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Disclosure of Potential Conflicts of Interest

**Advisory Boards**
- Abbott Diabetes Care
- BioRad
- Lilly
- Mannkind
- Medscape
- NovoNordisk
- Zealand

**Research Funding**
- Dexcom
- vTv Therapeutics
- Devices from Abbott Diabetes Care

**Stock Options**
- Pendulum Therapeutics
- Omada Health
- Stability Health
- Livongo
Established ASCVD/HF/CKD?

Yes

A1C irrelevant
Start GLP-1 RA/SGLT-2 I

No

A1C based therapy
If High-Risk or Established ASCVD, CKD, HF
## CV Outcomes Trials in Diabetes: SGLT-2 I

<table>
<thead>
<tr>
<th>Study</th>
<th>EMPA-REG</th>
<th>CANVAS Program</th>
<th>DECLARE-TIMI</th>
<th>VERTIS-CV</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGLT-2 I</td>
<td>empagliflozin</td>
<td>canagliflozin</td>
<td>dapagliflozin</td>
<td>ertugliflozin</td>
</tr>
<tr>
<td>N Reported</td>
<td>7028</td>
<td>10,142</td>
<td>17,276</td>
<td>2846</td>
</tr>
<tr>
<td>CVOT Outcome</td>
<td>Benefit</td>
<td>Benefit</td>
<td>Benefit</td>
<td>Noninferior</td>
</tr>
<tr>
<td>Renal and HF Outcome</td>
<td>Benefit</td>
<td>Benefit</td>
<td>Benefit</td>
<td>Benefit</td>
</tr>
</tbody>
</table>

EMPRA-REG Trial design

- Study medication was given in addition to standard of care
  - Glucose-lowering therapy was to remain unchanged for first 12 weeks
- Treatment assignment double masked
- The trial was to continue until at least 691 patients experienced an adjudicated primary outcome event
Primary outcome: 3-point MACE

HR 0.86
(95.02% CI 0.74, 0.99)
*p=0.0382*
CV death

**HR 0.62**
(95% CI 0.49, 0.77)

$p<0.0001$

<table>
<thead>
<tr>
<th>No. of patients</th>
<th>Empagliflozin</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>4687</td>
<td>4651</td>
<td>2333</td>
</tr>
<tr>
<td>4608</td>
<td>4608</td>
<td>2303</td>
</tr>
<tr>
<td>4556</td>
<td>4556</td>
<td>2280</td>
</tr>
<tr>
<td>4128</td>
<td>4128</td>
<td>2243</td>
</tr>
<tr>
<td>3079</td>
<td>3079</td>
<td>2012</td>
</tr>
<tr>
<td>2617</td>
<td>2617</td>
<td>1503</td>
</tr>
<tr>
<td>1722</td>
<td>1722</td>
<td>1281</td>
</tr>
<tr>
<td>414</td>
<td>414</td>
<td>825</td>
</tr>
<tr>
<td></td>
<td></td>
<td>177</td>
</tr>
</tbody>
</table>
Hospitalisation for heart failure

HR 0.65
(95% CI 0.50, 0.85)
p = 0.0017

Cumulative incidence function. HR, hazard ratio.
Primary outcome was composite of worse hospitalization for HF or urgent visit resulting in IV treatment for HF or CV death, which occurred in a significantly lower (P < .001) percentage of patients in dapagliflozin (16.3%) vs placebo (21.2%).

DAPA = dapagliflozin; AFib = atrial fibrillation; ECG = electrocardiogram; IV = intravenous.

EMPA-REG OUTCOME: Secondary Outcome
Cumulative Incidence of Incident or Worsening Nephropathy

Incident or worsening nephropathy includes:
- Macroalbuminuria (UACR >300 mg/g)
- Doubling serum creatine + eGFR ≤45 mL/min/1.73 m²
- Renal replacement therapy
- Death due to renal disease

Patients with event* (%)

<table>
<thead>
<tr>
<th>Months</th>
<th>Placebo</th>
<th>Empagliflozin</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>30</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>36</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>42</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>48</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

HR† = 0.61
(95% CI, 0.53–0.70)
P < .001

*Kaplan-Meier estimate; †Hazard ratio based on Cox regression analyses.

