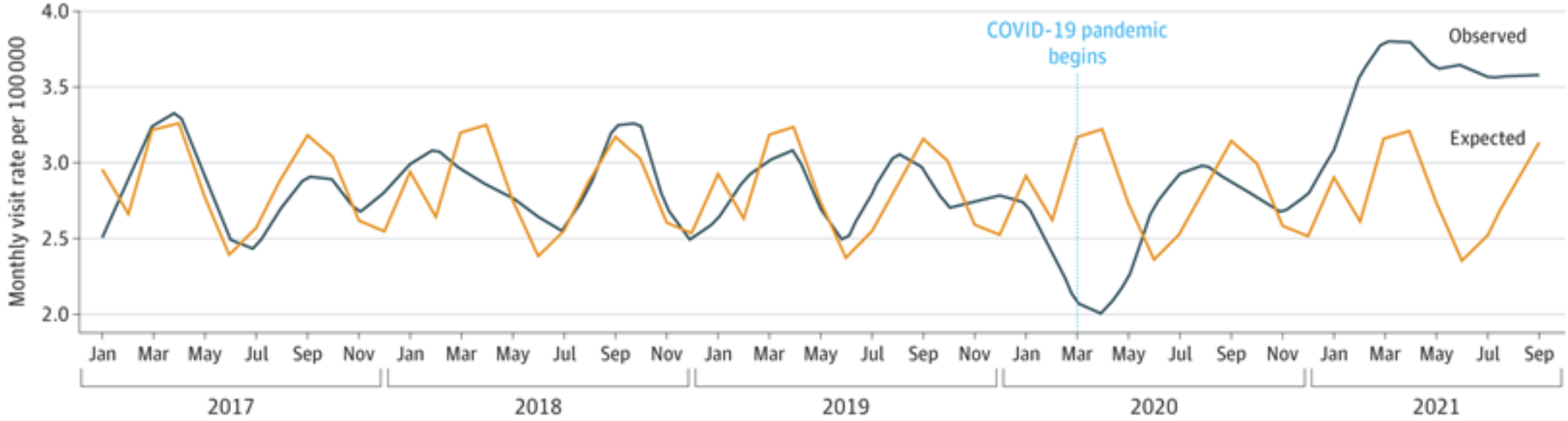
- Pas certain que toutes les études tiennent compte de l'augmentation annuelle
- Biais de constatation (infections COVID-19 asymptomatiques)
- Augmentation de l'incidence au milieu et à la fin de 2020 seulement après une diminution de l'incidence au début et au milieu de 2020
- Autres facteurs pandémiques non directement liés à la COVID-19.

Articles sélectionnés publiés après les RS

- **Gottesmann B**. et al. *Incidence of New-Onset Type 1 Diabetes Among US Children During the COVID-19 Global Pandemic.* JAMA Pediatr. 2022 Apr 1;176(4):414-415. doi: 10.1001/jamapediatrics.2021.5801.
- **Shulman R** et al. *Examination of Trends in Diabetes Incidence Among Children During the COVID-19 Pandemic in Ontario, Canada, From March 2020 to September 2021*. JAMA Netw Open. 2022 Jul 1;5(7):e2223394. doi: 10.1001/jamanetworkopen.2022.23394.
- **Kendall EK** et al. *Association of SARS-CoV-2 Infection With New-Onset Type 1 Diabetes Among Pediatric Patients From 2020 to 2021*. JAMA Netw Open. 2022 Sep 1;5(9):e2233014.

Articles sélectionnés publiés après la RS

Figure 1. Observed vs Expected Incidence of Diabetes Among Children and Adolescents (Aged 1-17 Years) in Ontario, Canada, From January 2017 to September 2021, by Month



Pas de différence entre les taux relatifs (RR) observés et attendus de DT1 de novo (RR, 1,09 [IC à 95 %, 0,91-1,30]

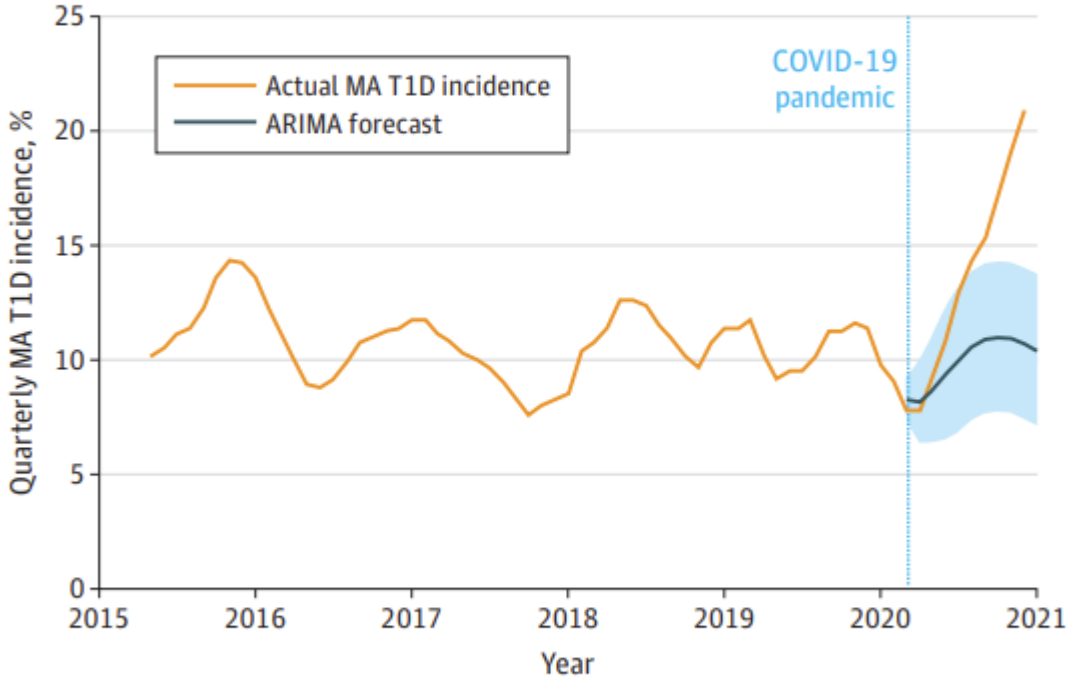
Shulman R et al. JAMA Netw Open. 2022 Jul 1;5(7):e2223394. doi: 10.1001/jamanetworkopen.2022.23394.

Articles sélectionnés publiés après la RS

Année COVID vs. 5 années avant:

- Entre Juillet 2020 – Fév 2021, le **nombre de DT1 de novo a dépassé le nombre de patients prévus** dans l'IC à 95 %.
- Il y a eu une augmentation de 40.7% à 49.7% de patients présentant une ACD au diagnostic.
- Pas de différence d'HbA1c (11.6% vs. 11.7%) au diagnostic.

Figure. Autoregressive Integrated Moving Average (ARIMA) Forecast and Quarterly Moving Average (MA) of New Type 1 Diabetes (T1D) Cases



The shaded area indicates the 95% CI.

Gottesmann B. et al. JAMA Pediatr. 2022 Apr 1;176(4):414-415. doi: 10.1001/jamapediatrics.2021.5801.

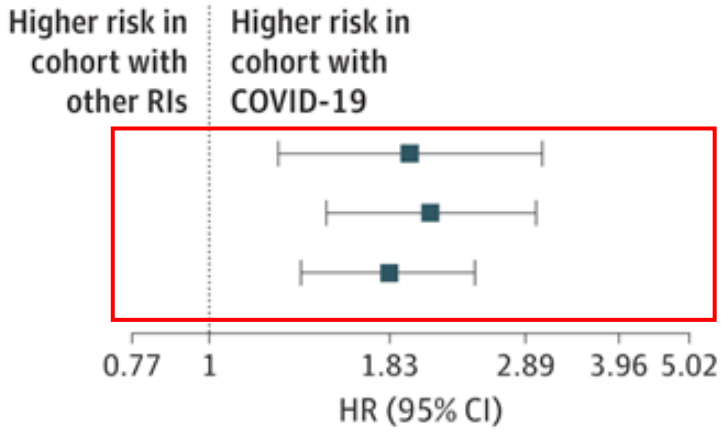
Articles sélectionnés publiés après la RS

- Base de données Global Collaborative Network (90 millions de patients)
- Patients de ≤18 ans avec infection SRAS-CoV-2 vs. sans mais autre infection respiratoire (Mars 2020 - Décembre 2021)
- Score de propension apparié pour données démographiques et antécédents familiaux de diabète
- Cohorte de 571 256 patients : 285 628 + COVID-19 et 285 628 - COVID-19 (mais autre infection respiratoire)

Figure. Comparison of Risk of New Diagnosis of Type 1 Diabetes in Patients After COVID-19 vs Other Respiratory Infections (RIs)

A Patients aged 0-18 y at diagnosis of infection

Time since infection, mo	Patients with type 1 diabetes, No. (%)		HR (95% CI)
	Cohort with COVID-19	Cohort with other RIs	
1	56 (0.02)	30 (0.01)	1.96 (1.26-3.06)
3	91 (0.03)	46 (0.02)	2.10 (1.48-3.00)
6	123 (0.04)	72 (0.03)	1.83 (1.36-2.44)



Kendall EK et al. JAMA Netw Open. 2022 Sep 1;5(9):e2233014.

The COVID-19 Pandemic Affects Seasonality, With Increasing Cases of New-Onset Type 1 Diabetes in Children, From the Worldwide SWEET Registry

Felix Reschke,[1,2] Stefanie Lanzinger,[3,4] Vivien Herczeg,[5] Priya Prahalad,[6,7] Riccardo Schiaffini,[8] Dick Mul,[9] Helen Clapin,[10] Bedowra Zabeen,[11] Julie Pelicand,[12,13] Moshe Phillip,[14,15] Catarina Limbert,[16,17] and Thomas Danne,[1,2] on behalf of the SWEET Study Group*

Diabetes Care 2022;45:2594–2601 | https://doi.org/10.2337/dc22-0278

- Données du registre SWEET fournissant des données sur le DT1 de novo (patients 6 mois – 18 ans) entre 2018-2021
- Stratification par groupe d'âge (<6, 6 à <12 et 12 à 18 ans)
- 92 centres de 47 pays
  - 2100 nouveaux cas dans 52 centres en Europe
  - 536 nouveaux cas dans 21 centres en Asie/Moyen-Orient/Afrique
  - 211 nouveaux cas dans 6 centres en Australie/Nouvelle-Zélande
  - 746 nouveaux cas dans 8 centres en Amérique du Nord/Canada
  - 114 nouveaux cas dans 5 centres en Amérique du Sud et centrale

Reschke F. et al. Diabetes Care 2022;45:2594-2601

Résultats

- Le nombre de **DT1 de novo a augmenté** de manière significative dans les centres du monde entier dans tous les groupes d'âge avec **une pente inchangée**, conformément aux rapports d'augmentation de l'incidence mondiale.
- Pas de différence dans la valeur des HbA1c au diagnostic.

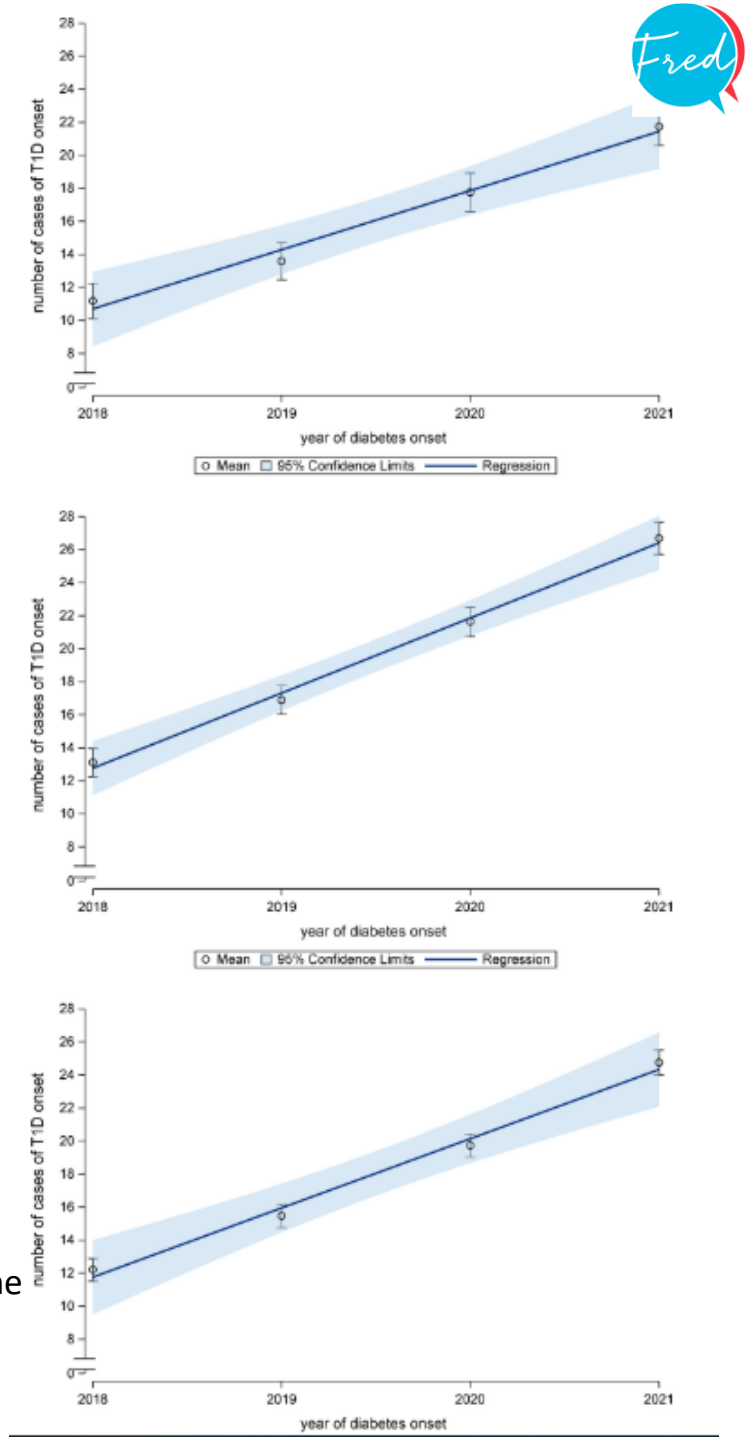


Figure 1—Linear regression model of new T1D onset cases presented as adjusted means with 95% CIs of children ages <6 years (top panel), 6–12 years (middle panel), and >12 years, bottom panel). Linear or logistic regression models were used with adjustment for number of patients treated at the center per year.

