# CME Series

# Frontline Excellence in Ambulatory Chronic Disease Management Module 1: Heart Failure and Diabetes

November 11, 2020
6:00pm-7:30pm

Mount Sinai Health Partners

# Agenda

- Welcome and Introduction
- Heart Failure Types, Office and Medication Management, Referrals and Multidisciplinary Teamwork
- Heart Failure Rapid Follow Up Clinic Overview
  - Q&A Session
- Diabetes Type II: Medication Management and Newer Medication Options, Including Cardiac Benefits
  - Q&A Session

# Poll Question: What best describes your role?

A) Primary Care Physician
B) Specialist Physician
C) Advanced Practice Provider (NP, PA, APN, Clinical Pharmacist)
D) Allied Health Professionals (including CDEs)
E) Non-Clinical Staff

# Heart Failure Types, Office and Medication Management, Referrals and Multidisciplinary Teamwork

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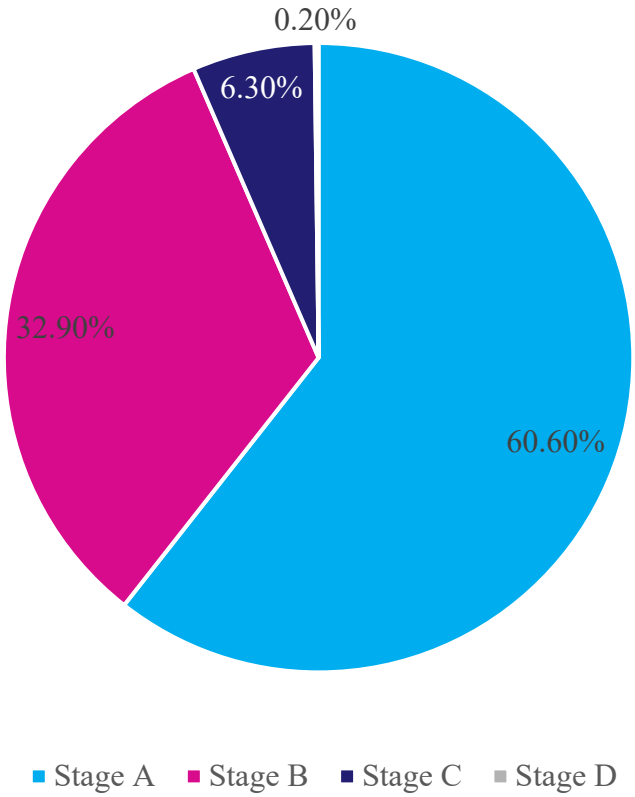
Mount Sinai Health Partners

# No relevant financial disclosures or conflicts of interest

# Stages of Heart Failure

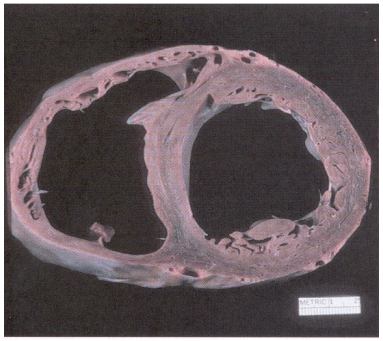
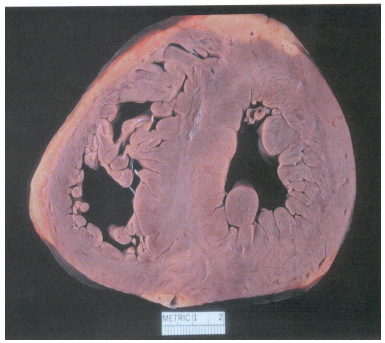
| Stage | Description | Treatment |
|---|---|---|
| A<br>*At risk for HF* | HT, diabetes, CAD, cardiotoxins, family hx | Rx HT, lipid disorders, smoking cessation, exercise<br>Limit ETOH<br>ACE in appropriate pts |
| B<br>*Structural Heart Disease; no symptoms* | Prior MI, LVSD, valvular disease | All measures in stage A<br>ACE and β blockers in appropriate pts |
| C<br>*Symptoms* | Structural disease with SOB, fatigue, decreased exercise capacity | Restrict Na<br>Diuretics, digoxin, ACE and β blockers |
| D<br>*Refractory* | Symptoms at rest despite maximum medical therapy | All measures in stages A, B, C<br>Mechanical devices, transplant, continuous inotropic infusions, hospice care |



# NYHA Classification

| | Class | Patient Symptoms |
|---|---|---|
| I | Mild | • No limitation of physical activity<br>• No undue fatigue, palpitation or dyspnea |
| II | Mild | • Slight limitation of physical activity<br>• Comfortable at rest<br>• Less than ordinary activity results in fatigue, palpitation, or dyspnea |
| III | Moderate | • Marked limitation of physical activity<br>• Comfortable at rest<br>• Less than ordinary activity results in fatigue, palpitation, or dyspnea |
| IV | Severe | • Unable to carry out any physical activity without discomfort<br>• Symptoms of cardiac insufficiency at rest<br>• Physical activity causes increased discomfort |

# Types of Heart Failure

| | HFrEF | HFpEF |
|---|---|---|
| |  |  |
| **Pathophysiology** | Impaired Contraction | Impaired filling |
| **Demographics** | All ages | > 60 years |
| **1° Cause** | Coronary Artery Disease | Hypertension |

# Clinical Manifestations

## Symptoms

- Reduced exercise tolerance
- Shortness of breath
- Congestion
- Fluid retention
- Difficulty in sleeping
- Weight loss

| Variable | Sensitivity | Specificity |
|---|---|---|
| Hx of HF | 62 | 94 |
| Dyspnea | 56 | 53 |
| Orthopnea | 47 | 88 |
| Rales | 56 | 80 |
| S3 | 20 | 99 |
| JVD | 39 | 94 |
| Edema | 67 | 68 |

