

Update on Diabetes Care in Older Adults

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CMDA Conference, 4/29/22

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Disclosures

- None

Learning Objectives

1. Review the most recent American Diabetes Association guidance on care of older adults with diabetes.
2. Understand the risks and benefits of newer anti-hyperglycemic agents in the nursing home setting.
3. Recognize the utility of continuous glucose monitoring devices for the elderly population.

Epidemiology of Diabetes in Older Adults

- >25% of adults >65 years old have diabetes
 - ~50% have prediabetes
- 2016: 1.3 million adults in nursing homes
 - 25-34% with diabetes

Guidelines on Diabetes Management in Older Adults

2013

Guidelines Abstracted from the American Geriatrics Society Guidelines for Improving the Care of Older Adults with Diabetes Mellitus: 2013 Update

American Geriatrics Society Expert Panel on the Care of Older Adults with Diabetes Mellitus

CLINICAL PRACTICE GUIDELINE

2019

Treatment of Diabetes in Older Adults: An Endocrine Society* Clinical Practice Guideline

Derek LeRoith,¹ Geert Jan Biessels,² Susan S. Braithwaite,^{3,4} Felipe F. Casanueva,⁵
Boris Draznin,⁶ Jeffrey B. Halter,^{7,8} Irl B. Hirsch,⁹ Marie E. McDonnell,¹⁰
Mark E. Molitch,¹¹ M. Hassan Murad,¹² and Alan J. Sinclair¹³

2022

13. Older Adults: *Standards of Medical Care in Diabetes—2022*

*American Diabetes Association
Professional Practice Committee**

Diabetes Care 2022;45(Suppl. 1):S195–S207 | <https://doi.org/10.2337/dc22-S013>

Recommended Glycemic Targets in Older Adults

American Geriatrics Society (2013):

- A1c 7.5-8% if moderate co-morbidities and life expectancy <10 yrs

American Diabetes Association (2022):

- Healthy: A1c <7-7.5%
- Complex/Intermediate: A1c <8%
- Community dwelling in skilled nursing or very complex: Avoid reliance on A1c

J Am Geriatr Soc 2013;61:2020.

Diabetes Care. 2022 Jan 1;45(Suppl 1):S195.

Endocrine Society Conceptual Framework for Determining Glycemic Targets

Overall Health Category	Group 1: Good Health	Group 2: Intermediate Health	Group 3: Poor Health
Patient characteristics	<p>No comorbidities or 1-2 non-diabetes chronic illnesses* and No ADL^ε impairments and ≤1 IADL impairment</p>	<p>3 or more non-diabetes chronic illnesses* and/or Any one of the following: mild cognitive impairment or early dementia ≥2 IADL impairments</p>	<p>Any one of the following: End-stage medical condition(s)** Moderate to severe dementia ≥2 ADL impairments Residence in a long-term nursing facility</p>
<p>Reasonable glucose target ranges and HbA1c by group</p> <p>Shared decision-making: individualized goal may be lower or higher</p>			

2022 ADA Standards of Medical Care: Older Adults

Main Points

1. Framework for considering glycemic treatment goals
1. Simplification of complex insulin regimens
1. Considerations for diabetes treatment regimen simplification and deintensification/deprescribing in older adults



Why Is Less Tight Glycemic Control Recommended in Older Adults?

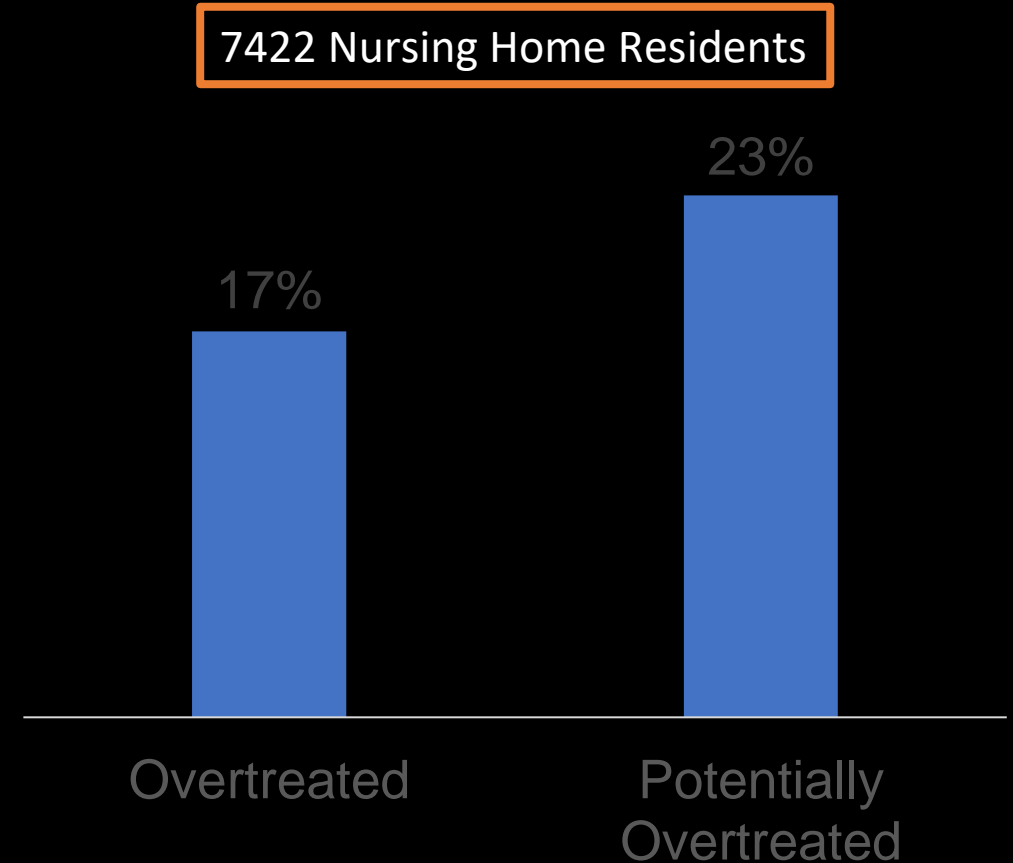
Lack of macrovascular benefit from tight control

