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MiniMed 780G system performance in older users with type 1 diabetes: Real-world evidence and the case for stricter glycaemic targets

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Abstract

Aims: Large-scale studies on the effectiveness of automated insulin delivery (AID) systems in older people with type 1 diabetes are still limited. A multinational, retrospective, real-world study was conducted to examine the performance of the MiniMed™ 780G advanced hybrid closed-loop system in users with type 1 diabetes aged ≥56 years compared with those aged 16–55 years.

Materials and Methods: Data from 35 366 MiniMed™ 780G system users aged 16–55 years and 7415 users aged ≥56 years were included. The main outcome was time in range 70–180 mg/dL (TIR); other continuous glucose monitoring (CGM) metrics were also assessed.

Results: Across all users, mean TIR was 77.1% for users aged ≥56 years and 73.1% for those aged 16–55 years (Δ4.0, 95% confidence interval [CI]: 3.8–4.2, p <0.0001). In users employing the optimal system settings (i.e., Glucose Target: 100 mg/dL; active insulin time: 2 h), mean TIR was 81.9% in older and 79.7% in younger users (Δ2.2, 95% CI: 1.5–2.9, p <0.0001). Across all users, mean time below range <70 mg/dL (TBR_{70}) was 1.5% in older and 2.1% in younger users. In older users, TIR and TBR_{70} remained consistent over 12 months.

Conclusions: This real-world analysis demonstrated that older MiniMed™ 780G system users with type 1 diabetes can achieve a TIR >70% without increasing hypoglycaemia risk. Users employing optimal settings showed the best outcomes. The system performed as well as or better than in younger users. These findings support the case that more stringent TIR targets can be achieved safely.

KEYWORDS

continuous glucose monitoring (CGM), database research, insulin pump therapy, real-world evidence, type 1 diabetes

1 | INTRODUCTION

Life expectancy has steadily improved over time, including for people with type 1 diabetes, resulting in a growing number of older individuals living with this condition. Yang et al.[1] recently estimated that, on a global level, there were 3.7 million people aged ≥65 years living with type 1 diabetes in 2019, including >0.9 million aged >80 years, compared with just 1.3 million aged ≥65 years in 1990. Elderly individuals living with type 1 diabetes often have a long diabetes duration and disease-related complications are common. These challenges are further compounded by the risk of multiple age-related issues, including cognitive decline, comorbid conditions and frailty.[2]

Avoiding both hypoglycaemia and hyperglycaemia is particularly important when managing type 1 diabetes in older people. A 2012 study demonstrated that people with type 1 diabetes aged >60 years had a higher risk for severe hypoglycaemic events relative to their younger counterparts,[3] which may be partly explained by a high prevalence of impaired hypoglycaemia awareness in older people.[4] Severe hypoglycaemia in older people has also contributed to accelerated cognitive decline.[5] On the other hand, hyperglycaemia also poses risks, as it increases the likelihood of cognitive dysfunction in elderly people with type 1 diabetes and is linked to an increased frailty risk.[5,6]

Both 2024 American Diabetes Association (ADA) guidelines and 2019 international consensus targets on time in range (TIR) make specific recommendations for managing of older and/or high-risk people with diabetes. The ADA recommends that glucose targets be adjusted to the health agility status of older people.[2] The 2019 consensus targets do not provide health agility specific glucose targets and recommend that the TIR target for older and/or high-risk people should be less stringent at 50% (vs. 70% for younger people) and the time below range (TBR_{70}; time below 70 mg/dL) target more stringent at <1% (vs. <4% for younger people).[7] Both guidelines emphasise the importance of avoiding hypoglycaemia; however, they allow for a higher percentage of time spent above range (TAR), which also poses risks. There is an ongoing debate about whether older adults with type 1 diabetes should have the same glycaemic targets as younger individuals, or if current targets for older people should be adjusted to account for distinct health status categories such as 'healthy', 'intermediate' and 'poor' (with specific targets for each category).[8]

Diabetes technology has advanced substantially over the past decades, with automated insulin delivery (AID) systems now at the forefront. The MiniMed™ 780G AID system has been shown as highly effective and safe in both clinical trials and real-world studies.[9,10] AID systems can be considered in older people with type 1 diabetes, although barriers to using diabetes-related technology in older people have been reported. These may include visual or hearing impairment, cognition or dexterity issues and potentially being overwhelmed by the quantity of data.[11,12]

Despite the recognition that managing older people with type 1 diabetes warrants special consideration, they represent an understudied group. Across many disease areas, older people are often under-represented in, or even excluded from, clinical trials,[13] resulting in a lack of data specific to this group. To address this paucity of data, the aim of this study was to assess the effectiveness of the MiniMed™ 780G system in older people (in this study defined as aged ≥56 years) with type 1 diabetes in a real-world setting and compare the effectiveness with that in users aged 16–55 years. Secondly, it was explored if strict glycaemic targets could be attained without compromising safety in a real-world setting.

