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School of Medicine  
& Health Sciences



Courtesy Univ Texas San Antonio

# Diabetes Medications: Non-Insulin Therapies

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# Diabetes Medications

- Many new medications on the market in the last 10 years
- Three main categories of medication
  - Oral agents (pills)- many different kinds old and new
  - Insulin- newer, more modern insulins
  - Newer, non-insulin injectable medications
- Choices allow individualization of treatment plan
- Different medications, different indications, different situations

# Goals of Glucose Management

Targets for glycemic (blood sugar) control

	ADA	AACE
A1c (%)	<7*	≤6.5
Fasting (preprandial) plasma glucose	70-130 mg/dL	<110 mg/dL
Postprandial (after meal) plasma glucose	<180 mg/dL	<140 mg/dL

\*<6 for certain individuals

- American Diabetes Association. *Diabetes Care*. 2009;32(suppl 1)
- Implementation Conference for ACE Outpatient Diabetes Mellitus Consensus Conference Recommendations: Position Statement at <http://www.aace.com/pub/pdf/guidelines/OutpatientImplementationPositionStatement.pdf>. Accessed January 6, 2006.
- AACE Diabetes Guidelines – 2002 Update. *Endocr Pract*. 2002;8(suppl 1):40-82.

# A1C ~ “Average Glucose”

A1C	eAG	
%	mg/dL	mmol/L
6	126	7.0
6.5	140	7.8
7	154	8.6
7.5	169	9.4
8	183	10.1
8.5	197	10.9
9	212	11.8
9.5	226	12.6
10	240	13.4

*Formula:  $28.7 \times A1C - 46.7 = eAG$*

American Diabetes Association

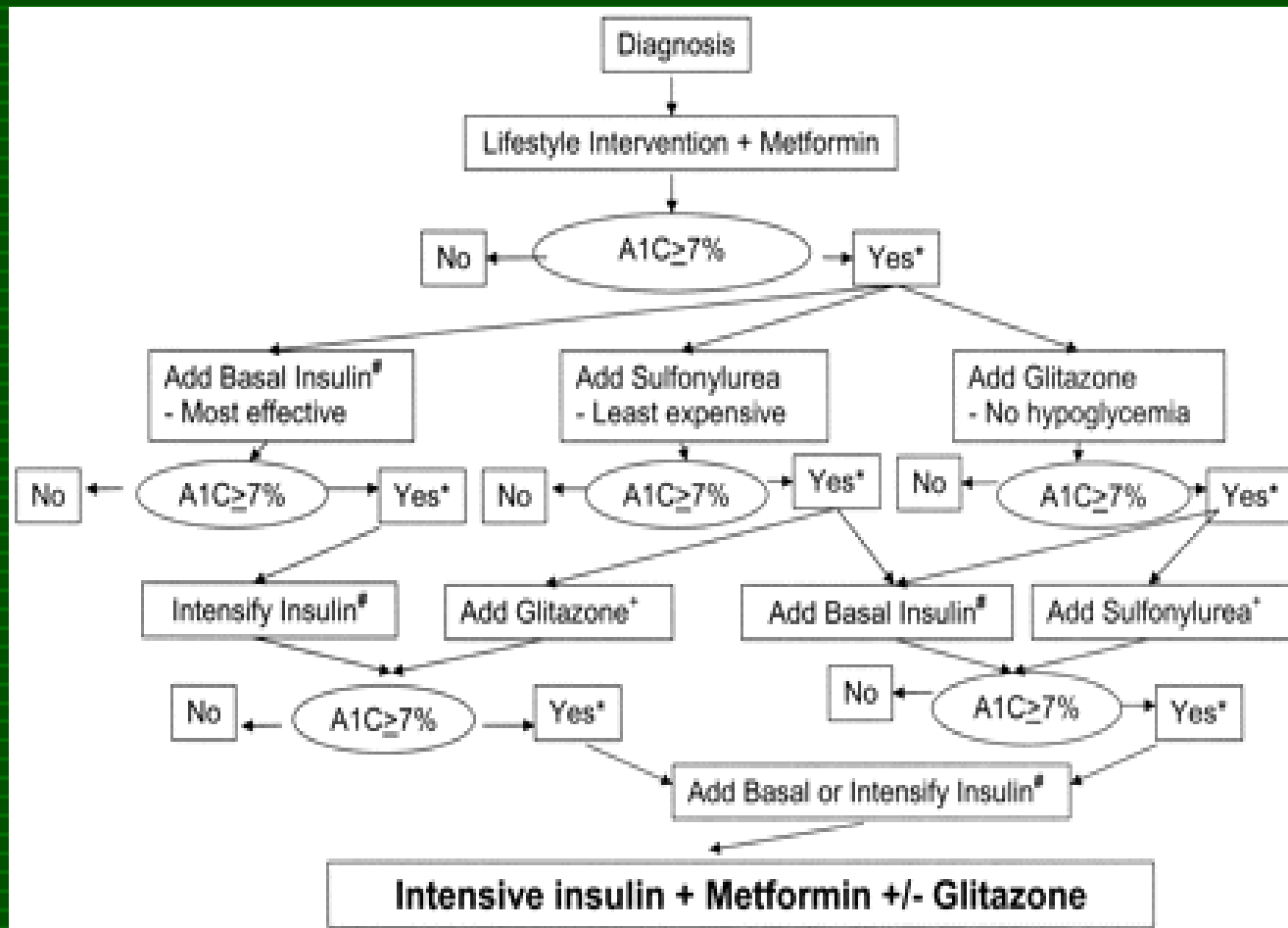
# Why Good Glucose Control?