## Meta-analysis of Effects of SGLT2 Inhibitors on Major Kidney Outcomes

<table>
<thead>
<tr>
<th>Major kidney outcomes</th>
<th>Events</th>
<th>Patients</th>
<th>RR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialysis, transplantation, or death due to kidney disease</td>
<td>252</td>
<td>38,723</td>
<td>0.67 (0.52–0.86)</td>
</tr>
<tr>
<td>ESKD</td>
<td>335</td>
<td>38,723</td>
<td>0.65 (0.53–0.81)</td>
</tr>
<tr>
<td>Substantial loss of kidney function, ESKD, or death due to kidney disease</td>
<td>967</td>
<td>38,671</td>
<td>0.58 (0.51–0.66)</td>
</tr>
<tr>
<td>Substantial loss of kidney function, ESKD, or death due to CV or kidney disease</td>
<td>2323</td>
<td>38,676</td>
<td>0.71 (0.63–0.82)</td>
</tr>
<tr>
<td>Acute kidney injury</td>
<td>943</td>
<td>38,684</td>
<td>0.75 (0.66–0.85)</td>
</tr>
</tbody>
</table>

RR = relative risk.

## CV Outcomes Trials in Diabetes: GLP1-RA

<table>
<thead>
<tr>
<th>Study</th>
<th>ELIXA</th>
<th>FREEDOM-CVO</th>
<th>LEADER</th>
<th>SUSTAIN 6</th>
<th>EXSCEL</th>
<th>REWIND</th>
</tr>
</thead>
<tbody>
<tr>
<td>GLP1-RA</td>
<td>Lixisenatide</td>
<td>ITCA-650</td>
<td>liraglutide</td>
<td>semaglutide</td>
<td>Exenatide LR</td>
<td>dulaglutide</td>
</tr>
<tr>
<td>N</td>
<td>6,068</td>
<td>~4,000</td>
<td>9,340</td>
<td>3,297</td>
<td>14,752</td>
<td>9,901</td>
</tr>
<tr>
<td>CVOT Outcome</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Benefit In label</td>
<td>Benefit</td>
<td>Neutral</td>
<td>Benefit</td>
</tr>
<tr>
<td>Other</td>
<td>Renal benefit</td>
<td>Worsening retinopathy</td>
<td></td>
<td></td>
<td></td>
<td>31% CVD; A1C = 7.3%</td>
</tr>
</tbody>
</table>

Primary outcome
CV death, non-fatal myocardial infarction, or non-fatal stroke

The primary composite outcome in the time-to-event analysis was the first occurrence of death from cardiovascular causes, non-fatal myocardial infarction, or non-fatal stroke. The cumulative incidences were estimated with the use of the Kaplan–Meier method, and the hazard ratios with the use of the Cox proportional-hazard regression model. The data analyses are truncated at 54 months, because less than 10% of the patients had an observation time beyond 54 months. CI: confidence interval; CV: cardiovascular; HR: hazard ratio.
The cumulative incidences were estimated with the use of the Kaplan–Meier method, and the hazard ratios with the use of the Cox proportional-hazard regression model. The data analyses are truncated at 54 months, because less than 10% of the patients had an observation time beyond 54 months.

CI: confidence interval; CV: cardiovascular; HR: hazard ratio.
Hospitalization for heart failure

The cumulative incidences were estimated with the use of the Kaplan–Meier method, and the hazard ratios with the use of the Cox proportional-hazard regression model. The data analyses are truncated at 54 months, because less than 10% of the patients had an observation time beyond 54 months. CI: confidence interval; HR: hazard ratio.

Presented at the American Diabetes Association 76th Scientific Sessions, Session 3-CT-SY24. June 13 2016, New Orleans, LA, USA.
Time to first renal event
Macroalbuminuria, doubling of serum creatinine, ESRD, renal death

The cumulative incidences were estimated with the use of the Kaplan–Meier method, and the hazard ratios with the use of the Cox proportional-hazard regression model. The data analyses are truncated at 54 months, because less than 10% of the patients had an observation time beyond 54 months. CI: confidence interval; ESRD: end-stage renal disease; HR: hazard ratio.

