Effective Health Care

Short- vs. Long-Acting Insulins and Insulin Analogs For Adult Type 2 Diabetes Mellitus Nomination Summary Document

Results of Topic Selection Process & Next Steps

- Short- vs. long-acting insulins and insulin analogs for adult type 2 diabetes mellitus was found to be addressed by a 2009 systematic review and meta-analysis of basal long-acting insulins versus prandial short-acting insulins. Given that the existing review covers this nomination, no further activity will be undertaken on this topic.
  - Lasserson DS et al. Optimal insulin regimens in type 2 diabetes mellitus: systematic review and meta-analyses. Diabetologia 2009; 52:1990-2000.

Topic Description

Nominator: Individual

Nomination Summary: The nominator wants to know the most effective way to control blood glucose levels and specifically mentions comparing long-acting insulins such as glargine (Lantus) with short-acting insulins such as aspart (Novolog). She is concerned about the costs of these treatments. She is also interested in whether "cookie-cutter" treatments derived from clinical trials are optimum for all subgroups, specifically African-Americans.

Staff-Generated PICO
Population(s): adults with type 2 diabetes mellitus, including subgroups such as African-Americans
Intervention(s): long-acting insulins
Comparator(s): short-acting insulins
Outcome(s): control of blood glucose levels, % hemoglobin A1c, hypoglycemic events, and costs

Key Questions from Nominator:

1. For people of color with type 2 diabetes, what is the most effective way to control blood glucose levels, comparing time released medication such as Lantus with short-term effect medication like Novolog?
2. Does one [time released vs. short-term] work better in people of color vs. the general population diagnosed with type 2 diabetes?
3. Could it also be the biological makeup of people of different ethnic backgrounds, as well as lifestyle and culture, which inhibits the use of certain standardized progressions of treatment for the disease?

Considerations

- The topic meets EHC Program appropriateness and importance criteria. (For more information, see http://effectivehealthcare.ahrq.gov/index.cfm/submit-a-suggestion-for-research/how-are-research-topics-chosen/.)

- The topic was found to be addressed by a 2009 review titled *Optimal insulin regimens in type 2 diabetes mellitus: systematic review and meta-analyses.* This meta-analysis includes seven randomized controlled trails that are head-to-head comparisons of basal insulins versus short-acting insulins. These studies included conventional insulin neutral protamine Hagedorn (NPH) and regular insulin, as well as long-acting and short-acting analogs.

- Also of relevance to this topic is a 2008 AHRQ review titled *Comparative Effectiveness, Safety, and Indications of Insulin Analogues in Premixed Formulations for Adults With Type 2 Diabetes.* Key questions from this report include:
  1. In adults (age ≥ 18 years) with type 2 diabetes, what is the effectiveness of premixed insulin analogues (insulin aspart 70/30, insulin lispro 75/25, insulin lispro 50/50) in achieving optimal glycemic control, as compared to insulin regimens including, but not necessarily limited to, the following preparations?
     a. Premixed human insulin preparations (NPH/regular 70/30, NPH/regular 50/50).
     b. Long-acting insulin analogues (insulin detemir, insulin glargine) administered alone.
     c. Intermediate-acting human insulin (NPH insulin) administered alone.
     d. Short-acting human insulin (regular insulin) administered prandially.
     e. Rapid-acting insulin analogues (insulin aspart, insulin glulisine, insulin lispro) administered separately (prandially) with a long-acting insulin analogue (insulin detemir, insulin glargine).
  2. For adults with type 2 diabetes, do premixed insulin analogues differ from other commonly used insulin preparations with regard to safety, adverse effects, or adherence? The adverse effects of interest include, but are not limited to, hypoglycemia (nocturnal and daytime), weight gain, and interactions with other medications.
  3. Does the effectiveness or safety of the new premixed insulin analogue regimens vary across the following subpopulations of patients with type 2 diabetes?
     a. The elderly (≥ 65 years), very elderly (≥ 85 years).
     b. Other demographic groups (ethnic or racial groups, genders).
     c. Individuals with comorbid medical conditions.
     d. Individuals with limited life expectancy.
     e. Individuals with disabilities.
  4. What are the effectiveness and safety of the new premixed insulin analogue regimens in individuals on oral antidiabetic agents and individuals with different blood glucose patterns (such as fasting hyperglycemia or postprandial hyperglycemia) or types of control (such as tight control, usual control, good fasting, or postprandial control)?

- A review of differential effects (or lack thereof) of these pharmaceuticals in different ethnic or racial groups is not feasible due to the limited data available for a review at this time; however, AHRQ's DEcIDE (Developing Evidence to Inform Decisions about Effectiveness) Network is currently conducting research on utilization and outcomes of different diabetes medications in various racial and ethnic populations.