Guide for Storage of Insulin

Updated February 16, 2007

Insulin Storage:

Insulin comes from drug manufacturers in three basic packages; vials, pens, and cartridges. In addition to these prepackaged forms of insulins; pharmacists, physicians, and patients may mix insulin themselves in vials or syringes and/or pre-draw insulin for later use by the patient.

General insulin storage requirements are as follows:

1. Never freeze. (Frozen insulin should be thrown away.)

2. Never use insulin beyond the expiration date stamped on the vial, pen, or cartridge that is supplied from the drug manufacturer.

3. Never expose insulin to direct heat or light.

4. Inspect insulin prior to each use. Any insulin that has clumps or solid white particles should not be used. Insulin that is supposed to be clear should not have any cloudy appearance.

5. Check storage guidelines specific to the insulin formulation. This is usually in the product package insert.

6. Unopened, not-in-use insulin should be stored in a refrigerator at a temperature of 36-46º F.

7. Opened, in-use insulin should be stored at room temperature below 86º F.

8. If receiving insulin through the mail, always confirm that the insulin is going to be stored under proper requirements.

9. When storing pre-filled insulin syringes, store them with the needle pointing up.

Mixing insulin in vials or in pre-drawn syringes is an acceptable approach to customize insulin treatment and minimize injections. It is recommended that the same technique or procedure to mix and store these customized preparations be utilized. Some insulins, like regular mixed with lente, may react with each other for up to 24 hours. During this 24-hour period the insulin mixture when injected may react differently based on the amount of time they have had to react with each other. Therefore, it is recommended that all mixtures stored for 24 hours before using, or that they be used immediately.

The following tables address specific expiration or beyond-use dating that applies to insulin products that have been opened, mixed, or pre-drawn.

Maximum Storage Conditions for Insulin Vials

	Refrigerated 36-46ºF		Room Temperature 59-86ºF
Product Name	**Opened**	**Unopened**	**Opened/Unopened**
Humulin R	28 days	Until Expiration Date Stamp	28 days
Humulin N	28 days	Until Expiration Date Stamp	28 days
Humulin L	28 days	Until Expiration Date Stamp	28 days
Humulin U	28 days	Until Expiration Date Stamp	28 days
Humulin 70/30	28 days	Until Expiration Date Stamp	28 days
Humalog	28 days	Until Expiration Date Stamp	28 days
Humalog 75/25	28 days	Until Expiration Date Stamp	28 days
Humulin 50/50	28 days	Until Expiration Date Stamp	28 days
Novolin R	30 days	Until Expiration Date Stamp	30 days
Novolin N	30 days	Until Expiration Date Stamp	30 days
Novolin L	30 days	Until Expiration Date Stamp	30 days
Novolin 70/30	30 days	Until Expiration Date Stamp	30 days
Novolog	28 days	Until Expiration Date Stamp	28 days
Lantus	28 days	Until Expiration Date Stamp	28 days

Maximum Storage Conditions for Insulin Pens

	Refrigerated 36-46ºF		Room Temperature 59-86ºF
Product Name	**Opened**	**Unopened**	**Opened/Unopened**
Humulin N	Do not Refrigerate	Until Expiration Date Stamp	14 days
Humulin 70/30	Do not Refrigerate	Until Expiration Date Stamp	10 days
Humalog	Do not Refrigerate	Until Expiration Date Stamp	28 days
Humalog 75/25	Do not Refrigerate	Until Expiration Date Stamp	10 days
Novolin R 1.5 ml	Do not Refrigerate	Until Expiration Date Stamp	30 days
Novolin R 3 ml	Do not Refrigerate	Until Expiration Date Stamp	28 days
Novolin N 1.5 ml	Do not Refrigerate	Until Expiration Date Stamp	7 days
Novolin N 3 ml	Do not Refrigerate	Until Expiration Date Stamp	14 days
Novolin 70/30 1.5 ml	Do not Refrigerate	Until Expiration Date Stamp	7 days
Novolin 70/30 3 ml	Do not Refrigerate	Until Expiration Date Stamp	10 days
Novolog 3 ml	Do not Refrigerate	Until Expiration Date Stamp	28 days
Novolin R Prefilled	Do not Refrigerate	Until Expiration Date Stamp	30 days
Novolin N Prefilled	Do not Refrigerate	Until Expiration Date Stamp	7 days
Novolin 70/30 Prefilled	Do not Refrigerate	Until Expiration Date Stamp	7 days

