SIMULATING TREATMENT ESCALATION IN TYPE 2 DIABETES DISEASE STATE MODELING: AN APPLICATION TO COST-EFFECTIVENESS ANALYSIS OF TUBELESS AUTOMATED INSULIN DELIVERY

Joshua Weinstein, PhD,[1] Dan Carlow, MPH,[1] Colin Hopley,[1] Kevin Xue, PhD,[2] Erin O. Y. Wong, PhD,[2] Kirk Szafranski, MSc[2]
[1]Insulet Corporation, Acton, Massachusetts, United States; [2] EVERSANA, Toronto, Ontario, Canada

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INTRODUCTION AND OBJECTIVE

+ There is a large literature on cost-effectiveness modeling in type 2 diabetes – however, there is inconsistent consideration given to the organic progression of treatment throughout an individual's life as their risk factors fluctuate
+ In type 2 diabetes (T2D), guidelines from professional clinical organizations indicate treatment should be intensified when glycemic goals are not met
+ A 2022 report on tirzepatide for type 2 diabetes published by ICER[1] and a 2023 HTA report[2] published by NICE both include consideration of treatment escalation based on glycemic control as measured by HbA1c. Canada's CADTH has also highlighted natural treatment progression in T2D in their review of semaglutide.[3]
+ The objective of this analysis is to determine the extent to which simulating treatment escalation in a comparison of an intervention versus "standard of care" influences cost-effectiveness estimates in type 2 diabetes, using an example of tubeless automated insulin delivery (AID) compared to non-automated standard of care. **This is explicitly concerning treatment progression in the "standard of care" comparator arm.**

COMPARISON AND METHODS

METHODS

+ Cost-effectiveness analyses were conducted using the Simulation of Costs, Outcomes, and Treatment Dynamics in Type 2 Diabetes Mellitus (SCOTT2) model[4] from a US payer perspective.
+ A treatment escalation module simulated progression of patients through the spectrum of "Standard of Care" therapies -- through non-insulin regimens used independently or as background to insulin. Patients' treatment is escalated only in the "Standard of Care" arm.
+ Non-insulin therapies included oral antidiabetic agents, sodium-glucose cotransporter-2 inhibitors, and GLP-1 RA medications.
  - Patients could then escalate to basal insulin, multiple daily injections, or continuous subcutaneous insulin infusion.
+ All model settings were identical except for escalation. The model was run with escalation off and with escalation triggered at HbA1c thresholds of 9.0%, 8.5%, 8.0%, 7.5%, and 7.0%.
+ Treatment distribution at baseline were sourced from the SECURE T2D Trial[5] and ICER's 2022 report[1] on tirzepatide

Comparison

Intervention: Continuous use of tubeless AID (Omnipod 5)

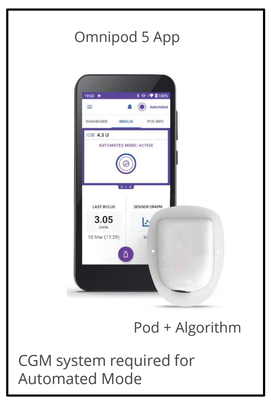
Comparator: Escalation from non-insulin therapies to various insulin modalities to non-AID CSII throughout the model time horizon to reflect real world practice

+ Treatment effects sourced from SECURE T2D Trial[5]
+ In the comparator arm, tubeless AID use was considered static throughout the model time horizon. **The escalation occurs only in the standard of care arm to reflect real-world practice.**
+ An overview of the tubeless AID system is below.

Omnipod 5 System Overview

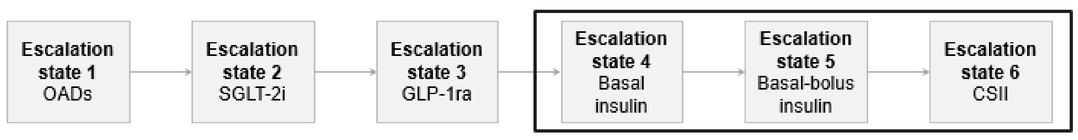
- The Omnipod 5 AID System includes a wearable, tubeless, waterproof (IP28#) insulin pump (the Pod) containing the dosing algorithm that communicates with a compatible CGM to adjust insulin delivery every 5 minutes based on current and predicted glucose values
- The Omnipod 5 App is used to start and stop Automated Mode, deliver boluses, view data, and change settings
- Omnipod 5 is indicated for type 1 diabetes for ages 2+, and type 2 diabetes for ages 18+

