

Artificial Intelligence Decision Support Enhances Engagement and Integration with Home Diabetes Care

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Background

The majority of youth with Type 1 Diabetes do not meet glycemic targets

–Cincinnati Children’s Hospital mean HbA1c 8.7%

Continuous glucose monitors (CGM) and pumps provide a wealth of knowledge largely untapped

–Provider visits only every 3 months

–Complex data

–Months of unutilized data between visits

–44/52 weeks: self interpretation and management

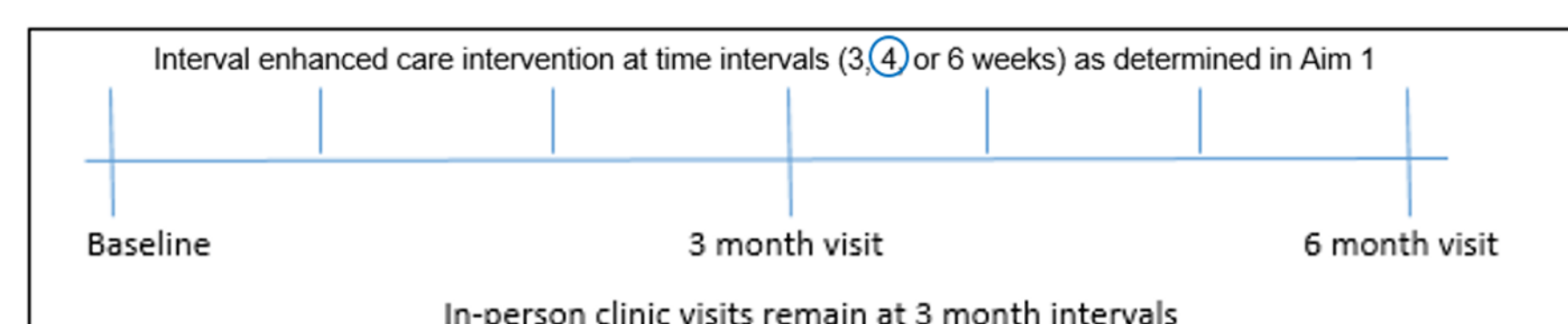
Artificial Intelligence (AI) can aid in aggregation and analysis of data, generation of recommendations for insulin adjustments

We investigated an enhanced care intervention (ECI) that uses AI-guided decision-making (DreaMed Advisor Pro®)

Methods

Aims

#1: Co-design an ECI with patients/families integrating AI-guided recommendations into provider visits and inter-office opportunities



