Diabetes and Hypertension Project ECHO* Clinic

*ECHO: Extension of Community Healthcare Outcomes

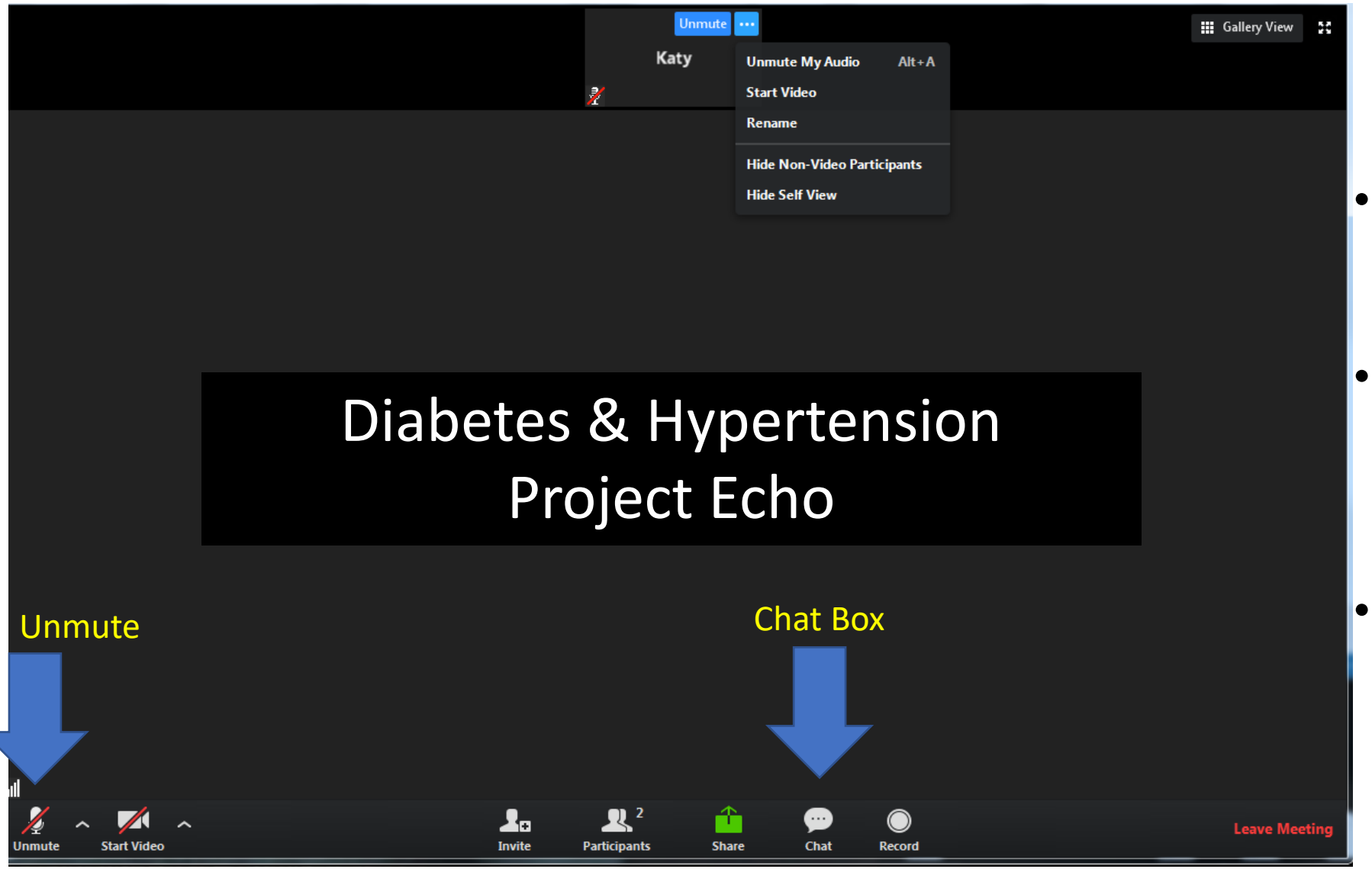
September 14, 2023

Before we begin:

- Rename your Zoom screen with your name and organization
- Claim CE:
- Go to **vcuhealth.org/echodmhtn** for instructions on creatin your account

The Diabetes and Hypertension ECHO is made possible by funding through CDC Cooperative Agreement NU58DP006620-InnoVAte.

Zoom Reminders



- You are all on mute. Please unmute to talk.
- If joining by telephone audio only, press *6 to mute and unmute.
- Use the chat function to speak with our team or ask questions.

Helpful Reminders

- Please feel free to eat your lunch or step away briefly if needed
- We are recording and can share sessions upon request
  - Each session's slides are available on www.vcuhealth.org/echodmhtn
- Please **do not share any protected health information** in your discussion or the chat box
- Project ECHO operates on the "All Teach, All Learn" model
  - Feel free to ask questions in the chat or unmute to ask questions at designated times
  - We're all here to learn from each other and value each person's input and expertise!

Disclosures

Trang Le, M.D., has no financial conflicts of interest to disclose.

There is no commercial or in-kind support for this activity.