Reschke F. et al. Diabetes Care 2022;45:2594-2601

Résultats

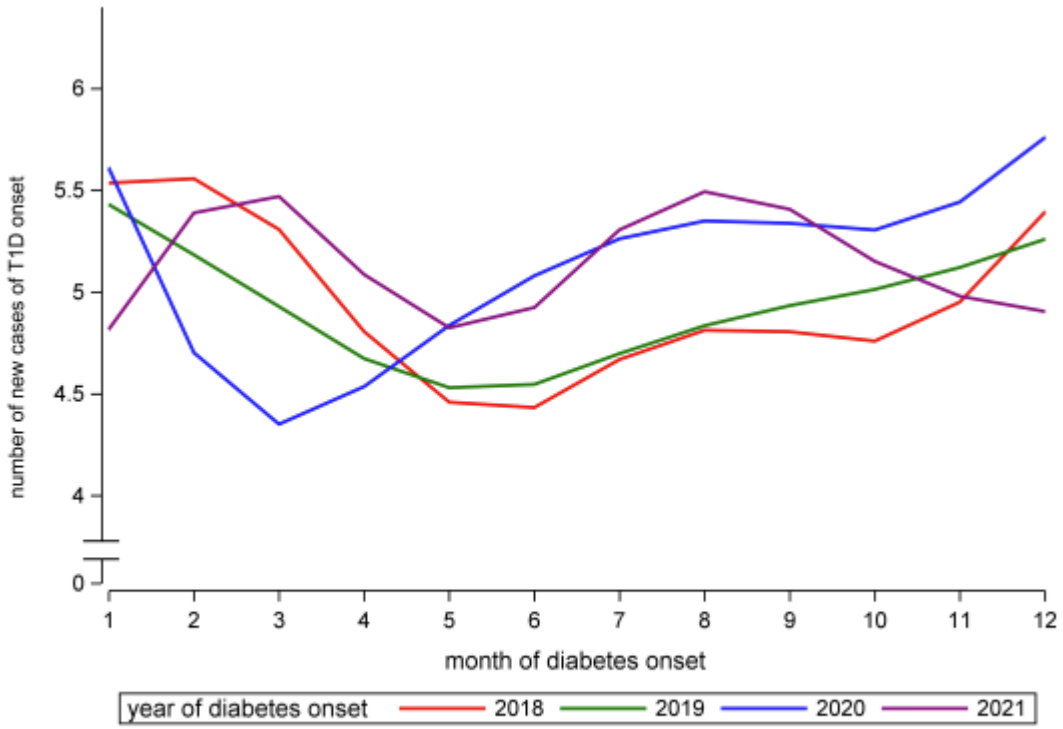


Figure 2—Seasonality of new cases in 92 centers of the worldwide SWEET project. Smoothed plot of the number of new T1D onset cases by month and year with second-degree B-splines.

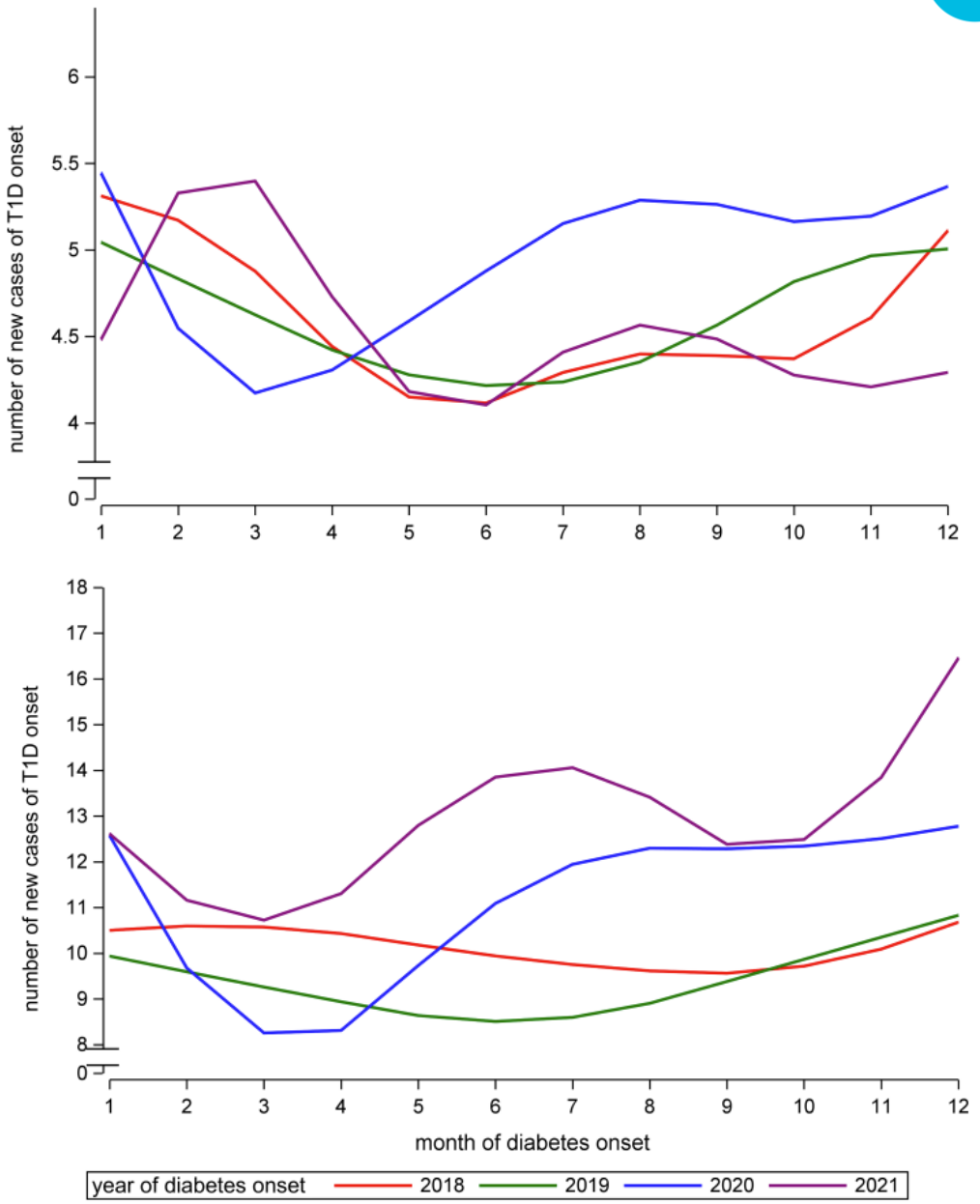


Figure 3—Seasonality of new cases in the centers from the Northern hemisphere: 52 European centers (top panel) and 8 centers from U.S./Canada (bottom panel). Smoothed plot of the number of new T1D onset cases by month and year with second-degree B-splines.

Reschke F. et al. Diabetes Care 2022;45:2594-2601

Conclusions

- Résultats ne soutiennent pas l'hypothèse selon laquelle le SRAS-CoV-2 a des effets aigus sur le développement du DT1.
  - Les nombres totales de DT1 de novo à travers le monde ont augmenté selon les projections d’augmentation annuelle attendue.
  - Cependant, la saisonnalité de l’incidence a été modifiée par la pandémie.
- Il est important de surveiller l'évolution de la pandémie à long terme.
- Prudence quant aux observations précoces d'augmentations locales du nombre de DT1 – ceux-ci peuvent refléter un décalage saisonnier.

Reschke F. et al. Diabetes Care 2022;45:2594-2601

Diabète de type 2

ORIGINAL ARTICLE

Once-Weekly Dulaglutide for the Treatment of Youths with Type 2 Diabetes

Silva A. Arslanian, M.D., Tamara Hannon, M.D., Philip Zeitler, M.D., Ph.D., Lily C. Chao, M.D., Claudia Boucher-Berry, M.D., Margarita Barrientos-Pérez, M.D., Elise Bismuth, M.D., Sergio Dib, M.D., Ph.D., Jang Ik Cho, Ph.D., and David Cox, Ph.D., for the AWARD-PEDS Investigators*

Once-Weekly Exenatide in Youth With Type 2 Diabetes

Diabetes Care 2022;45:1833–1840 | https://doi.org/10.2337/dc21-2275

William V. Tamborlane,[1] Raafat Bishai,[2] David Geller,[3] Naim Shehadeh,[4] Dalia Al-Abdulrazzaq,[5,6] Evelina Mánica Vazquez,[7] Eva Karoly,[8] Tünde Troja,[8] Orlando Doehring,[9] Debra Carter,[2] John Monyak,[10] and C. David Sjöström[11]

Received: 19 November 2021 | Revised: 28 February 2022 | Accepted: 30 March 2022

DOI: 10.1111/pedi.13343

OBESITY/INSULIN RESISTANCE, TYPE 2 DIABETES

A study on pharmacokinetics, pharmacodynamics and safety of lixisenatide in children and adolescents with type 2 diabetes

Margarita Barrientos-Pérez[1] | Daniel S. Hsia[2] | Lance Sloan[3,4] | Haylene Nell[5] | Ounisha Mungur[6] | Lionel Hovsepian[7] | Wolfgang Schmider[8] | Robert Spranger[8] | Na Yang[9] | Elisabeth Niemoeller[8]

Agonistes de GLP-1

Ref	Design	Population	N	Médicament	Issues Principaux			Sécurité
					HbA1c	Glycémie jeun	Poids / IMC	
1	RCT	10-18 ans (15.6 ± 1) HbA1c 6.5-11% (8.16 ± 0.93)	23	Lixisenatide x42 jours	-0.3 vs. +0.1%	-1.2 vs. +2.9	Poids +0.7 vs. +2.8 kg	GI
2	RCT	10-18 ans (14.5 ± 2.0) 55% White HbA1c 6.5-9% (8.1 ± 1.3)	154	Dulaglutide x26 sem	-0.6% (0.75mg) -0.9% (1.5 mg)	-0.7 (0.75 mg) -1.4 (1.5 mg) vs. +1.0	IMC -0.2 (0.75 mg) -0.1 (1.5 mg)	GI
3	RCT	10-18 ans (15 ± 1.8) HbA1c 6.5-11% (8.2 ± 1.3)	83	Exenatide X24 sem	-0.36 vs. +0.49%	-0.3 vs. +0.9 (NS)	-0.59 vs. +0.63 kg (NS)	GI

1. Barrientos-Perez M. et al. Pediatric Diabetes 2022
2. Arslanian et al. NEJM 2022
3. Tamborlane et al. Diabetes Care 2022

Efficacy and safety of dapagliflozin in children and young adults with type 2 diabetes: a prospective, multicentre, randomised, parallel group, phase 3 study

William V Tamborlane, Lori M Laffel*, Naim Shehadeh, Elvira Isganaitis, Michelle Van Name, Jayantha Ratnayake, Cecilia Karlsson, Ensio Norjavaara*

Design

- Étude de phase 3 multicentrique, contrôlée par placebo, en double aveugle et randomisée
- 30 centres en 5 pays (Hongrie, Israël, Mexique, Russie et États-Unis).