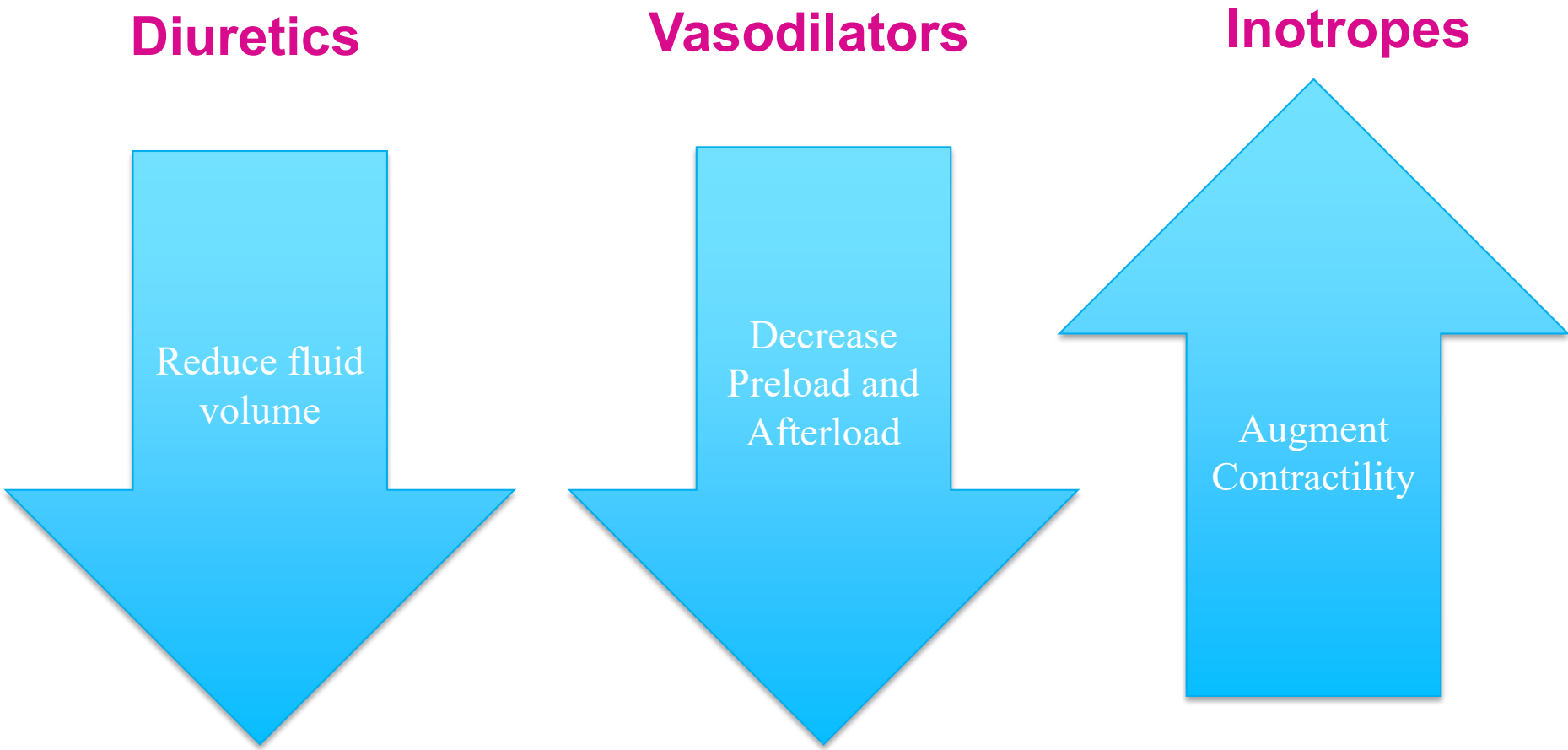
# HFpEF

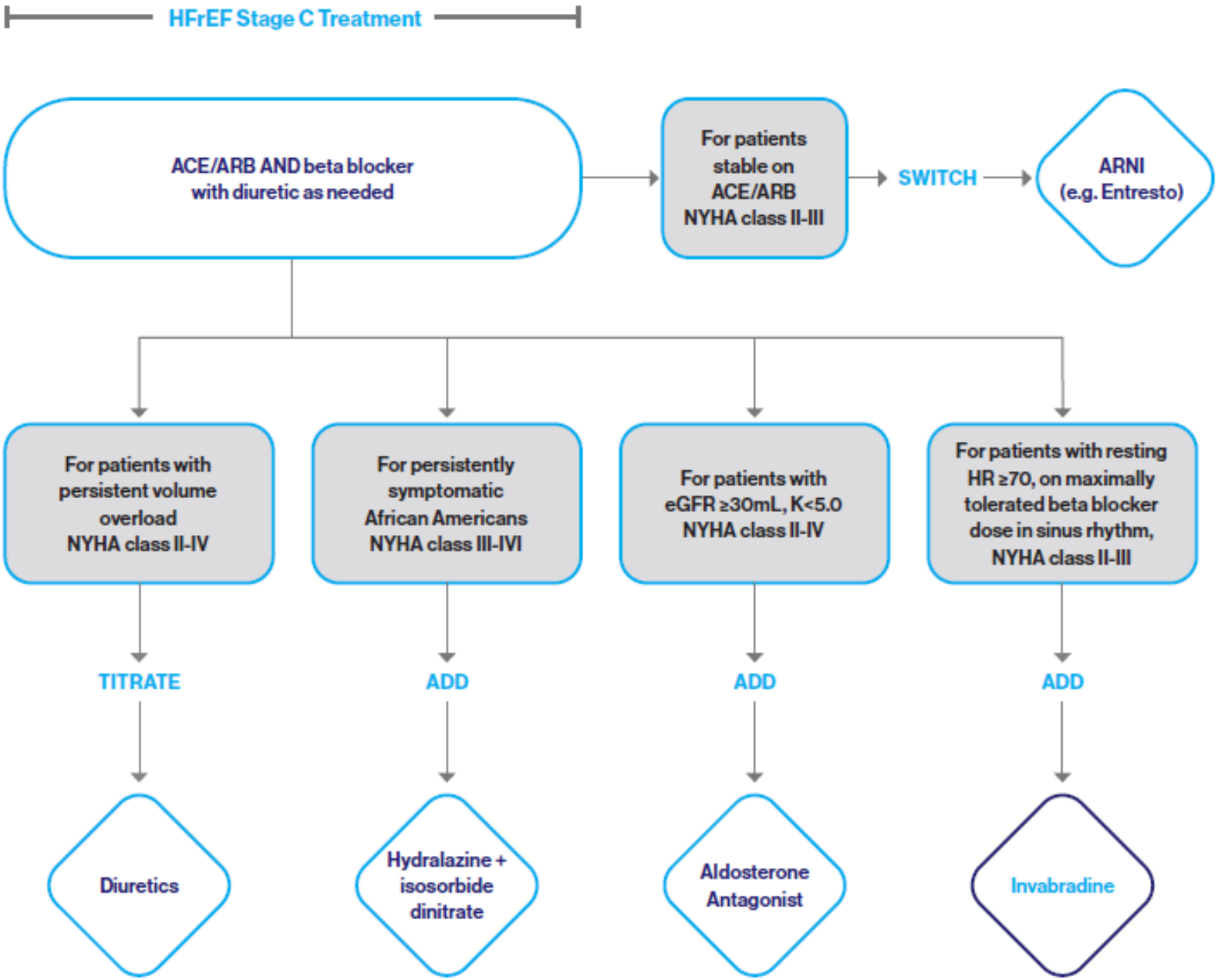
- Patients have symptoms and signs of HF, a normal or near normal left ventricular ejection fraction (LVEF ≥50 percent), and evidence of cardiac dysfunction as a cause of symptoms (eg, abnormal left ventricular filling and elevated filling pressures).
- Approximately ~50% of patients with heart failure are HFpEF, and proportion is increasing.
- Dominate form of heart failure in the elderly.
- No therapies with proven mortality benefit, unlike HFrEF.