VCU Health Diabetes & Hypertension ECHO Clinics

VCU Hub Team	
Principal Investigator	Dave Dixon, PharmD
Clinical Experts	Niraj Kothari, MD Trang Le, MD
Program Coordinator	Sydney Weber

- One-hour ECHO clinics on 2nd Thursdays
- Every ECHO clinic includes a didactic presentation followed by case discussions
- Website: www.vcuhealth.org/echodmhtn
  - Directions for claiming CE :
  - You have up to six days after our session to claim CE by **texting 29391-2819** to **804-625-4041**

https://VCU.cloud-cme.com/WebService/SelfAttendScan.aspx?EventID=29391

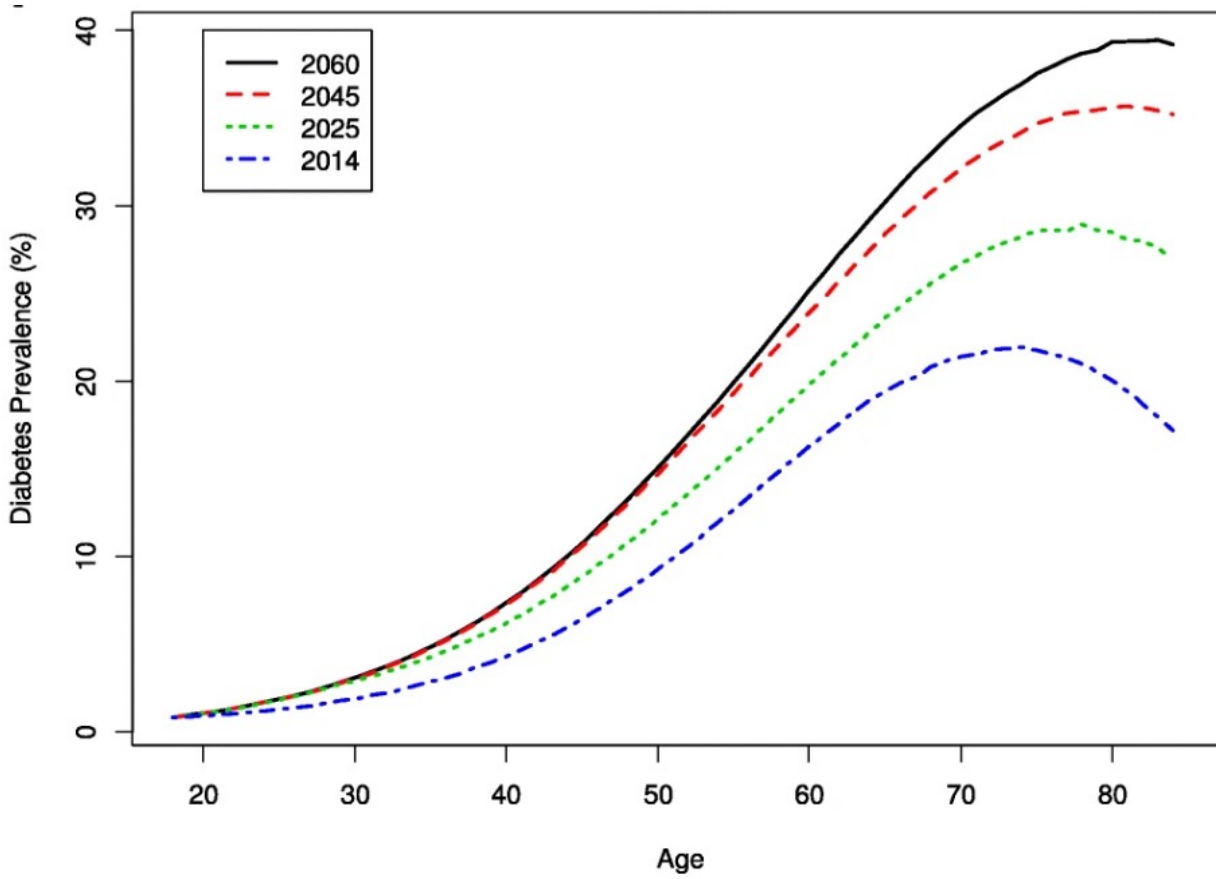
The Future of Diabetes Care

Learning objectives

- Describe the expected changes in epidemiology of diabetes over the next few decades
- Review emerging diabetes technologies
- Discuss new medications awaiting approval for use in treatment of diabetes

Diabetes in the US

- 1980 – 5.5 million
- 2014 – 21.9 million
- By 2060, projected to be 60.6 million (17.9% of US population)
- Age 65+ will have larger increases in number and % prevalence



J. Lin et al, *Population Health Metrics* **volume 16**, Article number: 9 (2018)

Projections of type 1 and type 2 diabetes burden in the U.S. population aged <20 years through 2060: The SEARCH for Diabetes in Youth Study

Objective

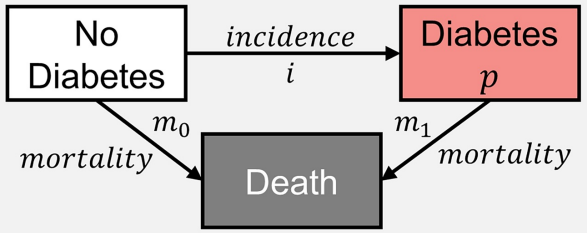
To project the prevalence and number of youth aged <20 years with diabetes through 2060