The graph shows the cumulative risk of renal events over time for patients receiving Liraglutide and Placebo. The hazard ratio (HR) for Liraglutide compared to Placebo is 0.78 with a 95% CI of 0.67–0.92, and a p-value of 0.003.

Patients at risk:
- Liraglutide: 4668, 4635, 4561, 4492, 4400, 4304, 4210, 4114, 1632, 454
- Placebo: 4672, 4643, 4540, 4428, 4316, 4196, 4094, 3990, 1613, 433

Presented at the American Diabetes Association 76th Scientific Sessions, Session 3-CT-SY24. June 13 2016, New Orleans, LA, USA.
Is A1c Enough To Help Us Manage Patients?

**Strengths of A1c**
- Reflects blood glucose concentrations over ~3 months
- Only metric of glycemic control that has been prospectively associated with chronic complications
- Useful for assessing trends in a population over time

**Limitations of A1c**
- Affected by other conditions that affect red blood cell lifespan or interfere with glucose binding to hemoglobin
- A wide range of mean glucose concentrations exist for a given HbA1c level
- Provides no information about hypoglycemia frequency or severity
- May under-represent the burden of hyperglycemia in African-Americans

CGM-measured Mean Glucose Versus Lab-Measured HbA1c

Data from 3 studies with Dexcom G4 (505 software)

N = 387 (315 T1D + 72 T2D)

Dexcom G6 CGM System

- Factory calibrated
- Approved for nonadjunctive use (i.e., don’t need to use blood glucose meter)
- 10 days of sensor use
- Measures glucose concentration every 5 min
- Has alarms for hypoglycemia and hyperglycemia thresholds and alerts for trending high or low
- Can display glucose levels on a receiver, phone, or watch
- Can ‘share’ glucose readings with someone else (e.g., parent, spouse)
Freestyle Libre 1 and 2

- Libre 1 and Libre 2 available
- Must swipe both for reading
- Libre 1 works with reader and smart phone but less accurate in low range, no alarms
- Libre 2 much more accurate but works with reader alone. Has low and high alarm
- Both last for 14 days
Websites for Data Transfer: Libre

CONNECT TO YOUR DOCTOR’S OFFICE WITH:

FreeStyle LibreLink

AND UPLOAD GLUCOSE DATA TO:

LibreView

With the FreeStyle LibreLink app, the “Connect to a Practice” feature lets you easily:

- **CONNECT** to your doctor’s LibreView account with a one-time, easy setup
- **SHARE** your glucose data automatically with your doctor in real time

With the secure LibreView website, you and your doctor can:

- **VIEW AND SHARE** your glucose data in detailed reports
- **USE** the reports to guide informed treatment decisions

*Download on the App Store*  *Get it on Google Play*  *Windows 8.1/10, Mac*
Hospitalizations were 6 times higher and deaths 12 times higher for COVID-19 patients with reported underlying conditions*.

**Most Frequently Reported Underlying Conditions**

- Cardiovascular Disease
- Diabetes
- Chronic Lung Disease

*compared to those with no reported underlying health conditions

CDC.GOV

bit.ly/MMWR61520

MMWR
Current CDC List of Conditions that Cause an Increased Risk of Severe Illness from COVID-19

- Cancer
- CKD
- COPD
- Heart Conditions
- Immunocompromised state from a solid organ transplant
- Obesity—BMI of 30 – 40 kg/m²
- Severe Obesity—BMI > 40 kg/m²
- Sickle Cell Disease
- Smoking
- T2DM
Current CDC List of Conditions that Might Increase the Risk of Severe Illness from COVID-19

- Asthma (moderate to severe)
- Cerebrovascular disease
- Cystic fibrosis
- HTN
- Immunocompromised state (HIV/Steroids/bone marrow transplant/other meds/etc)
- Neurologic conditions such as dementia
- Liver disease
- Overweight BMI 25 – 30 kg/m²
- Pregnancy
- Pulmonary fibrosis
- Thalessemia
- T1DM
CDC Risk for Hospitalization

COVID-19 ASSOCIATED HOSPITALIZATION RELATED TO UNDERLYING MEDICAL CONDITIONS

RISK FOR HOSPITALIZATION IF YOU HAVE ANY OF THESE CONDITIONS AND GET COVID-19 COMPARED TO PEOPLE WITHOUT THE CONDITION(S).