- Measured by Self-Glucose Blood Monitoring (your meter at home)
- Measured by A1C test (done at the clinic)
- Complications are reduced by:
  - A1C <7.0
  - Achieving self-monitored blood glucose targets

# Diabetes Medications

For Glucose (Blood Sugar) Control

# Treatment Recommendations (Type 2)



Diabetes Care, August, 2006

# Glucose-lowering Potential of Diabetes Therapies\*

<i>Treatment</i>	<i>FPG ↓</i>	<i>HbA1C ↓</i>
Sulfonylureas	50-60 mg/dl	1-2%
Metformin	50-60 mg/dl	1-2%
$\alpha$ -Glucosidase Inhibitors (Precose)	15-30 mg/dl	0.5-1%
Repaglinade (Prandin)	60mg/dl	1.7%
Thiazolidinediones	40-60 mg/dl	1-2%
Gliptins (Januvia)	targets ppd	0.5 - 0.8%

*\*based on package insert data as monotherapy*

# Glucose-lowering Potential of Injection Diabetes Therapies\*

<i>Treatment</i>	<i>FPG ↓</i>	<i>HbA1C ↓</i>
Exenatide (Byetta)	targets ppd	1-2%
Pramlintide (Symlin)	targets ppd	1-2%
Insulin	Limited by hypoglycemia	1.5-3.5%

*\*based on package insert data as monotherapy*

# Sulfonylureas

- Oldest oral medications
- Stimulate pancreas to secrete more insulin
- Effective, inexpensive
- Side effects: possible hypoglycemia (low blood sugar), rash, stomach upset
- Glyburide, Glipizide, Glimiperide

# Metformin

- Makes body use insulin more efficiently, liver makes less glucose
- Effective, inexpensive
- Side effects: stomach upset, worsening of kidney or liver disease

# Thiazolidinediones (TZD's)

- Pioglitazone (Actos)
- Rosiglitazone (Avandia)
- Make body more sensitive to insulin
- Effective, but more expensive
- Heart Disease questions

# Newer Medications

# Exenatide GLP-1 (Byetta)

- Injectable, available in pen
- Slows gastric emptying
- Reduces food intake(?)
- Indicated for use in Type 2 in combination with Metformin, Glyburide, TZD's

# Pramlintide-Synthetic Amylin (Symlin)

- Amylin secreted in the normal pancreas along with insulin to regulate blood glucose levels.
- Slows gastric emptying, controls liver glucose production
- Used along with insulin
- Side effects nausea, vomiting, low blood sugar

# Gliptins

- Sitagliptin (Januvia) only agent currently on the market
- DPP-IV inhibitors
- Action similar to Exenatide
- Oral agents

# Summary

- All oral medications (pills) are indicated for type 2 diabetes
- Amylin is the only non-insulin therapy that is indicated in type 1 diabetes
- Amylin and Exenatide are non-insulin injectable medications that can be used in type 2 diabetes
- Many diabetes medications can be used in combinations