2 | MATERIALS AND METHODS

2.1 | Design

In this retrospective, observational study, real-world, multi-country data were analysed to evaluate the performance of the MiniMed™ 780G system for a range of continuous glucose monitoring (CGM)-related metrics. The comparison was between older users, here defined as aged ≥56 years, and younger users, aged 16–55 years, with type 1 diabetes.

2.2 | Data source

The data were sourced from CareLink™ Personal, a software programme that MiniMed™ system users can register a personal account with to have information collected directly from their device. The platform provides users with ready access to their data, so they can monitor their trajectories.[14] Over 95% of MiniMed™ 780G system users have a CareLink™ Personal account, and >96% of account holders have provided consent for their data to be used for scientific purposes.[15] Data upload is either automatic (nightly; >98% of all uploads) or manual, depending on user preference. Systems can store information for up to 3 months, so any upload interval <3 months will ensure no missing data. In addition to device information on CGM-related metrics, CareLink™ Personal stores user age, self-reported in one of five age groups (≤15, 16–28, 29–42, 43–55, ≥56 years) and diabetes type (also self-reported).[16] Since the General Data Protection Regulation (GDPR) did not permit collecting more granular information on age, ≥56 years was chosen as the cut-off age for older users. For the present study, CareLink™ Personal data uploaded between August 2020 and December 2022, by users in Europe, the Middle East and Africa, were used for individuals who had consented and resided in a country where data privacy regulation permitted such analysis.

2.3 | Cohorts

Three different user cohorts were investigated, in line with Arrieta et al.[16] who conducted a similar analysis comparing outcomes in users younger or older than 15 years. The first cohort ('achievement cohort') included all users with ≥10 days of sensor glucose (SG) data after advanced hybrid closed loop (AHCL) initiation. This main cohort shows the average, real-world achievement of all, thus preventing the reporting bias of only successful users. The second cohort ('longitudinal cohort') included users with ≥12 months of follow-up and ≥10 days of SG in every month over the first 12 months after AHCL initiation.

This cohort allows assessing the consistency of results over time. The third cohort ('pre-post cohort') was designed to compare the pre-AHCL (before automation was started) to the post-AHCL window and included users with ≥10 days of SG before and after first AHCL initiation. The prerequisite for users to have ≥10 days of SG data was aligned with Arrieta et al., chosen based on findings that 10–14 days of CGM data correlate well with 3-month glucose metrics.[17] All user data available after AHCL initiation were included in the analysis, regardless if the system was in AHCL control or in open loop.[14]

2.4 | Outcomes

The main outcome was TIR (70–180 mg/dL [3.9–10.0 mmol/L]). Other range outcomes included time in tight range (TITR; 70–140 mg/dL [3.9–7.8 mmol/L]), time below range (TBR_{70}; <70 mg/dL [<3.9 mmol/L])—consisting of TBR_{54} (<54 mg/dL [<3.0 mmol/L]) and TBR_{54-70} (54–<70 mg/dL [3.0–<3.9 mmol/L])—and time-above range (TAR_{180}: >180 mg/dL [>10.0 mmol/L]), consisting of TAR_{250} (>250 mg/dL [>13.9 mmol/L]) and $TAR_{180-250}$ (>180–250 mg/dL [>10.0–13.9 mmol/L]).[7,18] Additional outcomes were the glucose management indicator (GMI), mean SG (in mg/dL) and the standard deviation thereof. Glucometrics were also shown as the percentage of users reaching guideline treatment targets, such as the percentage of users reaching a GMI <7%, a TIR >70% and TBR_{70} <4%. The proportion of time spent in AHCL control and with sensor use were also investigated. Within each cohort, outcomes were analysed separately for older and younger users. In the achievement cohort, sub-analyses were conducted for users who used recommended optimal device settings, that is, a glucose target (GT) at 100 mg/dL (5.6 mmol/L) for ≥95% of the time and an active insulin time (AIT) of 2 h for ≥95% of the time,[18] as well as a by-country analysis, including countries with ≥100 users.

