SUMMARY OF SAFETY AND EFFECTIVENESS DATA (SSED)

I. GENERAL INFORMATION

Device Generic Name: Automated Insulin Dosing System

Device Trade Name: MiniMed 780G System

Device Procode: OZP

Applicant's Name and Address: Medtronic MiniMed, Inc.
18000 Devonshire Street
Northridge, CA 91325

Date(s) of Panel Recommendation: None

Premarket Approval Application (PMA) Number: P160017/S124

Date of FDA Notice of Approval: August 29, 2025

The original PMA for the MiniMed 670G system (P160017) was approved on September 28, 2016, for use in persons ages 14 years and older. PMA Panel Track Supplement P160017/S017, approved on February 13, 2018, added the upper arm as an alternate insertion site for the Guardian Sensor (3). PMA Panel Track Supplement P160017/S031, approved on June 21, 2018, expanded the indication for pediatric patients 7 to 13 years of age. PMA Panel Track Supplement P160017/S076, approved on August 31, 2020, expanded the indications for the MiniMed 770G system to include pediatric patients down to 2 years old and changed the pump communication protocol to Bluetooth Low Energy (BLE). PMA Panel Track Supplement P160017/S118 to update the AHCL algorithm and add compatibility with the Simplera Sync CGM was approved on April 18, 2025. The SSEDs to support these prior approvals can be found on the CDRH website. These previous supplements are incorporated within this submission by reference herein as relevant.

The current Panel Track Supplement expands the indications for use to include persons over 18 years of age with insulin-requiring Type 2 diabetes.

II. INDICATIONS FOR USE

The MiniMed 780G system is indicated for use with either the Simplera Sync sensor, or with the Guardian 4 sensor/Guardian 4 transmitter. Indications for use for the MiniMed 780G system are provided for each of the two system configurations separately:

MiniMed 780G System for use with Guardian 4 Sensor and Guardian 4 Transmitter

The MiniMed 780G system is intended for the continuous delivery of basal insulin at selectable rates, and the administration of insulin boluses at selectable amounts for the management of type 1 diabetes mellitus in persons 7 years of age and older, and of type 2 diabetes mellitus in persons 18 years of age and older requiring insulin. The system is also intended to continuously monitor glucose values in the fluid under the skin. The MiniMed 780G system includes SmartGuard technology, which can be programmed to automatically adjust insulin delivery based on continuous glucose monitoring (CGM) sensor glucose values and can suspend delivery of insulin when the SG value falls below or is predicted to fall below predefined threshold values.

The MiniMed 780G system consists of the following devices:

- MiniMed 780G insulin pump
- Guardian 4 transmitter
- Guardian 4 sensor
- One-press serter
- Accu-Chek Guide Link blood glucose meter
- Accu-Chek Guide Test Strips

The system requires a prescription from a healthcare professional.

Guardian 4 sensor

The Guardian 4 sensor is intended for use with the MiniMed 780G system and the Guardian 4 transmitter to monitor glucose levels for the management of diabetes.

The sensor is intended for single use and requires a prescription. The Guardian 4 sensor is indicated for up to seven days of continuous use.

The Guardian 4 sensor is not intended to be used directly to make therapy adjustments while the MiniMed 780G is operating in manual mode. All therapy adjustments in manual mode should be based on measurements obtained using a blood glucosemeter and not on values provided by the Guardian 4 sensor.

The Guardian 4 sensor has been studied and is approved for use in the systems, insertion sites, and ages listed in the following table.

System	Age	Sensor Insertion Site
MiniMed 780G System	7 years and older	Arm

One-press Serter

The serter is used as an aid for inserting the sensor. It is indicated for single-patient use and it is not intended for multiple-patient use.

Guardian 4 transmitter

The Guardian 4 transmitter is intended for use with the MiniMed 780G system and Guardian 4 sensor to monitor glucose levels for the management of diabetes.

Accu-Chek Guide™ Link Blood Glucose Monitoring System
The Accu-Chek Guide Link Blood Glucose Monitoring system is comprised of the Accu-Chek Guide Link meter and the Accu-Chek Guide test strips.

The Accu-Chek Guide Link Blood Glucose Monitoring System is intended to quantitatively measure glucose in fresh capillary whole blood from the fingertip, palm, and upper arm as an aid in monitoring the effectiveness of glucose control.

The Accu-Chek Guide Link Blood Glucose Monitoring System is intended for *in-vitro* diagnostic single-patient use by people with diabetes.

The Accu-Chek Guide Link Blood Glucose Monitoring System is intended to be used by a single person and should not be shared.

This system is not for use in diagnosing or screening for diabetes mellitus and not for neonatal use.

Alternative site testing should be done only during steady-state times (when glucose is not changing rapidly).

The Accu-Chek Guide Link Blood Glucose Monitoring System is intended to be used to wirelessly transmit glucose values to the MiniMed 780G system and MiniMed 770G system with Bluetooth wireless technology through the use of Bluetooth low energy communication.

MiniMed 780G System for use with Simplera Sync Sensor
The MiniMed 780G system is intended for the continuous delivery of basal insulin at selectable rates, and the administration of insulin boluses at selectable amounts for the management of type 1 diabetes mellitus in persons 7 years of age and older, and of type 2 diabetes mellitus in persons 18 years of age and older requiring insulin. The system is also intended to continuously monitor glucose values in the fluid under the skin. The MiniMed 780G system includes SmartGuard technology, which can be programmed to automatically adjust insulin delivery based on continuous glucose monitoring (CGM) sensor glucose values and can suspend delivery of insulin when the SG value falls below or is predicted to fall below predefined threshold values.

The MiniMed 780G system consists of the following devices:
- MiniMed 780G insulin pump
- Simplera Sync
- Accu-Chek™ Guide Link blood glucose meter
- Accu-Chek Guide Test Strips

The system requires a prescription from a healthcare professional.

Simplera Sync Sensor
The Simplera Sync sensor is intended for use with the MiniMed 780G system to monitor

glucose levels for the management of diabetes. The Simplera Sync sensor can be used one time and has a life of up to six days, followed by a grace period of 24 hours. During the grace period, the sensor will continue to work as it did during the first six days, to allow the patient to change their sensor more flexibly. The Simplera Sync sensor is not intended to be used directly to make therapy adjustments while the MiniMed 780G is operating in manual mode. All therapy adjustments in Manual mode should be based on measurements obtained using a blood glucose meter and not on values provided by the Simplera Sync sensor. The Simplera Sync sensor has been studied and is approved for use in the systems, insertion sites, and ages listed in the following table.

System	Age	Sensor Insertion Site
MiniMed 780G	7 years and	Arm

Accu-Chek Guide Link Blood Glucose Monitoring System

The Accu-Chek Guide Link Blood Glucose Monitoring System is comprised of the Accu-Chek Guide Link meter and the Accu-Chek Guide test strips. The Accu-Chek Guide Link Blood Glucose Monitoring System is intended to quantitatively measure glucose in fresh capillary whole blood from the fingertip, palm, and upper arm as an aid in monitoring the effectiveness of glucose control.

The Accu-Chek Guide Link Blood Glucose Monitoring System is intended for in vitro diagnostic single-patient use by people with diabetes. The Accu-Chek Guide Link Blood Glucose Monitoring System is intended to be used by a single person and should not be shared. This system is not for use in diagnosing or screening for diabetes mellitus and not for neonatal use. Alternative site testing should be done only during steady-state times (when glucose is not changing rapidly).

The Accu-Chek Guide Link Blood Glucose Monitoring System is intended to be used to wirelessly transmit glucose values to the MiniMed 780G system and MiniMed 770G system with Bluetooth™ wireless technology through the use of Bluetooth low energy communication.

III. CONTRAINDICATIONS

A prominent boxed warning is included in the labeling regarding use of the device:

> "Do not use the SmartGuard feature for people who require less than 8 units or more than 250 units of total daily insulin per day. A total daily dose of at least 8 units, but no more than 250 units, is required to use the SmartGuard feature."

The following contraindications for this device are also described in the labeling:

MiniMed 780G System with Simplera Sync Sensor:

- The MiniMed 780G system is contraindicated for use in persons under age 7.

- Pump therapy is not recommended for people with a significant cognitive or physical impairment that affects their ability to safely operate the pump, including a lack of physical dexterity.
- Pump therapy is not recommended for children who are not under the care of a parent or caregiver who is capable of safely operating the pump for the patient.
- The reservoir is contraindicated for the infusion of blood or blood products. Infusion sets are indicated for subcutaneous use only and not for intravenous (IV) Infusion.
- Infusion sets are not indicated for the infusion of blood or blood products.
- Insulin pump therapy is not recommended for persons who are unwilling or unable to perform BG meter readings.
- Pump therapy is not recommended for people who are unwilling or unable to maintain contact with their healthcare professional.

MiniMed 780G System with Guardian 4 Sensor and Guardian 4 Transmitter:

- The MiniMed 780G system is contraindicated for use in persons under age 7.
- Do not use the serter to insert sensors other than the Guardian 4 sensor. Medtronic cannot guarantee the safety or efficacy of this product if used with other sensors.
- The reservoir is contraindicated for the infusion of blood or blood products.
- Infusion sets are indicated for subcutaneous use only and not for intravenous (IV) infusion.
- Infusion sets are not indicated for the infusion of blood or blood products.
- Pump therapy is not recommended for persons who are unwilling to or unable to perform BG meter readings.
- Pump therapy is not recommended for people who are unwilling or unable to maintain contact with their healthcare professional.

IV. WARNINGS AND PRECAUTIONS

The warnings and precautions can be found in the MiniMed 780G system labeling.

V. DEVICE DESCRIPTION

The MiniMed 780G System is comprised of the following devices:

MiniMed 780G Pump (MMT-1884)

The MiniMed 780G pump (model MMT-1884) is an ambulatory, battery--operated, rate -programmable micro-infusion pump designed to deliver insulin from a reservoir. The reservoir is driven by a motor to deliver pre-determined basal rate profiles and user -selected bolus amounts of insulin into the subcutaneous tissue through an infusion set.

The MiniMed 780G pump is offered in one model (MMT-1884). The pump houses electronics, a pumping mechanism, a user interface, and a medication reservoir within the same physical device. The reservoir is attached to a tube that connects to the user's infusion site on their body. The pump is intended to deliver insulin through a diffusion mechanism. Model MMT-1884 is compatible with a 3.0 mL reservoir. The pump only displays blood glucose level units in mg/dL and this units setting cannot be reconfigured by the user.

In addition to insulin delivery, the MiniMed 780G pump is designed to receive and display real-time interstitial fluid glucose values from a compatible CGM. The MiniMed 780G pump is compatible with two CGMs: the Guardian 4 sensor with Guardian 4 transmitter and Simplera Sync sensor. When used in combination with a CGM, the transmitter sends sensor signals to the MiniMed 780G pump via a BLE wireless communication protocol every five minutes.

When using the 780G pump with the Guardian 4 sensor with Guardian 4 transmitter or Simplera Sync sensor, calibration is not required. However, the system is designed to use every BG meter reading either entered manually or received from a linked glucose meter to calibrate the sensor.