#IP28 rating for up to 25 feet (7.6 meters) for up to 60 minutes



TREATMENT ESCALATION PATHWAY

Figure 1. Treatment Escalation Pathway



Note: Patients can only use one insulin type at a time, with insulin states in black bordered box.
Abbreviations: CSII = continuous subcutaneous insulin infusion; GLP-1ra = Glucagon-Like Peptide-1 Receptor Agonist; OAD = oral antidiabetic; SGLT-2i = Sodium-Glucose Cotransporter-2 Inhibitor.

Table 1. HbA1c Treatment Benefit by Component

Category	Treatment benefit (HbA1c reduction)	Source
OAD	0.80%	CADTH 2024[6]; Palmer et al., 2021[7]
GLP-1ra	0.69%	
SGLT-2i	0.41%	
Basal Insulin	0.55%	
Basal-Bolus Insulin	0.12%	
CSII	0.40%	Scott et al., 2019[8]

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RESULTS

Table 2. Top-Line Cost-Effectiveness Estimates by Treatment Escalation Threshold (Omnipod 5 vs. non-automated Standard of Care)

Standard of Care Treatment Escalation	Incremental Cost-Utility Ratio (ICUR)	Inc. LYG	Inc. QALYs	Inc. Costs ($2025)
Off	$66,458	0.33	1.55	$103,010
HbA1c: 9.0%	$12,596	0.18	1.62	$20,406
HbA1c: 8.5%	$9,028	0.18	1.68	$15,167
HbA1c: 8.0%	$9,972	0.18	1.72	$17,152
HbA1c: 7.5%	$10,361	0.19	1.75	$18,132
HbA1c: 7.0%	$11,463	0.19	1.76	$20,176

Note: Very small deviations from the published abstract (all <0.3%) reflect Monte Carlo error only, no structural changes made.

Figure 2. Incremental Cost-Utility Ratios (Cost/QALY) of Omnipod 5 vs. non-automated Standard of Care

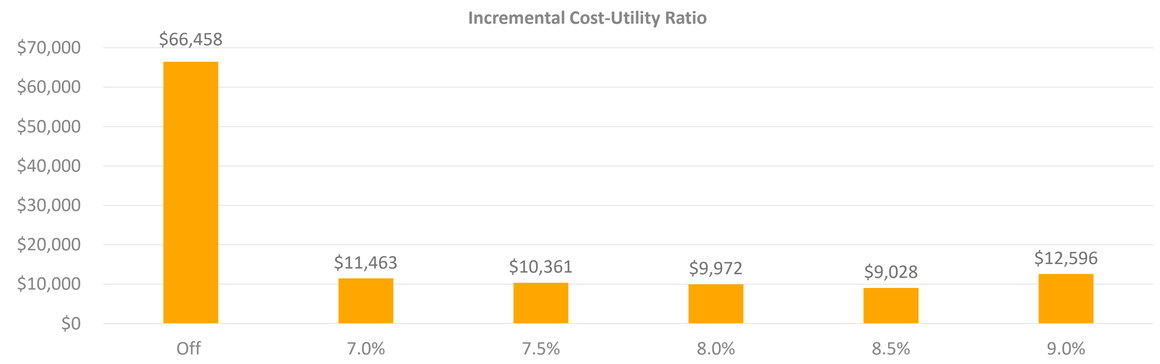


Figure 3. Difference in 100-Year Cumulative Incidence vs. No Treatment Escalation

