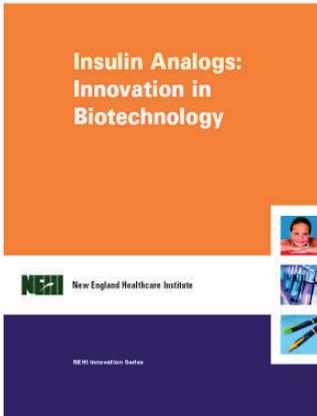


# Insulin Analogs

## Innovation in Biotechnology



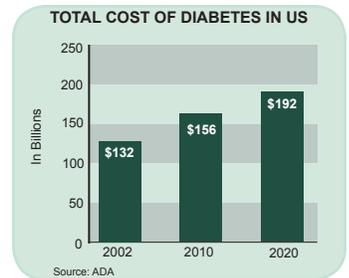
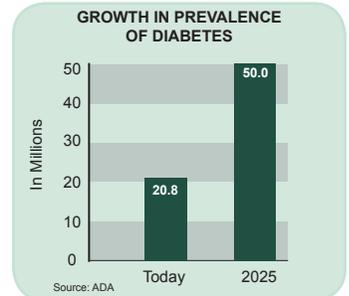
### Study in Brief:

Insulin analog drugs are cost-effective, improve outcomes, and have the added benefit of being more convenient for diabetes patients. This report examines the value of insulin analog therapy as an innovation in biotechnology.

To read the full report, visit [www.nehi.net](http://www.nehi.net).

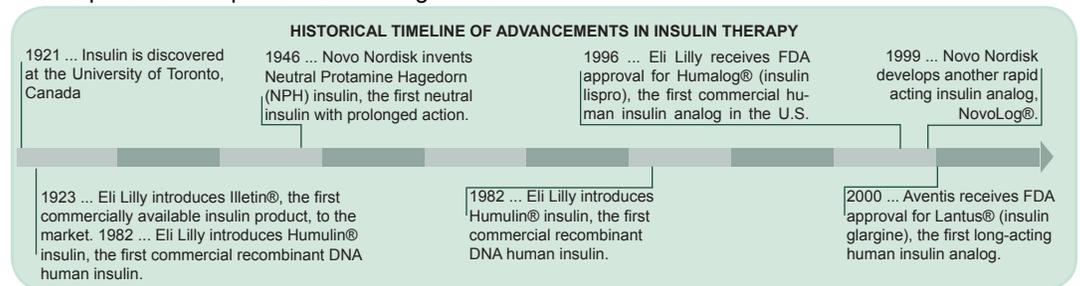
### Problem: The Growing Burden of Diabetes

**Diabetes is a complex and difficult disease to manage.** The societal burden of diabetes is well known - over 20.8 million Americans are living with the disease and it is the nation's sixth leading cause of death. Despite its high public profile, the CDC expects this number to more than double by 2050, with over 1.5 million new cases diagnosed each year, all at a cost of more than 12 percent of the U.S. health care budget. Because diabetes requires a delicate balance of food intake, activity level, and often, medication, it is an extremely difficult disease to manage. Insulin plays a central role in regulating the body's blood glucose level. Blood glucose levels that are too high or too low can cause serious complications for patients, such as blindness, kidney failure, loss of consciousness, or even seizures. For all patients, maintaining good blood glucose control is essential to improving long-term outcomes.



### Solution: Biotechnology Innovation in Diabetes Care

**Beginning with the first recombinant human insulin in 1982, biotechnology has played a critical role in improving the treatment and management of diabetes.** In recent years, one of the most significant areas of biotechnology innovation in diabetes has been the development of insulin analogs. By decreasing the frequency of low blood glucose and reducing A1C levels, insulin analogs enable patients to improve their blood glucose control.



For patients whose bodies produce little or no insulin – all type 1 and a portion of type 2 patients – the goal of insulin replacement therapy is to mimic the natural regulation of blood glucose and deliver the right amount of insulin at the right time to keep blood glucose within a normal range. Two types of biotechnology insulin analogs have recently been developed, both of which better mimic the functions of the pancreas: 1) rapid-acting insulin and 2) long-acting insulin. Rapid-acting analogs act faster and leave the system more quickly than regular insulin, making it possible to eat immediately after injection and with a lower likelihood of excess insulin after a meal. Long-acting analogs provide a more consistent dosage over a longer period of time than regular insulin. Taken together, rapid-acting and long-acting insulin analogs have two benefits: improved blood glucose control and patient convenience. Insulin analogs represent a significant advancement in insulin therapy.

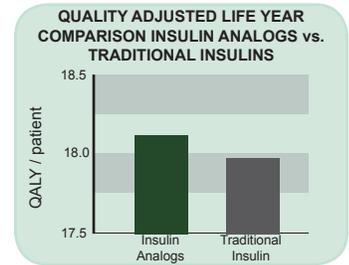
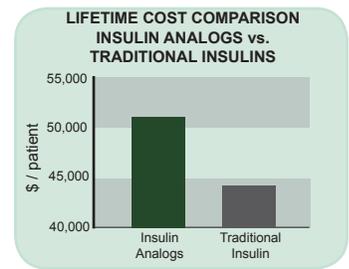
## About NEHI

The New England Healthcare Institute (NEHI) is an independent, not-for-profit organization dedicated to transforming health care for the benefit of patients and their families. In partnership with members from all across the health care system, NEHI conducts evidence-based research and stimulates policy change to improve the quality and the value of health care. Together with an unparalleled network of committed health care leaders, NEHI brings an objective, collaborative and fresh voice to health policy. Together, we are transforming health care. Find out more at [www.nehi.net](http://www.nehi.net).

*Working Together to Transform Health Care™*

## Insight: Insulin Analogs Are a Valuable Innovation

NEHI's analysis of the combination use of rapid- and long-acting insulin analogs in Type 1 patients demonstrates that insulin analogs are cost-effective drugs for managing diabetes. While insulin analogs cost more than traditional insulins, they are more effective for patients. By reducing the frequency of low blood sugar and by reducing A1C levels, insulin analogs improve patient outcomes. Moreover, insulin analogs provide significant convenience and short-term quality of life benefits to patients. These benefits include easier meal planning, reduction of daily injections and decreased stress/fear over low blood sugar. While there are few studies that quantify these benefits to patients, the wide coverage and use of insulin analogs suggest that these convenience factors carry significant weight with patients and physicians. Not surprisingly, some studies have shown that the use of insulin analogs also leads to improved compliance with treatment regimens.



## Lessons Learned: Convenience to Improved Outcomes

NEHI's analysis demonstrates that insulin analogs are cost-effective. What this analysis is unable to capture, however, is the full value of patient convenience that insulin analogs provide. While evidence in practice suggests that convenience for patients leads to improved compliance with treatment regimens and hence improved patient outcomes, researchers have not yet developed adequate tools to measure and quantify the value of these connections. As newer treatments and therapies are developed for diabetes and other diseases that make it easier for patients to manage their conditions, it is vital that we develop the tools necessary to value these benefits, understand if there is a link to improving outcomes and, if so, value them along with more direct improvements in health outcomes and quality of life.

**Manufacturers and payers should work with the research community to develop the studies, models and tools required to understand the connections among convenience, compliance and improved outcomes.**

*“It is important to examine the value of an innovation, not just its cost. Insulin analogs are an example of a cost-effective biotechnology innovation that improves patient outcomes and quality of life.”*

Wendy Everett, ScD, President  
New England Healthcare Institute