The 780G Pump can operate in Manual Mode or Auto Mode, and each mode includes various features and capabilities. These features and capabilities are described in detail in the MiniMed 780G system user guide. A summary of these features and capabilities is provided in *Table 1* below.

Table 1: Summary of the Features of the MiniMed 780G System

Mode	Description	When is it Active?	Will I receive Alerts?
Manual Mode: Insulin Infusion Pump	This mode is when the device is functioning as a pump that can deliver insulin, but the device does not have a sensor connected, is not in Auto Mode and the insulin suspend features are not turned on.	This is the default mode and the user does not have to specifically turn this mode on.	There are alerts if the pump has any issues with delivering insulin (e.g. suspended delivery) or low reservoir.
Manual Mode: Sensor Augmented Pump	This mode is when the device is functioning as a sensor and pump, but the device is not in Auto Mode and the insulin suspend features are not turned on.	This user has to be wearing a CGM that is communicating to the pump in order to receive sensor glucose alerts.	There is a mandatory severe low alarm for the system used with each compatible CGM; 64 mg/dL for Guardian 4 and Simplera Sync. The user can also set optional high and low alerts to sound on or before setting sensor glucose levels.

Mode	Description	When is it Active?	Will I receive Alerts?
Manual Mode: Suspend On Low	When this feature is active the device detects that your sensor glucose level has reached a pre-set sensor glucose value and it automatically suspends basal insulin delivery when that value is reached.	The user has to turn this feature on. It is not available when Auto Mode is turned on, and it cannot be turned on if Suspend before Low is turned on.	There is a mandatory severe low alarm for the system used with each compatible CGM: 64 mg/dL Guardian 4 CGM and Simplera Sync and at the pre-set low level. The user can also set optional high alerts to sound on or before set sensor glucose levels, and an optional alert before low alert.
Manual Mode: Suspend Before Low	When this feature is active the device detects when your sensor glucose is predicted to reach a pre-set value and it automatically suspends basal insulin delivery before that value is reached.	The user has to turn this feature on. It is not available when Auto Mode is turned on, and it cannot be turned on if Suspend before Low is turned on.	There is a mandatory severe low alarm for the system used with each compatible CGM: 64 mg/dL Guardian 4 and Simplera Sync CGM and at the pre-set low level. The user can also set optional high alerts to sound on or before set sensor glucose levels, and an optional alarm before low alert.
Auto Mode	When this mode is active, the device can automatically adjust basal insulin by increasing, decreasing, or turning off basal insulin delivery based on sensor glucose levels. The device can also automatically deliver an auto correction bolus without the user input based on the sensor glucose levels.	The user has to turn this mode on and certain pre-defined conditions have to be met.	There is a mandatory severe low alarm for the system used with each compatible CGM: 64 mg/dL Guardian 4 and Simplera Sync CGM and a mandatory high alarm if user is ≥250 mg/dL for 3 hours; The user can also set optional high and low alerts to sound on or before set sensor glucose levels.

Mode	Description	When is it Active?	Will I receive Alerts?
Auto Mode: Safe Basal Delivery	When this feature is active, the device will deliver basal insulin at a patient-specific safe basal or safe basal low rate for no longer than 90 minutes. If the fault condition resolves within 90 minutes, the system will begin to automatically adjust basal insulin again. If the fault does not resolve within 90 minutes, the system will switch to Manual Mode.	This feature turns on when the system determines that either the sensor data is not adequate for Auto Mode or delivery at the minimum or maximum limit for a set amount of time has elapsed.	There is a mandatory alert before this feature turns on when the sensor glucose accuracy check fails. The user can also set optional alerts to sound before this feature turns on when minimum or maximum insulin delivery times out or when the sensor has been under- reading for too long. There is a mandatory severe low alarm for the system used with each compatible CGM: 64 mg/dL Guardian 4 CGM and Simplera Sync. The user can also set optional high and low alerts to sound on or before set sensor glucose levels.

G*uardian 4 transmitter (MMT-7841)*
The Guardian 4 transmitter is a portable, electrical current meter intended to process, store, and transmit glucose sensor values to the compatible insulin pump. The transmitter sends sensor glucose (DG) values and sensor integrity (SI) data from the Guardian 4 sensor to the MiniMed 780G insulin pump via BLE wireless communication protocol. The Guardian 4 transmitter does not require entry of fingerstick blood glucose measurement for calibration purposes.

G*uardian 4 sensor (MMT-7040)*
The Guardian 4 sensor is a sterile, single-use, single patient glucose sensing component for continuous monitoring of glucose levels in the user's interstitial fluid for up to seven days. The Sensor is inserted into the subcutaneous tissue using the One-Press Serter and is taped to the user's skin. It connects to the Guardian 4 transmitter, which in turn communicates with the MiniMed 780G pump,

Simplera Sync Sensor (MMT- 5120*)*
The sensor is a sterile, all-in-one glucose sensing device, intended as a single patient, single-use component of a personal CGM system for the management of diabetes in persons 7 years of age and older. The Simplera Sync sensor can be used one time and has a life of up to six days, followed by a grace period of 24 hours. During the grace period, the sensor will continue to work as it did during the first six days, to allow the patient to change their sensor more flexibly. The sensor calculates user glucose concentrations based on collected signals from the interstitial fluid and transmits glucose and device data to the networked device. It is intended to replace fingerstick blood glucose (BG) readings for treatment decisions and reduce the overall burden associated with diabetes management.

Accu-Chek Guide™ Link Blood Glucose Meter
The Accu-Chek Guide™ Link Blood Glucose Meter can be used with the MiniMed 780G system. The meter sends blood glucose values to the insulin pump for sensor calibration via a BLE wireless communication protocol. The blood glucose meter was previously reviewed and approved under P160017/S076.

Additional System Accessories
The following additional accessory devices listed in *Table 2* are compatible with the MiniMed 780G Insulin Pump:

Table 2: Accessory Devices

Device	**Model**
Reservoirs and Infusion Sets	**Model Numbers**
MiniMed Quick Set infusion set	MMT-386, MMT-387, MMT-394, MMT-396, MMT-397, MMT-398, MMT-399
MiniMed Silhouette infusion set	MMT-368, MMT-377, MMT-378, MMT-381, MMT-382, MMT-383, MMT-384
MiniMed Mio Infusion set	MMT-921, MMT-923, MMT-925, MMT-941, MMT-943, MMT-945, MMT-965, MMT-975
MiniMed Sure-T infusion set	MMT-862, MMT-864, MMT-866, MMT-874, MMT-876, MMT-884, MMT-886
MiniMed Mio Advance infusion set	MMT-213A, MMT-242, MMT-243A, MMT-244A
Medtronic Extended infusion set	MMT-430A, MMT-431A, MMT-432A, MMT-433A, MMT-440A, MMT-441A, MMT-442A, MMT-443A
MiniMed reservoir	MMT-332A
Medtronic Extended reservoir	MMT-342
Optional Devices	**Model Numbers**
MiniMed Mobile Application (Android)	MMT-6101
MiniMed Mobile Application (iOS)	MMT-6102
CareLink Connect Application (Android)	MMT-6111
CareLink Connect Application (iOS)	MMT-6112
Blue Adapter	ACC-190
CareLink Online (Personal)	MMT-7333
CareLink Pro	MMT-7335

This medical device product has functions subject to FDA premarket review as well as functions (e.g., the MiniMed Mobile Applications) that are not subject to FDA premarket review. For this application, if the product has functions that are not subject to FDA premarket review, FDA assessed those functions only to the extent

that they either could adversely impact the safety and effectiveness of the functions subject to FDA premarket review or they are included as a labeled positive impact that was considered in the assessment of the functions subject to FDA premarket review.

VI. ALTERNATIVE PRACTICES AND PROCEDURES

Control of diabetes can be achieved through a combination of various behaviors and methods.

Self-behaviors including healthy eating, taking the clinically indicated medications (pharmaco-vigilance), and being physically active are fundamental lifestyle activities that are important for achieving glycemic control regardless of the methods of monitoring glucose and insulin administration.

Methods of monitoring glycemic control include periodic measurement of Hemoglobin A1c (HbA1c) which reflects mean blood levels control over a three-month period. This test is ordered and interpreted by the person with diabetes' (PWDs) healthcare provider. Self-monitoring of blood glucose using glucose meters and test strips provides quantitative measurements of blood glucose at a single point in time for PWDs and their healthcare providers. This helps to monitor the effectiveness of glycemic control, as well as in making more immediate treatment modifications.

PWDs may administer insulin by injection or using other insulin infusion pumps as prescribed by their physician. An insulin pump is an alternative to multiple daily insulin injections (via insulin syringe or an insulin pen). There are currently several commercially available ambulatory insulin infusion pumps that can be used for insulin infusion. Additionally, sensor-augmented insulin infusion pumps or continuous glucose monitoring systems may be used to record continuous interstitial glucose information and provide real-time hypoglycemia and hyperglycemia alerts. Several available insulin pump systems offer automated features where insulin delivery may be suspended when sensor glucose has reached or is predicted to reach a user selected low glucose threshold. Hybrid closed loop insulin pump systems are also available for people with type 1 diabetes. These systems can automatically increase or decrease the amount of insulin delivered to maintain glucose within an optimal range.

Each alternative has its own advantages and disadvantages. A patient should fully discuss these alternatives with his/her physician to select the method that best meets expectations and lifestyle.

VII. MARKETING HISTORY

The MiniMed 780G system has been commercially available in Europe since October 2020. The MiniMed 780G system has been commercially available in the US since May 2023.

The MiniMed 780G system is an iteration of the MiniMed 770G system (identical to the MiniMed 670G except it has Bluetooth communication capability). The MiniMed 670G system was originally approved for marketing in the United States on September 28, 2016 (P160017) and received approval for marketing with a pediatric indication (ages 7-13 years) on June 21, 2018 (P160017/S031). On August 31, 2020, the MiniMed 770G system was approved for an indication that included users ages 2-6 years old, and for an updated BLE communications protocol. Neither the MiniMed 670G system nor the MiniMed 770G system have been withdrawn from the market for any reason related to their safety or effectiveness.

The insulin reservoirs and infusion sets used with the MiniMed 780G system are also the same as those currently used with the MiniMed 530G system (P120010), the MiniMed 630G system (P150001), the MiniMed 670G system (P160017), and the MiniMed 770G system (P160017/S076). These devices have not been withdrawn from commercial distribution for any reason related to either safety or effectiveness.

VIII. POTENTIAL ADVERSE EFFECTS OF THE DEVICE ON HEALTH

Potential device-related serious adverse events include

- Diabetic ketoacidosis (DKA) resulting from high blood glucose due to suspension of insulin delivery or inadequate insulin delivery (which may result from catheter occlusion, hardware or software malfunction, erroneous CGM readings in Auto Mode or suspend mode, or inadequate insulin dosing).
- Severe hypoglycemia resulting from over-delivery of insulin (which can result from hardware or software malfunction, erroneous CGM readings in Auto Mode, or erroneous insulin dosing), which may lead to seizure, unconsciousness and, rarely, death.

