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ORIGINAL ARTICLE

Sustained Glycemic Outcomes with the MiniMed™ 780G System: Real-World Evidence from >16,000 Users Across 18 Latin American Countries Over Two Years

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Abstract

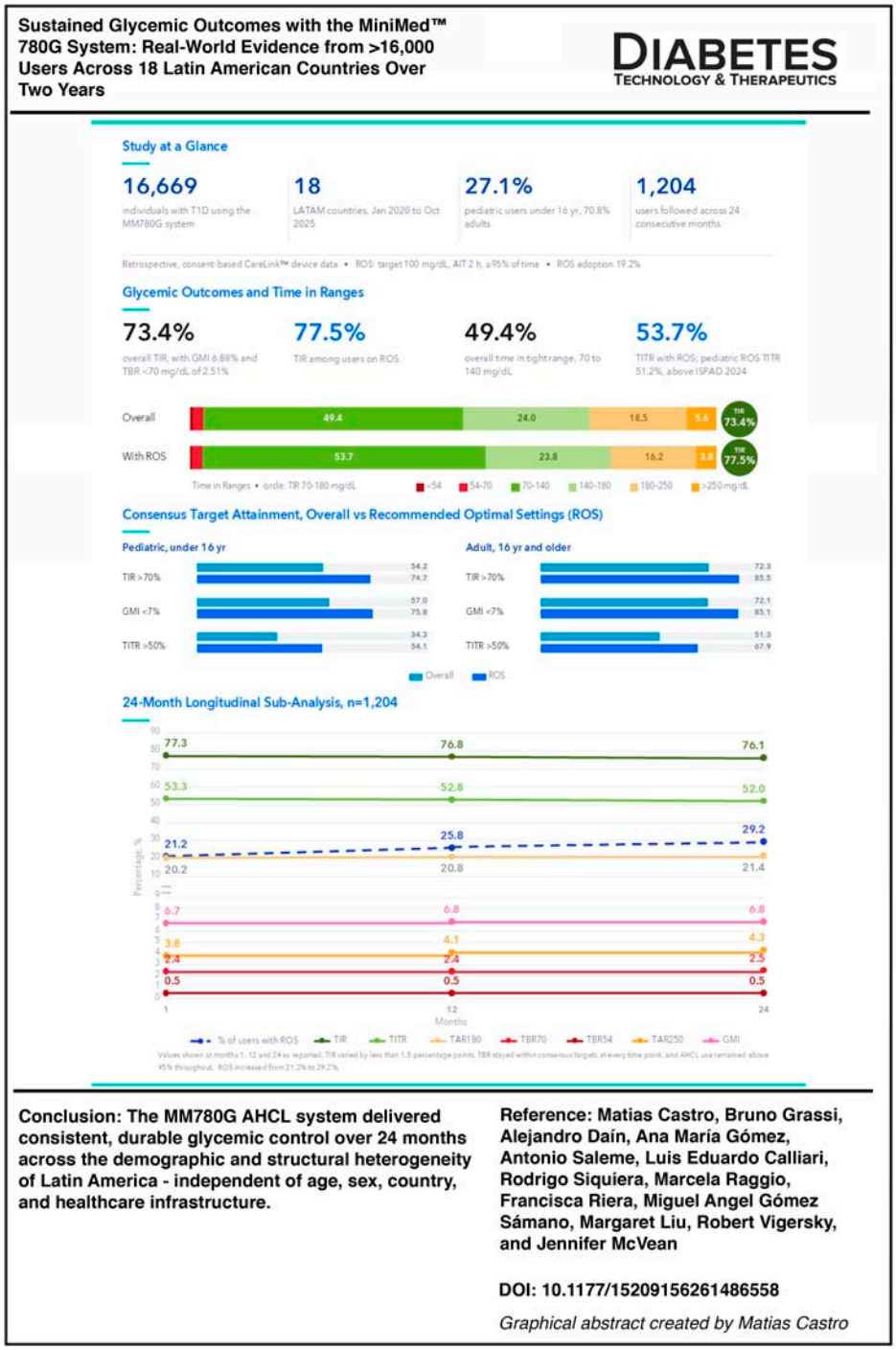
Background and Aims: Automated insulin delivery (AID) systems achieve consistent glycemic outcomes in real-world settings, yet access across Latin America (LATAM) remains critically low, with marked disparities driven by demographic, structural, and health care infrastructure heterogeneity across the region. This study characterizes the real-world performance of the MiniMed™ 780G (MM780G) advanced hybrid closed-loop (AHCL) system across 18 LATAM countries and evaluates the durability of glycemic outcomes over 24 months.

Methods: Data from 16,669 individuals with type 1 diabetes using the MM780G system across 18 LATAM countries (January 2020–October 2025) were analyzed; 27.1% were pediatric (<16 years) and 70.8% adult (≥16 years). Primary outcomes included time in range (TIR), time in tight range (TITR), glucose management indicator (GMI), and time below range (TBR), stratified by age, sex, country, and recommended optimal settings (ROS: glucose target 100 mg/dL, active insulin time 2 h, ≥95% of time). A longitudinal sub-analysis followed 1204 users across 24 consecutive monthly time points.

Results: Overall, mean TIR was 73.4% and GMI 6.9%, with TBR within consensus targets; approximately two-thirds of users achieved TIR > 70% and GMI < 7.0%. ROS was adopted by 19.2% of users, which was associated with substantially improved outcomes, with mean TIR 77.5%, TIR > 70% attainment occurred in 83.9% of users, and composite target of GMI < 7, TIR > 70, TB70 < 4 and TB54 < 1 attainment rising to 66.4%. Pediatric users met or exceeded (with ROS) the internationally recommended 70%TIR threshold (mean overall TIR 70.0% and 74.2% with ROS), while adults (mean TIR 74.6%) aligned closely with US and Europe, Middle East and Africa real-world benchmarks. TITR exceeded 50% in adults (50.3% overall and 54.1% with ROS) and exceeded the International Society for Pediatric and Adolescent Diabetes (ISPAD) 2024 recommended threshold of 50% in pediatric users (mean TITR 51.2% with ROS). Outcomes were consistent across sex and all five national cohorts. In the 24-month longitudinal sub-analysis, TIR remained clinically stable within one and a half percentage points throughout both age groups.

Conclusion: The MiniMed™ 780G AHCL system delivered consistent and durable glycemic control over 24 months across the full demographic and structural heterogeneity of Latin America. Performance was aligned with internationally recommended consensus targets and was independent of age, sex, country, and

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health care infrastructure. Eliminating barriers to AID access is an immediate and achievable priority in the region and may improve the health of hundreds of thousands of people with diabetes in Latin America.

Keywords: automated insulin delivery, Latin America, MiniMed 780G system, time in range.

Introduction

Automated insulin delivery (AID) systems have emerged as the preferred therapeutic modality for type 1 diabetes (T1D), superseding sensor-augmented pump therapy and multiple daily injections as the standard of care for those with access to advanced diabetes technology.

The MiniMed™ 780 G system (MM780G; MiniMed, Northridge, CA, USA) represents the current iteration of the Medtronic-MiniMed advanced hybrid closed-loop (AHCL)

platform available in the Latin America (LATAM) region. The MM780G adjusts basal insulin and delivers automated correction boluses as often as every 5 min. The system offers user-selectable glucose targets of 100, 110, or 120 mg/dL (with a temporary target of 150 mg/dL) with an active insulin time (AIT) adjustable between two and 8 h. To the authors' knowledge, the MM780G is the only commercially available AHCL system that incorporates a dedicated meal detection module on top of its standard AID hyperglycemia-correction capabilities: an algorithm-driven feature that identifies unannounced carbohydrate intake and modulates insulin delivery to mitigate post-prandial hyperglycemia, thereby providing a safety net for the everyday real-world scenario in which a user forgets a meal bolus.

The clinical effectiveness of the MM780G system has been demonstrated consistently through pivotal studies and large-scale real-world analyses. In the US pivotal trial, Carlson et al.[1] reported an overall time in range (TIR) of 74.5% and TBR of 2.3% among users aged 14–75. In real-world settings, Silva et al.[2] reported that more than 77% of 4,120 post-commercialization users achieved TIR > 70%, while Arrieta et al.[3] confirmed similar target attainment in a global cohort of 12,870 users across pediatric and adult age groups. In the most comprehensive published real-world report available, Choudhary et al.[4] demonstrated sustained TIR > 70% across more than 100,000 Europe, Middle East and Africa (EMEA) MM780G users over 3 years, with outcomes improving further among users on recommended optimal settings (ROS: glucose target 100 mg/dL and AIT 2 h for ≥ 95% of the time). The reproducibility of these findings across populations, health care systems, and observation periods contributes to a growing body of evidence supporting the MM780G's real-world performance.

