



Indiana Medicaid Therapeutics Committee **Therapeutic Class Review Summary**

Therapeutic Class:

Injectable Insulins

Overview:

Insulin is a pancreatic hormone that regulates carbohydrate metabolism in the body. It also increases lipogenesis and protein synthesis, while inhibiting lipolysis. Insulin can be provided exogenously as temporary replacement when the endogenous insulin supply is inadequate as in diabetes mellitus. The first insulin products were FDA approved in 1939, with biosynthetic insulin approved in 1982. Bovine insulin products were removed from the U.S. market in 1999 due to concern over the transmission of bovine spongiform encephalopathy (“mad-cow disease”). In addition, the use of porcine formulations has diminished greatly due to increased use of the recombinant human insulin preparations, and, as a result, manufacturers of porcine formulations in the US (Iletin[®] brand) have discontinued their production.

Insulin preparations are classified as rapid-, short-, intermediate-, and long-acting based on their onsets of activity and durations of action. Rapid-acting insulins, insulin lispro (Humalog[®]), insulin aspart (NovoLog[®]) and insulin glulisine (Apidra[®]) should be administered at mealtime due to their immediate onsets of action (5-20 minutes). Regular insulin (Humulin[®] R, Novolin[®] R) is classified as short-acting. These agents have an onset of action of 30-60 minutes and should be administered 30 minutes prior to meals. Intermediate-acting insulins include NPH insulin (Humulin[®] N, Novolin[®] N) and lente insulin (Humulin[®] L, Novolin[®] L). These agents are usually administered twice daily due to their longer durations of action. Insulin lispro protamine and insulin aspart protamine are also intermediate-acting, but are only available as premixed insulins (Humalog[®] Mix 75/25[™], NovoLog[®] Mix 70/30) in the U.S. Ultralente insulin (Humulin[®] U), insulin glargine (Lantus[®]) and insulin detemir (Levemir[®]) are long-acting insulins with durations of action ranging from 14-28 hours. Due to limited use, however, manufacturers in the US have discontinued lente insulin and ultralente insulin production.

Generic Name	Brand Name	Manufacturer
Insulin	Recombinant- Humulin [®] R, Humulin [®] N, Humulin [®] L, Humulin [®] U, Humulin [®] 50/50, Humulin [®] 70/30, Humalog [®] , Humalog [®] Mix 50/50 [™] , Humalog [®] Mix 75/25 [™] Pork- Iletin [®] II NPH, Iletin [®] II Regular	Eli Lilly
Insulin	Recombinant- Novolin [®] R, Novolin [®] N, Novolin [®] L, Novolin [®] 70/30, NovoLog [®] , NovoLog [®] Mix 70/30	Novo Nordisk
Insulin glargine	Lantus [®]	Aventis
Insulin detemir	Levemir [®]	Novo Nordisk
Insulin glulisine	Apidra [®]	Aventis

Summary:

Several types of insulin products are available in four basic forms, each with a different time of onset and duration of action. These forms include rapid-acting insulin, short-acting insulin, intermediate-acting insulin, and long-acting insulin. The different types of insulin can be used concomitantly to form an individual regimen, or premixed combinations may be used. The most appropriate treatment should be based on the individual. Selection for the preferred drug list should depend upon efficacy, safety, availability, and cost.