Input data

Prevalence in 2017 and incidence between 2002 and 2017 by

- Diabetes type
- Age
- Sex
- Race and ethnicity

Illness-Death Model



Two projection scenarios:

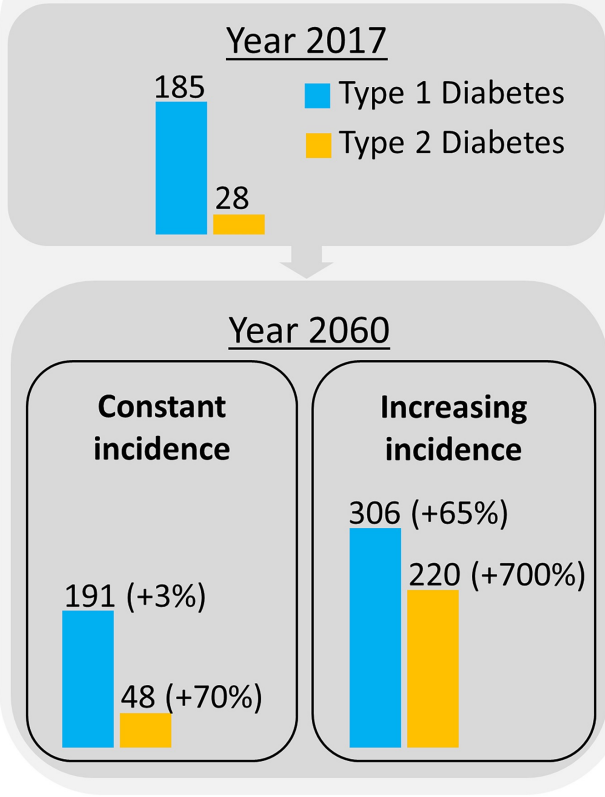
1. Constant incidence:

   Incidence remains constant between 2017 and 2060

2. Increasing incidence:

   Incidence continues to increase as observed between 2002 and 2017

Number of cases in 1,000s



*predicted a higher burden of type 2 diabetes for Black, Hispanic/Latino, Asian, Pacific Islander, and American Indian/Alaska Native youth

