

# Does insulin delivery technology change our relationship with foods? A scoping review

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## INTRODUCTION

Automated insulin delivery (AID) systems reduce the management burden and improve glycemic control for people with type 1 diabetes (PwT1D) by automatically adjusting insulin as a response to continuously measured glucose levels. There is a lack of evidence on AID and nutrition outcomes.

## OBJECTIVES

To analyze the literature regarding AID use and nutrition outcomes in PwT1D and synthesize current evidence regarding AID's relationship with nutrition.

## METHODS

Two researchers conducted a blinded search of Medline (OVID) and PubMed for studies including AID use (compared to multiple daily injections or pumps) and nutrition-related variables. Studies from 2000 to 2022 were included, as were PwT1D of all ages.

## RESULTS

Figure 1. Flow chart of articles

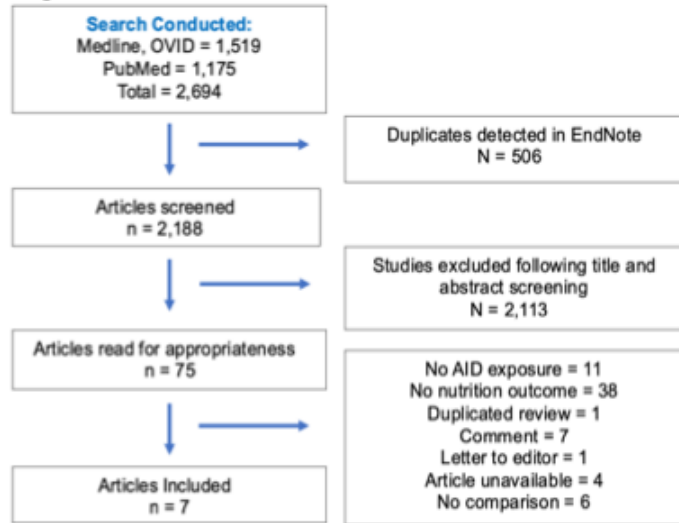
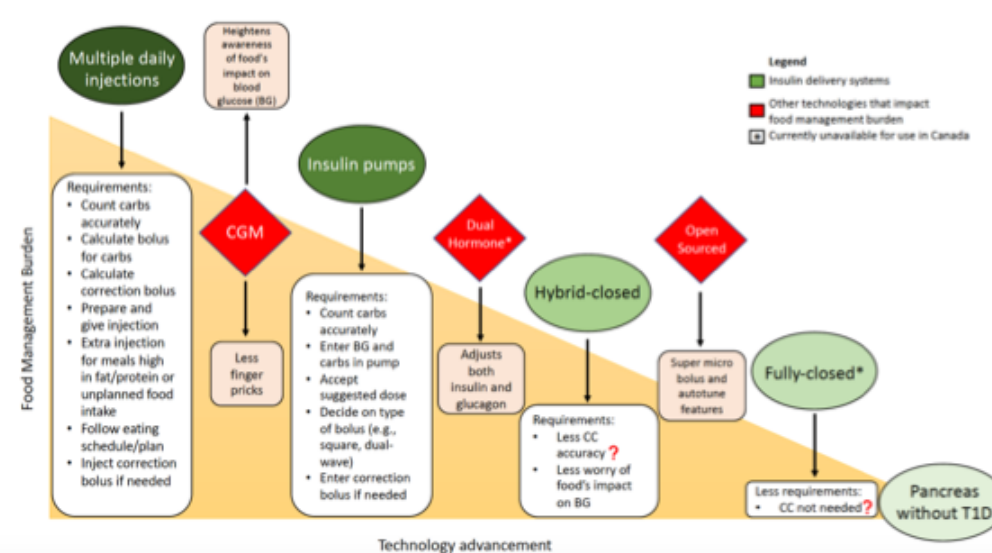


Table 1. Summary of articles

Author, Year, Country	Study Design	Sample Size	Sex	AID type	Comparison	Outcome Measure	Relevant findings
Lawton et al. 2019, UK	Qualitative	Parents (n=7) Adults (n=15)	Parent (78% Female) Adults (47% Female)	Closed loop	MDI or insulin pumps	In-depth interviews: Dietary habits	<ul style="list-style-type: none"> <li>Feeling more normal and less burden around dietary choices</li> <li>Concern of AID leading to carbohydrate counting deskilling, and unhealthier eating over time</li> </ul>
Iturraide et al. 2017, US	Qualitative	Adolescents (n=15) Adults (n=17)	Not identified	Hybrid	MDI or insulin pumps	Focus groups: Dietary habits	<ul style="list-style-type: none"> <li>Reported eating more pizza and burgers with less worry about glycemic levels</li> </ul>
Rankin et al. 2022, UK	Qualitative	Adolescents (n=18) Parents (n=15)	50% Female	Closed loop	MDI or insulin pumps	Semi-structured interviews: Food choices	<ul style="list-style-type: none"> <li>Parents having fewer concerns about food choices due to AID</li> </ul>
Suttiratana et al. 2022, US	Qualitative	Children or Parent (n=22) Adults (n=85)	53% Female (new-users at baseline)	Hybrid	MDI or insulin pumps	Focus groups: Carbohydrate counting	<ul style="list-style-type: none"> <li>Worrying less of food choices leading to hyperglycemia</li> <li>Worrying less about carbohydrate counting accuracy</li> </ul>
Emami et al. 2017, UK	Retrospective Observational	Adults (n=33)	45% Female	Hybrid	Sensor augmented pump	Daily carb frequency and amount (g) at meals and snacks	<ul style="list-style-type: none"> <li>Insufficient evidence of an association between AID and # of main meals (p=0.17), carb intake (grams) at meals (p=0.24), # of snacks (p=0.39) and snacks (p=0.99)</li> </ul>
Weissberg et al. 2017, USA	Cross-over	Adults (n=39)	54% Female	Dual hormone hybrid	MDI or insulin pumps	Eating distress subscore (diabetes distress scale)	<ul style="list-style-type: none"> <li>AID was associated with lower eating distress -0.43 ± 0.12, p=0.004</li> </ul>
Kahkoska et al. 2017, USA	Theoretical Review	n/a	n/a	Closed loop	MDI or insulin pumps	Dietary restraint theory	<ul style="list-style-type: none"> <li>More flexibility and improved eating behaviour, but may also lead to disordered eating behaviours like binge eating</li> </ul>

## DISCUSSION

Figure 2. Insulin delivery technologies and food management burden



AID may reduce worry about dietary choices and carbohydrate counting (CC), but the extent of less CC accuracy needed is yet to be investigated. AID may provide PwT1D the ability to adopt similar eating patterns to those without type 1 diabetes. Limitations of this review include the lack of studies included and subjectivity in qualitative responses.

## CONCLUSIONS

AID appears to influence eating behaviours, dietary patterns, and CC although evidence to support this relationship is limited and primarily comes from qualitative studies. AID may reduce food management burden due to the perception that AID can correct for CC inaccuracy.

## ACKNOWLEDGMENTS



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