Potential device related non-serious events include:

- Skin irritation or redness
- Infection
- Pain or discomfort
- Bruising
- Edema
- Rash
- Bleeding
- Induration of skin
- Allergic reaction to adhesive

Sensor breakage with fragments retained under the skin is a potential adverse event related to use of the CGM component of the 780G system, but this was not observed during the clinical studies. Based on post-market experience with similar devices and the results observed in the clinical studies described below, the occurrence and severity of these events are low.

Infection at the insulin pump infusion set insertion site and sensor insertion site is a potential complication related to insertion of the CGM or the insulin pump infusion set. Based on post-market experience with similar devices, and the results observed in clinical studies, the occurrence and severity of these events are not expected to differ from other approved infusion sets and CGM devices.

Insulin pump use is known to carry an increased risk of DKA. However, FDA has received information indicating some patients are willing to accept an increased risk of DKA or ketosis and hyperglycemia (severe hyperglycemia) because of the benefits of pump use (see also Section XII below).

Like other insulin pumps, there is an inherent risk that users of the device who do not use the 780G system as intended could harm themselves. Therefore, the device is for prescription use only and contraindicated for people unwilling or unable to perform fingerstick blood glucose meter readings and for people unwilling or unable to maintain contact with their healthcare professional.

As demonstrated under P120010/S046 for the MiniMed 530G system (which has the same 'suspend on low' feature, where insulin delivery will suspend for two hours after the low glucose threshold has been reached), two-hour suspension of insulin delivery is unlikely to lead to clinically significant ketosis or ketoacidosis even if the pump inappropriately suspends when blood sugar is normal or elevated and should respond to insulin therapy and hydration within a few hours.

There is a theoretical risk of insulin over-delivery due to device malfunction, which has a risk of leading to severe hypoglycemia due to malfunction of the 780G system. However, this event did not occur during the pivotal study. If insulin over-delivery were to occur, there are several mechanisms in place, designed to help detect and mitigate the risk of impending and/or current hypoglycemia, including the presence of alarms/alerts and insulin delivery suspension/reduction.

There is a theoretical risk of insulin under-delivery (due to a hardware or software malfunction) which may lead to severe hyperglycemia or DKA due to malfunction of the 780G system. However, this event did not occur during the pivotal study or the continuation phase of the pivotal study. If insulin under-delivery were to occur, there are mechanisms in place to help detect impending and/or current hyperglycemia, including the presence of alerts and alarms.

The consequences of falsely high glucose readings on the CGM would be potential over-delivery of insulin via automated insulin delivery and missed low glucose suspensions and alerts/alarms, which have the potential to lead to severe hypoglycemia.

The consequences of falsely low glucose readings on the continuous glucose monitor would be potential under-delivery of insulin and missed high glucose alerts, which have the potential to lead to severe hyperglycemia or DKA.

For the specific adverse events that occurred in the clinical studies, please see Section X below.

IX. SUMMARY OF NON-CLINICAL STUDIES

A. Laboratory Studies

Application-level verifications were performed on the full MiniMed 780G system (i.e. MiniMed 780G pump, transmitters, BG meter, MiniMed Mobile App, CareLink, and CareLink Connect App) to ensure that the devices are compatible, and that data is successfully transferred. Please see the SSED for P160017/S076, P160017/S091, and P160017/S118 for all other system testing.

Pre-clinical testing of the MiniMed 770G pump hardware supports the safe use of the 780G pump as the corresponding pumps contain identical hardware. Please see the SSEDs for P160017, and P160017/S076 for descriptions of pre-clinical testing of the MiniMed 780G pump with the A1 configuration. See approval of P160017/S116 for details on design changes, component material changes and manufacturing changes impacting the MiniMed 780G System with the A2 configuration.

The One-Press Serter remains unchanged. Please see the SSED for P160017 for descriptions of the pre-clinical testing of the One- Press Serter.

The Accu-Chek Guide™ Link Meter remains unchanged since its approval under P160017/S076. Please see the SSED for P160017/S076 for descriptions of the pre-clinical testing of the Accu-Chek Guide™ Link Meter.

The Guardian 4 CGM remains unchanged since its approval under P160017/S091. Please see the SSED for P160017/S091 for descriptions of the pre-clinical testing of the Guardian 4 CGM. The Simplera Sync CGM remains unchanged since its approval under P160017/S118. Please see the SSED for P160017/S118 for descriptions of the preclinical testing of the Simplera Sync sensor (MMT-5120)

All protocols, test reports, and acceptance criteria have been reviewed and found to be acceptable. All devices met all pre-defined acceptance criteria during testing.

1. Packaging

Medtronic packages all devices to meet the requirements for shipping as defined in ASTM D4169, Standard Practice for Performance Testing of Shipping Containers and Systems. This enables packages to withstand typical events associated with distribution without defects or loss of sterility as applicable. The ability of the package to protect the products throughout handling, distribution, and the storage environment is evaluated and documented.

Pre-clinical testing performed on the MiniMed 770G pump hardware and packaging supports the 780G pump as the corresponding pump hardware and packaging are

identical. Please see the SSED for P160017/S076 for packaging validation. Please see the SSED for P160017/S091 for descriptions of the pre-clinical packaging validation conducted for Guardian 4 Transmitter and Guardian 4 Sensor. Please see approval of P160017/S116 for details on design changes, component material changes and manufacturing changes impacting the MiniMed 780G System packaging.

2. Software

Software verification and validation were conducted in accordance with the FDA Guidance Document entitled *General Principles of Software Validation: Final Guidance for Industry and FDA Staff*. Software development activities included establishing detailed software requirements, linking requirements with associate verification tests, software code reviews, unit testing, system level testing and defect tracking and dispositioning to ensure the software conforms to user needs and intended uses. Comprehensive verification and validation testing were conducted to confirm that the software used in the MiniMed 780G system, Simplera Sync CGM, Guardian 4 CGM met all specified requirements, and that the software will operate reliably and safely under normal or abnormal use conditions.

3. Firmware Over the Air (FOTA)

The MiniMed 780G pump has the capability to securely receive and install firmware-over-the-air (FOTA) updates, via the FOTA app (Class I). Verification of the FOTA functionality in the MiniMed 770G pump software, which supports safe use of the FOTA feature, is relevant for the 780G pump as the FOTA architecture and components are identical for both pumps. Please see the SSED for P160017/S076 and P160017/S093 for details regarding pre-clinical testing of the FOTA functionality.

4. Human Factors Testing

Human Factors usability validation studies were conducted in accordance with the IEC 62366-1 standard entitled *Medical Devices – Application of Usability Engineering to Medical Devices* and the FDA Guidance Document entitled *Applying Human Factors and Usability Engineering to Medical Device*.

The sponsor conducted usability validation studies to evaluate use of the MiniMed 780G system by patients with insulin-requiring Type 2 diabetes mellitus ages 18 years and older.

Task Analyses were conducted to determine 780G system critical tasks. For all the usability studies conducted, all use errors, close calls and use difficulties observed during completion of critical tasks were analyzed, and the root causes and impacts were assessed. For any use errors and close calls, a residual risk analysis was performed to: (a) determine whether design changes would further reduce the risks, and (b) assess the residual risks in relation to the benefits to the patient. It was determined that no design changes were necessary. Overall, the human factors usability validation studies and assessment demonstrated that the MiniMed 780G system is safe and effective for use by patients ages 18 years and older with insulin requiring Type 2 diabetes.

B. Animal Studies

Not applicable

C. Additional Studies

Not Applicable

X. SUMMARY OF PRIMARY CLINICAL STUDY

The sponsor performed a clinical study to establish a reasonable assurance of safety and effectiveness of the MiniMed 780G system in users 18 years of age and older with insulin-requiring Type 2 diabetes in the US under IDE# G210352. Data from these clinical studies were the basis for the PMA approval decision. A summary of the clinical study is presented below.

A brief summary of the supporting clinical study for the indications expansion of the 780G system in patients 18 years of age and older with insulin requiring Type 2 diabetes is presented below in Table 3.

Table 3: Summary of P160017/S124 Clinical Study

Clinical Study	IDE	Patient Population	Study Design/Objective
Safety and Effectiveness Evaluation of the MiniMed™ 780G System in Adults with Insulin-requiring Type 2 Diabetes	G210352	18-80 years	Multi-center, single arm study in insulin-requiring adults with Type 2 diabetes, conducted in two phases. The study phases used two versions of the MiniMed 780G insulin pump (Phase 1 – AHCL and Phase 2 – updated AHCL algorithm) with two different CGMs (Phase 1 – Guardian 4 CGM, Phase 2 – Simplera Sync sensor). The objective of the study was to confirm the safety and effectiveness of the MiniMed 780G system when used by adults with insulin-requiring Type 2 diabetes.

Safety and Effectiveness Evaluation of the MiniMed 780G System Used by Adults with Insulin-Requiring Type 2 Diabetes (G210352)

A. Study Design

This study was a multi-center, single-arm study in adult subjects with insulin-requiring Type 2 diabetes. The study was conducted in two phases and used two versions of the MiniMed 780G insulin pump (Phase 1 – AHCL and Phase 2 – updated AHCL algorithm) with two different CGMs (Phase 1 – Guardian 4 sensor, Phase 2 –Simplera Sync sensor).

The updated algorithm in the MiniMed 780G pump used in Phase 2 included modifications to the calculation of auto correction boluses and daily user adaptations. For Phase 1, consent, screening and the run-in period lasted for approximately 45 days. These were followed by a study period lasting approximately 3 months, during which subjects used the MiniMed 780G pump with the unmodified algorithm and the Guardian 4 CGM. Subjects participated in meal and exercise challenges during the run-in and study periods that lasted no more than 4 hours at a time. Subjects completing the Phase 1 study period were given the option to participate in a continued access period, during which they were allowed to continue using the study devices with scheduled visits to the investigational site until the study ended or new devices were introduced for investigation.

Phase 1 subjects were given the opportunity to transition into Phase 2 upon completion of the Phase 1 study period or at a subsequent continued access period visit. Transitioning subjects were expected to complete all required consent and screening activities prior to entering the Phase 2 study period and did not need to complete a Phase 2 run-in period. For Phase 2 naïve subjects (i.e., subjects who enrolled for the first time in Phase 2) the combined run-in period and study period were approximately 135 days long. The period from consent and screening through the end of the run-in period was completed in 45 days. The Phase 2 study period lasted approximately 3 months, and participating subjects used the updated MiniMed 780G pump with the Simplera Sync CGM.

The study included general and study-specific inclusion and exclusion criteria as listed below.

i. Inclusion Criteria

1. Was age 18 - 80 years at time of screening.
2. Had a clinical diagnosis of type 2 diabetes for 2 years or more as determined via medical record or source documentation by an individual qualified to make a medical diagnosis.
3. Was on MDI regimen (basal/bolus regimen with long-acting insulin and rapid-acting analogs), defined as greater than or equal to 2 injections per day for at least 3 months prior signing the informed consent, or CSII pump therapy with or without CGM. The investigator will use their discretion to verify that insulin requirements have been stable for the last 3 months prior to screening.
4. Was able to comply with technology, according to Investigator's judgment.
5. Did not require a legally authorized representative to consent on their behalf due to mental or intellectual disability.
6. Was willing to perform fingerstick blood glucose measurements as needed.
7. Was willing to wear the system continuously throughout the study.