Diabetes Care. 2022;46(2):313-320. doi:10.2337/dc22-0945

Diabetes Technology

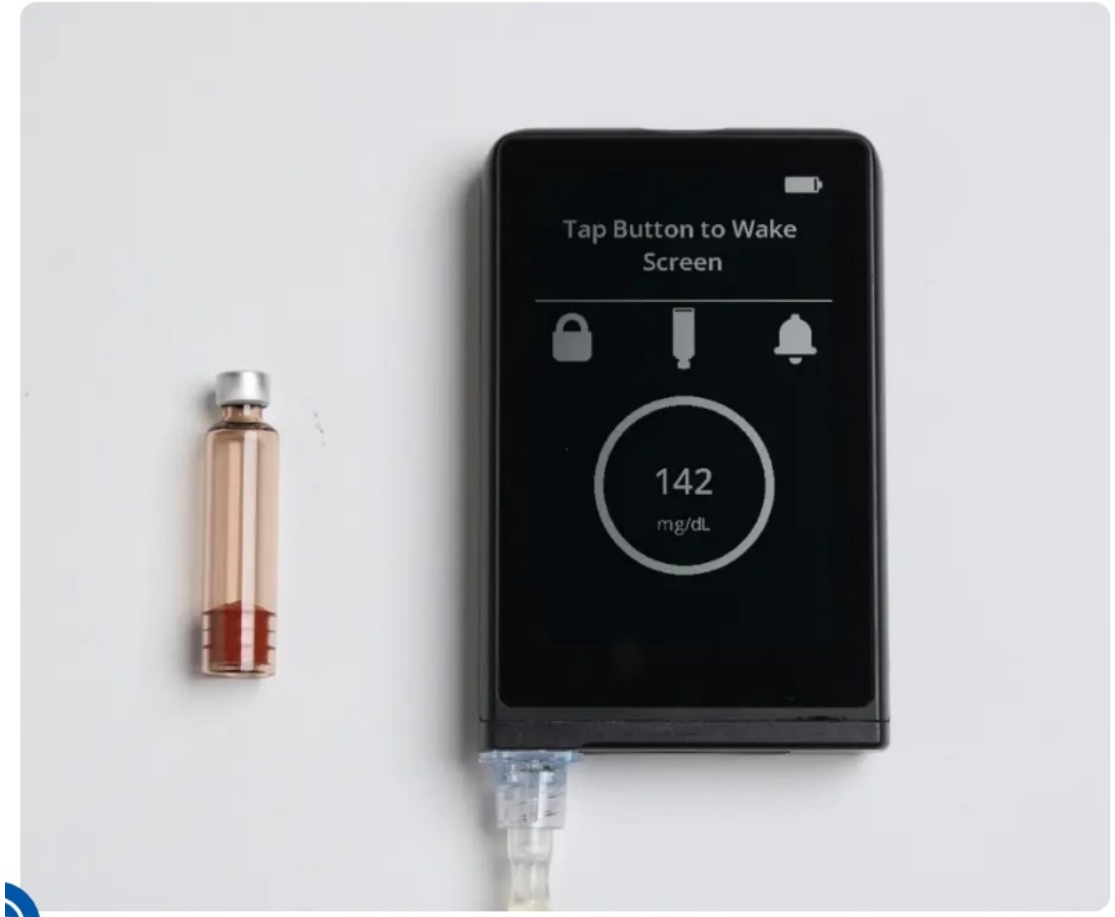
Question

- Success with hybrid-closed loop insulin pump systems which are integrated with continuous glucose monitors (CGMs) require which of the following?
- A. Ability to count carbs
- B. Calibration of the CGM at least twice daily, to ensure accurate data is transmitted to the pump software algorithm for insulin adjustments
- C. Neither – pumps are fully automated and CGMs no longer require fingerstick glucose calibration or data entry from the patient

Hybrid closed loop systems

- All still require some type of carb entry
- Newest market entry: iLet insulin pump

iLet Bionic Pancreas



What is a bionic pancreas?

It's the future of insulin therapy.

No more:

- ⊗ Carb Counting*
- ⊗ Correction Factors
- ⊗ Carb Ratios
- ⊗ Pre-set Basal Rates

or any of the other settings that might be overwhelming about other insulin delivery devices.

The iLet needs only one number - your weight.

*User must be carb aware.

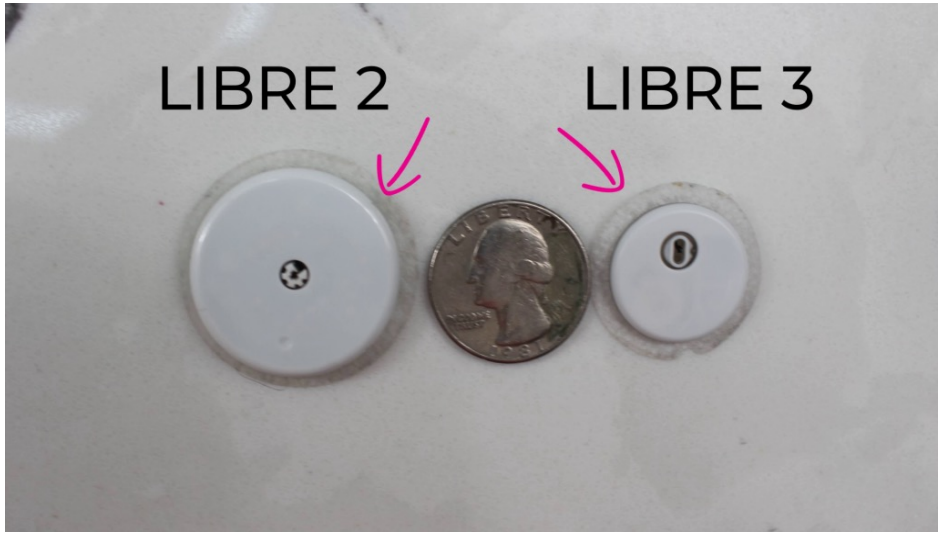
https://www.betabionics.com/ilet-bionic-pancreas/ilet-adults/

iLet Bionic Pancreas

- Approved for T1DM aged 6 years and up
- No basal rate settings / adjustments or carb ratio / correction factors can be made
- NOT approved for T2DM (yet)
- Dexcom G6 compatible only
- Still requires “meal announcement” – patient must enter “more”, “less”, or “normal” amount of carbs per meal

CGM

- CGM users in the US was about 38% of people with type 1 diabetes in 2018.
- That has risen to 80% in 2022



https://www.diabeteseducator.org/danatech/glucose-monitoring/continuous-glucose-monitors-%28cgm%29/cgm-selection-training/dexcom-g7-libre-3-comparison

CGM – current state

	Dexcom G7	Dexcom G6	Senseonics Eversense (US)	Freestyle Libre 2	Freestyle Libre 3
Fingerstick Calibration	0 - Factory Calibrated	0 - Factory Calibrated	2/day minimum	0 - Factory Calibrated	0 - Factory Calibrated
Medicare coverage	Yes	Yes	No	Yes	Yes
Warmup	30 minutes	2 Hours	24 hours after implantation	1 hour	1 hour
Wear length	10 days	10 days	90 Days	14 Days	14 Days
On-body form and transmitter design	~3 stacked quarters, one-press insertion **Fully disposable transmitter** integrated with sensor patch	Eraser-sized transmitter, one-button inserter **Three-month use transmitter separate from sensor**	Sensor inserted by a healthcare professional Rechargeable, watchface-sized transmitter separate from sensor	~2 stacked quarters, one-press insertion **Fully disposable transmitter** integrated with sensor patch	~2 stacked pennies, one-press insertion **Fully disposable transmitter** integrated with sensor patch

Question

- Which of the following locations are FDA approved for CGM placement?
- A. Arm only
- B. Abdomen
- C. Both
- D. Depends on CGM

CGM placement

- Libre – Back of arm only
- Dexcom – Back of arm, abdomen,
  - children are approved for use on upper buttocks

