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PHASE

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& STROKES EVERY DAY

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October 31, 2018

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Lisa K. Gilliam, MD, PhD
Clinical Leader, Kaiser Northern California Diabetes Program
The Permanente Medical Group

Diabetes Medications: What Do I Need to Know?

Wireside Chat

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Diabetes Medications: What do I need to know?

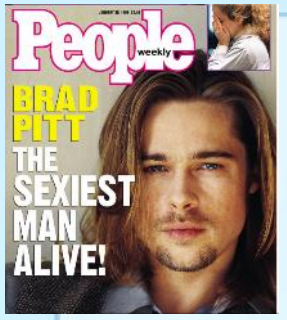
Lisa Gilliam, MD, PhD

Clinical Leader

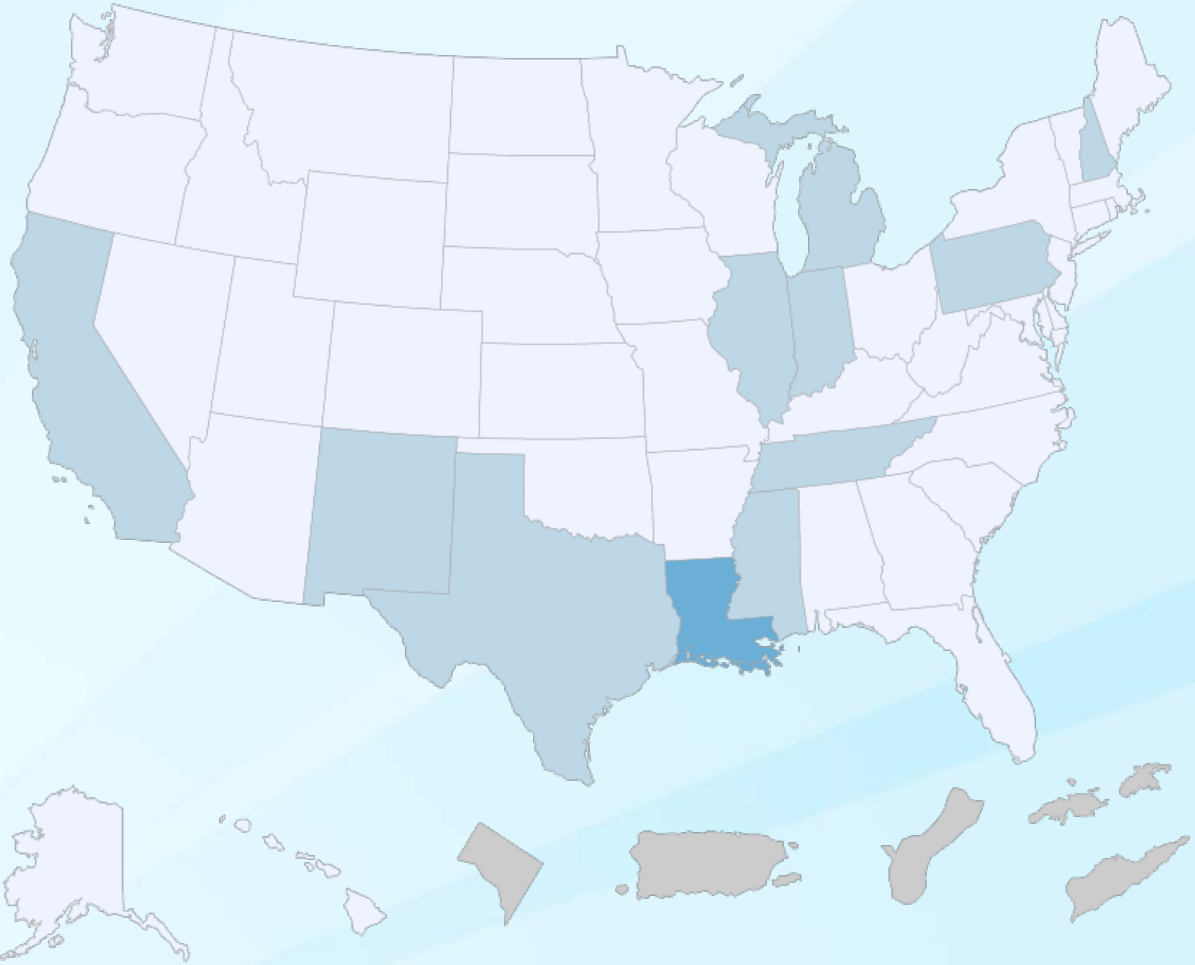
KP NCAL Diabetes Program

Agenda

1. Diabetes – how big is the problem?
2. Current target A1c recommendations
3. ADA guidelines
4. Kaiser National Adult Diabetes Guidelines
5. DM meds – old and new
6. Recent evidence in the literature supporting use of specific DM medications
7. Case studies



Diagnosed Diabetes, Age-Adjusted Percentage, Adults with Diabetes - U.S. States, 1995