# Treatment of HFpEF

- Treat volume overload with diuretics
- Direct treatment at co-morbidities
  - HT- diuretics, MRA, ACE/ARNI
  - Diabetes -SGLT2I
  - CAD
  - Afib
  - Obesity
  - CRF-ACE/ARB
  - OSA

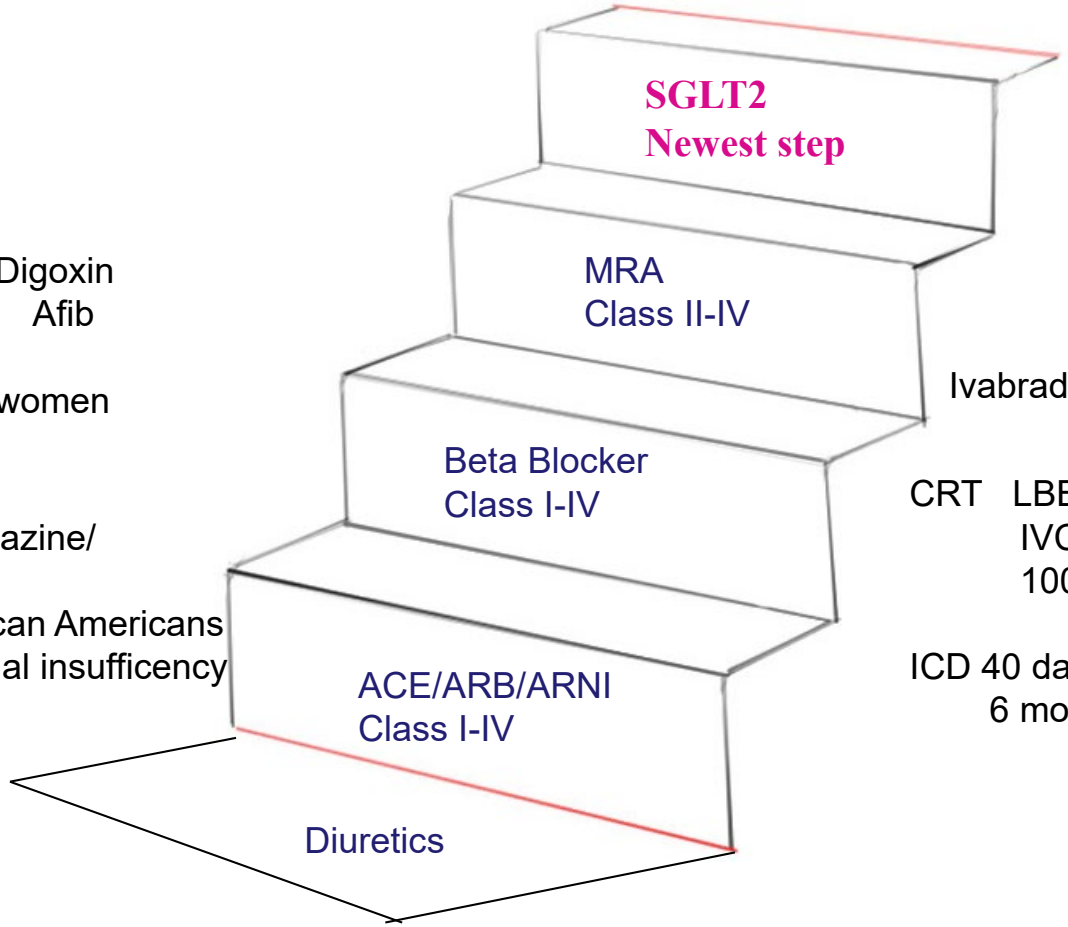
# Treatment of Heart Failure Reduced Ejection Fraction






Heart Failure Pathway Writing Committee. J Am Coll Cardiol 2018;71(2):201-230.

# Step Therapy for HFrEF




Digoxin
Afib

women

Hydralazine/
Isordil
African Americans
Renal insufficency

Ivabradine NSR w rate > 70 bpm on maximal BB

CRT LBBB w QRS duration >0.14 msec
IVCD w QRS > 015
100% paced rhythm

ICD 40 days post MI w LVEF <35%
6 mo post new onset CHF on meds

## 2 gm Sodium Diet

No fast foods
Canned soups
Coldcuts
No added salt

| Starting and Maximal doses of Diuretics | |
|---|---|
| | **Initial Daily Dose** |
| **Diuretics-Thiazides** | |
| **Chlorthalidne** | 12.5-25 mg once |
| **Hydrochlorothiazide** | 25 mg once or twice |
| **Metolazone** | 2.5 mg once |
| **Diuretics-Loop** | |
| **Bumetanide** | 0.5-1.0 mg once or twice |
| **Furosemide** | 20-40 mg once or twice |
| **Torsemide** | 10-20 mg once |