2.5 | Statistics

Descriptive statistics included means for continuous variables and proportions for categorical variables, as well as standard deviations (SD). Statistical testing comparing TIR, GMI and mean SG in the two age groups was performed in the achievement cohort, using two-sample *t*-tests (2-sided, alpha = 0.05). Statistical analyses were performed in R v4.4.0.[19,20]

3 | RESULTS

Data from 61 481 users living with diabetes were included in the achievement cohort (~93% with type 1 diabetes). Of these, 35 366 users were aged 16–55 years, with a mean system time of 225.2 (standard deviation ±177.7) days and 7415 users were aged ≥56 years, with a mean system time of 225.5 (±182.0) days (Table 1). Among them, 2619 users in the younger and 463 users in the older

TABLE 1 Sample sizes and glycaemic targets for the different cohorts, by user group.

	Users aged 16–55 years		Users aged ≥56 years	
Achievement cohort: all				
Users, *n*	35 366		7415	
Sensor wear, %	88.3 ± 14.0		94.1 ± 7.6	
Time in AHCL, %	88.9 ± 16.6		94.3 ± 11.8	
Mean SG, mg/dL	150.9 ± 17.0		146.9 ± 14.2	
GMI, %	6.9 ± 0.4		6.8 ± 0.3	
Users with GMI <7%, %	62.9		72.9	
Users with TIR >70%, %	66.0		79.2	
Achievement cohort: recommended optimal settings				
Users, *n*	2619		463	
Time in AHCL, %	93.2 ± 11.7		96.5 ± 7.6	
Mean SG, mg/dL	140.2 ± 11.7		139.1 ± 11.3	
GMI, %	6.7 ± 0.3		6.6 ± 0.3	
Users with GMI <7%, %	88.6		91.8	
Users with TIR >70%, %	89.5		93.7	
Pre-post cohort:	pre-AHCL initiation	post-AHCL initiation	pre-AHCL initiation	post-AHCL initiation
Users, *n*	8204	8204	1840	1840
Mean SG, mg/dL	165.0 ± 24.7	150.6 ± 17.0	161.3 ± 20.6	147.5 ± 13.9
GMI, %	7.3 ± 0.6	6.9 ± 0.4	7.2 ± 0.5	6.8 ± 0.3
Users with GMI <7%, %	34.3	63.8	38.6	70.9
Users with TIR >70%, %	29.4	67.0	39.6	78.3

Abbreviations: AHCL, advanced hybrid closed loop; GMI, glucose management indicator; SG, sensor glucose; TIR, time in range.

age group consistently used recommended optimal settings. The longitudinal cohort included 6010 users aged 16–55 years and 1442 users aged ≥56 years. Data for the pre-post comparison, in the third cohort, were available for 8204 users aged 16–55 years and 1840 users aged ≥56 years.

3.1 | Achievement cohort

Older users spent more time in AHCL (94.3% ± 11.8%) than younger users (88.9% ± 16.6%) and reported higher sensor wear (94.1% ± 7.6% vs. 88.3% ± 14%) (Table 1). The mean SG was lower in older users (146.9 ± 14.2 vs. 150.9 ± 17.0 mg/dL; Δ − 4.0 [95% CI −4.4 to −3.6], p <0.0001), as was the GMI (6.8% ± 0.3% vs. 6.9% ± 0.4%; Δ − 0.1 [95% CI −0.11 to −0.09], p <0.0001). The mean TIR was greater than 70% of the time in both age groups (Figure 1A). Older users spent more than three-quarters (77.1% ± 9.4%) of the TIR, slightly more than younger users (73.1% ± 10.3%; Δ4.0 [95% CI 3.8–4.2], p <0.0001). In the younger group, TIR was lowest in those aged 16–28 years relative to those aged 29–42 years and 43–55 years (Figure S1). TITR in older users was 51.3% ± 10.7%, higher than in younger users (48.4% ± 11%). TBR_{70} was slightly lower in older users relative to younger users at 1.5% ± 1.6% in older users (TBR_{54}: 0.3% ± 0.5%) compared with 2.1% ± 1.8% in younger users (TBR_{54}: 0.5% ± 0.6%). Mean TAR_{180} was <25% in both groups at 21.4% ± 9.6% in older users (TAR_{250}: 3.9% ± 3.8%) and 24.8% ± 10.8% in younger users (TAR_{250}: 5.6% ± 5.3%). In terms of treatment targets, 72.9% of older users reached GMI <7%, 79.2% TIR >70% and 93.7% TBR_{70} <4%. For younger users, this was 62.9%, 66.0% and 88.0%, respectively.