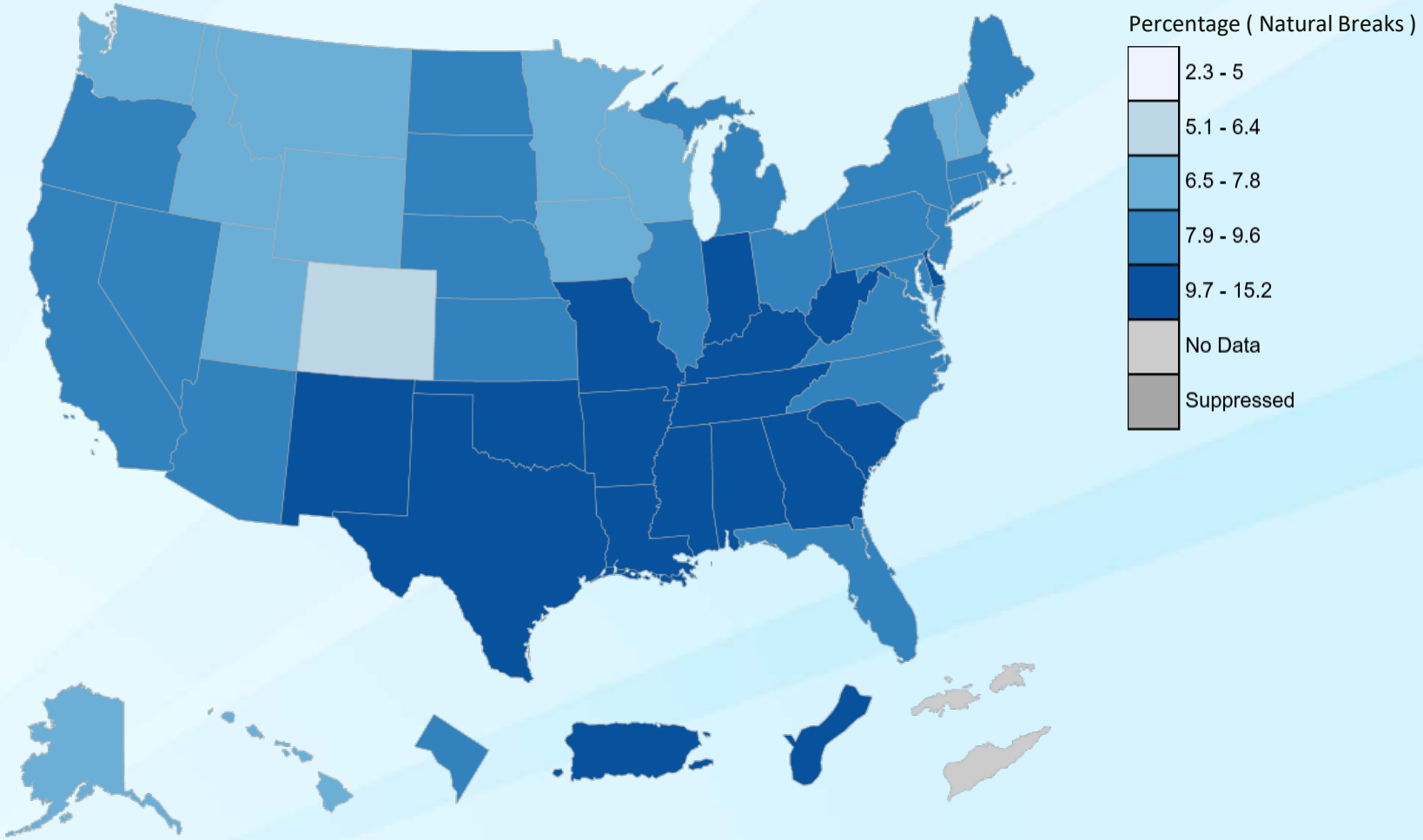
Source: www.cdc.gov/diabetes/data

Disclaimer: This is a user-generated report. The findings and conclusions are those of the user and do not necessarily represent the views of the CDC.

National Center for Chronic Disease Prevention and Health Promotion

Division of Diabetes Translation

Diagnosed Diabetes, Age-Adjusted Percentage, Adults with Diabetes - U.S. States, 2015



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National Center for Chronic Disease Prevention and Health Promotion

Division of Diabetes Translation

How much does diabetes cost?

- The total **direct** and **indirect** estimated cost of diagnosed diabetes in the United States in 2012 was $245 BILLION
- Average medical expenditures for people with diagnosed diabetes were about $13,700 per year
  - About $7,900 of this amount was attributed to diabetes
- After adjusting for age group and sex, average medical expenditures among people with diagnosed diabetes were about 2.3 times higher than expenditures for people without diabetes

American Diabetes Association. Economic costs of diabetes in the U.S. in 2012. Diabetes Care. 2013;36(4):1033–1046.

Centers for Disease Control and Prevention. National Diabetes Statistics Report, 2017. Atlanta, GA: Centers for Disease Control and Prevention, U.S. Dept of Health and Human Services; 2017

How do we reduce or stabilize the cost?

- Prevent diabetes in unaffected individuals

- Effectively treat diabetes in affected individuals
  - Consider glycemic targets
  - Consider costs of different treatment options
  - Consider patient factors

What is optimal diabetes control?

DM care in the early 2000's

- A1c < 7% for most
- The lower, the better
- One size fits all

ACCORD
ADVANCE
VADT

ADA Standards of Medical Care in Diabetes—2012

The ADA proposes optimal targets, but each target must be individualized to the needs of each patient and his or her disease factors

A1c Targets - ADA

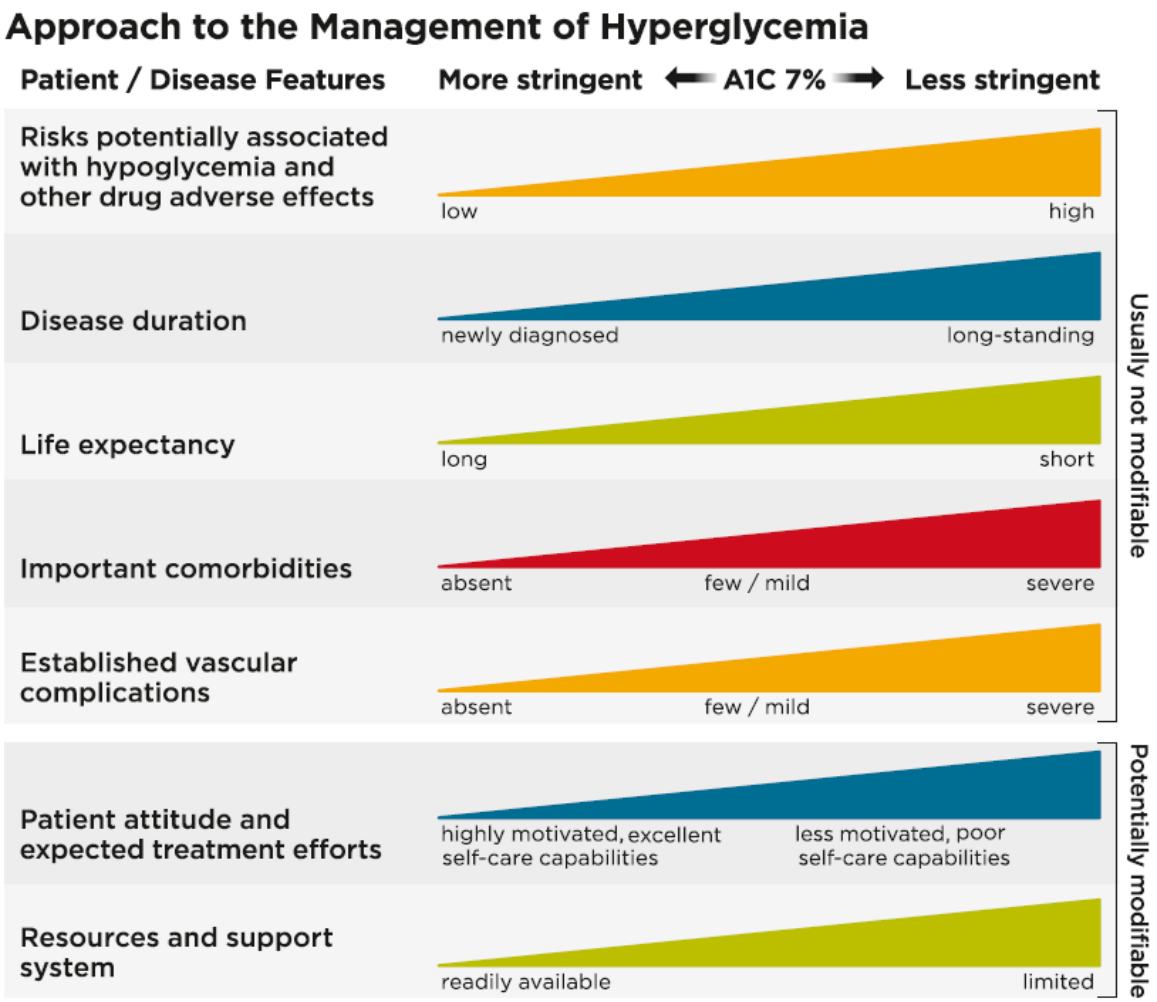
Table 6.2—Summary of glycemic recommendations for many nonpregnant adults with diabetes

A1C	<7.0% (53 mmol/mol)*
Preprandial capillary plasma glucose	80–130 mg/dL* (4.4–7.2 mmol/L)
Peak postprandial capillary plasma glucose†	<180 mg/dL* (10.0 mmol/L)

*More or less stringent glycemic goals may be appropriate for individual patients. Goals should be individualized based on duration of diabetes, age/life expectancy, comorbid conditions, known CVD or advanced microvascular complications, hypoglycemia unawareness, and individual patient considerations. †Postprandial glucose may be targeted if A1C goals are not met despite reaching preprandial glucose goals. Postprandial glucose measurements should be made 1–2 h after the beginning of the meal, generally peak levels in patients with diabetes.