- Asthma: 1.5x
- Hypertension (BMI ≥ 30): 3x
- Obesity (BMI ≥ 40): 3x
- Diabetes: 3x
- Chronic Kidney Disease: 4x
- Severe Obesity (BMI ≥ 40): 4.5x
- 2 Conditions*: 4.5x
- 3 or More Conditions*: 5x

*Conditions include asthma, obesity, diabetes, chronic kidney disease, severe obesity, coronary artery disease, history of stroke and COPD.

Data has shown that racial and ethnic minority groups with the referenced conditions are at even higher risk for severe COVID-19 illness. Race and ethnicity are risk markers for other underlying conditions that impact health — including socioeconomic status, access to health care, and increased exposure to the virus due to occupation (e.g., frontline, essential, and critical infrastructure workers).

# CDC Impact of Ethnicity

## COVID-19 Cases, Hospitalization, and Death by Race/Ethnicity

### Factors That Increase Community Spread and Individual Risk

<table>
<thead>
<tr>
<th>Rate Ratios Compared to White, Non-Hispanic Persons</th>
<th>American Indian or Alaska Native, Non-Hispanic Persons</th>
<th>Asian, Non-Hispanic Persons</th>
<th>Black or African American, Non-Hispanic Persons</th>
<th>Hispanic or Latino Persons</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cases</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td>2.8x higher</td>
<td>1.1x higher</td>
<td>2.6x higher</td>
<td>2.8x higher</td>
</tr>
<tr>
<td><strong>Hospitalization</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td>5.3x higher</td>
<td>1.3x higher</td>
<td>4.7x higher</td>
<td>4.6x higher</td>
</tr>
<tr>
<td><strong>Death</strong>&lt;sup&gt;3&lt;/sup&gt;</td>
<td>1.4x higher</td>
<td>No Increase</td>
<td>2.1x higher</td>
<td>1.1x higher</td>
</tr>
</tbody>
</table>

Race and ethnicity are risk markers for other underlying conditions that impact health — including socioeconomic status, access to health care, and increased exposure to the virus due to occupation (e.g., frontline, essential, and critical infrastructure workers).

COVID-19 Dashboard

DHS COVID Demographics by Race/Ethnicity
(March 1 – October 10, 2020)

COVID Cases Hospitalized by Race/Ethnicity (% of patients)

- American Indian or Alaska Native: 11%
- Asian: 6%
- Black or African American: 3%
- Hispanic: 5%
- White: 2%
- Other: 6%
- Unknown: 7%

COVID Cases Hospitalized by Race/Ethnicity & ICU Admission (% of patients)

- American Indian or Alaska Native: 0% Hospitalized, 0% Admitted to the ICU
- Asian: 3% Hospitalized, 5% Admitted to the ICU
- Black or African American: 6% Hospitalized, 5% Admitted to the ICU
- Hispanic: 73% Hospitalized, 70% Admitted to the ICU
- White: 2% Hospitalized, 1% Admitted to the ICU
- Other: 11% Hospitalized, 12% Admitted to the ICU
- Unknown: 5% Hospitalized, 7% Admitted to the ICU

1 Data source: Los Angeles County Health Services
A1C and Risk of Death in China

- Patients in Hubei Province
- 6,385 without T2DM. (A1C = 6.1%)
- 952 with T2DM (A1C = 7.9%)
- 282 well-controlled (A1C = 7.3%) (3.9 – 10); 528 poorly controlled (A1C = 8.1%) (3.9 - >10).
- 250 well-controlled matched with 250 poorly controlled patients (1:1 propensity score-matched analysis)
Survival Curves

Adjusted HR, 0.14 (95% CI, 0.03 - 0.60)
P = 0.008

No. at risk
Well-controlled 250 249 242 241 232 228 223 222
Poorly-controlled 250 248 240 239 223 217 214 211

Cell Metabolism 31:1068-1077, 2020
COVID Deaths Associated with DM in the UK

Figure 1: Unadjusted in-hospital COVID-19 mortality rates, March 1 to May 11, 2020, by diabetes status. Error bars show 95% CIs. Data for age groups 0–39 years and 40–49 years for type 1 diabetes and 0–39 years and 50–59 years for no diabetes have been excluded because of small numbers of events (one to four), to comply with data protection regulations.