8. Had a Glycosylated hemoglobin (HbA1c) less than 10% (as processed by Central Lab) at time of screening visit.
9. Note: All HbA1c blood specimens were sent to and tested by a National Glycohemoglobin Standardization Program (NGSP) certified Central Laboratory. HbA1c testing followed NGSP standards.
10. Had thyroid-stimulating hormone (TSH) in the normal range OR if the TSH was out of normal reference range the Free T3 was below or within the lab's reference range and Free T4 was within the normal reference range.
11. Was willing to upload data from the study pump, and had Internet access, and a computer system, or compatible smartphone that met the requirements for uploading the study pump.
12. Was willing to take one of the following insulins and could financially support the use of insulin preparations as required by the study:
13. Humalog (insulin lispro injection)
14. NovoLog (insulin aspart injection)
15. Admelog (insulin lispro injection)

ii. Exclusion Criteria

1. Had a history of 2 or more episodes of severe hypoglycemia, which resulted in any of the following during the 6 months prior to screening:
    i. Medical assistance (i.e., Paramedics, Emergency Room [ER] or Hospitalization)
    ii. Coma
    iii. Seizures
2. Had been hospitalized or had visited the ER in the 6 months prior to screening resulting in a primary diagnosis of uncontrolled diabetes.
3. Had diabetic ketoacidosis (DKA) or hyperglycemic hyperosmolar syndrome (HHS) in the last 6 months prior to screening visit.
4. Was unable to tolerate tape adhesive in the area of sensor placement as assessed by a qualified individual.
5. Had any unresolved adverse skin condition in the area of sensor placement (e.g; psoriasis, dermatitis herpetiformis, rash, Staphylococcus infection) at time of screening.
6. Had (Total Daily Dose) of less than 8 units or greater than 250 units at time of screening.
7. Had positive GAD (Glutamic Acid Decarboxylase) Antibody test.
8. Was female of child-bearing potential and result of pregnancy test was positive at screening.
9. Was sexually active female of child-bearing potential and was not using a form of contraception deemed reliable by the investigator.
10. Was female and planned to become pregnant during the course of the study.
11. Was being treated for hyperthyroidism at time of screening.
12. Had diagnosis of adrenal insufficiency at time of screening.
13. Had taken any oral, injectable, or intravenous (IV) glucocorticoids within 8 weeks from time of screening visit, or planned to take any oral, injectable, or IV glucocorticoids during the course of the study.

14. Was using hydroxyurea at time of screening or planned to use it during the study.
15. Was actively participating in an investigational study (drug or device) wherein he/she had received treatment from an investigational study drug or investigational study device in the last 2 weeks prior to screening. (Note: Did not apply to subjects who transitioned from Phase 1 to Phase 2)
16. Was currently abusing illicit drugs.
17. Was currently abusing marijuana.
18. Was currently abusing prescription drugs.
19. Was currently abusing alcohol.
20. Had a history of visual impairment which would not allow subject to participate in the study and perform all study procedures safely, as determined by the investigator.
21. Had elective surgery planned that required general anesthesia during the course of the study.
22. Had sickle cell disease, hemoglobinopathy; or had received red blood cell transfusion or erythropoietin within 3 months prior to time of screening.
23. Planned to receive red blood cell transfusion or erythropoietin over the course of study participation.
24. Was diagnosed with current eating disorder such as anorexia or bulimia.
25. Had been diagnosed with chronic kidney disease greater than CKD2 that resulted in chronic anemia.
26. Had a hematocrit that was below the normal reference range of lab used.
27. Was on dialysis.
28. Had serum creatinine of >2 mg/dL.
29. Had celiac disease that was not adequately treated as determined by the investigator.
30. Had any of the following cardiovascular events within 1 year of screening: myocardial infarction, unstable angina, coronary artery bypass surgery, coronary artery stenting, transient ischemic attack, cerebrovascular accident, angina, congestive heart failure, or ventricular rhythm disturbances.
31. Had history of cardiovascular event 1 year or more prior to screening: myocardial infarction, unstable angina, coronary artery bypass surgery, coronary artery stenting, transient ischemic attack, cerebrovascular accident, angina, congestive heart failure, or ventricular rhythm disturbances.
    For Phase 1, subject may have been enrolled if clearance from a board-certified cardiologist was provided prior to or at Screening.
32. Was a member of the research staff involved with the study.
33. Had used a MiniMed 780G pump prior to screening (Note: In Phase 2, this applied to new subjects only).

B. Accountability of Study Cohort

- In Phase 1, a total of 165 subjects 18 years of age and older with insulin-requiring type 2 diabetes were enrolled in the study at 13 investigational sites across the United States.
    - Of the 165 subjects enrolled, 89 subjects completed the study period.

- In Phase 2, a total of 481 subjects 18 years of age and older with insulin-requiring type 2 diabetes were enrolled in the study at 31 investigational sites across the United States.
    - Of the 481 subjects enrolled, 292 completed the study period.

C. Study Population Demographics and Baseline Parameters

The tables below provide a high-level summary of the population demographics of subjects 18-80 years of age that entered the study period with Auto Mode (i.e., intention-to-treat population). *Table 4* below provides the demographic of subjects enrolled in Phase 1 of the study (MiniMed 780G with Guardian 4 CGM). The Phase 2 demographics of the study (MiniMed 780G with Simplera Sync sensor) are provided in Table 5.

Table 4. Summary of Demographic and Other Baseline Characteristics, ITT (intention to treat) Population (Phase 1)

Characteristic	Number of Subjects = 95
Age (Years)	
N	95
Mean (SD)	60.3 (10.8)
Median	62
Min, Max	27.0, 80.0
Gender, N (%)	
Female	47 (49.5%)
Male	48 (50.5%)
Race, N (%)	
White	76 (80.0%)
Black or African American	16 (16.8%)
Asian	2 (2.1%)
Asian/White	1 (1.1%)
Ethnicity, N (%)	
Hispanic Or Latino	5 (5.3%)
Not Hispanic Or Latino	89 (93.7%)
Not Reported	1 (1.1%)
Baseline Therapy, N (%)	
Closed Loop Therapy (Pump + CGM + Algorithm)	7 (7.4%)
CSII	9 (9.5%)
Injection	58 (61.1%)
Other	2 (2.1%)
SAP (Pump + CGM)	19 (20.0%)
Diabetes History (Years)	
n	95
Mean (SD)	18.6 (8.6)
Median	19.8
Min, Max	3.3, 43.1
Height (cm)	

Characteristic	Number of Subjects = 95
n	95
Mean (SD)	171.6 (8.8)
Median	170.2
Min, Max	153.7, 198.1
Weight (kg)	
n	95
Mean (SD)	105.8 (21.8)
Median	103.1
Min, Max	66.3, 192.8
BMI (kg/m2)	
n	95
Mean (SD)	36.0 (7.4)
Median	35.2
Min, Max	21.4, 68.6
Baseline HbA1C (%)	
n	95
Mean (SD)	7.9 (1.0)
Median	7.9
Min, Max	5.5, 9.8

Table 5: Summary of Demographic and Other Baseline Characteristics, ITT Population (Phase 2)

Characteristic	Combined* Number of Subjects = 302	Transition Number of Subjects = 66	Naïve Number of Subjects = 236
Age (Years)			
n	302	66	236
Mean (SD)	60.3 (11.3)	62.6 (11.2)	59.7 (11.2)
Median	61.5	64.0	61.0
Min, Max	24.0, 82.0	28.0, 82.0	24.0, 80.0
Gender, N (%)			
Female	168 (55.6%)	30 (45.5%)	138 (58.5%)
Male	134 (44.4%)	36 (54.5%)	98 (41.5%)
Race, N (%)			
American Indian or Alaska Native	2 (0.7%)	N/A	2 (0.8%)
American Indian or Alaska Native, White	1 (0.3%)	N/A	1 (0.4%)
Asian	18 (6.0%)	1 (1.5%)	17 (7.2%)
Asian, Black or African American	1 (0.3%)	N/A	1 (0.4%)
Asian, White	1 (0.3%)	N/A	1 (0.4%)
Black or African American	38 (12.6%)	8 (12.1%)	30 (12.7%)
Native Hawaiian / Other Pacific Islander	1 (0.3%)	N/A	1 (0.4%)
Not reported	4 (1.3%)	2 (3.0%)	2 (0.8%)
Other (Detribalized indigenous)	1 (0.3%)	N/A	1 (0.4%)
Other (Hispanic)	1 (0.3%)	N/A	1 (0.4%)
Other (Persian)	1 (0.3%)	N/A	1 (0.4%)
Other (White / Native American)	1 (0.3%)	N/A	1 (0.4%)
Other (Hispanic)	1 (0.3%)	N/A	1 (0.4%)
Unknown	2 (0.7%)	N/A	2 (0.8%)
White	229 (75.8%)	55 (83.3%)	174 (73.7%)
Ethnicity, N (%)			
Hispanic or Latino	44 (14.6%)	4 (6.1%)	40 (16.9%)
Not Hispanic or Latino	256 (84.8%)	62 (93.9%)	194 (82.2%)
Not Reported	1 (0.3%)	N/A	1 (0.4%)
Unknown	1 (0.3%)	N/A	1 (0.4%)
Diabetes History (Years)			
n	302	66	236
Mean (SD)	19.4 (9.6)	20.1 (9.1)	19.2 (9.7)
Median	19.0	20.5	18.6

Characteristic	Combined* Number of Subjects = 302	Transition Number of Subjects = 66	Naïve Number of Subjects = 236
Min, Max	2.4, 60.4	4.2, 44.7	2.4, 60.4
Baseline Height (cm)			
n	301	66	235
Mean (SD)	170.2 (9.9)	172.5 (8.8)	169.6 (10.1)
Median	170.2	170.7	170.0
Min, Max	147.3, 198.1	157.2, 198.1	147.3, 198.1
Baseline Weight (kg)			
n	301	66	235
Mean (SD)	100.5 (23.6)	109.4 (24.1)	98.0 (22.8)
Median	98.6	105.2	96.1
Min, Max	50.4, 204.2	64.7, 204.2	50.4, 178.7
Baseline BMI (kg/m^2)			
n	301	66	235
Mean (SD)	34.7 (7.7)	36.9 (8.5)	34.0 (7.3)
Median	33.5	35.3	32.9
Min, Max	20.3, 72.7	23.4, 72.7	20.3, 67.6
Baseline Therapy, N (%)			
Closed Loop Therapy (Pump + CGM + Algorithm)	66 (21.9%)	58 (87.9%)	8 (3.4%)
CSII	7 (2.3%)	N/A	7 (3.0%)
Injection	191 (63.2%)	1 (1.5%)	190 (80.5%)
Other	2 (0.7%)	N/A	2 (0.8%)
Sap (Pump + CGM)	36 (11.9%)	7 (10.6%)	29 (12.3%)
Baseline A1C (%)			
n	302	66	236
Mean (SD)	7.6 (0.9)	7.1 (0.7)	7.7 (0.9)
Median	7.5	6.9	7.7
Min, Max	5.6, 9.9	5.9, 9.0	5.6, 9.9

* The Combined subjects group included both Naïve and Transition subjects.
The Naïve subjects group included subjects who enrolled and participated in Phase 2 of the study only.
The Transition subjects group included Phase 1 subjects who were given the opportunity to transition into Phase 2 upon completion of the Phase 1 study period or at a subsequent continued access period visit.