Long duration of treatment needed to decrease microvascular complications

Documented harms of tight glycemic control (i.e. hypoglycemia)

Glycemic treatment deintensification practices in *nursing home residents with type 2 diabetes*

- VA nursing home residents (2013-2019)
- “Overtreatment” = HbA1c <6.5 with any insulin use.
- “Potential overtreatment” = HbA1c <7.5 with any insulin use or HbA1c <6.5 on any glucose-lowering medication other than metformin alone.



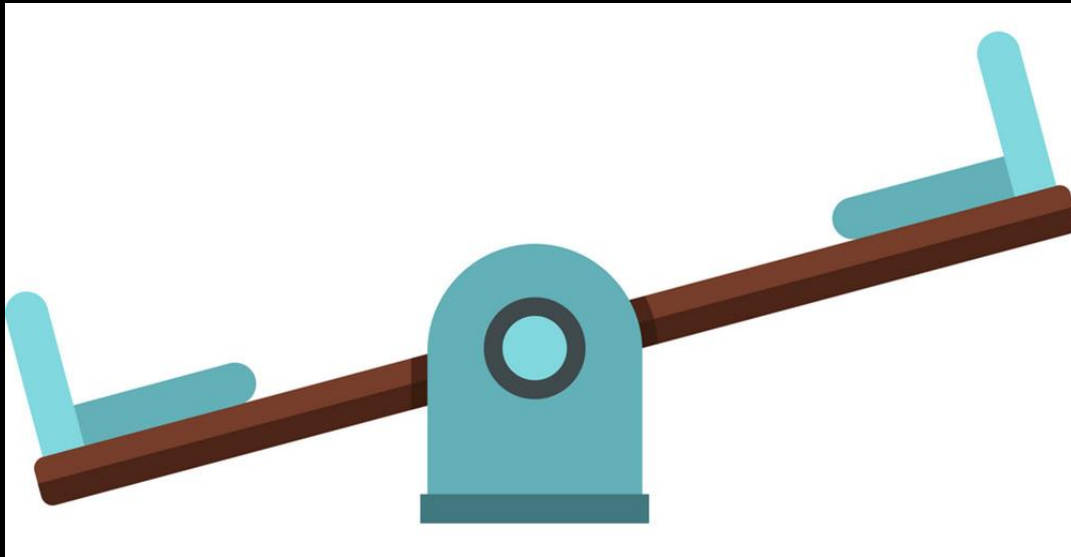
Glycemic treatment deintensification practices in *nursing home residents with type 2 diabetes*

Were medications de-intensified within 14 days of A1c result?

7422 Nursing Home Residents



But in 2022, Should “Deintensification” Really Be Our Primary Focus in Older Adults?.....



.....my opinion: “deintensification” is too simplistic in light of new developments in diabetes management.

- We can now often avoid hypoglycemia while maintaining tight glucose control.
- By adding or switching certain medications we can improve clinical outcomes that are important for older adults.
- We can monitor glucoses in a more patient-centered and informative way.

What's Changed in Diabetes Care Since 2013?

Short Answer = Almost Everything!

- Cardiovascular outcome trials:
 - 2015 – EMPA-REG Trial (empagliflozin)
 - 2016 – LEADER Trial (liraglutide)
- 3 once-weekly GLP-1 agonists: exenatide ER, dulaglutide, semaglutide
- 1st oral GLP-1 agonist (oral semaglutide)
- Huge improvements in continuous glucose and flash glucose monitoring (Dexcom G6, Freestyle Libre) and evidence for their use
- Benefits of GLP1 agonists and SGLT2i for CVD, renal disease, and HF
- Expansion of evidence of SGLT2i benefits in patients with and without diabetes

Let's Review 4 Things

DPP4 Inhibitors

GLP1 Agonists

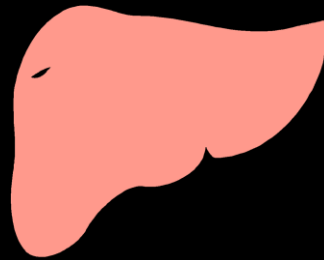
SGLT2

Inhibitors

Continuous Glucose Monitors

Incretin Physiology

↓ Glucose
Production



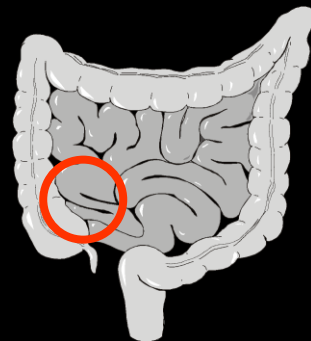
↓ Appetite
↑ Satiety



Glucose
Dependent

↑
↓ Insulin
Glucagon

↓ Gastric
Emptying



L-Cells

GLP-1

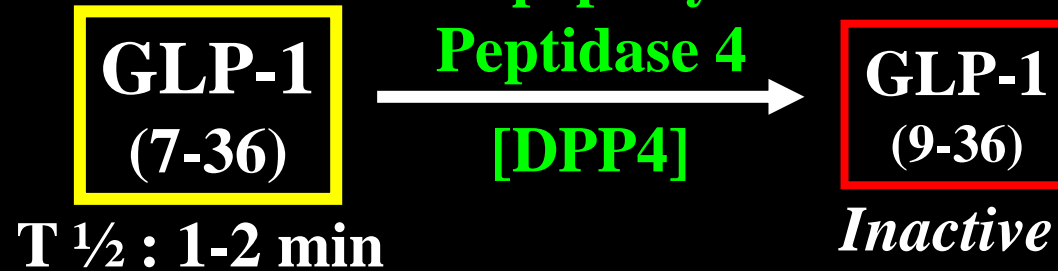
$T_{1/2} = 2 \text{ min}$
Due to DPP4



GLP-1 = Glucagon Like Peptide-1
DPP4 = Dipeptidyl Peptidase 4

Incretin Based

Therapy



GLP-1 Analog / Agonist

- Prolonged Duration of **Analog** Action

DPP4 Inhibitor

- Prolongs Duration of **Native GLP-1** Action

Incretin Based Therapy

GLP-1 Analogs (SQ)