Despite this globally validated evidence base, AID penetration across LATAM remains very low (1.5% based on Medtronic internal data), with marked disparities ranging from effectively zero access in several countries to approximately 8.6% in Chile. This stands in contrast with high-income regions where public and private policies have permitted wider adoption. Ensuring equitable access to AID technology in LATAM remains a shared challenge for health care systems, payers, clinicians, industry, and patient communities. Weighing the value of advanced diabetes technologies within constrained health care budgets is inherently complex. Registries of people with type 1 diabetes and their current therapies exist in only a limited number of LATAM countries, with scarce available information, making evidence-based policy-decision-making challenging. In this context, real-world evidence (RWE) derived from consent-based device data platforms such as CareLink™ has emerged as a valid and feasible complement to pivotal trials, offering the population-relevant data that health technology assessment processes require, especially in a region such as LATAM where there is marked heterogeneity of health care.

The first real-world characterization of MM780G performance in LATAM was reported in *Diabetes, Obesity and Metabolism,*[5] a landmark contribution that established the regional evidence base and demonstrated, for the first time, that the glycemic effectiveness of the MM780G observed in global trials and EMEA real-world cohorts was fully reproducible in a LATAM context. As a natural evolution of that work, the present analysis expands upon those findings in two important directions. First, the analysis has expanded geographically from four to 18 LATAM countries. Additionally, the cohort has increased from 1025 to more than 16,600 users. Secondly, a longitudinal sub-analysis of 1204 users evaluated the maintenance of glycemic outcomes over 24 months.

Methods

Study population

A total of 16,669 individuals with self-reported T1D using the MM780G system with at least 10 days of data across 18 LATAM countries (Argentina, Aruba, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela) were included (January 2020–October 2025): 10,035 (60.2%) female, 6,554 (39.3%) male; 4519 (27.1%) aged <16 years and 11,804 (70.8%) aged ≥16 years. Overall, 3,208 users (19.2%) were on ROS, with higher adoption in adults (22.9%) than in the pediatric group (9.8%). The five largest national cohorts were included in the country-level analysis: Brazil (n = 6944; 41.7%), Argentina (n = 3437; 20.6%), Colombia (n = 2871; 17.2%), Chile (n = 2229; 13.4%), and Mexico (n = 655; 3.9%). ROS adoption ranged from 13.6% in Argentina to 31.6% in Chile.

Statistics

Device utilization and glycemic outcomes were summarized using mean ± standard deviation. Device use metrics included the percentage of time spent in AHCL mode and continuous glucose monitor (CGM) wear time.

AHCL (automation) time was calculated as the percentage of total pump-active time during which the system remained in SmartGuard (auto-mode), delivering algorithm-driven automated insulin. CGM wear time was calculated independently as the total number of CGM readings divided by the maximum possible readings (288 per day, based on 5-minute sampling intervals), normalized to the total pump-active time, regardless of pump mode. Glycemic control was assessed using mean sensor glucose (SG), glucose management indicator (GMI), and the percentage of time spent within specific glucose ranges over the 24-hour day, including TIR (70–180 mg/dL), time in tight range (TITR; 70–140 mg/dL), time above range (time above range (TAR); > 180 mg/dL and > 250 mg/dL), and time below range (TBR; < 70 mg/dL and < 54 mg/dL).

The proportion of participants achieving internationally recommended glycemic targets was also determined. Evaluated thresholds included TIR > 70%, GMI < 7.0%, TBR < 70 mg/dL < 4%, TBR < 54 mg/dL < 1%. A composite outcome representing achievement of all specified glycemic targets was additionally calculated.

Insulin delivery and system interaction metrics were summarized using mean ± standard deviation and included total daily insulin dose (TDD), basal insulin, bolus insulin, and insulin delivered via automated correction boluses. The contribution of auto-correction boluses was expressed as a percentage of TDD. System engagement was further characterized by the number of meal boluses per day.

The metrics and outcomes were also compared between individuals who used the ROS (a 100 mg/dL glucose target with an AIT of 2 h for ≥ 95% of time) and those who did not.

Longitudinal sub-analysis

A longitudinal sub-analysis included 1204 users with continuous MM780G device data with a minimum of 10 days of device use in each of 24 consecutive months, starting from their first month of MM780G usage. There were 701 adults (≥15 years) and 475 pediatric users (<15 years). The same core metrics assessed in the above analysis include AHCL use, CGM wear time, glycemic range metrics, GMI, mean SG, insulin delivery parameters, and system engagement metrics, were calculated for each month. Additionally, the mean insulin-to-carbohydrate ratio (ICR) trend was assessed.

Results

Overall glycemic outcomes

Overall, mean TIR was 73.4% and GMI 6.9%, with TBR within consensus targets; approximately two-thirds of users achieved TIR > 70% and GMI < 7.0% (Table 1). More than 80% met TBR safety thresholds, and nearly half met all four primary composite targets simultaneously. When using ROS, all metrics improved substantially, with more than 83% of users achieving TIR > 70% and GMI < 7%, and composite target attainment rising to 66.4%. TBR levels remained within consensus recommendations in both the overall and optimal-settings subgroups (Table 1).

Outcomes by age group

Glycemic outcomes by age group are presented in Table 1. Pediatric (<16 years) and adult (≥16 years) users both achieved consensus recommended glycemic control. Hypoglycemia levels remained within consensus recommendations across both age groups. Adults and children utilizing ROS demonstrated substantially improved outcomes, with composite target attainment rising markedly, as detailed in Table 1. Notably, older adults (≥56 years) demonstrated the highest glycemic performance across age groups, achieving a mean TIR of 76.2%, GMI of 6.82%, and the lowest TBR < 70 mg/dL at 2.01%, with 60.3% attaining all four composite targets.

Outcomes by sex

All glycemic metrics were comparable between sexes (Table 2). Proportions achieving TIR > 70% were 68.4% and 65.8%; GMI < 7% 68.1% and 67.7%; composite target 49.9% and 48.5% in females and males, respectively.

Country-level outcomes

Overall, each country achieved international glycemic targets, with mean TIR exceeding 70% and GMI remaining below 7.0% across the full region. LATAM glycemic outcomes are presented in Figure 1. Country-level data were available for five countries (Argentina, Brazil, Chile, Colombia, and Mexico), with detailed numeric results, including estimated AID penetration relative to each country's total T1D population, presented in Table 3 and depicted graphically in Figure 1. Outcomes improved further under ROS in all countries.

Insulin delivery parameters

Mean TDD was 44.1 ± 20.9 U/d overall, with 42.9 ± 7.4% as basal insulin and automated correction boluses accounting for 17.3 ± 6.8% of total daily dose. A mean of 4.8 ± 2.0 meal boluses per day were given. On ROS, TDD was 49.5 ± 21.7 U/d with a higher automated bolus proportion (18.1 ± 6.7%). TDD was higher in males (48.9 ± 23.0 U/d) than females (41.0 ± 18.8 U/d) and higher in adults (45.7 ± 20.8 U/d) than pediatric users (39.9 ± 20.7 U/d) (Table 1). Due to the nature of this real-world analysis, these differences could not be adjusted by weight.

Longitudinal glycemic outcomes over 24 months

Longitudinal glycemic outcomes across a 24-month observation period are presented in Figure 2A, B and Supplementary Figure S1 and Table 4. Mean TIR, GMI, TBR, and TAR remained stable throughout, with all hypoglycemia metrics within consensus goals at each time point.

Adult and pediatric longitudinal trajectories are shown in Supplementary Figure S1A–D. Both age groups sustained clinically stable TIR and TITR across 24 months, above 70% in pediatric users (74%–73%) and above 78% in adults (80%–78%), with TITR consistently maintained around 50% and 55%, respectively. Hypoglycemic profiles remained at goal in both groups at all time points, with the pediatric cohort showing a modest improvement in TBR over time.

Longitudinal insulin delivery parameters

Insulin delivery parameters across the 24-month period are presented in Table 4, Figure 2B, and Supplementary Figure S1B and 1D. Adult and pediatric trajectories diverged substantially, as shown in Supplementary Figure S1B and 1D. Adult TDD remained relatively stable, after a modest increase in TDD during the first 3 months. In contrast, the pediatric cohort showed a 35% increase in TDD over 24 months, with automated correction boluses (U/d) increasing over 50% and ICR declining markedly, consistent with expected growth-related insulin requirements. AHCL was consistently high in both groups throughout the observation period.