ADA Standards of Diabetes Care - 2018

A1c Targets - ADA



ADA standards of Diabetes Care - 2018

Antihyperglycemic Therapy in Adults with Type 2 Diabetes

At diagnosis, initiate lifestyle management, set A1C target, and initiate pharmacologic therapy based on A1C:

A1C is less than 9%, **consider Monotherapy.**

A1C is greater than or equal to 9%, **consider Dual Therapy.**

A1C is greater than or equal to 10%, blood glucose is greater than or equal to 300 mg/dL, or patient is markedly symptomatic, **consider Combination Injectable Therapy** (See Figure 8.2).

Monotherapy

Lifestyle Management + Metformin

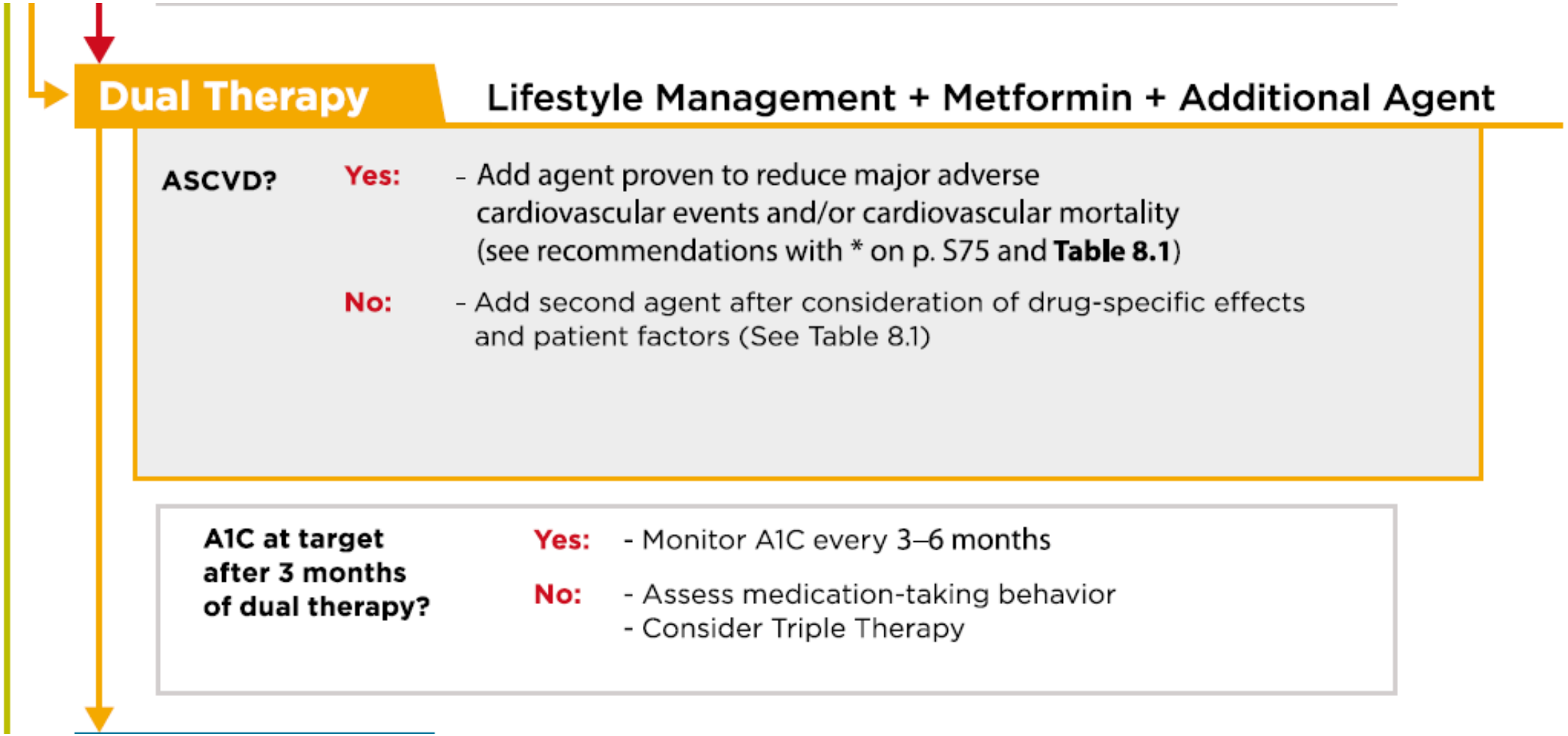
Initiate metformin therapy if no contraindications* (See Table 8.1)

A1C at target after 3 months of monotherapy?

Yes: - Monitor A1C every 3–6 months

No: - Assess medication-taking behavior
- Consider Dual Therapy

ADA standards of Diabetes Care - 2018



ADA standards of Diabetes Care - 2018

Table 8.1—Drug-specific and patient factors to consider when selecting antihyperglycemic treatment in adults with type 2 diabetes

	Efficacy*	Hypoglycemia	Weight Change	CV Effects		Cost	Oral/SQ	Renal Effects		Additional Considerations
				ASCVD	CHF			Progression of DKD	Dosing/Use considerations	
Metformin	High	No	Neutral (Potential for Modest Loss)	Potential Benefit	Neutral	Low	Oral	Neutral	▪ Contraindicated with eGFR <30	▪ Gastrointestinal side effects common (diarrhea, nausea) ▪ Potential for B12 deficiency
SGLT-2 inhibitors	Intermediate	No	Loss	Benefit: canagliflozin, empagliflozin†	Benefit: canagliflozin, empagliflozin	High	Oral	Benefit: canagliflozin, empagliflozin	▪ Canagliflozin: not recommended with eGFR <45 ▪ Dapagliflozin: not recommended with eGFR <60; contraindicated with eGFR <30 ▪ Empagliflozin: contraindicated with eGFR <30	▪ **FDA Black Box:** Risk of amputation (**canagliflozin**) ▪ Risk of bone fractures (canagliflozin) ▪ DKA risk (all agents, rare in T2DM) ▪ Genitourinary infections ▪ Risk of volume depletion, hypotension ▪ ↑LDL cholesterol
GLP-1 RAs	High	No	Loss	Neutral: lixisenatide, exenatide extended release Benefit: liraglutide†	Neutral	High	SQ	Benefit: liraglutide	▪ Exenatide: not indicated with eGFR <30 ▪ Lixisenatide: caution with eGFR <30 ▪ Increased risk of side effects in patients with renal impairment	▪ **FDA Black Box:** Risk of thyroid C-cell tumors (**liraglutide, albiglutide, dulaglutide, exenatide extended release**) ▪ Gastrointestinal side effects common (nausea, vomiting, diarrhea) ▪ Injection site reactions ▪ ?Acute pancreatitis risk
DPP-4 inhibitors	Intermediate	No	Neutral	Neutral	Potential Risk: saxagliptin, alogliptin	High	Oral	Neutral	▪ Renal dose adjustment required; can be used in renal impairment	▪ Potential risk of acute pancreatitis ▪ Joint pain
Thiazolidinediones	High	No	Gain	Potential Benefit: pioglitazone	Increased Risk	Low	Oral	Neutral	▪ No dose adjustment required ▪ Generally not recommended in renal impairment due to potential for fluid retention	▪ **FDA Black Box:** Congestive heart failure (**pioglitazone, rosiglitazone**) ▪ Fluid retention (edema; heart failure) ▪ Benefit in NASH ▪ Risk of bone fractures ▪ Bladder cancer (pioglitazone) ▪ ↑LDL cholesterol (rosiglitazone)
Sulfonylureas (2nd Generation)	High	Yes	Gain	Neutral	Neutral	Low	Oral	Neutral	▪ Glyburide: not recommended ▪ Glipizide & glimepiride: initiate conservatively to avoid hypoglycemia	▪ FDA Special Warning on increased risk of cardiovascular mortality based on studies of an older sulfonylurea (tolbutamide)
Insulin — **Human Insulin**	Highest	Yes	Gain	Neutral	Neutral	Low	SQ	Neutral	▪ Lower insulin doses required with a decrease in eGFR; titrate per clinical response	▪ Injection site reactions ▪ Higher risk of hypoglycemia with human insulin (NPH or premixed formulations) vs. analogs
Insulin — **Analogs**						High	SQ			