I. Phase 1 Safety and Effectiveness Results 18-80 years of age

1. Safety Results

A total of 67 adverse events (AEs) during the study period were reported from all investigational sites for subjects enrolled in the study. There were 4 serious adverse events (SAEs) reported during the study period and no reports of severe hypoglycemia, no reports of severe hyperglycemia, and no report of diabetic ketoacidosis. There were no reports of unanticipated adverse device effects (UADEs). None of the SAEs reported during the study period were device related.

2. Effectiveness Results

Change in HbA1c

The overall mean change in Hemoglobin A1c (HbA1c) from baseline to end of 3-month study period was analyzed.

A decrease of HbA1C (-0.71%) for subjects 18-80 years of age from baseline to end of 3-month study period was observed in the intention to treat (ITT) population.

Table 5: Overall Mean Change in HbA1C from Baseline to End of 3-Month Study Period, ITT Population

Number of Subjects	Overall Mean Δ in HbA1c (%)	95% Confidence Interval
88	-0.71	(-0.90, -0.51)

% Time in Range (TIR, 70-180 mg/dL)

The mean % of time in range (TIR 70-180 mg/dL) from baseline to end of the study period using the ITT population is shown in Table 7 below.

Table 6: Percentage of TIR (70-180 mg/dL), ITT Population

Number of Subjects	TIR[1] (%)	95% Confidence Interval[1] (%)
94	78.6	(76.1, 81.0)

[1]Hodges-Lehmann method used to compute TIR and 95% confidence interval.

SmartGuard Use
Time Spent in SmartGuard Versus Manual Mode is shown in Table 8.

Table 8: Time Spent (%) in the SmartGuard Feature Versus Time Spent (%) in Manual Mode, Overall Study Period

Category	Time Spent (%) in Study Period
Time spent wearing sensor	93.5%
Time spent not wearing sensor	6.5%
Time spent in the SmartGuard feature	92.5%
Time spent in Manual Mode	7.5%

SmartGuard Performance
Table 9 shows the mean percentage of sensor glucose (SG) values in specific glucose ranges for the overall study period.

Table 9. Time in Different Ranges (% of SG), Overall Study Period

Category	Baseline Mean (SD), (95% CI)	Study Period Mean (SD), (95% CI)	Change from Baseline to Study Period Mean (SD), (95% CI)
Number of Subjects	95	94	94
SG < 54 mg/dL	0.0 (0.1), (0.0, 0.1)	0.0 (0.1), (0.0, 0.0)	-0.0 (0.1), (-0.0, 0.0)
SG < 70 mg/dL	0.4 (0.7), (0.3, 0.6)	0.3 (0.3), (0.2, 0.3)	-0.2 (0.5), (-0.3, -0.1)
70 mg/dL ≤ SG ≤ 140 mg/dL	41.5 (19.5), (37.6, 45.5)	47.6 (13.6), (44.9, 50.4)	6.3 (15.9), (3.0, 9.5)
70 mg/dL ≤ SG ≤ 180 mg/dL	72.2 (17.1), (68.7, 75.7)	78.0 (11.4), (75.6, 80.3)	5.9 (12.8), (3.3, 8.5)
SG > 140 mg/dL	58.0 (19.7), (54.0, 62.0)	52.1 (13.6), (49.3, 54.9)	-6.1 (16.1), (-9.4, -2.8)
SG > 180 mg/dL	27.3 (17.2), (23.8, 30.9)	21.8 (11.5), (19.4, 24.1)	-5.7 (12.9), (-8.4, -3.1)
SG > 250 mg/dL	4.5 (5.7), (3.4, 5.7)	2.9 (3.5), (2.2, 3.6)	-1.6 (3.7), (-2.4, -0.9)
SG > 350 mg/dL	0.2 (0.9), (0.0, 0.4)	0.1 (0.4), (0.0, 0.2)	-0.1 (0.6), (-0.2, 0.0)

Note: 95 subjects with data at Baseline. 94 subjects with data between Visit 9 - Visit 18 or Exit if Visit 18 was missing.

Table 10 shows the mean glucose value change from baseline to study period.

Table 10: Change in Mean Glucose Value (mg/dL) from Baseline to Study Period

Category	Baseline	Study Period	Change from Baseline to Study Period
Number of Subjects	95	94	94
Mean (SD)	157.1 (22.4)	150.8 (14.8)	-6.4 (16.8)
Median	155.9	148.5	-5.3
95% Confidence Interval	(152.5, 161.7)	(147.8, 153.8)	(-9.9, -3.0)

Table 11 shows the number of SG points, mean SG value (mg/dL), and time in different ranges as a percentage of SG during Automode stratified by different target glucose settings during the study period.

Table 11: Number of SG Points, Mean SG Value (mg/dL), and Time in Different Ranges (% of SG) during Automode Stratified by Different Target Glucose Settings during the Study Period

Category	Overall Mean (SD), (95% CI)	Target Glucose Set to 100 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 110 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 120 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 150 mg/dL Mean (SD), (95% CI)
Number of Subjects	94	88	4	94	8
Number of SG Points	22797.5 (5928.0), (21583.3, 24011.7)	16873.0 (5389.9), (15731.0, 18015.0)	10880.3 (7309.9), (-751.4, 2511.9)	6524.1 (3932.6), (5718.6, 7329.5)	169.3 (222.0), (-16.3, 354.8)
Mean SG Value (mg/dL)	150.6 (14.7), (147.6, 153.7)	146.7 (12.9), (144.0, 149.4)	151.7 (13.4), (130.4, 173.0)	155.6 (15.2), (152.4, 158.7)	179.0 (80.8), (111.4, 246.6)
< 54 mg/dL	0.0 (0.0), (0.0, 0.0)	0.0 (0.1), (0.0, 0.0)	0.0 (0.0), (-0.0, 0.0)	0.0 (0.1), (0.0, 0.0)	0.0 (0.0), (N/A, N/A)
< 70 mg/dL	0.2 (0.3), (0.2, 0.3)	0.3 (0.3), (0.2, 0.4)	0.2 (0.5), (-0.5, 0.9)	0.2 (0.3), (0.1, 0.2)	1.8 (3.5), (-1.1, 4.8)
70 - 140 mg/dL	47.8 (13.6), (45.0, 50.5)	51.3 (12.6), (48.7, 54.0)	46.3 (13.2), (25.3, 67.3)	42.5 (15.1), (39.4, 45.6)	26.4 (33.5), (-1.7, 54.4)

Category	Overall Mean (SD), (95% CI)	Target Glucose Set to 100 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 110 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 120 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 150 mg/dL Mean (SD), (95% CI)
70 - 180 mg/dL	78.2 (11.3), (75.9, 80.5)	80.6 (10.0), (78.5, 82.7)	79.6 (14.5), (56.5, 102.6)	76.0 (12.1), (73.5, 78.5)	70.0 (40.4), (36.2, 103.7)
> 140 mg/dL	52.0 (13.6), (49.2, 54.8)	48.4 (12.7), (45.7, 51.1)	53.5 (13.2), (32.5, 74.5)	57.3 (15.2), (54.2, 60.4)	71.8 (36.1), (41.6, 102.0)
> 180 mg/dL	21.6 (11.3), (19.3, 23.9)	19.1 (10.0), (17.0, 21.3)	20.2 (14.3), (-2.6, 43.0)	23.8 (12.1), (21.3, 26.3)	28.2 (41.7), (-6.7, 63.1)
> 250 mg/dL	2.8 (3.5), (2.1, 3.5)	2.2 (2.5), (1.7, 2.8)	2.6 (2.5), (-1.3, 6.5)	3.2 (3.8), (2.4, 3.9)	18.8 (37.3), (-12.3, 50.0)
> 350 mg/dL	0.1 (0.3), (0.0, 0.2)	0.1 (0.2), (0.0, 0.1)	0.1 (0.2), (-0.2, 0.5)	0.1 (0.3), (0.0, 0.1)	0.9 (2.6), (-1.2, 3.1)

Total Daily Dose

Table 12 shows the change of total daily dose of insulin (TDD) from baseline to the end of study (EOS). Mean TDD increased 10.4 units.

Table 12: Change of Total Daily Dose (TDD) (U) of Insulin from Baseline to Overall Study Period

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	95	94	94
Mean (SD)	77.4 (38.5)	88.3 (48.8)	10.4 (25.3)
Median	70.8	79.6	6.9
95% Confidence Interval	(69.6, 85.3)	(78.3, 98.3)	(5.2, 15.6)
Min, Max	16.5, 250.9	17.1, 269.9	-53.0, 94.3

Weight

Table 13 shows the change of weight (kg) from Baseline to end of study (EOS) period.

Table 13: Change of Weight (kg) from Baseline to EOS Period

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	95	92	92
Mean (SD)	106.3 (21.5)	107.3 (22.0)	0.6 (4.0)
Median	103.4	105	0.6
95% Confidence Interval	(101.9, 110.6)	(102.7, 111.8)	(-0.3, 1.4)
Min, Max	69.8, 192.8	67.2, 196.4	-11.2, 14.8

Note: 95 subjects had Baseline Weight. 92 subjects had End of Study Period Weight between Visit 16 and Visit 18 or Exit if Visit 18 was missing.

II. Phase 2 Safety and Effectiveness Results 18-80 years of age

1. Safety Results

   For combined subjects, a total of 216 AEs were reported during the study period from all investigational sites for study subjects enrolled in the study.

   Out of 216 events, there were 11 reports of SAEs, 2 reports of severe hypoglycemia, 1 report of a severe hyperglycemia event, no reports of diabetic ketoacidosis events, and no reports of UADEs. None of the SAEs reported during the study period were device related.

2. Effectiveness Results

   Change in HbA1c

   The overall mean change in HbA1C from baseline to end of 3-month study period was analyzed.

   For Transition subjects, Table 14 shows the results of HbA1C (%) analysis from baseline to end of 3-month study period using the ITT population. The ITT population includes all subjects who started the study period. A decrease of HbA1C (-0.26%) at the end of study period was observed.

   For Naïve subjects, Table 15 shows the results of HbA1C (%) analysis from baseline to end of 3-month study period using the ITT population. A decrease of HbA1C (-0.7%) at the end of study period was observed.

Table 14: Overall Mean Change in HbA1c from Baseline to End of 3-Month Study Period, ITT Population, Transition Subjects

Number of Subjects	Overall Mean Δ in HbA1c (%)	95% Confidence Interval
65	-0.26	(-0.37, -0.15)

[1]Normality assumption met: One-Sample T-test used to calculate p-value.
Note: Baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline.

