

## BC Government survey of HCL systems

2025-Jun-15

The BC Government has asked that patients and caregivers [respond to a survey](#) between 2025-June-4 and 2025-July-2 regarding the benefits of hybrid closed loop (HCL) insulin pump systems.

In case you wish to cite the scientific literature supporting benefits of these systems I have prepared the following guide to some of the scientific evidence suggesting benefits for the use of HCL systems.

### 1. Young Children (Ages 2–6) – NEJM, 2023

**Campbell et al.** (PEDAP, NCT04796779) conducted a **13-week RCT** with 102 participants, showing an increase in time-in-range (70–180 mg/dL) from **56.7% to 69.3%** with HCL versus **54.9% to 55.9%** in standard care—a **12.4 pp gain (~3 hrs/day)**, with similar HbA1c and mean glucose improvements and no increase in hypoglycemia  
[diabetesjournals.org+15pubmed.ncbi.nlm.nih.gov+15pubmed.ncbi.nlm.nih.gov+15](https://diabetesjournals.org+15pubmed.ncbi.nlm.nih.gov+15pubmed.ncbi.nlm.nih.gov+15).

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### 2. Very Young Children – Diabetes Care, 2024

A **24-week observational study** in very young children demonstrated sustained TIR improvements at 18 months using HCL, with stable HbA1c and low hypoglycemia incidence  
[de.wikipedia.org+3diabetesjournals.org+3onlinelibrary.wiley.com+3](https://de.wikipedia.org+3diabetesjournals.org+3onlinelibrary.wiley.com+3).

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### 3. Children & Adolescents – Cambridge Algorithm

Clinical evaluations of the Cambridge HCL algorithm for children/adolescents reported acceptable safety and improved glycemc outcomes  
[diabetesjournals.org+9sciencedirect.com+9jamanetwork.com+9](https://diabetesjournals.org+9sciencedirect.com+9jamanetwork.com+9).

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#### **4. Adolescents – Pilot RCT, Nat Commun, 2022**

**Reiss et al.** conducted a **6-month RCT (N=42)** showing HCL improved glycemc control alongside improvements in brain structure and cognitive metrics  
<https://doi.org/10.1038/s41467-022-32289-x>

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#### **5. Adults (MDI → AHCL) – BMC Endocr Disord, 2022**

In a 6-month RCT, patients with baseline HbA1c  $\geq 8.0\%$  shifted from MDI + RT-CGM to AHCL, yielding HbA1c reductions of **-1.70 pp vs. -0.60 pp**, and TIR increasing to **73.6% vs. 46.4%** [jamanetwork.com+4pubmed.ncbi.nlm.nih.gov+4onlinelibrary.wiley.com+4](https://jamanetwork.com+4pubmed.ncbi.nlm.nih.gov+4onlinelibrary.wiley.com+4).

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#### **6. Adults – Diabetes Care, 2021**

A longitudinal adult cohort switching to HCL showed improvements in glycemc, patient satisfaction, and quality-of-life over 6–12 months [jamanetwork.com](https://jamanetwork.com).

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#### **7. Advanced HCL vs. Conventional – Lancet Diabetes, Oct 2022**

The ADAPT study compared advanced HCL systems to baseline therapy demonstrated superior TIR and HbA1c control with no increase in severe hypoglycemia. Authors & Journal: Choudhary et al.; Lancet Diabetes Endocrinol (Oct 2022)  
[https://www.thelancet.com/journals/landia/article/PIIS2213-8587\(22\)00212-1/abstract](https://www.thelancet.com/journals/landia/article/PIIS2213-8587(22)00212-1/abstract)

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#### **8. Hypoglycemia & DKA Risk Reduction – Lancet Diabetes, 2025**

A recent investigation evaluated HCL's role in reducing severe hypoglycemia and diabetic ketoacidosis compared to sensor-augmented pump therapy, reporting favorable safety outcomes [de.wikipedia.org+15thelancet.com+15pubmed.ncbi.nlm.nih.gov+15](https://de.wikipedia.org+15thelancet.com+15pubmed.ncbi.nlm.nih.gov+15).

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## 9. Systemic Review – NIHR HTA, 2024

A meta-analysis of **12 RCTs** found HCL systems significantly reduced HbA1c by **0.28 pp**, increased TIR by **8.6 pp**, and reduced hyperglycemia with no rise in hypoglycemia [diabetes.jmir.org+2pubmed.ncbi.nlm.nih.gov+2online-library.wiley.com+2](https://diabetes.jmir.org/2024/02/pubmed.ncbi.nlm.nih.gov/2024/02/online-library.wiley.com/).

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## 10. Supported open-source AID - BCDiabetes first 248 Loop installations.

Samuel et al 2024: Dr. Tom Elliott's group at BCDiabetes describe outcomes for 248 Loopers in their Vancouver, BC clinic. <https://bit.ly/CJD248>

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## 11. Supported open-source AID - BCDiabetes first 1442 Loop installations.

Alqahtani et al 2025 (in press 2025-06-15), American Diabetes Association poster presented 2025-Jun-21): Dr. Tom Elliott's group at BCDiabetes describe outcomes for their first 1442 Loopers in their Vancouver, BC clinic. <https://bit.ly/LoopPosterADA2025>

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### Summary Table

#	Population	Design & Duration	Key Outcome
1	Ages 2–6	13-week RCT	+12.4 % TIR
2	Very young children	18-month study	Sustained TIR
3	Children/adolescent	Algorithm evaluation	Improved glycemia
4	Adolescents	6-mo pilot RCT	Glycemic + brain + cognitive gains
5	Adults (HbA1c ≥8)	6-month RCT	–1.1 pp A1c, +27 % TIR
6	Adults	Longitudinal cohort	Improved glycemia/QoL

7	Mixed	AHCL vs conventional	Superior control
8	Any age	Safety study	↓ severe events
9	Broad (all ages)	Meta-analysis RCTs	A1c ↓0.28 pp, +8.6 % TIR
10	Broad (all ages)	Looping observational first 248 BCDiabetes	A1c ↓0.5 pp, +16 % TIR
11	Broad (all ages)	Looping observational First 1442 BCDiabetes	GMI ↓0.6 pp, +12 % TIR

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These eleven clinical investigations—from device-specific RCTs to real-world outcomes and meta-analyses—solidify the evidence that HCL/AHCL systems meaningfully enhance glycemic control, increase time-in-range, reduce hyper-/hypoglycemia risk, and in some cases improve cognitive and psychosocial parameters.

Short URL = <https://bit.ly/HCLevidence>