

2025-Jan-10

## **Loop installation in-house at BCDiabetes**

On 2020-Aug-1 BCDiabetes began supporting in-house installations of open source (DIY) [Artificial Pancreas Systems](#) (AID, also termed “automated insulin delivery” AID) with the tubeless Omnipod Dash-Dexcom G6 and iPhone & Android AID algorithms. [Here’s a picture of the setup with a phone running AndroidAPS](#). Although not Health Canada-approved, BCDiabetes considers the current version of [Loop \(Master branch\)](#) to be the best entry level open source AID available for most adults & children with good family support. Loop is a conservative algorithm that has been installed by our estimates on more than 35,000 individuals worldwide and 1220 BCDiabetes clients to date. At BCDiabetes, Loop in its various flavors is preferred over retail AID because it is more affordable for most given coverage by BC Pharmacare of both the Omnipod system & Dexcom G6/7 and only partial coverage of retail AID components.

The mission of BCDiabetes is to optimize care and improve outcomes for every person living with diabetes. For those living with Type 1 diabetes (T1), BCDiabetes considers that AID is now the standard of care. BCDiabetes’ 5 year goal is to have 200,000 Canadians, or 70% of those with T1, and an equal proportion of T1s worldwide, using one form of AID or another. In Canada in 2025, the Loop initiative represents the quickest route to that goal, and the recent announcement of a National Pharmacare program will hopefully accelerate this process. We welcome the collaboration of T1s, their moms and dads, family and friends, physicians, scientists, programmers, business leaders and politicians in this endeavor. BCDiabetes invites other clinicians to set up their own Looping site: for those who wish to do so as BCDiabetes affiliates, using many BCDiabetes resources at no cost, [click here](#) to learn more.

BCDiabetes now uses the acronym SOS-AID (supported open source AID) to describe its clinic-run, clinic-provided AID installation service. People using any version of OS-AID are still generically described as using “Loop”, being “Loopers” and to be “Looping”.

For the fascinating history of Looping see Dr. Ben Mammon’s [55 minute youtube](#); and to see how far things have come in the last four years see [BCDiabetes “The Weekly” webinar on AID](#) from 2020 May (during the height of COVID) which focussed on closed-loop pump systems in general comparing Loop, Tandem Control IQ and Medtronic.

For those who are looking for an AID system who are not willing to use a non-health Canada approved solution, and for whom cost is not a consideration, today we equally recommend the Tandem T-slim with Control IQ and the Medtronic 780G. The tubeless Omnipod 5 was approved by Health Canada in 2024-Apr, however its roll-out will likely not occur until 2025. The tubed Ypsomed CamAID is also expected in the next 12 months. If you wish to start with Medtronic, Tandem, Omnipod or Ypso AIDs, [email us](#) & we will support you by filling in the necessary forms and continue to work with you afterwards. For a CAD\$ cost comparison of the various AID options in Canada see rows 7-9 of [this spreadsheet](#). It assumes no BC Pharmacare subsidy & that the up-front cost of the pump is amortized over 5 years. For a comparison of the features of all

AIDs worldwide see [this spreadsheet](#). For a comparison of TIR improvements with various AIDs from published studies [click here](#).

Want to know which is the best AID algorithm in head-to-head comparisons, including open source and retail? So do we, which is why we are in the planning stages of a randomized control trial comparing them all. Watch this space for details.

BCDiabetes has to-date installed SOS-AID in its various flavors (Loop, iAPS & AndroidAID =AAPS) on 1604 clients (33% of pediatric age, 12% under age 10, the youngest at 18 months and 12% age >70 with the oldest at 84). Loop's elegant interface and simple algorithm makes it our preferred choice for most clients and the only choice for age < 14 and >75.