Storage Conditions for Insulin Cartridges

	Refrigerated 36-46ºF		Room Temperature 59-86ºF
Lilly Product Name	**Opened**	**Unopened**	**Opened/Unopened**
Humalog 1.5 ml	28 days	Until Expiration Date Stamp	28 days
Humalog 3 ml	28 days	Until Expiration Date Stamp	28 days
Novolin R 1.5 ml	Do not Refrigerate	Until Expiration Date Stamp	30 days
Novolin R 3 ml	Do not Refrigerate	Until Expiration Date Stamp	28 days
Novolin N 1.5 ml	Do not Refrigerate	Until Expiration Date Stamp	7 days
Novolin N 3 ml	Do not Refrigerate	Until Expiration Date Stamp	14 days
Novolin 70/30 1.5 ml	Do not Refrigerate	Until Expiration Date Stamp	7 days
Novolin 70/30 3 ml	Do not Refrigerate	Until Expiration Date Stamp	14 days
Novolog 3 ml	Do not Refrigerate	Until Expiration Date Stamp	28 days

Maximum Storage Conditions for Syringes Predrawn or Vials Premixed*

*(post drug manufacturer by pharmacist, patient and/or other health care professional)

Product	Refrigerated	Room Temperature	Source/Comments
All Insulin Types (single formulation) Syringe	30 days	No Information	American Diabetes Association
All Insulin Types (single formulation) Syringe or Vial	21 days	No Information	Eli Lilly U.S.M.D. Medical Information Services
All Insulin Types (single formulation) Syringe	30 days	No Information	Novo Nordisk
Novolin R &N	30 days	No Information	
Novolin R & L	30 days	No Information	Standardize intervals of drawing up and injection
Novolog and Novolin N	Use Immediately	No information	Draw up Novolog first
Humulin R & N	30 days		
Humulin R & L or U	21 days		Standardize time interval
Humalog & N,L or U	Use immediately		Draw up Humalog First
Lantus	Manufacturer recommends immediate use. Study information provided by manufacturer suggest two days ok.	Manufacturer recommends immediate use. Study information provided by manufacturer suggest two days ok.	NEVER MIX

Insulin Characteristics

Brand	Action	Onset	Peak	Duration	Compatibility	Appearance	General Comments
Apidra	Rapid	20 min	30-60 min	3-5 hrs	NPH	Clear	Give 15 min before or within 20 minutes after meals.
Humalog	Rapid	15-30 min	30-90 min	3-5 hrs	NPH Ultralente	Clear	Give 15 min before or immediately after meals
Humalog 75/25 mix	Mixed Rapid/Intermediate	15-30 min	1 hr-6.5 hrs	Up to 24 hrs	None	Cloudy	Give within 15 minutes of meals
Humulin L	Intermediate	1-4 hrs	4-14 hrs	12-24 hrs	Ultralente	Cloudy	30-60 minutes before meal or at bed time
Humulin N	Intermediate	1-4 hrs	4-14 hrs	10-24 hrs	Regular, Humalog, Novolog, Apidra	Cloudy	
Humulin R	Short	0.5-1 hr	2.5-5 hrs	8-12 hrs	NPH	Clear	30-60 minutes before a meal.
Humulin U	Long	4-6 hrs	8-20 hrs	18-36 hrs	Humulin L, Humalog	Cloudy	30-60 minutes before a meal or at bedtime
Humulin 70/30	Mixed	0.5-1 hr	1.5-16 hrs	10-24 hrs	None	Cloudy	30 minutes before a meal

Brand	Action	Onset	Peak	Duration	Compatibility	Appearance	General Comments
Humulin 50/50	Mixed	0.5-1 hr	2.5-5 hrs	10-24 hrs	None	Cloudy	30 minutes before a meal
Lantus	Long	1.5 hrs	Constant	24 hrs	None	Clear	
Levemir	Long	?	6-8 hrs	12-24 hrs	None	Clear	
Novolin N	Intermediate	1-4 hrs	4-14 hrs	10-24 hrs	Regular, Humalog, Novolog, Apidra	Cloudy	
Novolin R	Short	0.5-1 hr	2.5-5 hrs	8-12 hrs	NPH	Clear	30-60 minutes before a meal.
Novolin 70/30	Mixed	0.5-1 hr	1.5-16 hrs	10-24 hrs	None	Cloudy	30 minutes before a meal
Novolog	Rapid	15 min	1-2 hrs	3-5 hrs	NPH	Clear	5-10 minutes before a meal
Novolog 70/30	Mixed		1-4 hrs	15-24 hrs	None	Clear	Within 15 minutes of meals