Table 15: Overall Mean Change in HbA1c from Baseline to End of 3-Month Study Period, ITT Population, Naïve Subjects

Number of Subjects	Overall Mean Δ in HbA1c (%)[1]	95% Confidence Interval[1]
229	-0.7	(-0.80, -0.60)

[1]Hodges-Lehmann method used to compute estimate and 95% confidence interval.

% Time in Range (TIR, 70-180mg/dL)

For combined subjects, Table 16 shows the results of the percentage of sensor glucose (SG) values within 70-180 mg/dL from baseline to end of the study period using the ITT population. The ITT population includes all subjects who started the study period. A TIR of 84.1% of SG values within 70-180 mg/dL was observed.

Table 16: Percentage of TIR (70-180 mg/dL), ITT Population, Combined Subjects

Number of Subjects	TIR[1] (%)	95% Confidence Interval[1]
302	84.1	(83.1, 85.1)

[1]Hodges-Lehmann method used to compute estimate and 95% confidence interval.

SmartGuard Use

Time Spent in SmartGuard Versus Manual Mode is shown in Tables 16, 17, and 18.

For Transition subjects, Table 17 shows Time Spent (%) in the SmartGuard Feature Versus Time Spent (%) in Manual Mode, Overall Study Period.

For Naïve subjects, Table 18 shows Time Spent (%) in the SmartGuard Feature Versus Time Spent (%) in Manual Mode, Overall Study Period.

For Combined subjects, Table 19 shows Time Spent (%) in the SmartGuard Feature Versus Time Spent (%) in Manual Mode, Overall Study Period.

Table 17: Time Spent (%) in the SmartGuard Feature Versus Time Spent (%) in Manual Mode, Overall Study Period, Transition subjects

Category	Time Spent (%) in Study Period
Time spent wearing sensor	95.0%
Time spent not wearing sensor	5.0%
Time spent in the SmartGuard feature	92.2%
Time spent in Manual Mode	7.8%

Table 18: Time Spent (%) in the SmartGuard Feature Versus Time Spent (%) in Manual Mode, Overall Study Period, Naïve subjects

Category	Time Spent (%) in Study Period
Time spent wearing sensor	95.0%
Time spent not wearing sensor	5.0%
Time spent in the SmartGuard feature	92.6%
Time spent in Manual Mode	7.4%

Table 19: Time Spent (%) in the SmartGuard Feature Versus Time Spent (%) in Manual Mode, Overall Study Period, Combined subjects

Category	Time Spent (%) in Study Period
Time spent wearing sensor	95.0%
Time spent not wearing sensor	5.0%
Time spent in the SmartGuard feature	92.5%
Time spent in Manual Mode	7.5%

SmartGuard Performance

Tables 20, 21 and 22 show the mean percentage of SG values in specific glucose ranges for the overall study period for Transition subjects, Naïve subjects, and Combined subjects, respectively.

Table 20. Time in Different Ranges (% of SG, Overall Study Period, Transition Subjects

Category	Baseline Mean (SD), (95% CI)	Study Period Mean (SD), (95% CI)	Change from Baseline to Study Period Mean (SD), (95% CI)
Number of Subjects	62	66	62

Category	Baseline Mean (SD), (95% CI)	Study Period Mean (SD), (95% CI)	Change from Baseline to Study Period Mean (SD), (95% CI)
SG < 54 mg/dL	0.0 (0.1), (0.0, 0.1)	0.0 (0.0), (0.0, 0.0)	-0.0 (0.1), (-0.0, 0.0)
SG < 70 mg/dL	0.2 (0.5), (0.1, 0.4)	0.2 (0.3), (0.2, 0.3)	0.0 (0.4), (-0.1, 0.1)
70 mg/dL ≤ SG ≤ 140 mg/dL	49.0 (15.4), (45.1, 52.9)	52.9 (10.1), (50.4, 55.4)	3.7 (10.6), (1.0, 6.4)
70 mg/dL ≤ SG ≤ 180 mg/dL	78.5 (14.0), (75.0, 82.1)	82.0 (8.2), (80.0, 84.0)	3.2 (10.4), (0.6, 5.8)
SG > 140 mg/dL	50.8 (15.4), (46.9, 54.7)	46.8 (10.2), (44.4, 49.3)	-3.7 (10.7), (-6.4, -1.0)
SG > 180 mg/dL	21.2 (14.1), (17.6, 24.8)	17.8 (8.2), (15.8, 19.8)	-3.2 (10.4), (-5.8, -0.6)
SG > 250 mg/dL	2.8 (4.3), (1.7, 3.9)	1.9 (2.0), (1.4, 2.4)	-0.9 (3.6), (-1.8, 0.0)
SG > 350 mg/dL	0.1 (0.3), (-0.0, 0.2)	0.1 (0.1), (0.0, 0.1)	-0.0 (0.3), (-0.1, 0.1)

Notes: Baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline. 62 subjects with data at Baseline. 66 subjects with data between Visit 9 - Visit 18 or Exit if Visit 18 was missing.

Table 21. Time in Different Ranges (% of SG), Overall Study Period, Naïve Subjects

Category	Baseline Mean (SD), (95% CI)	Study Period Mean (SD), (95% CI)	Change from Baseline to Study Period Mean (SD), (95% CI)
Number of Subjects	236	236	236
SG < 54 mg/dL	0.0 (0.1), (0.0, 0.0)	0.0 (0.1), (0.0, 0.0)	-0.0 (0.1), (-0.0, 0.0)
SG < 70 mg/dL	0.3 (0.5), (0.2, 0.4)	0.3 (0.4), (0.2, 0.3)	-0.0 (0.4), (-0.1, 0.0)
70 mg/dL ≤ SG ≤ 140 mg/dL	45.3 (19.7), (42.8, 47.8)	55.9 (12.7), (54.3, 57.5)	10.6 (16.6), (8.5, 12.7)
70 mg/dL ≤ SG ≤ 180 mg/dL	76.4 (15.9), (74.3, 78.4)	84.2 (9.0), (83.1, 85.4)	7.9 (13.4), (6.1, 9.6)
SG > 140 mg/dL	54.4 (19.8), (51.9, 56.9)	43.8 (12.8), (42.2, 45.5)	-10.6 (16.7), (-12.7, -8.4)
SG > 180 mg/dL	23.4 (15.9), (21.3, 25.4)	15.5 (9.0), (14.4, 16.7)	-7.8 (13.5), (-9.6, -6.1)
SG > 250 mg/dL	3.5 (5.2), (2.8, 4.1)	1.7 (2.2), (1.4, 2.0)	-1.8 (4.4), (-2.4, -1.2)
SG > 350 mg/dL	0.1 (0.4), (0.1, 0.2)	0.0 (0.2), (0.0, 0.1)	-0.1 (0.4), (-0.1, -0.0)

Note: 236 subjects with data at Baseline. 236 subjects with data between Visit 9 - Visit 18 or Exit if Visit 18 was missing.

Table 22. Time in Different Ranges (% of SG), Overall Study Period, Combined Subjects

Category	Baseline Mean (SD), (95% CI)	Study Period Mean (SD), (95% CI)	Change from Baseline to Study Period Mean (SD), (95% CI)
Number of Subjects	298	302	298
SG < 54 mg/dL	0.0 (0.1), (0.0, 0.0)	0.0 (0.0), (0.0, 0.0)	-0.0 (0.1), (-0.0, 0.0)
SG < 70 mg/dL	0.3 (0.5), (0.2, 0.3)	0.3 (0.3), (0.2, 0.3)	-0.0 (0.4), (-0.1, 0.0)
70 mg/dL ≤ SG ≤ 140 mg/dL	46.1 (18.9), (43.9, 48.2)	55.3 (12.2), (53.9, 56.6)	9.2 (15.8), (7.4, 11.0)
70 mg/dL ≤ SG ≤ 180 mg/dL	76.8 (15.5), (75.0, 78.6)	83.7 (8.9), (82.7, 84.7)	6.9 (13.0), (5.4, 8.4)
SG > 140 mg/dL	53.6 (19.0), (51.5, 55.8)	44.5 (12.3), (43.1, 45.9)	-9.2 (15.9), (-11.0, -7.4)
SG > 180 mg/dL	22.9 (15.6), (21.1, 24.7)	16.0 (8.8), (15.0, 17.0)	-6.9 (13.0), (-8.4, -5.4)
SG > 250 mg/dL	3.3 (5.0), (2.8, 3.9)	1.7 (2.2), (1.5, 2.0)	-1.6 (4.3), (-2.1, -1.1)
SG > 350 mg/dL	0.1 (0.4), (0.1, 0.2)	0.1 (0.2), (0.0, 0.1)	-0.1 (0.4), (-0.1, -0.0)

Note: For transition subjects, baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline. 298 subjects with data at Baseline. 302 subjects with data between Visit 9 - Visit 18 or Exit if Visit 18 was missing.

Tables 23, 24, and 25 show the mean glucose value change from baseline to study period for transition subjects, naïve subjects, and combined subjects, respectively.

Table 23: Change in Mean Glucose Value (mg/dL) from Baseline to Study Period, Transition Subjects

Category	Baseline	Study Period	Change from Baseline to Study Period
Number of Subjects	62	66	62
Mean (SD)	149.8 (17.6)	145.3 (10.1)	-4.2 (12.9)
Median	147	144.6	-1.5
95% Confidence Interval	(145.3, 154.2)	(142.8, 147.8)	(-7.5, -0.9)

Note: Baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline.

Table 24: Change in Mean Glucose Value (mg/dL) from Baseline to Study Period, Naïve Subjects

Category	Baseline	Study Period	Change from Baseline to Study Period
Number of Subjects	236	236	236
Mean (SD)	152.9 (21.2)	142.6 (12.1)	-10.3 (17.8)
Median	149.9	141.9	-8.5
95% Confidence Interval	(150.2, 155.6)	(141.0, 144.1)	(-12.6, -8.0)

Table 25: Change in Mean Glucose Value (mg/dL) from Baseline to Study Period, Combined Subjects

Category	Baseline	Study Period	Change from Baseline to Study Period
Number of Subjects	298	302	298
Mean (SD)	152.3 (20.5)	143.2 (11.7)	-9.0 (17.0)
Median	149	142.8	-6
95% Confidence Interval	(149.9, 154.6)	(141.9, 144.5)	(-11.0, -7.1)

Note: For transition subjects, baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline.

Tables 26 and 27 show the number of sensor glucose (SG) points, mean SG value (mg/dL), and time in different ranges as a percentage of SG during Automode stratified by different target glucose settings during the study period for Transition subjects and Combined subjects, respectively.

