

# Type 2 Diabetes: Best Treatment Practices

Adam S. Harold, BSN, RN

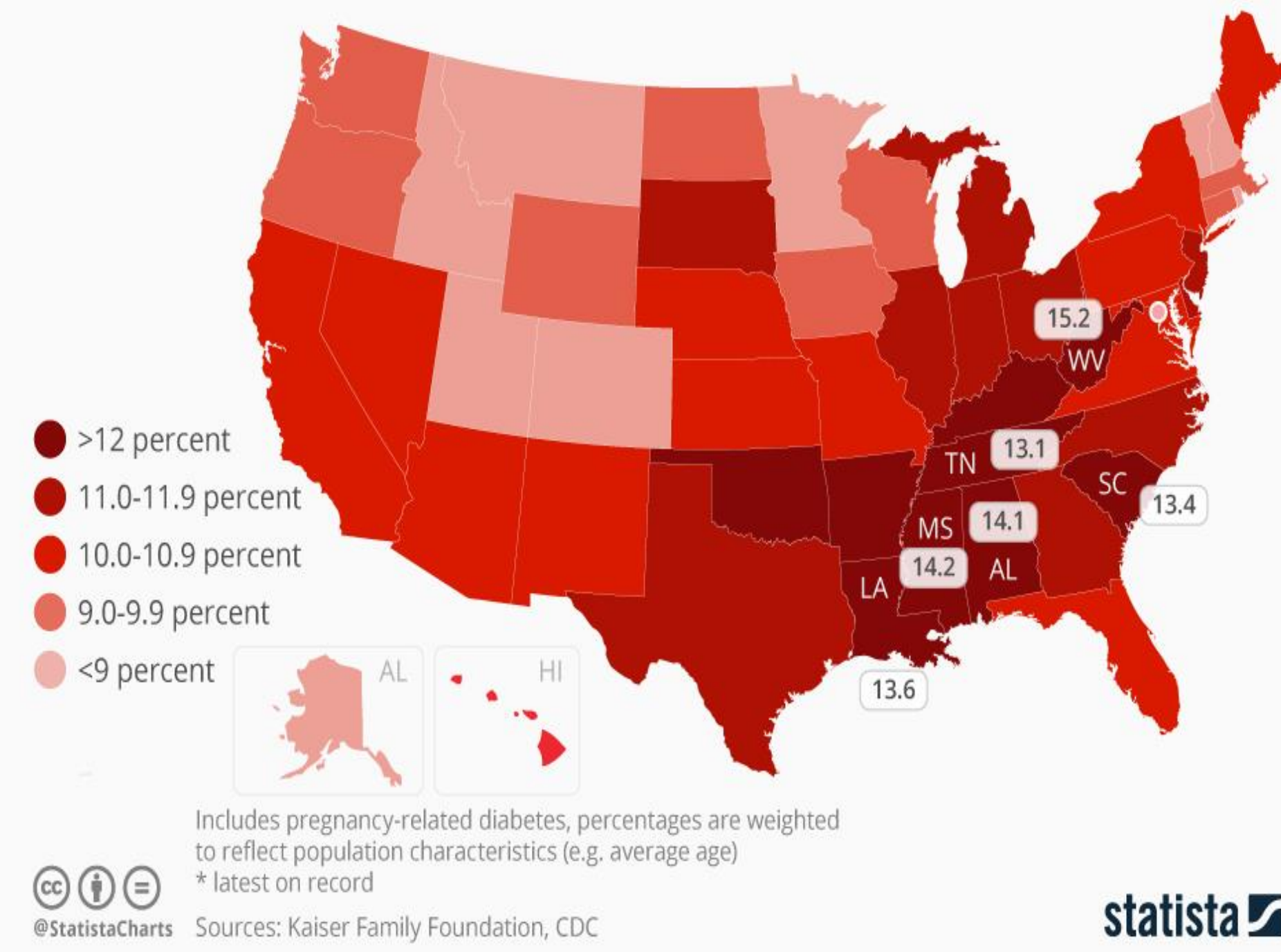
Salem State University  
Salem, MA

## INTRODUCTION

- 37 million people in the US have been told they have diabetes
- 95% of those cases are Type 2 Diabetes
- Total cost and lost wages for people with diabetes is over \$300 billion