Discussion

Robust and sustained glycemic outcomes across LATAM

The MiniMed™ 780 G system delivered consistent and at goal glycemic improvement across a large, heterogeneous real-world population with type 1 diabetes in Latin America. A mean TIR of 73.4 ± 9.4% and GMI of 6.9 ± 0.4%, together with TBR values that remained within consensus guidelines, sustained across more than 16,600 users in 18 countries over 2 years, constitute robust evidence that the system performs reliably under real-world conditions. Grassi et al.,[5] documented a mean TIR of 76.5% and a GMI of 6.7% in 1025 users across four countries, a cohort that represents the early-adopter phase of technology deployment in LATAM. The present study reproduces those glycemic metrics with substantial consistency

Table 1. Glycemic Outcomes and Insulin Delivery Parameters by Age Group and Device Settings (N = 16,669)

	Overall (all ages)				*Pediatric (≤15 years)*				*Adult (≥16 years)*				*Adult (≥56 years)*			
Category	*Overall* (n = *16,669*)	*On ROS* (n = *3208*)	*Not ROS* (n = *13,461*)	P *value*	*Overall* (n = *4519*)	*On ROS* (n = *442*)	*Not ROS* (n = *4077*)	P *value*	*Overall* (n = *11,804*)	*On ROS* (n = *2703*)	*Not ROS* (n = *9101*)	P *value*	*Overall* (n = *976*)	*On ROS* (n = *182*)	*Not ROS* (n = *794*)	P *value*
Study population																
n (%)	16,669	3208 (19.2%)	13,461 (80.8%)		4519 (27.1%)	442 (9.8%)	4077 (90.2%)	—	11,804 (70.8%)	2,703 (22.9%)	9101 (77.1%)	—	976 (5.9%)	182 (18.6%)	794 (81.4%)	—
ROS adoption, %	19.2	100	0	—	9.8	100	0	—	22.9	100	0	—	18.6	100	0	—
AHCL use, %	88.4 ± 16.0	91.3 ± 12.5	87.7 ± 16.6	<0.001*	90.6 ± 14.5	90.7 ± 13.6	90.6 ± 14.5	0.146*	87.6 ± 16.4	91.4 ± 12.4	86.4 ± 17.3	<0.001*	93.4 ± 10.8	95.7 ± 5.47	92.9 ± 11.6	0.011*
Sensor use, %	86.3 ± 14.7	88.0 ± 12.7	85.9 ± 15.1	<0.001*	88.3 ± 13.3	86.8 ± 13.9	88.5 ± 13.3	<0.001*	85.5 ± 15.1	88.1 ± 12.6	84.8 ± 15.8	<0.001*	91.8 ± 9.5 3	93.3 ± 5.52	91.5 ± 10.2	0.155*
Glycemic metrics (mean ± SD)																
TIR 70–180 mg/dL, %	73.4 ± 9.41	77.5 ± 7.92	72.4 ± 9.46	<0.001*	70.0 ± 8.81	74.2 ± 7.86	69.6 ± 8.79	<0.001*	74.6 ± 9.31	78.1 ± 7.78	73.6 ± 9.47	<0.001*	76.2 ± 9.50	80.9 ± 8.04	75.1 ± 9.49	<0.001*
TITR 70–140 mg/dL, %	49.4 ± 9.71	53.7 ± 8.88	48.3 ± 9.61	<0.001*	46.9 ± 8.47	51.2 ± 8.38	46.4 ± 8.34	<0.001*	50.3 ± 9.95	54.1 ± 8.87	49.1 ± 9.97	<0.001*	51.2 ± 10.4	57.2 ± 9.92	49.8 ± 9.96	<0.001*
GMI, %	6.88 ± 0.36	6.73 ± 0.29	6.91 ± 0.37	<0.001*	6.98 ± 0.35	6.83 ± 0.30	7.00 ± 0.35	<0.001*	6.84 ± 0.36	6.71 ± 0.29	6.87 ± 0.37	<0.001*	6.82 ± 0.35	6.64 ± 0.30	6.86 ± 0.34	<0.001*
Mean SG, mg/dL	149.1 ± 15.2	143.0 ± 12.3	150.6 ± 15.5	<0.001*	153.5 ± 14.7	147.1 ± 12.6	154.2 ± 14.7	<0.001*	147.5 ± 15.1	142.3 ± 12.0	149.0 ± 15.5	<0.001*	146.8 ± 14.5	139.1 ± 12.7	148.5 ± 14.4	<0.001*
TAR >180 mg/dL, %	24.1 ± 9.72	20.1 ± 8.16	25.1 ± 9.81	<0.001*	27.4 ± 9.03	23.3 ± 8.17	27.8 ± 9.01	<0.001*	22.9 ± 9.66	19.5 ± 8.02	23.9 ± 9.88	<0.001*	21.8 ± 9.74	17.1 ± 8.33	22.9 ± 9.71	<0.001*
TAR >250 mg/dL, %	5.59 ± 4.80	3.85 ± 3.21	6.00 ± 5.01	<0.001*	7.20 ± 5.16	5.22 ± 3.74	7.41 ± 5.25	<0.001*	4.98 ± 4.49	3.62 ± 3.05	5.38 ± 4.77	<0.001*	4.46 ± 4.10	2.89 ± 3.04	4.82 ± 4.22	<0.001*
TBR <70 mg/dL, %	2.51 ± 1.84	2.39 ± 1.65	2.54 ± 1.89	0.016*	2.58 ± 1.74	2.47 ± 1.75	2.60 ± 1.73	0.099*	2.48 ± 1.88	2.37 ± 1.63	2.51 ± 1.95	0.220*	2.01 ± 1.73	2.10 ± 1.63	1.98 ± 1.75	0.181*
TBR <54 mg/dL, %	0.59 ± 0.65	0.51 ± 0.52	0.61 ± 0.68	<0.001*	0.60 ± 0.58	0.56 ± 0.58	0.60 ± 0.58	0.019*	0.58 ± 0.68	0.50 ± 0.51	0.61 ± 0.72	<0.001*	0.41 ± 0 .57	0.38 ± 0.45	0.41 ± 0.59	0.950*
Consensus target attainment (%)																
TIR >70%	67.4	83.9	63.4	<0.001**	54.2	74.7	52.0	<0.001**	72.3	85.5	68.4	<0.001**	76.4	90.7	73.2	<0.001**
GMI <7%	67.9	83.8	64.2	<0.001**	57.0	75.8	55.0	<0.001**	72.1	85.1	68.3	<0.001**	73.3	89.6	69.5	<0.001**
TITR >50%	46.7	66.0	42.1	<0.001**	34.3	54.1	32.2	<0.001**	51.3	67.9	46.4	<0.001**	53.3	76.9	47.9	<0.001**
TBR70 <4%	82.8	85.2	82.2	<0.001**	81.7	85.1	81.4	0.060**	83.2	85.2	82.6	0.001**	87.6	87.4	87.7	0.901**
TBR54 <1%	83.1	86.4	82.3	<0.001**	82.6	86.0	82.2	0.048**	83.4	86.6	82.4	<0.001**	89.4	90.7	89.2	0.688**
TAR180 <25%	56.7	73.9	52.6	<0.001**	41.5	60.2	39.5	<0.001**	62.4	76.2	58.3	<0.001**	65.4	83.0	61.3	<0.001**
Composite (all 4 targets) GMI <7% TIR >70% TBR70 <4% TBR54 <1%,%	49.4	66.4	45.3	<0.001**	38.9	59.3	36.7	<0.001**	53.4	67.6	49.1	<0.001**	60.3	76.9	56.5	<0.001**
Insulin delivery parameters																
TDD, U/d	44.1 ± 20.9	49.5 ± 21.7	42.8 ± 20.5	<0.001*	39.9 ± 20.7	54.3 ± 19.2	38.4 ± 20.3	<0.001*	45.7 ± 20.8	48.7 ± 22.0	44.9 ± 20.3	<0.001*	37.7 ± 20.4	4 1.6 ± 23.6	36.8 ± 19.5	0.020*
Basal, % TDD	42.9 ± 7.40	43.6 ± 6.90	42.7 ± 7.50	<0.001*	40.9 ± 6.01	42.2 ± 6.18	40.8 ± 5.97	<0.001*	43.6 ± 7.71	43.8 ± 6.98	43.5 ± 7.91	0.002*	42.8 ± 7.81	43. 2 ± 7.03	42.7 ± 7.98	0.246*
Auto-bolus, % TDD	17.3 ± 6.80	18.1 ± 6.56	17.1 ± 6.85	<0.001*	19.2 ± 6.32	20.2 ± 6.60	19.1 ± 6.28	<0.001	16.6 ± 6.83	17.7 ± 6.46	16.3 ± 6.90	<0.001*	16.5 ± 7.03	16.7 ± 6.87	16.5 ± 7.07	0.960*
Meal boluses/d	4.83 ± 1.95	4.70 ± 1.88	4.86 ± 1.96	<0.001*	5.32 ± 1.93	4.93 ± 1.98	5.36 ± 1.91	<0.001*	4.64 ± 1.92	4.66 ± 1.85	4.64 ± 1.94	0.363*	4.55 ± 1.68	4.67 ± 1.97	4.52 ± 1.61	0.705*
AHCL exits/wk	0.99 ± 0.81	0.90 ± 0.63	1.02 ± 0.85	<0.001*	0.97 ± 0.83	0.99 ± 0.69	0.97 ± 0.84	0.044*	1.00 ± 0.79	0.89 ± 0.63	1.04 ± 0.83	<0.001*	0.73 ± 0.62	0.68 ± 0.60	0.74 ± 0.63	0.138*

*P values with * are from Wilcoxon rank-sum test; ** P values with ** are from Fisher exact test; other P values without * and ** are from two sample t test.

AHCL, advanced hybrid closed-loop; GMI, glucose management indicator; ROS, recommended optimal settings; SG, sensor glucose; TAR, time above range; TBR, time below range; TIR, time in range; TITR, time in tight range; TDD, total daily insulin dose.