*See ref. 31 for description of efficacy. †FDA approved for CVD benefit. CVD, cardiovascular disease; DKA, diabetic ketoacidosis; DKD, diabetic kidney disease; NASH, nonalcoholic steatohepatitis; RAs, receptor agonists; SQ, subcutaneous; T2DM, type 2 diabetes.

ADA standards of Diabetes Care - 2018

Triple Therapy — Lifestyle Management + Metformin + Two Additional Agents

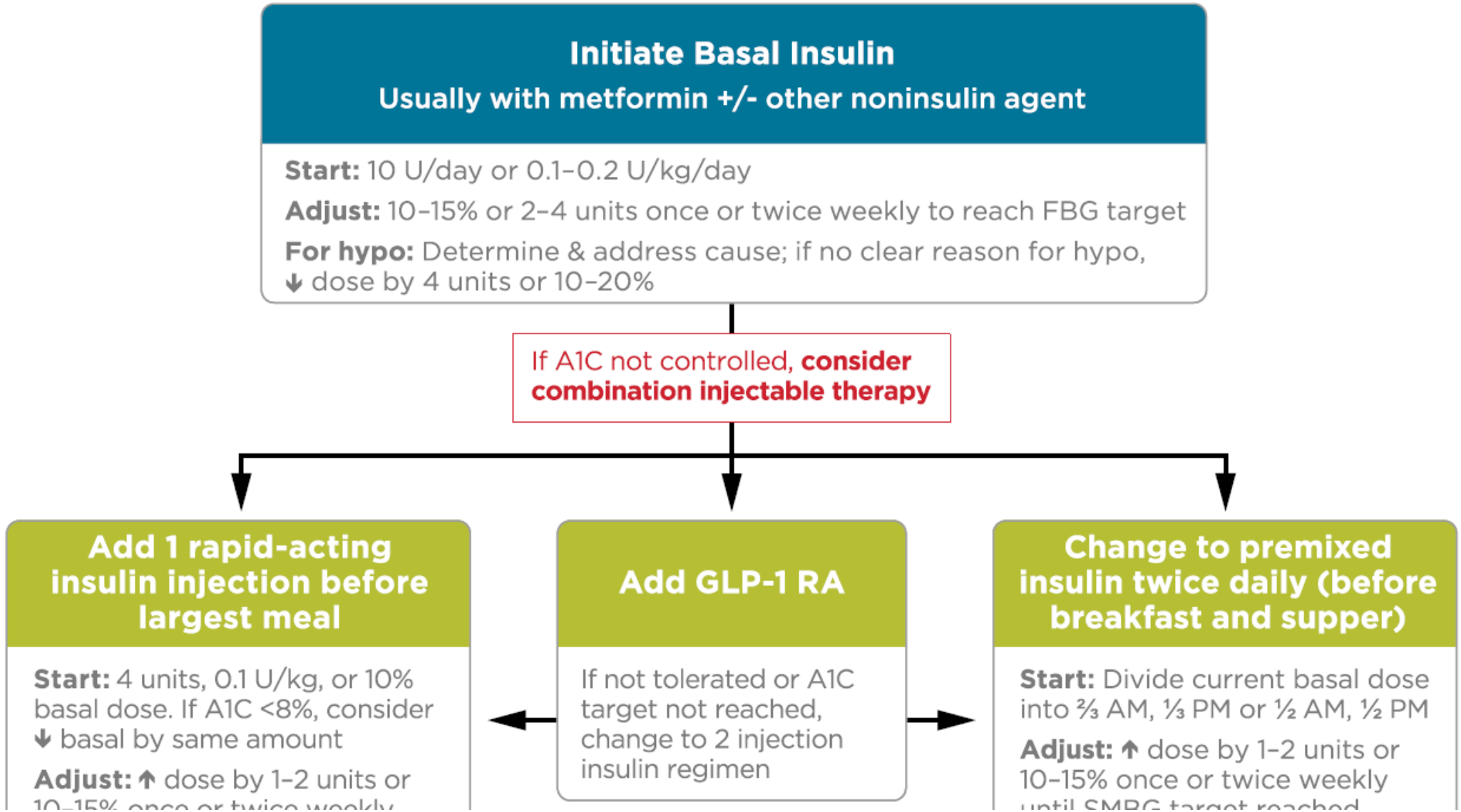
Add third agent based on drug-specific effects and patient factors[#] (See Table 8.1)

A1C at target after 3 months of triple therapy?

Yes:
- Monitor A1C every 3–6 months

No:
- Assess medication-taking behavior
- Consider Combination Injectable Therapy (See Figure 8.2)

ADA standards of Diabetes Care - 2018



ADA standards of Diabetes Care - 2018

How does a health plan achieve optimal diabetes control?

Kaiser Permanente Northern California: Leader in diabetes control

2017
#3 in the US
for
A1c <8%

- 67% of DM patients have A1c under 8%
  - Regional target = 73%
- 81% of DM patients have A1c under 9%
  - Regional target = 86%

What has the KP NCal strategy been??