### Where Diabetes is Most Prevalent in the U.S.

Percent of adults who have ever been told by a doctor that they have diabetes (2017)



- Type 2 diabetes occurs when your body can't use insulin properly
- Most cases can be prevented



**What is TYPE 2 DIABETES?**  
A condition that occurs when your body CAN'T PROPERLY PROCESS SUGAR INTO ENERGY.

**What are the SYMPTOMS?**  
Feeling hungry even while eating, Extreme thirst, Frequent urination, Slow-healing cuts, Numbness in hands or feet, Blurred vision.

**Why is it DANGEROUS?**  
High blood sugar can lead to stroke, threaten vision, and cause limb and extremity amputations.

**What Parts of Your Body Can BE AFFECTED BY DIABETES?**  
Nervous System, Eyes, Teeth & Gums, Coronary Arteries, Kidneys, Blood Vessels, Feet & Skin.

Go to [CardioSmart.org/Diabetes](http://CardioSmart.org/Diabetes) to learn more about making healthier choices.

- Early symptoms include frequent urination, feeling hungry, blurred vision
- Despite significant statistical data, people continue to be developing type 2 diabetes at alarmingly high rates.
- Oral medications are the first line of defense other than lifestyle changes

Noninsulin Drugs for Type 2 Diabetes Mellitus		
Drug Class (Type)	Mechanism of Action (How it Works)	Drugs Available (Chemical Names / Brand Names)
<b>Sulfonylureas</b>	Increases insulin secretion by pancreas	gliclazide: Amaryl® glipizide: Glucotrol® glyburide: Diabeta® Micronase® Gliclazide® Glucophage®
<b>Biguanides</b>	1) Increases glucose production by the liver 2) Increases uptake of glucose by muscles	metformin
<b>GLP-1 RAS (glucagon-like peptide-1 receptor agonists)</b>	1) Increases insulin secretion in response to blood glucose level 2) Decreases glucagon secretion by pancreas 3) Delays stomach emptying 4) Increases satiety (i.e., feeling of fullness)	exenatide: Byetta liraglutide: Victoza dulaglutide: Trulicity exenatide XR: Bydureon semaglutide: Ozempic lixisenatide: Lyxumia
<b>DPP-4 inhibitors (dipeptidyl peptidase-4 inhibitors)</b>	1) Increases insulin secretion in response to blood glucose level 2) Decreases glucagon secretion by pancreas	alogliptin: Nesina saxagliptin: Onglyza linagliptin: Tradjenta sitagliptin: Januvia
<b>TZDs (thiazolidinediones or glitazones)</b>	1) Increases glucose uptake in muscle & fat 2) Decreases glucose production by the liver	rosiglitazone: Avandia pioglitazone: Actos
<b>SLGT-2 inhibitors (sodium glucose cotransporter-2 inhibitors)</b>	Increases excretion of glucose in urine by blocking reabsorption in the kidney	canagliflozin: Invokana empagliflozin: Jardiance dapagliflozin: Farxiga ertugliflozin: Steglato

\*also available as a generic preparation

## OBJECTIVES

- Does sustained exercise improve A1C better than medication alone?
- What evidenced-based practice says are the best lifestyle modifications
- To better understand how to approach treatment of individuals with Type 2 diabetes
- Discuss the updated clinical practice guidelines for the treatment of Type 2 Diabetes

## METHODS

Eight key reviews were chosen:

- The Effect of Integrated Intervention Based on the Protection Motivation Theory and Implementation Intention to Promote Physical Activity and Physiological Indicators of Patients with Type 2 Diabetes (Morowatisharifabad, M. et al 2021)
- Empagliflozin, diabetes, and outcomes (Drug and Therapeutics Bulletin 2016)
- Effect of 8 Weeks Interval Aerobic Exercise Program on Lipid Profile of Type 2 Diabetes Patients (Ezema, CI et al 2020)
- Back to basics with active lifestyles: exercise is more effective than metformin to reduce cardiovascular risk in older adults with type 2 diabetes Babista, et al (2018)
- Effect of aerobic exercise on glycosylated hemoglobin and VO2max values in patients with type 2 diabetes (Khashaba, A. et al 2016)
- High-intensity aerobic interval training improves aerobic fitness and HbA1c among persons diagnosed with type 2 diabetes (Stoa, et al 2017)
- Extremely short duration interval exercise improves 24-h glycemia in men with type 2 diabetes (Metcalfe, R. et al 2018)
- Empagliflozin and Clinical Outcomes in Patients With Type 2 Diabetes Mellitus, Established Cardiovascular Disease, and Chronic Kidney Disease (Wanner, C. et al. 2017)

## RESULTS

Morowatisharifabad, M. et al 2021

- This study showed that combining motivational interventions and implementing intention intervention can be effective in promoting the physical activity of patients with type 2 diabetes.

Drug and Therapeutics Bulletin 2016

- In people with type 2 diabetes and a history of a previous cardiovascular event, empagliflozin reduced total and cardiovascular mortality compared with placebo.

- Hospitalization due to heart failure was reduced with empagliflozin but outcomes relating to myocardial infarction and stroke did not reach statistical significance

Ezema CI, et al 2020

- Interval aerobic exercise does not optimize reduction in lipid profiles in T2DM patients with controlled blood sugar

Babista et al 2018

- multicomponent exercise (MEX) was the most effective therapy for decreasing multi-cardiovascular risk factors in the early stage of T2D in older adults

Khashaba et al. 2016

- The decrease in the HbA1c for the study group at the end of the treatment was statistically significant in comparison to baseline

Stoa, et al 2017

- A significant improvement was found in HbA1c in HAIT compared to MIT (p < 0.01), with a 0.58% reduction in HbA1c (from 7.78 to 7.20%, p < 0.001) in HAIT, while no change was found in MIT