TABLE 2. GLYCEMIC OUTCOMES BY SEX: MM780G SYSTEM, LATAM (*N* = 16,669; FEMALE = 10,035, MALE = 6554)

	Overall (all ages)		
Category	*Overall* (n = *16,669*)	*Female* (n = *10,035*)	*Male* (n = *6554*)
Study population			
n (%)	16,669	10,035 (60%)	6554 (40%)
ROS adoption, %	19.2	19.2	19.3
AHCL use, %	88.4 ± 16.0	88.0 ± 16.2	88.9 ± 15.6
Sensor use, %	86.1 ± 14.7	85.7 ± 14.8	86.5 ± 14.4
Glycemic metrics (mean ± SD)			
TIR 70–180 mg/dL, %	73.4 ± 9.41	73.5 ± 9.24	73.2 ± 9.64
TITR 70–140 mg/dL, %	49.4 ± 9.71	49.4 ± 9.64	49.3 ± 9.80
GMI, %	6.88 ± 0.36	6.88 ± 0.36	6.88 ± 0.37
Mean SG, mg/dL	149 ± 15.2	149 ± 15.1	149 ± 15.4
TAR >180 mg/dL, %	24.1 ± 9.72	24.0 ± 9.60	24.3 ± 9.88
TAR >250 mg/dL, %	5.59 ± 4.80	5.54 ± 4.71	5.67 ± 4.92
TBR <70 mg/dL, %	2.51 ± 1.84	2.47 ± 1.83	2.58 ± 1.86
TBR <54 mg/dL, %	0.59 ± 0.65	0.59 ± 0.66	0.58 ± 0.64
Consensus target attainment (%)			
TIR >70%	67.4	68.4	65.8
GMI <7%	67.9	68.1	67.7
TITR >50%	46.7	47.2	45.8
TBR <4%	82.8	83.3	81.9
TBR <1%	83.1	83.1	83.2
TAR <25%	56.7	57.3	55.7
Composite (all 4 targets)	49.4	49.9	48.5
Insulin delivery parameters			
TDD, U/d	44.1 ± 20.9	41.0 ± 18.8	48.9 ± 23.0
Basal, % TDD	42.9 ± 7.40	43.4 ± 7.57	42.0 ± 7.03
Auto-bolus, % TDD	17.3 ± 6.80	17.3 ± 6.70	17.2 ± 6.93
Meal boluses/d	4.83 ± 1.95	4.67 ± 1.86	5.08 ± 2.04
AHCL exits/d	0.99 ± 0.81	0.98 ± 0.79	1.01 ± 0.84

across a population significantly larger, geographically broader, and more heterogeneous; the modest attenuation relative to the earlier cohort is entirely consistent with the expected dilution effect as technology access expands beyond early adopters.

Age analyses

In the adult population (≥16 years, *n* = 11,804), TIR of 74.6% and GMI of 6.85% align the LATAM cohort directly with the results documented in 4,120 early EMEA users



FIG. 1. Glycemic outcomes by country.

Table 3. Country-Level Glycemic Outcomes and AID Penetration (Five Largest National Cohorts)

	LATAM		*Argentina*		*Brazil*		*Chile*		*Colombia*		*Mexico*	
Category	*Overall*	*ROS*	*Overall*	*ROS*	*Overall*	*ROS*	*Overall*	*ROS*	*Overall*	*ROS*	*Overall*	*ROS*
Study population												
Number of users, *n*	16669	3208	3437	468	6944	1218	2229	704	2871	565	655	202
Users on ROS, %	19.2	100.0	13.6	100.0	17.5	100.0	31.6	100.0	19.7	100.0	30.8	100.0
Mean SG, mg/dL	149.0	143.0	153.0	145.0	149.0	143.0	144.0	141.0	148.0	143.0	150.0	145.0
GMI, %	6.9	6.7	7.0	6.8	6.9	6.7	6.8	6.7	6.8	6.7	6.9	6.8
Device utilization												
AHCL use, %	88.4	91.3	90.0	91.2	87.1	90.4	92.9	94.2	86.2	89.7	88.2	92.1
TDD, U/d	44.1	49.5	42.3	48.3	44.8	50.3	43.6	49.7	43.9	48.5	46.2	48.5
TIR by age group												
Pediatric TIR, %	70.0	74.2	68.3	—	70.6	74.8	71.6	—	68.9	—	72.1	—
Adult TIR, %	74.6	78.1	73.2	77.1	74.4	77.8	76.3	78.7	75.0	78.4	76.2	79.0
AID penetration												
AID penetration, % of T1D population	4.0		3.8		1.3		8.6		5.7		0.5	

AID, automated insulin delivery.

(TIR 76.2%, GMI 6.8%), by[6] in 7499 US real-world users, and[4] in 101,629 EMEA real-world users. LATAM real-world results are similar to MiniMed 780G pivotal trial results. Carlson et al.[1] reported a mean TIR of approximately 75% in the US pivotal adult cohort. This supports the consistency of the MM780G system across diverse populations, clinical settings, and fundamentally different health care systems.

Among the 3,208 adult users (19.2%) on ROS, TIR rose to 78.1%, and GMI fell to 6.7%, with 84.8% achieving TIR > 70% and 85.7% achieving GMI < 7.0%, while composite target attainment reached 67.4%. These findings represent cross-sectional differences between subgroups, not within-person changes. The gap between overall and optimal-settings performance in the adult cohort (nearly 4 percentage points in TIR and over 15 percentage points in composite target attainment) is consistent with ROS adoption as one of the most readily modifiable levers available to improve patient outcomes across the region. As this is a cross-sectional, nonrandomized comparison between users who did and did not adopt ROS, unmeasured patient, clinician, and system-level factors associated with both ROS adoption and glycemic outcomes cannot be excluded, and the association reported here should not necessarily be interpreted as proof of a causal effect within this real-world cohort.

A finding that deserves particular emphasis is that pediatric users in the overall LATAM cohort achieved a mean TIR of 70.0 ± 8.81%, meeting the consensus threshold of 70%,[7] without any formal optimization protocol and with only 9.8% utilizing ROS. That a broader, less optimized, and more representative pediatric population reaches the 70% threshold, a goal unmet for most pediatric T1D cohorts outside of AHCL, strengthens the case for expanded pediatric access across the region. With ROS, pediatric mean TIR rose to 74.2 ± 7.86%, exceeding the 70% international threshold. While slightly below the 78.9% reported by Arrieta et al.[3] in 365 pediatric users (<16 years) on ROS from a global CareLink™ sample, the present findings carry greater generalizability given the considerably larger and demographically heterogeneous LATAM cohort. Composite target attainment was more than 20 percentage points higher in the ROS subgroup than in the non-ROS pediatric cohort (Table 1), consistent with the 70% population-level threshold being an attainable goal with the appropriate technology.

A newer metric, TITR (70–140mg/dL), is emerging as a potentially better metric than TIR for prognosis,[8–10] particularly for microvascular endpoints where sustained exposure to glucose values in the upper portion of the TIR band contributes meaningfully to cumulative glycemic burden.[10–12]

Adults achieved TITR 50.7 ± 9.8% overall, while children reached 46.3 ± 8.20%; the corresponding TITR values were 53.7 ± 8.9% and 52.0 ± 9.07%, respectively, among the distinct, nonoverlapping ROS subgroup. These results are similar to those reported by Castañeda et al.,[13] who reported mean TITR of 48.9% and 48.8% in pediatric and adult MM780G users, with optimal-settings users achieving 56.7% and 57.0%, respectively. The optimal-settings pediatric cohort, at TITR of 52.0%, meets and surpasses the TITR > 50% target established by the ISPAD 2024 Clinical Practice Consensus Guidelines as the recommended threshold for children and adolescents using advanced diabetes technologies,[14] narrowing the adult-pediatric TITR gap from approximately 4.4 percentage points to 1.7 under optimization.

The potentially neuroprotective implications of achieving these TITR levels in children are important to consider. Longitudinal neuroimaging data confirm that children with T1D exhibit reduced brain volumes and lower full-scale IQ compared with age-matched controls, with differences correlated with cumulative hyperglycemic exposure and widening over time;[15] acute hyperglycemia further impairs spatial working memory with direct consequences for academic performance.[16] Given that children with T1D in LATAM face decades of glycemic exposure during the most critical window of neurodevelopment, the TITR levels achieved by MiniMed™ 780 G in the present pediatric cohort carry potential implications that extend well beyond glycemic control.

In the present analysis, older adult users (≥56 years, *n* = 976) achieved the strongest outcomes of any age group.