When considering only users employing the recommended optimal settings, time spent in AHCL was 96.5% ± 7.6% in older and 93.2% ± 11.7% in younger users (for the distribution of settings across age groups, see Table S1). Both mean SG (139.1 ± 11.3 vs. 140.2 ± 11.7 mg/dL; Δ − 1.1 [95% CI −2.2 to −0.03], p = 0.056) and GMI (6.6% ± 0.3% vs. 6.7% ± 0.3%; Δ − 0.1 [95% CI −0.05 to 0.00], p = 0.056) were comparable between groups. Relative to the entire user group, TIR with optimal settings was 4.8% and 6.6% points higher in older and younger users, respectively, reaching 81.9% ± 7.2% and 79.7% ± 7.5% (Δ2.2 [95% CI 1.5–2.9], p <0.0001) (Figure 1B). As in the overall cohort, users aged 16–28 years had lower TIR than users aged 29–42 and 43–55 years (Figure S1). TITR was higher in those on optimal settings than in the overall cohort and comparable between older (57.4% ± 9.2%) and younger (56.2% ± 9.0%) users. As expected, TAR was lower (TAR_{250}: 2.4% ± 2.2% in older, 3.1% ± 2.7% in younger users) while TBR remained low (TBR_{54}: 0.3% ± 0.4%, TBR_{70}: 1.7% ± 1.7% in older and TBR_{54}: 0.5% ± 0.5%, TBR_{70}: 2.3% ± 1.7% in younger users) in both groups with optimal settings relative to the entire cohort. In terms of users on recommended optimal settings reaching treatment targets, 91.8% of the older users reached a GMI <7%, 93.7% a TIR >70% and 92.4% a TBR_{70} <4%. In younger users, this was 88.6%, 89.5% and 86.5%, respectively.

Outcomes in older users across 11 countries with ≥100 users were consistent across countries. Except in South Africa (88.5%), time in AHCL was ≥92%, reaching >96% in France and Sweden (Table S2). Mean SG ranged from 140.5 mg/dL in Czechia to 149.0 mg/dL in Great Britain (cross-country mean: 145.9 mg/dL). GMI ranged from 6.7% in Czechia to 6.9% in Great Britain (mean 6.8% across countries).

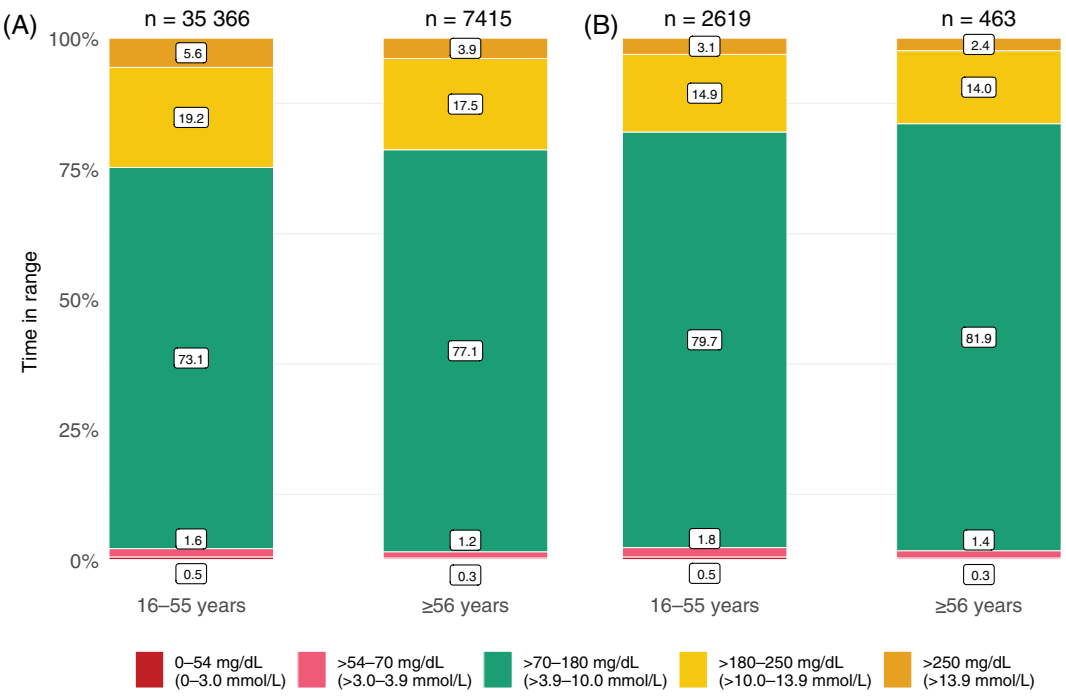

FIGURE 1 Time in range for users aged 16–55 versus ≥56 years (achievement cohort). (A) All users. (B) Users with optimal settings.

