

**HIGHLIGHTS OF PRESCRIBING INFORMATION**

These highlights do not include all the information needed to use TRULICITY safely and effectively. See full prescribing information for TRULICITY.

TRULICITY (dulaglutide) injection, for subcutaneous use

Initial U.S. Approval: 2014

**WARNING: RISK OF THYROID C-CELL TUMORS**

See full prescribing information for complete boxed warning.

- Dulaglutide causes thyroid C-cell tumors in rats. It is unknown whether TRULICITY causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans as human relevance could not be determined from clinical or nonclinical studies (5.1, 13.1).
- TRULICITY is contraindicated in patients with a personal or family history of MTC and in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2) (4.1).

**INDICATIONS AND USAGE**

TRULICITY™ is a glucagon-like peptide (GLP-1) receptor agonist indicated as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus.

**Limitations of Use:**

- Not recommended as first-line therapy for patients inadequately controlled on diet and exercise (1, 5.1).
- Has not been studied in patients with a history of pancreatitis. Consider another antidiabetic therapy (1, 5.2).
- Not for treatment of type 1 diabetes mellitus or diabetic ketoacidosis.
- Not for patients with pre-existing severe gastrointestinal disease.
- Has not been studied in combination with basal insulin.

**DOSAGE AND ADMINISTRATION**

- Administer once weekly at any time of day (2.1).
- Inject subcutaneously in the abdomen, thigh, or upper arm (2.1).
- Initiate at 0.75 mg subcutaneously once weekly. Dose can be increased to 1.5 mg once weekly for additional glycemic control (2.1).
- If a dose is missed administer within 3 days of missed dose (2.1).

**DOSAGE FORMS AND STRENGTHS**

- Injection: 0.75 mg/0.5 mL solution in a single-dose pen (3)
- Injection: 1.5 mg/0.5 mL solution in a single-dose pen (3)
- Injection: 0.75 mg/0.5 mL solution in a single-dose prefilled syringe (3)
- Injection: 1.5 mg/0.5 mL solution in a single-dose prefilled syringe (3)

**CONTRAINDICATIONS**

- Do not use in patients with a personal or family history of medullary thyroid carcinoma or in patients with Multiple Endocrine Neoplasia syndrome type 2 (4.1, 5.1, 13.1).
- Do not use if history of serious hypersensitivity to TRULICITY or any product components (4.2, 5.4).

**WARNINGS AND PRECAUTIONS**

- Thyroid C-cell tumors in animals:* Counsel patients regarding the risk of medullary thyroid carcinoma and the symptoms of thyroid tumors (5.1).
- Pancreatitis:* Has been reported in clinical trials. Discontinue promptly if pancreatitis is suspected. Do not restart if pancreatitis is confirmed. Consider other antidiabetic therapies in patients with history of pancreatitis (5.2).
- Hypoglycemia:* When TRULICITY is used with an insulin secretagogue (e.g., a sulfonylurea) or insulin, consider lowering the dose of the sulfonylurea or insulin to reduce the risk of hypoglycemia (5.3).
- Hypersensitivity Reactions:* Discontinue TRULICITY if suspected. Monitor and treat promptly per standard of care until signs and symptoms resolve (5.4).
- Renal Impairment:* Monitor renal function in patients with renal impairment reporting severe adverse gastrointestinal reactions (5.5).
- Macrovascular outcomes:* There have been no studies establishing conclusive evidence of macrovascular risk reduction with TRULICITY or any other antidiabetic drug (5.7).

**ADVERSE REACTIONS**

The most common adverse reactions, reported in ≥5% of patients treated with TRULICITY are: nausea, diarrhea, vomiting, abdominal pain, and decreased appetite (6.1).

To report SUSPECTED ADVERSE REACTIONS, contact Eli Lilly and Company at 1-800-LillyRx (1-800-545-5979) or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

**DRUG INTERACTIONS**

Dulaglutide slows gastric emptying and may impact absorption of concomitantly administered oral medications (7.1, 12.3).

**USE IN SPECIFIC POPULATIONS**

- Pregnancy:* TRULICITY may cause fetal harm; only use if potential benefit justifies potential risk to fetus (8.1).
- Nursing Mothers:* Discontinue nursing or discontinue TRULICITY (8.3).
- Renal Impairment:* No dosage adjustment recommended. Monitor renal function in patients with renal impairment reporting severe adverse gastrointestinal reactions (5.5, 8.7).

See 17 for PATIENT COUNSELING INFORMATION and FDA-approved Medication Guide

Revised: 09/2014

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## FULL PRESCRIBING INFORMATION

### WARNING: RISK OF THYROID C-CELL TUMORS

- In male and female rats, dulaglutide causes a dose-related and treatment-duration-dependent increase in the incidence of thyroid C-cell tumors (adenomas and carcinomas) after lifetime exposure. It is unknown whether TRULICITY causes thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans as human relevance could not be determined from clinical or nonclinical studies [see *Warnings and Precautions (5.1)*, and *Nonclinical Toxicology (13.1)*].
- TRULICITY is contraindicated in patients with a personal or family history of MTC and in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2). Routine serum calcitonin or thyroid ultrasound monitoring is of uncertain value in patients treated with TRULICITY. Counsel regarding the risk factors and symptoms of thyroid tumors [see *Contraindications (4.1)*, *Warnings and Precautions (5.1)*, and *Nonclinical Toxicology (13.1)*].

## 1 INDICATIONS AND USAGE

TRULICITY™ is indicated as an adjunct to diet and exercise to improve glycemic control in adults with type 2 diabetes mellitus.

### 1.1 Limitations of Use

- TRULICITY is not recommended as a first-line therapy for patients who have inadequate glycemic control on diet and exercise [see *Warnings and Precautions (5.1)*].
- TRULICITY has not been studied in patients with a history of pancreatitis [see *Warnings and Precautions (5.2)*]. Consider other antidiabetic therapies in patients with a history of pancreatitis.
- TRULICITY should not be used in patients with type 1 diabetes mellitus or for the treatment of diabetic ketoacidosis. TRULICITY is not a substitute for insulin.
- TRULICITY has not been studied in patients with severe gastrointestinal disease, including severe gastroparesis. The use of TRULICITY is not recommended in patients with pre-existing severe gastrointestinal disease [see *Warnings and Precautions (5.6)*].
- The concurrent use of TRULICITY and basal insulin has not been studied.

## 2 DOSAGE AND ADMINISTRATION

### 2.1 Dosage

The recommended initiating dose of TRULICITY is 0.75 mg once weekly. The dose may be increased to 1.5 mg once weekly for additional glycemic control. The maximum recommended dose is 1.5 mg once weekly.

Administer TRULICITY once weekly, any time of day, with or without food. TRULICITY should be injected subcutaneously in the abdomen, thigh, or upper arm.

If a dose is missed, instruct patients to administer as soon as possible if there are at least 3 days (72 hours) until the next scheduled dose. If less than 3 days remain before the next scheduled dose, skip the missed dose and administer the next dose on the regularly scheduled day. In each case, patients can then resume their regular once weekly dosing schedule.

The day of weekly administration can be changed if necessary as long as the last dose was administered 3 or more days before.

### 2.2 Concomitant Use with an Insulin Secretagogue (e.g., Sulfonylurea) or with Insulin

When initiating TRULICITY, consider reducing the dosage of concomitantly administered insulin secretagogues (e.g., sulfonylureas) or insulin to reduce the risk of hypoglycemia [see *Warnings and Precautions (5.3)*].

### 2.3 Dosage in Patients with Renal Impairment

No dose adjustment is recommended in patients with renal impairment including end-stage renal disease (ESRD). Monitor renal function in patients with renal impairment reporting severe adverse gastrointestinal reactions. [see *Warning and Precautions (5.5)*, *Use in Specific Populations (8.7)*, *Clinical Pharmacology (12.3)*].

### 2.4 Important Administration Instructions

Prior to initiation of TRULICITY, patients should be trained by their healthcare professional on proper injection technique. Training reduces the risk of administration errors such as improper injection site, needle sticks, and incomplete dosing. Refer to the accompanying Instructions for Use for complete administration instructions with illustrations. The instructions can also be found at [www.trulicity.com](http://www.trulicity.com).

When using TRULICITY with insulin, instruct patients to administer as separate injections and to never mix the products. It is acceptable to inject TRULICITY and insulin in the same body region but the injections should not be adjacent to each other.

When injecting in the same body region, advise patients to use a different injection site each week. TRULICITY must not be administered intravenously or intramuscularly.

TRULICITY solution should be visually inspected for particulate matter and discoloration prior to administration.

### 3 DOSAGE FORMS AND STRENGTHS

- Injection: 0.75 mg/0.5 mL or solution in a single-dose pen
- Injection: 1.5 mg/0.5 mL solution in a single-dose pen
- Injection: 0.75 mg/0.5 mL solution in a single-dose prefilled syringe
- Injection: 1.5 mg/0.5 mL solution in a single-dose prefilled syringe

### 4 CONTRAINDICATIONS

#### 4.1 Medullary Thyroid Carcinoma

TRULICITY is contraindicated in patients with a personal or family history of medullary thyroid carcinoma (MTC) or in patients with Multiple Endocrine Neoplasia syndrome type 2 (MEN 2) [see *Warnings and Precautions* (5.1)].

#### 4.2 Hypersensitivity

TRULICITY is contraindicated in patients with a prior serious hypersensitivity reaction to dulaglutide or to any of the product components [see *Warnings and Precautions* (5.4)].

### 5 WARNINGS AND PRECAUTIONS

#### 5.1 Risk of Thyroid C-cell Tumors

In male and female rats, dulaglutide causes a dose-related and treatment-duration-dependent increase in the incidence of thyroid C-cell tumors (adenomas and carcinomas) after lifetime exposure [see *Nonclinical Toxicology* (13.1)]. Glucagon-like peptide (GLP-1) receptor agonists have induced thyroid C-cell adenomas and carcinomas in mice and rats at clinically relevant exposures. It is unknown whether TRULICITY will cause thyroid C-cell tumors, including medullary thyroid carcinoma (MTC), in humans, as the human relevance of this signal could not be determined from the clinical or nonclinical studies.