The Lancet August 2020 DOI:https://doi.org/10.1016/S2213-8587(20)30272-2
## COVID Deaths in the UK—T2DM

<table>
<thead>
<tr>
<th>Type 2 diabetes</th>
<th>Hazard ratio (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.61 (1.54−1.67)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Female</td>
<td>1 (ref)</td>
<td></td>
</tr>
<tr>
<td><strong>Age, years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40</td>
<td>0.18 (0.12−0.27)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>40–49</td>
<td>0.25 (0.20−0.31)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>50–59</td>
<td>0.52 (0.47−0.58)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>60–69</td>
<td>1 (ref)</td>
<td></td>
</tr>
<tr>
<td>70–79</td>
<td>1.94 (1.81−2.08)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>≥80</td>
<td>4.52 (4.23−4.84)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Index of multiple deprivation quintile</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (most deprived)</td>
<td>1.46 (1.37−1.56)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>2</td>
<td>1.28 (1.20−1.37)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>3</td>
<td>1.08 (1.01−1.16)</td>
<td>0.029</td>
</tr>
<tr>
<td>4</td>
<td>1.01 (0.94−1.08)</td>
<td>0.78</td>
</tr>
<tr>
<td>5 (least deprived)</td>
<td>1 (ref)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>1.08 (1.01−1.15)</td>
<td>0.021</td>
</tr>
<tr>
<td>Black</td>
<td>1.63 (1.51−1.77)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Mixed</td>
<td>1.30 (1.19−1.55)</td>
<td>0.0027</td>
</tr>
<tr>
<td>Other*</td>
<td>1.01 (0.86−1.18)</td>
<td>0.91</td>
</tr>
<tr>
<td>White</td>
<td>1 (ref)</td>
<td></td>
</tr>
<tr>
<td><strong>HbA1c, mmol/mol</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;48</td>
<td>1.11 (1.05−1.18)</td>
<td>0.0005</td>
</tr>
<tr>
<td>48–53</td>
<td>1.05 (0.97−1.13)</td>
<td>0.23</td>
</tr>
<tr>
<td>54–58</td>
<td>1.22 (1.15−1.30)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>59–74</td>
<td>1.36 (1.24−1.50)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>75–85</td>
<td>1.61 (1.47−1.77)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>≥86</td>
<td>1 (ref)</td>
<td></td>
</tr>
<tr>
<td><strong>eGFR, mL/min per 1.73 m²</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥90</td>
<td>1.02 (0.96−1.08)</td>
<td>0.51</td>
</tr>
<tr>
<td>60–89</td>
<td>1.39 (1.30−1.49)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>45–59</td>
<td>1.76 (1.63−1.89)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>30–44</td>
<td>2.31 (2.10−2.54)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>15–29</td>
<td>4.92 (4.34−5.56)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>&lt;15</td>
<td>1 (ref)</td>
<td></td>
</tr>
<tr>
<td><strong>BMI, kg/m²</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20.0</td>
<td>2.33 (2.11−2.56)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>20.0–24.9</td>
<td>1.34 (1.27−1.42)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>25.0–29.9</td>
<td>1 (ref)</td>
<td></td>
</tr>
<tr>
<td>30.0–34.9</td>
<td>1.04 (0.98−1.10)</td>
<td>0.23</td>
</tr>
<tr>
<td>35.0–39.9</td>
<td>1.17 (1.08−1.26)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>≥40</td>
<td>1.66 (1.43−1.95)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
March 2020: A New Era in Medicine
Monthly Telehealth Tracker

Volume of Claim Lines, 2019 vs. 2020

Percent Change (2019-2020)  
8335.51%  13.00%

Percent of medical claim lines
0%  2%  4%  6%  8%  10%  12%  14%

Apr. 2019  Apr. 2020

https://www.fairhealth.org/states-by-the-numbers/telehealth
HOW TO CONDUCT A VIRTUAL CLINIC: A HEALTH CARE PROFESSIONAL'S GUIDE