The percentage of users with GMI <7% varied between 65.5% in Great Britain to 87.8% in Czechia (mean 74.7% across countries). The same two countries also marked the minimum (71.9%) and maximum (92.2%) percentage of users with TIR >70%. In all countries, TBR was <2% (Figure S2).

3.2 | Longitudinal cohort

When analysing 12-month data, both groups were found to have constant GMI (6.7% in older vs. 6.8% in younger users) over time. Mean SG values were comparable in the first month, at 143.4 mg/dL in older and 144.5 mg/dL in younger users. While values remained nearly constant in older users, with a mean value of 143.6 mg/dL in month 12, values increased slightly in younger users, to 147.5 mg/dL in month 12 (Figure S3).

Estimates for TIR suggested that, in both groups and for the entire 12 months, ≥75% of time were spent in range (Figure 2). In older users, TIR was nearly constant, varying between 78.9% in months 9 and 10 and 79.6% in months 3 and 4. In each month, TIR was lower for younger than older users, varying between 75.1% in months 11 and 12 and 76.8% in the first month. Across the 12-month follow-up, TBR was <2% in older (TBR_{54}: ≤0.3%) and <2.5% in younger users (TBR_{54}: ≤0.5%), with the percentage of users in the >54–70 mg/dL (>3.0–3.9 mmol/L) and ≤54 mg/dL (≤3.0 mmol/L), respectively, nearly constant over time in both groups. As a corollary of the slightly higher TIR in older users, their TAR was lower relative to younger users—in every month, TAR