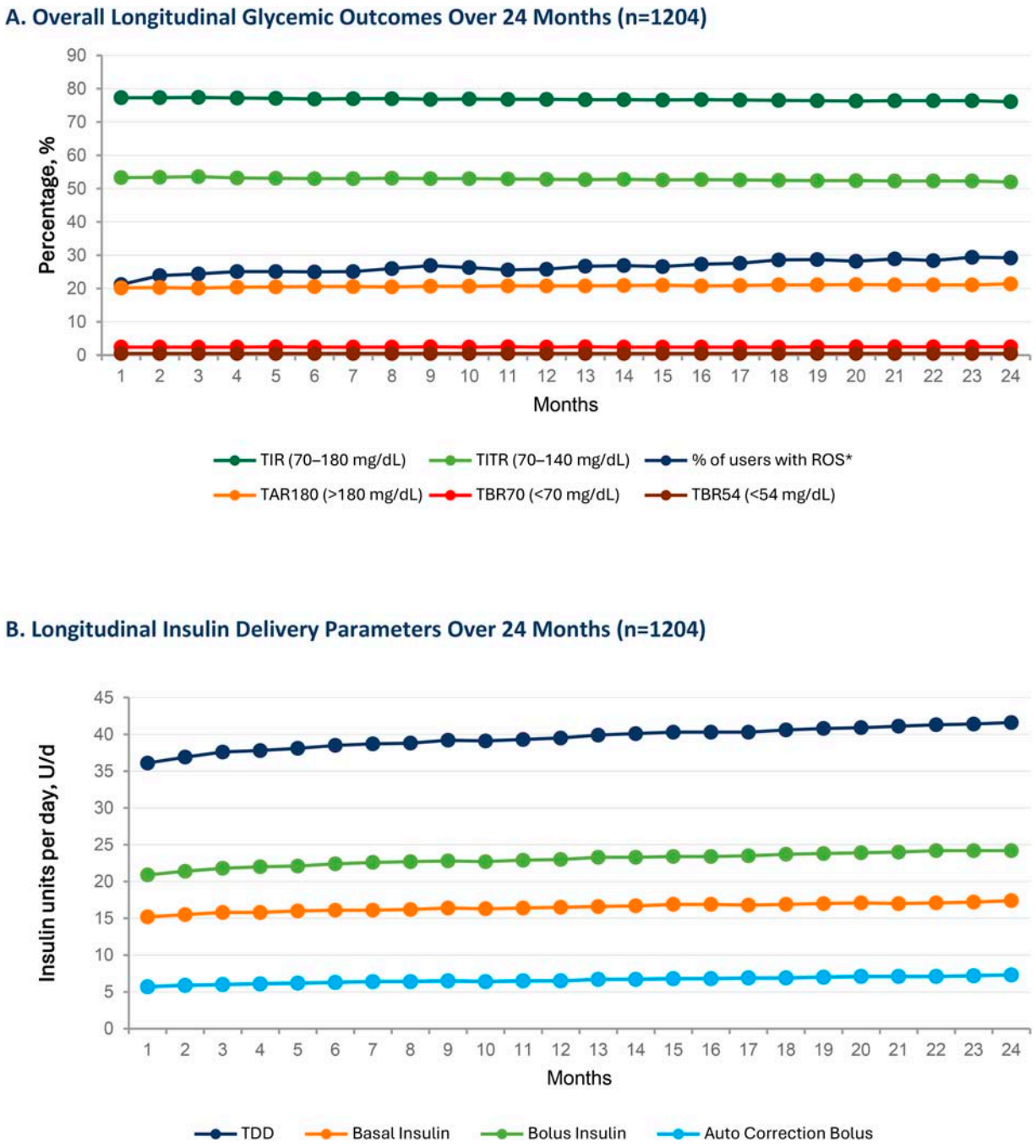


FIG. 2. **(A)** Overall longitudinal glycemic outcomes over 24 months (n = 1204). **(B)** Longitudinal insulin delivery parameters over 24 months (n = 1204).

This pattern, previously documented in the EMEA RWE analysis by Choudhary et al.[4] and in the recent multinational analysis by Smaniotto et al.[17] across 7,415 older MM780G users, who achieved a mean TIR of 77.1% versus 73.1% in those aged 16–55 years, with sustained glycemic control over 12 months without increased hypoglycemia. Similarly, RWE from the US published by Chien et al.[18] reported consistently high TIR in a cohort of 8,542 MM780G users aged ≥ 65 and ≥ 75 years. In the present LATAM study, 90.7% of older adults on ROS achieved TIR above 70%, the highest attainment of any subgroup, with GMI of 6.6% and TITR of 55.9%, also the highest of any group with the lowest TBR < 70mg/dL and 54 mg/dL compared to younger users. This represents clinical relevance in a population where hypoglycemia unawareness, cognitive vulnerability, and cardiovascular risk collectively amplify the benefit of automated glycemic control.[19]

Several factors may contribute to this pattern, including more consistent routines after retirement, greater experience with diabetes self-management, and preferential ROS adoption in older adults due to increased clinical focus on optimal glycemic control without increasing hypoglycemia. These remain hypotheses, as the database lacks behavioral, psychosocial, and clinician-level data to test them.

Table 4. Longitudinal Glycemic and Insulin Delivery Outcomes at Selected Time Points: Sub-Analysis (N = 1204)

	Overall (n = *1204*)			*Pediatric <16 yr* (n = *475*)			*Adult ≥16 yr* (n = *701*)		
Category	*Month 1*	*Month 12*	*Month 24*	*Month 1*	*Month 12*	*Month 24*	*Month 1*	*Month 12*	*Month 24*
Glycemic metrics									
TIR 70–180 mg/dL, %	77.3 ± 9.3	76.8 ± 9.6	76.1 ± 9.7	73.5 ± 9.4	73.5 ± 9.0	73.0 ± 8.7	79.8 ± 8.3	79.0 ± 9.3	78.2 ± 9.8
TITR 70–140 mg/dL, %	53.3 ± 10.3	52.8 ± 10.7	52.0 ± 10.7	50.3 ± 9.6	50.1 ± 9.1	49.4 ± 9.2	55.3 ± 10.2	54.8 ± 11.0	53.7 ± 11.3
TAR >180 mg/dL, %	20.2 ± 9.4	20.8 ± 9.8	21.4 ± 10.0	23.8 ± 9.5	23.9 ± 9.1	24.5 ± 9.1	17.9 ± 8.5	18.6 ± 9.6	19.4 ± 10.1
TAR >250 mg/dL, %	3.8 ± 3.9	4.1 ± 4.1	4.3 ± 4.3	5.4 ± 4.7	5.3 ± 4.5	5.4 ± 4.5	2.8 ± 2.8	3.3 ± 3.6	3.6 ± 4.0
TBR <70 mg/dL, %	2.4 ± 2.0	2.4 ± 1.9	2.5 ± 2.0	2.7 ± 2.0	2.5 ± 1.9	2.5 ± 1.8	2.3 ± 1.9	2.3 ± 1.9	2.4 ± 2.1
TBR <54 mg/dL, %	0.5 ± 0.6	0.5 ± 0.6	0.5 ± 0.6	0.5 ± 0.6	0.5 ± 0.6	0.5 ± 0.6	0.4 ± 0.6	0.5 ± 0.6	0.5 ± 0.6
GMI, %	6.7 ± 0.3	6.8 ± 0.4	6.8 ± 0.4	6.8 ± 0.4	6.9 ± 0.3	6.9 ± 0.3	6.7 ± 0.3	6.7 ± 0.3	6.7 ± 0.4
Mean SG, mg/dL	143.3 ± 14.1	144.1 ± 14.9	145.1 ± 15.3	147.7 ± 14.7	148.0 ± 14.2	149.0 ± 14.4	140.4 ± 12.8	141.3 ± 14.5	142.6 ± 15.4
Target attainment (%)									
TIR >70%, %	80.1	77.4	75.2	67.8	66.7	64.2	88.2	84.9	82.2
GMI <7%, %	81.5	79.9	76.3	72.6	72.4	69.1	87.3	85.0	81.2
TBR <4%, %	83.0	82.4	80.6	80.4	81.9	79.8	84.7	82.9	81.2
TBR <1%, %	86.5	84.6	82.8	84.8	83.4	83.6	87.4	85.6	82.3
Composite (GMI <7 TIR >70 TB70 <4 TB54 <1)	63.4	59.4	54.2	53.5	50.5	45.9	69.9	65.5	59.6
Device settings									
% on optimal settings, %	21.2	25.8	29.2	6.5	9.1	17.3	31.1	37.1	37.8
AHCL use, %	95.9 ± 10.9	95.5 ± 10.1	95.1 ± 10.1	95.3 ± 12.9	96.4 ± 9.0	96.6 ± 7.0	96.3 ± 9.3	95.0 ± 10.1	94.0 ± 11.8
Insulin delivery parameters									
TDD, U/d	36.1 ± 19.8	39.5 ± 20.6	41.6 ± 20.3	27.8 ± 18.0	33.1 ± 19.6	37.6 ± 19.8	41.8 ± 19.1	44.0 ± 20.3	44.5 ± 20.2
Basal, U/d	15.2 ± 8.9	16.5 ± 9.4	17.4 ± 9.4	11.2 ± 7.8	13.3 ± 8.5	15.4 ± 9.0	18.0 ± 8.6	18.7 ± 9.4	18.8 ± 9.5
Bolus, U/d	20.9 ± 11.7	23.0 ± 12.3	24.2 ± 11.9	16.7 ± 10.6	19.7 ± 11.7	22.2 ± 11.5	23.8 ± 11.7	25.3 ± 12.3	25.7 ± 12.1
Autocorrection bolus, U/d	5.7 ± 4.5	6.5 ± 5.4	7.3 ± 5.4	4.8 ± 4.1	5.8 ± 4.4	7.3 ± 5.1	6.4 ± 4.7	7.0 ± 6.0	7.4 ± 5.7
Mean ICR, g/U	13.7 ± 7.8	12.4 ± 6.4	11.7 ± 5.7	18.3 ± 9.8	15.9 ± 7.7	14.5 ± 6.9	10.6 ± 4.0	10.1 ± 3.9	9.9 ± 3.9
Meal boluses/d	5.3 ± 1.8	5.8 ± 2.2	5.7 ± 2.2	5.8 ± 1.7	6.5 ± 2.2	6.2 ± 2.2	5.0 ± 1.7	5.4 ± 2.2	5.3 ± 2.2
AHCL exits/wk	0.7 ± 0.7	0.8 ± 0.9	0.8 ± 0.8	0.7 ± 0.7	0.8 ± 0.9	0.8 ± 0.7	0.7 ± 0.7	0.8 ± 0.9	0.9 ± 0.9

