

The Big Myths

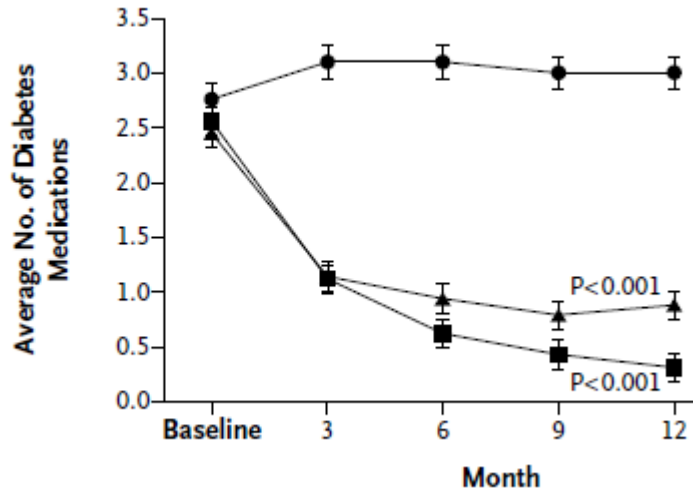
1. Diabetes is a chronic progressive disease
2. Lowering blood sugars is the primary goal of therapy

The Truth

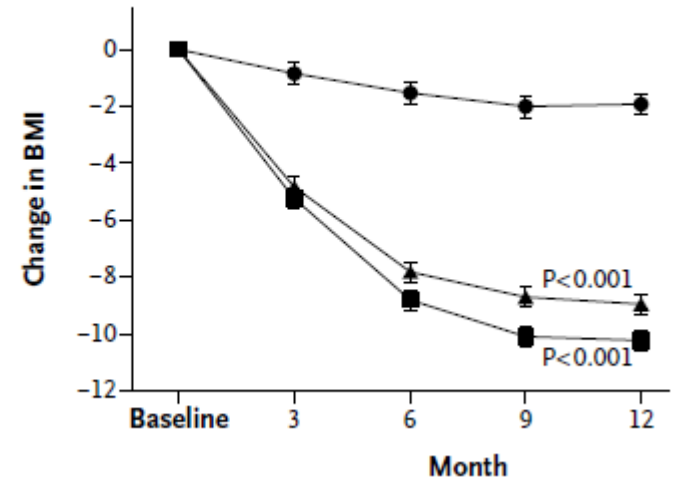
1. Diabetes is a curable dietary disease
2. Diabetes is a disease of high insulin resistance
Treatment is directed to lowering resistance

Surgery cures diabetes

C Average No. of Diabetes Medications



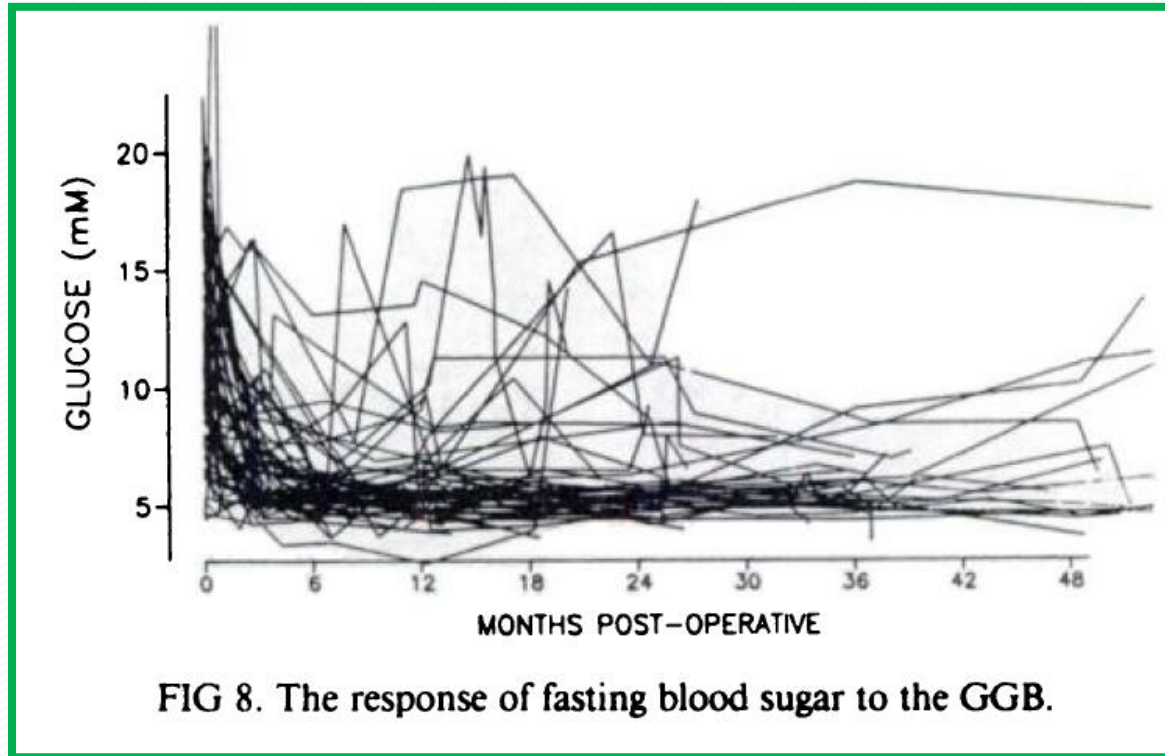
D Change in BMI



● Intensive medical therapy ■ Roux-en-Y gastric bypass ▲ Sleeve gastrectomy

Bariatric Surgery versus Intensive Medical Therapy in Obese Patients with Diabetes
N Engl J Med 2012;366:1567-76 Schauer PR