One case of MTC was reported in a patient treated with TRULICITY. This patient had pretreatment calcitonin levels approximately 8 times the upper limit of normal (ULN).

TRULICITY is contraindicated in patients with a personal or family history of MTC or in patients with MEN 2. Counsel patients regarding the risk for MTC with the use of TRULICITY and inform them of symptoms of thyroid tumors (e.g. a mass in the neck, dysphagia, dyspnea, persistent hoarseness).

The role of serum calcitonin monitoring or thyroid ultrasound monitoring for the purpose of early detection of MTC in patients treated with TRULICITY is unknown. Such monitoring may increase the risk of unnecessary procedures, due to the low specificity of serum calcitonin as a screening test for MTC and a high background incidence of thyroid disease. Very elevated serum calcitonin value may indicate MTC and patients with MTC usually have calcitonin values >50 ng/L. If serum calcitonin is measured and found to be elevated, the patient should be referred to an endocrinologist for further evaluation. Patients with thyroid nodules noted on physical examination or neck imaging should also be referred to an endocrinologist for further evaluation.

#### 5.2 Pancreatitis

In Phase 2 and Phase 3 clinical studies, 12 (3.4 cases per 1000 patient years) pancreatitis related adverse reactions were reported in patients exposed to TRULICITY versus 3 in non-incretin comparators (2.7 cases per 1000 patient years). An analyses of adjudicated events revealed 5 cases of confirmed pancreatitis in patients exposed to TRULICITY (1.4 cases per 1000 patient years) versus 1 case in non-incretin comparators (0.88 cases per 1000 patient years).

After initiation of TRULICITY, observe patients carefully for signs and symptoms of pancreatitis, including persistent severe abdominal pain. If pancreatitis is suspected, promptly discontinue TRULICITY. If pancreatitis is confirmed, TRULICITY should not be restarted. TRULICITY has not been evaluated in patients with a prior history of pancreatitis. Consider other antidiabetic therapies in patients with a history of pancreatitis.

#### 5.3 Hypoglycemia with Concomitant Use of Insulin Secretagogues or Insulin

The risk of hypoglycemia is increased when TRULICITY is used in combination with insulin secretagogues (e.g., sulfonylureas) or insulin. Patients may require a lower dose of sulfonylurea or insulin to reduce the risk of hypoglycemia in this setting [see *Adverse Reactions* (6.1)].

#### 5.4 Hypersensitivity Reactions

Systemic hypersensitivity reactions were observed in patients receiving TRULICITY in clinical trials [see *Adverse Reactions* (6.1)]. If a hypersensitivity reaction occurs, the patient should discontinue TRULICITY and promptly seek medical advice.

#### 5.5 Renal Impairment

In patients treated with GLP-1 receptor agonists, there have been postmarketing reports of acute renal failure and worsening of chronic renal failure, which may sometimes require hemodialysis. Some of these events were reported in patients without known underlying renal disease. A majority of reported events occurred in patients who had experienced nausea, vomiting, diarrhea, or dehydration. Because these reactions may worsen renal function, use caution when initiating or escalating doses of TRULICITY in patients with renal impairment. Monitor renal function in patients with renal

impairment reporting severe adverse gastrointestinal reactions [see *Dosage and Administration (2.3), Use in Specific Populations (8.7)*].

## 5.6 Severe Gastrointestinal Disease

Use of TRULICITY may be associated with gastrointestinal adverse reactions, sometimes severe [see *Adverse Reactions (6.1)*]. TRULICITY has not been studied in patients with severe gastrointestinal disease, including severe gastroparesis, and is therefore not recommended in these patients.

## 5.7 Macrovascular Outcomes

There have been no clinical studies establishing conclusive evidence of macrovascular risk reduction with TRULICITY or any other antidiabetic drug.

## 6 ADVERSE REACTIONS

The following serious reactions are described below or elsewhere in the labeling:

- Risk of Thyroid C-cell Tumors [see *Warnings and Precautions (5.1)*]
- Pancreatitis [see *Warnings and Precautions (5.2)*]
- Hypoglycemia with Concomitant Use of Insulin Secretagogues or Insulin [see *Warnings and Precautions (5.3)*]
- Hypersensitivity reactions [see *Warnings and Precautions (5.4)*]
- Renal impairment [see *Warnings and Precautions (5.5)*]

### 6.1 Clinical Studies Experience

Because clinical studies are conducted under widely varying conditions, adverse reaction rates observed in the clinical studies of a drug cannot be directly compared to rates in the clinical studies of another drug and may not reflect the rates observed in practice.

#### Pool of Placebo-controlled Trials

The data in Table 1 are derived from the placebo-controlled trials [see *Clinical Studies (14)*].

These data reflect exposure of 1670 patients to TRULICITY and a mean duration of exposure to TRULICITY of 23.8 weeks. Across the treatment arms, the mean age of patients was 56 years, 1% were 75 years or older and 53% were male. The population in these studies was 69% White, 7% Black or African American, 13% Asian; 30% were of Hispanic or Latino ethnicity. At baseline, the population had diabetes for an average of 8.0 years and had a mean HbA1c of 8.0%. At baseline, 2.5% of the population reported retinopathy. Baseline estimated renal function was normal or mildly impaired (eGFR  $\geq 60$  mL/min/1.73 m<sup>2</sup>) in 96.0% of the pooled study populations.

Table 1 shows common adverse reactions, excluding hypoglycemia, associated with the use of TRULICITY in the pool of placebo-controlled trials. These adverse reactions were not present at baseline, occurred more commonly on TRULICITY than on placebo, and occurred in at least 5% of patients treated with TRULICITY.

**Table 1: Adverse Reactions in Placebo-Controlled Trials Reported in  $\geq 5\%$  of TRULICITY-Treated Patients**

Adverse Reaction	Placebo (N=568) %	Trulicity 0.75 mg (N=836) %	Trulicity 1.5 mg (N=834) %
Nausea	5.3	12.4	21.1
Diarrhea <sup>a</sup>	6.7	8.9	12.6
Vomiting <sup>b</sup>	2.3	6.0	12.7
Abdominal Pain <sup>c</sup>	4.9	6.5	9.4
Decreased Appetite	1.6	4.9	8.6
Dyspepsia	2.3	4.1	5.8
Fatigue <sup>d</sup>	2.6	4.2	5.6

<sup>a</sup> Includes diarrhea, fecal volume increased, frequent bowel movements.

<sup>b</sup> Includes retching, vomiting, vomiting projectile.

<sup>c</sup> Includes abdominal discomfort, abdominal pain, abdominal pain lower, abdominal pain upper, abdominal tenderness, gastrointestinal pain.

<sup>d</sup> Includes fatigue, asthenia, malaise.

Note: Percentages reflect the number of patients that reported at least 1 treatment- emergent occurrence of the adverse reaction.

#### Gastrointestinal Adverse Reactions

In the pool of placebo-controlled trials, gastrointestinal adverse reactions occurred more frequently among patients receiving TRULICITY than placebo (placebo 21.3%, 0.75 mg 31.6%, 1.5 mg 41.0%). More patients receiving TRULICITY 0.75 mg (1.3%) and TRULICITY 1.5 mg (3.5%) discontinued treatment due to gastrointestinal adverse reactions than patients receiving placebo (0.2%). Investigators graded the severity of gastrointestinal adverse reactions occurring on

0.75 mg and 1.5 mg of TRULICITY as “mild” in 58% and 48% of cases, respectively, “moderate” in 35% and 43% of cases, respectively, or “severe” in 7% and 11% of cases, respectively.

In addition to the reactions in Table 1, the following adverse reactions were reported more frequently in TRULICITY-treated patients than placebo (frequencies listed, respectively, as: placebo; 0.75 mg; 1.5 mg): constipation (0.7%, 3.9%, 3.7%), flatulence (1.4%, 1.4%, 3.4%), abdominal distension (0.7%, 2.9%, 2.3%), gastroesophageal reflux disease (0.5%, 1.7%, 2.0%), and eructation (0.2%, 0.6%, 1.6%).

#### Pool of Placebo- and Active-Controlled Trials

The occurrence of adverse reactions was also evaluated in a larger pool of patients with type 2 diabetes participating in 6 placebo- and active-controlled trials evaluating the use of TRULICITY as monotherapy and add-on therapy to oral medications or insulin. [see *Clinical Studies (14)*]. In this pool, a total of 3342 patients with type 2 diabetes were treated with TRULICITY for a mean duration of 52 weeks. The mean age of patients was 56 years, 2% were 75 years or older and 51% were male. The population in these studies was 71% White, 7% Black or African American, 11% Asian; 32% were of Hispanic or Latino ethnicity. At baseline, the population had diabetes for an average of 8.2 years and had a mean HbA1c of 7.6-8.5%. At baseline, 5.2% of the population reported retinopathy. Baseline estimated renal function was normal or mildly impaired (eGFR  $\geq$ 60 ml/min/1.73 m<sup>2</sup>) in 95.7% of the TRULICITY population.

In the pool of placebo- and active-controlled trials, the types and frequency of common adverse reactions, excluding hypoglycemia, were similar to those listed in Table 1.

#### Other Adverse Reactions

##### *Hypoglycemia*

Table 2 summarizes the incidence and rate of documented symptomatic ( $\leq$ 70 mg/dL glucose threshold) and severe hypoglycemia in the placebo-controlled clinical studies.