Metcalfe, et al 2018

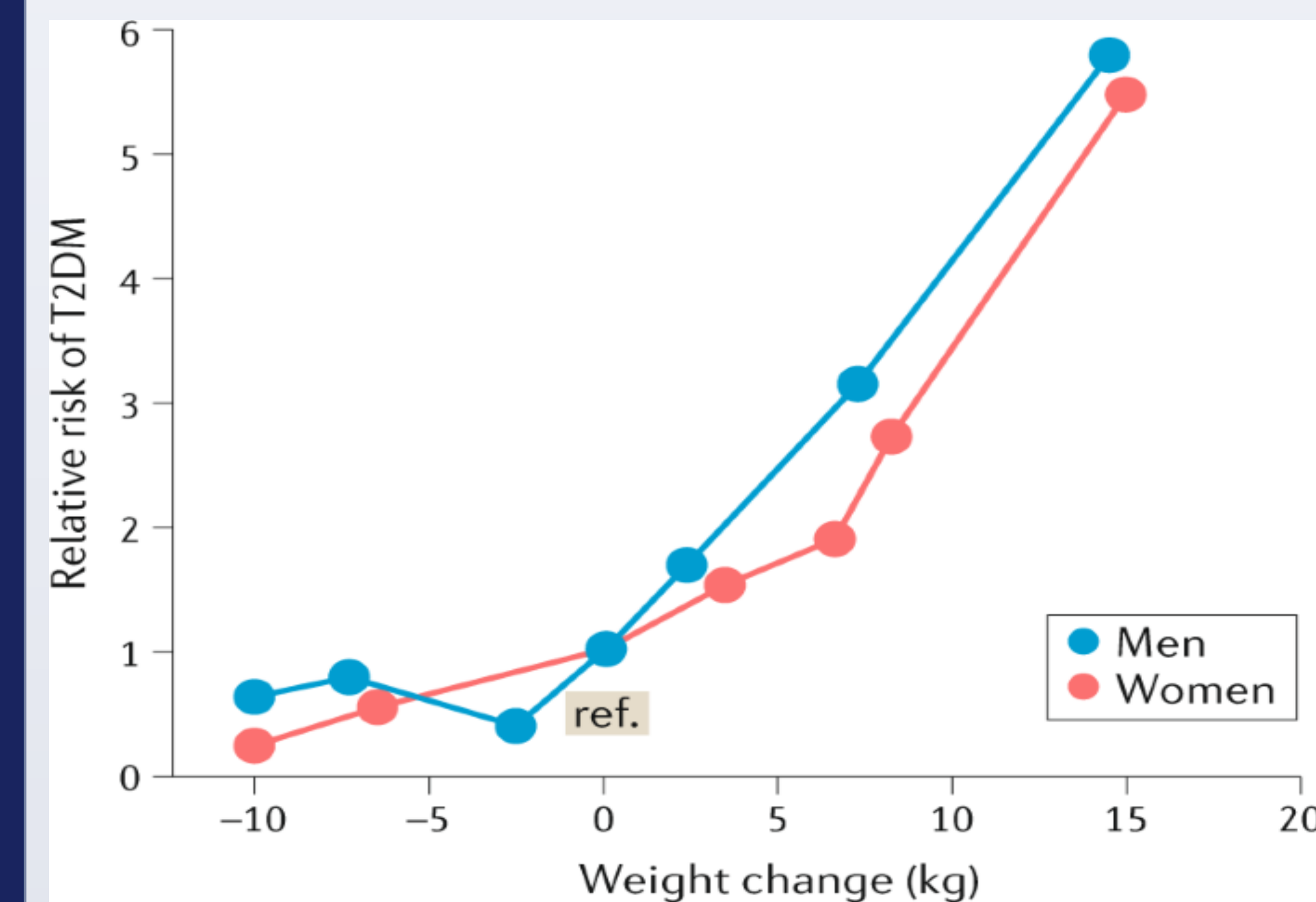
- 40 sec of high-intensity exercise within a total time commitment of 10 min, is associated with positive glycemic effects in the post-exercise period.

Wanner, C. et al 2017

- Empagliflozin improved clinical outcomes and reduced mortality in vulnerable patients with type 2 diabetes mellitus, established cardiovascular disease, and chronic kidney disease.