CGM – what's next

- Dexcom G7+ = 16 day sensor
- Libre – integration with insulin pumps
- Abbott – CGM with continuous ketone monitoring, clinical trials underway
- Noninvasive CGM – still in development:
  - Optical glucose monitoring: when a noninvasive measurement involves passing a type of radiation into a vascular region of the body (Raman spectroscopy)
  - Noninvasive fluid sampling (NIFS-GM): analyzes a fluid sample (tears, sweat, saliva, urine, etc.) that's collected without an invasive procedure
  - Volatile organic compounds (VOCs) in exhaled breath have been identified that correlated with glucose levels and can be measured


Noninvasive Glucometer
Идёт измерение
Вытащите палец и вставьте снова
33%
ПРОДОЛЖИТЬ

Medications on the horizon

Once weekly icodec insulin

JAMA®

QUESTION How does once-weekly insulin icodec compare with once-daily insulin degludec in glucose-lowering efficacy (hemoglobin A_{1c} [HbA_{1c}]) in adults with insulin-naive type 2 diabetes?

CONCLUSION Among people with insulin-naive type 2 diabetes, once-weekly icodec demonstrated superior HbA_{1c} reduction to once-daily degludec after 26 weeks of treatment, with no difference in weight change and a higher rate of combined level 2 or 3 hypoglycemic events.

POPULATION

369 Men
219 Women

Insulin-naive adults with type 2 diabetes and HbA_{1c} of 7.0% to 11.0% treated with noninsulin glucose-lowering agents

Mean age: **58** years

LOCATIONS

92
Medical sites
in 11 countries

INTERVENTION

588 Participants randomized

294
Icodec
Once-weekly icodec and once-daily placebo via subcutaneous injections

294
Degludec
Once-daily degludec and once-weekly placebo via subcutaneous injections

PRIMARY OUTCOME

Change in mean HbA_{1c} from baseline (week 0) to week 26 (noninferiority margin, 0.3 percentage points)

FINDINGS

Change in mean HbA_{1c}

Icodec	Degludec
Baseline ▸ 8.6%	Baseline ▸ 8.5%
6 months ▸ 7.0%	6 months ▸ 7.2%
Estimated change, −1.6 percentage points	Estimated change, −1.4 percentage points

Icodec was found to be noninferior ($P < .001$) and superior ($P = .002$) to degludec:

Estimated treatment difference,
−0.2 percentage points (95% CI, −0.3 to −0.1)

Lingvay I, Asong M, Desouza C, et al. Once-weekly insulin icodec vs once-daily insulin degludec in adults with insulin-naive type 2 diabetes: the ONWARDS 3 randomized clinical trial. *JAMA*. Published online July 24, 2022. doi:10.1001/jama.2023.11313

Once weekly icodec insulin – secondary endpoints

- Body weight change not different from baseline to week 26

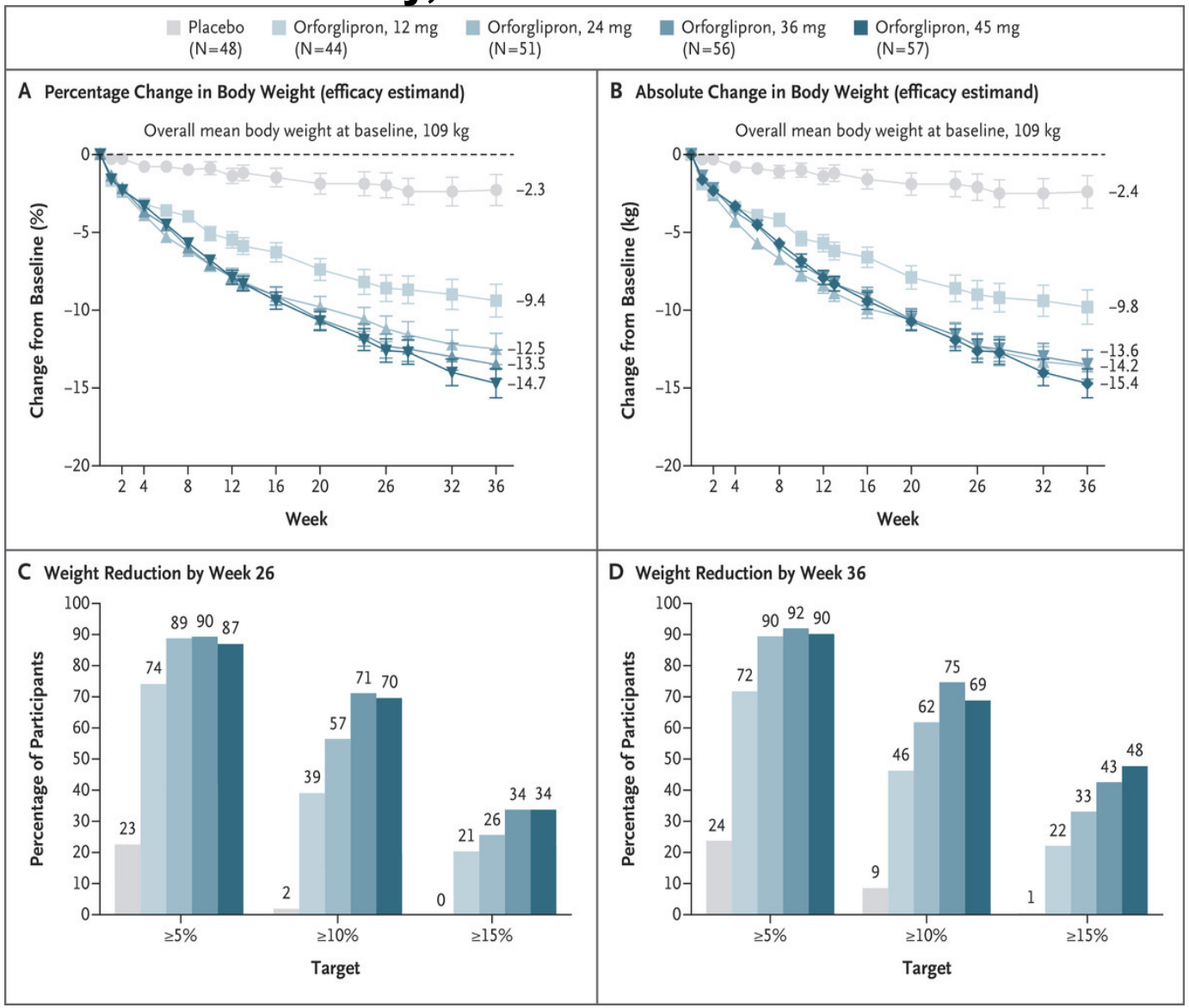
  (2.8 kg vs 2.3 kg; estimated treatment difference, 0.46 [95% CI, −0.19 to 1.10] kg; *P* = .17