Intervention:

- Dapagliflozin 10mg PO Qdie vs. Placebo x24 semaines
- Titration d'insuline si: glycémie à jeun ≥10 mmol/l, glycemie post-prandiale ≥13.3 mmol/l, A1c ≥8%

Tamborlane WV et al. Lancet Diabetes Endocrinol. 2022 May;10(5):341-350

Protocole

Participants

- 10–24 years with type 2 diabetes at
- HbA1c 6·5–11%, glycémie à jeun ≤ 14·2 mmol/L
- Dose stable de metformin (≥1000 mg daily), insulin, ou combinaison

Issue primaire

- Changement de HbA1c entre 0-24 semaines

Tamborlane WV et al. Lancet Diabetes Endocrinol. 2022 May;10(5):341-350

Caractéristiques des participants

	Dapagliflozin 10 mg (N=39)	Placebo (N=33)	Total (N=72)
Mean age (SD), years	16·1 (3·3)	16·2 (3·6)	16·1 (3·4)
Age group			
10–15 years	16 (41%)	14 (42%)	30 (42%)
16–17 years	13 (33%)	10 (30%)	23 (32%)
18–24 years	10 (26%)	9 (27%)	19 (26%)
Sex			
Female	24 (62%)	19 (58%)	43 (60%)
Male	15 (38%)	14 (42%)	29 (40%)
Race			
White	28 (72%)	16 (48%)	44 (61%)
Black or African American	8 (21%)	10 (30%)	18 (25%)
Native American or Alaska Native	2 (5%)	3 (9%)	5 (7%)
Other*	1 (3%)	4 (12%)	5 (7%)
Geographical region			
North America	16 (41%)	16 (48%)	32 (44%)
Latin America	7 (18%)	9 (27%)	16 (22%)
Europe	16 (41%)	8 (24%)	24 (33%)
Mean duration of type 2 diabetes (SD), years	3·10 (2·67)	3·15 (3·05)	3·12 (2·83)
Duration of type 2 diabetes			
<3 years	22 (56%)	21 (64%)	43 (60%)
3–10 years	15 (38%)	10 (30%)	25 (35%)
>10 years	2 (5%)	2 (6%)	4 (6%)
Mean HbA1c concentration (SD), %; mmol/mol	7·95% (1·59); 63 (17·4)	7·85% (1·19); 62 (13·0)	7·90% (1·41); 63 (15·4)
HbA1c concentration†			
<6·5%; <48 mmol/mol	5 (13%)	2 (6%)	7 (10%)
≥6·5% to <9%; ≥48 to <75 mmol/mol	25 (64%)	24 (73%)	49 (68%)
≥9% to ≤11%; ≥75 to ≤97 mmol/mol	7 (18%)	7 (21%)	14 (19%)
>11%; >97 mmol/mol	2 (5%)	0 (0%)	2 (3%)
Mean fasting plasma glucose concentration (SD), mmol/L; mg/dL	8·66 (3·09); 156·0 (55·7)	9·27 (3·51); 167·0 (63·2)	8·94 (3·28); 161·1 (59·1)
Mean bodyweight (SD), kg	89·2 (25·7)	92·5 (31·9)	90·7 (28·5)
Mean BMI (SD), kg/m²	31·3 (7·5)	33·6 (8·8)	32·4 (8·1)
Mean standardised BMI (SD), *Z* score ‡	1·69 (0·91)	1·84 (1·08)	1·76 (0·98)
Mean eGFR (SD), mL/min/1·73 m²	121·5 (22·4)	122·2 (26·0)	121·8 (23·9)
Mean systolic blood pressure (SD), mm Hg	119·4 (12·9)	118·2 (15·2)	118·8 (13·9)
Mean diastolic blood pressure (SD), mm Hg	73·4 (8·8)	75·8 (7·6)	74·5 (8·3)

(Table 1 continues on next page)

Tamborlane WV et al. Lancet Diabetes Endocrinol. 2022 May;10(5):341-350

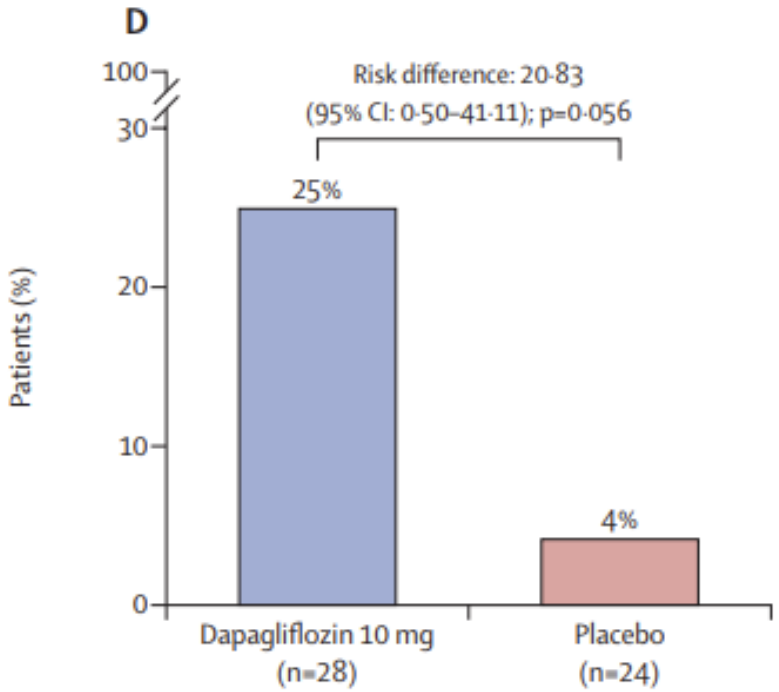
	Dapagliflozin 10 mg (N=39)	Placebo (N=33)	Total (N=72)
(Continued from previous page)			
Diabetes treatments			
Metformin only	17 (44%)	20 (61%)	37 (51%)
Insulin only	7 (18%)	5 (15%)	12 (17%)
Metformin plus insulin	15 (38%)	8 (24%)	23 (32%)
Metformin dose			
Mean (SD), mg per day	1666 (431)	1625 (565)	1647 (494)
Median (range), mg per day	1700 (1000–2550)	1600 (1000–2550)	1700 (1000–2550)
Insulin dose			
Mean (SD), IU per day	58·0 (42·7)	57·2 (48·1)	57·7 (44·1)
Median (range), IU per day	44·5 (5–170)	38·0 (3–170)	40·0 (3–170)

Data are n (%) unless specified. eGFR=estimated glomerular filtration rate. *Asian, Native Hawaiian or other Pacific Islander, Arab, White and Native American mixed race, and mixed race. †All participants met the study criteria of a HbA1c concentration of ≥6·5% to 11% (≥48 to 97 mmol/mol) at screening, but after the 4 week placebo lead-in period some participants had a HbA1c concentration of <6·5% (<48 mmol/mol; seven [10%] participants) or >11% (>97 mmol/mol; two [3%] participants); ‡Adjusted for age and sex based on 2000 US Center for Disease Control and Prevention *Z* score (derived using age in months with participants aged ≥20 years set as 239·5 months).[24]

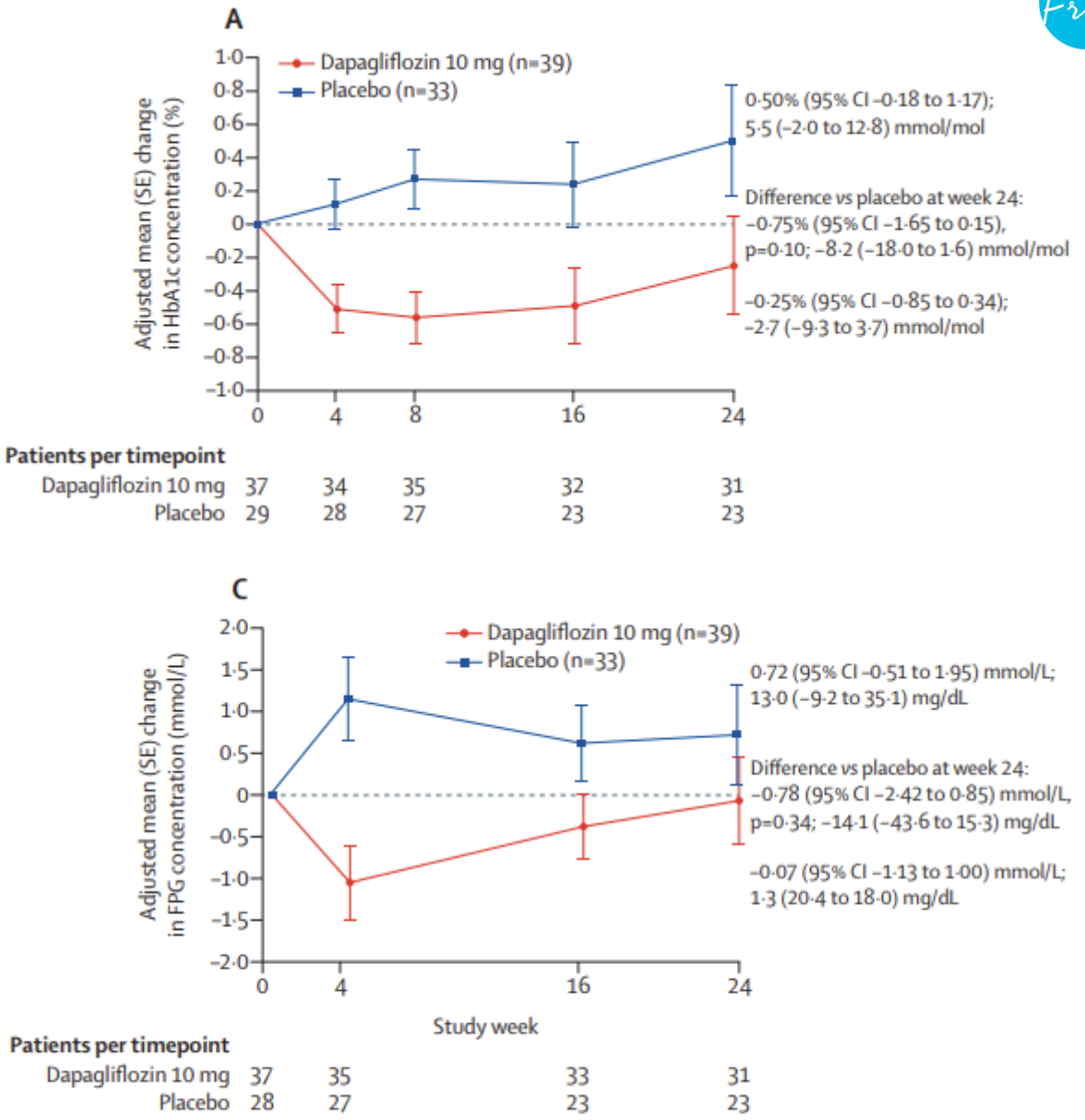
Table 1: **Demographics and baseline characteristics**

Tamborlane WV et al. Lancet Diabetes Endocrinol. 2022 May;10(5):341-350

Résultats



Proportion of participants with baseline HbA1c concentration of 7% or more who had an HbA1c concentration of less than 7% at week 24 (ITT analysis).



Adjusted mean change in HbA1c (A) and FPG (C) from baseline to week 24 (ITT analysis)

Tamborlane WV et al. Lancet Diabetes Endocrinol. 2022 May;10(5):341-350

Événements indésirables

	Double-blind short-term period only (24 weeks)		Open-label long-term period only (28 weeks)	Double-blind period plus open-label period (52 weeks)
	Dapagliflozin 10 mg (N=39)	Placebo (N=33)	Placebo during double-blind period and switched to dapagliflozin 10 mg (N=27)	Dapagliflozin 10 mg (N=39)
Adverse events				
≥1 adverse event	27 (69%)	19 (58%)	4 (15%)	29 (74%)
Adverse events leading to discontinuation of study drug	1 (3%)	0	0	1 (3%)
≥1 serious adverse events	1 (3%)	2 (6%)	1 (4%)	2 (5%)

Most common adverse events*				
Headache	4 (10%)	3 (9%)	1 (4%)	5 (13%)
Nasopharyngitis	4 (10%)	0	2 (7%)	5 (13%)
Vitamin D deficiency	4 (10%)	1 (3%)	1 (4%)	5 (13%)
Oropharyngeal pain	3 (8%)	1 (3%)	0	4 (10%)
Nausea	3 (8%)	0	0	3 (8%)
Urinary tract infection	2 (5%)	1 (3%)	0	3 (8%)
Cough	2 (5%)	1 (3%)	1 (4%)	2 (5%)
Diarrhoea	2 (5%)	2 (6%)	0	2 (5%)
Gastroenteritis viral	2 (5%)	0	0	2 (5%)
Hypertension	2 (5%)	1 (3%)	0 (0%)	2 (5%)
Pharyngitis streptococcal	2 (5%)	0	1 (4%)	2 (5%)
Sinus congestion	2 (5%)	0	0	2 (5%)
Vomiting	2 (5%)	0	0	2 (5%)
Increased weight	2 (5%)	0	0	2 (5%)
Hypertriglyceridaemia	1 (3%)	2 (6%)	1 (4%)	1 (3%)
Toothache	1 (3%)	2 (6%)	0	1 (3%)
Hyperglycaemia	0	3 (9%)	1 (4%)	0

Data are n (%). All safety analyses include data after glycaemic rescue. Adverse events were recorded up to and including 4 days after the last dose or the end of treatment period, and serious adverse events up to and including 30 days after last dose or end of treatment period. *≥5% or more of participants in either treatment group during the double-blind period.