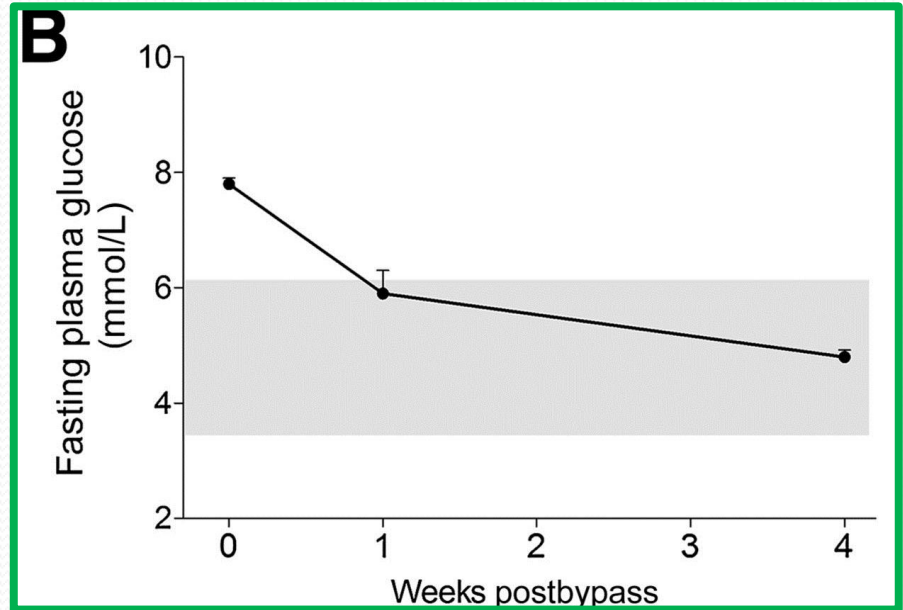
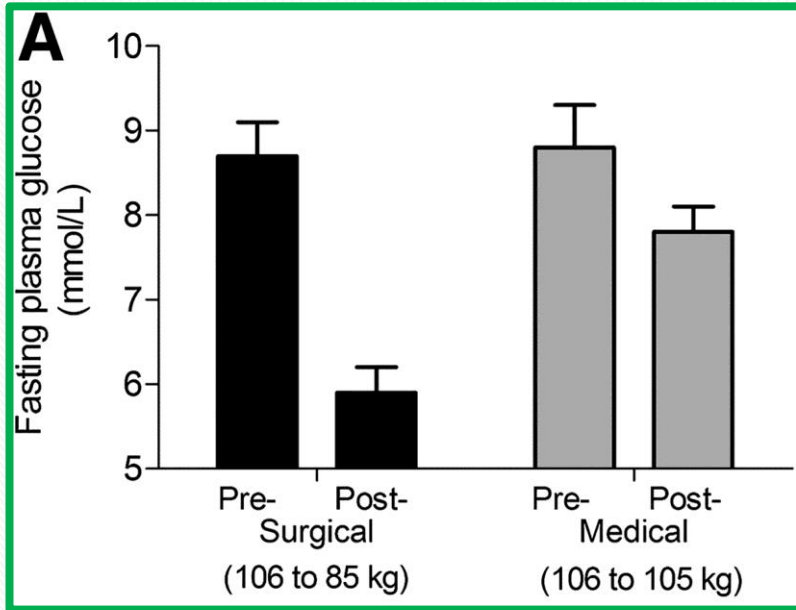
Surgery cures Diabetes



Cure is both rapid and long lived

Surgical treatment of obesity and its effect on diabetes: 10-y follow-up
Am J Clin Nutr 1992;55(Suppl.):582S-585S

Gastric Banding cures Diabetes



A: Fasting plasma glucose and weight change 2 years after randomization either to gastric banding or to intensive medical therapy for weight loss and glucose control.

Adjustable gastric banding and conventional therapy for type 2 diabetes JAMA 2008;299:316-232

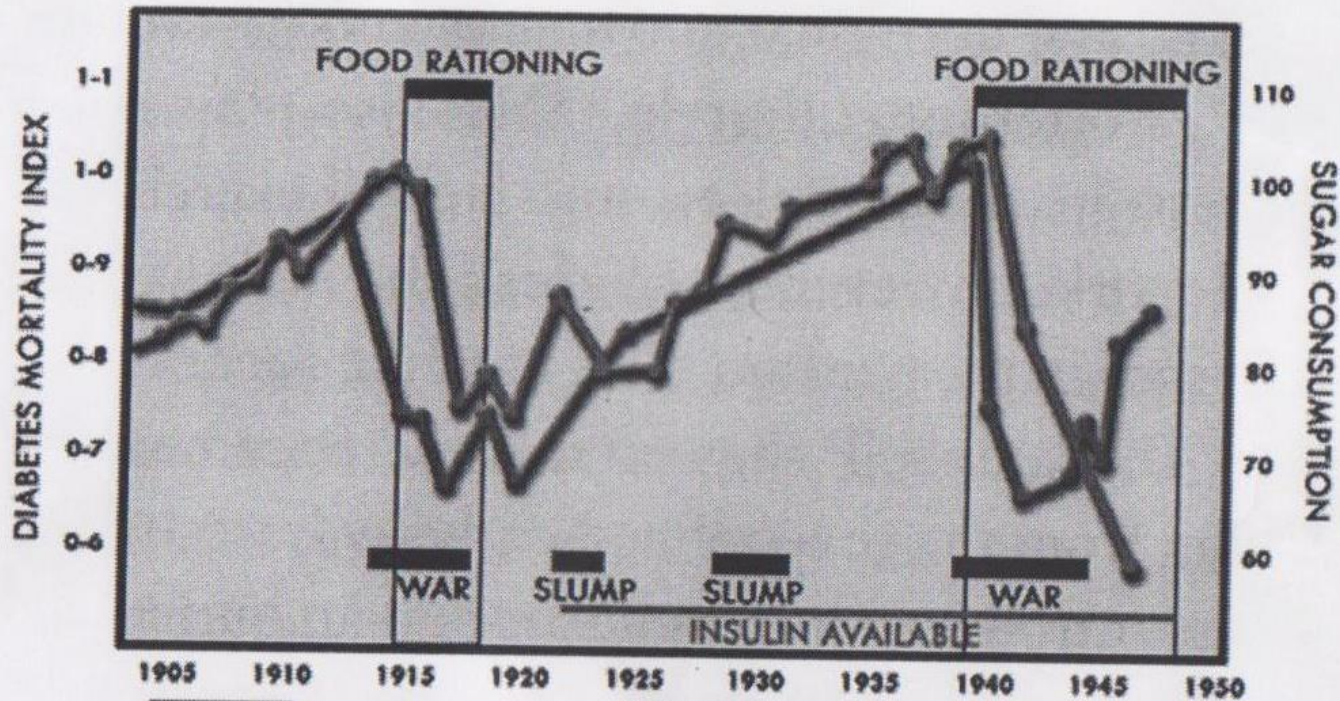
Treatment of Diabetes Mellitus 1916

”That temporary periods of under-nutrition are helpful in the treatment of diabetes will probably be *acknowledged by all* after these two years of experience with fasting” p676

Can Med Assoc J. Aug 1916; 6(8): 673–684.