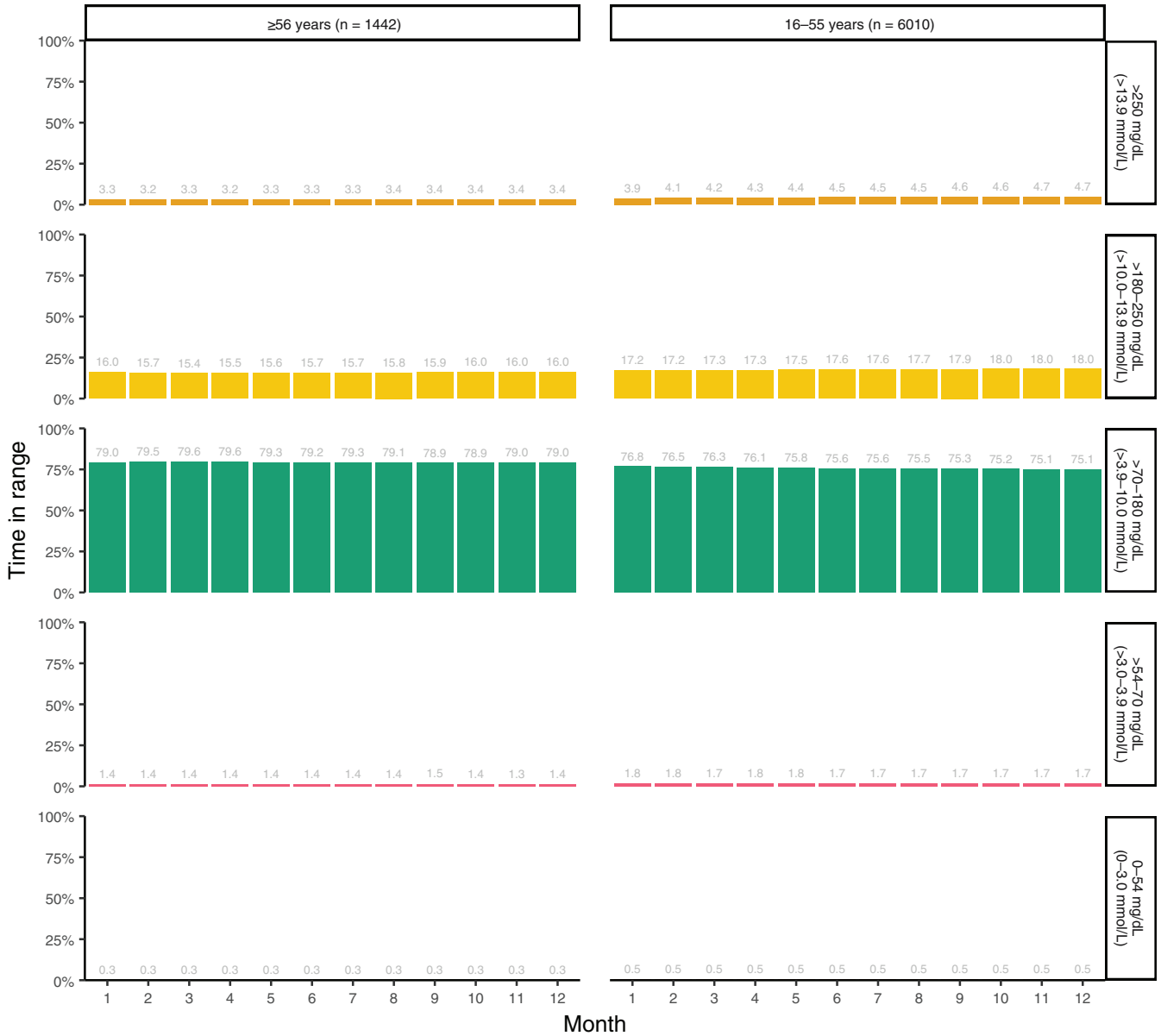

FIGURE 2 Time in range over 12 months for users aged 16–55 versus ≥56 years.

was <20% in older (TAR_{250}: ≤3.4%) and <23% in younger users (TAR_{250}: ≤4.7%).

3.3 | Pre-post cohort

After initiating AHCL, mean SG and GMI were lower than pre-AHCL initiation in either user group (Table 1). Consequently, percentages of users with GMI <7% increased, from 34.3% to 63.8% in younger users and from 38.6% to 70.9% in older users. The percentage of users with TIR >70% also increased, from 29.4% to 67.0% in the younger group and from 39.6% to 78.3% in the older group. Estimates for TBR decreased, from 2.7% before to 2.1% after initiation in younger users and from 1.9% before to 1.6% after initiation in older users (Figure 3). TAR was reduced substantially, from 35.8% before to 24.6% after AHCL initiation in younger users and from 32.4% to 21.7% in older users (Figure 3).

4 | DISCUSSION

This was a large-scale real-world evidence study comparing the MiniMed™ 780G system in older (aged ≥56 years) versus younger users (16–55 years) with type 1 diabetes. Findings indicated that, with an average TIR of 77.1%, older users performed as well or even slightly better than younger users (73.1%). This average TIR was substantially above the international target of 50% for older and/or high-risk individuals and surpassed the 70% target for younger individuals. The mean TBR_{70} for older users was 1.5%, lower than the 2.1% observed in younger users. Interestingly, it did not meet the <1% TBR_{70} target set by the 2019 international consensus for older and/or high-risk individuals (although it met the target for younger users).[7] When recommended optimal system settings were applied, glycaemic control was better; the mean TIR for the older group exceeded 80% while the TBR_{70} remained low. Additionally, glycaemic control for older