Alogliptin (Nesina)

Acarbose (Precose)

Lispro (Humalog)

NPH insulin

Empagliflozin (Jardiance)

Regular insulin

Linagliptin (Tradjenta)

Dulaglutide inj (Trulicity)

Dapagliflozin (Farxiga)

Metformin

Albiglutide inj (Tanzeum)

Liraglutide inj (Victoza)

Pioglitazone (Actos)

Sitagliptin (Januvia)

Glimiperide (Amaryl)

Glargine (Lantus)

Canagloflozin (Invokana)

Glipizide (Glucotrol)

Exenatide inj (Byetta)

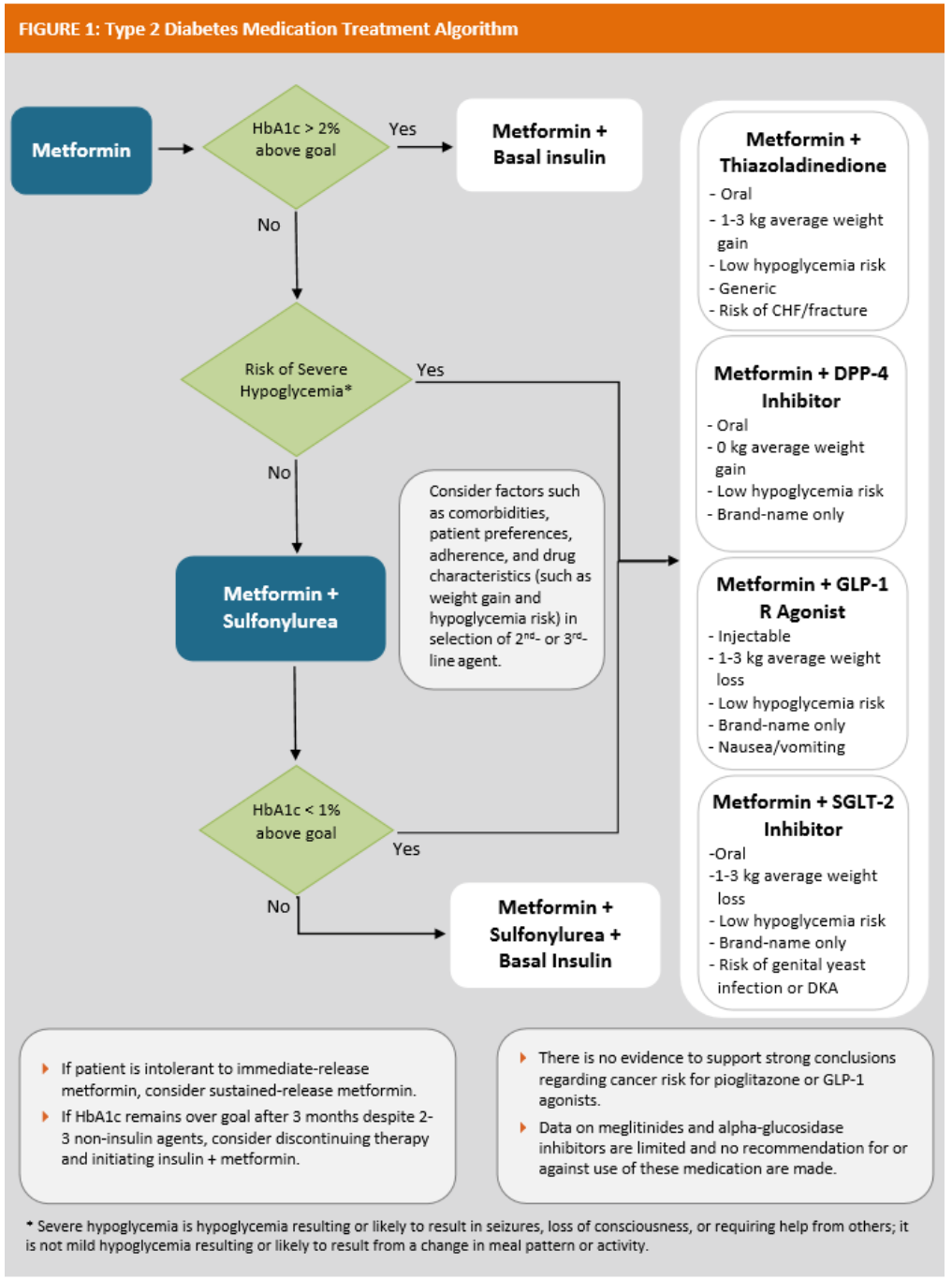
Saxagliptin (Onglyza)

Exenatide ER inj (Bydureon)

Kaiser National Adult Diabetes Guidelines

Updated Nov 2017

In patients with type 2 diabetes not controlled on metformin monotherapy, initiate combination therapy using a second-line agent (sulfonylurea, thiazolidinediones [TZDs], DPP4, basal insulin, SGLT-2 inhibitor, or GLP-1 receptor agonist). When selecting second- or third-line agents after metformin, ***consider factors*** such as comorbidities (eg, presence of clinical atherosclerotic cardiovascular disease [ASCVD]), patient preferences (eg, oral vs injectable route, side effect profile, cost to patient, etc.), adherence, and drug characteristics.



What has the KP NCal strategy been??

Alogliptin (Nesina)

Acarbose (Precose)

Lispro (Humalog)

NPH insulin

Empagliflozin (Jardiance)

Regular insulin

Linagliptin (Tradjenta)

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Metformin

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Liraglutide inj (Victoza)

Pioglitazone (Actos)

Sitagliptin (Januvia)

Glimiperide (Amaryl)

Glargine (Lantus)

Canagloflozin (Invokana)

Glipizide (Glucotrol)

Exenatide inj (Byetta)

Saxagliptin (Onglyza)

Exenatide ER inj (Bydureon)

Key Factors in NCAL Performance

- Technology Tools: PROMPT
- Responsibility: Accountable Population Managers, or “APMs”
  - PharmDs or RNXs – manage panels of patients with diabetes and other CV risk factors
- Accountability: PROMPT Reporting

OK, so what medications should I use??

DM meds cost key (cost per year/patient)

- **<$100 - $**
- **$100 - 500 - $$**
- **$500-1000 - $$$**
- **$1000-2000 - $$$$**
- **$2000-6000 - $$$$$**
- **>$6000 - $$$$$$**

Biguanides

- **Metformin (Glucophage)** - $
- Uncontested first line agent
- Decreases hepatic glucose production, decreases intestinal absorption of glucose and improves insulin sensitivity
- 1% ↓ A1c

Advantages

- Oral
- Affordable
- Long clinical experience
- ↓ microvascular risk (UKPDS)
- Potential CVD benefit
- Weight neutral (potential for modest loss)
- No hypoglycemia

Disadvantages

- GI SEs
- Low risk for lactic acidosis
- Contraindicated if low GFR (<30) or LFTs >3x
- Potential for B12 deficiency

Sulfonylureas (SU)

- **Glipizide (Glucotrol), Glimepiride (Amaryl), Glyburide (Glynase)** - **$**
- Stimulates pancreatic beta cell insulin secretion
- 1-1.25% ↓ A1c*

Advantages

- Oral
- Affordable
- Long clinical experience
- ↓ microvascular risk (UKPDS)

Disadvantages

- Hypoglycemia risk
  - 1-3% risk for severe hypoglycemia
- Weight gain (avg <5 kg)

*Expected decrease in A1c (%) with MONOtherapy, actual A1c lowering when used as 2nd or 3rd line agent will be less

Thiazolidinediones (TZD)

- **Pioglitazone (Actos)** - $, Rosiglitazone (Avandia) - $$$$
- Activates PPAR gamma, ↑ insulin sensitivity
- 1-1.25% ↓ A1c

Advantages

- Oral
- Affordable
- No hypoglycemia
- Potential CVD benefit (Pioglitazone)

Disadvantages

- CHF [FDA black box warning]
  - <0.2% overall, 2-5% in high risk
  - **Contraindicated** in III/IV CHF
- Edema (25%)
- Weight gain (Avg 1-3 kg)
- ↑ Fracture risk
- ↑ Bladder CA?-mixed data [avoid in patients at risk for bladder CA]

Basal Insulin

- **NPH (Humulin N)** - **$$$**
- Analogs - Glargine (Lantus), Detemir (Levemir), Degludec (Tresiba) - **$$$$$ to $$$$$$**
- **Unlimited** ↓ A1c