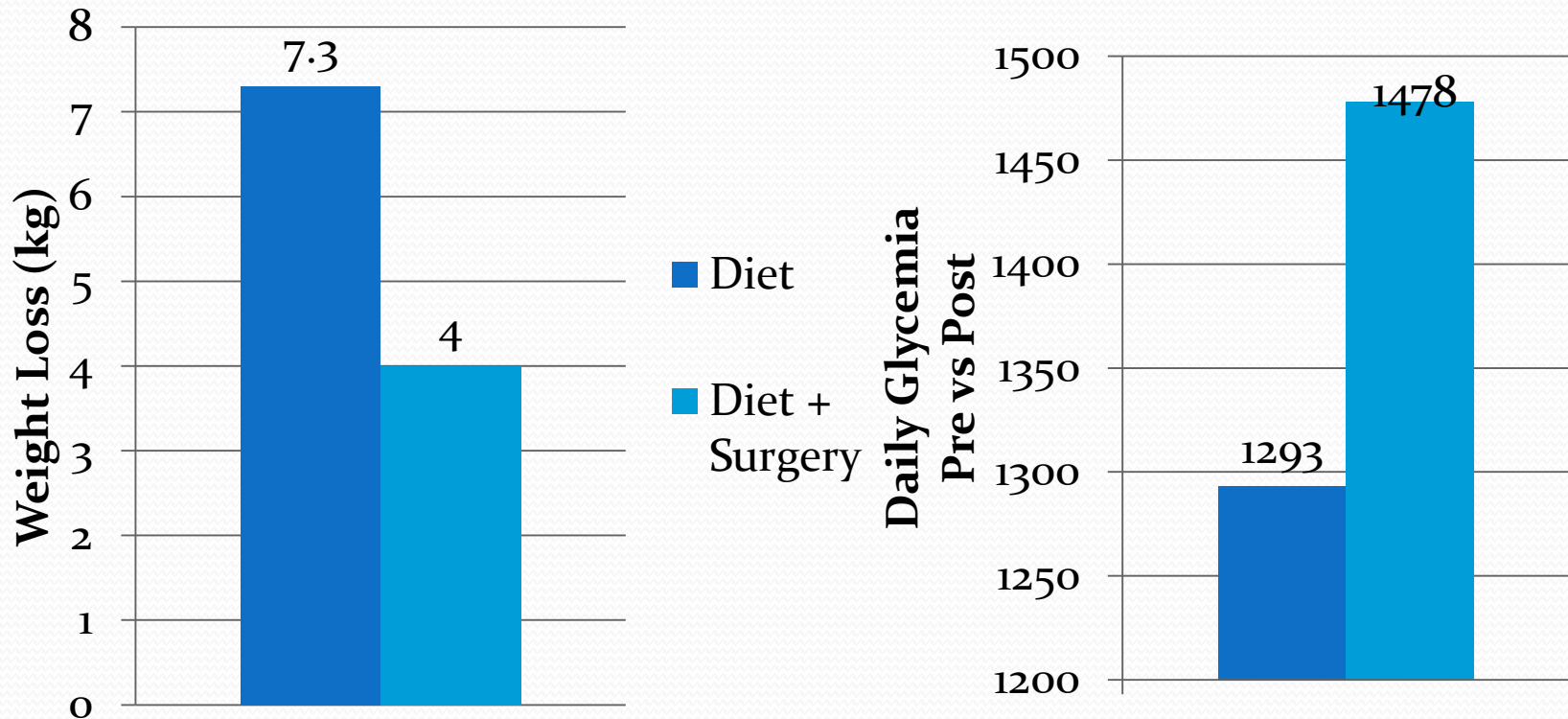
Elliot P Joslin

Food Rationing



■ Sugar Consumption ■ Diabetes Mortality
England and Wales. Diabetic Mortality indices. The figures for 1946 and 1947 supplied by Dr. Percy Stocks. Drawn by Thomas L. Cleave in *The Saccharine Disease*.

Fasting vs. Bariatric Surgery



Rapid Improvement of Diabetes After Gastric Bypass Surgery: Is It the Diet or Surgery?

Diabetes Care. 2013 Mar 25, Lingvay I

Very Low Carb Diets

- 27 year old graduate student in physiology
 - Recent diagnosis of diabetes HgBA_{1c} 10.4%
 - Started on 3 medications
 - Very low carb diet (ketogenic)
 - Weight loss 20 pounds
- HgBA_{1c} 5.5% off all meds
- Diabetes cured

No Cure

Cure

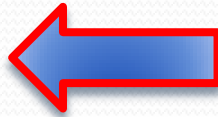
Insulin



Bariatric Surgery



Drugs



Type 2
Diabetes



Fasting

Low Fat
Diets



Very Low Carb
Diets



Current Treatment Protocol
Current Research
Current Goal – normalized blood sugars

Learned Helplessness

- Fact: For most people, type 2 diabetes is a progressive disease. Actually – this is a lie
- eventually oral medications may not be enough to keep blood glucose levels normal. Using insulin to get blood glucose levels to a healthy level is a good thing, not a bad one. WTF?



<http://www.diabetes.org/diabetes-basics/myths>

Big Lie #2

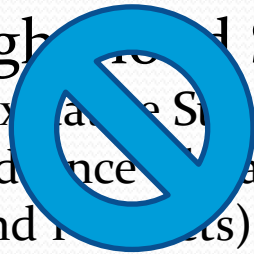
Lowering blood sugars is the goal of treatment

Complications of Diabetes

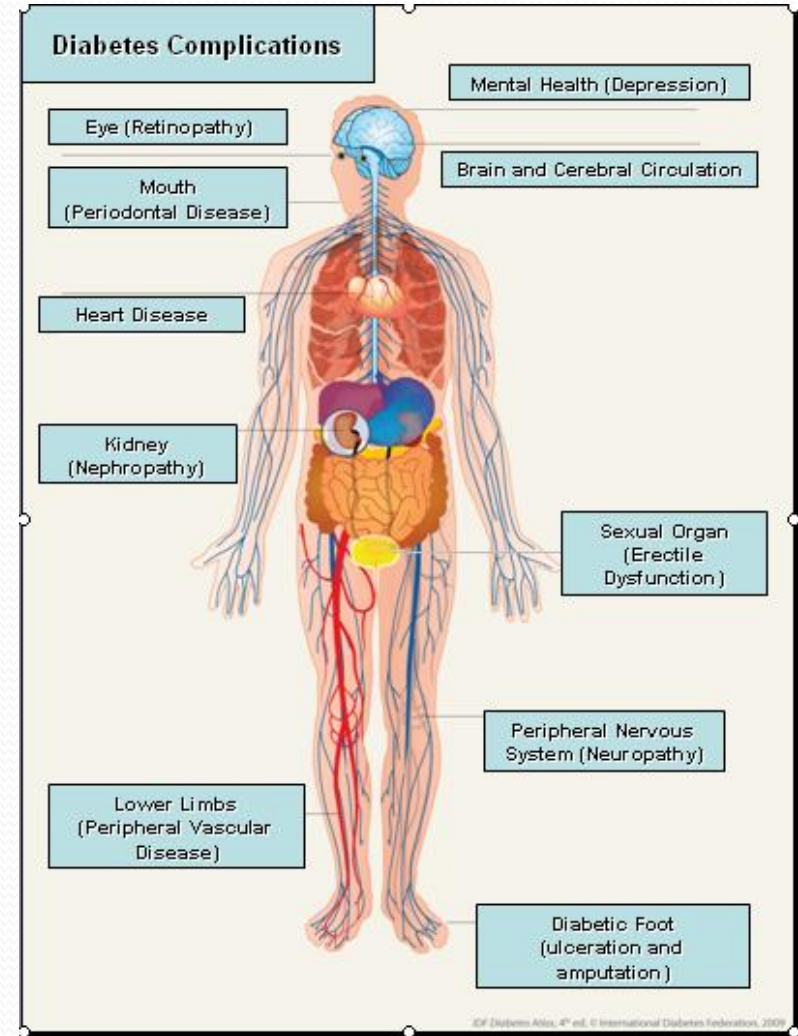
Type 1 and 2 Diabetes



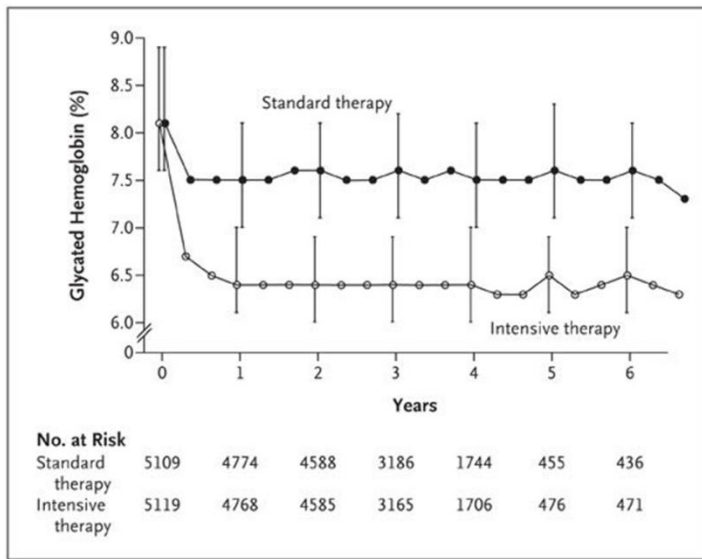
High Blood Sugars
(Oxidative Stress)
(Advanced Glycation
End Products)