Published, peer-reviewed outcomes for the first 248 Loop installations at BCDiabetes are described [here](#). In summary, the average Time in Range (TIR) and GMI immediately pre-Loop were 64% and 7.3% and three weeks later were 80% and 6.7% respectively. The average A1c immediately pre-Loop was 7.2 - three months later it was 6.7. Pre-Loop, 43% had TIR >70% while post-Loop 84% had TIR >70%. Quality of Life measures (Diabetes Distress, Fear of Hypoglycemia and Insomnia index) were favorable pre Loop and 3 months later even more favorable. We saw 3 episodes of severe hypoglycemia. These results compare favorably with all published retail AID literature. [Click here](#) for outcomes for the first 1147 Loop installations at BCDiabetes as of 2024-Sep-21.

Read BCDiabetes client testimonials of the first two weeks of using Loop [here](#) and [here](#). These clients (& the parents of kids on Loop) are all sleeping through the night and experiencing life without the rigors of diabetes for the first time in years. All they need to do is change their pod every 3 days, their CGM every 10 days and charge their smartphone as usual. Click [here](#) to see BCD client John Young's Nightscout tracings over 72 hours (the first 48 on manual pump and the last 24 hours on Loop), his quote to me "I don't know how I managed to cope before this."

All three of our apps support Dexcom G7. BCDiabetes does not currently support Loop using the Freestyle Libre 2. This will hopefully change soon after the upgrade to the Freestyle Libre 3 app expected in Oct 2024.

In case you want to build, install & configure one of these offerings yourself, here are the links: [Loop master branch](#), [iAPS](#) & [AndroidAPS](#). To build Loop or iAPS, a free Apple developer account is required and a rebuild is mandated every 3 months. With a paid Apple developer account (US\$99/year) a build will last 12 months. For step by step visuals on OS-AID installation check out our youtube "how-tos" for [Loop](#) and [iAPS](#) (AAPS is being updated shortly).

For BCDiabetes in-house staff teaching tutorials presented at our Journal Club in early 2023 see Nabeel Khan's [Looping 101 video](#) and [associated powerpoint](#) (Loop & iAPS basic settings) and [Looping 102](#) (openAID advanced settings). For tips on tuning Loop [click here](#). For general Looping FAQs [click here](#). For support in being allowed to use Loop at elementary school [click here](#) or while hospitalized [click here](#).

For clinician FAQs [click here](#) and for BCDiabetes Technology Fellow Dr. Kate Hawke's 2024-07 lecture "Open-source AID for Endocrinologists" click [here](#) (and [here](#) for the associated powerpoint pdf). For Dr. Elliott's Diabetes Directors Seminar keynote address 2024-Oct-19 click [here](#). For BCDiabetes Dr. Clare Henderson's ped-endo-focussed 2024-03 "Into the Loop" slideshow click [here](#).

**Referrals from outside British Columbia:** Clinicians wishing to refer a patient for looping, click [here](#) for a quick referral form. Note, physicians referring from outside British Columbia, Canada should enter 99998 for “Doctor’s College ID” and 0000000000 for Patient CareCard #. Clinicians who would like to set up their own Loop site as an affiliate of BCDiabetes, providing no-cost access to BCDiabetes’ Loop app and consent/waiver, [click here](#). Please note, as of 2025-Jan-10, virtual care for non-BC residents is permitted for residents of Ontario, Alberta, Ontario, Saskatchewan, Nova Scotia, Newfoundland & Labrador, Yukon and Northwest Territories only. Special Authority to provide virtual care to residents of Quebec was applied for 2025-Jan-10.

Because Loop, iAPS & AAPS are not Health Canada approved, we require an online signed consent & waiver including an undertaking that users will not copy or distribute the installation to others without our consent. Adult BCDiabetes clients should complete [this adult consent & waiver](#); guardians of minor BCDiabetes clients should complete [this consent & waiver for minors](#). For parents or guardians who wish to be able to remotely give commands for carbs, boluses and overrides to their kids, BCDiabetes also offers [Loop Caregiver](#) which runs on the parent/guardian’s iPhone. For a one-pager on “Looping for kids of elementary school age” click [this link](#).