Exenatide (Byetta) BID
Liraglutide (Victoza) QD
Lixisenatide (Adlyxin) QD
Exenatide QW (Bydureon) Weekly
Dulaglutide (Trulicity) Weekly
Semaglutide (Ozempic) Weekly

Combinations

Liraglutide + Degludec (Xultophy)
Lixisenatide + Glargine (Soliqua)

Blood Glucose



Weight Loss

Incretin Based Therapy

DPP4 Inhibitors (PO)

Sitagliptin (Januvia)

Saxagliptin (Onglyza)

Linagliptin (Tradjenta)

Alogliptin (Nesina)

Combinations

Many

Blood Glucose

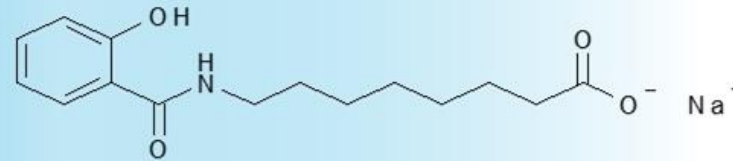


Weight Neutral

Oral Semaglutide (Rybelsus)

FDA Approved Sept 2019

Sodium N-(8-(2-hydroxybenzoyl) Amino) Caprylate (SNAC)



- Co-formulation of semaglutide with an absorption enhancer is necessary to achieve adequate bioavailability of oral administration
- The absorption enhancer, SNAC, is a small fatty acid derivative that promotes absorption across the gastric epithelium
- Oral semaglutide is co-formulated with 300 mg SNAC

SNAC, Sodium N-(8-(2-hydroxybenzoyl) amino) caprylate.
Buckley ST et al. *Sci Transl Med* 2018;10:pii: eaar7047.

Some Practical GLP-1RA Tips

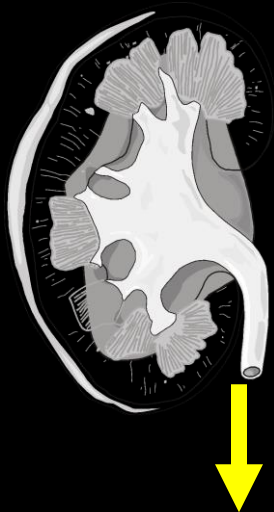
- Nausea is very common
 - Usually gets better w/in a month
 - Reduce meal size by ~50%
 - If vomiting, stop the med!
- Reduce insulin ~20% if starting when diabetes is already fairly well-controlled
- It's an injection – lots of videos online to educate
 - Needle is small!

Sodium Glucose Transporter 2

Inhibitors

Kidneys Filter + Reabsorb Glucose: 180 g/day
SGLT2 (proximal tubules): 90%

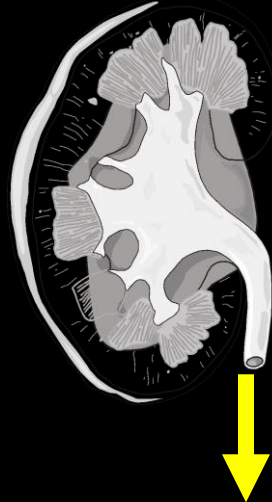
Normal



Glycosuria

BG > 180 mg/dl

SGLT2
Inhibitor



Glycosuria

BG > 80 mg/dl

Glucose Loss

80-100 g/day
320-400 kcal/day

Blood Glucose ↓
Weight Loss

No Renal Damage

GU Infections / UTI

Sodium/Glucose Co-Transporter 2 Inhibitors

<u>Generic</u>	<u>Trade Name</u>	<u>Doses</u>
Canagliflozin mg	Invokana	100, 300
Dapagliflozin	Farxiga	5, 10 mg
Empagliflozin	Jardiance	10, 25 mg
Ertugliflozin	Steglatro	5, 15 mg

DKA with BG 150-250 mg/dl Occasionally with These Agents

Most Common Precipitants: Low Carb Diets, Fasting

Cardiovascular Disease Benefit

Proven

High Risk ASCVD Patients **SGLT2 Inhibitors**

- Empagliflozin (Jardiance)
- Canagliflozin (Invokana)
- Dapagliflozin (Farxiga)

GLP-1 Analogs

- Liraglutide (Victoza)
- Semaglutide (Ozempic)
- Dulaglutide (Trulicity)

Heart Failure Benefit

Proven SGLT2 Inhibitors

- Empagliflozin (Jardiance)
- Canagliflozin (Invokana)
- Dapagliflozin (Farxiga)
- Ertugliflozin (Steglatro)

Davies MJ. Diabetes Care 2018; 41:2669-2701
Diabetes Care 2020 (Jan); 43 (Suppl 1). S1-S204