**Table 2: Incidence (%) of Documented Symptomatic and Severe Hypoglycemia Adverse Reactions in Placebo-Controlled Trials**

	Placebo	TRULICITY 0.75 mg	TRULICITY 1.5 mg
<b>Add-on to Metformin</b>			
<b>(26 weeks)</b>	<b>N=177</b>	<b>N=302</b>	<b>N=304</b>
Documented symptomatic	1.1%	2.6%	5.6%
Severe	0	0	0
<b>Add-on to Metformin + Pioglitazone</b>			
<b>(26 weeks)</b>	<b>N=141</b>	<b>N=280</b>	<b>N=279</b>
Documented symptomatic	1.4%	4.6%	5.0%
Severe	0	0	0

Hypoglycemia was more frequent when TRULICITY was used in combination with a sulfonylurea or insulin [see *Warnings and Precautions (5.3)*]. Documented symptomatic hypoglycemia occurred in 39% and 40% of patients when TRULICITY 0.75 mg and 1.5 mg, respectively, was co-administered with a sulfonylurea. Severe hypoglycemia occurred in 0% and 0.7% of patients when TRULICITY 0.75 mg and 1.5 mg, respectively, was co-administered with a sulfonylurea. Documented symptomatic hypoglycemia occurred in 85% and 80% of patients when TRULICITY 0.75 mg and 1.5 mg, respectively, was co-administered with prandial insulin. Severe hypoglycemia occurred in 2.4% and 3.4% of patients when TRULICITY 0.75 mg and 1.5 mg, respectively, was co-administered with prandial insulin.

##### *Heart Rate Increase and Tachycardia Related Adverse Reactions.*

TRULICITY 0.75 mg and 1.5 mg resulted in a mean increase in heart rate (HR) of 2-4 beats per minute (bpm). The long-term clinical effects of the increase in HR have not been established [see *Warnings and Precautions (5.7)*].

Adverse reactions of sinus tachycardia were reported more frequently in patients exposed to TRULICITY. Sinus tachycardia was reported in 3.0%, 2.8%, and 5.6% of patient treated with placebo, TRULICITY 0.75 mg and TRULICITY 1.5 mg, respectively. Persistence of sinus tachycardia (reported at more than 2 visits) was reported in 0.2%, 0.4% and 1.6% of patients treated with placebo, TRULICITY 0.75 mg and TRULICITY 1.5 mg, respectively. Episodes of sinus tachycardia, associated with a concomitant increase from baseline in heart rate of  $\geq$ 15 beats per minute, were reported in 0.7%, 1.3% and 2.2% of patient treated with placebo, TRULICITY 0.75 mg and TRULICITY 1.5 mg, respectively.

##### *Immunogenicity*

Across four Phase 2 and five Phase 3 clinical studies, 64 (1.6%) TRULICITY treated patients developed anti-drug antibodies (ADAs) to the active ingredient in TRULICITY (i.e., dulaglutide).

Of the 64 dulaglutide-treated patients that developed dulaglutide ADAs, 34 patients (0.9% of the overall population) had dulaglutide-neutralizing antibodies, and 36 patients (0.9% of the overall population) developed antibodies against native GLP-1.

The detection of antibody formation is highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody (including neutralizing antibody) positivity in an assay may be influenced by several factors including assay methodology, sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, the incidence of antibodies to dulaglutide cannot be directly compared with the incidence of antibodies of other products.

#### *Hypersensitivity*

Systemic hypersensitivity adverse reactions sometimes severe (e.g., severe urticaria, systemic rash, facial edema, lip swelling) occurred in 0.5% of patients on TRULICITY in the four Phase 2 and Phase 3 studies.

#### *Injection-site Reactions*

In the placebo-controlled studies, injection-site reactions (e.g., injection-site rash, erythema) were reported in 0.5% of TRULICITY-treated patients and in 0.0% of placebo-treated patients.

#### *PR Interval Prolongation and Adverse Reactions of First Degree Atrioventricular (AV) Block*

A mean increase from baseline in PR interval of 2-3 milliseconds was observed in TRULICITY-treated patients in contrast to a mean decrease of 0.9 millisecond in placebo-treated patients. The adverse reaction of first degree AV block occurred more frequently in patients treated with TRULICITY than placebo (0.9%, 1.7% and 2.3% for placebo, TRULICITY 0.75 mg and TRULICITY 1.5 mg, respectively). On electrocardiograms, a PR interval increase to at least 220 milliseconds was observed in 0.7%, 2.5% and 3.2% of patients treated with placebo, TRULICITY 0.75 mg and TRULICITY 1.5 mg, respectively.

#### *Amylase and Lipase Increase*

Patients exposed to TRULICITY had mean increases from baseline in lipase and/or pancreatic amylase of 14% to 20%, while placebo-treated patients had mean increases of up to 3%.

## **7 DRUG INTERACTIONS**

### **7.1 Oral Medications**

TRULICITY slows gastric emptying and thus has the potential to reduce the rate of absorption of concomitantly administered oral medications. Caution should be exercised when oral medications are concomitantly administered with TRULICITY. Drug levels of oral medications with a narrow therapeutic index should be adequately monitored when concomitantly administered with TRULICITY. In clinical pharmacology studies, TRULICITY did not affect the absorption of the tested, orally administered medications to a clinically relevant degree [see *Clinical Pharmacology* (12.3)].

## **8 USE IN SPECIFIC POPULATIONS**

### **8.1 Pregnancy**

#### Pregnancy Category C

There are no adequate and well-controlled studies of TRULICITY in pregnant women. The risk of birth defects, loss, or other adverse outcomes is increased in pregnancies complicated by hyperglycemia and may be decreased with good metabolic control. It is essential for patients with diabetes to maintain good metabolic control before conception and throughout pregnancy.

TRULICITY should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. In rats and rabbits, dulaglutide administered during the major period of organogenesis produced fetal growth reductions and/or skeletal anomalies and ossification deficits in association with decreased maternal weight and food consumption attributed to the pharmacology of dulaglutide.

In pregnant rats given subcutaneous doses of 0.49, 1.63, or 4.89 mg/kg dulaglutide on Gestation Days 6, 9, 12, and 15 (organogenesis), reduced fetal weights associated with decreased maternal food intake and decreased weight gain attributed to the pharmacology of dulaglutide were observed at  $\geq 1.63$  mg/kg, a systemic exposure  $\geq 14$ -fold the MRHD based on AUC. Irregular skeletal ossifications and increases in post implantation loss also were observed at 4.89 mg/kg, a systemic exposure 44-fold the MRHD based on AUC. No developmental adverse effects were observed at 4-fold the MRHD based on AUC.

In pregnant rabbits given subcutaneous doses of 0.04, 0.12, or 0.41 mg/kg dulaglutide on Gestation Days 7, 10, 13, 16, and 19 (organogenesis), fetal skeletal malformations of the vertebrae and/or ribs were observed in conjunction with decreased maternal food intake and decreased weight gain attributed to the pharmacology of dulaglutide at 0.41 mg/kg, a systemic exposure 13-fold the MRHD based on AUC. No developmental adverse effects were observed at 4-fold the MRHD based on AUC.

In a prenatal-postnatal study in F<sub>0</sub> maternal rats given subcutaneous doses of 0.2, 0.49, or 1.63 mg/kg every third day from implantation through lactation, F<sub>1</sub> pups from F<sub>0</sub> maternal rats given 1.63 mg/kg dulaglutide had statistically significantly lower mean body weight from birth through post-natal day 63 for males and post-natal day 84 for females. F<sub>1</sub> offspring from F<sub>0</sub> maternal rats receiving 1.63 mg/kg dulaglutide had decreased forelimb and hindlimb grip strength and males had delayed balano-preputial separation. Females had decreased startle response. These physical findings may relate to the decreased size of the offspring relative to controls as they appeared at early postnatal assessments but were not observed at a later assessment. F<sub>1</sub> female offspring of the F<sub>0</sub> maternal rats given 1.63 mg/kg of dulaglutide had a

longer mean escape time and a higher mean number of errors relative to concurrent control during 1 of 2 trials in the memory evaluation portion of the Biel water maze. These findings occurred in conjunction with decreased  $F_0$  maternal food intake and decreased weight gain attributed to the pharmacologic activity at 1.63 mg/kg, a systemic exposure 16-fold the MRHD based on AUC. The human relevance of these memory deficits in the  $F_1$  female rats is not known.

### 8.3 Nursing Mothers

It is not known whether TRULICITY is excreted in human milk. Because many drugs are excreted in human milk and because of the potential for clinical adverse reactions from TRULICITY in nursing infants, a decision should be made whether to discontinue nursing or to discontinue TRULICITY, taking into account the importance of the drug to the mother.

### 8.4 Pediatric Use

Safety and effectiveness of TRULICITY have not been established in pediatric patients. TRULICITY is not recommended for use in pediatric patients younger than 18 years.

### 8.5 Geriatric Use

In the pool of placebo- and active-controlled trials [see *Adverse Reactions (6.1)*], 620 (18.6%) TRULICITY-treated patients were 65 years of age and over and 65 TRULICITY-treated patients (1.9%) patients were 75 years of age and over. No overall differences in safety or efficacy were detected between these patients and younger patients, but greater sensitivity of some older individuals cannot be ruled out.

### 8.6 Hepatic Impairment

There is limited clinical experience in patients with mild, moderate, or severe hepatic impairment. Therefore, TRULICITY should be used with caution in these patient populations.

In a clinical pharmacology study in subjects with varying degrees of hepatic impairment, no clinically relevant change in dulaglutide pharmacokinetics (PK) was observed [see *Clinical Pharmacology (12.3)*].

### 8.7 Renal Impairment

In the four Phase 2 and five Phase 3 randomized clinical studies, at baseline, 50 (1.2%) TRULICITY-treated patients had mild renal impairment (eGFR  $\geq 60$  but  $< 90$  mL/min/1.73 m<sup>2</sup>), 171 (4.3%) TRULICITY-treated patients had moderate renal impairment (eGFR  $\geq 30$  but  $< 60$  mL/min/1.73 m<sup>2</sup>) and no TRULICITY-treated patients had severe renal impairment (eGFR  $< 30$  mL/min/1.73 m<sup>2</sup>). No overall differences in safety or effectiveness were observed relative to patients with normal renal function, though conclusions are limited due to small numbers. In a clinical pharmacology study in subjects with renal impairment including end-stage renal disease (ESRD), no clinically relevant change in dulaglutide PK was observed [see *Clinical Pharmacology (12.3)*].