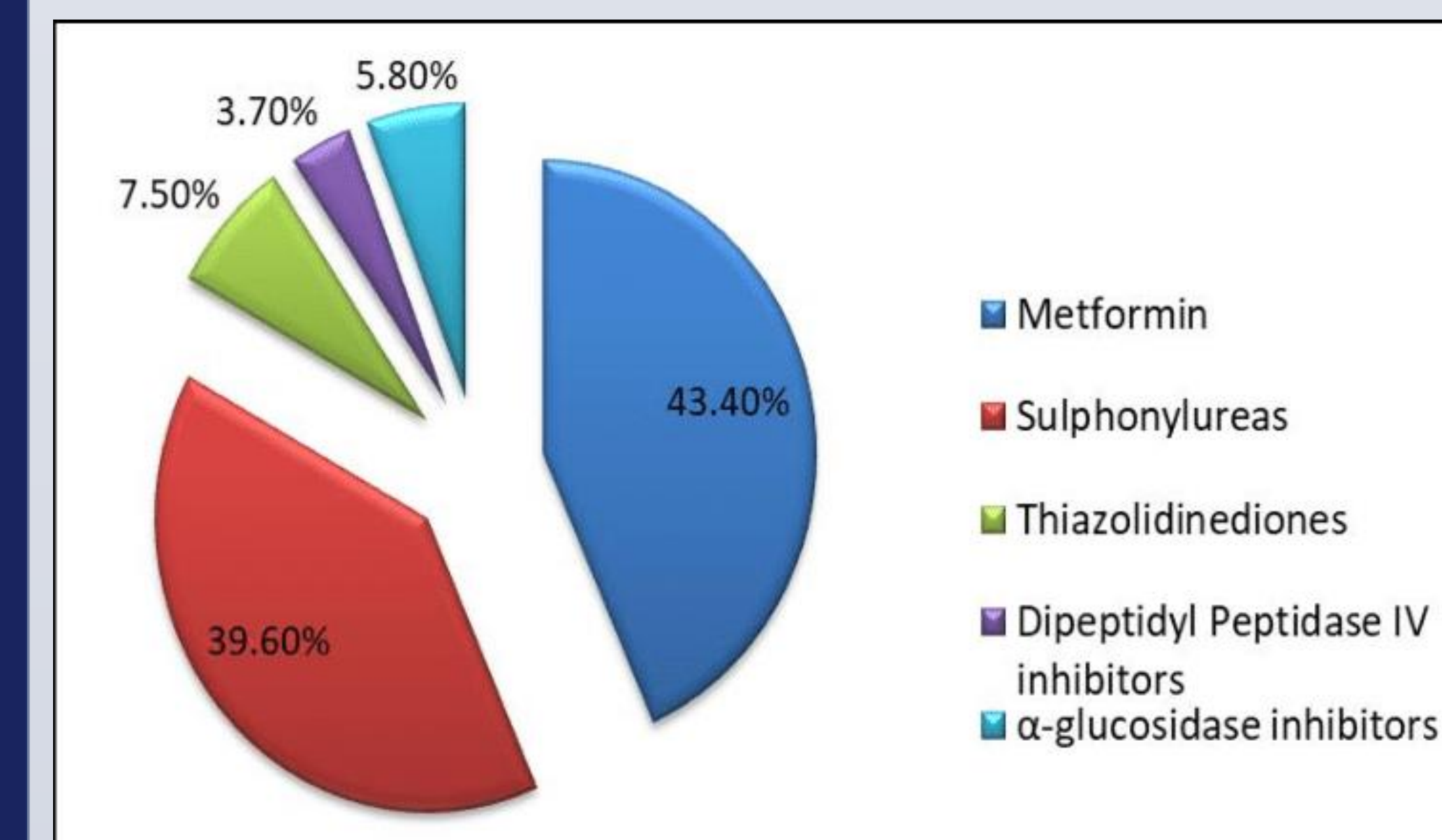
## Evidenced-Based Practice for the prevention of Type 2 Diabetes

- First Step:** Set a weight-loss goal- 5% weight reduction
- Second Step:** Make a nutrition plan for healthier eating
- Third Step:** Get Moving: Exercise is key
- Fourth Step:** Track your Progress
- Fifth Step:** Get informed and prepare for the long-haul



