“We’re at the early stages of using computerized ordering,” Automated systems “make it easier for nonendocrinologists to do the right thing” when administering insulin to hospitalized patients, said Dr. Korytkowski, who is director of the Center for Diabetes and Endocrinology at the University of Pittsburgh.

Setting up computerized order templates for insulin management is complicated because there is “no protocol a hospital can pull off the shelf. Every hospital has their own electronic medical record, and they need to build [an automated insulin-dose guidance algorithm] into their system. There is a lot of behind-the-scenes work that goes into building a protocol like this. At Pitt, we’re working on it. We don’t have it yet, but it’s worth doing,” she said in an interview.

The introduction of computer-guided insulin order templates comes at a time when experts appear to have reached a consensus on managing hyperglycemia in hospitalized patients.

This began a decade ago, with the publication of the landmark study from Belgium that showed strict glucose control in intensive care patients improved survival and cut morbidity (N. Engl. J. Med. 2001;345:359-67).

 IMPORTA NT SAF ETY I NFORMA TION

WARNING: POTENTIAL RISK OF OSTEOSARCOMA

In male and female rats, teriparatide caused an increase in the incidence of osteosarcoma (a malignant bone tumor) that was dependent on dose and treatment duration. The effect was observed at systemic exposures to teriparatide ranging from 3 to 60 times the exposure in humans given a 20-mcg dose. Because of the uncertain relevance of the rat osteosarcoma finding to humans, prescribe FORTEO® (teriparatide [rDNA origin] injection) only for patients for whom the potential benefits are considered to outweigh the potential risk. FORTEO should not be prescribed for patients who are at increased baseline risk for osteosarcoma (including those with Paget’s disease of bone or unexplained elevations of alkaline phosphatase, pediatric and young adult patients with open epiphyses, or prior external beam or implant radiation therapy involving the skeleton).

CONTRAINDICATIONS
Hypercalciuria to teriparatide or to any of its excipients. Reactions have included angioedema and anaphylaxis.

WARNINGS AND PRECAUTIONS
The following categories of patients have increased baseline risk of osteosarcoma and therefore should not be treated with FORTEO: Paget’s disease of bone, pediatric populations and young adults with open epiphyses, or prior external beam or implant radiation therapy.

Patients should be encouraged to enroll in the voluntary FORTEO Patient Registry, which is designed to collect information about any potential risk of osteosarcoma in patients who have taken FORTEO. Enrollment information can be obtained by calling 1-866-382-6813, or by visiting www.forteoregistry.rti.org.

Osteosarcoma occurs in about 4 out of every million older adults each year. Cases of bone tumor and osteosarcoma have been reported rarely in people taking FORTEO in the post-marketing period. The causality to FORTEO use is unclear.

Use of FORTEO for more than 2 years during a patient’s lifetime is not recommended.

Patients with the following conditions also should not receive FORTEO: bone metastases or a history of skeletal malignancies, metabolic bone diseases other than osteoporosis, or hyperparathyroid disorders.

FORTEO may increase serum calcium, serum phosphorus, and serum uric acid.

Use with caution in patients with active or recent urolithiasis because of risk of exacerbation. If active urolithiasis or pre-existing hypercalciuria are suspected, measurement of urinary calcium excretion should be considered.

Transient orthostatic hypotension may occur with initial doses of FORTEO. In short-term clinical pharmacology studies, transient episodes of symptomatic orthostatic hypotension were observed in 5% of patients. FORTEO should be administered initially under circumstances where the patient can sit or lie down if symptoms of orthostatic hypotension occur. Patients receiving digoxin should use FORTEO with caution because FORTEO may transiently increase serum calcium and hypercalcemia may predispose patients to digitalis toxicity.

FORTEO should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. Based on animal studies, FORTEO may cause fetal harm.

It is not known whether teriparatide is excreted in human milk. Breastfeeding mothers should discontinue nursing or FORTEO, taking into account the importance of treatment to the mother.