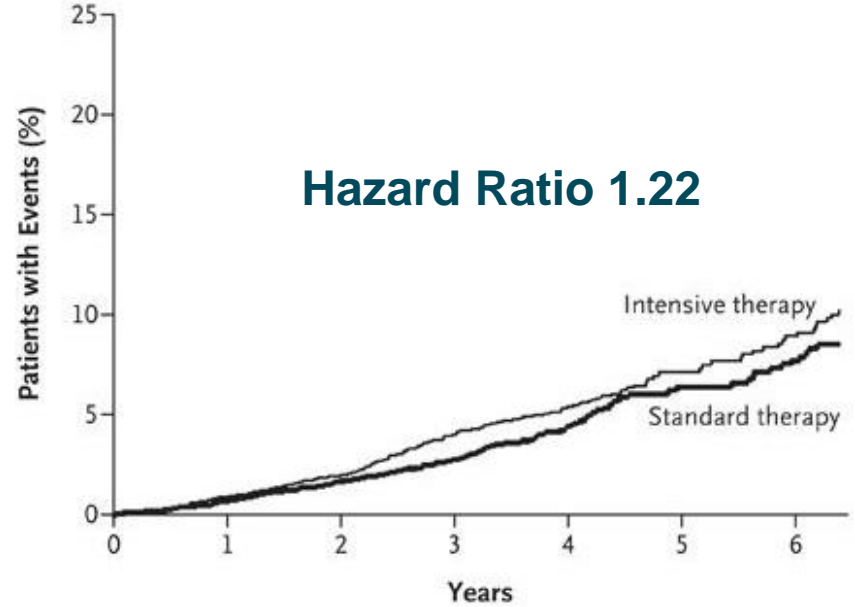
Complications of Diabetes



ACCORD



B Death from Any Cause



No. at Risk

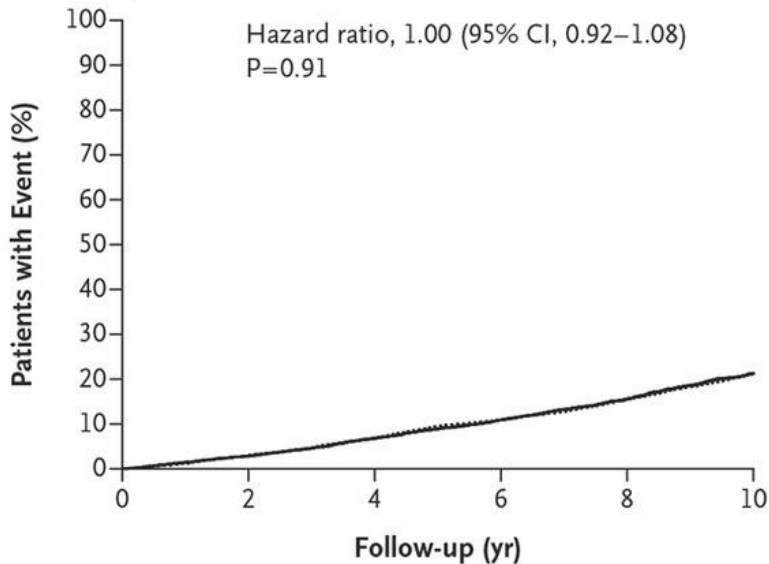
	0	1	2	3	4	5	6
Intensive therapy	5128	4972	4803	3250	1748	523	506
Standard therapy	5123	4971	4700	3180	1642	499	480



ADVANCE-ON

..... Standard — Intensive

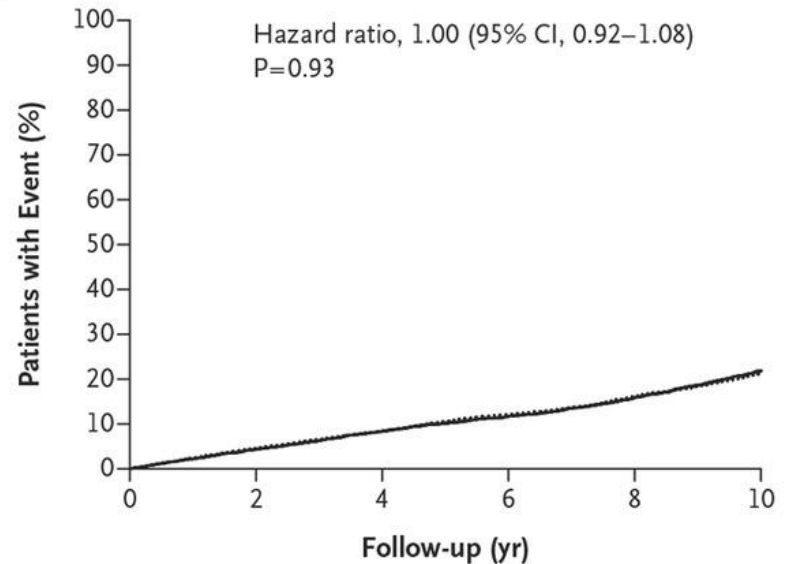
A Death from Any Cause



No. at Risk

Intensive	5571	5414	5197	4125	3772	2822
Standard	5569	5412	5190	4050	3693	2697

B Major Macrovascular Events



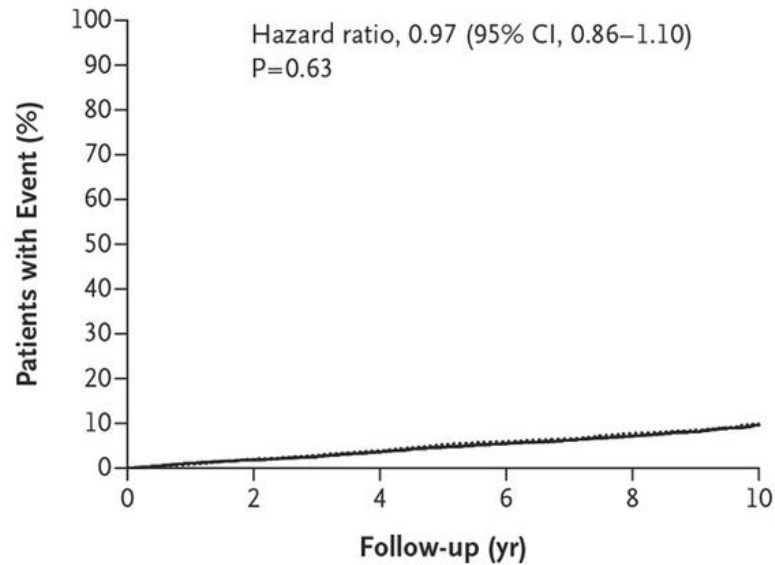
No. at Risk

Intensive	5571	5273	4942	3881	3448	2448
Standard	5569	5253	4940	3774	3359	2363

Follow-up of Blood-Pressure Lowering and Glucose Control in Type 2 Diabetes N Engl J Med Volume 371(15):1392-1406 October 9, 2014