Tamborlane WV et al. Lancet Diabetes Endocrinol. 2022 May;10(5):341-350

Conclusions

- L’ajout d’une inhibition des **SGLT-2** par la dapagliflozin chez les jeunes avec DT2 recevant de la metformine, de l'insuline ou metformine et insuline, **n’améliore pas l'HbA1c vs placebo** après 24 semaines (analyse ITT) – sauf s’ils sont adhèrent au traitement (p=0·012)
- Dapagliflozin n’avait pas d’effet sur le poids, IMC ou TA.
- Le médicament est généralement bien toléré mais il y a un risque d’hypoglycémie, surtout chez les patients recevant de l’insuline.

Tamborlane WV et al. Lancet Diabetes Endocrinol. 2022 May;10(5):341-350

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OBESITY/INSULIN RESISTANCE, TYPE 2 DIABETES

A randomized clinical trial of the efficacy and safety of sitagliptin as initial oral therapy in youth with type 2 diabetes

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Gregory T. Golm[1] | Samuel S. Engel[1] | Keith D. Kaufman[1]

Design

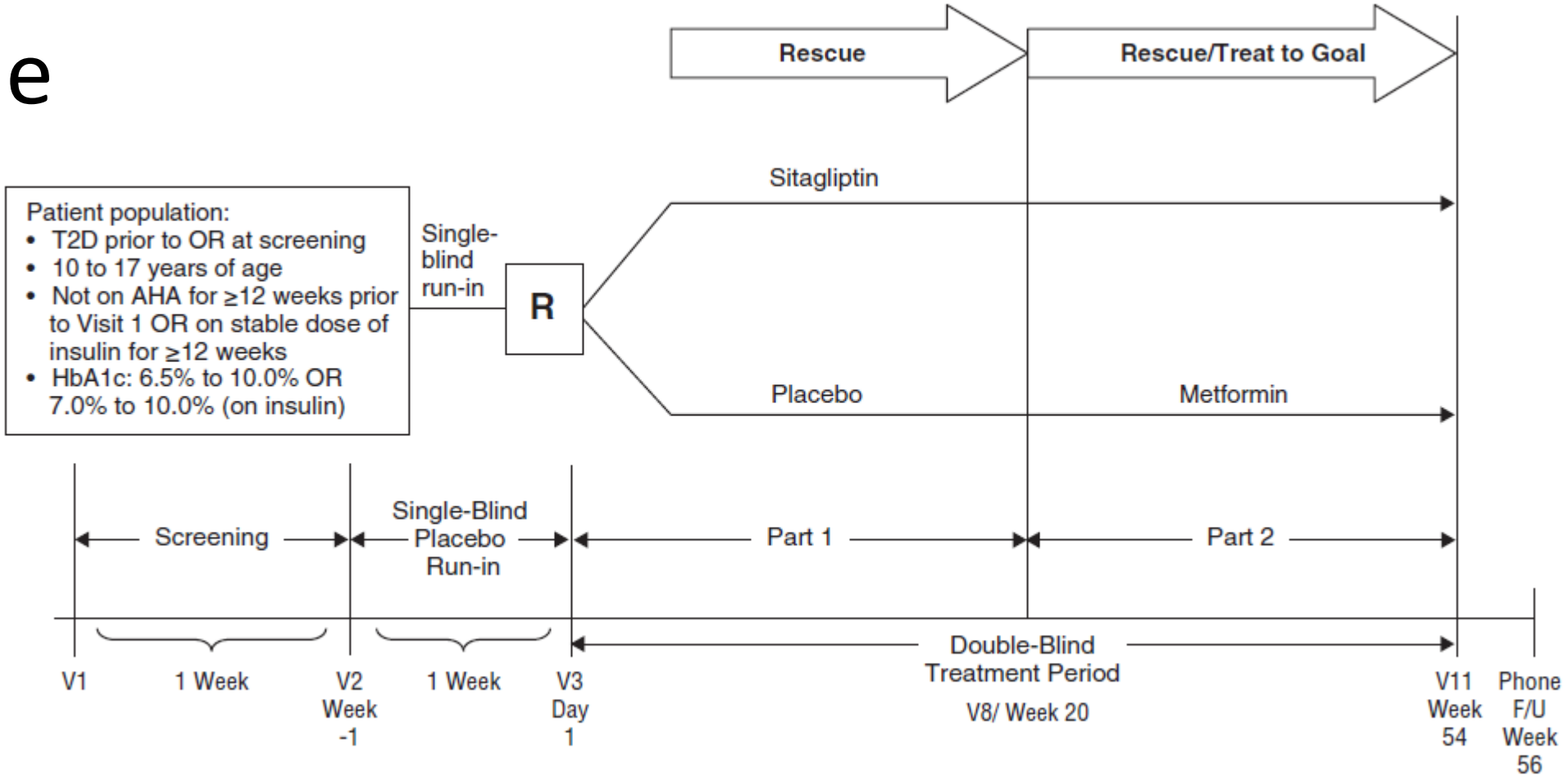
- Étude randomisée contrôlée, double-aveuglée, multicentrique en groupes parallèles

Intervention

- Inhibition de DPP-4 avec sitagliptin 100 mg Qdie comme traitement oral INITIAL pour des jeunes avec DT2
- 54 semaines (20 semaines DPP4 vs. placebo, puis DPP4 vs. metformine)

Shankar et al. Pediatr Diabetes . 2022 Mar;23(2):173-182

Protocole



Issue primaire:

- HbA1c à 20 semaines et à 54 semaines

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	Sitagliptin N = 95	Placebo N = 95
Sex, *n* (%)		
Female	54 (56.8)	61 (64.2)
Male	41 (43.2)	34 (35.8)
Age, year	14.3 ± 2.0	13.7 ± 1.9
10 to <15, *n* (%)	47 (49.5)	62 (65.3)
15 to <18, *n* (%)	48 (50.5)	33 (34.7)
Race, *n* (%)		
White	48 (50.5)	50 (52.6)
Multiple	20 (21.1)	18 (18.9)
American Indian or Alaska Native, White	11 (11.6)	11 (11.6)
Black or African American, White	8 (8.4)	5 (5.3)
American Indian or Alaska Native, Black or African American	1 (1.1)	1 (1.1)
American Indian or Alaska Native, Black or African American, White	0 (0.0)	1 (1.1)
Asian	13 (13.7)	16 (16.8)
Black or African American	8 (8.4)	2 (2.1)
American Indian or Alaska Native	6 (6.3)	9 (9.5)

	Sitagliptin N = 95	Placebo N = 95
Ethnicity, *n* (%)		
Hispanic or Latino	36 (37.9)	35 (36.8)
Not Hispanic or Latino	53 (55.8)	57 (60.0)
Unknown	6 (6.3)	3 (3.2)
Weight, kg	89.1 ± 25.3	81.9 ± 24.8
BMI, kg/m^2	33.3 ± 7.7	31.2 ± 7.7
BMI percentile, n (%)		
<85	1 (1.1)	4 (4.2)
≥85	94 (98.9)	91 (95.8)
HbA1c, %	7.4 ± 1.0	7.6 ± 1.1
FPG[a], mg/dL	138.4 ± 47.2	138.8 ± 42.4
Insulin use at screening		
Yes, *n* (%)	11 (11.6)	11 (11.6)
Duration of T2D, years	0.6 (1.1)	0.8 (1.4)

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Résultats

Week 20	Sitagliptin, N = 95	Placebo, N = 95
HbA1c, %		
Baseline	7.4 ± 1.0	7.6 ± 1.1
Week 20	7.2 ± 1.7	7.5 ± 1.6
Change from baseline[a]	−0.01 (−0.35, 0.34)	0.18 (−0.17, 0.53)
Between-group difference[b]	−0.19[d] (−0.68, 0.30)	-
FPG[c], mg/dL		
Baseline	138.4 ± 47.2	138.8 ± 42.4
Week 20	142.2 ± 59.7	139.5 ± 50.2
Change from baseline[a]	7.2 (−4.2, 18.7)	5.7 (−6.0, 17.4)
Between-group difference[b]	1.5 (−14.4, 17.5)	-
Week 54	**Sitagliptin, n = 95**	**Placebo/Metformin, n = 90[e]**
HbA1c, %		
Baseline	7.4 ± 1.0	7.6 ± 1.1
Week 54	7.1 ± 1.8	6.5 ± 1.0
Change from baseline[a]	0.45 (0.01, 0.88)	−0.11 (−0.54, 0.32)
FPG[c], mg/dL		
Baseline	138.4 ± 47.2	138.6 ± 42.8
Week 54	129.5 ± 41.9	121.3 ± 40.1
Change from baseline[a]	3.3 (−10.0, 16.5)	−6.5 (−19.2, 6.1)

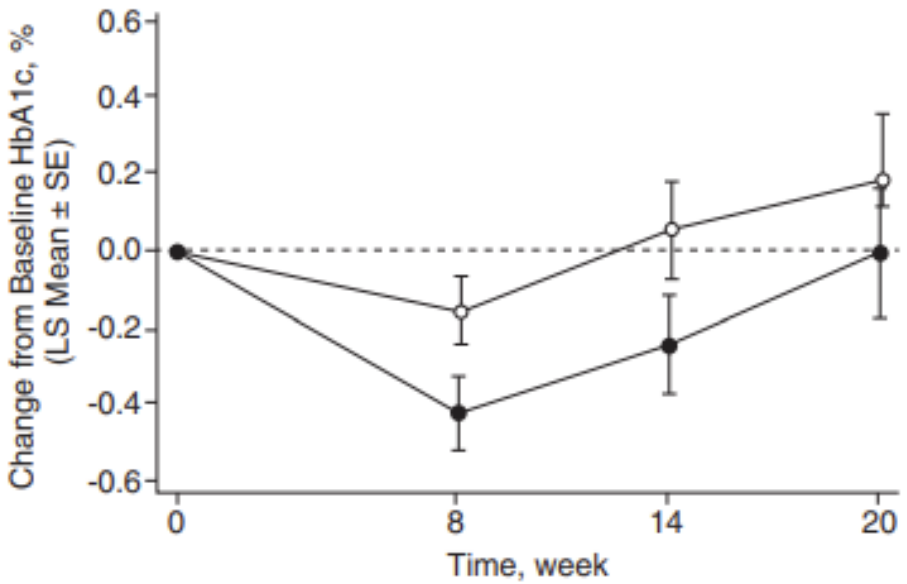

FIGURE 3 LS mean ± *SE* change from baseline HbA1c (%); filled circles = sitagliptin, open circles = placebo

Shankar et al. Pediatr Diabetes . 2022 Mar;23(2):173-182

Conclusions

- L'inhibition de la DPP-4 par la sitagliptine **n’apporte pas d'amélioration significative du contrôle glycémique** chez les jeunes atteints de DT2.
- La différence d'efficacité par rapport aux études adultes peut être due à la combinaison de:
  - Évolution plus rapide du DT2 + détérioration plus rapide des cellules β,
  - Faible HbA1c initialeà
- La sitagliptine est généralement bien tolérée avec un profil de sécurité similaire à celui rapporté chez l'adulte.