Advantages

- Affordable (NPH vials)
- **Unlimited efficacy**
- Long clinical experience
- ↓ microvascular risk (UKPDS)

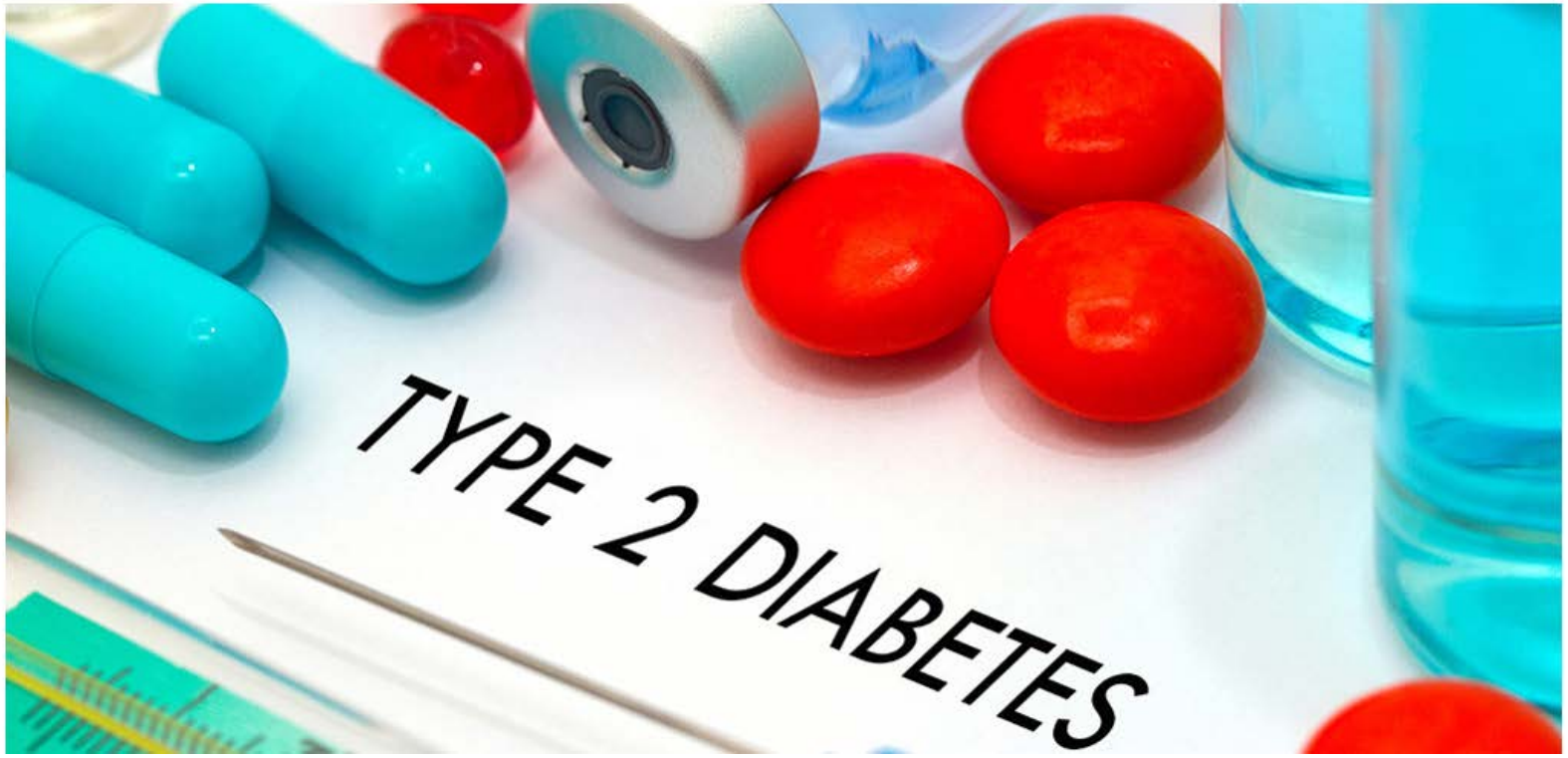
Disadvantages

- Injected
- Hypoglycemia risk
- Weight gain (<5 kg)

Is glargine better than NPH?

Human insulin as safe and effective to treat type 2 diabetes as costlier insulin analogs

By Karen N. Peart | JUNE 26, 2018



Lipska, et al. JAMA. 2018;320(1):53-62.

DPP4 inhibitors

- Linagliptin (Tradjenta), Sitagliptin (Januvia), Alogliptin (Nesina), Saxagliptin (Onglyza) – **$$$$$**
- Inhibits DPP-4 which ↑ GLP
- GLP-1: ↓ food intake, ↓ gastric emptying
  ↑ insulin release, ↓ post-prandial glucagon
- 0.6-0.8% ↓ A1c

Advantages

- Oral
- Weight neutral
- No hypoglycemia
- Generally few SEs

Disadvantages

- Not affordable
- Angioedema/urticaria
- Joint pain
- Risk for acute pancreatitis
- Poss ↑ CHF hospitalizations (Alogliptin and Saxagliptin)

SGLT2 inhibitors

- Empagliflozin (Jardiance), Dapagliflozin (Farxiga), Canagloflozin (Invokana), Ertugliflozin (Steglatro) - **$$$$$**
- Blocks renal glucose reabsorption, promotes glucosuria
- 0.7-1.1% ↓ A1c

Advantages

- Oral
- Modest weight loss (~2-3 kg)
- No hypoglycemia
- ↓ blood pressure
- CV benefit in patients with **established** CVD (empagliflozin, canagliflozin)
- Reduce progression of DKD (empagliflozin, canagliflozin)

Disadvantages

- Not affordable
- **GU infections (10%)**
  - UTI/urosepsis, pyelonephritis, Fournier's gangrene
- **FDA black box** -**Risk of amputation** (canagliflozin)
- DKA
- Polyuria/hypotension/dizziness
- ↑ Fracture risk (canagliflozin)
- Not effective in pts with renal impairment and **contraindicated for GFR<30 to <60, depending on agent**

If prescribing **Empagliflozin, start with ½ tabs (½ of 25 mg tab = 12.5 mg)** to reduce cost from**$$$$$** to **$$$$**

EMPA-REG trial – 2015

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Empagliflozin, Cardiovascular Outcomes, and Mortality in Type 2 Diabetes

Bernard Zinman, M.D., Christoph Wanner, M.D., John M. Lachin, Sc.D., David Fitchett, M.D., Erich Bluhmki, Ph.D., Stefan Hantel, Ph.D., Michaela Mattheus, Dipl. Biomath., Theresa Devins, Dr.P.H., Odd Erik Johansen, M.D., Ph.D., Hans J. Woerle, M.D., Uli C. Broedl, M.D., and Silvio E. Inzucchi, M.D., for the EMPA-REG OUTCOME Investigators

- Empagliflozin reduced death from CVD causes IN PATIENTS AT HIGH RISK (Hazard ratio, 0.86 (95% CI, 0.74–0.99)

CANVAS trial - 2017

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Canagliflozin and Cardiovascular and Renal Events in Type 2 Diabetes