There is limited clinical experience in patients with severe renal impairment or ESRD. TRULICITY should be used with caution, and if these patients experience adverse gastrointestinal side effects, renal function should be closely monitored [see *Dosage and Administration (2.3)*, *Warning and Precautions (5.5)*, *Clinical Pharmacology (12.3)*].

### 8.8 Gastroparesis

Dulaglutide slows gastric emptying. TRULICITY has not been studied in patients with preexisting gastroparesis.

## 10 OVERDOSAGE

Overdoses have been reported in clinical studies. Effects associated with these overdoses were primarily mild or moderate gastrointestinal events (e.g., nausea, vomiting) and non-severe hypoglycemia. In the event of overdose, appropriate supportive care (including frequent plasma glucose monitoring) should be initiated according to the patient's clinical signs and symptoms.

## 11 DESCRIPTION

TRULICITY contains dulaglutide, a human GLP-1 receptor agonist. The molecule is a fusion protein that consists of 2 identical, disulfide-linked chains, each containing an N-terminal GLP-1 analog sequence covalently linked to the Fc portion of a modified human immunoglobulin G4 (IgG4) heavy chain by a small peptide linker and is produced using mammalian cell culture. The GLP-1 analog portion of dulaglutide is 90% homologous to native human GLP-1 (7-37). Structural modifications were introduced in the GLP-1 part of the molecule responsible for interaction with the enzyme dipeptidyl-peptidase IV (DPP-4). Additional modifications were made in an area with a potential T-cell epitope and in the areas of the IgG4 Fc part of the molecule responsible for binding the high-affinity Fc receptors and half-antibody formation. The overall molecular weight of dulaglutide is approximately 63 kilodaltons.

TRULICITY is a clear, colorless, sterile solution. Each 0.5 mL of TRULICITY solution contains 0.75 mg or 1.5 mg of dulaglutide. Each single-dose pen or prefilled syringe contains 0.5 mL of solution and the following excipients: citric acid anhydrous (0.07 mg), mannitol (23.2 mg), polysorbate 80 (0.10 mg), trisodium citrate dihydrate (1.37 mg), in water for injection.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

TRULICITY contains dulaglutide, which is a human GLP-1 receptor agonist with 90% amino acid sequence homology to endogenous human GLP-1 (7-37). Dulaglutide activates the GLP-1 receptor, a membrane-bound cell-surface

receptor coupled to adenylyl cyclase in pancreatic beta cells. Dulaglutide increases intracellular cyclic AMP (cAMP) in beta cells leading to glucose-dependent insulin release. Dulaglutide also decreases glucagon secretion and slows gastric emptying.

## 12.2 Pharmacodynamics

TRULICITY lowers fasting glucose and reduces postprandial glucose (PPG) concentrations in patients with type 2 diabetes mellitus. The reduction in fasting and postprandial glucose can be observed after a single dose.

### Fasting and Postprandial Glucose

In a clinical pharmacology study in adults with type 2 diabetes mellitus, treatment with once weekly TRULICITY resulted in a reduction of fasting and 2-hour PPG concentrations, and postprandial serum glucose incremental AUC, when compared to placebo (-25.6 mg/dL, -59.5 mg/dL, and -197 mg h/dL, respectively); these effects were sustained after 6 weeks of dosing with the 1.5 mg dose.

### First- and Second-Phase Insulin Secretion

Both first- and second-phase insulin secretion were increased in patients with type 2 diabetes treated with TRULICITY compared with placebo.

### Insulin and Glucagon Secretion

TRULICITY stimulates glucose-dependent insulin secretion and reduces glucagon secretion. Treatment with TRULICITY 0.75 mg and 1.5 mg once weekly increased fasting insulin from baseline at Week 26 by 35.38 and 17.50 pmol/L, respectively, and C-peptide concentration by 0.09 and 0.07 nmol/L, respectively, in a Phase 3 monotherapy study. In the same study, fasting glucagon concentration was reduced by 1.71 and 2.05 pmol/L from baseline with TRULICITY 0.75 mg and 1.5 mg, respectively.

### Gastric Motility

Dulaglutide causes a delay of gastric emptying. The delay is largest after the first dose and diminishes with subsequent doses.

### Cardiac Electrophysiology (QTc)

The effect of dulaglutide on cardiac repolarization was tested in a thorough QTc study. Dulaglutide did not produce QTc prolongation at supratherapeutic doses of 4 and 7 mg.

## 12.3 Pharmacokinetics

The pharmacokinetics of dulaglutide is similar between healthy subjects and patients with type 2 diabetes mellitus. Following subcutaneous administration, the time to maximum plasma concentration of dulaglutide at steady-state ranges from 24 to 72 hours, with a median of 48 hours. After multiple-dose administration of 1.5 mg to steady state, the mean peak plasma concentration ( $C_{max}$ ) and total systemic exposure (AUC) of dulaglutide were 114 ng/mL (range 56 to 231 ng/mL) and 14,000 ng h/mL (range 6940 to 26,000 ng/mL), respectively; accumulation ratio was approximately 1.56. Steady-state plasma dulaglutide concentrations were achieved between 2 and 4 weeks following once weekly administration. Site of subcutaneous administration (abdomen, upper arm, and thigh) had no statistically significant effect on the exposure to dulaglutide.

Absorption – The mean absolute bioavailability of dulaglutide following subcutaneous administration of single 0.75 mg and 1.5 mg doses was 65% and 47%, respectively.

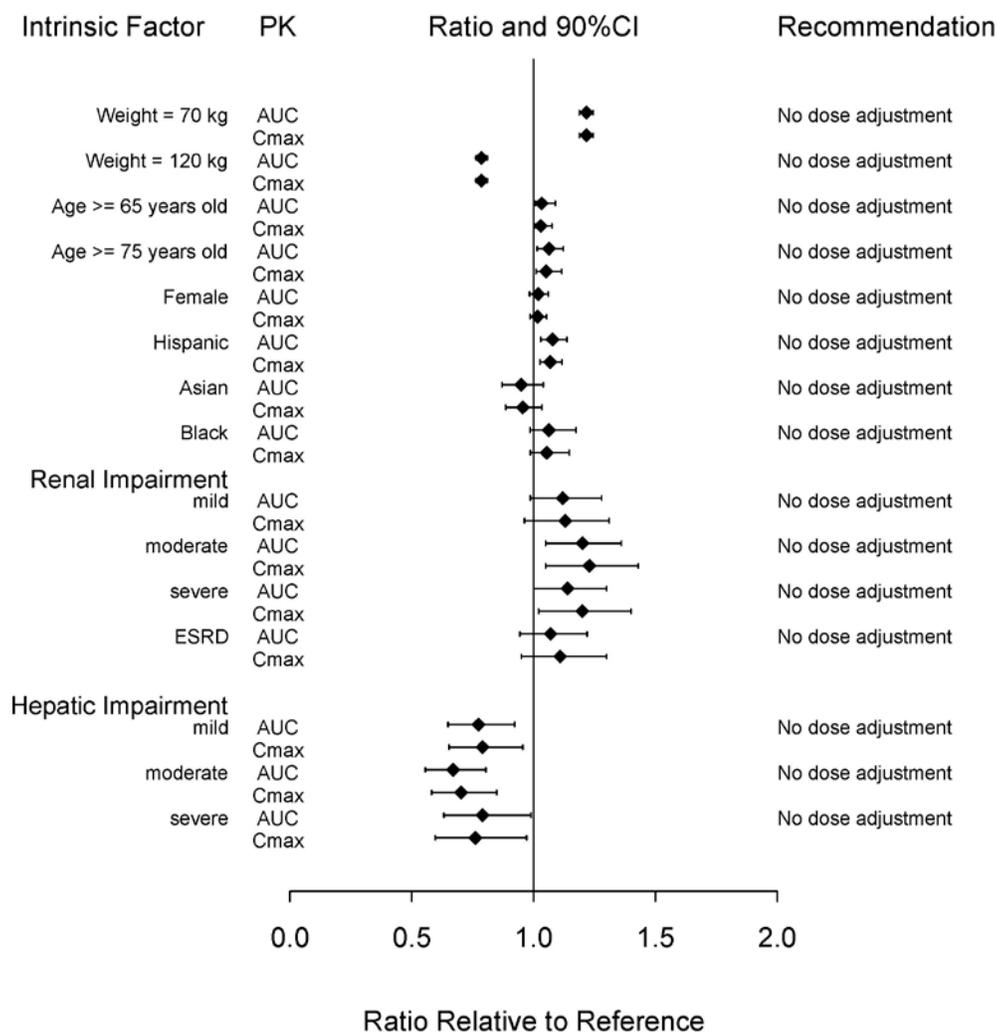
Distribution – The mean volumes of distribution after subcutaneous administration of TRULICITY 0.75 mg and 1.5 mg to steady state were approximately 19.2 L (range 14.3 to 26.4) and 17.4 L (range 9.3 to 33), respectively.

Metabolism – Dulaglutide is presumed to be degraded into its component amino acids by general protein catabolism pathways.

Elimination – The mean apparent clearance at steady state of dulaglutide is approximately 0.111 L/hr for the 0.75 mg dose, and 0.107 L/hr for the 1.5 mg dose. The elimination half-life of dulaglutide for both doses is approximately 5 days.

### Specific Populations

No dose adjustment of dulaglutide is needed based on age, gender, race, ethnicity, body weight, or renal or hepatic impairment. The effects of intrinsic factors on the PK of dulaglutide are shown in Figure 1.



Abbreviations: AUC = area under the time-concentration curve; CI = confidence interval; C<sub>max</sub> = maximum concentration; ESRD = end-stage renal disease; PK = pharmacokinetics.

Note: Reference values for weight, age, gender, and race comparisons are 93 kg, 56 years old, male, and white, respectively; reference groups for renal and hepatic impairment data are subjects with normal renal and hepatic function from the respective clinical pharmacology studies. The weight values shown in the plot (70 and 120 kg) are the 10<sup>th</sup> and 90<sup>th</sup> percentiles of weight in the Phase 3 PK population.