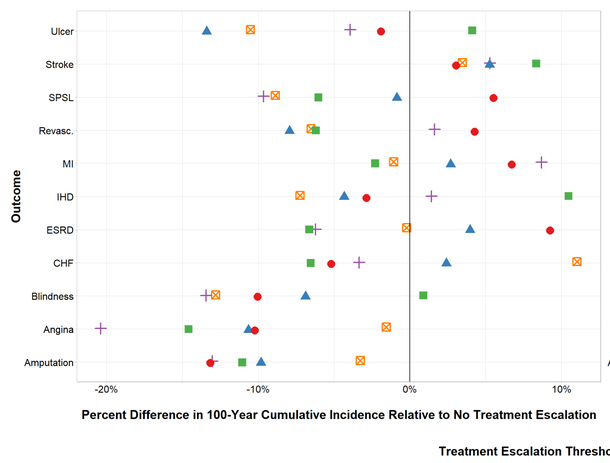
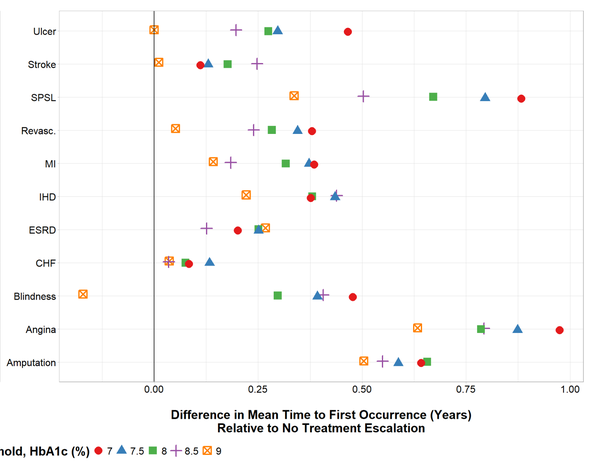


Figure 3. Difference in Mean Time to First Occurrence



CONCLUSIONS

+ Simulating treatment escalation and discontinuation to reflect guideline-concordant real-world care practice can notably influence cost-effectiveness endpoints in T2D.
+ The specific thresholds that trigger treatment intensification (e.g., 7.5%, 8.0%) may be less influential than the general inclusion of treatment escalation
+ Effects on estimates of incremental ratios may be directionally ambiguous, as incidence of complications may be delayed while additional treatment acquisition costs are incurred
+ Local practice patterns should be considered to closely match real-world treatment dynamics in the given geography
+ Tubeless AID therapy is cost-effective for United States payers at the $100,000/QALY willingness-to-pay threshold regardless of inclusion or choice of treatment escalation modeling thresholds

REFERENCES

1. Lin GA, Brouwer E, Nikitin D, Moradi A, Chen Y, Herron-Smith S, Hansen RN, Pearson SD, Campbell JD. Tirzepatide for Type 2 Diabetes; Final Report. Institute for Clinical and Economic Review, February 15, 2022. https://icer.org/assessment/diabetes-type-2-2022/#timeline.
2. National Institute for Health and Care Excellence (2023). Tirzepatide for treating type 2 diabetes - Technology appraisal guidance TA924.
3. CADTH Common Drug Review: Pharmacoeconomic Review Report for Ozempic. Final report, June 2019.
4. Weinstein, J., Hopley, C., Zara, A., Szafranski, K., Biskupiak, J., & Carlow, D. (2025). EE326 Development and Validation of a Novel Patient Microsimulation Cost-Effectiveness Model to Evaluate Automated Insulin Delivery Systems in Type 2 Diabetes. Value in Health, 28(12), S168.
5. Pasquel, F. J., Davis, G. M., Huffman, D. M., Peters, A. L., Parker, J. C., Laffel, L. M., ... & Beck, R. W. (2025). Automated insulin delivery in adults with type 2 diabetes: a nonrandomized clinical trial. JAMA Network Open, 8(2), e2459348.
6. Li S, Nong, K., Shi, Q. (2024). Sodium-Glucose Cotransporter-2 Inhibitors in Type 2 Diabetes Mellitus. Available online. Accessed: June 9 2025.
7. Palmer SC, Tendal B, Mustafa RA, Vandvik PO, Li S et al. (2021) Sodium-glucose cotransporter protein-2 (SGLT-2) inhibitors and glucagon-like peptide-1 (GLP-1) receptor agonists for type 2 diabetes: systematic review and network meta-analysis of randomised controlled trials. BMJ 372 m4573.
8. Scott ES, McGrath RT, Januszewski AS, Calandro D, Hardikar AA et al. (2019) HbA1c variability in adults with type 1 diabetes on continuous subcutaneous insulin infusion (CSII) therapy compared to multiple daily injection (MDI) treatment. BMJ open 9 (12): e033059.

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Omnipod 5 is FDA cleared and CE marked for use in individuals 2 years and older with type 1 diabetes and is FDA cleared for use in individuals 18 years and older with type 2 diabetes.