ADVERSE REACTIONS
The most common adverse reactions in clinical trials include: arthralgia (10.1 FORTEO vs. 8.4 placebo), pain (21.3 FORTEO vs. 20.5 placebo), and nausea (8.5 FORTEO vs. 6.7 placebo). Other adverse reactions include: dizziness, leg cramps, joint aches, and injection site reactions.

INSTRUCTIONS FOR FORTEO USE
FORTEO is provided as a fixed-dose, prefilled delivery device that can be used for up to 28 days, including the first injection. The delivery device contains 28 daily doses of 20 mcg each. Do not transfer the contents of the delivery device into a syringe. The FORTEO Delivery Device should be stored under refrigeration at 36° to 46° F (2° to 8° C) at all times. Do not use FORTEO if it has been frozen.

Please see Brief Summary of Prescribing Information on adjacent pages.

FORTEO®
teriparatide (rDNA origin) injection
ANABOLIC ACTION FOR NEW BONE
Subsequent study results showed intensive glycemic control that kept blood glucose levels below 110 mg/dL, resulted in no extra benefit compared with good control. Specialists now generally recommend a blood glucose range of 140-200 mg/dL for hospitalized, intensive care patients, including the guidelines published in February by the American College of Physicians (Ann. Int. Med. 2011;154:260-7).

A computerized order template would make such insulin treatment needed to achieve it — more automatic. A lot of places are still struggling to get people to buy into controlling glucose levels in the hospital," Dr. Korytkowski said.

Evidence documenting the advantages of a computerized insulin-order template appeared in an article published last October by physicians at the Massachusetts General Hospital, one of the few U.S. sites with a computerized system in place, Dr. Korytkowski said.

The study analyzed 128 patients with type 2 diabetes who received a basal-bolus insulin regimen at MGH during April 2007-May 2009, a period when the computerized system was not available to all MGH physicians.

Insulin treatment was guided by the computerized template in 63 patients, and 65 received treatment prescribed by physicians who had received a brief teaching session and a dosing pamphlet, she said.

The results showed significantly better glycemic control in the group whose treatment had computerized guidance, with an average blood glucose level of 194 mg/dL, compared with an average level of 224 mg/dL in the patients who were treated without using the computer-based dosage template (Diabetes Care 2010;33:2181-3).

Dr. Korytkowski said that she has been a consultant to Eli Lilly.


FOREWARN: POTENTIAL RISK OF OSTEOSARCOMA
In male and female rats, teriparatide caused an increase in the incidence of osteosarcoma (a malignant bone tumor) that was dependent on dose and treatment duration. The effect was observed at systemic exposures to teriparatide ranging from 3 to 60 times the exposure in humans given a 20 mcg dose. Because of the uncertain relevance of the rat osteosarcoma finding to humans, prescribe FORTEO® only for patients for whom the potential benefits are considered to outweigh the potential risk. Teriparatide should not be prescribed for patients who are at increased baseline risk for osteosarcoma (including those with Paget’s disease of bone or unexplained elevations of alkaline phosphatase, pediatric and young adult patients with open epiphyses, or prior external beam or implant radiation therapy involving the skeleton).

INDICATIONS
FORTEO is indicated for the treatment of postmenopausal women with osteoporosis at high risk for fracture; to increase bone mass in men with primary or hypogonadal osteoporosis at high risk for fracture; for the treatment of men and women with osteoporosis associated with sustained, systemic glucocorticoid therapy at high risk for fracture.

CONTRAINDICATIONS
Do not use FORTEO in patients with Hypersensitivity to teriparatide or to any of its excipients. Reactions have included angioedema and anaphylaxis.

WARNINGS AND PRECAUTIONS
Osteosarcoma in male and female rats, teriparatide caused an increase in the incidence of osteosarcoma (a malignant bone tumor) that was dependent on dose and treatment duration. FORTEO should not be prescribed for patients at increased baseline risk of osteosarcoma. These include Paget’s disease of bone (unexplained elevations of alkaline phosphatase may indicate Paget’s disease of bone); pediatric and young adult patients with open epiphyses; prior external beam or implant radiation therapy involving the skeleton. Patients should be encouraged to enroll in the voluntary FORTEO Patient Registry, which is designed to collect information about any potential risk of osteosarcoma in patients who have taken FORTEO. Enrollment information can be obtained by calling 1-866-382-6813, or by visiting www.forteoregistry.rti.org.