Table 26: Number of SG Points, Mean SG Value (mg/dL), and Time in Different Ranges (% of SG) during Automode Stratified by Different Target Glucose Settings during the Study Period, Transition Subjects

Category	Overall Mean (SD), (95% CI)	Target Glucose Set to 100 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 110 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 120 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 150 mg/dL Mean (SD), (95% CI)
Number of Subjects	66	64	1	59	6
Number of SG Points	24037.1 (3649.9),	18475.0 (4180.0),	8503.0 (N/A, N/A)	6609.0 (5076.7),	118.7 (122.7), (-10.1, 247.4)

Category	Overall Mean (SD), (95% CI)	Target Glucose Set to 100 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 110 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 120 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 150 mg/dL Mean (SD), (95% CI)
	(23139.8, 24934.3)	(17430.9, 19519.2)		(5286.0, 7932.0)	
Mean SG Value (mg/dL)	144.7 (9.5), (142.3, 147.0)	142.3 (9.7), (139.9, 144.7)	152.0 (N/A, N/A)	153.0 (11.7), (150.0, 156.0)	145.9 (27.5), (117.0, 174.7)
< 54 mg/dL	0.0 (0.0), (0.0, 0.0)	0.0 (0.0), (0.0, 0.0)	0.0 (N/A, N/A)	0.0 (0.0), (0.0, 0.0)	0.1 (0.3), (-0.2, 0.4)
< 70 mg/dL	0.2 (0.3), (0.2, 0.3)	0.3 (0.3), (0.2, 0.3)	0.0 (N/A, N/A)	0.1 (0.2), (0.1, 0.2)	1.4 (2.4), (-1.1, 3.9)
70 - 140 mg/dL	53.5 (9.8), (51.1, 55.9)	56.0 (9.9), (53.5, 58.4)	49.7 (N/A, N/A)	44.6 (12.5), (41.4, 47.9)	43.1 (37.8), (3.5, 82.7)
70 - 180 mg/dL	82.5 (7.7), (80.6, 84.4)	83.8 (7.8), (81.8, 85.7)	75.9 (N/A, N/A)	78.3 (9.5), (75.8, 80.7)	76.4 (38.3), (36.2, 116.5)
> 140 mg/dL	46.2 (9.8), (43.8, 48.7)	43.8 (9.9), (41.3, 46.3)	50.3 (N/A, N/A)	55.3 (12.6), (52.0, 58.5)	55.5 (38.7), (14.9, 96.1)
> 180 mg/dL	17.2 (7.7), (15.4, 19.1)	16.0 (7.8), (14.0, 17.9)	24.1 (N/A, N/A)	21.6 (9.5), (19.1, 24.1)	22.3 (38.6), (-18.2, 62.7)
> 250 mg/dL	1.7 (1.8), (1.3, 2.2)	1.6 (1.8), (1.1, 2.0)	2.8 (N/A, N/A)	2.3 (2.4), (1.7, 2.9)	0.0 (0.0), (N/A, N/A)
> 350 mg/dL	0.0 (0.1), (0.0, 0.1)	0.0 (0.1), (0.0, 0.1)	0.0 (N/A, N/A)	0.1 (0.2), (0.0, 0.1)	0.0 (0.0), (N/A, N/A)

Table 27: Number of SG Points, Mean SG Value (mg/dL), and Time in Different Ranges (% of SG) during Automode Stratified by Different Target Glucose Settings during the Study Period, Combined Subjects

Category	Overall Mean (SD), (95% CI)	Target Glucose Set to 100 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 110 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 120 mg/dL Mean (SD), (95% CI)	Target Glucose Set to 150 mg/dL Mean (SD), (95% CI)
Number of Subjects	302	291	12	287	25
Number of Points	23241.1 (4954.5), (22680.1, 23802.2)	17153.9 (4952.7), (16582.5, 17725.3)	11032.2 (6947.2), (6618.1, 15446.2)	6486.3 (4022.6), (6018.9, 6953.7)	250.5 (575.5), (12.9, 488.1)
Mean Sensor Glucose Value (mg/dL)	142.5 (11.1), (141.2, 143.7)	140.4 (11.2), (139.1, 141.7)	142.0 (11.3), (134.8, 149.1)	148.6 (14.9), (146.9, 150.3)	148.1 (38.7), (132.1, 164.1)
< 54 mg/dL	0.0 (0.0), (0.0, 0.0)	0.0 (0.0), (0.0, 0.0)	0.0 (0.0), (-0.0, 0.0)	0.0 (0.1), (0.0, 0.0)	0.1 (0.3), (-0.0, 0.2)
< 70 mg/dL	0.3 (0.4), (0.2, 0.3)	0.3 (0.4), (0.2, 0.3)	0.2 (0.3), (-0.0, 0.4)	0.2 (0.4), (0.1, 0.2)	0.6 (1.6), (-0.1, 1.3)
70 - 140 mg/dL	56.0 (11.9), (54.7, 57.3)	58.2 (11.9), (56.8, 59.6)	55.7 (14.6), (46.4, 65.0)	49.5 (14.6), (47.8, 51.2)	49.8 (41.6), (32.7, 67.0)
70 - 180 mg/dL	84.3 (8.4) (83.3, 85.2)	85.2 (8.4), (84.3, 86.2)	86.0 (7.7), (81.1, 90.9)	81.6 (11.3), (80.2, 82.9)	72.9 (38.0), (57.2, 88.6)
> 140 mg/dL	43.7 (11.9), (42.4, 45.1)	41.5 (12.0), (40.1, 42.9)	44.1 (14.7), (34.8, 53.5)	50.4 (14.7), (48.7, 52.1)	49.6 (42.0), (32.2, 66.9)
> 180 mg/dL	15.5 (8.4), (14.5, 16.4)	14.5 (8.4), (13.5, 15.4)	13.8 (7.6), (9.0, 18.7)	18.3 (11.3), (16.9, 19.6)	26.5 (38.3), (10.7, 42.3)
> 250 mg/dL	1.6 (2.0), (1.3, 1.8)	1.5 (2.0), (1.2, 1.7)	1.1 (1.1), (0.4, 1.9)	2.2 (6.3), (1.5, 2.9)	0.5 (2.5), (-0.5, 1.5)
> 350 mg/dL	0.0 (0.2), (0.0, 0.1)	0.0 (0.2), (0.0, 0.1)	0.0 (0.0), (-0.0, 0.0)	0.0 (0.2), (0.0, 0.1)	0.0 (0.0), (N/A, N/A)

Total Daily Dose

Tables 28, 29, and 30 show the change of total daily dose of insulin (TDD) from baseline to the end of study for the Transition subjects, naïve subjects, and combined subjects, respectively.

Table 28: Change of Total Daily Dose (TDD) (U) of Insulin from Baseline to Overall Study Period, Transition Subjects

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	63	66	63
Mean (SD)	93.9 (47.8)	94.7 (40.4)	2.2 (22.7)
Median	88.3	91.5	4.8
95% Confidence Interval	(81.9, 105.9)	(84.7, 104.6)	(-3.5, 7.9)
Min, Max	14.7, 233.6	10.1, 234.8	-101.1, 45.3

Note: Baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline.

Table 29: Change of Total Daily Dose (TDD) (U) of Insulin from Baseline to Overall Study Period, Naïve Subjects

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	236	236	236
Mean (SD)	61.0 (36.1)	72.3 (42.4)	11.3 (21.4)
Median	55.5	63.3	9.1
95% Confidence Interval	(56.4, 65.7)	(66.9, 77.7)	(8.5, 14.0)
Min, Max	6.0, 261.1	4.0, 236.0	-99.2, 90.1

Table 30: Change of Total Daily Dose (TDD) (U) of Insulin from Baseline to Overall Study Period, Combined Subjects

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	299	302	299
Mean (SD)	68.0 (41.0)	77.2 (42.9)	9.3 (22.0)
Median	60.3	69.8	7.2
95% Confidence Interval	(63.3, 72.6)	(72.3, 82.0)	(6.8, 11.8)

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Min, Max	6.0, 261.1	4.0, 236.0	-101.1, 90.1

Note: For transition subjects, baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline.

Weight

Tables 31, 32, and 33 show the change of weight (kg) from Baseline to end of study (EOS) period for the Transition subjects, Naïve subjects, and Combined subjects, respectively.

Table 31: Change of Weight (kg) from Baseline to EOS Period, Transition subjects

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	66	65	65
Mean (SD)	109.4 (24.1)	110.3 (23.7)	0.4 (3.4)
Median	105.2	104.8	0.4
95% Confidence Interval	(103.5, 115.3)	(104.4, 116.2)	(-0.5, 1.2)
Min, Max	64.7, 204.2	66.3, 204.6	-14.2, 10.6

Note: Baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline. 66 subjects had Baseline Weight. 65 subjects had End of Study Period Weight between Visit 16 and Visit 18 or Exit if Visit 18 was missing.

Table 32: Change of Weight (kg) from Baseline to EOS Period, Naïve subjects

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	235	229	229
Mean (SD)	98.0 (22.8)	98.4 (23.0)	0.7 (4.7)
Median	96.1	96.1	0.8
95% Confidence Interval	(95.1, 101.0)	(95.4, 101.4)	(0.0, 1.3)
Min, Max	50.4, 178.7	52.8, 188.2	-18.7, 20.0

Note: 235 subjects had Baseline Weight. 229 subjects had End of Study Period Weight between Visit 16 and Visit 18 or Exit if Visit 18 was missing.

Table 33: Change of Weight (kg) from Baseline to EOS Period, Combined subjects

Category	Baseline	EOS Period	Change from Baseline to EOS Period
Number of Subjects	301	294	294
Mean (SD)	100.5 (23.6)	101.0 (23.6)	0.6 (4.4)
Median	98.6	98.2	0.7
95% Confidence Interval	(97.8, 103.2)	(98.3, 103.7)	(0.1, 1.1)
Min, Max	50.4, 204.2	52.8, 204.6	-18.7, 20.0

Note: For transition subjects, baseline reflects data gathered at Phase 2 screening and is therefore not a true baseline.
Note: 301 subjects had Baseline Weight. 294 subjects had End of Study Period Weight between Visit 16 and Visit 18 or Exit if Visit 18 was missing.

XI. FINANCIAL DISCLOSURE

The Financial Disclosure by Clinical Investigators regulation (21 CFR 54) requires applicants who submit a marketing application to include certain information concerning the compensation to, and financial interests and arrangement of, any clinical investigator conducting clinical studies covered by the regulation.

The Safety and Effectiveness Evaluation of the MiniMed™ 780G System in Adults with Insulin-requiring Type 2 Diabetes (CIP341) pivotal study (G210352) included 33 investigators. The following clinical investigator had disclosable financial interests/arrangements as defined in sections 54.2(a), (b), (c), and (f):

- Scott Lee

The applicant has adequately disclosed the financial interest/arrangements with clinical investigators. The information provided does not raise any questions about the reliability of the data.

XII. SUMMARY OF SUPPLEMENTAL CLINICAL INFORMATION

Not applicable

XIII. PANEL MEETING RECOMMENDATION AND FDA'S POST-PANEL ACTION

In accordance with the provisions of section 515(c)(2) of the act as amended by the Safe Medical Devices Act of 1990, this PMA was not referred to the Clinical Chemistry and Clinical Toxicology Devices Panel, an FDA advisory committee, for review and recommendation because the information in the PMA substantially duplicates information previously reviewed by this panel.