## Clinical Practice Guidelines for the Treatment fo Type 2 Diabetes

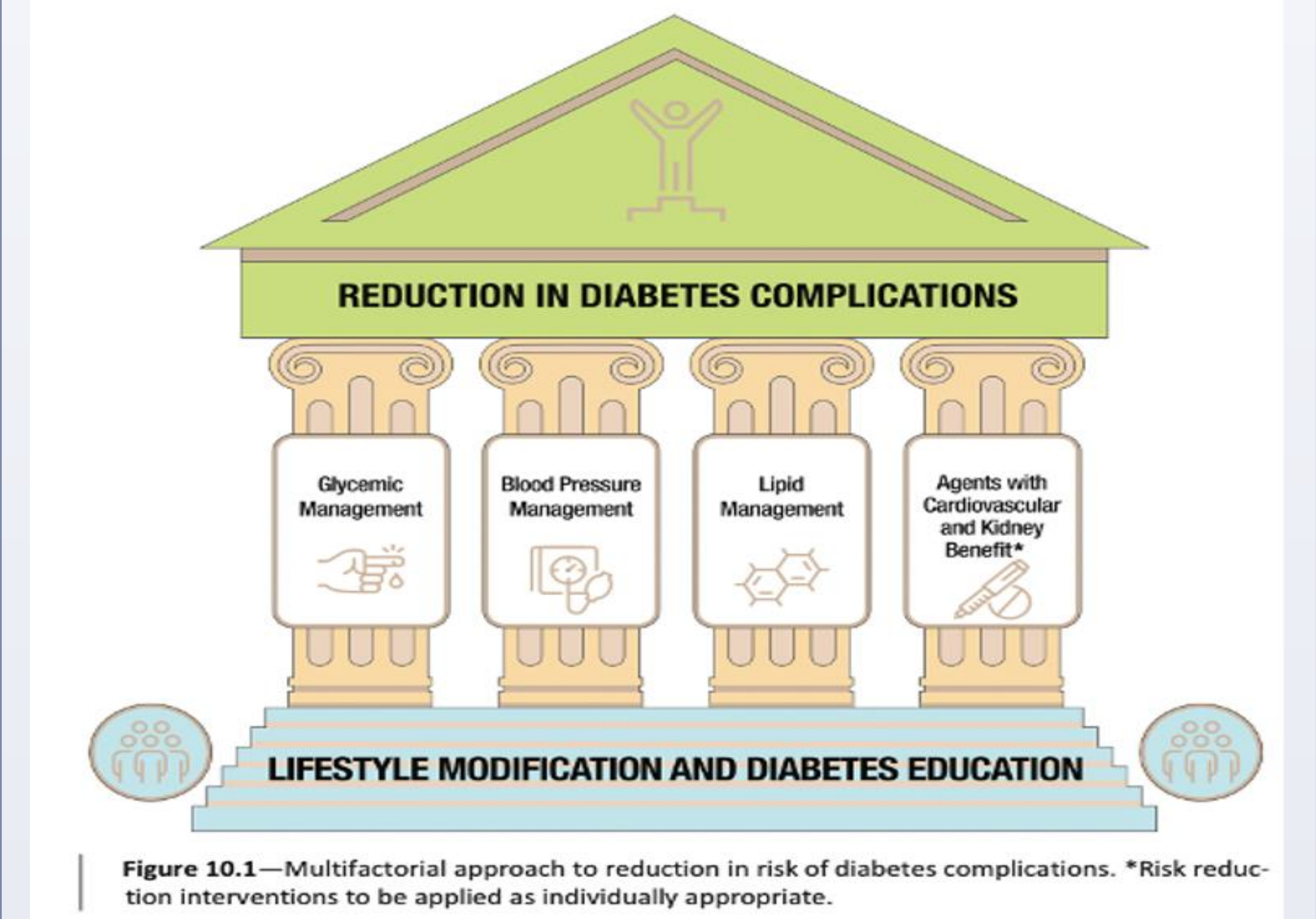
Establish a baseline A1C  
Initiate Metformin and an exercise regimen where appropriate  
Establish cardiovascular risks  
If there is a cardiovascular risk, add an SGLT-2 Inhibitor OR a GLP-1 Receptor Agonist for risk reduction



First-Line treatment remains metformin and comprehensive lifestyle modification.