Chronic Kidney Disease Benefit

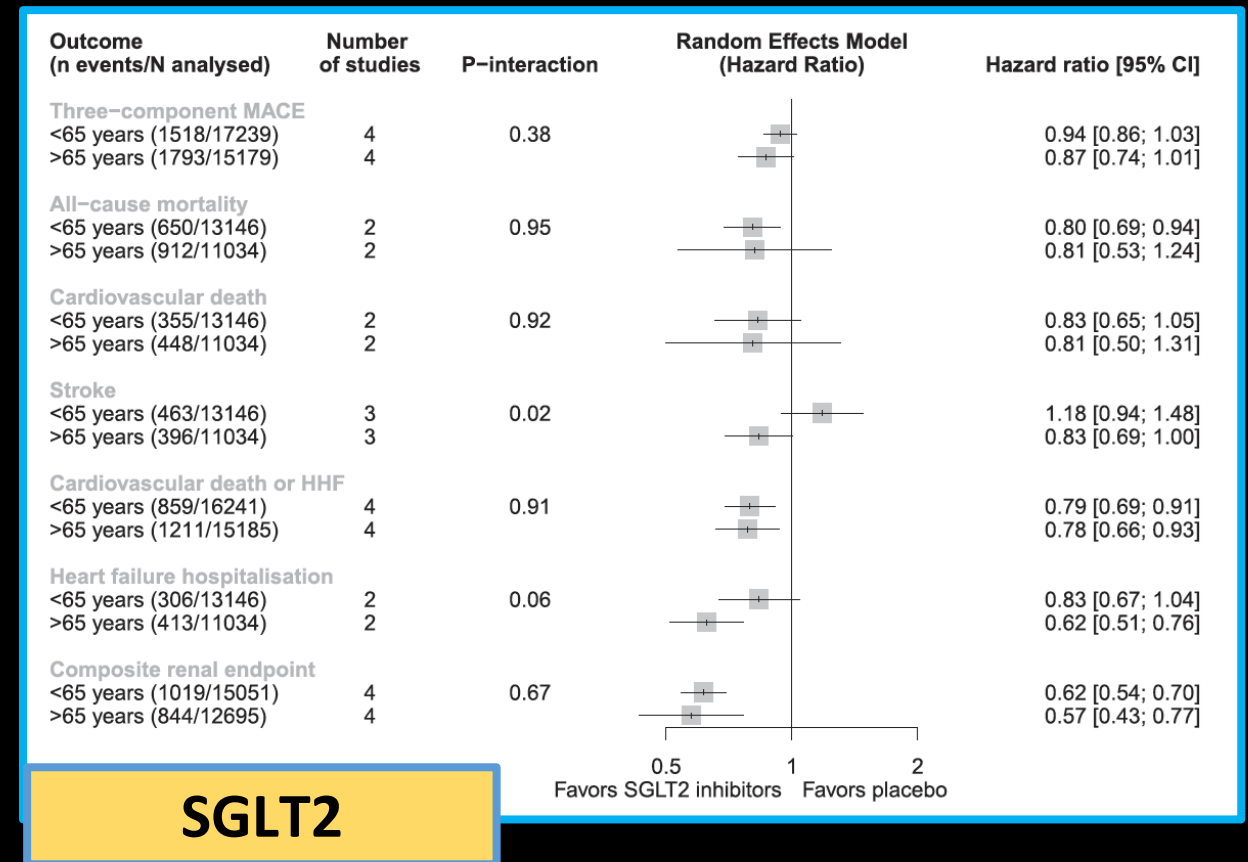
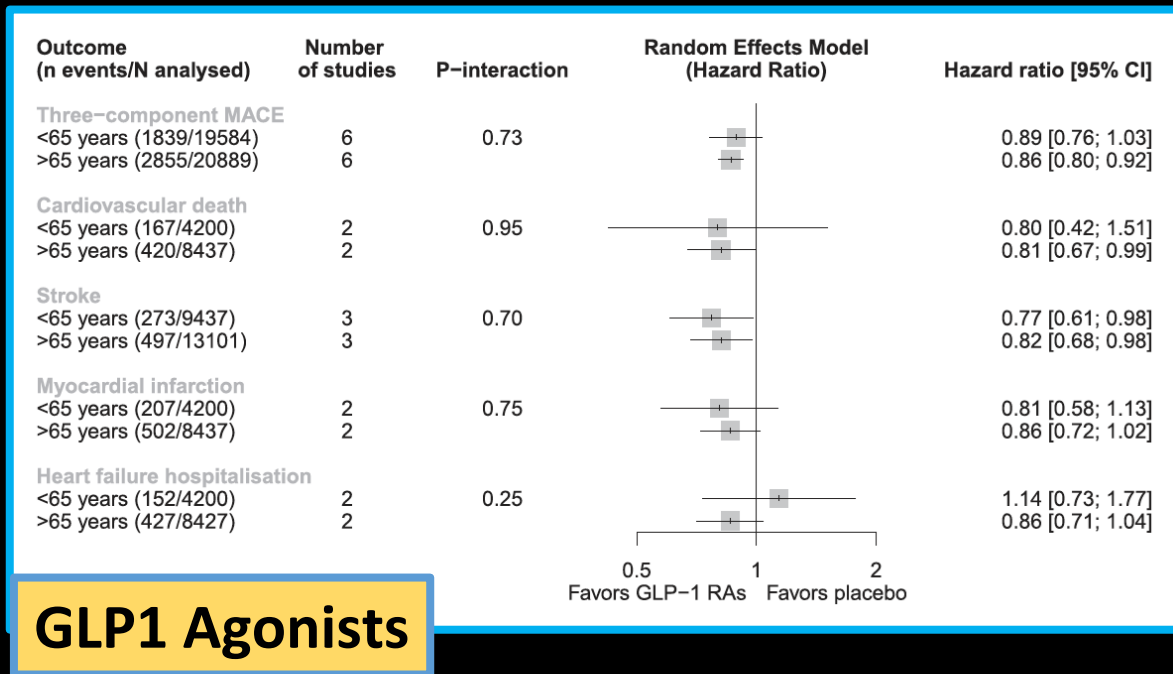
Proven SGLT2 Inhibitors