Bruce Neal, M.B., Ch.B., Ph.D., Vlado Perkovic, M.B., B.S., Ph.D., Kenneth W. Mahaffey, M.D., Dick de Zeeuw, M.D., Ph.D., Greg Fulcher, M.D., Ngozi Erondu, M.D., Ph.D., Wayne Shaw, D.S.L., Gordon Law, Ph.D., Mehul Desai, M.D., and David R. Matthews, D.Phil., B.M., B.Ch., for the CANVAS Program Collaborative Group*

- Canagliflozin reduced death from CVD causes IN PATIENTS AT HIGH RISK (Hazard ratio, 0.86 (95% CI, 0.75–0.97)
- Inc risk of amputation (Hazard ratio 1.97, 95% CI 1.41 to 2.75)

ADA/EASD panel stance on SGLT2 inhibitors

For the SGLT2 inhibitors studied to date, it appears that among patients with established CVD, there ***is likely*** cardiovascular benefit, with the evidence of benefit modestly stronger for empagliflozin than canagliflozin

GLP-1 receptor agonists

- Exenatide ER inj (Bydureon), Exenatide inj (Byetta), Liraglutide inj (Victoza), Dulaglutide inj (Trulicity), Semaglutide (Ozempic), Lixisenatide (Adlyxin) – **$$$$$ to $$$$$$**
- GLP-1: ↓ food intake, ↓ gastric emptying
  ↑ insulin release, ↓ post-prandial glucagon
- 0.7-1.5 ↓ A1c

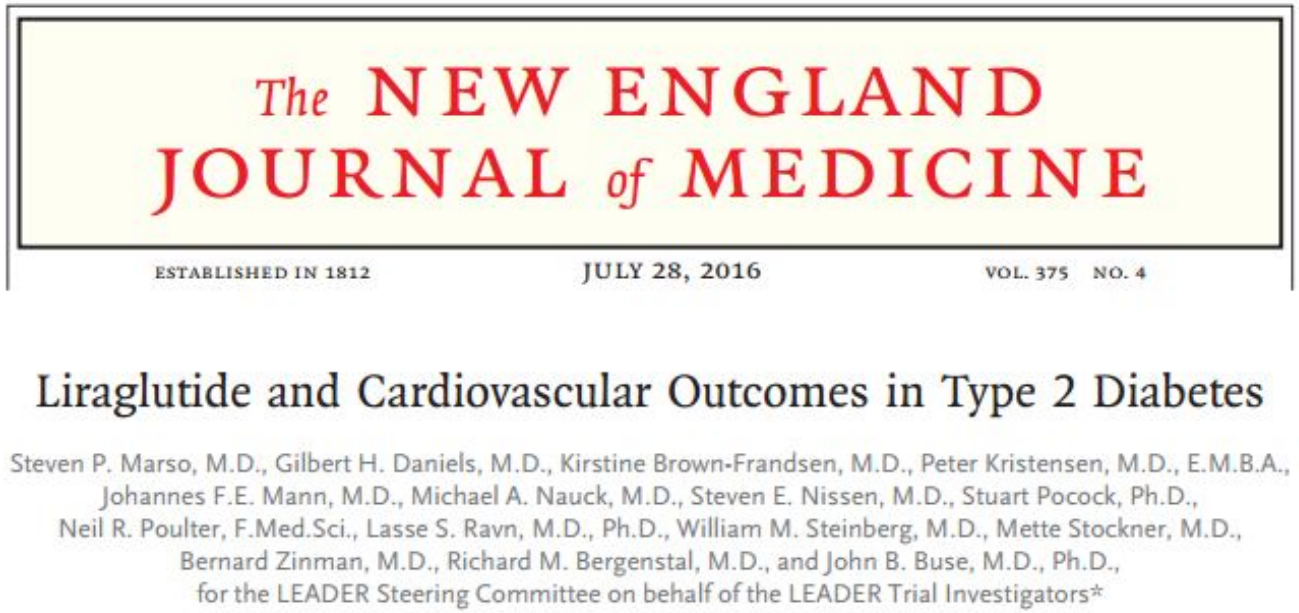
<u>Advantages</u>

- Modest weight loss
- Once weekly dosing (Exenatide ER)
- No hypoglycemia
- CV benefit in patients with established CVD (Liraglutide)
- Reduce progression of DKD (Liraglutide)

<u>Disadvantages</u>

- Injected
- **GI SE's** (N/V, diarrhea in 20-40%)
- **VERY** costly
- **Contraindicated** if FHx of MTC or MEN2 (Black box warning)
- Acute pancreatitis risk (?)

Leader Trial – 2016



The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JULY 28, 2016 VOL. 375 NO. 4

Liraglutide and Cardiovascular Outcomes in Type 2 Diabetes

Steven P. Marso, M.D., Gilbert H. Daniels, M.D., Kirstine Brown-Frandsen, M.D., Peter Kristensen, M.D., E.M.B.A., Johannes F.E. Mann, M.D., Michael A. Nauck, M.D., Steven E. Nissen, M.D., Stuart Pocock, Ph.D., Neil R. Poulter, F.Med.Sci., Lasse S. Ravn, M.D., Ph.D., William M. Steinberg, M.D., Mette Stockner, M.D., Bernard Zinman, M.D., Richard M. Bergenstal, M.D., and John B. Buse, M.D., Ph.D., for the LEADER Steering Committee on behalf of the LEADER Trial Investigators*

- Liraglutide (Victoza) reduced death from CVD causes (hazard ratio, 0.87; 95% CI, 0.78 to 0.97)
- 2.3 kg more weight loss
- ~80% had established CVD
- Unknowns:
  - Helpful for primary prevention?
  - Class effect? (Evaluation of other GLP-1 agents for CVD benefit were +/-
    - SUSTAIN trial – probable benefit for Semaglutide
    - EXSCEL and ELIXA trials did ***not*** show benefit for Exenatide ER or Lixisenatide

ADA/EASD panel stance on GLP1 RAs

Taken together, it appears that among patients with established CVD, some GLP1 receptor agonists **may** provide cardiovascular benefit, with the evidence of benefit strongest for liraglutide, favorable for semaglutide, and less certain for exenatide.

There is no evidence of cardiovascular benefit with lixisenatide.

Cases

Case 1 – Bernie's next steps?

- Bernie U. Rheinhard is a 57 year-old lady with type 2 diabetes whose last three hemoglobin A1C values were, in order, 7.9%, 8.5% and 9.5%.
- Meds:
  - Metformin 2,000 mg once daily
  - Glipizide 10 mg twice daily
  - She has a prescription for fluconazole 150 mg PO x 1 for yeast infections with 11 refills
- Bernie is currently complaining of UTI sxs. Today is the fourth time in the past three months she has mentioned these symptoms to you. While steering her back to the blood sugars, you recognize her A1C trend and recommend adjusting her medication regimen.

Case 1 – Bernie's next steps?

You decide to…

(A) Add linagliptin (Tradjenta)
(B) Add empagliflozin (Jardiance)
(C) Add pioglitazone (Actos)
(D) Add bedtime NPH insulin
(E) A, C, or D

Hints:

- *Current meds: Metformin + Glipizide*
- *A1c 9.5%*
- *Considerations: UTI sxs*

Case 1 – Bernie's next steps?

Answer:

(A) Add linagliptin (Tradjenta) - NO – her a1c is 9.5% and no oral hypoglycemic will get her to goal…

(B) Add empagliflozin (Jardiance) - NO – for reasons above, AND this woman is at high risk for genital yeast infections. Empagliflozin will only cause more problems and cost a lot, without getting her to goal.