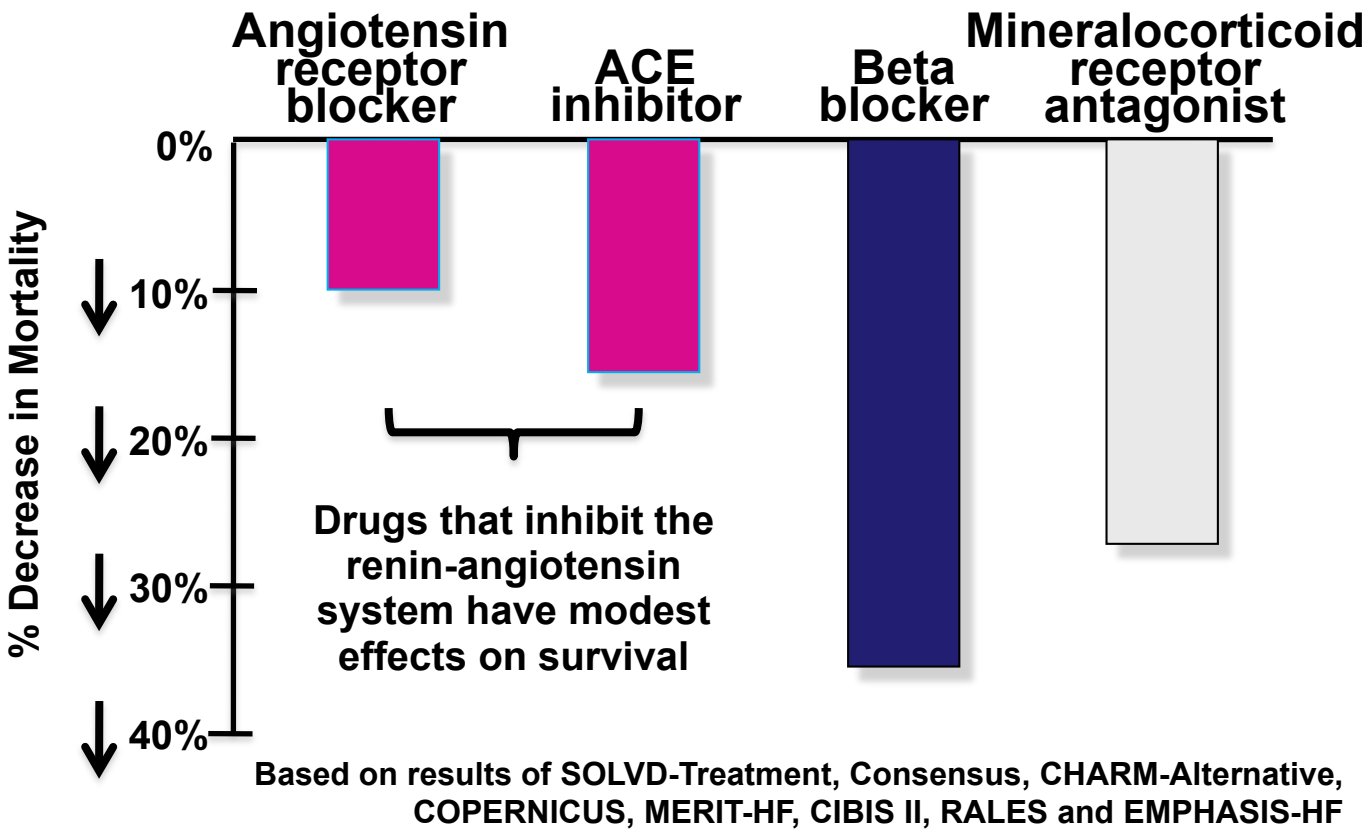
Major deficiency on referral is Often Inadequate diuretic doses