ADVANCE ON

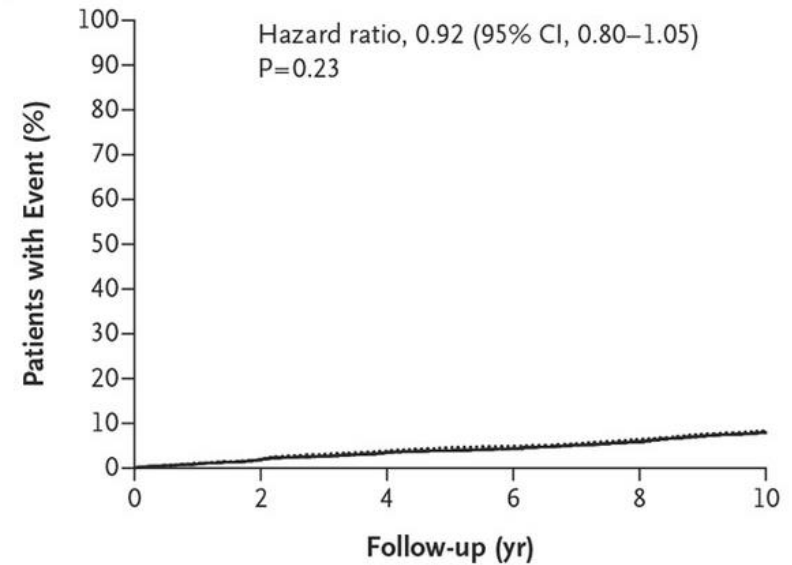
C Death from Cardiovascular Causes



No. at Risk

Intensive	5571	5414	5197	4125	3772	2822
Standard	5569	5412	5190	4050	3693	2697

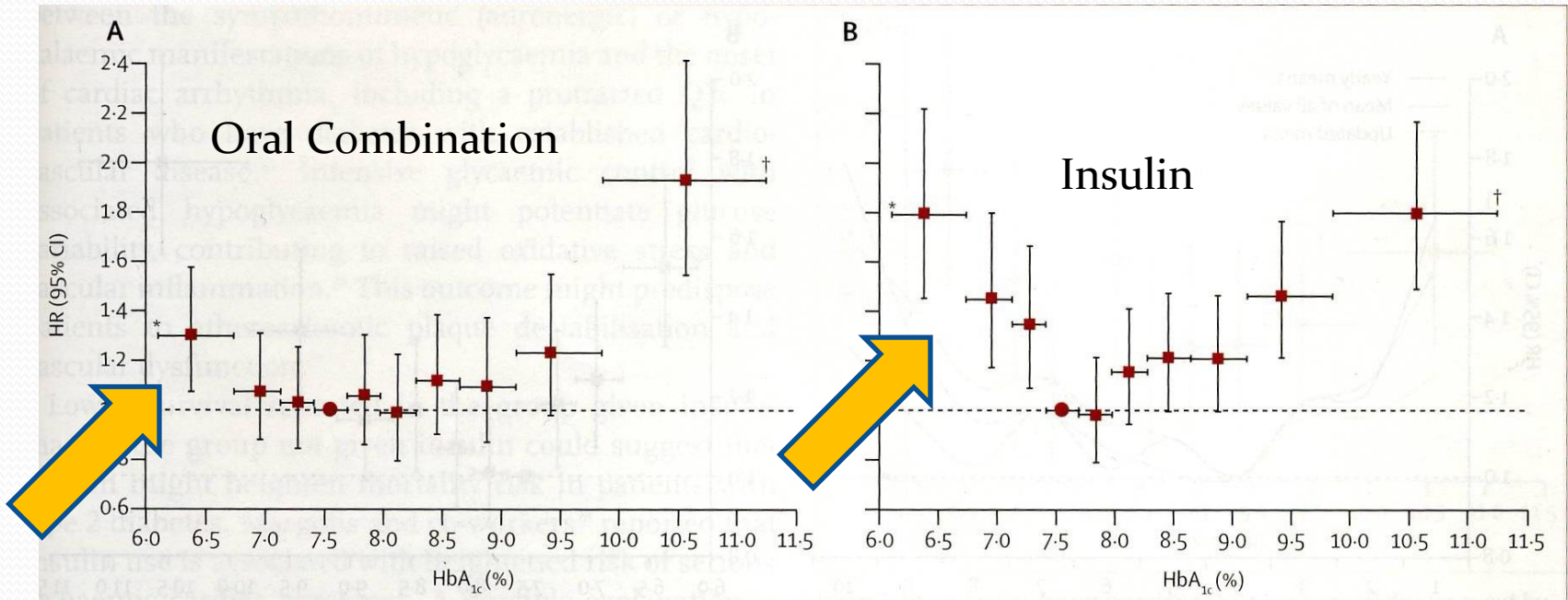
D Major Clinical Microvascular Events



No. at Risk

Intensive	5571	5324	5033	3986	3589	2632
Standard	5569	5324	5015	3863	3478	2499

Low A1C is **NOT** good for you



Adjusted Hazard Ratios by A1c

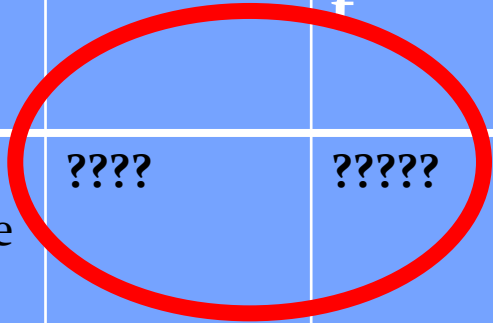
27,965 patients intensified from oral monotherapy to combination therapy

Survival as a function of HbA_{1c} in people with type 2 diabetes: a retrospective cohort study

Lancet 2010; 375:481-89, Currie CJ

Type 2 Diabetes

Disease	Cause	Treatment	Symptom	Symptomatic Treatment
Diabetes Insulin Resistance	????	??????	High Blood Sugars	Insulin OHA
Infection	Bacteria	Antibiotic	Fever	Acetaminophen



**Does not alter
disease process**

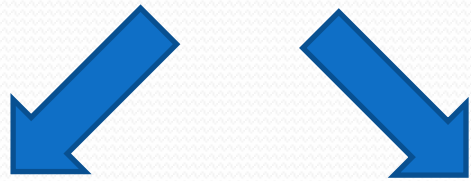
Diabetes is getting worse!



Disease – Insulin Resistance
Current target – Blood Sugar

What about hyperinsulinemia?