(C) Add pioglitazone (Actos) - NO - This is wrong for the same reason that (A) is wrong.

(D) Add bedtime NPH insulin - YES - Insulin is the only medication likely to help her achieve the necessary A1C reduction.

(E) A, C, or D - NO - neither (A) nor (C) is correct.

Case 2- Best option(s) for a 2nd line agent

- "Tobacco Red" is a 48 year-old dye-worker with type 2 diabetes:
  - Smokes 3 packs per day for the last 40 years
  - Describes some exertional left-sided chest pain
  - He has beaten bladder cancer twice in last 10 years
  - His current BMI is 55.3
  - Last three quarterly A1C levels were:
    - 7.5%
    - 7.8%
    - 8.1%
  - Current DM meds:
    - Metformin XR 2 gm PO qd
- ***Tobacco Red has been stable on this regimen for the last 3 years. At this point, the best course of action would be to...***

Case 2- Best option(s) for a 2nd line agent

(A) Do nothing

(B) Add Pioglitazone (Actos)

(C) Add bedtime NPH

(D) Add Liraglutide (Victoza)

(E) Add Empagliflozin (Jardiance)

Hints:

- ***Current meds = Metformin 2000 mg qd***
- ***Considerations: A1c 8.1%, Obesity (BMI 55), smoker, chest pain, h/o bladder CA***

Does Pioglitazone cause bladder cancer?

- Dormandy, Lancet 2005: 366, 1279 - PROspective pioglitAzone Clinical Trial In macroVascular Events (PROactive) study – **YES**
  - Erdmann, Diabetes Obes Metab 2014: 16, 63 – PROactive update – **NO**
- Lewis, JAMA 2015: 314, 265 – Cohort and nested case-control study – **NO**
- Tuccori, BMJ 2016; 352:i1541 – Cohort study – **YES**
- AHRQ review (Diabetes Medications for Adults With Type 2 Diabetes: An Update, April 2016) - **NO**
  - Used most rigorous evidence which evaluated people prospectively

- **Mixed/weak evidence** – highest quality studies have not found an association

Case 2- Best option(s) for a 3rd line agent

(A) Do nothing

(B) Add Pioglitazone (Actos)

(C) Add bedtime NPH

(D) Add Liraglutide (Victoza)

(E) Add Empagliflozin (Jardiance)

Hints:

- ***Current meds = Metformin 2000 mg qd***
- ***Considerations: A1c 8.1%, Obesity (BMI 55), smoker, chest pain, h/o bladder CA***

Case 2- Best option(s) for a 2nd line agent

Answers:

(A) Nothing - **NO** – A1c has been increasing, likely to continue to rise unless you take action

(B) Add Pioglitazone (Actos) - **NO** - adding Actos will get you sued when he develops bladder cancer for the 3rd time

(C) Add bedtime NPH – **NO** – more cost effective and clinically effective, but no CVD benefit, and likely to cause weight gain

(D) Add Liraglutide (Victoza) – **YES** - less cost-effective, but weight negative effect (which this gentleman needs), may reduce his risk for CVD death.

(E) Add Empagliflozin (Jardiance) – **YES** – less cost effective, but weight negative, and may reduce risk for CVD death

Case 3 - what is Terry's next best course of action?

- "Terry Treetrunklegs" is a 55 year-old lover of salt with type 2 diabetes who recently graduated to the 4th stage of CHF. She is quite proud of her accomplishment and feels a debt of gratitude to her hubby Jim, who buys her six nightly margaritas with salt at her favorite Mexican Restaurant. Her weight has increased by 5 lbs over the last 12 hours.
- Terry has battled pancreatitis and won four different times.
- Terry currently takes glipizide 10 mg PO bid
- Her last three quarterly A1C values:
  - 7.2%
  - 7.8%
  - 8.5%

Case 3 - what is Terry's next best course of action?

(A) Add metformin

(B) Add Pioglitazone (Actos)

(C) Increase glipizide to 20 mg PO BID

(D) Start bedtime NPH

(E) Add Exenatide ER inj (Bydureon)

Hints:

- *Current meds = Glipizide 10 bid*
- *Considerations: A1c 8.5%, Stage IV CHF, h/o recurrent pancreatitis*

Case 3 - what is Terry's next best course of action?

Answers:

(A) Add metformin - NO - Metformin is contraindicated due to risk of lactic acidosis in acute CHF

(B) Add Pioglitazone (Actos) - NO – Pioglitazone (Actos) is contraindicated in CHF class 3 or higher

(C) Increase glipizide to 20 mg PO BID - NO – The difference in efficacy between 20 mg and 40 mg of glipizide daily is small

(D)Start bedtime NPH - YES - Insulin is needed for this patient

(E) Add Exenatide ER inj (Bydureon) - NO - This is a good way to get sued when Jim and his margaritas provoke pancreatitis bout #5.

Case 4 – Sugar's second choice?

- "Sugar T. Lowe" is a 74 yo lady with longstanding type 2 diabetes (>20 years) who has the local EMS team on her Christmas card list after several visits to the ED for hypoglycemia when she was previously taking glipizide. She also got to see her EMS friends recently after getting out of bed too quickly, feeling dizzy and conking her head on the nightstand, leading to unconsciousness.
- Recent A1c 8.4%.
- Meds:
  - Metformin 1000 bid
  - Donepezil (Aricept) for "senior moments" (she's very forgetful these days)

Case 4 – Sugar's second choice?

(A) Add empagliflozin (Jardiance)

(B) Add pioglitazone (Actos)

(C) Start bedtime NPH

(D) Add linagliptin (Tradjenta)

(E) B or D

Hints:

- *Current meds = Metformin 1000 mg bid*
- *Considerations: A1c 8.4%, h/o severe hypoglycemia, longstanding DM, occasional dizziness, early dementia*

Case 4 – Sugar's second choice?

Answers:

(A) Add empagliflozin (Jardiance) - NO - empagliflozin (Jardiance) would not be a great option in an elderly patient with dizziness/fall risk because it lowers BP.

(B) Add pioglitazone (Actos) - YES - Pioglitazone (Actos) would be a good option in this case, and is cost-effective. Target A1c in this lady would be <8% because of h/o severe hypoglycemia and comorbid conditions (early dementia), and this target would probably be readily achieved by adding pioglitazone, while you would not increase her risk for hypoglycemia.

(C) Start bedtime NPH - NO – with history of severe hypoglycemia on glipizide, NPH would not be a great option for this lady.

(D) Add linagliptin (Tradjenta) - YES – linagliptin (Tradjenta) would be a good option for the same reasons listed above for Pioglitazone (Actos). However, this option is less cost-effective.

(E) B or D - YES **- either (B) or (D) is correct.**

Thanks for your attention!

Questions??

SMBP Community of Practice

Next call: Friday, Nov. 2, 12-1pm.

Interested in getting involved?
[Let Alexis know.]

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This implementation guide is designed to help health care delivery organizations implement SMBP into practice or optimize existing SMBP processes. It includes change ideas, implementation tips, and tools to set up SMBP successfully based on one's unique goals, environment, and community.

Self-measured Blood Pressure Monitoring

Implementation Guide for Health Care Delivery Organizations

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