Shankar et al. Pediatr Diabetes . 2022 Mar;23(2):173-182

Merci & Questions

FONDATION RESSOURCES POUR LES ENFANTS DIABÉTIQUES

Hôpital de Montréal pour enfants
Centre universitaire de santé McGill

Montreal Children's Hospital
McGill University Health Centre

The NEW ENGLAND JOURNAL of MEDICINE

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Randomized Trial of Closed-Loop Control in Very Young Children with Type 1 Diabetes

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Design:

- Essai contrôlé randomisé croisé multicentrique ouvert
- CamAPS FX app (Samsung 8) + Dana Diabecare pompe + Dexcom 6
- 16 semaines boucle fermée hybride
- 16 semaines pompe + capteur

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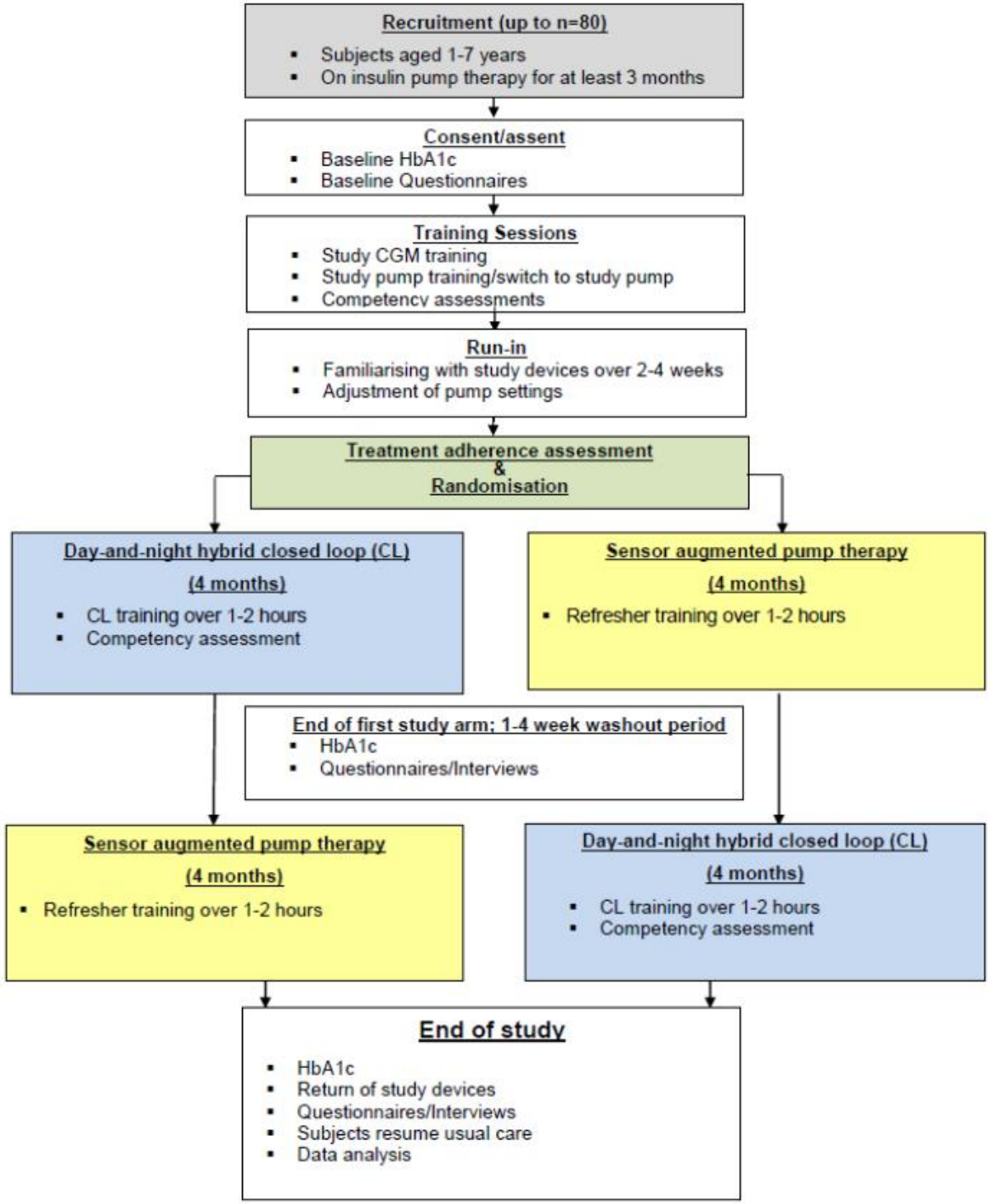

Ware J. et al. NEJM 2022;386(3):209-219

Caractéristiques

Participants:

- DT1 x 6 mois, pompe à insuline x 3 mois
- HbA1c ≤ 11%
- Âge 1-7 ans

Calculs de puissance

- 65 participants pour 90% de puissance de l'issue primaire (différence %TIR)

Table 1. Characteristics of the Participants at Baseline, According to Group.*

Characteristic	Total (N=74)	Closed-Loop Period–First Group (N=39)	Sensor-Augmented Pump Period–First Group (N=35)
Age			
Mean — yr	5.6±1.6	5.6±1.4	5.6±1.7
Range — yr	2.3–7.9	2.5–7.9	2.3–7.9
Distribution — no. (%)			
2 to <5 yr	27 (36)	14 (36)	13 (37)
5 to <7 yr	29 (39)	17 (44)	12 (34)
7 yr	18 (24)	8 (21)	10 (29)
Sex — no. (%)			
Female	31 (42)	21 (54)	10 (29)
Male	43 (58)	18 (46)	25 (71)
Race — no. (%)†			
White	66 (89)	34 (87)	32 (91)
Black	2 (3)	2 (5)	0
Asian	2 (3)	1 (3)	1 (3)
Multiple	4 (5)	2 (5)	2 (6)
Duration of diabetes — yr			
Mean	2.6±1.8	2.5±1.7	2.7±1.9
Range	0–6	0–6	0–6
Glycated hemoglobin level at screening			
Percent	7.3±0.7	7.3±0.7	7.4±0.6
Millimoles per mole	56.6±7.2	56.3±7.4	57.0±7.1
Median total daily insulin dose (IQR) — U/kg/day	0.76 (0.67–0.85)	0.76 (0.67–0.83)	0.77 (0.69–0.86)
Age- and sex-adjusted BMI percentile	69.1±23.8	67.3±23.2	71.1±24.6
Continuous glucose monitor use — no. (%)			
Current	67 (91)	35 (90)	32 (91)
In past but not current	1 (1)	0	1 (3)
Never	6 (8)	4 (10)	2 (6)
Continuous glucose-monitoring metrics at baseline			
Percent of time in glucose range of 70–180 mg/dl	61.2±10.1	61.5±9.5	60.8±10.9

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Résultats

Table 2. Glycemic Outcomes during Hybrid Closed-Loop Insulin Delivery and Sensor-Augmented Pump Therapy over a 16-Week Period.*

End Point	Closed-Loop Period (N=73)	Sensor-Augmented Pump Period (N=74)	Mean Adjusted Difference (95% CI)	P Value
Primary end point				
Percent of time spent at glucose level 70–180 mg/dl	71.6±5.9	62.9±9.0	8.7 (7.4 to 9.9)	<0.001
Key end points				
Median percent of time spent at glucose level >180 mg/dl (IQR)	22.9 (19.3 to 27.3)	31.7 (23.4 to 40.1)	−8.5 (−9.9 to −7.1)	<0.001
Glycated hemoglobin				
Percent	6.6±0.6	7.0±0.7	−0.4 (−0.5 to −0.3)	<0.001
Millimoles per mole	49.0±5.9	52.8±7.2	−3.9 (−4.9 to −2.9)	
Sensor glucose level — mg/dl	145.8±11.8	158.1±18.5	−12.3 (−14.8 to −9.8)	<0.001
Median percent of time spent at glucose level <70 mg/dl (IQR)†	4.9 (3.3 to 6.7)	4.5 (2.9 to 7.3)	0.1 (−0.4 to 0.5)	0.74
Secondary end points				
Median percent of time spent at glucose level (IQR)†				
>300 mg/dl	2.0 (1.2 to 3.1)	3.1 (1.3 to 5.7)	−1.0 (−1.6 to −0.6)	—
<63 mg/dl	2.6 (1.8 to 3.7)	2.4 (1.4 to 4.2)	0.04 (−0.3 to 0.3)	—
<54 mg/dl	1.0 (0.6 to 1.4)	0.9 (0.4 to 1.6)	0.02 (−0.1 to 0.1)	—
Median glucose AUC (IQR)†				
<63 mg/dl	0.1 (0.0 to 0.1)	0.1 (0.0 to 0.1)	0.002 (−0.006 to 0.009)	—
<54 mg/dl	0.0 (0.0 to 0.0)	0.0 (0.0 to 0.0)	0.001 (−0.001 to 0.003)	—
Median glucose SD (IQR) — mg/dl†	58.6 (53.7 to 64.4)	64.2 (58.1 to 71.9)	−6.2 (−7.6 to −4.8)	—
Median coefficient of variation of glucose (IQR) — %†	41 (39 to 43)	41 (38 to 44)	−0.7 (−1.5 to 0.05)	—
Insulin metrics†				
Median total daily insulin use (IQR) — U/day	16.9 (13.2 to 21.5)	17.6 (13.6 to 20.3)	0.3 (−0.1 to 0.8)	—
Median total daily basal insulin use (IQR) — U/day	8.0 (5.8 to 10.9)	5.7 (4.0 to 6.9)	2.5 (2.1 to 2.9)	—
Median total daily bolus insulin use (IQR) — U/day	8.6 (6.9 to 10.6)	11.0 (9.1 to 13.5)	−2.3 (−2.7 to −1.9)	—

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Résultats

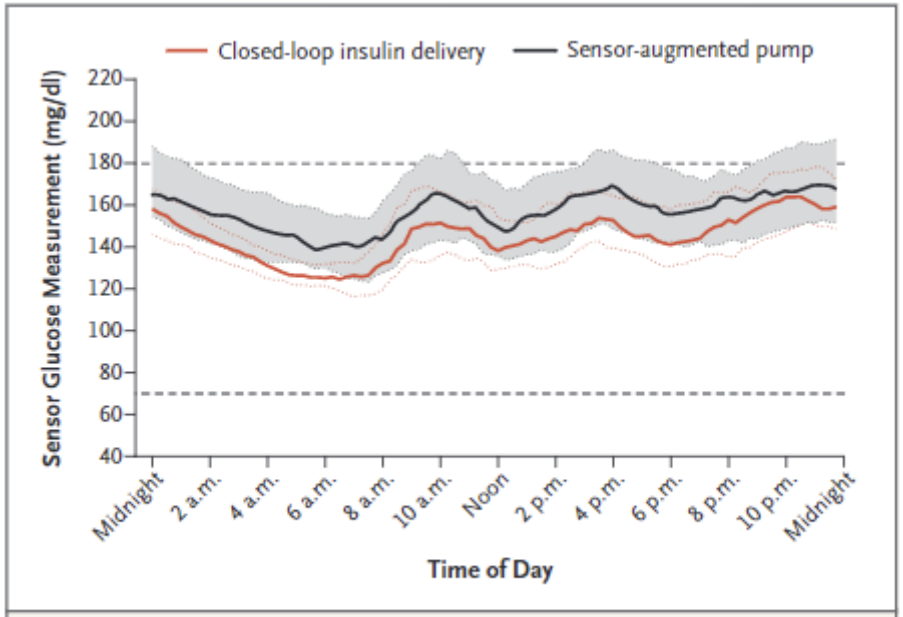

Figure 1. Sensor Glucose Levels.

Table 3. Daytime and Nighttime Glucose Control during 16-Week Periods of Hybrid Closed-Loop Insulin Delivery and Sensor-Augmented Pump Therapy.*

Variable	Daytime		Nighttime	
	Closed-Loop Period (N=73)	Sensor-Augmented Pump Period (N=74)	Closed-Loop Period (N=73)	Sensor-Augmented Pump Period (N=74)
Percent of time spent at glucose level				
70–180 mg/dl — mean	66.2±7.1	61.1±9.2	82.2±5.8	66.3±10.7
<70 mg/dl — median (IQR)†	5.7 (4.0–7.8)	4.3 (2.9–6.9)	2.8 (1.7–3.7)	4.6 (2.7–7.3)
Sensor glucose level — mg/dl	150.6±14.6	161.3±20.0	136.2±9.5	151.8±18.3
Median glucose SD (IQR) — mg/dl†	63.6 (57.7–68.1)	66.4 (60.1–74.6)	46.6 (41.8–53.7)	59.4 (52.6–66.9)

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Événements indésirables

Table 4. Summary of Postrandomization Adverse Events during 16-Week Periods of Closed-Loop Insulin Delivery and Sensor-Augmented Pump Therapy.*

Event	Closed-Loop Period (N=73)	Sensor-Augmented Pump Period (N=74)
Any reportable adverse event — no. of participants (%)†		
No events	53 (73)	56 (76)
1 event	15 (21)	12 (16)
≥2 events	5 (7)	6 (8)
No. of events per participant	0.4±0.7	0.4±0.8
Prespecified events of interest		
Severe hypoglycemia‡		
No. of events	1	0
Incidence rate per 100 person-yr	4.1	0.0
Diabetic ketoacidosis — no. of events	0	0
Other serious adverse event — no. of events§	0	1

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Safety and Glycemic Outcomes With a Tubeless Automated Insulin Delivery System in Very Young Children With Type 1 Diabetes: A Single-Arm Multicenter Clinical Trial

*Jennifer L. Sherr,[1] Bruce W. Bode,[2] Gregory P. Forlenza,[3] Lori M. Laffel,[4] Melissa J. Schoelwer,[5] Bruce A. Buckingham,[6] Amy B. Criego,[7] Daniel J. DeSalvo,[8] Sarah A. MacLeish,[9] David W. Hansen,[10] and Trang T. Ly,[11] for the Omnipod 5 in Preschoolers Study Group**

Diabetes Care 2022;45:1907–1910 | https://doi.org/10.2337/dc21-2359

Design

- Étude monobras, multicentrique, prospective clinique
- Système Omnipod 5 + Dexcom 6 + Android
  - Microbolus Q5min, cible ajustable de 6.1 – 8.3 mmol/l
- 14 jours phase de thérapie standard
- 13 semaines boucle fermée
- Visites de suivi Q2 semaines (95% virtuelles)