Treatment Duration The safety and efficacy of FORTEO have not been evaluated beyond 2 years of treatment. Consequently, use of the drug for more than 2 years during a patient’s lifetime is not recommended.

Bone Metastases and Skeletal Malignancies Patients with bone metastases or a history of skeletal malignancies should not be treated with FORTEO. Metabolic Bone Diseases Patients with metabolic bone diseases other than osteoporosis should not be treated with FORTEO. Hypercalcemia and Hypercalcemic Disorders and Hyperuricemia Hyperuricemia has been observed in 1% of patients in the double-blind trials, the frequency of at least 1 episode of transient hypercalcemia in placebo group. The incidence of serious adverse events was 16% in FORTEO patients and 19% in placebo patients. Early discontinuation due to adverse events occurred in 7% of FORTEO patients and 6% of placebo patients. Percentage of Patients with Adverse Events Reported by At Least 2% of FORTEO-Treated Patients and in More FORTEO-Treated Patients than Placebo-Treated Patients from the Two Principal Osteoporosis Trials in Women and Men Adverse Events are Shown Without Attribution of Causality (FORTEO, N=691, Placebo, N=691); Body as a Whole: Pain (21.3%, 20.5%), Headache (7.5%, 7.4%), Asthenia (8.7%, 6.8%), Neck Pain (3.0%, 2.7%); Cardiovascular: Hypertension (7.1%, 6.8%), Angina Pectoris (2.5%, 1.6%), Syncope (2.6%, 1.4%); Digestive System: Nausea (8.5%, 6.7%), Constipation (5.4%, 4.5%), Diarrhea (5.1%, 4.8%), Dyspepsia (8.2%, 4.1%), Vomiting (3.0%, 2.3%); Gastrointestinal disorder (2.3%, 2.0%), Tooth disorder (2.0%, 1.3%); Musculoskeletal: Arthralgia (10.1%, 8.4%), Leg cramps (2.8%, 1.3%); Nervous System: Dizziness (8.0%, 5.4%), Depression (4.1%, 2.7%) Insomnia (4.3%, 3.8%), Vertigo (3.8%, 2.7%); Respiratory System: Rhinitis (9.6%, 8.8%), Cough increased (6.4%, 5.5%), Pharyngitis (5.5%, 4.8%), Dyspepsia (3.6%, 2.6%), Pneumonia (3.9%, 3.3%); Skin and Appendages: Rash (4.9%, 4.5%), Sweating (2.2%, 1.7%); Immune system In the clinical trial, antibodies that cross-react with teriparatide were detected in 3% of women (15/541) receiving FORTEO. Generally, antibodies were first detected following 12 months of treatment and diminished after withdrawal of therapy. There was no evidence of hypersensitivity reactions or allergic reactions among these patients. Antibody formation did not appear to have effects on serum calcium, or on bone mineral density (BMD) response. Laboratory Findings Serum Calcium: FORTEO transiently increased serum calcium, with the maximal effect observed at approximately 4 to 6 hours post-dose. Serum calcium measured at least 16 hours post-dose was not different from pretreatment levels. In clinical trials, the frequency of at least 1 episode of transient hypercalcemia in the 4 to 6 hours after FORTEO administration was increased from 2% of women and none of the men treated with placebo to 11% of women and 6% of men treated with FORTEO. The number of patients treated with FORTEO whose transient hypercalcemia was verified on consecutive measurements was 3% of women and 1% of men. Urinary Calcium: FORTEO increased urinary calcium excretion, but the frequency of hypercalciuria in clinical trials was similar for patients treated with FORTEO and placebo. Serum Uric Acid: FORTEO increased serum uric acid concentrations. In clinical trials, 3% of FORTEO patients had serum uric acid concentrations above the upper limit of normal compared with 1% of placebo patients. However, the hyperuricemia did not result in an increase in gout, arthralgia, or uriculithiasis. Renal Function: No clinically