Sex-gap analysis

The MM780G attenuated sex-based performance gaps. Mean TIR was 73.5 ± 9.24% in female users and 73.2 ± 9.64% in male users, with virtually identical GMI, TBR, and composite target attainment (Table 2). Menstrual-cycle-related fluctuations in insulin sensitivity are among the most common sources of glycemic instability reported by women with T1D, and they have historically represented a significant therapeutic challenge addressed only partially by standard dose adjustment strategies.[20,21] The absence of sex differences in this large cross-sectional cohort is notable. CareLink does not capture menstrual cycle–resolved glucose variability and therefore cannot directly assess compensation for cyclic insulin sensitivity changes. Previous mechanistic studies have shown that the MM780G attenuates luteal-phase glycemic deterioration due to progesterone-induced insulin resistance in women with T1D.[22,23] It is therefore plausible that the absence of a glycemic performance gap between women and men observed in this cohort is, at least in part, attributable to the adaptive capabilities of the AID algorithm.

These implications are particularly relevant for women planning pregnancy. There is robust clinical evidence demonstrating the importance of preconception glycemic optimization in reducing the risk of congenital malformations, macrosomia, and adverse perinatal outcomes in T1D.[24] However, achieving this remains clinically challenging. The data presented here, showing that female users across LATAM, including those of childbearing age, provide population-level evidence that the iMM780G system supports the sustained target attainment that preconception counseling guidelines recommend.[24,25]

Country-level analysis

The MM780G system delivered consistent glycemic outcomes, within internationally recommended targets, across the five largest national cohorts, Argentina, Brazil, Chile, Colombia, and Mexico, despite substantial heterogeneity in reimbursement, health care infrastructure, and user population characteristics.

Between-country differences were modest (TIR range, 3.2 percentage points; GMI range, 0.19%), and all cohorts met international glycemic targets. These findings highlight opportunities to further improve regional outcomes through greater ROS adoption and optimized access rather than meaningful country-level performance differences. This distinction is important because the narrow outcome ranges suggest that the system performs reliably once users gain access, while the larger regional opportunity lies in expanding access and optimizing system settings.

Chile's profile reflects both technology and structural advantage. Achieving TIR > 70% of 75.2%, the lowest GMI of 6.77%, composite target attainment of 52.3%, and ROS adoption of 31.6% (the highest in the region), and estimated AID penetration of 8.6% of the national T1D population (the highest among the five cohorts). Chile was the only country operating under a formal legal reimbursement framework specifically for people with T1D. The Ley Ricarte Soto program supports sustained health care professional (HCP) training, structured patient education, and systematic clinical follow-up, as ROS adoption reflects.

Colombia, a middle-income country with a mixed public-private system that has expanded AHCL coverage through mandatory health insurance, represents a relevant regional model. Mean TIR of 74.0 ± 9.47%, with 68.2% of users achieved TIR > 70% overall and 84.6% under optimal settings, estimated AID penetration was 5.7%. Colombia's results were also consistent with those observed in more resource-rich settings, reinforcing that supportive policy and clinical infrastructure can offset broader economic constraints. These findings corroborate Castro et al.[26] :system performance is shaped less by country income or educational achievement than by deployment conditions. In this respect, Colombia appears more similar to Chile than differences between their health care systems might suggest. Both countries demonstrate that organized, clinically supported access (whether through a dedicated public program or a coverage mandate) can produce outcomes approaching the technology's upper performance boundary.

Mexico's predominantly privately funded cohort ($n = 655$), among the region's latest adopters, achieved TIR > 70% attainment of 71.9%, composite target attainment of 58.2%, and an estimated AID penetration of only 0.5%, the lowest among the five cohorts. These results, likely reflecting early-adopter users and experienced HCPs, demonstrate both what is achievable and how limited access remains for the broader Mexican T1D population.[27]

Argentina, the second-largest, operates under fragmented provincial coverage and case-by-case legal pathways. Mean TIR of 71.9% and 60.8% of users meeting TIR > 70%, and estimated AID penetration of 3.8%. It is 13.6% ROS adoption rate, the region's lowest, may reflect constraints on sustained clinical engagement and limited HCP familiarity with the system, potentially influencing perceptions of the benefits and safety . Users on ROS achieved TIR and TITR approximately five percentage points higher than the overall Argentine cohort, without increased hypoglycemia, illustrating the system's capabilities when used as intended.

Brazil presents the most structurally complex health care landscape, with an estimated AID penetration of 1.3%. AHCL access is largely restricted to privately insured patients or those who obtain coverage through judicial pathways, whereby individuals sue the public health system for technologies not formally reimbursed. These patients reflect care from centers of excellence, limiting generalizability.[28,29] Mean TIR of 72.5 ± 9.81% and GMI of 6.92 ± 0.37%, and 63.4% achieved TIR > 70%. As in Mexico, these outcomes represent what is possible when access barriers are overcome.

National penetration estimates, ranging from 0.5% in Mexico to 8.6% in Chile, contrast sharply with high-income markets where policy has driven adoption. In the United Kingdom, NICE guidance has progressively established AID as standard of care; hybrid closed-loop use reported at the 2025 ABCD DTN-UK meeting increased from 36%–62% among people aged < 19 years and from 4.4%–9.7% among adults between 2023/24 and 2024/25.[30,31] In the United States, real-world T1D Exchange data indicate that approximately half of CGM users have adopted AID, a 35-percent-point increase from 2016–2017 cohort.[32] Even Chile's 8.6% penetration remains far below these benchmarks and clearly reveals the persistent gap between efficacy and reach. Thus, the present outcomes reflect performance among those with access rather than reach across the broader LATAM T1D population. This dataset

provides population-relevant evidence to inform regional reimbursement and access decisions. A recurring concern in lower-income settings is whether AHCL outcomes depend on socioeconomic status (SES) or educational level; assumptions historically used to justify restricted access. Here, outcomes were consistent across LATAM's structural and economy heterogenity. Castro et al.,[26] reported that among adult MM780G users at a public university hospital in Bogotá, educational level was not associated with glycemic control. Across SES levels ranging from extreme poverty to middle-high income, GMI remained <7.0%, while TIR and TITR ranged 74.7%–79.5% and 51.2%–55.2%, respectively.

The MiniMed™ 780G system delivers clinically meaningful outcomes independently of educational background or socioeconomic position, providing no evidence to justify restricting access on these grounds. As Saboo et al.[33] have argued in a recent international call-to-action, eliminating barriers to AID access for people with T1D is an immediate and achievable priority; these findings provide region-specific evidence to support that case across Latin America.

Longitudinal sub-analysis

Prior longitudinal evidence from large CareLink-based analyses has been limited to 12-month observation windows, including the EMEA benchmark by Choudhary et al. (n > 100,000) and the global analysis by Arrieta et al. covering 6 months in 12,870 users. Among single- and multicenter studies, most have been constrained to 12 months.[34–37] Beyond 12 months, the most comprehensive evidence derives from the ABCD NHS England closed-loop pilot.[38,39] Both analyses enrolled a clinically selected population with baseline HbA1c ≥ 8.5%, covered multiple commercial systems simultaneously, and included only approximately 199 MM780G users (47% of the total cohort), precluding any system-specific conclusions. The only prior MM780G-specific longitudinal analysis surpassing the 24-month mark was conducted by McVean et al.[40] (n = 1145), documenting stable TIR of 78.6% and TITR of 53.7% over 36 months in EMEA adults.

For pediatric-specific literature, studies with follow-up beyond 12 months have only recently emerged, uniformly limited to single- or dual-center cohorts of fewer than 100 users.[41–44] Our results reflect the durability observed in other cohorts and confirm these outcomes can be reproduced across geographically and structurally distinct populations.