Sherr J. et al. Diabetes Care. 2022 Aug 1;45(8):1907-1910

Caractéristiques

- **Participants:**
  - Diabète de type 1
  - Âge 2.0–5.9 ans
  - HbA1c <10%
  - Pas d'ACD ou hypoglycémie sévère x 6 mois
- **Issues primaires**
  - Sûreté: ACD, hypoglycémie sévère
  - Efficacité: HbA1c et TIR (comparés à la ligne de base)

Table S3. Characteristics at baseline of the study participants in the modified intention-to-treat dataset (N=80)*

Characteristic	
N	80
Age (years)†	4.7 ± 1.0 (2.0, 6.0)
Age 2-4 years – no. (%)	16 (20)
Duration of diabetes (years)	2.3 ± 1.1 (0.1, 4.6)
Duration of diabetes < 3 months – no. (%)	3 (3.8)
Body mass index‡ (kg/m²)	16.7 ± 1.5 (14.0, 21.7)
Body mass index z-score	0.74 ± 0.95 (-1.51, 3.55)
Female sex – no. (%)	34 (42.5)
Race/ Ethnicity - no. (%)§	
White	67 (83.8)
Hispanic or Latino	5 (6.3)
Not Hispanic or Latino	62 (77.5)
Black or African American	4 (5.0)
Black or African American, White	3 (3.8)
Asian	3 (3.8)
Asian, White	2 (2.5)
Hispanic or Latino	1 (1.3)
Not Hispanic or Latino	1 (1.3)
Other (Dominican)	1 (1.3)
Hispanic or Latino	1 (1.3)
HbA1c (%)‖	7.4 ± 1.0 (5.4, 10.2)
HbA1c (mmol/mol) ‖	57 ± 10.9 (36, 88)
Daily insulin dose (U/kg)¶	0.69 ± 0.18 (0.30, 1.33)
Daily insulin dose (Units)¶	13.7 ± 4.4 (5.3, 27.1)
Previous# or current continuous glucose monitor use – no. (%)	78 (97.5)
Previous# or current pump use – no. (%)	68 (85.0)
Using multiple daily injections as standard therapy method – no. (%)	12 (15.0)

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Résultats

Table 1—Primary and secondary glycemic outcomes (*N* = 80)

	Baseline or standard therapy phase‡	Follow-up or automated insulin delivery phase‡	Change	*P* value§
Overall (24 h)				
Primary glycemic end points:				
HbA_{1c}, %	7.4 ± 1.0, 7.4 (6.8, 8.1)	6.9 ± 0.7, 6.9 (6.5, 7.4)	−0.55 ± 0.58, −0.40 (−0.85, −0.10)	<0.0001
HbA_{1c}, mmol/mol	57 ± 10.9, 57 (51, 65)	52 ± 7.7, 52 (48, 57)	−6.0 ± 6.3, −4.4 (−9.3, −1.1)	<0.0001
% TIR 70–180 mg/dL	57.2 ± 15.3, 59.1 (48.0, 67.5)	68.1 ± 9.0, 68.4 (61.4, 74.1)	10.9 ± 9.6, 8.9 (4.9, 13.8)	<0.0001
Mean sensor glucose value, mg/dL	171.1 ± 30.5, 164.1 (148.6, 189.0)	157.4 ± 16.8, 155.4 (147.1, 170.6)	−13.7 ± 19.9, −9.5 (−17.5, −1.4)	<0.0001
SD of sensor glucose values, mg/dL	64.9 ± 13.4, 64.0 (56.0, 73.1)	59.6 ± 10.3, 59.5 (53.0, 66.2)	−5.3 ± 8.0, −4.6 (−9.3, −0.5)	<0.0001
Coefficient of variation of sensor glucose values, %†	38.1 ± 5.5, 37.4 (35.1, 41.7)	37.7 ± 4.0, 37.7 (35.1, 40.5)	−0.4 ± 4.2, −0.5 (−3.6, 2.3)	0.4232
% time in glucose range				
<54 mg/dL	0.81 ± 1.68, 0.24 (0.05, 0.84)	0.47 ± 0.54, 0.26 (0.16, 0.60)	−0.34 ± 1.33, 0.06 (−0.30, 0.16)	0.9394
<70 mg/dL	3.43 ± 3.87, 2.19 (0.89, 4.68)	2.46 ± 1.83, 1.94 (1.18, 3.43)	−0.97 ± 2.75, −0.27 (−1.54, 0.46)	0.0204
>180 mg/dL	39.4 ± 16.7, 37.0 (27.4, 50.0)	29.5 ± 9.8, 29.3 (23.1, 37.2)	−9.9 ± 10.5, −7.6 (−12.8, −3.5)	<0.0001
≥250 mg/dL	14.8 ± 12.1, 11.5 (5.4, 21.0)	9.2 ± 5.6, 8.4 (5.2, 13.0)	−5.6 ± 8.9, −2.3 (−6.6, −0.1)	<0.0001
≥300 mg/dL	6.0 ± 7.3, 3.5 (1.1, 8.3)	3.2 ± 2.8, 2.4 (1.2, 4.6)	−2.7 ± 6.1, −0.7 (−2.5, 0.2)	<0.0001

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Résultats

Figure S4. Percentage of participants meeting international consensus targets for glycemic control.

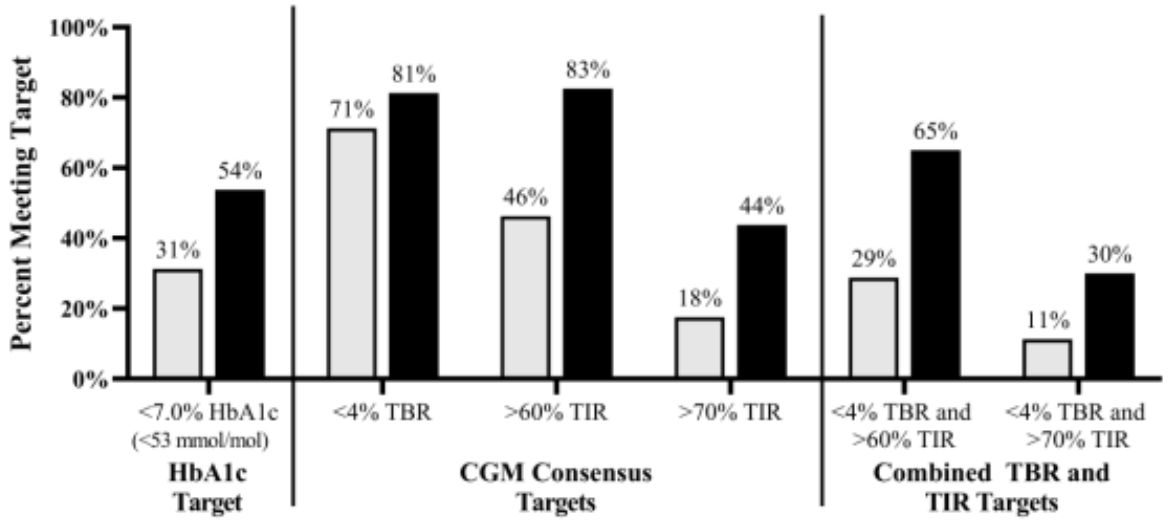
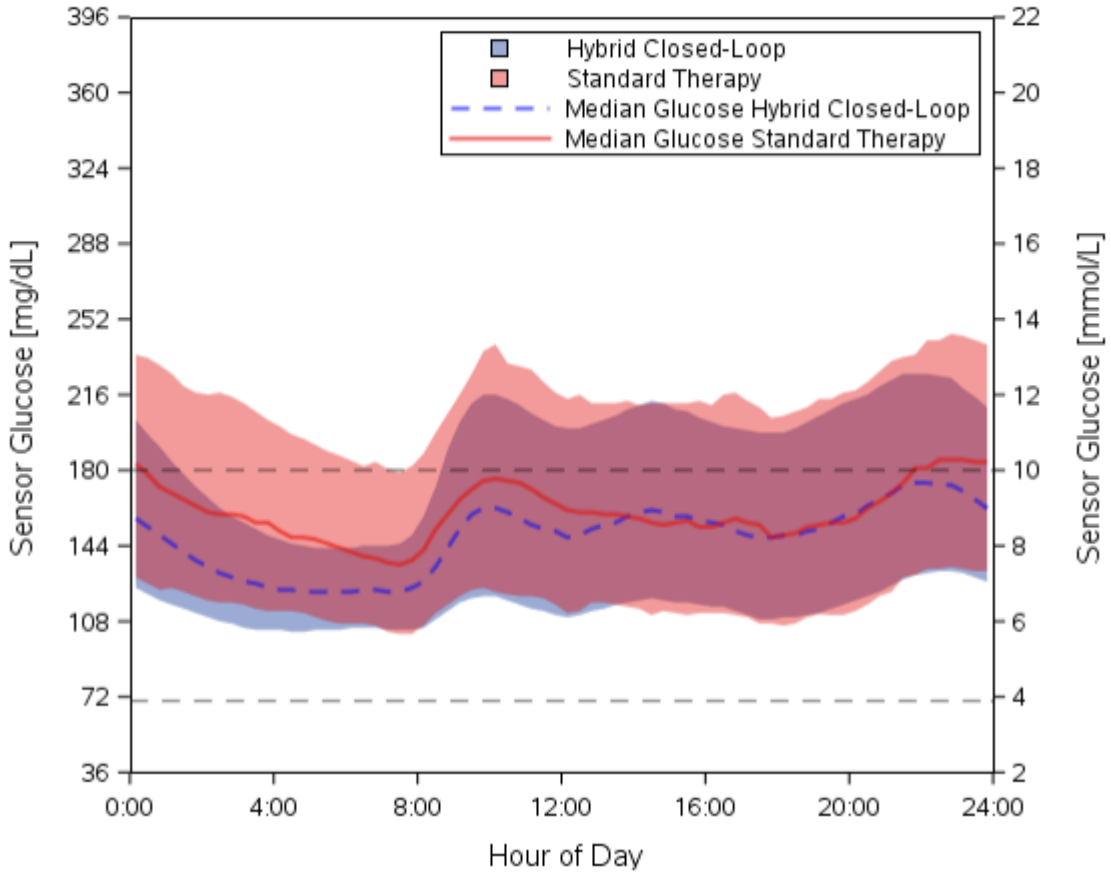


Figure S5. Sensor Glucose Measurements



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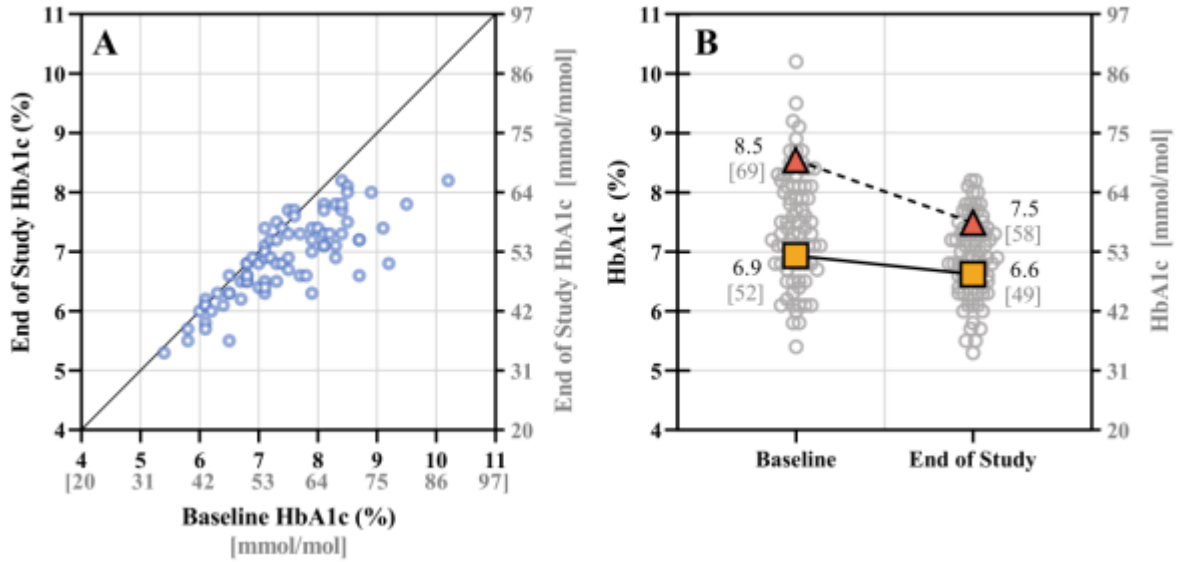
Résultats

Table S7. Subgroup analyses of mean glycemic outcomes at baseline or during the standard therapy phase and the 3-months of automated insulin delivery phase ("AID phase"), stratified by baseline characteristics

	% Time in range 70-180mg/dL	% Time below 70mg/dL[§]	% Time above 180mg/dL	HbA1c (%) [mmol/mol]
Parameter	standard therapy/AID phase, p-value	standard therapy/AID phase, p-value	standard therapy/AID phase, p-value	baseline/follow-up, p-value
Overall (N=80)	57/68, <0.0001†	2.19/1.94, 0.0204†	39/30, <0.0001†	7.4[57]/6.9[52], <0.0001†
Standard Therapy				
Multiple daily injections (n=12)	48/62, 0.0009‡	1.45/1.48, 0.5693†	48/36, 0.0084‡	8.4[68]/7.5[58], 0.0005‡
Pump (n=68)	59/69, <0.0001†	2.44/2.00, 0.0258†	38/28, <0.0001†	7.3[56]/6.8[51], <0.0001†
Gender				
Female (n=34)	56/68, <0.0001†	1.72/1.43, 0.0996†	42/31, <0.0001†	7.5[58]/6.9[52], <0.0001‡
Male (n=46)	59/69, <0.0001†	2.37/2.39, 0.0938†	38/29, <0.0001†	7.4[57]/6.9[52], <0.0001†
Race				
White* (n=72)	58/68, <0.0001†	1.97/1.83, 0.0819†	39/30, <0.0001†	7.4[57]/6.9[52], <0.0001†
Non-white (n=8)	54/70, 0.0078†	5.51/4.43, 0.1094†	39/26, 0.0078†	7.5[58]/6.9[52], 0.0313†

To convert the values for glucose to millimoles per liter, multiply by 0.05551.
*Includes those who responded with more than one race and included "white" as one of the responses
†p-value determined using two-sided Wilcoxon signed rank tests.
‡p-value determined using two-sided paired t-tests.
§Values presented for % Time below 70mg/dL are medians, the remaining values in the table are means.