Identify the renal threshold Dose

One large dose is better than Multiple low doses

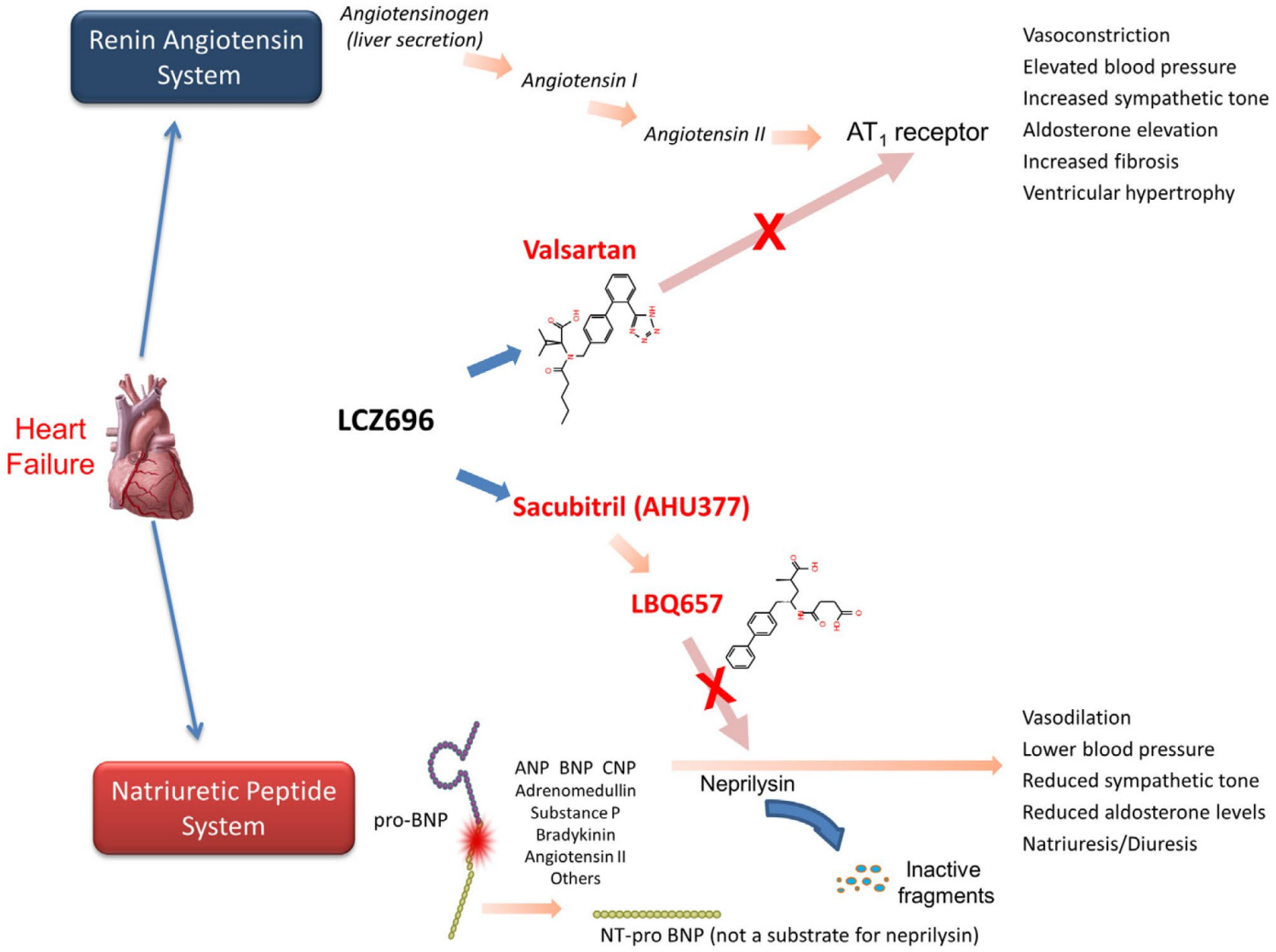
Eliminate nephrotoxic drugs- NSAID

# Drugs That Reduce Mortality in Heart Failure With Reduced Ejection Fraction




Based on results of SOLVD-Treatment, Consensus, CHARM-Alternative, COPERNICUS, MERIT-HF, CIBIS II, RALES and EMPHASIS-HF

# Sacubitril/Valsartan (Entresto)




*Vardeney O, et al. JACC-HF 2014*

# PARADIGM-HF: Summary of Findings

In heart failure with reduced ejection fraction, when compared with recommended doses of enalapril:

Entresto was *more effective* than enalapril in . . .

- Reducing the risk of CV death and HF hospitalization
- Reducing the risk of CV death by incremental 20%
- Reducing the risk of HF hospitalization by incremental 21%
- Reducing all-cause mortality by incremental 16%
- Incrementally improving symptoms and physical limitations

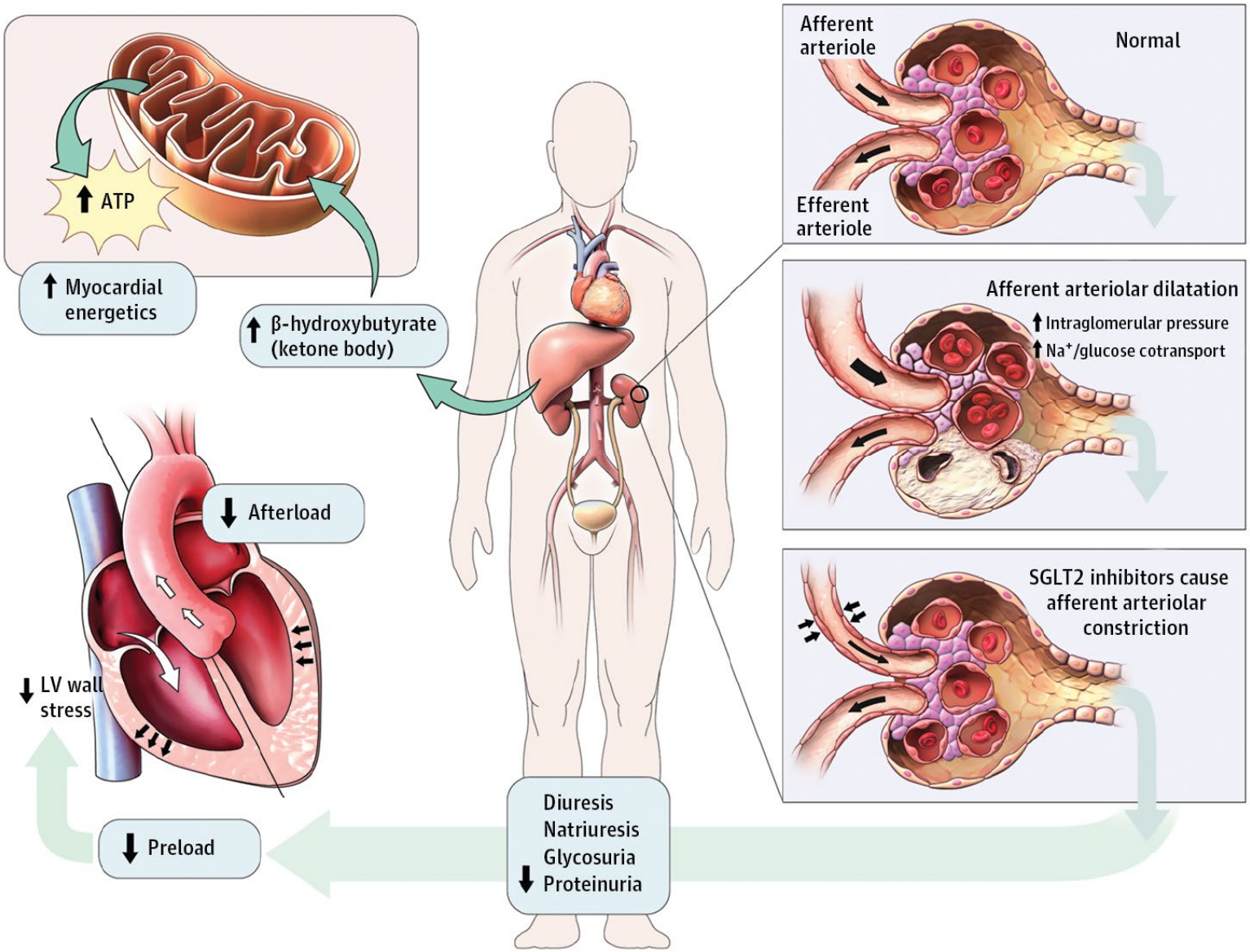
Entresto was *better tolerated* than enalapril . . .