STEP 1-BEFORE
• Review the electronic medical records
• Review blood test results
• Review patient notes
• Review last clinic consultation
• Review action points from the last consultation–have they been actioned?
• Review medication changes
• Establish reason(s) for the consultation

STEP 2-IMMEDIATELY BEFORE: SET-UP THE ENVIRONMENT AND TECHNOLOGY
• Identify a suitable location for the video consultation
• How many rooms are available and what technology is available in these rooms?
• Are the patient’s notes available?
• Set-up your virtual clinic system
• Set-up the webcam and audio headset
• Login to the electronic health records
• What type of clinic is it, how many patients are there, and how many health care professionals participating in the clinic?
• Is there an MDT present or available if needed?
• What has been communicated to the patient–what time is their appointment and are you running on time?

STEP 3-DURING
• The following recommendations for how to undertake the virtual clinic consultations are adapted from best practice models for consultation models in primary care, including the Cambridge Calgary model and Neighbour models (Denness 2013).
• Introduce yourself
• Check patient details–DOB and name
• Check the signal and connection
• Establish informed consent to proceed with virtual consultation: implied, verbal or informed consent
• Build rapport throughout
• Clarify reason for the consultation from the HCP and patient perspectives
• Gather information
• Establish patient’s ideas, concerns, and expectations, and understand this in light of the biopsychosocial context
• Respond to cues
• COVID-19 screening questions and consider direction to acute services if necessary
• Health promotion and health education
• Identify the key issues and problems
• Formulate a management plan with the patient
• Make use of resources available, eg. patient information leaflets and resources
• Explain how further investigations will be arranged
• Explain everything in a way the patient can understand
• Summarize as you go along and check understanding
• Outline when the next clinic appointment will be
• Final checklist of questions–quick checks about contact numbers, prescriptions, ketone meter
• Have the patients details changed?
• Safety netting (advise given to patient, to prevent further complications if their condition fails to improve)

STEP 4-AFTER
• Reflect on the consultation and housekeeping–prepare for the next virtual consultation
• Action outputs, for example, blood tests and forms, request imaging, writing prescriptions, and ensuring these get to the patient or right professional.
• Dictate the clinic letter
• Chase results of investigations

FDA NEWS RELEASE

Coronavirus (COVID-19) Update: FDA allows expanded use of devices to monitor patients’ vital signs remotely

For Immediate Release: March 20, 2020
Continuous Glucose Monitors and Automated Insulin Dosing Systems in the Hospital Consensus Guideline

Abstract

This article is the work product of the Continuous Glucose Monitor and Automated Insulin Dosing Systems in the Hospital Consensus Guideline Panel, which was organized by Diabetes Technology Society and met virtually on April 23, 2020. The guideline panel consisted of 24 international experts in the use of continuous glucose monitors (CGMs) and automated insulin dosing (AID) systems representing adult endocrinology, pediatric endocrinology, obstetrics and gynecology, advanced practice nursing, diabetes care and education, clinical chemistry, bioengineering, and product liability law. The panelists reviewed the medical literature pertaining to five topics: (1) continuation of home CGMs after hospitalization, (2) initiation of CGMs in the hospital, (3) continuation of AID systems in the hospital, (4) logistics and hands-on care of hospitalized patients using CGMs and AID systems, and (5) data management of CGMs and AID systems in the hospital. The panelists then developed three types of recommendations for each topic, including
Early Real-World Logistics of Inpatient CGM

Placement of sensor
- Skilled endocrine NP
- Proning trend $\rightarrow$ arm placement

Placement of receiver
- On door facing out, within 20 feet
- Re-used receiver (after cleaning)

Alerts (100 mg/dL to 250 mg/dL, drop/rise)

Slide courtesy of Dr. Shivani Agarwal
Outpatient Diabetes “ICU”

- New onset or out of control/sick patients
- Use CGM/InPen as much as possible
- Followed daily by my diabetes team
- Feedback provided/adjustments made via telemedicine/email
- Once stable patients go back to routine follow-up
87 year old on oral agents