XIV. CONCLUSIONS DRAWN FROM PRECLINICAL AND CLINICAL STUDIES

A. Effectiveness Conclusions

The results of the clinical studies performed to support this submission establish a reasonable assurance of effectiveness that the MiniMed 780G system, with either Simplera Sync or Guardian 4 sensor, can automatically adjust basal insulin rates and calculate and deliver auto correction boluses based on CGM values in adult patients with insulin-requiring Type 2 diabetes.

The results of the clinical studies performed to support approval establish a reasonable assurance that the MiniMed 780G system with Simplera Sync and Guardian 4 Sensor are effective for their intended use.

B. Safety Conclusions

An understanding of the risks of the device are based on nonclinical laboratory data as well as on data collected in the clinical studies conducted to support PMA approval that are described above.

The following events are possible adverse device effects of inserting a sensor into your skin: local infection, inflammation, pain or discomfort, bleeding at the glucose sensor insertion site, bruising, itching, scarring or skin discoloration, hematoma, tape irritation, sensor or needle fracture during insertion, wear, or removal.

Potential device related non serious events include:

- Skin Irritation or redness
- Infection
- Pain or discomfort
- Bruising
- Edema
- Rash
- Bleeding
- Induration of skin
- Allergic reaction to adhesives
- Hyperglycemia following inadequate or suspension of insulin delivery (which can result from catheter occlusion, hardware or software malfunction, or erroneous CGM readings)
- Ketosis following inadequate or suspension of insulin delivery (which can result from catheter occlusion, hardware or software malfunction, or erroneous CGM readings)
- Hypoglycemia resulting from insulin over-delivery (which can result from catheter occlusion, hardware or software malfunction, or erroneous CGM readings)

Sensor breakage with fragments retained under the skin is a potential adverse event related to use of the CGM component of the system, but this was not observed during

these studies. Based on post-market experience with similar devices, the occurrence and severity of these events do not raise major concerns.

Infection at the insulin pump infusion set insertion site and sensor insertion site is a potential complication related to insertion of the CGM or the insulin pump infusion set. Based on post-market experience with similar devices, the occurrence and severity of these events are not expected to be different from other approved infusion sets and CGM devices, and so do not pose an unreasonable risk.

The CGM readings (together with blood glucose meter readings) are used by the system to determine automated insulin delivery, including insulin suspension and insulin dosing, and are the basis for alerts for hypoglycemia and hyperglycemia. While in manual mode, readings from the Simplera Sync sensor and Guardian 4 sensor are intended to be used adjunctively (i.e., confirmatory blood glucose meter readings should be used for diabetes treatment decisions) for tracking and trending of blood sugars.

The consequences of a false positive (falsely high) glucose reading on the continuous glucose meter would be potential over-delivery of insulin via automated insulin delivery, which has the potential to lead to severe hypoglycemia or even death. The consequences of a false negative (falsely low) glucose reading on the continuous glucose meter would be potential under-delivery of insulin, which has the potential to lead to severe hyperglycemia or DKA.

A confirmatory blood glucose meter reading has the potential to mitigate some of the risk of falsely high or falsely low glucose sensor readings, as the patient could choose to override the settings of the system in some cases (i.e., decline to take additional bolus of insulin as recommended by the system in setting of falsely high continuous glucose reading or exit Auto Mode).

C. Benefit-Risk Determination

Summary of Benefits

780G System (AHCL version 5.3) with Guardian 4 Sensor (G4S)
The 780G System with Guardian 4 Sensor was previously approved with the advanced hybrid closed loop (AHCL) algorithm version 4.3 in the 780G System in P160017/S091 and subsequently with the AHCL algorithm version 5.3 in the 780G System in P160017/S118 – in both cases for use in individuals with Type 1 Diabetes (T1D) down to 7 years of age. With use of the 780G System with the G4S as the glucose input, Phase 1 of the pivotal clinical study in an adult Type 2 Diabetes (T2D) study population, the sponsor reported overall findings of improved CGM metrics compared to baseline - time in range (70-180 mg/dL), time below range (TBR <54 mg/dL or <70 mg/dL) and time above range (TAR >180 mg/dL or >250 mg/dL), as well as lower HbA1c, compared to baseline in a study population of individuals with Type 2 Diabetes (T2D). The sponsor reported an HbA1c decrease from 7.9% +/- 1.0% at baseline to 7.2% +/- 0.7% with mean TIR 80.9% for Stage 3 of Phase 1 (last 6 weeks at optimized glucose setpoint and active

insulin time (AIT) settings) although the entirety of the 3-month study period was also analyzed and was comparable with these results at other setting combinations.
It is of note that Phase 1 of the pivotal study using the G4S sensor to guide the 780G AID system was completed with AHCL version 4.3. Similarly in review of P160017/S118, there was no clinical data available for the 780G with G4S with the to be marketed version of the AHCL 5.3 algorithm. This will be further discussed in the Summary of Assessment of Risk Section.

780G System (AHCL version 5.3) with Simplera Sync Sensor
The 780G System with Simplera Sync sensor was previously approved with AHCL algorithm version 5.3 in the 780G System in P160017/S118 for use in individuals with Type 1 Diabetes (T1D) down to 7 years of age. With use of the 780G System with the Simplera Sync Sensor as the glucose input, Phase 2 of the pivotal clinical study in an adult T2D study population reported overall findings of improved CGM metrics compared to baseline - time in range (70-180 mg/dL), time below range (TBR <54 mg/dL or <70 mg/dL) and time above range (TAR >180 mg/dL or >250 mg/dL), as well as lower HbA1c, compared to baseline. Although there is residual uncertainty about the magnitude of increase in TIR and decrease in TAR due to the known large negative bias of varying magnitude in the hyperglycemic ranges for the Simplera Sync Sensor from the review of P160017/S118, the alignment of the HbA1c decrease supported that subjects in the study did experience a change in glucose levels based on a decrease from 7.1% +/- 0.7% at baseline to 6.8% +/- 0.6% for transition subjects (who had participated in Phase 1 of the study using the AID system with the G4S sensor) and a decrease from 7.7% +/- 0.9% at baseline to 6.9% +/- 0.7% for naïve subjects (who were new to the 780G AID system and only used it in the study with the Simplera Sync sensor). The sponsor reported a mean TIR 85.4% for Stage 3 of Phase 1 across all subjects (transition and naïve for the last 6 weeks at optimized glucose setpoint and AIT settings) although the entirety of the 3-month study period was also analyzed and was comparable with these results at other setting combinations.

It is of note that Phase 2 of the pivotal study using the Simplera Sync sensor to guide the 780G AID system was completed with AHCL version 5.1. The sponsor clarified that this version only differs from the to be marketed 5.3A version in that an anomaly to remove a nuisance alert was removed and thus the clinical data from the study was adequately representative of the version to be marketed.

As in several other AID system clinical studies, it is important to note that there are study design limitations (including lack of a dedicated control group, as well as the fact that to date CGM metrics are not validated as surrogate clinical outcomes). The totality of the reported HbA1c, CGM metrics, and patient experience with use of the 780G System with Simplera Sync Sensor are generally thought to be beneficial to patients with the majority of the time spent in SmartGuard mode, which is particularly important to highlight in the labeling to ensure understanding that the attributed benefits are to the system as a whole operating in SmartGuard mode, with uncertainty about the impact on glucose management in Manual Mode only minimally evaluated in the pivotal study.

Summary of Risks

780G System (AHCL version 5.3) with Simplera Sync Sensor
There were no device related adverse glycemic events reported in Phase 2 of the pivotal study using 780G/Simplera Sync and no increased risk for users with high TDD of insulin needs or with 1 or more non-insulin medications. Of note, there was a widely variable change in the TDD of insulin and subject weight with use of the device but there did not appear to be a safety signal in either change.

780G System (AHCL version 5.3) with Guardian 4 Sensor (G4S):
There were no device related adverse glycemic events reported in Phase 1 of the pivotal study using 780G/G4S and no increased risk for users with high TDD of insulin needs or with 1 or more non-insulin medications. Of note, there was a widely variable change in the TDD of insulin and subject weight with use of the device but there did not appear to be a safety signal in either change.

No clinical data was presented to characterize the performance of the updated 780G System (AHCL 5.3) with G4S, with Phase 1 of the pivotal study being completed with AHCL 4.3 instead. The AHCL algorithm version 5.3 compared to the AHCL algorithm version 4.3 in the 780G System contain modifications assessed as net more aggressive by the agency during review of P160017/S118, with a possible increased risk of hypoglycemia, and thus potentially able to adversely impact the system's performance. In this submission only simulation study data was presented using Medtronic's Virtual Patient Model to support of the performance of AHCL version 5.3 with G4S even though this approach has not yet been validated. This gap was addressed with use of RWD presented in P160017/S118 for the T1D population and a comparison of the performance of the system in T1D and T2D populations. Given that the RWD in the T1D population did not differ in a clinically significant way depending on which AHCL version was used with the Simplera Sync sensor, and that it did not differ significantly from the performance observed in the T1D pivotal study conducted with the 780G/G4S with algorithm 4.3, we concluded during that review that despite the lack of clinical study data for the 780G/G4S algorithm 5.3 combination, there was no evidence to suggest this combination would compromise the safety of the device. Therefore, given that the results of the T2D pivotal study Phase 1 (using G4S) yields a similar decrease in HbA1c in T2D adults as was noted for the T1D adult population in P160017/S118 (both around -0.7% as compared to baseline) with TIR 70-180 mg/dL reported as >80% in both cases, and that in addition the adult T2D population is likely to exhibit lower glycemic variability and have a lower risk of hypoglycemia than the adult T1D population, we conclude that use of the 780G/G4S with the updated algorithm 5.3 would be unlikely to impact the safety of the system and thus does not warrant new clinical data for safe use based on our observations in the T1D population. Therefore, the demonstration of benefits, in consideration of the totality of the pivotal clinical data for the T2D population, the additional RWE provided by the sponsor during the P160017/S118 review for the AHCL version 4.3 with both sensors in question in the T1D population, and the similarities in performance in the T1D and T2D population of the AID system, the initial high degree of

uncertainty when only simulated data was presented to support the use of the updated algorithm with the G4S is decreased to a reasonable and acceptable level.

Patient Perspectives

Patient perspectives considered during the review included:

Patients want a variety of devices that provide information and aid in management of their glucose control to inform decision maintaining with their health care providers on lifestyle changes and treatment decisions. Patients have also expressed in conversations with FDA staff, on social media outlets, and at patient centered public conferences that they want devices that provide features that enable automated insulin delivery and are willing to accept reasonable risks related to such devices. This information was gathered via email, during patient-oriented conferences, and face-to-face meetings with patients.

D. Overall Conclusions

The data in this application support the reasonable assurance of safety and effectiveness of this device when used in accordance with the indications for use.

XV. CDRH DECISION

CDRH issued an approval order on August 29, 2025.

The applicant's manufacturing facilities have been inspected and found to be in compliance with the device Quality System (QS) regulation (21 CFR 820).

XVI. APPROVAL SPECIFICATIONS

Directions for use: See device labeling.

Hazards to Health from Use of the Device: See Indications, Contraindications, Warnings, Precautions, and Adverse Events in the device labeling.

Post-approval Requirements and Restrictions: See approval order.

XVII. REFERENCES

None.