- Less likely to cause cough, hyperkalemia or renal impairment
- Less likely to be discontinued due to an adverse event
- More hypotension, but no increase in discontinuations
- Not more likely to cause serious angioedema

# Conversion from ACE to ARNI

- Exclude patients with a history of angioedema
- **Maintain off ACE for 36 hrs before beginning ARNI**
- **GFR < 30 ml/min-starting dose Entresto 24/26 mg po BID**
- High dose ACE/ARB (>10 mg enalopril or 10 mg lisinopril, > valsartan 160 mg daily) start Entresto at 49/51 mg BID dose

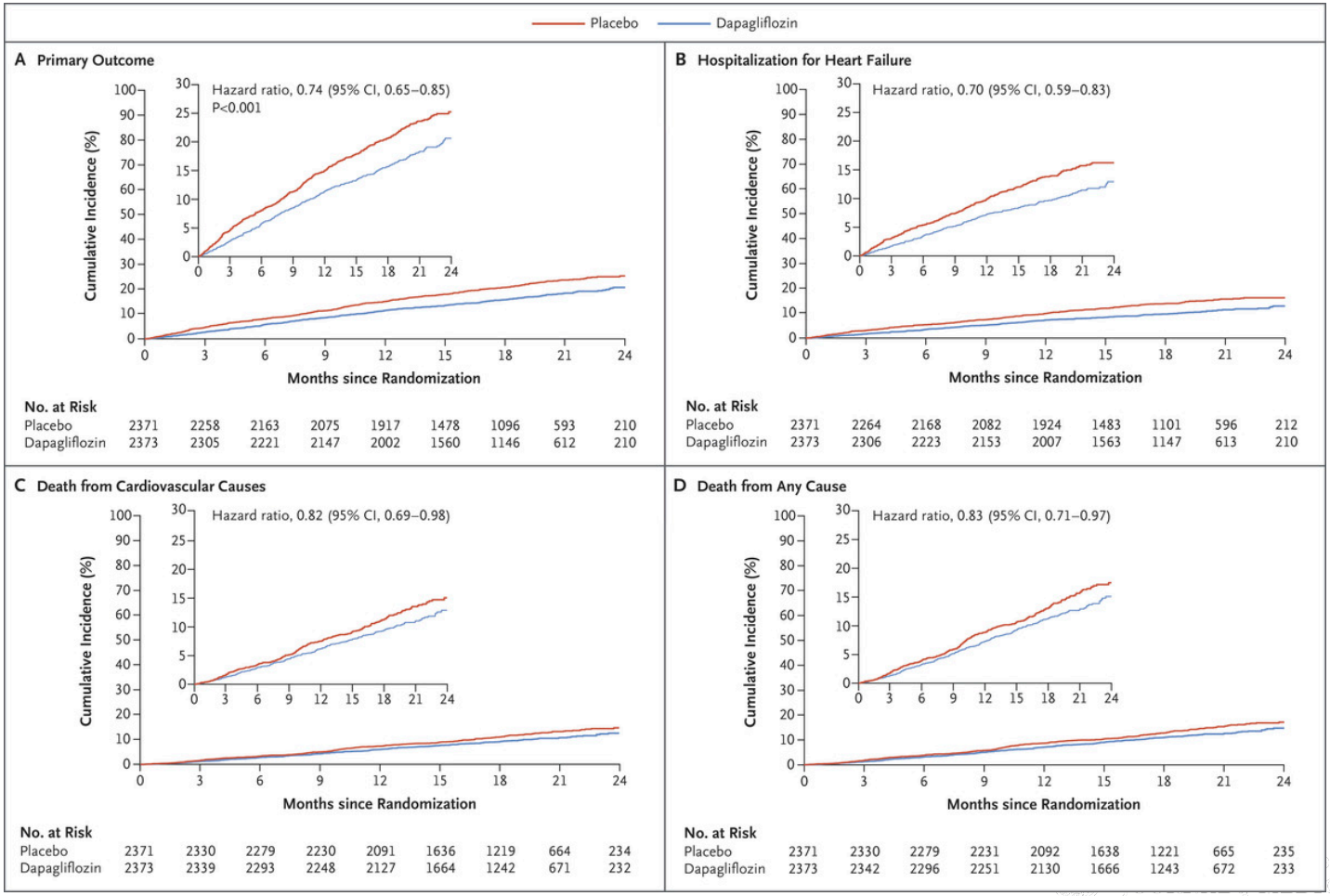
# SGLT2 Inhibition




JAMA Cardiol. 2017;2(9):939-940.

# Cardiovascular Outcomes

4744 patients w Class II-IV CHF
Randomized 10 mg dapagliflozin vs placebo




Dapa or Empa at 10 mg daily

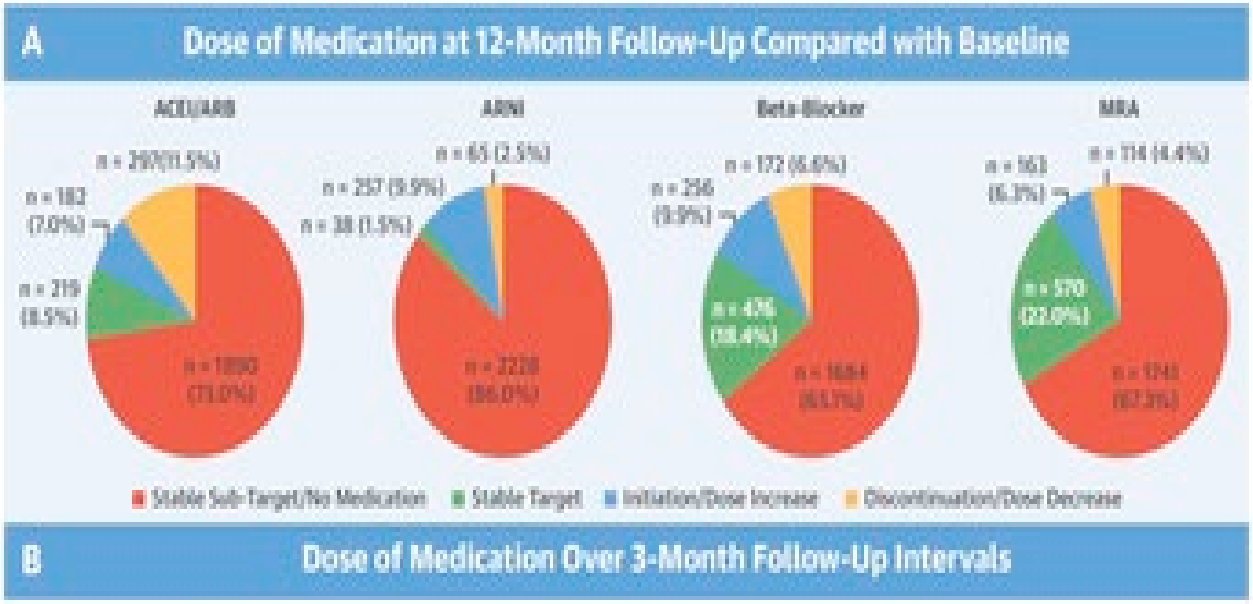
GFR>30 ml/min

Do not use if
1. Prior DKA or risk for DKA
2. Recurrent UTIs

JJ McMurray et al. N Engl J Med 2019;381:1995-2008.