**Figure 1: Impact of intrinsic factors on dulaglutide pharmacokinetics.**

Renal – Dulaglutide systemic exposure was increased by 20, 28, 14 and 12% for mild, moderate, severe, and ESRD renal impairment sub-groups, respectively, compared to subjects with normal renal function. The corresponding values for increase in C<sub>max</sub> were 13, 23, 20 and 11%, respectively (Figure 1). [see *Dosage and Administration (2.3)*, *Warning and Precautions (5.5)*, *Use in Specific Population (8.7)*].

Hepatic - Dulaglutide systemic exposure decreased by 23, 33 and 21% for mild, moderate and severe hepatic impairment groups, respectively, compared to subjects with normal hepatic function, and C<sub>max</sub> was decreased by a similar magnitude (Figure 1). [see *Use in Specific Population (8.6)*].

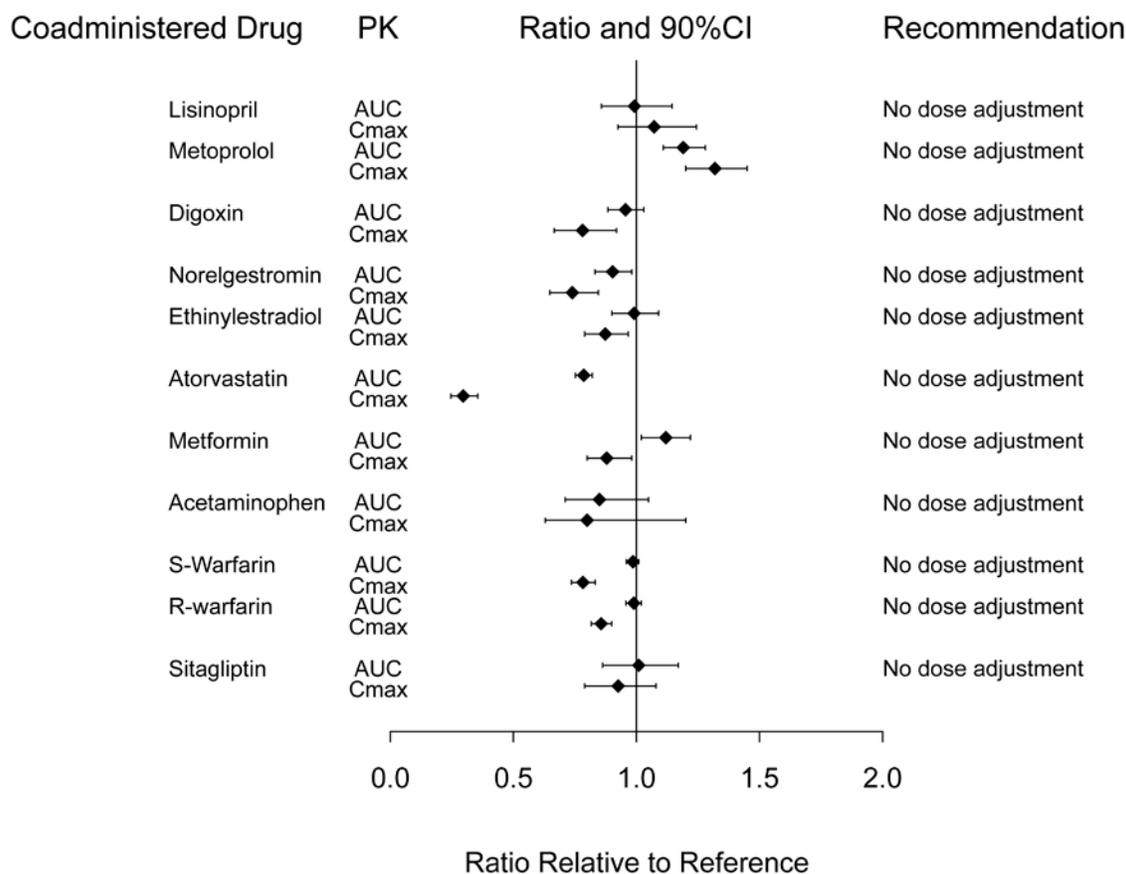
#### Drug Interactions

The potential effect of co-administered medications on the PK of dulaglutide and vice-versa was studied in several single- and multiple-dose studies in healthy subjects, patients with type 2 diabetes mellitus, and patients with hypertension.

#### Potential for Dulaglutide to Influence the Pharmacokinetics of Other Drugs

Dulaglutide slows gastric emptying and, as a result, may reduce the extent and rate of absorption of orally co-administered medications. In clinical pharmacology studies, dulaglutide did not affect the absorption of the tested orally administered medications to any clinically relevant degree.

Pharmacokinetic (PK) measures indicating the magnitude of these interactions are presented in Figure 2. No dose adjustment is recommended for any of the evaluated co-administered medications.



Abbreviations: AUC = area under the time-concentration curve; CI = confidence interval; C<sub>max</sub> = maximum concentration; PK = pharmacokinetics.

Note: Reference group is co-administered medication given alone.

**Figure 2: Impact of dulaglutide on the pharmacokinetics of co-administered medications.**

#### Potential for Co-administered Drugs to Influence the Pharmacokinetics of Dulaglutide

In a clinical pharmacology study, the coadministration of a single dose of dulaglutide (1.5 mg) with steady-state sitagliptin (100 mg) caused an increase in dulaglutide AUC and C<sub>max</sub> of approximately 38% and 27%, which is not considered clinically relevant.

### 13 NONCLINICAL TOXICOLOGY

#### 13.1 Carcinogenesis, Mutagenesis, and Impairment of Fertility

A 2-year carcinogenicity study was conducted with dulaglutide in male and female rats at doses of 0.05, 0.5, 1.5, and 5.0 mg/kg (0.5-, 7-, 20-, and 58-fold the MRHD of 1.5 mg once weekly based on AUC) administered by subcutaneous injection twice weekly. In rats, dulaglutide caused a dose-related and treatment-duration-dependent increase in the incidence of thyroid C-cell tumors (adenomas and/or carcinomas) compared to controls, at  $\geq 7$ -fold the MRHD based on AUC. A statistically significant increase in C-cell adenomas was observed in rats receiving dulaglutide at  $\geq 0.5$  mg/kg. Numerical increases in thyroid C-cell carcinomas occurred at 5 mg/kg (58 times the MRHD based on AUC) and were considered to be treatment-related despite the absence of statistical significance.

A 6-month carcinogenicity study was conducted with dulaglutide in rasH2 transgenic mice at doses of 0.3, 1.0, and 3.0 mg/kg administered by subcutaneous injection twice weekly. Dulaglutide did not produce increased incidences of thyroid C-cell hyperplasia or neoplasia at any dose.

Dulaglutide is a recombinant protein; no genotoxicity studies have been conducted.

Human relevance of thyroid C-cell tumors in rats is unknown and could not be determined by clinical studies or nonclinical studies [see *Boxed Warning and Warnings and Precautions (5.1)*].

In fertility and early embryonic development studies in male and female rats, no adverse effects of dulaglutide on sperm morphology, mating, fertility, conception, and embryonic survival were observed at up to 16.3 mg/kg (130-fold the MRHD based on AUC). In female rats, an increase in the number of females with prolonged diestrus and a dose-related decrease in the mean number of corpora lutea, implantation sites, and viable embryos were observed at  $\geq 4.9$  mg/kg ( $\geq 32$ -fold the MRHD based on AUC), which occurred in the presence of decreased maternal food consumption and body weight gain.

### 13.2 Animal Toxicology and/or Pharmacology

Zucker diabetic fatty (ZDF) rats were given 0.5, 1.5, or 5.0 mg/kg/twice weekly of dulaglutide (3-, 8-, and 30-fold the MRHD based on AUC) for 3 months. Increases of 12% to 33% in total and pancreatic amylase, but not lipase, were observed at all doses without microscopic pancreatic inflammatory correlates in individual animals. Other changes in the dulaglutide-treated animals included increased interlobular ductal epithelium without active ductal cell proliferation ( $\geq 0.5$  mg/kg), increased acinar atrophy with/without inflammation ( $\geq 1.5$  mg/kg), and increased neutrophilic inflammation of the acinar pancreas (5 mg/kg).

Treatment of monkeys for 12 months with 8.15 mg/kg/twice weekly of dulaglutide (nearly 500-fold the MRHD based on AUC) demonstrated no evidence of pancreatic inflammation or pancreatic intraepithelial neoplasia. In 4 of 19 monkeys on dulaglutide treatment, there was an increase in goblet cells within the pancreatic ducts, but no differences from the control group in total amylase or lipase at study termination. There were no proliferative changes in the thyroid C-cells.

## 14 CLINICAL STUDIES

TRULICITY has been studied as monotherapy and in combination with metformin, metformin and sulfonylurea, metformin and thiazolidinedione, and prandial insulin with or without metformin.

The studies evaluated the use of TRULICITY 0.75 mg and 1.5 mg. Uptitration was not performed in any of the trials; patients were initiated and maintained on either 0.75 mg or 1.5 mg for the duration of the trials.

In patients with type 2 diabetes mellitus, TRULICITY produced reductions from baseline in HbA1c compared to placebo. No overall differences in glycemic effectiveness were observed across demographic subgroups (age, gender, race/ethnicity, duration of diabetes).

### 14.1 Monotherapy

In a 52-week double-blind study (26 week primary endpoint), 807 patients inadequately treated with diet and exercise, or with diet and exercise and one anti-diabetic agent used at submaximal dose, were randomized to TRULICITY 0.75 mg once weekly, TRULICITY 1.5 mg once weekly, or metformin 1500 to 2000 mg/day following a two week washout. Seventy-five percent (75%) of the randomized population were treated with one antidiabetic agent at the screening visit. Most patients previously treated with an antidiabetic agent were receiving metformin (~90%) at a median dose of 1000 mg daily and approximately 10% were receiving a sulfonylurea.