Panel A: HbA1c at follow-up plotted versus HbA1c at baseline, with each circle representing a single participant.

Panel B: Mean HbA1c (%) values at baseline and follow-up when stratified into two groups by baseline HbA1c

Sherr J. et al. Diabetes Care. 2022 Aug 1;45(8):1907-1910

Événements indésirables

Table S4. Safety outcomes during automated insulin delivery phase*

	Children (2 to 5.9 years) (N=80)
Event Type	
Primary Safety Outcomes (events per 100 person-years)†	
Severe hypoglycemia	0.0
Diabetic ketoacidosis	0.0
Hypoglycemia, number of events (% of participants)‡	0 (0.0)
Severe Hypoglycemia, number of events (% of participants)§	0 (0.0)
Diabetic Ketoacidosis, number of events (% of participants)‖	0 (0.0)
Hyperglycemia, number of events (% of participants)¶	4 (5.0)
Prolonged Hyperglycemia, number of events (% of participants)#	20 (18.8)
Other, number of events (% of participants)**	5 (5.0)

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CLINICAL CARE AND TECHNOLOGY

ISPAD WILEY

Glycemic outcomes of children 2–6 years of age with type 1 diabetes during the pediatric MiniMed™ 670G system trial

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Design

- Étude monobras, multicentrique, prospective
- Système de boucle fermée
  - MiniMed 670G + Guardian 3 (2-week run-in period with open-loop)
- 2 semaines de run-in (mode manuel)
- 3 mois de boucle fermée (mode automatique)

Forlenza GP et al. Pediatr Diabetes. 2022 May;23(3):324-32

Caractéristiques

- **Participants (n=46):**
  - DT1 x >3 mois
  - Âge 2 à <7 ans (4.6 ± 1.4)
  - HbA1c <10%, pompe >3 months, dose totale >8 unités
- **Issues primaires**:
  - Sûreté: Effets adverses sérieux, hypo sévère, ACD
  - Efficacité: Différence d'HbA1c comparé à la ligne de base

TABLE 1 System use, glycemic outcomes, weight, and insulin delivery during the run-in and study phase

	Overall 24-h day (*N* = 46)			Overnight 9:00 PM–12:00 AM (*N* = 46)		
	Run-in	Study	P	Run-in	Study	P
Auto Mode, %	–	87.1%	–	–	85.2%	–
A1C, %	8.0 ± 0.9	7.5 ± 0.6 (*N* = 44)	<0.001	–	–	–
CGM use, %	87.9 ± 14.9	91.0 ± 5.6	–	–	–	–
Percentage of time spent at sensor glucose (SG) ranges						
<50 mg/dl	0.5 ± 0.5	0.5 ± 0.4	0.447[a]	0.4 ± 0.8	0.5 ± 0.7	0.107[a]
<54 mg/dl	0.7 ± 0.8	0.7 ± 0.6	0.679[a]	0.7 ± 1.2	0.7 ± 1.0	0.786
<70 mg/dl	3.3 ± 2.5	3.2 ± 1.6	0.996[a]	2.3 ± 3.5	2.4 ± 2.6	0.297[a]
70–180 mg/dl	55.7 ± 13.4	63.8 ± 9.4	<0.001	48.6 ± 17.3	51.6 ± 12.0	0.174
>180 mg/dl	41.0 ± 14.7	33.0 ± 9.9	<0.001	49.1 ± 19.0	46.0 ± 13.0	0.183
>250 mg/dl	14.6 ± 9.4	10.7 ± 5.9	<0.001[a]	19.4 ± 14.7	15.9 ± 9.2	0.263[a]
>300 mg/dl	5.2 ± 4.9	3.7 ± 2.9	0.011[a]	7.5 ± 10.2	5.6 ± 4.9	0.951[a]
SG, mg/dl	173 ± 24	161 ± 16	<0.001	186 ± 34	181 ± 22	0.166
SD of SG, mg/dl	65.3 ± 11.7	63.3 ± 9.9	0.024	64.2 ± 13.9	63.9 ± 10.6	0.848
CV of SG, %	37.7 ± 4.1	39.1 ± 3.3	0.002	34.6 ± 5.7	35.4 ± 4.9	0.202
Weight, kg	20.6 ± 4.0	21.3 ± 4.0	<0.001	–	–	–
TDD, units/kg/day	0.75 ± 0.13	0.76 ± 0.15	0.759[a]	0.07 ± 0.02	0.08 ± 0.02	<0.001
Total basal, units/kg/day	0.30 ± 0.09	0.31 ± 0.08	0.445	0.04 ± 0.01	0.05 ± 0.01	<0.001
Total bolus, units/kg/day	0.45 ± 0.11	0.45 ± 0.11	0.951	0.03 ± 0.02 (*N* = 44)	0.03 ± 0.02	0.684
Basal percentage, %	41.6 ± 10.1	39.8 ± 10.7	0.587[a]	73.1 ± 13.8	74.5 ± 10.8	0.418
Bolus percentage, %	58.4 ± 10.1	60.2 ± 10.7	0.587[a]	26.9 ± 13.8	25.5 ± 10.8	0.418
Insulin-to-carb ratio[b]	19.6 ± 5.6	18.5 ± 5.1	<0.001[a]	22.7 ± 8.6 (*N* = 29)	22.1 ± 8.0	0.002[a]
Number of boluses	9.0 ± 3.1	8.6 ± 2.0	0.236[a]	0.8 ± 0.5	0.8 ± 0.4	0.834

Forlenza GP et al. Pediatr Diabetes. 2022 May;23(3):324-32

Événements indésirables

- Pas d'événements indésirable sérieux
- Pas d'événement sérieux du dispositif
- Pas d'hypo sévère ni ACD
- 49 épisodes d'hyperglycémie sévère (glycémie >17 mmol/L avec cétones >0.6 mmol/L ou symptômes de nausées, vomissements, douleur abdominale)
  - 10 pendant run-in (0.824/100 user-days)
  - 39 pendant phase d'étude (0.841/100 user-days).

Forlenza GP et al. Pediatr Diabetes. 2022 May;23(3):324-32

The NEW ENGLAND JOURNAL of MEDICINE

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Open-Source Automated Insulin Delivery in Type 1 Diabetes

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Design:

- Étude randomisée contrôlée, ouverte, multicentrique
- OpenAPS 0.7.0 algorithm + DANA-i insulin pump + Dexcom G6
- 4 semaines run-in, étude de 24 semaines
- 3 rencontres cliniques + 2 revues par téléphone (AID seulement)
- Accès à une communauté en ligne (Tribe Technologies) + staff

Burnside MJ et al. N Engl J Med. 2022 Sep 8. 387:869-881

Protocole

- **Participants:**
  - 7-70 ans (48 enfants: 7-15 ans + 49 adultes 16-70 ans)
  - DT1 x 1 an et pompe à insuline x 6 mois
  - HbA1c <10.5%
- **Issues primaires:**
  - TIR (J 155-168), HbA1c
  - Effets psychosociaux, apprentissage collective, comportements alimentaires
  - Effets adverses, hypoglycémie sévère, ACD

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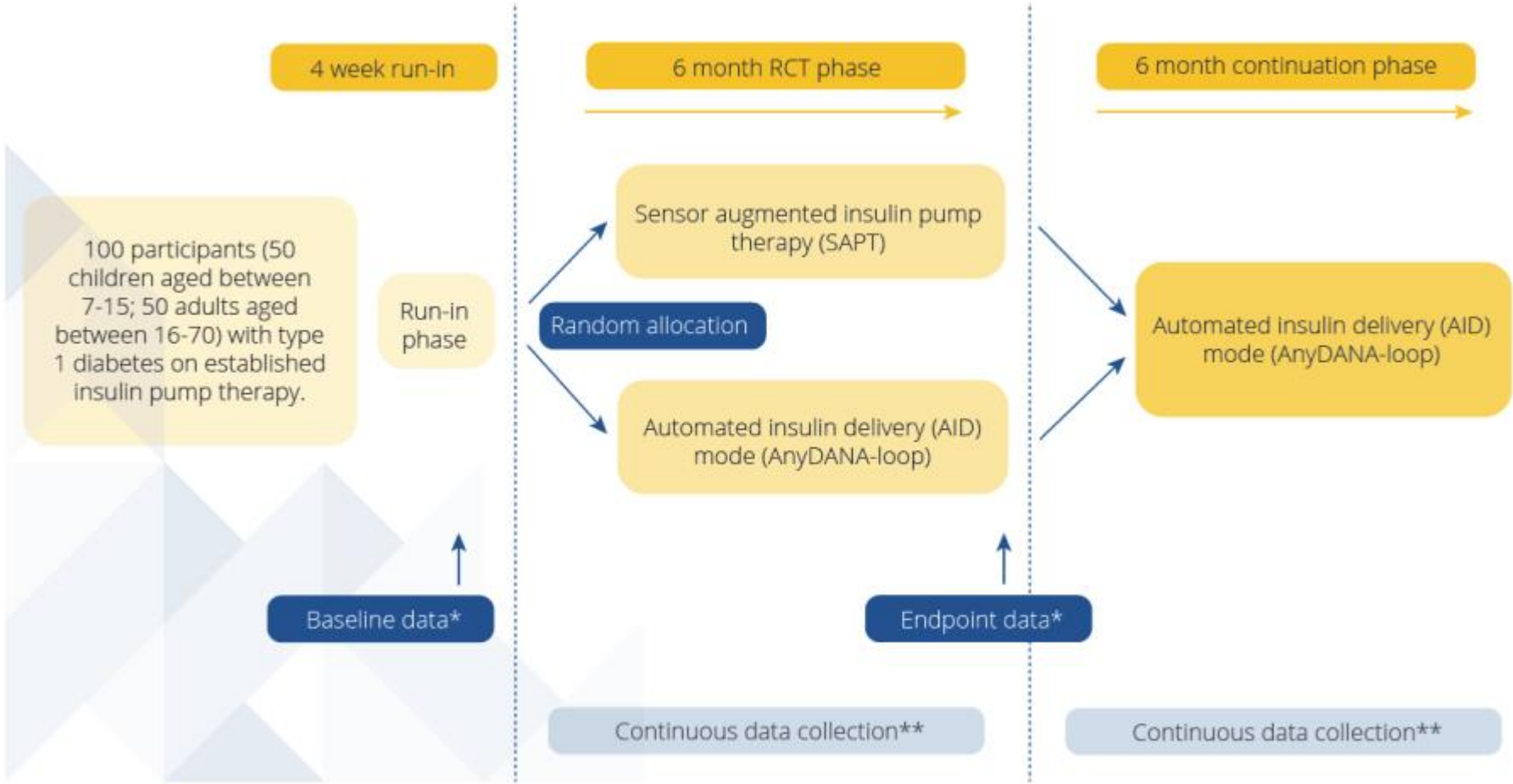
Protocole



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Caractéristiques

- 2 patients du groupe intervention (1 enfant) se sont retirés en raison d'une frustration avec les dispositifs d'essai ;