# Titration of Medical Therapy for HFrEF: CHAMP registry

**CENTRAL ILLUSTRATION: Changes in Use and Dose of GDMT Over 12 Months Among Patients With Chronic Heart Failure With Reduced Ejection Fraction in Contemporary U.S. Outpatient Practice**




3500 HF patients in out Patient practices

Up titration of GDMT is Frequently inadequate

**Red is subtherapeutic dose**

Journal of American College of Cardiology (JACC), Volume: 73, Issue: 19, Pages: 2365-2383,

# Hypertension

## *Treating Hypertension in Stage C HFrEF*

| COR | LOE | Recommendations | Comment/Rationale |
|---|---|---|---|
| I | C-EO | Patients with HFrEF and hypertension should be prescribed GDMT titrated to attain systolic blood pressure less than 130 mm Hg | **NEW:** Recommendation has been adapted from recent clinical trial data but not specifically tested per se in a randomized trial of patients with HF |

# Clinical Case

- A 68-year-old African American woman with hypertension, CKD-3 and T2DM presents for ongoing heart failure care
- She has a non-ischemic cardiomyopathy, LVEF 30% with Stage C HF
- She reports one-block exercise tolerance, no orthopnea or LE swelling
- Last hospitalized 3 months ago for 4 days
- Her medications are losartan 25 mg, carvedilol 3.125 mg BID, furosemide 40 mg, metformin 1000 mg bid and vitamin D
- On exam, BP 130/80, pulse 80 and regular, BMI 28. No JVD, clear lungs, regular rhythm, normal S1S2 no S3. Grade II/VI HSM. No hepatomegaly or LE edema.
- Labs: Na 138, K 4.8, BUN/Cr 28/1.4. NT-proBNP 1200 pg/mL
- EKG: NSR, LAE, LBBB, QRSd 152 msec
- CXR: cardiomegaly, clear lungs, no effusion

What is the next most appropriate step in her management?

A. Stop losartan and start sacubitril/valsartan 24/26 mg bid
B. Start ISDN/hydralazine
C. Start spironolactone 25 mg
D. Add dapagliflozin 10 mg
E. Upgrade her ICD to a CRT-D

# When to Refer to MS HF Program/Community HF Specialist

- Persistent NYHA Class III-IV
- 1 or more ER visits or hospitalizations for HF
- Clinical deterioration despite treatment
- Inability to tolerate GDMT
- Systolic BP $\leq$ 90 mm Hg or symptomatic hypotension
- BUN $\geq$ 43 or Cr $\geq$ 1.8
- Onset of afib, ventricular arrhythmias or ICD shocks

# Multidisciplinary Considerations for Patients with HF

- **Care Management**
  - Email mshpcmreferral@mountsinai.org, call **212-241-7228**, or use the **MSHP Care Management Referral in Epic (order #391414)**
  - Prompt and efficient processing of your referral
  - Communication about assignment through Epic In-Basket
  - Follow up from clinical staff within 1 week of assignment

- **Behavioral Health**
  - Screen patients annually for depression using the PHQ-2/PHQ-9 and refer to psychiatric services

- **Palliative Care**
  - NYHA class III/IV symptoms with frequent readmissions
  - Anxiety/depression adversely affecting quality of life or ability to manage illness
  - Assistance with decision making regarding advanced therapies
  - Martha Stewart Center for Living, 1440 Madison Avenue, **212-241-1446**
  - Martha Stewart Center for Living Downtown, Union Square, **212-844-1712**

# Conclusions

- Heart Failure is a team sport: Optimize multidisciplinary care
- Follow the guidelines and up-titrate meds to effective doses used in clinical trials
  - African-American patients experience further benefit from the use of HYD/ISDN therapy
- Major advances in the treatment of Heart failure centering on neurohormonal inhibition (i.e. subcutril/valsartan)
- Management of co-morbidities especially in patients w HFpEF
- Hospitalizations and Mortality remain high
- Many new devices CRT, Mitral Clip, LVADs

# Heart Failure Rapid Follow Up Clinic Overview

**Beth Oliver, DNP, RN**

Chief Nurse Executive

Senior Vice President, Cardiac Services

Mount Sinai Health System

November 11, 2020

Mount Sinai Health Partners

# No relevant financial disclosures or conflicts of interest

# Rapid Follow Up and Transition of Care

**AHA, Target HF, recommends all patients admitted with HF have follow up clinic visit within 7 days of hospital discharge and that it is documented*

**This is the only discharge procedure which reduces readmissions**

- Considered an extension of the hospitalization
- Goal is to reduce and eliminate burden across the spectrum
- Comprehensive follow up for transition to next step
  - Patient receives focused/ tailored HF patient education at the bedside
  - Sinai swag *(Scale, pitcher, pill box, and Managing your Heart Health patient guide)*
  - Appointment made for RFU *along with* patient and care partners/family
  - Physical exam including ReDS (if available) and labs, patient education, medication optimization, appropriate referrals - (PCP, specialist, cardiology, VNS), follow up communication with team and patient

# MSHS Rapid Follow Up Structure

- Clinic started in 2014 at MSH, NP run with MD Support
- Program operationalized across system (MSSL, MSQ, MSBI, MSSN – MSW coming soon)
- Significant positive impact on readmission rate

| Hospital | RFU Schedule | Avg # of Pts Per Session | Contact | Contact Info |
|---|---|---|---|---|
| **MSH** | Wed | 10-20 patients | Jennifer Ullman, NP | Jennifer.ullman@mountsinai.org<br>Cell: 646-584-8947<br>To schedule 212 241-7300 Opt 1 |
| **MSQ** | Mon & Wed | 8 patients | Tiffany Vargas, NP | Tiffany.vargas@mountsinai.org<br>Cell 347-502-3951<br>To schedule 718-808-7777 |
| **MSM** | Mon-Fri | 2 per 7 scheduled half day sessions with one walk in session | Cathy Varley, NP | cathleen.varley@mountsinai.org \| Cell: 646 832 5088<br>To schedule:<br>Mirella.Galarza@mountsinai.org<br>212-636-1432 |
| **MSBI** | Wed (9am-1pm) | 5-6 patients | Jayitha Janardhanan, NP | To schedule RFU, contact 212-844-8830 or EPIC secure chat to MSBI CHF team (inpatient discharges).<br>Cell: 646-400-4889 \|<br>Jayitha.Janardhanan@mountsinai.org |
| **MSSN*** | Wed | 4-5 patients | Eileen Harris, RN | Eileen.harris@snch.org \| 516-632-3572 |