Patients had a mean age of 56 years and a mean duration of type 2 diabetes of 3 years. Forty-four percent were male. The White, Black and Asian race accounted for 74%, 7% and 8% of the population, respectively. Twenty-nine percent of the study population were from the US.

Treatment with TRULICITY 0.75 mg and 1.5 mg once weekly resulted in reduction in HbA1c from baseline at the 26 week primary timepoint (Table 3). The difference in observed effect size between TRULICITY 0.75 mg and 1.5 mg, respectively, and metformin excluded the pre-specified non-inferiority margin of 0.4%.

**Table 3: Results at Week 26 in a Trial of TRULICITY as Monotherapy<sup>a</sup>**

	26-Week Primary Time Point		
	TRULICITY 0.75 mg	TRULICITY 1.5 mg	Metformin 1500-2000 mg
<b>Intent-to-Treat (ITT) Population (N)<sup>‡</sup></b>	270	269	268
<b>HbA1c (%) (Mean)</b>			
Baseline HbA1c	7.6	7.6	7.6
Change from baseline (adjusted mean)	-0.7	-0.8	-0.6
<b>Fasting Serum Glucose (mg/dL) (Mean)</b>			
Baseline	161	164	161
Change from baseline (adjusted mean)	-26	-29	-24
<b>Body Weight (kg) (Mean)</b>			
Baseline (mean)	92.7	92.7	92.4
Change from baseline (adjusted mean)	-2.3	-2.3	-2.2

Abbreviation: HbA1c = hemoglobin A1c.

<sup>‡</sup> Subjects included in the analysis are a subset of the ITT population that had at least one post-baseline assessment. The primary analysis included 265 individuals in each of the treatment arms.

<sup>a</sup> Intent-to-treat population. Last observation carried forward (LOCF) was used to impute missing data. Data post-onset of rescue therapy are treated as missing. At Week 26, primary efficacy was imputed for 10%, 12% and 14% of individuals randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg and metformin, respectively.

## 14.2 Combination Therapy

### Add-on to Metformin

In this 104-week placebo-controlled, double-blind study (52-week primary endpoint), 972 patients were randomized to placebo, TRULICITY 0.75 mg once weekly, TRULICITY 1.5 mg once weekly, or sitagliptin 100 mg/day (after 26 weeks, patients in the placebo treatment group received blinded sitagliptin 100 mg/day for the remainder of the study), all as add-on to metformin. Randomization occurred after an 11-week lead-in period to allow for a metformin titration period, followed by a 6-week glycemic stabilization period. Patients had a mean age of 54 years; mean duration of type 2 diabetes of 7 years; 47% were male; race: White, Black and Asian were 52%, 4% and 25%, respectively; and 26% of the study population were in the US.

At the 26 week placebo-controlled time point, the HbA1c reduction was 0.1%, 1.0%, 1.2%, and 0.6% for placebo, TRULICITY 0.75 mg, TRULICITY 1.5 mg, and sitagliptin, respectively. The percentage of patients who achieved HbA1c <7.0% was 22%, 56%, 62%, 39% for placebo, TRULICITY 0.75 mg, TRULICITY 1.5 mg, and sitagliptin, respectively. At 26 weeks, there was a mean weight reduction of 1.4 kg, 2.7 kg, 3.0 kg, and 1.4 kg for placebo, TRULICITY 0.75 mg, TRULICITY 1.5 mg, and sitagliptin, respectively. There was a mean reduction of fasting glucose of 9 mg/dL, 35 mg/dL, 41 mg/dL, and 18 mg/dL for placebo, TRULICITY 0.75 mg, TRULICITY 1.5 mg, and sitagliptin, respectively.

Treatment with TRULICITY 0.75 mg and 1.5 mg once weekly resulted in a statistically significant reduction in HbA1c compared to placebo (at 26 weeks) and compared to sitagliptin (at 26, and 52), all in combination with metformin (Table 4 and Figure 4).

**Table 4: Results at Week 52 of TRULICITY Compared to Sitagliptin used as Add-On to Metformin<sup>a</sup>**

	52-Week Primary Time Point		
	TRULICITY 0.75 mg	TRULICITY 1.5 mg	Sitagliptin 100 mg
<b>Intent-to-Treat (ITT) Population (N)<sup>‡</sup></b>	281	279	273
<b>HbA1c (%) (Mean)<sup>b</sup></b>			
Baseline	8.2	8.1	8.0
Change from baseline (adjusted mean)	-0.9	-1.1	-0.4
Difference from sitagliptin (95% CI)	-0.5 (-0.7, -0.3) <sup>††</sup>	-0.7 (-0.9, -0.5) <sup>††</sup>	-
<b>Percentage of patients HbA1c &lt;7.0%</b>	49 <sup>###</sup>	59 <sup>###</sup>	33
<b>Fasting Plasma Glucose (mg/dL) (Mean)<sup>b</sup></b>			
Baseline	174	173	171

Change from baseline (adjusted mean)	-30	-41	-14
Difference from sitagliptin (95% CI)	-15 (-22, -9)	-27 (-33, -20)	-
<b>Body Weight (kg) (Mean)<sup>b</sup></b>			
Baseline (mean)	85.5	86.5	85.8
Change from baseline (adjusted mean)	-2.7	-3.1	-1.5
Difference from sitagliptin (95% CI)	-1.2 (-1.8, -0.6)	-1.5 (-2.1, -0.9)	-

Abbreviations: HbA1c = hemoglobin A1c.

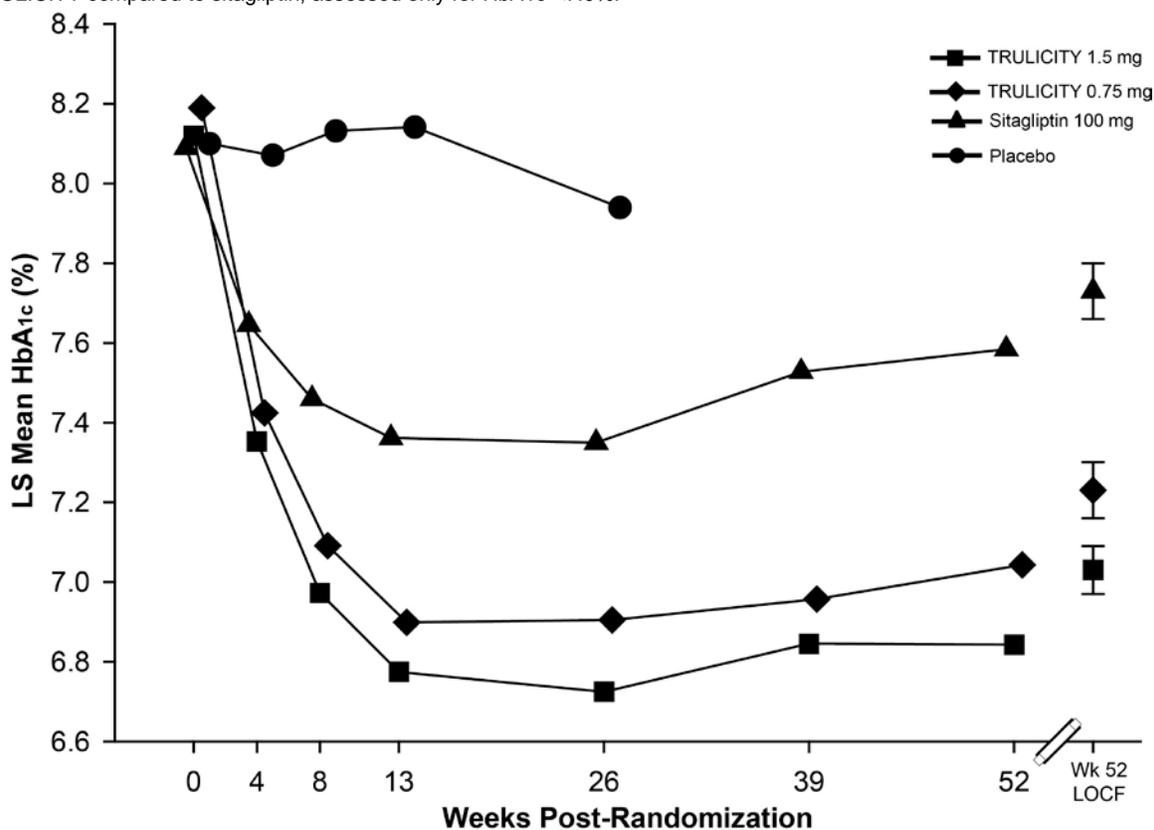
<sup>a</sup> All ITT patients randomized after the dose-finding portion of the study. Last observation carried forward (LOCF) was used to impute missing data. At Week 52 primary efficacy was imputed for 15%, 19%, and 20% of individuals randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg and sitagliptin, respectively.

<sup>b</sup> Least-squares (LS) mean adjusted for baseline value and other stratification factors.

‡ Subjects included in the analysis are a subset of the ITT population that had at least one post-baseline assessment. The primary analysis included 276, 277, and 270 individuals randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg and sitagliptin, respectively.

†† Multiplicity adjusted 1-sided p-value <0.001, for superiority of TRULICITY compared to sitagliptin, assessed only for HbA1c.

### p<0.001 TRULICITY compared to sitagliptin, assessed only for HbA1c <7.0%.



#### Number of subjects with observed data

Placebo	139	108	
TRULICITY 0.75 mg	281	258	238
TRULICITY 1.5 mg	279	249	225
Sitagliptin	273	241	219

Mean change from baseline adjusted for baseline HbA1c and country.