Table 1. Characteristics of the Patients at Baseline.*

Characteristic	Automated Insulin Delivery	Control	Total
Children			
No. of patients	21	27	48
Median age (IQR) — yr	14.0 (11.0–15.0)	11.0 (9.0–14.5)	13.0 (9.0–15.0)
Female sex — no. (%)	11 (52)	13 (48)	24 (50)
Ethnic group — no. (%)†			
Maori	4 (19)	4 (15)	8 (17)
Asian	1 (5)	0	1 (2)
European or other	16 (76)	23 (85)	39 (81)
New Zealand Deprivation Index — no. (%)‡			
Quintile 1	9 (43)	10 (37)	19 (40)
Quintile 2	6 (29)	10 (37)	16 (33)
Quintile 3	4 (19)	3 (11)	7 (15)
Quintile 4	2 (10)	2 (7)	4 (8)
Quintile 5	0	2 (7)	2 (4)
Diabetes history			
Glycated hemoglobin§			
Value — mmol/mol	58.3±6.6	58.4±9.9	58.4±8.5
Mean percent§	7.5	7.5	7.5
Previous use of CGM — no. (%)¶	20 (95)	26 (96)	46 (96)
Previous use of automated insulin delivery — no. (%)‖	1 (5)	2 (7)	3 (6)
Time in glucose range — (%)**	57.4±10.6	55.1±12.6	56.1±11.7

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Table 2. Daily Glycemic Metrics in Children and Adults, According to Trial Period.*

Age Group and Glycemic Metric	Automated Insulin Delivery			Control			Adjusted Mean Difference between Groups (95% CI)‡
	Run-in Period	Days 155–168†	Mean Change (95% CI)	Run-in Period	Days 155–168†	Mean Change (95% CI)	
Children							
No. of patients	21	20	20	27	27	27	
Percentage of time with glucose in 70–180 mg/dl range	57.4±10.6	67.5±11.5	9.9 (2.9 to 16.9)	55.1±12.6	52.5±17.5	−2.6 (−8.1 to 2.8)	12.6 (5.7 to 19.5)
Percentage of time with glucose level <70 mg/dl: level 1 or 2 hypoglycemia	3.5±2.6	2.1±1.5	−1.5 (−2.5 to −0.4)	3.7±3.0	2.7±2.8	−1.0 (−1.9 to −0.2)	−0.5 (−1.6 to 0.5)
Percentage of time with glucose in 180–250 mg/dl range: level 1 hyperglycemia	25.3±5.3	21.1±6.8	−4.1 (−8.2 to −0.0)	25.0±8.0	26.0±7.5	1.0 (−0.7 to 2.8)	−4.8 (−8.7 to −1.0)
Percentage of time with glucose level >250 mg/dl: level 2 hyperglycemia	13.8±7.3	9.3±6.0	−4.4 (−8.0 to −0.7)	16.1±7.5	18.8±14.7	2.6 (−2.2 to 7.4)	−7.2 (−12.0 to −2.4)
Mean glucose level — mg/dl	171.0±19.6	156.8±18.8	−13.6 (−25.2 to −2.1)	174.1± 22.4	182.4±36.4	8.3 (−3.4 to 20.0)	−21.4 (−34.4 to −8.4)
Glucose standard deviation — mg/dl	69.6±12.4	62.2±10.6	−7.3 (−13.2 to −1.3)	70.8±12.2	67.6±13.6	−3.2 (−7.4 to 0.9)	−4.5 (−10.1 to 1.0)
Coefficient of variation — %	40.6±4.7	39.7±5.2	−0.9 (−3.6 to 1.7)	40.8±6.1	37.4±5.9	−3.4 (−5.4 to −1.4)	2.1 (−0.4 to 4.6)
Glycated hemoglobin§							
Value — mmol/mol	58.3±6.6	52.6±9.8	−5.9 (−11.4 to −0.4)	58.4±9.9	59.2±10.7	0.0 (−3.2 to 3.1)	−5.2 (−10.0 to −0.4)
Percent	7.5±0.6	7.0±0.9	−0.5 (−1.0 to 0.0)	7.5±0.9	7.6±1.0	0.0 (−0.3 to 0.3)	−0.5 (−0.9 to −0.0)

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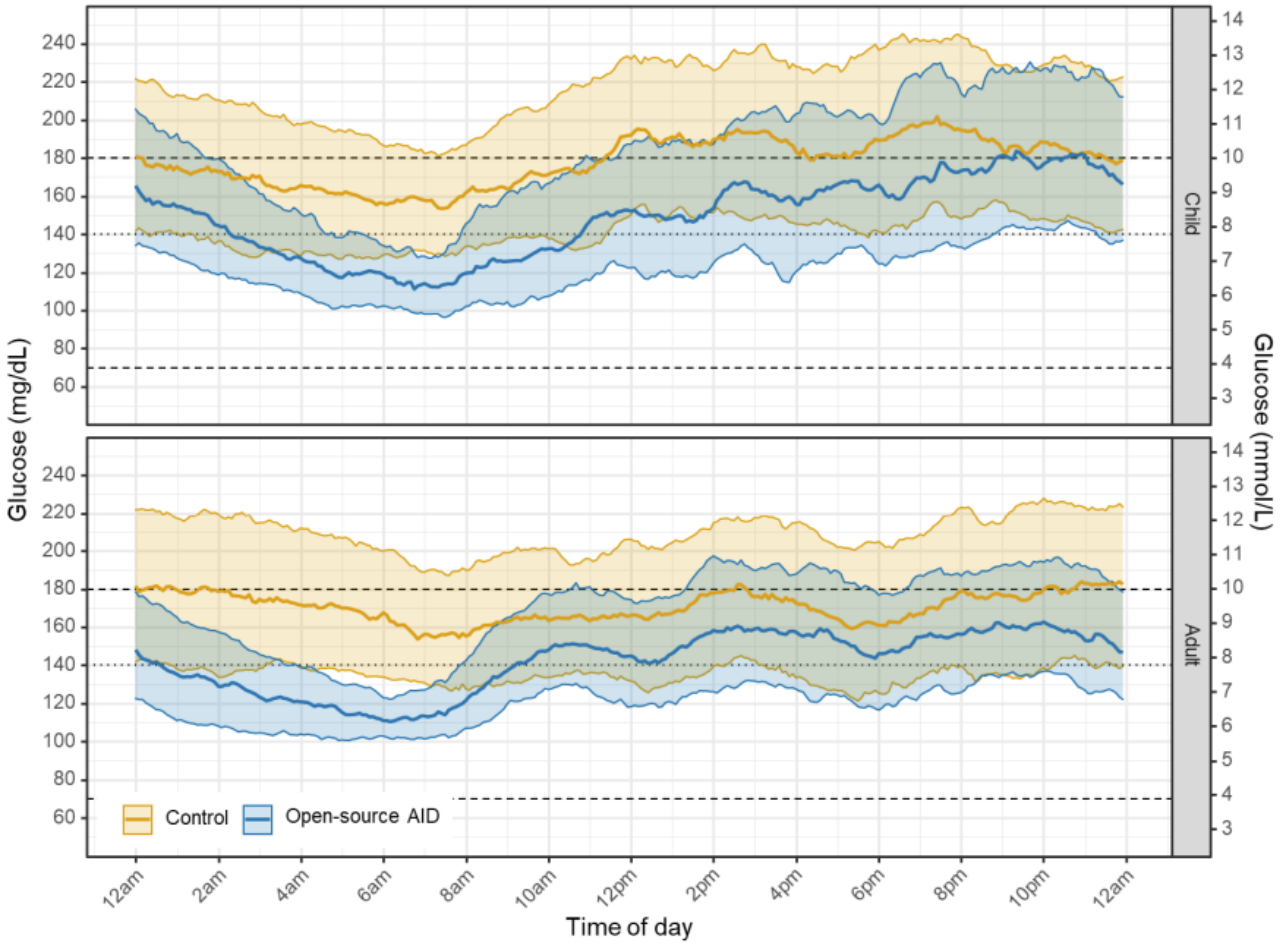
Résultats



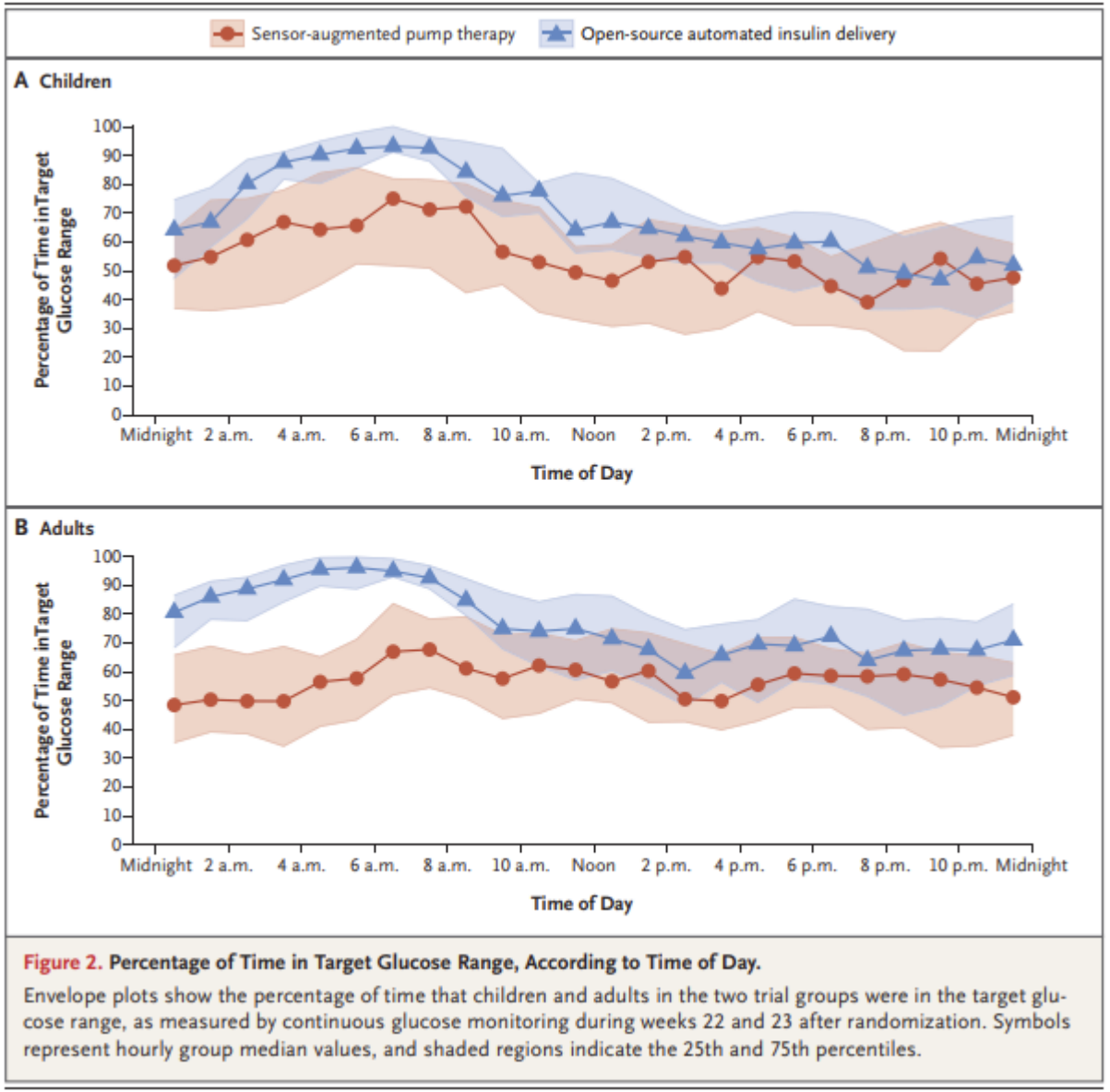


Figure 2. Percentage of Time in Target Glucose Range, According to Time of Day.

Envelope plots show the percentage of time that children and adults in the two trial groups were in the target glucose range, as measured by continuous glucose monitoring during weeks 22 and 23 after randomization. Symbols represent hourly group median values, and shaded regions indicate the 25th and 75th percentiles.

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Événements indésirables

Table 3. Adverse Events, According to Age Group.*

Adverse Event and Age Group	Automated Insulin Delivery		Control		Total	
	Events	Patients	Events	Patients	Events	Patients
Children						
Nonserious adverse device effect†						
Any	5	5	4	4	9	9
Hyperglycemia	3	3	3	3	6	6
Skin infection	1	1	0	0	1	1
Localized skin reaction	1	1	0	0	1	1
Urticaria	0	0	1	1	1	1
Serious adverse event or serious adverse device effect‡						
Any	2	2	5	5	7	7
Anaphylactic reaction to food	0	0	2	2	2	2
Croup	1	1	1	1	2	2
Hyperglycemia	1	1	1	1	2	2
Pilonidal cyst with abscess	0	0	1	1	1	1
Adults§						
Nonserious adverse device effect						
Any	5	3	4	4	9	7
Burn	2	1	0	0	2	1
Hyperglycemia	3	2	2	2	5	4
Infection at medical device site	0	0	2	2	2	2

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