- Empagliflozin (Jardiance)
- Canagliflozin (Invokana)
- Dapagliflozin (Farxiga)
- Ertugliflozin (Steglatro)

Davies MJ. Diabetes Care 2018; 41:2669-2701
Diabetes Care 2020 (Jan); 43 (Suppl 1). S1-S204

Meta-Analysis of GLP-1 Agonist and SGLT2 Inhibitors in Older Adults

11 studies with >91,000 patients were included



Review of GLP-1 Agonist and SGLT2 Inhibitors in Older Adults

Table 2 – Meta-analysis results versus placebo for patients 75 years or older and patients younger than 75 years.

Outcome	Number of trials	Age categories (n events/N analyzed) ^a	HR	95% CI	P-interaction	I ²
GLP-1 receptor agonists versus placebo						
3-p MACE	2	All patients	0.87	0.79 to 0.97	0.07	40%
		<75 years (2598/22,006)	0.92	0.85 to 0.99		
		≥75 years (448/2086)	0.75	0.61 to 0.92		
SGLT2 inhibitors versus placebo						
3-p MACE	2	All patients	0.91	0.83 to 0.99	0.16	4%
		<75 years (2075/22,432)	0.93	0.85 to 1.02		
		≥75 years (256/1748)	0.77	0.60 to 0.99		
CVD	2	All patients	0.78	0.58 to 1.06	0.94	71%
		<75 years (691/22,432)	0.79	0.52 to 1.20		
		≥75 years (112/1748)	0.77	0.40 to 1.46		
CVDHHF	2	All patients	0.75	0.62 to 0.90	0.83	52%
		<75 years (1089/22,432)	0.76	0.63 to 0.91		
		≥75 years (187/1748)	0.71	0.40 to 1.27		
HHF	2	All patients	0.71	0.61 to 0.83	0.70	0%
		<75 years (607/22,432)	0.72	0.61 to 0.84		
		≥75 years (102/1748)	0.64	0.36 to 1.12		
Renal composite outcome	2	All patients	0.59	0.52 to 0.65	0.49	0%
		<75 years (1147/21,667)	0.59	0.51 to 0.68		
		≥75 years (133/1668)	0.51	0.36 to 0.65		

Abbreviations: HR, hazard ratio; CI, confidence interval; GLP-1, glucagon-like peptide-1; SGLT2, sodium-glucose co-transporter 2; 3-p MACE, 3-point composite of major adverse cardiovascular events; CVD, cardiovascular death; CVDHHF, cardiovascular death or hospitalization for heart failure; HHF, hospitalization for heart failure. ^aNumber of events (n) and patients analyzed (N) are both for intervention and placebo arms.

What About CGMs in Older Adults?

- Medicare expanded CGM coverage and rule changes have made it easier to prescribe
- CGMs can aide “deprescribing” by helping to focus on how diet impacts glucose readings
- CGMs can make insulin use safer

Polling Question

PollEv.com/travisneill338

Do you currently prescribe continuous glucose monitors (i.e. Dexcom CGM or Freestyle Libre) to your patients >65 years old?

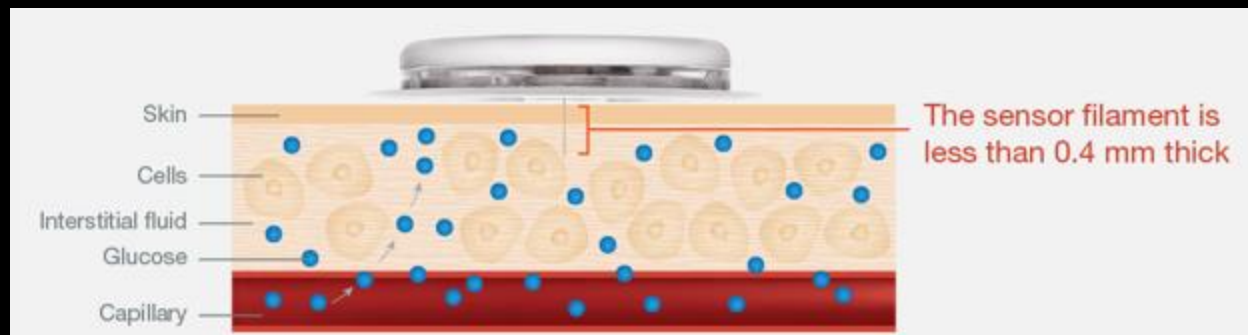
☐ Yes

☐ No

Freestyle Libre & Dexcom G6



Interstitial Glucose Readings



Ambulatory Glucose Profile

GLUCOSE STATISTICS AND TARGETS

26 Feb 2019 - 10 Mar 2019
% Time CGM is Active

13 days
99.9%

Glucose Ranges	Targets [% of Readings (Time/Day)]
Target Range 70-180 mg/dL	Greater than 70% (16hr 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 250 mg/dL	Less than 5% (1hr 12min)