Type 2 Diabetes



Increased Insulin

High Blood Sugars



Complications of Diabetes

Diabetes is disease of *insulin resistance*

Current treatment is directed at *high blood sugars*

Insulin and atherosclerosis

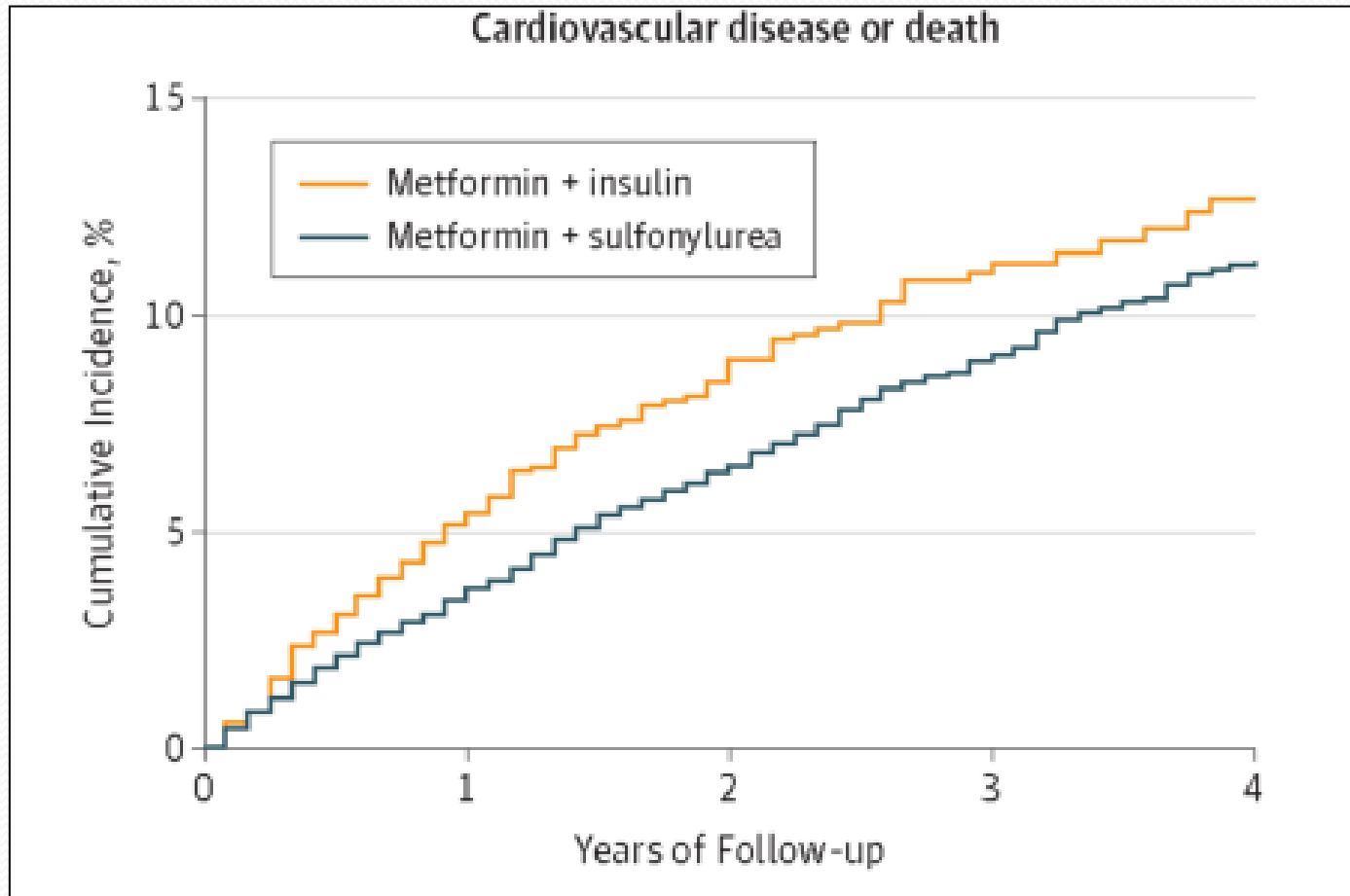
Insulin:

- enhances VLDL synthesis and may reduce HDL-cholesterol levels
- increases cholesterol transport into arteriolar smooth muscle cells
- is a growth factor that:
 - augments collagen synthesis
 - stimulates proliferation of arteriolar smooth muscle cells
- promotes atherogenesis in animal models (rabbit, chicken, dog)
- causes insulin resistance



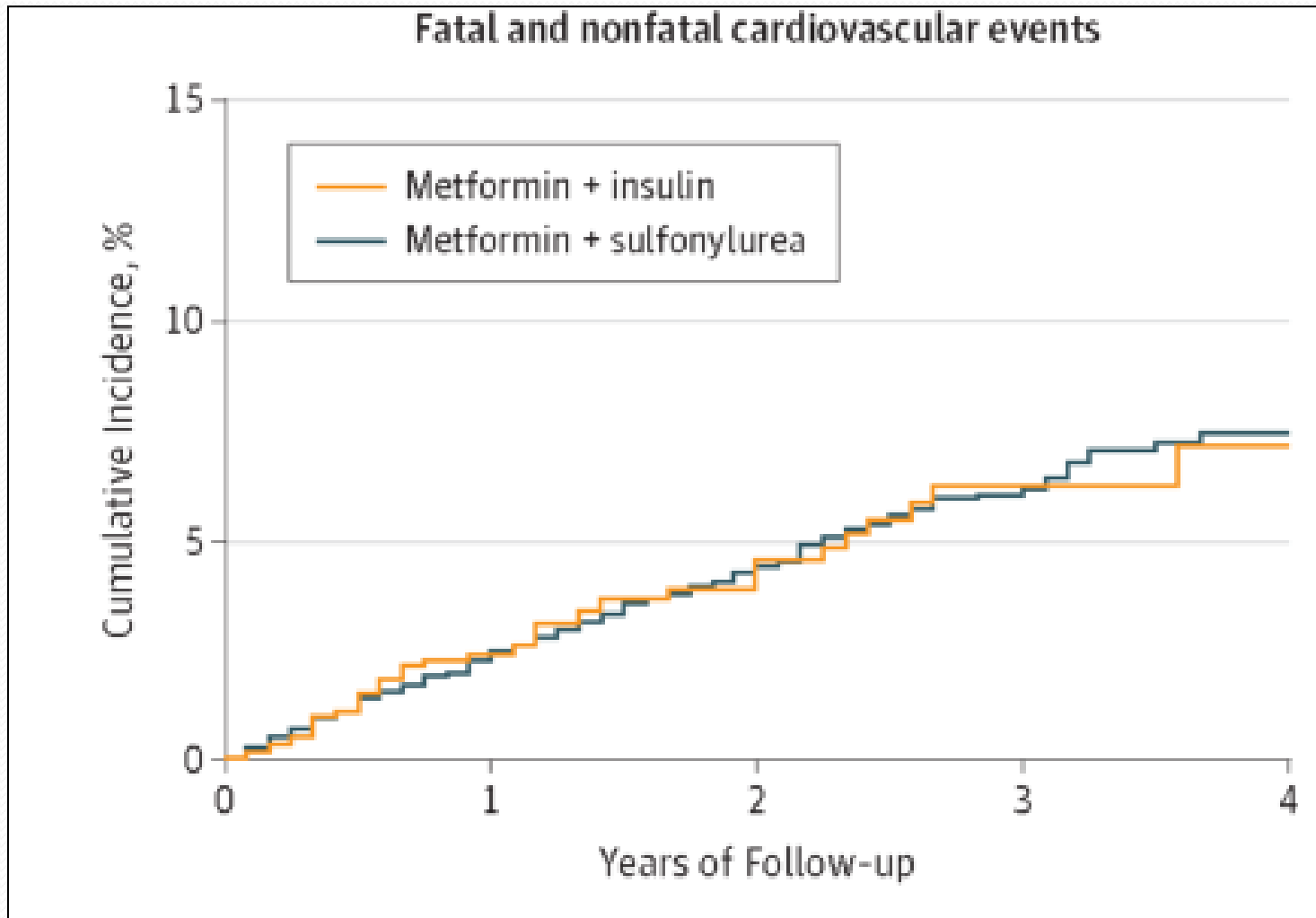
**Insulin is the *Problem*,
not the solution**