**Figure 3: Adjusted Mean HbA1c Change at each Time Point (ITT, MMRM) and at Week 52 (ITT, LOCF)**

#### Add-on to Metformin and Thiazolidinedione

In this 52-week placebo-controlled study (26-week primary endpoint), 976 patients were randomized to placebo, TRULICITY 0.75 mg once weekly, TRULICITY 1.5 mg once weekly, or exenatide 10 mcg BID, all as add-on to maximally tolerated doses of metformin ( $\geq 1500$  mg per day) and pioglitazone (up to 45 mg per day). Exenatide treatment group assignment was open-label while the treatment assignments to placebo, TRULICITY 0.75 mg, and TRULICITY 1.5 mg were blinded. After 26 weeks, patients in the placebo treatment group were randomized to either TRULICITY 0.75 mg once weekly or TRULICITY 1.5 mg once weekly to maintain study blind. Randomization occurred after a 12-week lead-in period; during the initial 4 weeks of the lead-in period, patients were titrated to maximally tolerated doses of metformin and pioglitazone; this was followed by an 8-week glycemic stabilization period prior to randomization. Patients randomized to

exenatide started at a dose of 5 mcg BID for 4 weeks and then were escalated to 10 mcg BID. Patients had a mean age of 56 years; mean duration of type 2 diabetes of 9 years; 58% were male; race: White, Black and Asian were 74%, 8% and 3%, respectively; and 81% of the study population were in the US.

Treatment with TRULICITY 0.75 mg and 1.5 mg once weekly resulted in a statistically significant reduction in HbA1c compared to placebo (at 26 weeks) and compared to exenatide at 26 weeks (Table 5 and Figure 4). Over the 52-week study period, the percentage of patients who required glycemic rescue was 8.9% in the TRULICITY 0.75 mg once weekly + metformin and pioglitazone treatment group, 3.2% in the TRULICITY 1.5 mg once weekly + metformin and pioglitazone treatment group, and 8.7% in the exenatide BID + metformin and pioglitazone treatment group.

**Table 5: Results at Week 26 of TRULICITY Compared to Placebo and Exenatide, All as Add-On to Metformin and Thiazolidinedione<sup>a</sup>**

	26-Week Primary Time Point			
	Placebo	TRULICITY 0.75 mg	TRULICITY 1.5 mg	Exenatide 10 mcg BID
<b>Intent-to-Treat (ITT) Population (N)<sup>‡</sup></b>	141	280	279	276
<b>HbA1c (%) (Mean)<sup>b</sup></b>				
Baseline	8.1	8.1	8.1	8.1
Change from baseline (adjusted mean)	-0.5	-1.3	-1.5	-1.0
Difference from placebo (95% CI)	-	-0.8 (-1.0, -0.7) <sup>‡‡</sup>	-1.1 (-1.2, -0.9) <sup>‡‡</sup>	-
Difference from exenatide (95% CI)	-	-0.3 (-0.4, -0.2) <sup>‡‡</sup>	-0.5 (-0.7, -0.4) <sup>‡‡</sup>	-
<b>Percentage of patients HbA1c &lt;7.0%</b>	43	66 <sup>**</sup> , <sup>###</sup>	78 <sup>**</sup> , <sup>###</sup>	52
<b>Fasting Serum Glucose (mg/dL) (Mean)<sup>b</sup></b>				
Baseline	166	159	162	164
Change from baseline (adjusted mean)	-5	-34	-42	-24
Difference from placebo (95% CI)	-	-30 (-36, -23)	-38 (-45, -31)	-
Difference from exenatide (95% CI)	-	-10 (-15, -5)	-18 (-24, -13)	-
<b>Body Weight (kg) (Mean)<sup>b</sup></b>				
Baseline (mean)	94.1	95.5	96.2	97.4
Change from baseline (adjusted mean)	1.2	0.2	-1.3	-1.1
Difference from placebo (95% CI)	-	-1.0 (-1.8, -0.3)	-2.5 (-3.3, -1.8)	-
Difference from exenatide (95% CI)	-	1.3 (0.6, 1.9)	-0.2 (-0.9, 0.4)	-

Abbreviations: BID = twice daily; HbA1c = hemoglobin A1c.

<sup>a</sup> Intent-to-treat population. Last observation carried forward (LOCF) was used to impute missing data. Data post-onset of rescue therapy are treated as missing. At Week 26, primary efficacy was imputed for 23%, 10%, 7% and 12% of individuals randomized to placebo, TRULICITY 0.75 mg, TRULICITY 1.5 mg, and exenatide, respectively.

<sup>b</sup> Least-squares (LS) mean adjusted for baseline value and other stratification factors.

<sup>‡</sup> Subjects included in the analysis are a subset of the ITT population that had at least one post-baseline assessment.

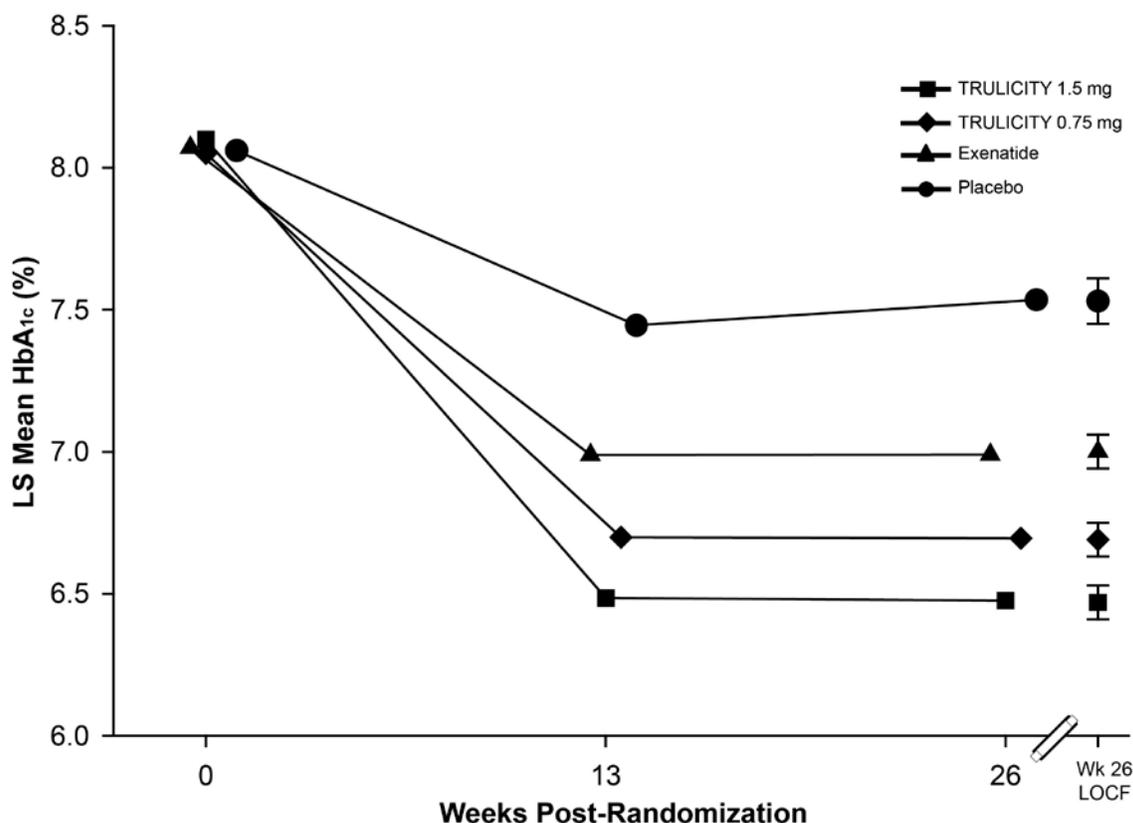
<sup>‡‡</sup> Multiplicity adjusted 1-sided p-value <0.001, for superiority of TRULICITY compared to placebo, assessed only for HbA1c.

<sup>‡‡</sup> Multiplicity adjusted 1-sided p-value <0.001, for superiority of TRULICITY compared to exenatide, assessed only for HbA1c.

<sup>‡</sup> Subjects included in the analysis are a subset of the ITT population that had at least one post-baseline assessment. The primary analysis included 119, 269, 271 and 266 individuals randomized to placebo, TRULICITY 0.75 mg, TRULICITY 1.5 mg, and exenatide, respectively.

<sup>\*\*</sup> p<0.001 TRULICITY compared to placebo, assessed only for HbA1c <7.0%.

<sup>###</sup> p<0.001 TRULICITY compared to exenatide, assessed only for HbA1c <7.0%.



**Number of subjects with observed data**

Placebo	141	108
TRULICITY 0.75 mg	280	251
TRULICITY 1.5 mg	279	259
Exenatide	276	242

Mean change from baseline adjusted for baseline HbA1c and country.

**Figure 4: Adjusted Mean HbA1c Change at Each Time Point (ITT) and at Week 26 (ITT) - LOCF**

Add-on to Metformin and Sulfonylurea

In this 78-week (52-week primary endpoint) open-label comparator study (double-blind with respect to TRULICITY dose assignment), 807 patients were randomized to TRULICITY 0.75 mg once weekly, TRULICITY 1.5 mg once weekly, or insulin glargine once daily, all as add-on to maximally tolerated doses of metformin and glimepiride. Randomization occurred after a 10-week lead-in period; during the initial 2 weeks of the lead-in period, patients were titrated to maximally tolerated doses of metformin and glimepiride. This was followed by a 6- to 8-week glycemic stabilization period prior to randomization.

Patients randomized to insulin glargine were started on a dose of 10 U once daily. Insulin glargine dose adjustments occurred twice weekly for the first 4 weeks of treatment based on self-measured fasting plasma glucose (FPG), followed by once weekly titration through Week 8 of study treatment, utilizing an algorithm that targeted a fasting plasma glucose of <100 mg/dL. Only 24% of patients were titrated to goal at the 52 week primary endpoint. The dose of glimepiride could be reduced or discontinued after randomization (at the discretion of the investigator) in the event of persistent hypoglycemia. The dose of glimepiride was reduced or discontinued in 28%, 32%, and 29% of patients randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg, and glargine.

Patients had a mean age of 57 years; mean duration of type 2 diabetes of 9 years; 51% were male; race: White, Black and Asian were 71%, 1% and 17%, respectively; and 0% of the study population were in the US.

