

CDC: Coordinated Strategy Will Curb Resistant Infections

BY KARI OAKES

A coordinated approach to infection control and antibiotic stewardship would dramatically reduce the number of people affected by antibiotic-resistant pathogens and health care-associated infections (HAIs), saving tens of thousands of lives and billions of dollars over the next 5 years, according to a federal report.

With a nationwide prevention and antibiotic stewardship program, the total number of HAIs could be reduced by 619,000 over the next 5 years, saving 37,000 lives and reducing direct medical costs by \$7.7 billion, Thomas Frieden, MD, MPH, director of the Centers for Disease Control and Prevention, said in a telebriefing sponsored by the agency.

The coordinated approach requires both a public health tracking and alerting system and robust interfacility infection control practices. "Facilities that go it alone can't effectively protect their own patients," he said.

In a CDC Vital Signs report, Rachel Slayton, PhD, of the Center for Emerging and Zoonotic Infectious Diseases, used carbapenem-resistant *Enterobacteriaceae* (CRE) as the test case to determine the effect size of coordinated compared

with institution-based infection control and alerting practices.

She and her coauthors projected that the number of health care-associated CRE infections would rise about 10% over the next 5 years, from 310,000 to 340,000, under current practices. Using these prevalence figures, a coordinated approach would result in CRE prevalence within a health care network of just 2% after 5 years, compared with a 12% baseline prevalence and an 8.6%

prevalence with augmented individual efforts.

Infection control practices that are enhanced by interfacility coordination may include maintaining regional databases that permit alerts when an individual with an HAI transfers from one facility to the other; having inter-institution agreement about best practices for gowning, gloving, and isolation; and commencing enhanced screening for HAIs when public health

officials identify a potential outbreak. Implementation of the coordinated approach would be supported by the CDC's Antibiotic Resistance Solutions Initiative, with \$264 million requested in the federal fiscal year 2016 budget for a broad set of programs and laboratory facilities for improved surveillance for resistant pathogens.

KARI OAKES is with the Midwest bureau of *Frontline Medical News*.

PA/LTC Perspective

The CDC is to be commended for its push toward a more coordinated approach to infection control. Although evidence supports the efficacy of specific antimicrobial stewardship programs in PA/LTC settings, the prerequisites for success vary considerably, depending on the context and scope of the program. At a minimum, success requires buy-in from the medical and nursing staff. There need to be clear lines of accountability and efficient means of interprofessional communication. A close partnership with the pharmacy and consulting pharmacist is also a must and may require more on-site presence than is the norm. In addition, the medical director, the director of nursing, and the administrator must work collaboratively to ensure timely communication and the sharing of content expertise with their acute care partners.

A major challenge in accomplishing the CDC's objectives is to overcome the current dearth of infection control practitioners in post-acute/long-term care. Resources must also be directed toward the real time collection of facility-specific microbial data, including resistance patterns, as well as the dissemination of evidence-based treatment algorithms. While there is clearly much to do, doing nothing and accepting the status quo is not an option.

—Paul Katz, MD, CMD
Tallahassee, FL

Lipodystrophy

Long-term use of insulin, including Humalog, can cause lipodystrophy at the site of repeated insulin injections or infusion. Lipodystrophy includes lipohypertrophy (thickening of adipose tissue) and lipatrophy (thinning of adipose tissue), and may affect insulin absorption. Rotate insulin injection or infusion sites within the same region to reduce the risk of lipodystrophy (see Dosage and Administration).

Weight Gain

Weight gain can occur with insulin therapy, including Humalog, and has been attributed to the anabolic effects of insulin and the decrease in glucosuria.

Peripheral Edema

Insulin, including Humalog, may cause sodium retention and edema, particularly if previously poor metabolic control is improved by intensified insulin therapy.

Adverse Reactions with Continuous Subcutaneous Insulin Infusion (CSII)

In a 12-week, randomized, crossover study in adult patients with type 1 diabetes comparing Humalog (n=38) to regular human insulin (n=39), the rates of catheter occlusions per month (0.9 vs. 0.10, respectively) and infusion site reactions (2.6% vs. 2.6%, respectively) were similar.

In a randomized, 16-week, open-label, parallel design study of children and adolescents with type 1 diabetes, adverse event reports related to infusion-site reactions were similar for insulin lispro and insulin aspart (21% of 100 patients versus 17% of 198 patients, respectively). In both groups, the most frequently reported infusion site adverse events were infusion site erythema and infusion site reaction.

Allergic Reactions

Local Allergy—As with any insulin therapy, patients taking Humalog may experience redness, swelling, or itching at the site of the injection. These minor reactions usually resolve in a few days to a few weeks, but in some occasions, may require discontinuation of Humalog. In some instances, these reactions may be related to factors other than insulin, such as irritants in a skin cleansing agent or poor injection technique.

