ACE agency for care effectiveness

# VALUE-BASED HEALTHCARE CONFERENCE 2024

22-23 AUGUST 2024

Singapore General Hospital
SingHealth

## Assessing the budget impact of adopting an advanced hybrid closed-loop (AHCL) insulin delivery system in People with Type 1 Diabetes (T1D) in Singapore

**Daphne Gardner[1],** Simona de Portu[2], Jessica Yu[2], Zhiyu Qiu[3], Suresh Rama Chandran[1]

1. Department of Endocrinology, Singapore General Hospital, Singapore, Singapore.2. Medtronic International Trading Sarl, Tolochenaz, Switzerland.
3.Medtronic Singapore, Singapore, Singapore.

### Background and Aims

The AHCL system has been in use in Singapore since 2021. Clinical trials and local health economics analyses demonstrate improvements in glycaemia in T1D and cost effectiveness [1]. This study explored the potential complication management-related budget impact from adopting the AHCL system compared to Multiple Daily Injections (MDI) with Intermittently-Scanned Continuous Glucose Monitoring (is-CGM) from Singapore's healthcare system perspective over a 5-year time horizon.

### Methods

A published probabilistic budget impact model was localized to estimate each treatment type's associated complication management costs using projected incidence and progression of microvascular, macrovascular complications, severe hypoglycemic events (SHE) and diabetic ketoacidosis over a 5-year time horizon [2]. Baseline HbA1c of 8.4% and SHE rate of 1.73 per patient year were obtained from the Singapore General Hospital (SGH) database and local literature respectively [3]. Treatment effects followed data reported in a published randomized controlled trial [4]. The complication rates were estimated through published risk curves except for SHE which could be independent of glycemic control hence modelled independently. SHE reduction rate was conservatively assumed to be 50% in the base case and 80% in a scenario analysis (SA). Treatment costs of complications were obtained from published literature and local hospital databases, inflated to 2024 costs.

### Results

With a HbA1c reduction of 1.3% from a baseline of 8.4% and 50% reduction of SHE rate from a baseline of 1.73 per patient year through adopting the AHCL system, there would potentially be up to 50% reduction in acute and long-term complications (Figure 1a and 1b), translating to a cost saving of SGD 5,420.0 per patient over 5 years from complications avoided. Assuming an 80% reduction in SHE rates, the cost saving increases further to SGD 7,095 per patient over 5 years (Figure 2).

**Figure 1a**

5-year cumulative incidence of acute complications

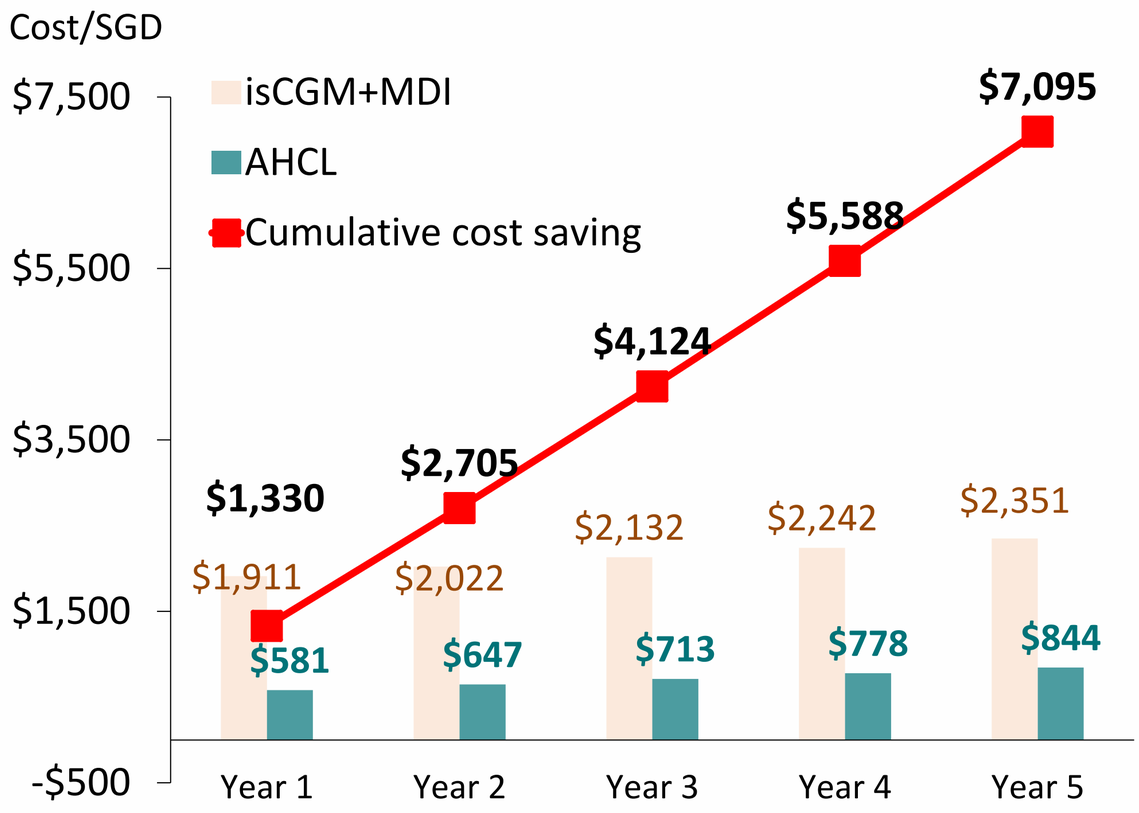
| Incidence per person | DKA | SHE |
|---|---|---|
| **AHCL** | 0.09 | 4.33 (SA 1.73) |
| is-CGM+MDI | 0.23 | 8.65 |

**Figure 1b**

5-year cumulative incidence of long-term complications

| Incidence per person | Microvascular | | | Macrovascular |
|---|---|---|---|---|
| | Eye | Renal | Neuro | CVD |
| **AHCL** | 0.04 | 0.02 | 0.04 | 0.02 |
| is-CGM+MDI | 0.07 | 0.03 | 0.07 | 0.02 |

**Figure 2 Yearly expected complication costs (SA)**




### Conclusion

Using the AHCL system can lead to improved glycaemia and reduction in complications, translating to significant cumulative cost savings that can offset the AHCL system cost.

1. Gardner D et al. Diabetes Technol Ther. 2024;26(5):324-334
2. Choudhary P et al. Diabet Med. 2019;36(8):988-994
3. Chandran SR et al. Indian J Endocrinol Metab. 2024;28(2):167-176
4. Choudhary P et al. Lancet Diabetes Endocrinol. 2022;10(10):720-731

Medtronic
Engineering the extraordinary

SingHealth DukeNUS ACADEMIC MEDICAL CENTRE

MINISTRY OF HEALTH SINGAPORE