The present analysis, following 1204 users (including 475 pediatric and 701 adult users) across 24 consecutive monthly time points using exclusively the MM780G system, represents the largest LATAM dedicated longitudinal cohort published to date and the first to characterize the full two-year trajectory of glycemic outcomes and insulin delivery adaptation in both age groups within a single, system-specific real-world dataset.

Our longitudinal sub-analysis of MiniMed 780G users over 24 months of observation demonstrated that overall TIR varied by less than one and a half percentage points and TBR remained within consensus thresholds at every time point. AHCL utilization remained consistently above 95% throughout, indicating that both system effectiveness and user engagement were maintained.

Adult users maintained mean TIR between 79.8% and 78.2% across all 24 months, with TITR similarly stable throughout (55.3%–53.7%). TDD increased modestly from 41.8 to 44.5 U/d (Supplementary Fig. S1B). While user-initiated meal bolusing remained comparatively stable in adults, auto-correction bolus delivery and its proportional contribution to TDD evolved over time in a pattern consistent with progressive algorithmic adaptation to individual user requirements. Meal bolus frequency increased modestly in adults but showed a less consistent pattern in children and adolescents. This may reflect greater reliance on automated corrections while preserving preexisting bolusing behaviors in younger users, although age-related differences in eating habits and caregiver involvement are also plausible contributors. These mechanisms cannot be distinguished using the present dataset.

Taken together, the adult longitudinal data present a picture of sustained, algorithm-driven glycemic stability across a two-year period that, to our knowledge, represents the longest MM780G-specific follow-up reported in LATAM in an adult population. These findings have direct relevance for long-term treatment planning, reimbursement policy, and complication prevention within the region.

The pediatric cohort tells an equally compelling story. Mean TIR and TITR remained clinically stable across all 24 time points, ranging between 73.5% and 73.0% and 50.3% and 49.4%, respectively (Table 4 and Supplementary Fig. S1C). This sustained level of glycemic control is, in our view, the central finding of the pediatric longitudinal analysis. This stability was maintained through a period of substantial growth-related physiological change, with insulin delivery parameters evolving markedly over the observation period as shown in Table 4 and Supplementary Figure S1D: TDD increased by 35%, driven by parallel increases in basal and bolus delivery. In addition, automated correction bolus delivery increased by 50%, the mean ICR became progressively more aggressive, and the proportional contribution of auto-correction boluses to TDD rose steadily. Simultaneously, user-initiated meal bolus frequency increased modestly, while algorithm-driven correction delivery grew substantially—reflecting a genuinely collaborative insulin delivery dynamic in which user engagement and algorithmic automation complemented each other (Table 4). The net result, visible across all glycemic metrics in Supplementary Figure S1C, was clinically stable TIR and TITR, rising algorithmic protagonism, and simultaneously improving hypoglycemia over 2 years of growth.

ROS adoption trajectories over the full 24-month observation period are detailed for both age groups in the monthly longitudinal figure. In the pediatric cohort rose from 6.5%–17.3% over 24 months (Table 4 and Supplementary Fig S1C), a trajectory of progressive clinical optimization that emerged organically from practice. Structured optimization implemented at device initiation, rather than accumulated over years, would accelerate attainment of these outcomes from the outset.

Strengths and limitations

A major strength of this study is its large sample size, broad representation across 18 Latin American countries, and inclusion of a 24-month longitudinal subcohort, representing the longest MM780G-specific real-world follow-up reported in the region and providing monthly ROS adoption trajectories in both pediatric and adult users. A further strength is the

intentionally broad inclusion criteria. Beyond a minimum requirement of 10 days of device data to ensure reliable calculation of glycemic metrics, no additional clinical or behavioral exclusion criteria were applied, minimizing selection bias and allowing the cohort to closely reflect routine MM780G users across diverse health care settings.

Several limitations should nevertheless be considered. First, CareLink™ contains device-derived data only and lacks important clinical and socioeconomic variables, including diabetes duration, laboratory HbA1c, body mass index, comorbidities, insurance status, and health care utilization, precluding adjustment for these potential confounders. Second, comparisons between ROS and non-ROS users, and between countries, are non-randomized and predominantly cross-sectional, describing associations rather than causal effects. Although the longitudinal subcohort provides unique insight into long-term ROS adoption patterns in routine clinical practice, it was not designed to evaluate within-person glycemic changes before and after ROS initiation, which would require a prospective or matched-cohort design. Third, age stratification was limited by registry privacy requirements, preventing evaluation of narrower pediatric age groups, while pregnancy-specific analyses were not possible because dedicated subgroup data were unavailable. These populations warrant dedicated future investigation. Because access pathways differ substantially across Latin America, country-specific reimbursement and health care contexts should also be considered when interpreting cross-country comparisons. Finally, both Guardian™ 3 and Guardian™ 4 sensors were used during the study period. Although these sensors have comparable analytical accuracy, glycemic outcomes should be interpreted cautiously when compared with studies of other AID platforms using different CGM technologies.

Conclusion

The MiniMed™ 780G AHCL system delivered durable glycemic outcomes across 16,669 users over 2 years in 18 Latin American countries, fully consistent with global benchmarks regardless of age, sex, SES, or health care infrastructure. The 24-month longitudinal sub-analysis demonstrates that the glycemic benefits are durable. Between-country differences reflect access gaps, not technology limitations, as evidenced by countries with structured reimbursement programs achieving the strongest outcomes.

These data can help eliminate barriers to AID access and inform ongoing efforts by health care systems, payers, and clinicians to expand equitable access to AID technology in the region.

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Authors' Contributions

M.C.: Conceptualization, writing, reviewing, and editing. B.G.: Writing and reviewing. A.D.: Writing and reviewing. A.M.G.: Writing and reviewing. AS: Writing and reviewing. L.E.C.: Writing and reviewing. R.S.: Writing and reviewing. M.R.: Writing and reviewing. F.R.: Writing and reviewing. M.A.G.S.: Writing and reviewing. M.L.: Data curation, formal analysis, writing, reviewing. R.V.: Writing, reviewing, and editing. J.M.: Conceptualization, writing, reviewing, and editing.

Ethical Considerations

This study was conducted as a RWE analysis using anonymized data retrospectively extracted from the CareLink™ platform (Medtronic, Northridge, CA, USA). In accordance with applicable national and international regulations, formal ethical committee review was not required, as the analysis was performed exclusively on anonymized, aggregate data voluntarily uploaded by registered platform users. The study did not involve any interventional procedures, patient recruitment, or direct access to individually identifiable health information beyond what is routinely collected within the platform infrastructure.

Consent to Participate

All data included in this analysis were derived from users who provided explicit informed consent during the CareLink™ platform registration process, in compliance with the platform's Terms of Use and Privacy Policy. Users acknowledged and agreed to the potential use of their anonymized data for research and quality improvement purposes at the time of registration. No additional consent was required.

Data Availability

The datasets analyzed in this study were obtained from the CareLink™ cloud platform under the applicable data access framework. Data are not publicly available due to platform ownership and privacy constraints; requests for access may be directed to the platform data governance team.

Author Disclosure Statement

M.C., M.L., R.V., and J.M. are MiniMed-Medtronic employees. B.G., A.D., A.M.G., A.S., L.E.C., R.S., and M.R. have served as paid speakers and/or received honoraria for consultancy services for MiniMed-Medtronic. The remaining authors declare no competing interests relevant to the present work.

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Supplementary Material

Supplementary Figure S1

References

1. Carlson AL, Sherr JL, Shulman DI, et al. Safety and glycemic outcomes during the MiniMed advanced hybrid closed-loop system pivotal trial in adolescents and adults with type 1 diabetes. Diabetes Technol Ther 2022;24(3):178–189.