- Combined level 2 or 3 hypoglycemia rates:
  - numerically higher in the icodec group than the degludec group from week 0 to 31 (0.31 vs 0.15 events per patient-year exposure; *P* = .11)
  - statistically higher in the icodec group from week 0 to 26 (0.35 vs 0.12 events per patient-year exposure; *P* = .01)

Question

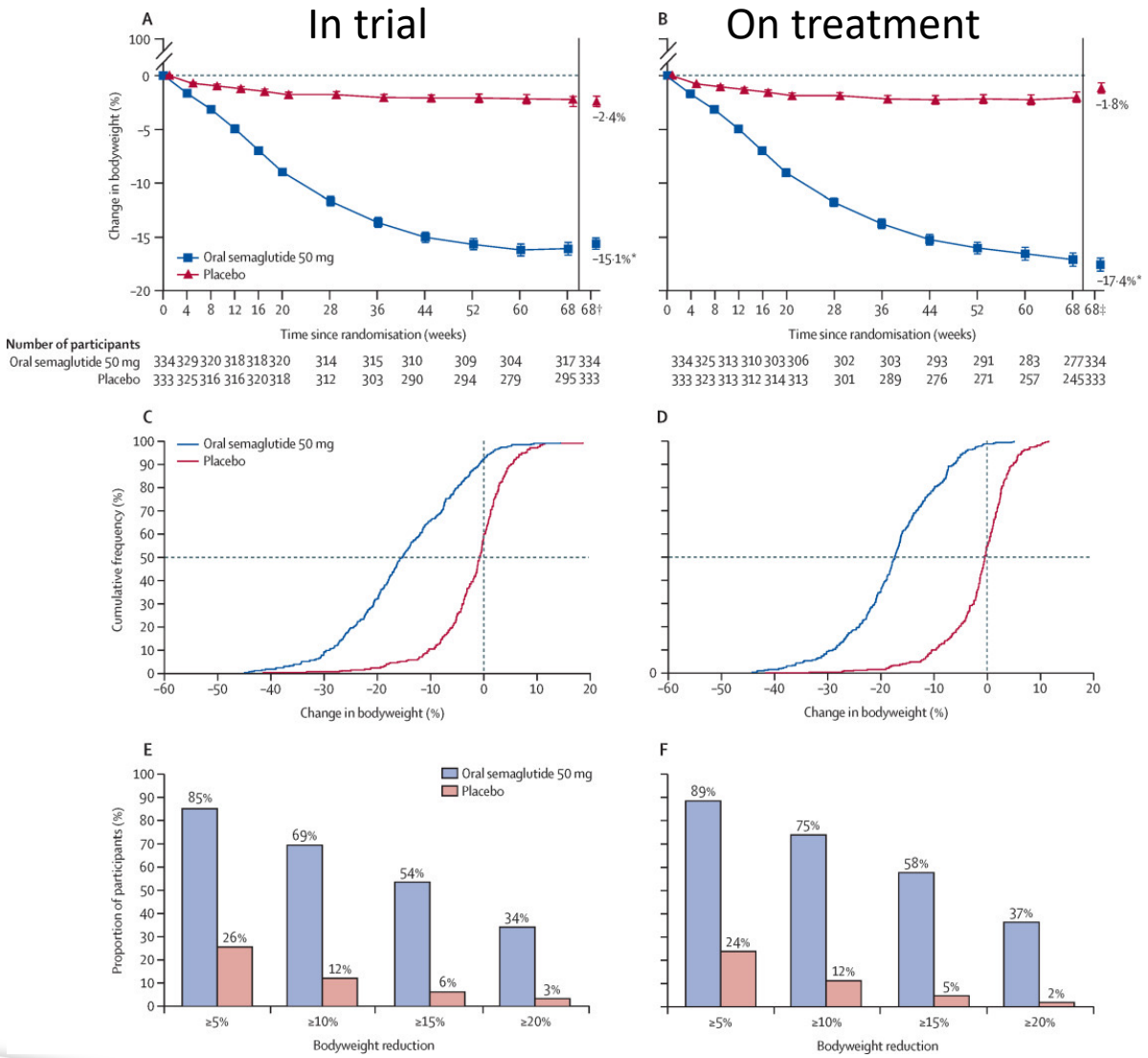
- Which of the following are FDA approved for WEIGHT LOSS and do not require presence of type 2 diabetes?
- A. Wegovy (semaglutide)
- B. Rybelsus (semaglutide, oral)
- C. Mounjaro (tirzepatide)
- D. Ozempic (semaglutide, injectable)