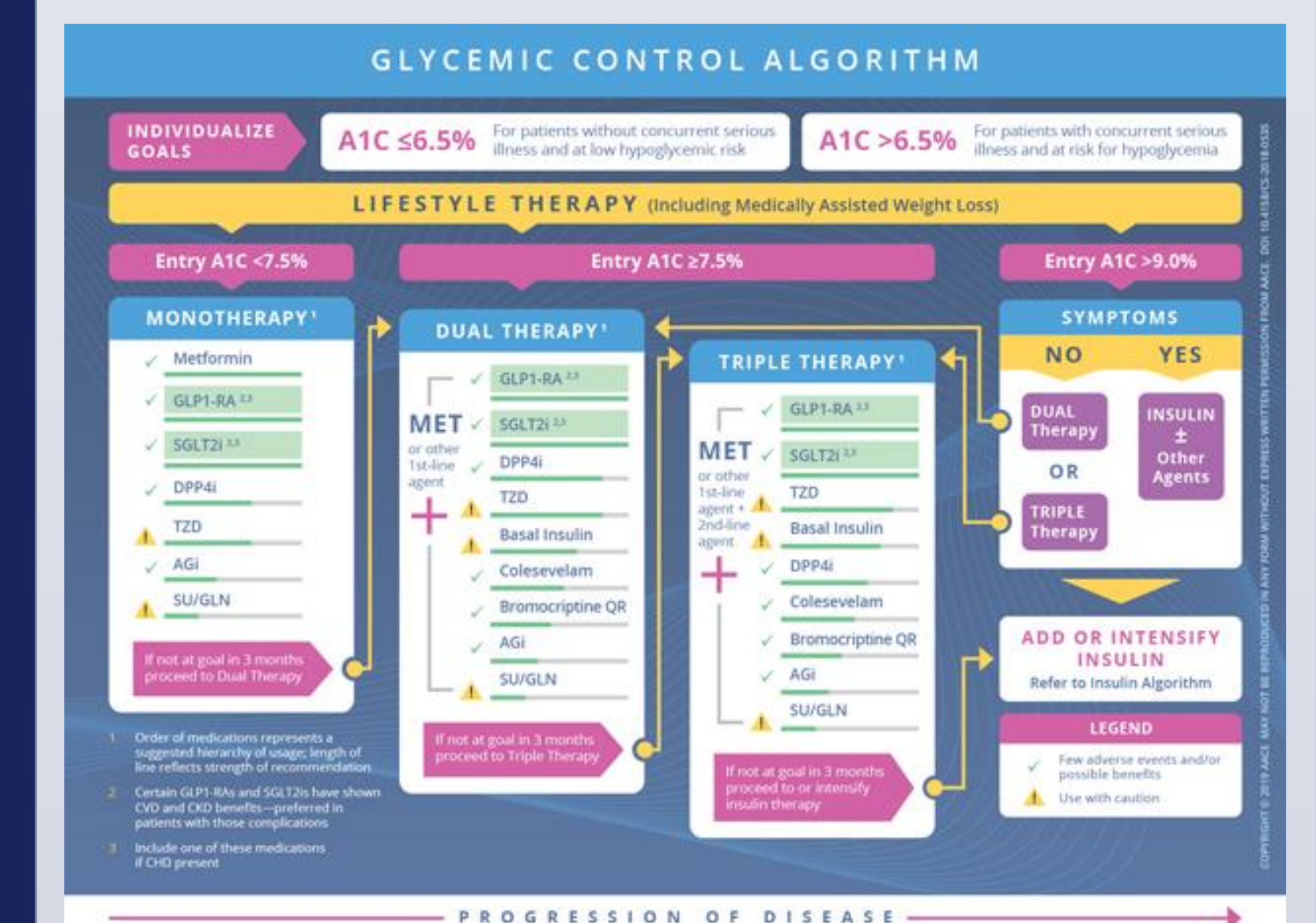
## CONCLUSIONS

- Medication alone is not enough to maintain healthy A1C in the majority of patients
- Comprehensive lifestyle modifications should be initiated at the time of diagnosis
- Regular 3-month A1C checks are paramount to assure proper treatment
- Follow up visits with PCP every 3-6 months
- Cardiovascular associated risk should be evaluated regularly
- Proper maintenance and monitoring of regimen is paramount to success



## RECOMMENDATIONS

- Counsel high-risk patients to monitor diet and weight regularly
- Patient's A1C should be monitored every 3 months. Medications should be adjusted accordingly based on results
- Patients with HTN should be treated with anti-hypertensives independent of DM2 status
- Cholesterol should be checked Q 6 months and statin therapy initiated as needed. Prophylactically now, for some high-risk patients
- Patients with cardiovascular risk to be given SGLT-2 inhibitors OR GLP-1 receptor agonists with established cardiovascular and renal protection benefits
- Above all things, educate your patient population regarding risks



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