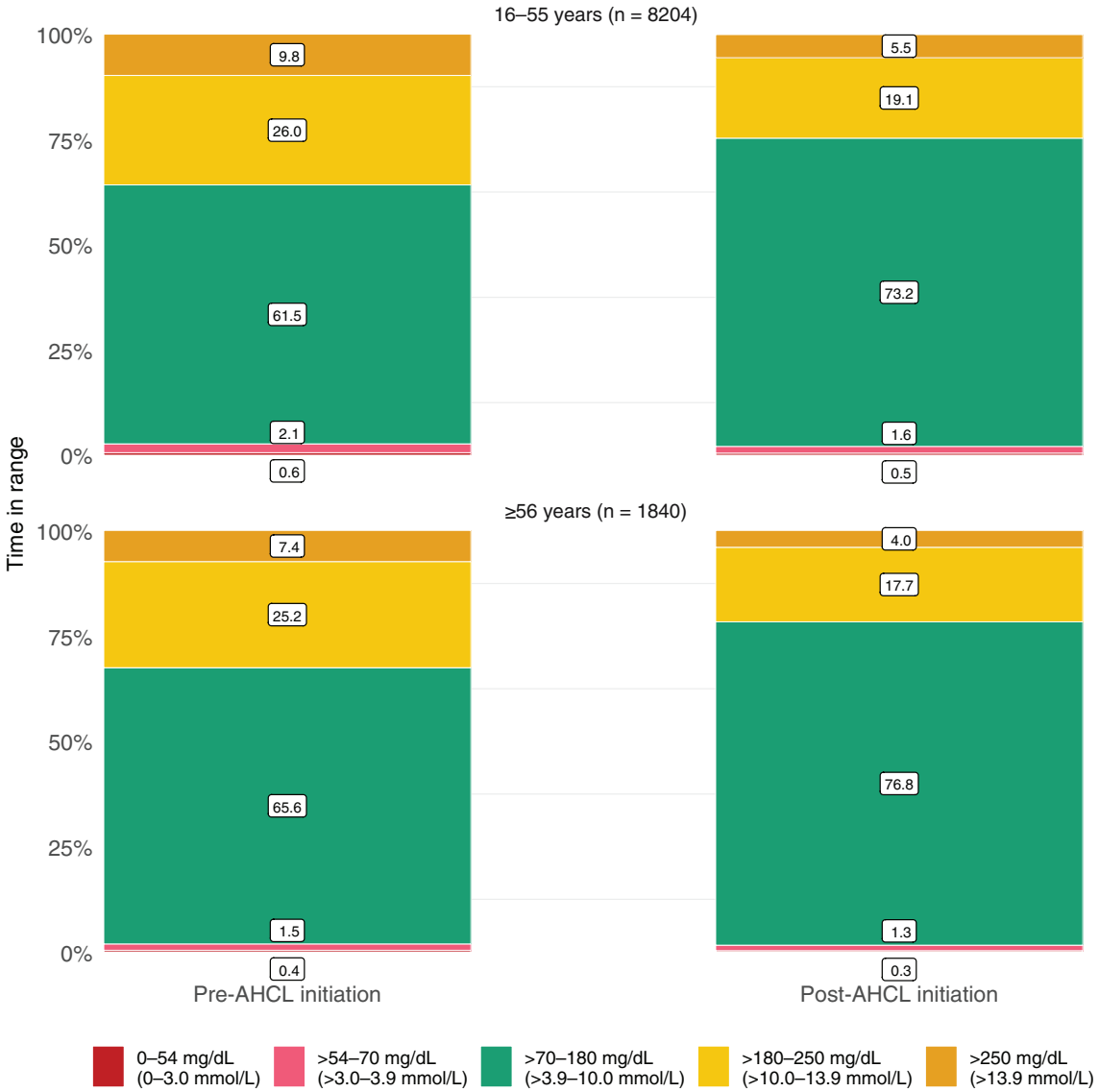

FIGURE 3 Time in range for users aged 16–55 versus ≥56 years, before and after advanced hybrid closed loop (AHCL) initiation.

system users remained consistent throughout the entire 12-month analysis period.

These findings aligned with those from the few other studies examining the effectiveness (and safety) of AID systems in older people. In particular, Pintaudi et al.[21] reported a small-scale prospective observational study in 18 older adults (mean age 74 years) with type 1 diabetes in Italy. In this study, MiniMed™ 780G system was associated with a considerable TIR improvement from baseline. At 12 months, TIR was 79.8% versus 64% at baseline; however, there was no significant change in TBR_{70}, which was 1.2% both at baseline and 12 months ($p = 0.58$ for TBR_{54} and $p = 0.99$ for TBR_{54-70}). Studies conducted with other AID systems have reported similar findings. For example, in a real-world study of the Control IQ system (Tandem Diabetes Care) in older people (mean age 70 years), a TIR of 76% was reported and TBR_{70} improved to 1.0%.[12] Similarly, in a randomised crossover trial of the earlier generation MiniMed™ 670G system versus sensor-augmented pump (SAP) therapy in people aged ≥60 years, MiniMed™ 670G system use led to improvements in both TIR and TBR versus SAP. TIR with the 670G system was 75.2% but TBR_{70} was again >1%.[22]

There is ongoing discussion around the applicability of the 2019 consensus targets for older people, specifically around the TIR target, challenging the paradigm that achieving a more stringent TBR target must be at the expense of reducing TIR. In 2024, Toschi et al.[8] suggested that reconsidering the 2019 targets is warranted and proposed that, given the heterogeneous nature of the older population and in line with ADA guidance, targets for older people should be based on health agility status (healthy, intermediate or poor health). For the healthy category, Toschi et al. suggested a TIR target of >70% and a TBR_{70} target of 0% as well as the addition of a 'buffer zone' of 70–90 mg/dL with a target of <4% (for people with intermediate or poor health status, a buffer zone of 70–100 mg/dL was proposed). The authors further noted that strict targets for TBR can be implemented without needing to relax the TIR target. Indeed, O'Neal et al.[23] recently explored the relationship between TIR and TBR across different age groups including older people (aged >55 years and aged >60 years) and demonstrated a strong correlation between TIR and TAR but a relatively weak correlation between TIR and TBR, which led the authors to suggest that TIR targets should be independent of TBR. This was further supported by recent findings that there is very limited interdependency between TIR and TBR, with TIR and hypoglycaemia belonging to different principal components.[24]