Treatment with TRULICITY once weekly resulted in a reduction in HbA1c from baseline at 52 weeks when used in combination with metformin and sulfonylurea (Table 6). The difference in observed effect size between TRULICITY 0.75 mg and 1.5 mg, respectively, and glargine in this trial excluded the pre-specified non-inferiority margin of 0.4%.

**Table 6: Results at Week 52 of TRULICITY Compared to Insulin Glargine, Both as Add-on to Metformin and Sulfonylurea<sup>a</sup>**

	52-Week Primary Time Point		
	TRULICITY 0.75 mg	TRULICITY 1.5 mg	Insulin Glargine
<b>Intent-to-Treat (ITT) Population (N)<sup>†</sup></b>	272	273	262
<b>HbA1c (%) (Mean)<sup>b</sup></b>			
Baseline	8.1	8.2	8.1
Change from baseline (adjusted mean)	-0.8	-1.1	-0.6
<b>Fasting Serum Glucose (mg/dL) (Mean)<sup>b</sup></b>			
Baseline	161	165	163
Change from baseline (adjusted mean)	-16	-27	-32
Difference from insulin glargine. Adjusted mean (95% CI)	16 (9, 23)	5 (-2, 12)	-
<b>Body Weight (kg) (Mean)<sup>b</sup></b>			
Baseline (mean)	86.4	85.2	87.6
Change from baseline (adjusted mean)	-1.3	-1.9	1.4
Difference from insulin. Adjusted mean (95% CI)	-2.8 (-3.4, -2.2)	-3.3 (-3.9, -2.7)	-

Abbreviations: HbA1c = hemoglobin A1c.

<sup>a</sup> Intent-to-treat population. Last observation carried forward (LOCF) was used to impute missing data. Data post-onset of rescue therapy are treated as missing. At Week 52, primary efficacy was imputed for 17%, 13% and 12% of individuals randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg and glargine, respectively.

<sup>b</sup> Least-squares (LS) mean adjusted for baseline value and other stratification factors.

<sup>†</sup> Subjects included in the analysis are a subset of the ITT population that had at least one post-baseline assessment. The primary analysis included 267, 263 and 259 individuals randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg, and glargine, respectively.

#### Add-on to Prandial Insulin, with or without Metformin

In this 52-week (26-week primary endpoint) open-label comparator study (double-blind with respect to TRULICITY dose assignment), 884 patients on 1 or 2 insulin injections per day were enrolled. Randomization occurred after a 9-week lead-in period; during the initial 2 weeks of the lead-in period, patients continued their pre-study insulin regimen but could be initiated and/or up-titrated on metformin, based on investigator discretion; this was followed by a 7-week glycemic stabilization period prior to randomization.

At randomization, patients discontinued their pre-study insulin regimen and were randomized to TRULICITY 0.75 mg once weekly, TRULICITY 1.5 mg once weekly, or insulin glargine once daily, all in combination with prandial insulin lispro 3 times daily, with or without metformin. Insulin lispro was titrated in each arm based on preprandial and bedtime glucose, and insulin glargine was titrated to a fasting plasma glucose goal of <100 mg/dL. Only 38% of patients randomized to glargine were titrated to the fasting glucose goal at the 26 week primary timepoint.

Patients had a mean age of 59 years; mean duration of type 2 diabetes of 13 years; 54% were male; race: White, Black and Asian were 79%, 10% and 4%, respectively; and 33% of the study population were in the US.

Treatment with TRULICITY 0.75 mg and 1.5 mg once weekly resulted in a reduction in HbA1c from baseline. The difference in observed effect size between TRULICITY 0.75 mg and 1.5 mg, respectively, and glargine in this trial excluded the pre-specified non-inferiority margin of 0.4%.

**Table 7: Results at Week 26 of TRULICITY Compared to Insulin Glargine, Both in Combination with Insulin Lispro<sup>a</sup>**

	26-Week Primary Time Point		
	TRULICITY 0.75 mg	TRULICITY 1.5 mg	Insulin Glargine
<b>Intent-to-Treat (ITT) Population (N)<sup>†</sup></b>	293	295	296
<b>HbA1c (%) (Mean)<sup>b</sup></b>			
Baseline	8.4	8.5	8.5
Change from baseline (adjusted mean)	-1.6	-1.6	-1.4
<b>Fasting Serum Glucose (mg/dL) (Mean)<sup>b</sup></b>			
Baseline	150	157	154

Change from baseline (adjusted mean) Difference from insulin glargine. Adjusted mean (95% CI)	4 32 (24, 41)	-5 24 (15, 32)	-28 -
<b>Body Weight (kg) (Mean)<sup>b</sup></b>			
Baseline (mean)	91.7	91.0	90.8
Change from baseline (adjusted mean) Difference from insulin glargine. Adjusted mean (95% CI)	0.2 -2.2 (-2.8, -1.5)	-0.9 -3.2 (-3.8, -2.6)	2.3 -

<sup>a</sup> Intent-to-treat population. Last observation carried forward (LOCF) was used to impute missing data. Data post-onset of rescue therapy are treated as missing. At Week 26, primary efficacy was imputed for 14%, 15%, and 14% of individuals randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg and glargine, respectively.

<sup>b</sup> Least-squares (LS) mean adjusted for baseline value and other stratification factors.

‡ Subjects included in the analysis are a subset of the ITT population that had at least one post-baseline assessment. The primary analysis included 275, 273 and 276 individuals randomized to TRULICITY 0.75 mg, TRULICITY 1.5 mg, and glargine, respectively.

## 16 HOW SUPPLIED/STORAGE AND HANDLING

### 16.1 How Supplied

Each TRULICITY single-dose pen or prefilled syringe is packaged in a cardboard outer carton.

#### Carton of 4 Single-Dose Pens

- 0.75 mg/0.5 mL solution in a single-dose pen (NDC 0002-1433-80)
- 1.5 mg/0.5 mL solution in a single-dose pen (NDC 0002-1434-80)

#### Carton of 4 Prefilled Syringes

- 0.75 mg/0.5 mL solution in a single-dose prefilled syringe (NDC 0002-1431-80)
- 1.5 mg/0.5 mL solution in a single-dose prefilled syringe (NDC 0002-1432-80)

### 16.2 Storage and Handling

- Store TRULICITY in the refrigerator at 36°F to 46°F (2°C to 8°C). Do not use TRULICITY beyond the expiration date.
- If needed, each single-dose pen or prefilled syringe can be kept at room temperature, not to exceed 86°F (30°C) for a total of 14 days.
- Do not freeze TRULICITY. Do not use TRULICITY if it has been frozen.
- TRULICITY must be protected from light. Storage of TRULICITY in the original carton is recommended until time of administration.
- Discard the TRULICITY single-dose pen or prefilled syringe after use in a puncture-resistant container.

## 17 PATIENT COUNSELING INFORMATION

See FDA-approved Medication Guide

- Inform patients that TRULICITY causes benign and malignant thyroid C-cell tumors in rats and that the human relevance of this finding is unknown. Counsel patients to report symptoms of thyroid tumors (e.g., a lump in the neck, persistent hoarseness, dysphagia, or dyspnea) to their physician [see Warnings and Precautions (5.1)].
- Inform patients that persistent severe abdominal pain, that may radiate to the back and which may (or may not) be accompanied by vomiting, is the hallmark symptom of acute pancreatitis. Instruct patients to discontinue TRULICITY promptly, and to contact their physician, if persistent severe abdominal pain occurs [see Warnings and Precautions (5.2)].
- The risk of hypoglycemia may be increased when TRULICITY is used in combination with a medicine that can cause hypoglycemia, such as a sulfonylurea or insulin. Review and reinforce instructions for hypoglycemia management when initiating TRULICITY therapy, particularly when concomitantly administered with a sulfonylurea or insulin [see Warnings and Precautions (5.3)].
- Patients treated with TRULICITY should be advised of the potential risk of dehydration due to gastrointestinal adverse reactions and take precautions to avoid fluid depletion. Inform patients treated with TRULICITY of the potential risk for worsening renal function and explain the associated signs and symptoms of renal impairment, as well as the possibility of dialysis as a medical intervention if renal failure occurs.
- Inform patients that serious hypersensitivity reactions have been reported during postmarketing use of GLP-1 receptor agonists. If symptoms of hypersensitivity reactions occur, patients must stop taking TRULICITY and seek medical advice promptly.
- Advise patients to inform their healthcare provider if they are pregnant or intend to become pregnant.
- Prior to initiation of TRULICITY, train patients on proper injection technique to ensure a full dose is delivered. Refer to the accompanying Instructions for Use for complete administration instructions with illustrations.

- Inform patients of the potential risks and benefits of TRULICITY and of alternative modes of therapy. Inform patients about the importance of adherence to dietary instructions, regular physical activity, periodic blood glucose monitoring and HbA1c testing, recognition and management of hypoglycemia and hyperglycemia, and assessment for diabetes complications. During periods of stress such as fever, trauma, infection, or surgery, medication requirements may change and advise patients to seek medical advice promptly.
- Each weekly dose of TRULICITY can be administered at any time of day, with or without food. The day of once weekly administration can be changed if necessary, as long as the last dose was administered 3 or more days before. If a dose is missed and there are at least 3 days (72 hours) until the next scheduled dose, it should be administered as soon as possible. Thereafter, patients can resume their usual once weekly dosing schedule. If a dose is missed and the next regularly scheduled dose is due in 1 or 2 days, the patient should not administer the missed dose and instead resume TRULICITY with the next regularly scheduled dose [*see Dosage and Administration (2)*].
- Advise patients treated with TRULICITY of the potential risk of gastrointestinal side effects [*see Adverse Reactions (6.1)*].
- Instruct patients to read the Medication Guide and the Instructions for Use before starting TRULICITY therapy and review them each time the prescription is refilled. Instruct patients to inform their doctor or pharmacist if they develop any unusual symptom, or if any known symptom persists or worsens.
- Inform patients that response to all diabetic therapies should be monitored by periodic measurements of blood glucose and HbA1c levels, with a goal of decreasing these levels towards the normal range. HbA1c is especially useful for evaluating long-term glycemic control.

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