GLUCOSE STATISTICS AND TARGETS

<table>
<thead>
<tr>
<th>Range</th>
<th>% Compliant</th>
<th>Type 1 or Type 2 Diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 70 mg/dL</td>
<td>2.8%</td>
<td>More than 70% (56/80)</td>
</tr>
<tr>
<td>Between 70 and 180 mg/dL</td>
<td>97.7%</td>
<td>Less than 7% (1/80)</td>
</tr>
<tr>
<td>Above 180 mg/dL</td>
<td>0.5%</td>
<td>Less than 2% (1/80)</td>
</tr>
</tbody>
</table>

Average Glucose: 130 mg/dL
Glucose Management Indicator (GMI): 3.7%

AMBULATORY GLUCOSE PROFILE (AGP)

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

DAILY GLUCOSE PROFILES

Each daily profile represents a midnight to midnight period with the same day shown in the upper left corner.

Reaction to COVID

AGP Report
October 5, 2020 - October 18, 2020 (14 Days)

GLUCOSE STATISTICS AND TARGETS

October 5, 2020 - October 18, 2020 14 Days
% Time CGM is Active 60%

Ranges And Targets For Glucose Ranges
- Type 1 or Type 2 Diabetes

- Target Range 70-180 mg/dL

- Average Glucose 214 mg/dL
- Glucose Management Indicator (GMI) 8.4%
- Glucose Variability 21.2%

TIME IN RANGES

- Very High >250 mg/dL 22% (9h 17min)
- High 181 - 250 mg/dL 47% (11h 17min)
- Target Range 70 - 180 mg/dL 31% (7h 28min)
- Low 54 - 69 mg/dL 0% (0min)
- Very Low <54 mg/dL 0% (0min)

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 with the data displayed in the upper-left corner.

- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Sunday

New Onset Diabetes with COVID-19

DAILY GLUCOSE PROFILES

Each daily profile represents a midnight to midnight period with the date displayed in the upper left corner.
First Two Weeks

**AGP Report**

July 8, 2020 - July 21, 2020 (14 Days)

**GLUCOSE STATISTICS AND TARGETS**

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<tr>
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<tr>
<td>Glucose Ranges</td>
<td>Targets % of Readings (Time/Day)</td>
</tr>
<tr>
<td>Target Range 70-180 mg/dL</td>
<td>Greater than 70% (16h 48min)</td>
</tr>
<tr>
<td>Below 70 mg/dL</td>
<td>Less than 4% (58min)</td>
</tr>
<tr>
<td>Below 54 mg/dL</td>
<td>Less than 1% (14min)</td>
</tr>
<tr>
<td>Above 180 mg/dL</td>
<td>Less than 25% (8h)</td>
</tr>
<tr>
<td>Above 250 mg/dL</td>
<td>Less than 5% (1h 12min)</td>
</tr>
</tbody>
</table>

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

**Average Glucose**

261 mg/dL

**Glucose Management Indicator (GMI)**

9.6%

**Glucose Variability**

23.6%

**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.
4 – 6 Weeks Later

**AGP Report**

*August 1, 2020 - August 14, 2020 (14 Days)*

**GLUCOSE STATISTICS AND TARGETS**

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<tr>
<td>Below 70 mg/dL</td>
<td>Less than 4% (56min)</td>
</tr>
<tr>
<td>Below 54 mg/dL</td>
<td>Less than 1% (14min)</td>
</tr>
<tr>
<td>Above 180 mg/dL</td>
<td>Less than 25% (6h)</td>
</tr>
<tr>
<td>Above 250 mg/dL</td>
<td>Less than 5% (1h 12min)</td>
</tr>
</tbody>
</table>

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

**Average Glucose** 105 mg/dL

**Glucose Management Indicator (GMI)** 5.8%

**Glucose Variability** 16.1%

Defined as percent coefficient of variation (%CV); target ≤36%

**TIME IN RANGES**

- **Very High** >250 mg/dL: 0% (0min)
- **High** 181 - 250 mg/dL: 0% (0min)
- **Target Range** 70 - 180 mg/dL: 100% (24h)
- **Low** 54 - 69 mg/dL: 0% (0min)
- **Very Low** <54 mg/dL: 0% (0min)