### **Client requirements**

BCDiabetes believes that Looping is suitable for the vast majority of individuals living with Type 1 and Type 2 diabetes. Looping is not intended for individuals who are unable to maintain adequate diabetes self-care skills, who do not see their healthcare provider regularly, who do not have adequate carbohydrate-counting skills. Loop clients expecting to Loop independently should have good cognitive capabilities and should not have physical impairments that would make operating hardware (pump, CGM) challenging.

### **Hardware & software requirements for first Looping appointment**

Clients need to be running a DexcomG6/G7 sensor with an active connection to their smartphone (not a reader) and an Omnipod (plus a spare) running off its PDM. Note, if the Omnipod pod is an Eros pod, an additional component, an [Orangelink Pro](#), must be on hand to connect the Eros pod and the smartphone. Users of Omnipod Dash do not need an Oranlink.

#### Other requirements....

**an iPhone 11** (or newer) OR

**an Android** phone (OS 9+) connected to a Dexcom G6/G7 sensor, not with the usual Dexcom G6 app (uninstall first), but with [xDrip](#) using this [installation instructional video](#), an open-source app compatible with Dexcom G6 & G7. If you have a Dexcom G6 you could alternatively install [BYODA](#) (BYODA for Dexcom G7 is buggy and is not recommended).

With an iPhone, enable Apple Health, install TestFlight from the App store and disable automatic iOS updates (disabling iOS updates is to prevent Dexcom failures which sometimes occur after iOS updates - Dexcom is typically 3 months behind).

Regardless of whether you have an iPhone or Android, or an Eros or Dash pump, you need a [Looping Safety/Emergency kit](#) in case of component failure.

If you would like to have an OSAID installed at BCDiabetes you first need to become a BCDiabetes client. To do so you will need a referral from a licensed physician in your jurisdiction, preferably your endocrinologist/diabetes specialist - [click here](#) for our quick referral form (non BC physicians should enter

99998 in the “Doctor’s College ID” field and 0000000000 in the Patient CareCard #. *Not all endocrinologists/diabetes specialists support Loop - if this describes your endocrinologist/diabetes specialist BCDiabetes, we suggest you share this document with them to see if it changes their mind.* Once you have been established on Loop BCDiabetes recommends that its Loop clients every 6 months for a year and annually thereafter. You should continue to see your regular endocrinologist/diabetes specialist for your regular non-Looping diabetes follow-up.

In advance of the referral you may [email us](#) requesting an appointment or [register online](#). Once we have the referral you will be seen within 2 weeks for a regular appointment either in-person or virtually. The cost of the appointment and follow up will be covered in full by your Canadian provincial medical plan with the exception of Quebec which does not have a reciprocal agreement for payment with BC. For Quebec residents, who can only be seen in-person at the time of writing (pending application for a Special Authority for virtual care), the fee is \$1500 (initial appointment plus up to two weeks of daily follow-up and routine follow-up to 6 months). *BCDiabetes does not routinely offer care to non-Canadian residents. If a non-Canadian resident has a letter from his/her referring physician asserting that BCDiabetes' level of care is not readily in their country of residence, BCDiabetes may offer its services on a case-by-case basis.*

### **Loop installation & fine-tuning - a two-step, two appointment process then daily follow-up for 3 days**

The first appointment, usually virtual, is an introductory session at which time a [Nightscout account](#) is set up (if not already in place), and CGM and Looping-specific analytics touched upon - clients have previously been encouraged to conduct [insulin experiments](#) to ensure that their basal rate, ICR & ISF are optimized.

The second appointment is preferred in-person but offered virtually to most clients at the discretion of BCDiabetes staff - it lasts 60-90 minutes. For iPhone users we share a link to the latest builds of either the Loop app on BCDiabetes’ TestFlight account, at no charge. For Android users we share the latest build of androidAID from our own cloud source, at no charge. For Loop users their Nightscout will have been configured pre-Loop start, with their initial Loop basal rate, ICR, ISF, max bolus and total daily dose of insulin such that once the Nightscout credentials are entered, and the Loop “closed”, they are up and running immediately, with data entry errors minimized.