Adding insulin kills you



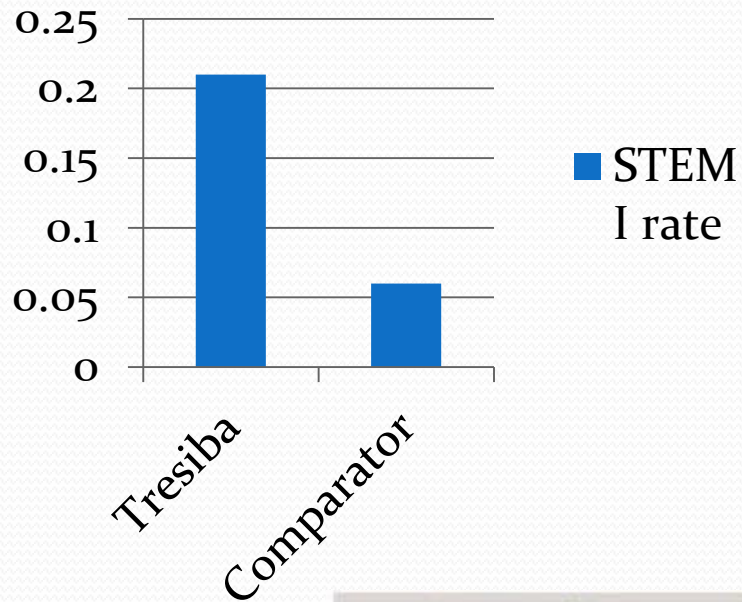
Association Between Intensification of Metformin Treatment with Insulin vs Sulfonylureas and Cardiovascular Events and All-Cause Mortality Among Patients with Diabetes *JAMA* 2014; 311(22): 2288-2296

Insulin Kills

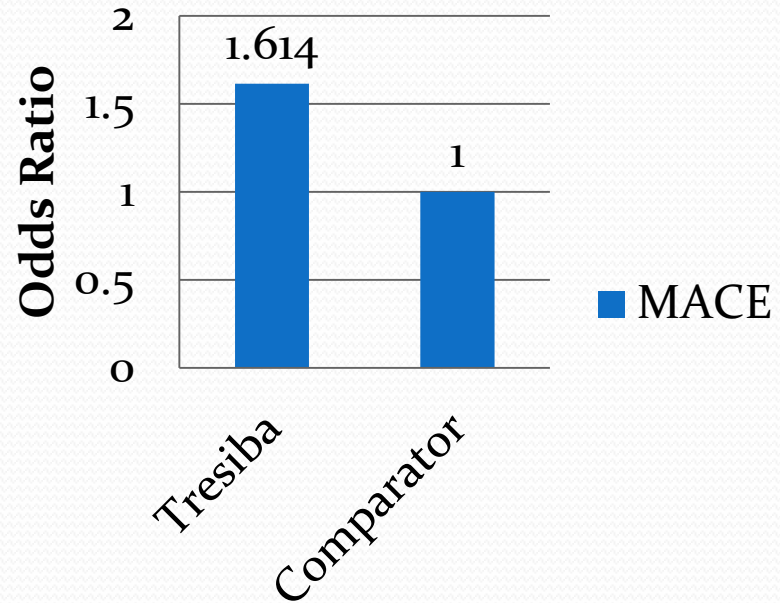


Long acting insulin increases risk

350% increase rate of
MI



MACE



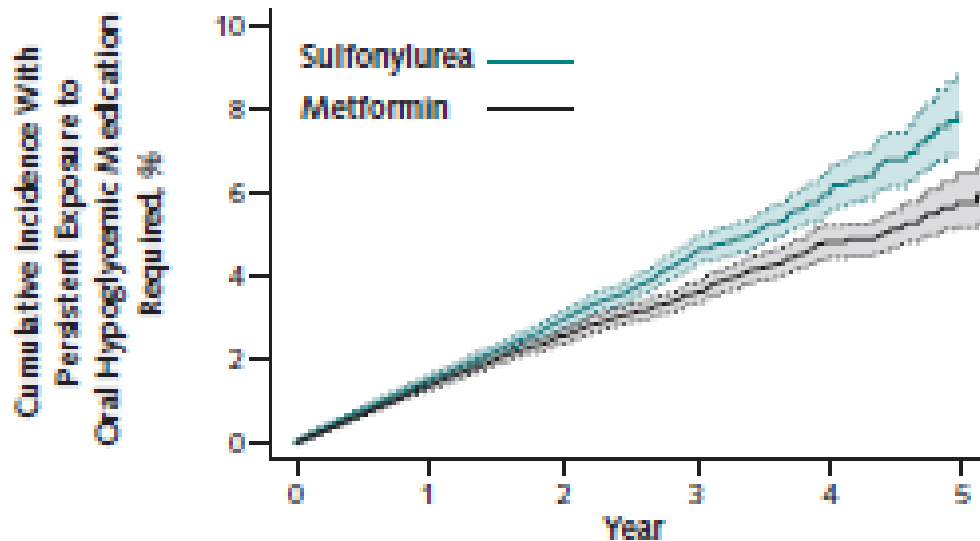
**Insulin
degludec**

A new-generation
ultra-long-acting
basal insulin



Metformin versus Sulfonylurea

Figure 2. Cumulative incidence (95% CIs) of cardiovascular disease or death.