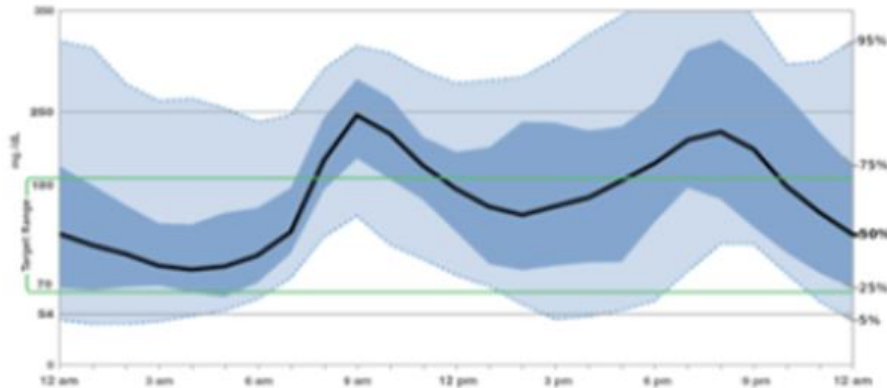
Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.
Average Glucose 173 mg/dL
Glucose Management Indicator (GMI) 7.6%
Glucose Variability 49.5%
Defined as percent coefficient of variation (%CV); target $\leq 36\%$

TIME IN RANGES

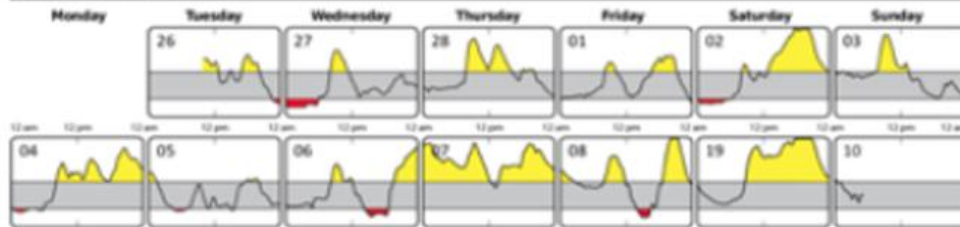


AMBULATORY GLUCOSE PROFILE (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if occurring in a single day.



DAILY GLUCOSE PROFILES



Each daily profile represents a midnight to midnight period.

GLUCOSE STATISTICS AND TARGETS

26 Feb 2019-10 Mar 2019
% Time CGM is Active

13 days
99.9%

Glucose Ranges **Targets [% of Readings (Time/Day)]**

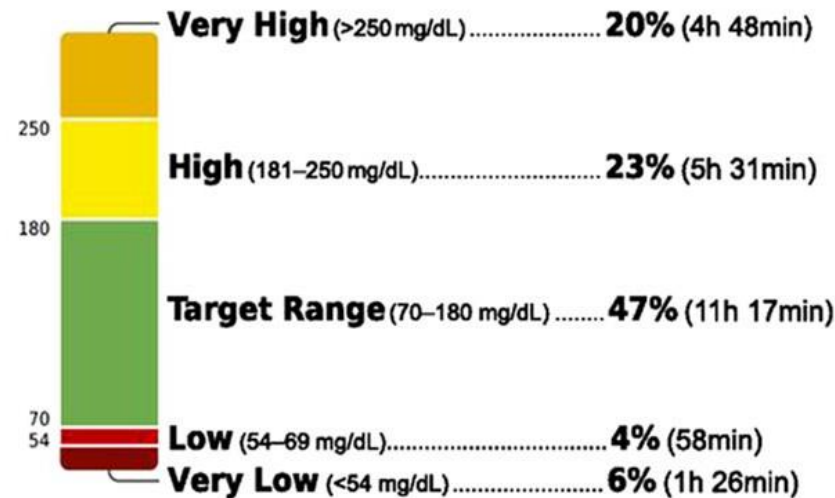
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)

Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.