Systemic Allergy—Severe, life-threatening, generalized allergy, including anaphylaxis, may occur with any insulin, including Humalog. Generalized allergy to insulin may cause whole body rash (including pruritus), dyspnea, wheezing, hypotension, tachycardia, or diaphoresis.

In controlled clinical trials, pruritus (with or without rash) was seen in 17 patients receiving regular human insulin (n=2969) and 30 patients receiving Humalog (n=2944).

Localized reactions and generalized myalgias have been reported with injected metacresol, which is an excipient in Humalog (see Contraindications).

Antibody Production

In large clinical trials with patients with type 1 (n=509) and type 2 (n=262) diabetes mellitus, anti-insulin antibody (insulin lispro-specific antibodies, insulin-specific antibodies, cross-reactive antibodies) formation was evaluated in patients receiving both regular human insulin and Humalog (including patients previously treated with human insulin and naive patients). As expected, the largest increase in the antibody levels occurred in patients new to insulin therapy. The antibody levels peaked by 12 months and declined over the remaining years of the study. These antibodies do not appear to cause deterioration in glycemic control or necessitate an increase in insulin dose. There was no statistically significant relationship between the change in the total daily insulin dose and the change in percent antibody binding for any of the antibody types.

USE IN SPECIFIC POPULATIONS

Pregnancy—Pregnancy Category B. All pregnancies have a background risk of birth defects, loss, or other adverse outcome regardless of drug exposure. This background risk is increased in pregnancies complicated by hyperglycemia and may be decreased with good metabolic control. It is essential for patients with diabetes or history of gestational diabetes to maintain good metabolic control before conception and throughout pregnancy. In patients with diabetes or gestational diabetes insulin requirements may decrease during the first trimester, generally increase during the second and third trimesters, and rapidly decline after delivery. Careful monitoring of glucose control is essential in these patients. Therefore, female patients should be advised to tell their physicians if they intend to become, or if they become pregnant while taking Humalog.

Although there are limited clinical studies of the use of Humalog in pregnancy, published studies with human insulins suggest that optimizing overall glycemic control, including postprandial control, before conception and during pregnancy improves fetal outcome.

Nursing Mothers—It is unknown whether insulin lispro is excreted in human milk. Use of Humalog is compatible with breastfeeding, but women with diabetes who are lactating may require adjustments of their insulin doses.

Pediatric Use—Humalog is approved for use in children for subcutaneous daily injections and for subcutaneous continuous infusion by external insulin pump. Humalog has not been studied in pediatric patients younger than 3 years of age. Humalog has not been studied in pediatric patients with type 2 diabetes.

Geriatric Use—Of the total number of subjects (n=2834) in eight clinical studies of Humalog, twelve percent (n=338) were 65 years of age or over. The majority of Humalog® (insulin lispro injection, USP [rDNA origin]) HI HCP BS 25MAR2015

these had type 2 diabetes. HbA1c values and hypoglycemia rates did not differ by age. Pharmacokinetic/pharmacodynamic studies to assess the effect of age on the onset of Humalog action have not been performed.

OVERDOSAGE

Excess insulin administration may cause hypoglycemia and hypokalemia. Mild episodes of hypoglycemia usually can be treated with oral glucose. Adjustments in drug dosage, meal patterns, or exercise may be needed. More severe episodes with coma, seizure, or neurologic impairment may be treated with glucagon or concentrated intravenous glucose. Sustained carbohydrate intake and observation may be necessary because hypoglycemia may recur after apparent clinical recovery. Hypokalemia must be corrected appropriately.

STORAGE

Do not use after the expiration date.

Unopened Humalog should be stored in a refrigerator (36° to 46°F [2° to 8°C]), but not in the freezer. Do not use Humalog if it has been frozen. In-use Humalog vials, cartridges, pens, and Humalog KwikPen® should be stored at room temperature, below 86°F (30°C), and must be used within 28 days or be discarded, even if they still contain Humalog. Protect from direct heat and light.

PATIENT COUNSELING INFORMATION: See FDA-approved patient labeling and Patient Counseling Information section of the Full Prescribing Information.

Humalog® and Humalog® KwikPen® are registered trademarks of Eli Lilly and Company.



Marketed by: Lilly USA, LLC, Indianapolis, IN 46285, USA

Copyright © 1996, 2011, Eli Lilly and Company. All rights reserved.

Additional information can be found at www.humalog.com.

HI HCP BS 25MAR2015

Humalog® (insulin lispro injection, USP [rDNA origin])

HI HCP BS 25MAR2015