#2: Establish short-term efficacy for the ECI

–Primary Outcome: Time in range

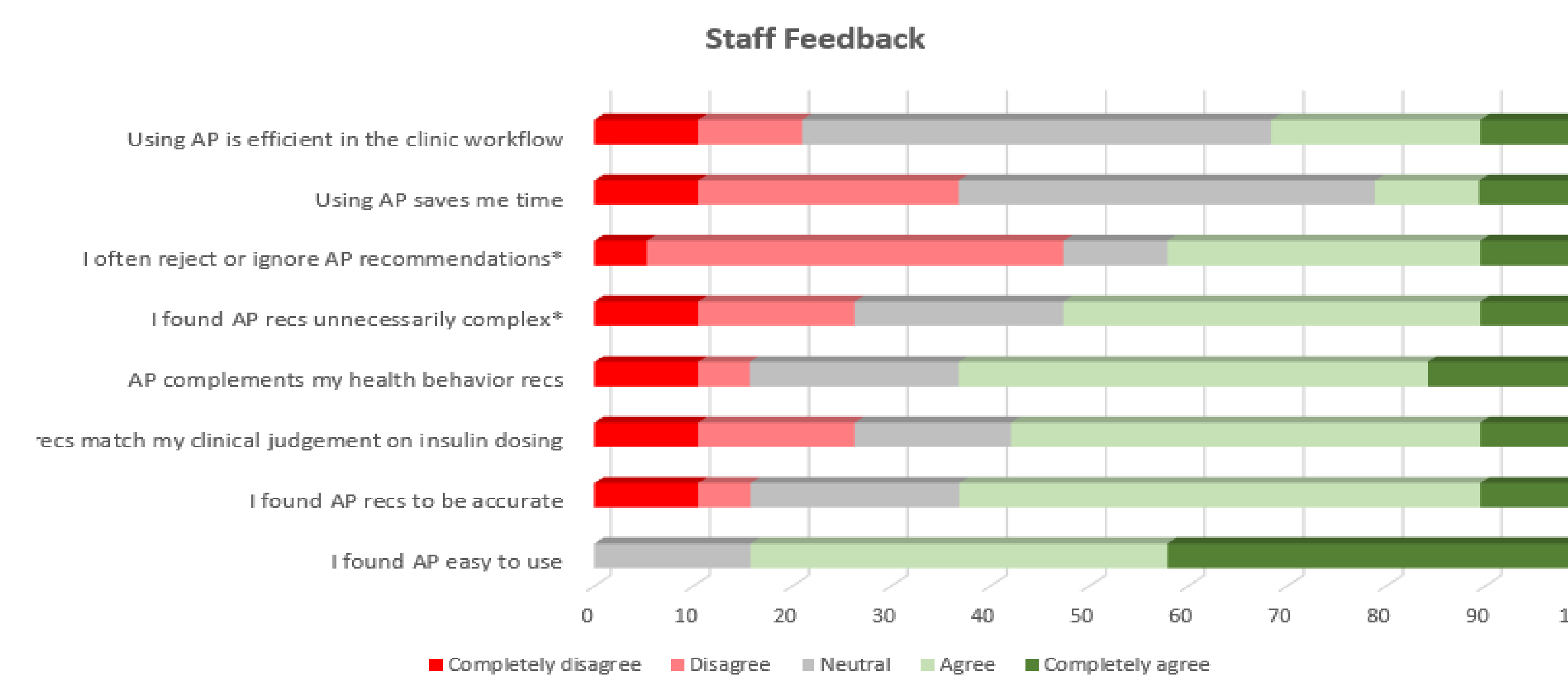
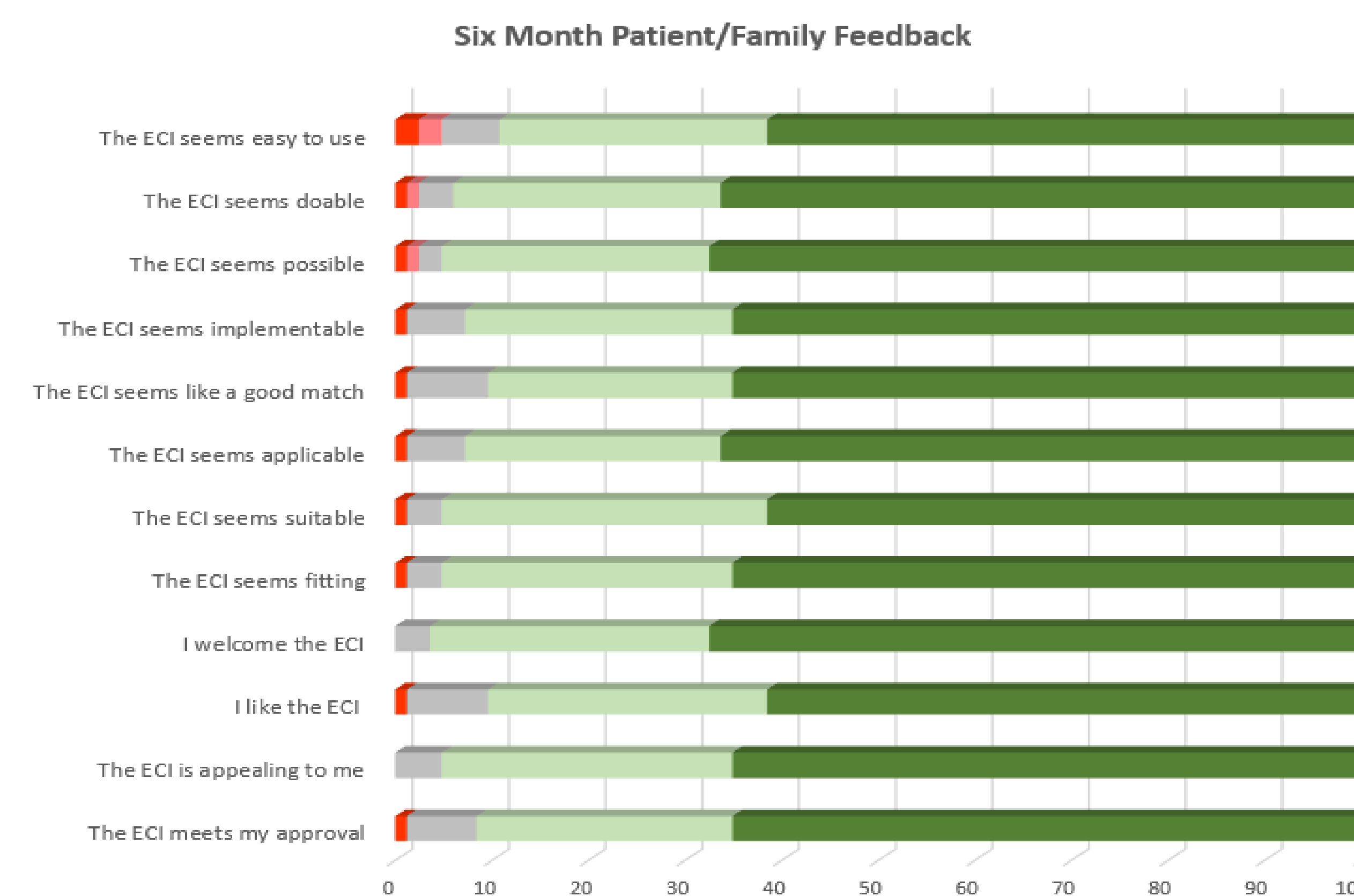
–Secondary Outcomes: HbA1c/GMI, % hypoglycemia