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TIME IN RANGES

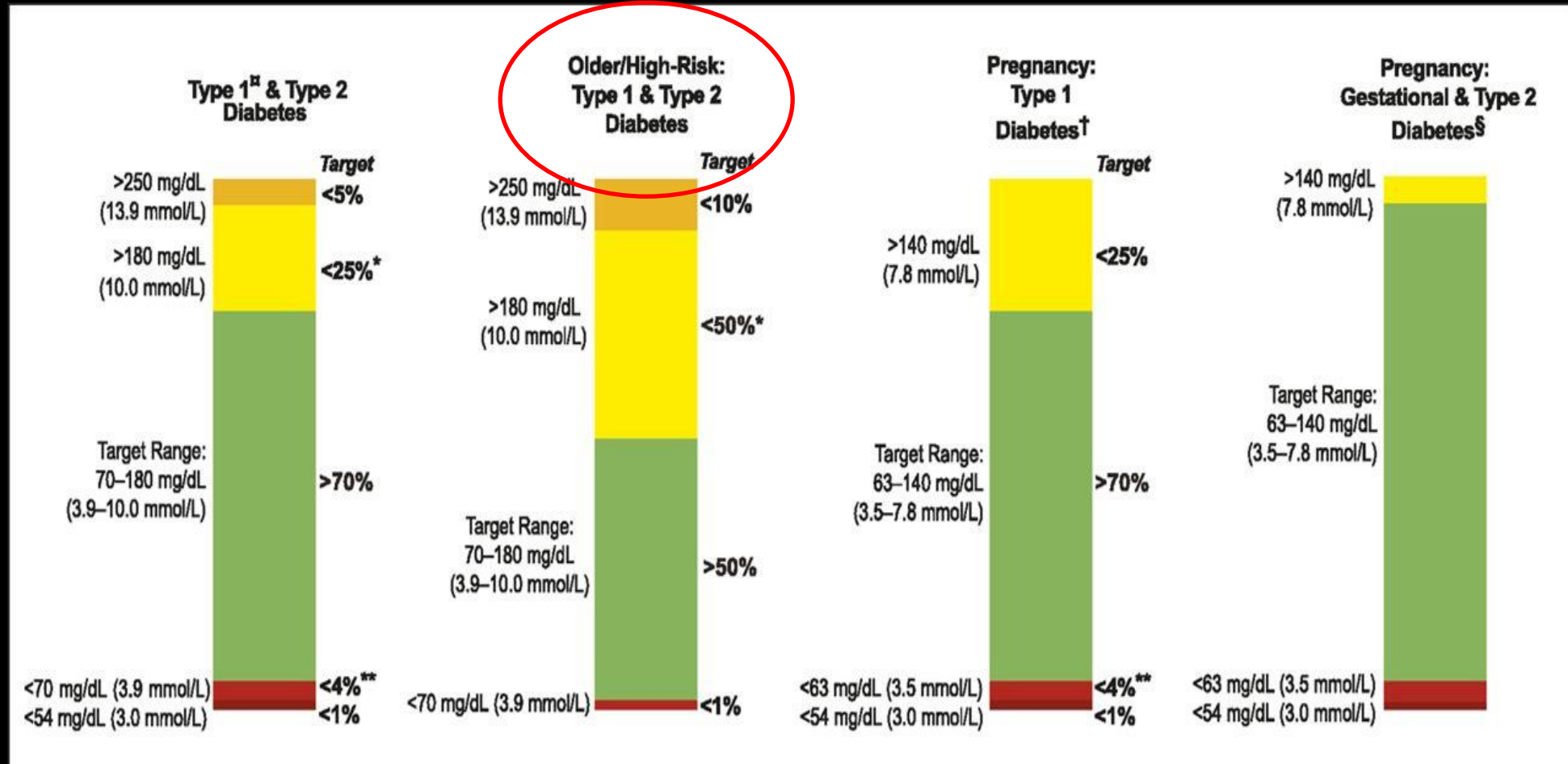


Time In Range (TIR):
time between 70-
180mg/dL

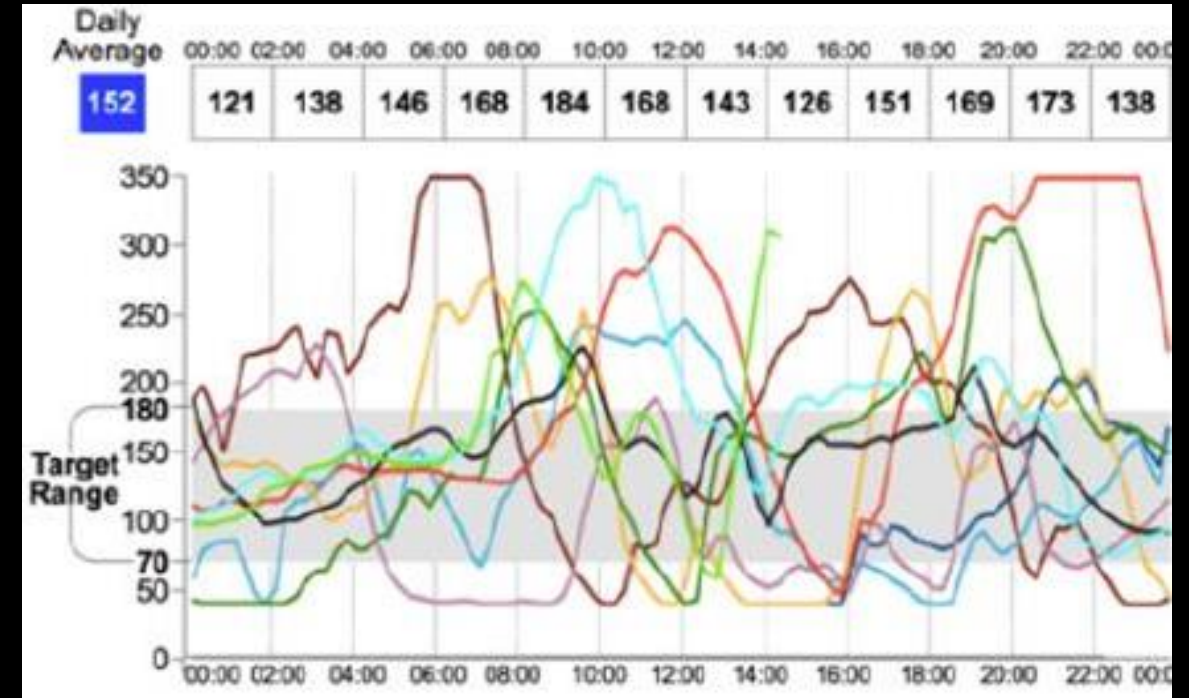
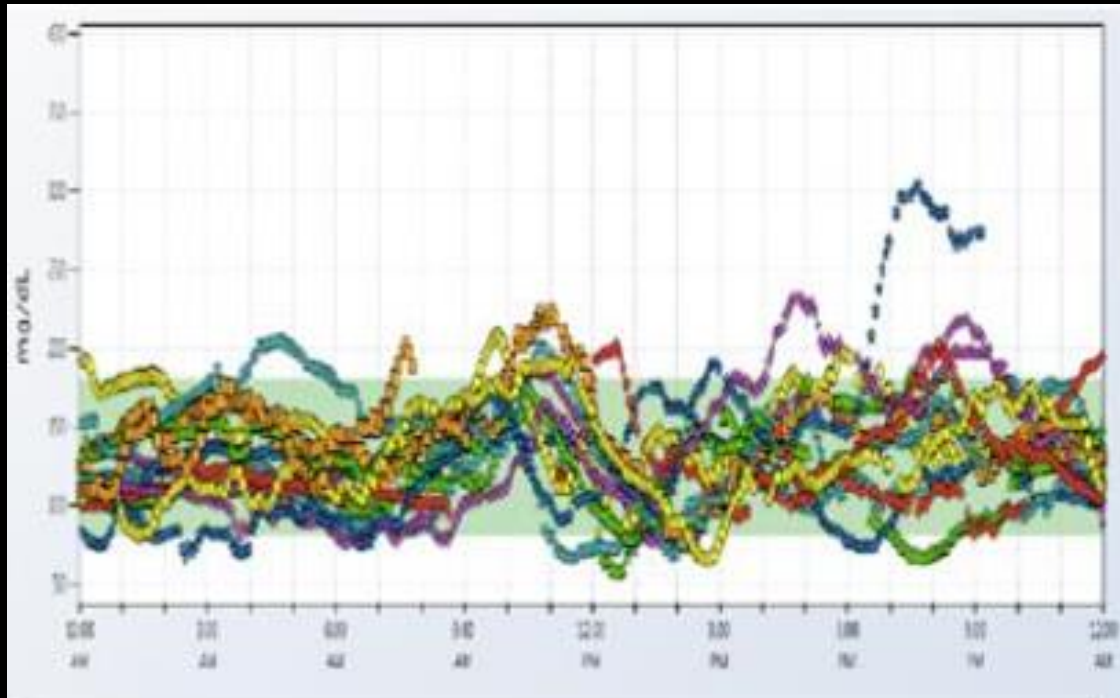
70% TIR ~ 7.0% HbA1c