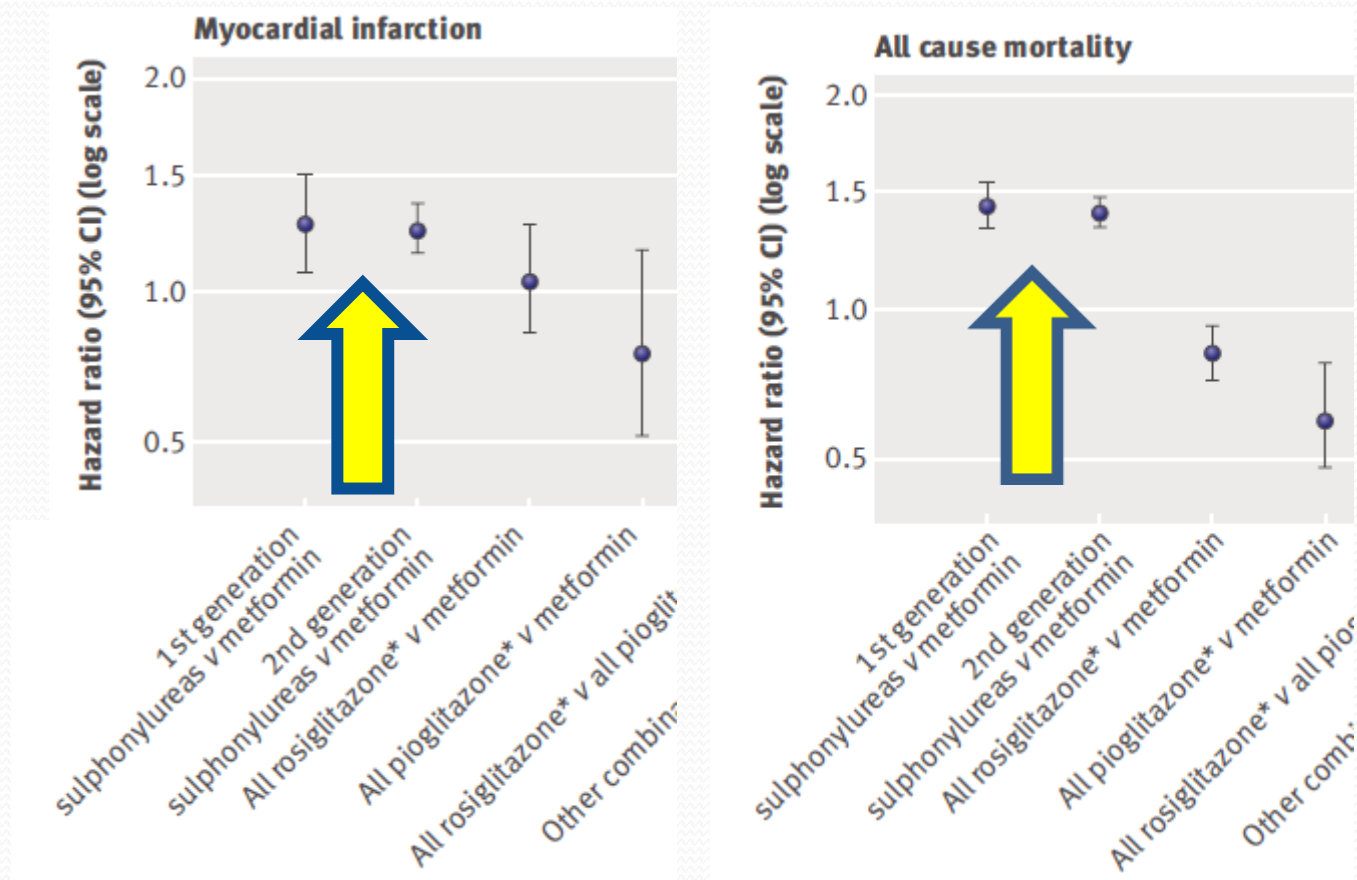
Patients receiving metformin, n	80 648	33 418	16 887	7976	3297	718
Patients receiving sulfonylurea, n	80 648	29 502	14 118	6185	2301	462

Retrospective cohort study of 253,690 patients initiating treatment

Comparative Effectiveness of Sulfonylurea and Metformin Monotherapy on Cardiovascular Events in Type 2 Diabetes Mellitus

Ann Intern Med. 2012;157:601-610 Roumie CL

Metformin versus sulphonyurea



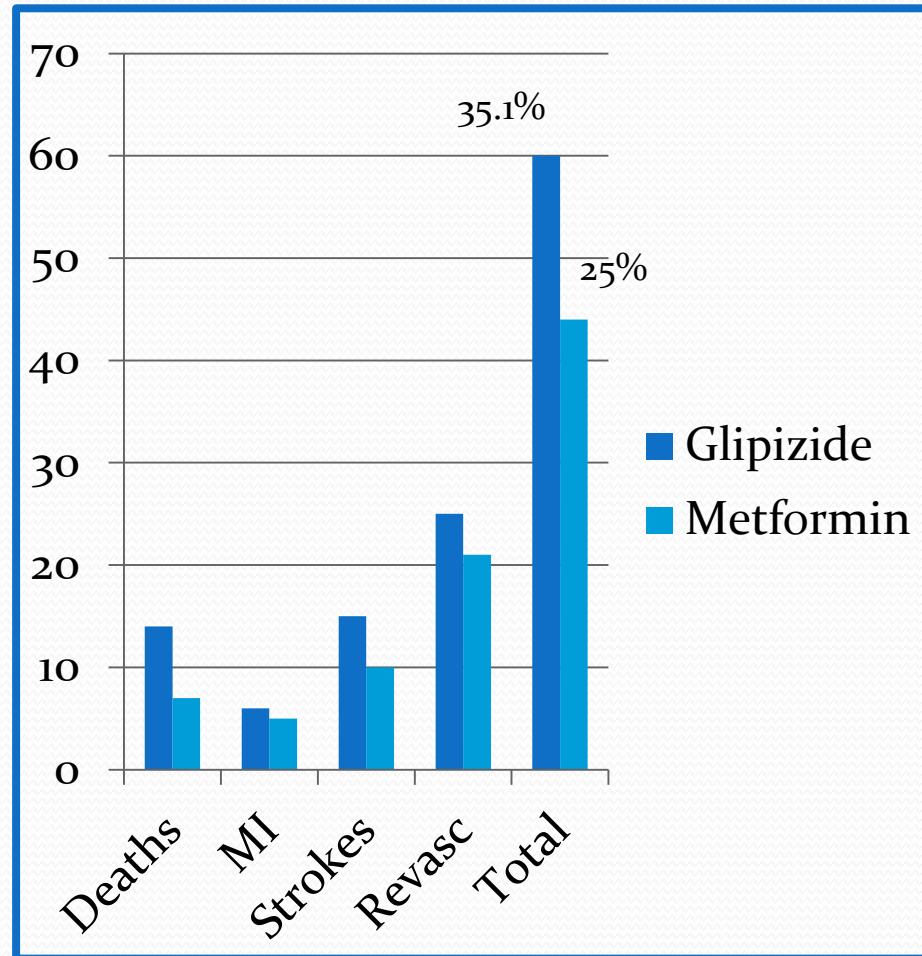
Retrospective cohort study 91,521 patients with DM

Risk of cardiovascular disease and all cause mortality among patients with type 2 diabetes prescribed oral antidiabetes drugs

Tzoulaki I. BMJ 2009; 339:b4731

Sulfonylurea versus Metformin

Multicenter,
randomized,
double-blind,
placebo-
controlled trial



Effects of Metformin Versus Glipizide on Cardiovascular Outcomes in Patients With Type 2 Diabetes and Coronary Artery Disease

Diabetes Care, epub Dec 10, 2012 Hong Jie

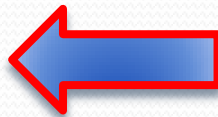
Worsening Diabetes

Cure

Insulin



Drugs



Low Fat
Diets



Type 2
Diabetes



Bariatric Surgery



Fasting



Very Low Carb
Diets

Increase insulin!

Decrease Insulin!

Stupid

Smart

Type 2 Diabetes is a disease of too much insulin

Here's the Problem....



- Current therapies do not reduce the sugar load in the body.

Treatment that work

- Dietary
 - Fasting
 - Very Low Carbohydrate Diets
 - Very Low Calorie Diets
- Surgical – bariatrics – surgically enforced fasting
- **All reduce sugar load in the body**



Everything Rots

ACCORD, ADVANCE, VADT, ORIGIN