Change in Body Weight with Daily Oral Orforglipron (oral GLP-1RA) vs Placebo for Adults with Obesity, without Diabetes



S Wharton et al. N Engl J Med 2023;389:877-888.

Oral semaglutide 50 mg once daily in adults with overweight or obesity (OASIS 1) WITHOUT T2DM



- randomized, double-blind, placebo-controlled, phase 3 trial
- Once daily pill + lifestyle intervention, 68 weeks
- n=334 in placebo vs 333 in placebo
- most frequently reported events with oral semaglutide 50 mg were gastrointestinal related (nausea, constipation, diarrhea, and vomiting)
- reported side effects peaked during dose escalation
- Current FDA approved max dose semaglutide = 14mg daily for T2DM, avg 4-6 % weight loss

Lancet Volume 402, Issue 10403, 26 August–1 September 2023, Pages 705-719

Tirzepetaide (Mounjaro)

- FDA is expected to review and potentially approve it for weight loss WITHOUT diabetes in late 2023.
- Wegovy is approved for chronic weight management in adults and adolescents ages 12 and older.

Summary

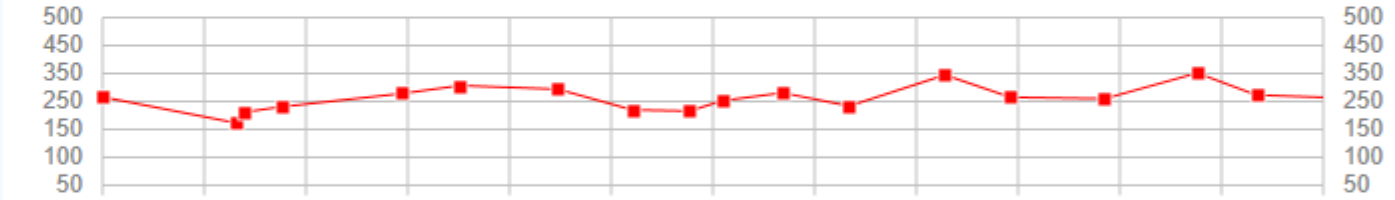
- Diabetes incidence / prevalence is continuing to increase at an alarming rate
- Diabetes technologies are shifting towards less active patient involvement
- Indications for GLP1-RA both oral and injectable will be expanded

Case Studies

Case 1: 60 yo M with idiopathic pulmonary fibrosis and T2DM

- Admitted for IPF flare, received IV methylprednisolone 60mg BID x 3 days, then 60mg x 1 day, then prednisone 50mg, to be followed by steroid taper after discharge:
  - Prednisone 50 mg 8/31 through 9/6
  - Prednisone 40 mg x 7 days
  - Prednisone 30 mg x 7 days
  - Prednisone 20 mg x 7 days
  - Prednisone 10 mg x 7 days
  - Prednisone 5 mg x 7 days
- T2DM x 15 years, on glyburide 2.5mg BID + metformin 1000mg BID, with A1c 5.8%, Cr 1.03, eGFR 78. Weight 115kg

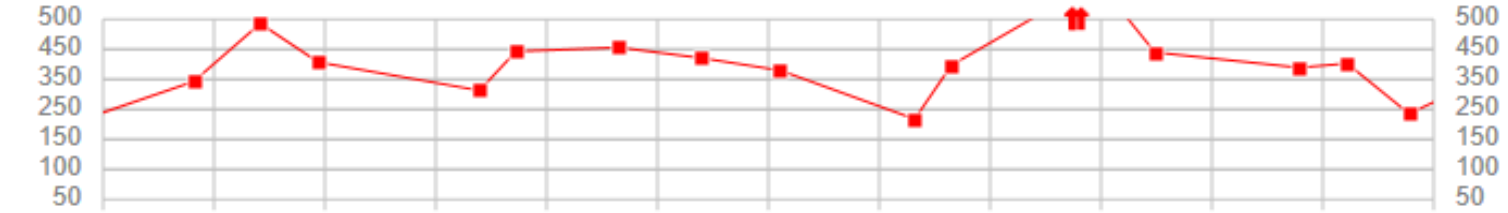
Started on insulin while inpatient, on steroids

6h: ◀	08/26	08/26 0701 - 08/27 0700				08/27 0701 - 08/28 0700				08/28 0701 - 08/29 0700			▶
	0101	0701	1301	1901	0101	0701	1301	1901	0101	0701	1301	1901	
Correction Insulin													
Insulin Lispro INJ (Units)			4	13		4	6	4	6		14		Insulin Lispro INJ (Units)
Basal Insulin													
Insulin Glargine SC (Units)				10				10				10	Insulin Glargine SC (Units)
Glucose (mg/dL)													
Glucose													
Glucose (mg/dL)													
Glucose (mg/dL)	266	231	279	307	294	216	281	234	265	260	352	273	Glucose (mg/dL)
Glucocorticoids													
methylPREDNISolone Sodium Succ INJ (mg)	40		60		60		60		60		60		methylPREDNISolone Sodium Succ INJ (...
Diet													

Questions / next steps?