#3: Examine acceptability, appropriateness, and feasibility of the ECI

Results

	Baseline (n=96)	3-month Visit (n=92)	6-month Visit (n=85)
HbA1c (%) [mean ± std (range)]	7.79 ± 0.87 (6.1, 10.6) [n=95]	7.84 ± 1.05 (5.9, 11.1) [n=90]	7.81 ± 0.90 (6.0, 10.2) [n=83]
Glucose management index (%) [mean ± std (range)]	7.96 ± 0.74 (6.7, 10.2) [n=88]	7.95 ± 0.82 (6.6, 10.9) [n=83]	8.03 ± 0.71 (6.7, 10.0) [n=70]
Time in range (%) [mean ± std (range)]	45.4 ± 14.3 (5.5, 72.1) [n=96]	46.3 ± 15.5 (2.1, 87.6) [n=90]	43.8 ± 13.0 (13.0, 74.6) [n=84]
Hypoglycemia (%) [mean ± std (range)]	1.96 ± 2.24 (0, 11.4) [n=96]	2.25 ± 2.15 (0, 14.1) [n=90]	2.24 ± 2.22 (0, 9.7) [n=83]

Using a general linear mixed model, no differences were seen over time for HbA1c (p=0.94), glucose management index (p=0.76), time in range (p=0.51), and hypoglycemia (p=0.60).



*agree/disagree responses have been inverted
†AP, Advisor Pro®

Discussion

No statistical change in glycemic outcomes was appreciated

Patient/family feedback was largely positive regarding acceptability, feasibility, and appropriateness of the ECI

Provider feedback was more heterogeneous (complexity and level of agreement with insulin recs)

Challenges at times were seen with home upload compatibility and data flow between diabetes platforms, limiting use of AI decision support

Negative patient/family feedback correlated with the inconsistent usability of platforms for data upload and recommendation generation

When available, cloud based device uploading greatly improved usability of the ECI, further supporting lessening the onus on patients/families is of benefit

Despite challenges, feedback on the ECI, if anything, improved by 6 months

Conclusion

Although there were no statistically significant changes to metabolic outcomes, participant enthusiasm encourages continued acceptability of the intervention to explore further glycemic improvement with longitudinal application and improved interoperability between diabetes device platforms

Acknowledgements

Financial support was provided by Place Outcomes Research Award. Cincinnati Children’s Hospital Study team acknowledges partnership with DreaMed Diabetes and T1Dx-QI Collaborative.

Inclusion Criteria	T1D for ≥6 months	Ages 7-24 years	Use of insulin pump and CGM	HbA1c or GMI 7-13%
Exclusion Criteria	Alternative diabetes diagnosis	Patients on closed loop pump/CGM models	Insufficient CGM use to utilize AI	Use of non-insulin diabetes medications