2. Silva JD, Lepore G, Battelino T, et al. Real-world performance of the MiniMed 780G system: First report of outcomes from 4120 users. Diabetes Technol Ther 2022;24(2):113–119.
3. Arrieta A, Battelino T, Scaramuzza AE, et al. Comparison of MiniMed 780G system performance in users aged younger and older than 15 years: Evidence from 12 870 real-world users. Diabetes Obes Metab 2022;24(7):1370–1379.
4. Choudhary P, Arrieta A, van den Heuvel T, et al. Celebrating the data from 100,000 real-world users of the MiniMed 780G system in Europe, Middle East, and Africa collected over 3 years: From data to clinical evidence. Diabetes Technol Ther 2024;26(S3):32–37.
5. Grassi B, Gomez AM, Calliari LE, et al. Real-world performance of the MiniMed 780G advanced hybrid closed loop system in Latin America: Substantial improvement in glycaemic control with each technology iteration of the MiniMed automated insulin delivery system. Diabetes Obes Metab 2023;25(6):1688–1697.
6. Thrasher JR, Arrieta A, Niu F, et al. Early real-world performance of the MiniMed 780G advanced hybrid closed-loop system and recommended settings use in the United States. Diabetes Technol Ther 2024;26(S3):24–31.
7. Battelino T, Danne T, Bergenstal RM, et al. Clinical targets for continuous glucose monitoring data interpretation: Recommendations from the international consensus on time in range. Diabetes Care 2019;42(8):1593–1603.
8. De Meulemeester J, Charleer S, Visser MM, et al. The association of chronic complications with time in tight range and time in range in people with type 1 diabetes: A retrospective cross-sectional real-world study. Diabetologia 2024;67(8):1527–1535.
9. Kim JY, Kim S, Park SH, et al. Associations of time in tight range, time in range, and glycated hemoglobin with albuminuria in type 1 diabetes: A cross-sectional study. Diabetes Res Clin Pract 2025;226:112325.
10. Shah VN, Kanapka LG, Akturk HK, et al. Time in range is associated with incident diabetic retinopathy in adults with type 1 diabetes: A longitudinal study. Diabetes Technol Ther 2024;26(4):246–251.
11. Lobo B, Kanapka L, Kovatchev BP, et al. The association of time-in-range and time-in-tight-range with retinopathy progression in the virtual diabetes control and complications trial continuous glucose monitoring dataset. Diabetes Technol Ther 2025;27(7):558–561.
12. Kovatchev BP, Lobo B, Fabris C, et al. The virtual DCCT: Adding continuous glucose monitoring to a landmark clinical trial for prediction of microvascular complications. Diabetes Technol Ther 2025;27(3):209–216.
13. Castañeda J, Arrieta A, van den Heuvel T, et al. Time in tight glucose range in type 1 diabetes: Predictive factors and achievable targets in real-world users of the MiniMed 780G system. Diabetes Care 2024;47(5):790–797.
14. de Bock M, Agwu JC, Deabreu M, et al. International society for pediatric and adolescent diabetes clinical practice consensus guidelines 2024: Glycemic targets. Horm Res Paediatr 2024;97(6):546–554.
15. Mauras N, Buckingham B, White NH, et al.; Diabetes Research in Children Network (DirecNet). Impact of type 1 diabetes in the developing brain in children: A longitudinal study. Diabetes Care 2021;44(4):983–992.
16. Suput Omladic J, Slana Ozimic A, Vovk A, et al. Acute hyperglycemia and spatial working memory in adolescents with type 1 diabetes. Diabetes Care 2020;43(8):1941–1944.
17. Smaniotto V, Heller S, O'Neal D, et al. MiniMed 780G system performance in older users with type 1 diabetes: Real-world evidence and the case for stricter glycaemic targets. Diabetes Obes Metab 2025;27(4):2242–2250.
18. Chien A, Shin JJ, Liu M, et al. Real-world effectiveness of the MiniMed 780G advanced hybrid closed-loop system for people >/=65 years with type 1 or type 2 diabetes in the United States. Diabetes Technol Ther 2025;27(12):989–996.
19. American Diabetes Association Professional Practice Committee for Diabetes. 13. Older adults: Standards of care in diabetes—2026. Diabetes Care 2025;49(Supplement_1): S277–S296.
20. Brown SA, Jiang B, McElwee-Malloy M, et al. Fluctuations of hyperglycemia and insulin sensitivity are linked to menstrual cycle phases in women with T1D. J Diabetes Sci Technol 2015;9(6):1192–1199.
21. Gamarra E, Trimboli P. Menstrual cycle, glucose control and insulin sensitivity in type 1 diabetes: A systematic review. J Pers Med 2023;13(2):374.
22. Elhenawy YI, Abdel Kader MS, Thabet RA. Performance of the MiniMed 780G system on mitigating menstrual cycle-dependent glycaemic variability. Diabetes Obes Metab 2024; 26(11):4916–4923.
23. Monroy G, Picon-Cesar MJ, Garcia-Aleman J, et al. Glycemic control across the menstrual cycle in women with type 1 diabetes using the MiniMed 780G advanced hybrid closed-loop system: The 780MENS prospective study. Diabetes Technol Ther 2025;27(5):395–401.
24. Benhalima K, Beunen K, Siegelaar SE, et al. Management of type 1 diabetes in pregnancy: Update on lifestyle, pharmacological treatment, and novel technologies for achieving glycaemic targets. Lancet Diabetes Endocrinol 2023;11(7): 490–508.
25. Wyckoff JA, Lapolla A, Asias-Dinh BD, et al. Preexisting diabetes and pregnancy: An endocrine society and European Society of Endocrinology joint clinical practice guideline. J Clin Endocrinol Metab 2025;110(9):2405–2452.
26. Castro M, Gomez AM, Robledo Gomez A, et al. Bridging the gap: socioeconomic status, educational level and glycemic control in colombian users of the minimed™ 780g system. Diabetes Technol Ther 2025;27(S2):e135–e203.
27. Ogle GD, Wang F, Haynes A, et al. Global type 1 diabetes prevalence, incidence, and mortality estimates 2025: Results from the International diabetes Federation Atlas, 11th Edition, and the T1D index version 3.0. Diabetes Res Clin Pract 2025;225:112277.
28. Santos Castro AV, Caneca KO, Garcia PM, et al. Type 1 diabetes technology gap between high-income and developing countries: Continuous glucose monitoring access remains a challenge in Brazil. Diabet Med 2025;42(10):e70116.
29. Ortega F, Pele A. Brazil's unified health system: 35 years and future challenges. Lancet Reg Health Am 2023;28:100631.
30. Khan MS, Sivanantham S, Farouk L, et al. Real-world glycaemic outcomes observed with the use of Medtronic 780G, tandem control-IQ and omnipod 5 automated insulin delivery systems. Diabet Med 2026;43(5):e70251.
31. Atkin M. National update on hybrid CLosed loop—Update on HCL rollout. Paper presented at: ABCD DTN-UK Meeting 2025. Newcastle; 2025.

32. Limbert C, Kowalski AJ, Danne TPA. Automated insulin delivery: A milestone on the road to insulin independence in type 1 diabetes. Diabetes Care 2024;47(6):918–920.
33. Saboo B, Garg S, Bergenstal RM, et al.; Call-to-Action Coalition. A call-to-action to eliminate barriers to accessing automated insulin delivery systems for people with type 1 diabetes. Diabetes Technol Ther 2025;27(3):147–151.
34. Lablanche S, Delageniere J, Jalbert M, et al. 12-month real-life efficacy of the MiniMed 780G advanced closed-loop system in patients living with type 1 diabetes: A French observational, retrospective, multicentric study. Diabetes Technol Ther 2024;26(6):426–432.
35. Dekker P, van den Heuvel T, Arrieta A, et al. Twelve-month real-world use of an advanced hybrid closed-loop system versus previous therapy in a Dutch center for specialized type 1 diabetes care. J Diabetes Sci Technol 2026;20(3):1003–1014.
36. Gruber N, Wittenberg A, Brener A, et al. Real-life achievements of MiniMed 780G advanced closed-loop system in youth with type 1 diabetes: AWeSoMe study group multicenter prospective trial. Diabetes Technol Ther 2024;26(11):869–880.
37. Al-Sofiani M, Chaar W, van den Heuvel T, et al. Real-world performance of the MiniMed 780G advanced hybrid closed-loop system in the Middle East, North Africa, and Turkiye Region. Diabetes Technol Ther 2026;28(7):689–696.
38. Crabtree TSJ, Griffin TP, Yap YW, et al.; ABCD Closed-Loop Audit Contributors. Hybrid closed-loop therapy in adults with type 1 diabetes and above-target HbA1c: A real-world observational study. Diabetes Care 2023;46(10):1831–1838.
39. Liarakos AL, Crabtree TSJ, Griffin TP, et al. Hybrid closed-loop therapy in adults with type 1 diabetes in England: Long-term outcomes from a real-world observational study. Diabetes Technol Ther 2025;27(10):820–830.
40. McVean J, Juachon M, Voelker B, et al. Achieved and sustained glycaemic outcomes with reduction in burden: Three-year real-world follow-up of the MiniMed 780G system. Diabetologia 2025;68(Suppl 1):30–31.
41. Bombaci B, Passanisi S, Calderone M, et al. Long-term use of Minimed 780G in children and adolescents with type 1 diabetes under real-world conditions: The benefits of optimal settings. Diabetes Obes Metab 2025;27(4):2309–2312.
42. Kiilavuori M, Varimo T, Tuomaala AK, Pulkkinen MA. Children and adolescent with suboptimal control of type 1 diabetes improve during the first 2 years on automated insulin delivery system. Diabetes Obes Metab 2025;27(1):134–142.
43. Pulkkinen MA, Varimo TJ, Hakonen ET, et al. During an 18-month course of automated insulin delivery treatment, children aged 2 to 6 years achieve and maintain a higher time in tight range. Diabetes Obes Metab 2024;26(6):2431–2438.
44. Petrovski G, Campbell J, Hussain K, Diabetes Group S. 1905-LB: Eighteen-month follow-up comparison of simplified meal announcement vs. Precise carbohydrate counting in adolescents with type 1 diabetes using the MiniMed 780G advanced hybrid closed-loop system. Diabetes 2024;73(Suppl_1)

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