Post Loop installation, clients are followed up, typically virtually, on a daily basis M-F until they are independent & able to make adjustments. For most users 3 visits are sufficient. Routine follow-up visits thereafter are at 3 & 6 months. All new Loopers are directed to BCDiabetes’ after-hours online support forum.

*Prior to July 2023, Loop installation was a three-step process: step one was purely introductory, step two was Nightscout setup and teaching, and step three was Loop installation itself. From July 2023, the original first two steps were consolidated into a single step and the original step three visit became step 2.*

**Not trained on Omnipod Eros or Dash?** If you are not trained on the Omnipod Eros or Dash & are a BC resident we will fill out & email a [certificate of medical necessity](#) form to Insulet (the manufacturer). Once your payment details are sorted a starter kit with 2 pods will be delivered to your home within 2-3 business days: once you have been trained online (2 sessions 3 days apart) & been certified, you are ready to Loop. Note, the pod for Omnipod 5 is not compatible with Loop/iAPS/AAPS.

## Where to get Looping Hardware:

### Looping Safety kit:

BCDiabetes requires that a [Looping Safety kit](#) be carried by all its clients who use insulin pumps, including all Loopers, at all times. The bare minimum is a pen of rapid insulin with needle and finger-poke glucometer. And every client on intensive insulin therapy needs to understand & follow [sick day management](#) when they are unwell and sugar is consistently > 10.

### Omnipod pump system setup

request that a BCDiabetes staff member complete paperwork (Letter of Medical Necessity) or email [Andrew Muirhead](#) phone +1--604-754-6195.

### Omnipod pod purchase

Both Eros & Dash pods can also be purchased directly in Canada from [these pharmacies](#) providing the client was trained in Canada by an Insulet-certified trainer.

Omnipod pods may be purchased online without a prescription & with no questions asked [from these four US sources](#) (verified 2023-Mar-23).

For android users who want to practice with the Omnipod Dash without automation, the Omnipod PDM need not be purchased - it can be replaced by an [open source app](#) - find the latest version of the apk = "wear-pumpcontrol-release"

### Dexcom G6/G7

request that a BCDiabetes staff member complete Special Authority & prescription or [order online](#) or email [Anthony Petrovich](#) phone +1-604-363-8776

### OrangeLink Pro

Required for the Omnipod Eros (not for Dash): [order online](#) & pick up at BCDiabetes.

Medtronic 780G email [andrew.bierworth@medtronic.com](mailto:andrew.bierworth@medtronic.com) phone +1-250-938-2524

Tandem Control IQ email [Teri.Currie](mailto:Teri.Currie) phone +1-778-995-1268

Ypsopump email [Sarah.Peterson](mailto:Sarah.Peterson) phone +1-604-805-6384

## Online Loop Support = [BCDiabetes Loopers](#)

### See also

<https://www.facebook.com/groups/TheLoopedGroup/>

<https://www.loopnlearn.org>

<https://loop.zulipchat.com>

### Credits due:

The open-source community AID in general & specifically

[Ben West](#) (the founder of DIY AID, cofounder of openAPS, primary developer of Nightscout)

Dana Lewis (openAID co-founder)

Pete Schwamb (Loop founder)

BCDiabetes clients who use SOSAID

Praveen Samuel: former BCDiabetes lead SOSAID trainer

Nabeel Khan former BCDiabetes technology lead, SOSAID trainer, programmer, app builder, iAPS & Loop documentation

Prince Sevilla: BCDiabetes SOSAID trainer

Gerri Klein: BCDiabetes in-house Omnipod pump trainer

Dr. Ben Mammon: medical inspiration, OSAID advisor, app builder, OSAID superuser

Sergey Skobkarev: systems engineer, Nightscout code contributor

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