Escalation in correction doses of insulin

VCU Medical Center Medical Intermediate and Intensive Care

6h:	08/31 0701 - 09/01 0700			09/01 0701 - 09/02 0700				09/02 0701 - 09/03 0700				09/03	
	1301	1901	0101	0701	1301	1901	0101	0701	1301	1901	0101	0701	
Prandial Insulin													
insulin lispro solution (Units) (Units)									5				insulin lispro solution (Units) (Units)
Correction Insulin													
Insulin Lispro INJ (Units)	7			17	10	6			10			12	Insulin Lispro INJ (Units)
Basal Insulin													
Insulin Glargine SC (Units)		10				15							Insulin Glargine SC (Units)
Insulin NPH Human (Isophane) SC (Units)								35		10		50	Insulin NPH Human (Isophane) SC (Units)
Glucose (mg/dL)													
Glucose													
Glucose (mg/dL)													
Glucose (mg/dL)	343	407		443	453	421	380	397	598	440	389	236	Glucose (mg/dL)
Glucocorticoids													
PredniSONE (mg)				50				50				50	PredniSONE (mg)

Trial of NPH given at same time as prednisone, 0.1 units/kg per 10mg prednisone to max of 40 mg prednisone

Post discharge

- Did require addition of low dose 10 units NPH in the evening
- Follow up phone call: fasting AM glucose 93, midday 182
- Recommendations: Stop bedtime dose NPH, advised prednisone and NPH should be given at the same time in the morning
- Starting 9/7: Prednisone 40mg: NPH 40 units in the morning.
- Starting 9/14: Prednisone 30mg: NPH 30 units in the morning
- Starting 9/21:Prednisone 20mg: NPH 20 units in the morning
- Starting 9/28: Prednisone 10mg: NPH 10 units in the morning
- Starting 10/5: Prednisone 5mg: Stop NPH
- Resumed metformin

Questions / next steps?

Case 2: 57-year-old lady with lupus, fibromyalgia, hypothyroidism, depression, Class 1 obesity, and type 2 diabetes

-->T2DM Diagnosed 3 years previously, preceded by gestational diabetes requiring insulin treatment only during pregnancy,

- Medications:
  - Farxiga (dapagliflozin) 10mg daily
  - Glipizide 10mg BID
  - Metformin 1000mg BID
- Context: Today's hemoglobin A1c 8.7%, progressed over the last few years,
- Patient does report previous significant improvement in glycemia when she lost 84 pounds by cutting out sugar sweetened beverages
- detailed glucose logs brought in, checking up to 4 times daily, and reports that she has had glucose values ranging from 100s–400s range

Questions / next steps?

Case 2

- Discontinue glipizide,
- Continue Metformin and dapagliflozin,
- Start Trulicity (dulaglutide), 0.75 mg once weekly
- Instructed on use of insulin pen, in case we need to start insulin between now and next visit based on ongoing glucose review

Questions / next steps?

- Hospitalized 1 month later in DKA
- GAD-65 antibodies 4722u/mL (normal <5)
- ZnT8 antibodies >500 (negative <15)

Questions?

Provide Feedback

www.vcuhealth.org/echodmhtn

- Feedback
  - Overall feedback related to session content and flow?
  - Ideas for guest speakers?

Send us your feedback

vcuhealth.org/services/telehealth/for-providers/education/diabetes-and-hypertension-project-echo

For Providers

- Education
  - **Diabetes and Hypertension Project ECHO**
    - Our Team
    - Curriculum
    - Claiming CE Credit
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  - VCU Nursing Home ECHO
  - VCU Health Palliative Care ECHO
  - Virginia Opioid Addiction ECHO
  - Virginia Sickle Cell Disease ECHO

Diabetes and Hypertension Project ECHO

Welcome to the Diabetes and Hypertension Extension for Community Health Outcomes or ECHO, a virtual network of multidisciplinary diabetes and hypertension experts. An ECHO model connects professionals with each other in real-time collaborative virtual sessions on Zoom. Participants present de-identified cases to one another, share resources, connect to each other, and grow in their expertise. This ECHO will address practice level issues and solutions related to managing complex patients with difficult to control diabetes and hypertension. Register now for an ECHO Session!

Network, Participate and Present

- Engage in a collaborative community with your peers.
- Listen, learn and discuss informational and case presentations in real-time.
- Take the opportunity to submit your de-identified case study for feedback from a team of specialists for diabetes and hypertension.
- Provide valuable feedback.
- Claim CE credit by texting in attendance.

Benefits

Thank you for coming!

Reminder: Mute and Unmute to talk
Press *6 for phone audio
Use chat function for questions