This study added to that current discussion. Given that the TBR_{70} remained very low in older MiniMed™ 780G system users (even among those applying optimal settings) and given that the TIR target was frequently met (79.2% of older MiniMed™ 780G system users achieved an average TIR >70%), there was no indication for more stringent targets in current older MiniMed™ 780G system users. However, we acknowledge that this statement cannot be generalised to all older individuals, as there may have been a selection bias regarding which users are actually prescribed AID devices. Specifically, there is a possibility that users with challenges related to frailty and cognition might have been excluded.

The current analysis has both strengths and limitations. The major limitation stems from the constraints of the data collected in CareLink™ Personal, although this is inherent to real-world analyses using such platforms. For example, exact age is not recorded; instead, age is self-reported and categorised in five age groups (≤15, 16–28, 29–42, 43–55, ≥56 years), with the oldest group encompassing users as young as 56 years old. More granularity was not available due to the GDPR-compliant design of the CareLink™ Personal platform. A proportion of the older users in our analysis likely were between 56 and 60/65 years (the cut-off for 'elderly' as defined by the guidelines or consensus).[2] These 'younger elderly' had stricter target values and potentially increased the average TIR for older users in this study. This type of database also inherently has limited data around clinical parameters such as previous therapies, duration of diabetes and history of complications, as well as comorbidities (including hypoglycaemia awareness, frailty and others) and co-medications. Additionally, HbA1c could not be used as a measure of glycaemic control, although it must be noted that TIR and other CGM metrics are increasingly accepted as standard measures. Secondly, a large part of the data were collected during COVID-19 pandemic. Currently, the data available have not shown a significant impact of COVID-19 on glycaemic control in AID system users. However, if there was an effect, one could speculate that the observed glycaemic control in this study would affect both groups. Thirdly, the younger age group included over 12 000 young adults (16–28 years). These users are known to exhibit a lower glycaemic control than other adult users on average,[25] possibly affecting our conclusion that older individuals had a higher TIR than the younger group. In a sensitivity analysis on the achievement cohort (supplement), we demonstrated that the 16–28 age group indeed lowered the average TIR of the entire 16–55 group (partly explained by their lower time spent in automation, 84.2%). However, even when this subgroup was excluded, our conclusion remained valid. Additionally, the other individuals within the younger group (i.e., 29–42 years, 43–55 years) also spent less time in automation compared with older users (89.5% and 92.7%, respectively, vs. 94.2% in the ≥56 years group), and this may partly explain the better outcomes observed in the older group. Key strengths of the analysis included its large-scale multinational nature, meaning that findings should be both robust and generalisable across settings.

In conclusion, these real-world findings for the MiniMed 780G system provided a valuable addition to the evidence base on the use of AID systems by older people and suggested that older people can achieve similar, or better, TIR compared with younger people. With AID systems, improvements in TIR to >70% can be achieved by many older people without increasing TBR. The findings presented here support the argument for TIR targets in older populations. However, it is important to note that these findings cannot be generalised to all elderly individuals, as the selection criteria and health status of those prescribed the MiniMed 780G system were not known.

AUTHOR CONTRIBUTIONS

VS, AA, JC, TH and OC designed the study. AA and JC analysed the data. All authors interpreted and discussed the data and reviewed

the manuscript. OC is the guarantor of this work and, as such, has full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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CONFLICT OF INTEREST STATEMENT

SH has received consultancy/speaking fees from Novo Nordisk, Eli Lily, Zealand, Mylan and Medtronic and research support from Dexcom. DO has received consultancy/speaking fees from Medtronic, Insulet, Abbott, Novo and Sanofi; research support from Medtronic, Insulet, Dexcom, Roche, GlySense, BioCapillary and Endogenex; and served on advisory boards for Medtronic, Insulet, Abbott, Ypsomed, Novo Nordisk and Sanofi. JJ served as speaker and/or member of the advisory board for Abbott, AstraZeneca, Boehringer Ingelheim, Eli Lilly, Medtronic, Nordic InfuCare, Novo Nordisk and Sanofi. TC has received consultancy/speaking fees from Eli Lilly, Sanofi, MSD, Novo Nordisk, Medtronic, Geffen Medical, AZ and BI and research support from Medtronic, MSD and Novo Nordisk. VS, AA, JC, TH and OC are employees of Medtronic.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

Data are confidential and proprietary so cannot be made available.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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