**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.
New Onset T1D

### GLUCOSE STATISTICS AND TARGETS

**August 10, 2020 - August 16, 2020**

- **7 Days**
- **60%** % Time CGM is Active

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<td>Less than 25% (8h)</td>
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<tr>
<td>Above 250 mg/dL</td>
<td>Less than 5% (1h 12min)</td>
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</tbody>
</table>

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

- **Average Glucose** 315 mg/dL
- **Glucose Management Indicator (GMI)** -
- **Glucose Variability** 17.5%

### TIME IN RANGES

- **Very High** >250 mg/dL: 88% (21h 7min)
- **High** 181 - 250 mg/dL: 12% (2h 53min)
- **Target Range** 70 - 180 mg/dL: 0% (0min)
- **Low** 54 - 69 mg/dL: 0% (0min)
- **Very Low** <54 mg/dL: 0% (0min)

### 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 with the date displayed in the upper left corner.

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<tbody>
<tr>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>
New Onset T1D

FRI Aug 14

Glucose mg/dL

Carbs grams

Long-Acting Insulin

Notes

SAT Aug 15

Glucose mg/dL

Carbs grams

Long-Acting Insulin

Notes
Depression and Recurrent Severe Hypoglycemia

GLUCOSE STATISTICS AND TARGETS

September 21, 2020 - October 4, 2020
14 Days

% Time CGM is Active
93%

Ranges And Targets For Type 1 or Type 2 Diabetes

Glucose Range
Target Range (70-180 mg/dl)
Below 70 mg/dl
Less than 4% (daily)
Below 54 mg/dl
Less than 1% (daily)
Above 180 mg/dl
Less than 25% (daily)
Above 230 mg/dl
Less than 1% (daily)

Each 0.5% increase in time in range (70/180 mg/dL) (a clinically relevant threshold)

Average Glucose
115 mg/dL
Glucose Management Indicator (GMI)
6.1%
Glucose Variability
37.3%

TIME IN RANGES

High
181 - 230 mg/dL
8% (13 days)

Target Range
76 - 180 mg/dL
76% (10 days)

Very Low
<54 mg/dL
5% (9 days)

AMBULATORY GLUCOSE PROFILE (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown.Each profile is for a single day.

DAILY GLUCOSE PROFILES

Each daily profile represents a single day from the data displayed in the upper left corner.

Relapse
Sacropenia and COVID

COVID-19 Containment Measures

Increased Time at Home

- Physical activity ↓
- Step count ↓
- Sitting time ↑
- Screen time ↑
- Sun exposure ↓
- Stress/Anxiety ↑
- Sleep quality ↓
- Meal frequency ↑
- Snacking ↑
- Ultra-processed foods ↑
- Protein % ↓

Muscle Protein Synthesis
- Vitamin D ↓
- Insulin sensitivity ↓
- mTORc1 ↓
- Anabolic hormones (testosterone etc.) ↓
- Cortisol ↑
- Oxidative stress ↑
- Proinflammatory cytokines (IL-6, TNF-α, CRP etc.) ↑

Muscle Protein Breakdown
- ↓↓

Skeletal Muscle
- Loss of muscle mass & function
- Sarcopenia
- Adipose tissue accumulation
- Sarcopenic obesity
- Normal muscle mass

Chronic calorie excess

Cardiovascular Disease ↑
Osteoporosis & Fractures ↑
Physical Frailty ↑
Cognitive Decline & Depression ↑
Risk of COVID-19 ↑
Diabetes ↑
Quality of Life ↓

Mechanisms of muscle loss

Lifestyle behaviour change

Acute body composition changes

Longterm health risks
Sacropenia and COVID

What to do going forward

• Create systems to get everyone who needs them on SGLT-2 inhibitors/GLP-1RA’s due to glucose/renal/cardiac/HF benefits
• Use CGM widely for remote monitoring as well as real-time adjusting
• Develop hybrid systems of in-person and telemedicine visits that can be customized to the individual patient
• Focus on the mental health components to care—an increasing concern
THANK YOU