TIR increase 10% ~
HbA1c decrease 0.8%

CGM Data: Beyond A1c Targets



Case example: CGM overlay from two different patients with A1C 6.8%



Wireless Innovation for Seniors with Type 1 Diabetes Mellitus (WISDM) Study

- 203 participants (median age 68, 52% female)
- A1c 7.5%, 53% on insulin pumps

With CGM:

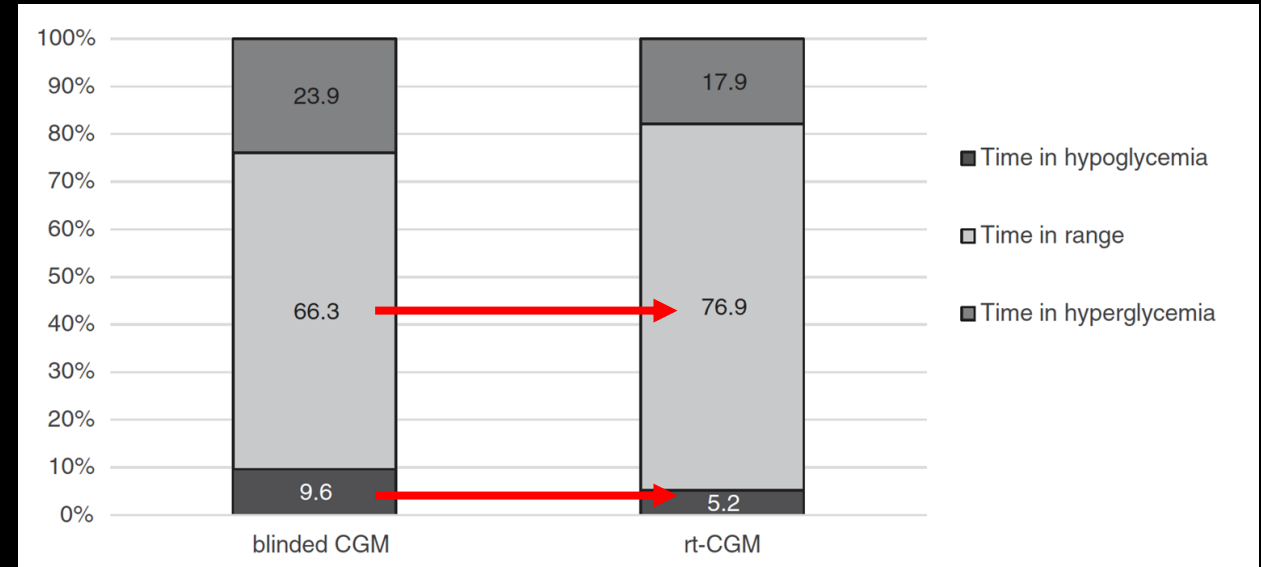
- Median time with glucose levels less than 70mg/dL was 5.1% (73 minutes per day) at baseline and 2.7% (39 minutes per day)
- Mean HbA1c decreased in the CGM group compared with the standard BGM group (adjusted group difference, -0.3%; 95%CI, -0.4% to -0.1%; P <.001).

Acceptability of Continuous Glucose Monitoring in Elderly Diabetes Patients Using Multiple Daily Insulin Injections

MDI-treated elderly (n = 25, mean age 67.6 – 1.2 years, HbA1c = 7.1% – 0.2%, 56% type 1 diabetes) were instructed to use a CGM device.

Results

- Satisfaction w/ CGM was “high” and annoyance was “modest”
- 95% had improved sense of security with CGM use
- 68% with improved sleep quality
- 82% wanted to use CGM after study completion



Potential Benefits & Disadvantages of CGM in Elderly

Benefits

1. Reduction in fingerstick glucose checks (comfort)
2. Alarms to detect hypoglycemia and hyperglycemia
3. Remote monitoring by caregivers / family
4. Better glycemic control

Disadvantages

1. “Too much data”: alarm fatigue and anxiety
2. Cost
3. Technological challenges

Summary

- Several guidelines exist regarding management of diabetes in older adults
- Deintensification is important, but that's not all we should do
 - “Intensify to de-intensity” in some patients
- SGLT2 inhibitors and GLP-1 RAs at the forefront of our care
 - Think about these meds based on co-morbidities
- New technologies – like Freestyle Libre & Dexcom CGM – are revolutionizing glucose monitoring and management
 - Great way to mitigate hypoglycemia risk

Thank you!

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**ADA Standards of Medical
Care: Older Adults (2022)**



**Treatment of Diabetes in
Older Adults: An
Endocrine Society* Clinical
Practice Guideline (2019)**



**CGM Time in Range
Webinars**