**MSSN runs Cardiac Wellness Program where interdisciplinary team sees patients (RN, Pharmacist and Dietician) – modified RFU*

# Lessons Learned and Take Aways

- Despite our success, additional work to do:
  - Continued and improved communication with home care, social work and SARs
  - **Improve referrals from primary care providers (gatekeepers)**
  - Continuing to educate teams about benefits of RFU
  - Ensure transition to community paramedicine/VNSNY
  - **Close communication loop with primary care, cardiology and HF Team**

- Patient Education is at the center of transition of care
  - Communication is paramount and lack of leads to poor patient care, outcomes and satisfaction
  - Help to make sure patient has right medications and understands discharge plan and self care-before they are discharged
  - Ensure patient has a RFU appointment- before they are discharged

***Rapid Follow Up is important piece in transition of care for HF patients***

# Q & A

# Medication Management in Diabetes Type II and Newer Medication Options, Including Cardiac Benefits

**David W. Lam, MD**
Assistant Professor of Medicine
Department of Medicine, Endocrinology, Diabetes and Bone Disease
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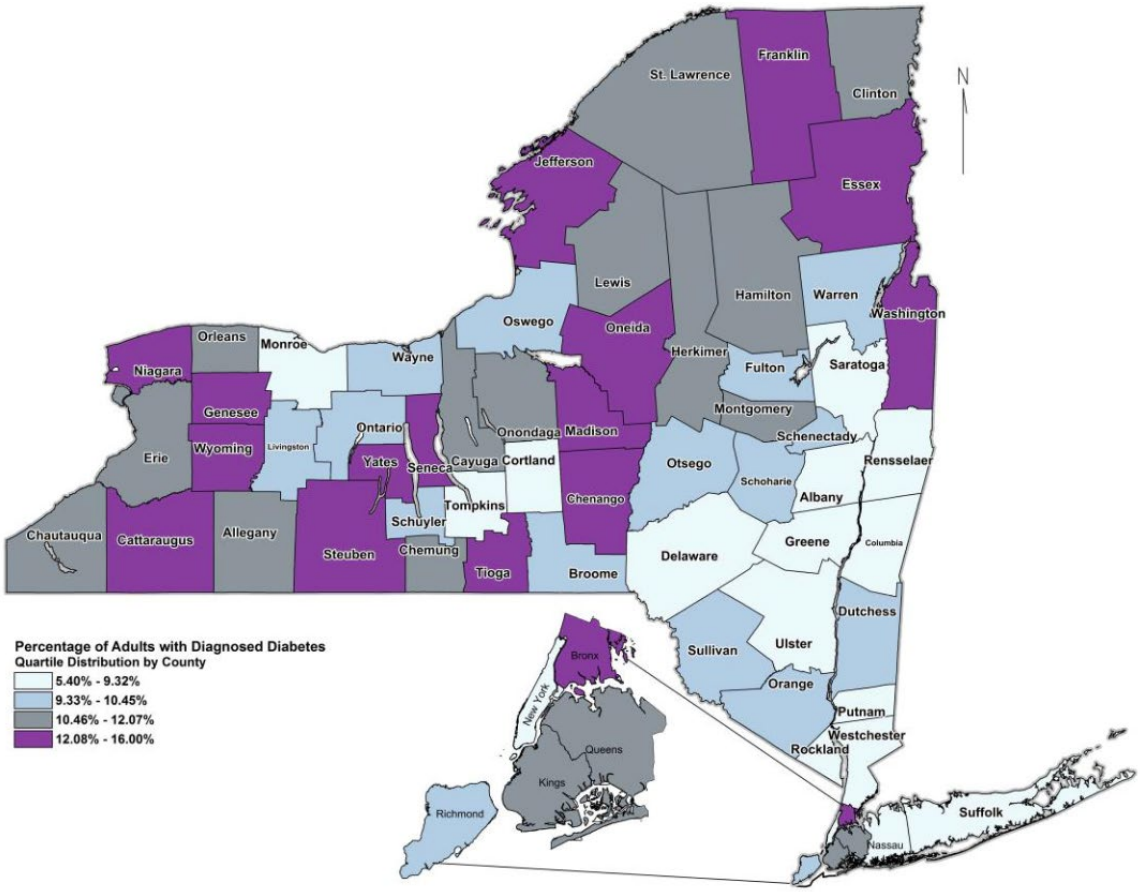
Mount Sinai Health Partners

# No relevant financial disclosures or conflicts of interest

# Overview

1. Clinical context and the need for a talk on this subject
2. Discuss the general ambulatory approach to the complex T2D patient
3. Review current indications and added cardiac benefits of newer T2D agents

# Percentage of Adults with Diagnosed Diabetes, New York State, BRFSS 2016




*Source: Information for action report 2018-2019. New York State Department of Health*

# Diabetes Care for the Busy Clinician

- Have a management checklist
- Establish treatment goals
- Utilize evidenced based treatment algorithms
- Enlist help

# Checklist for DM Management for Front Line Providers

| Screening/ Mgmt Target | Benchmark | Frequency | Next Step if uncontrolled/positive finding |
|---|---|---|---|
| **HgbA1c Test** | <7.0% | Every 6 months if controlled<br>Every 3 months if poorly controlled | • Lifestyle modification<br>• Escalate dosing of anti-diabetic medications<br>• Referral to endocrinologist or pharmacist if HgbA1c >9%<br>• CM/BH referral as indicated |
| ★ **Blood Pressure Control** | BP <140/90 or <130/80 in select pts with CVD, CAD, or ASCVD risk ≥ 15%* | Annually if normal | • Lifestyle modification<br>• Home BP monitoring<br>• If no CKD, use ACE/ARB, diuretic, or CCB<br>• If CKD present: ACE/ARB<br>• If resistant hypertension or progressive kidney disease, consider refer to Nephrology or clinical pharmacy program |
| **Lipid Management** | LDL is <100 mg/dL.<br>With CV disease, target is <70 mg/dL. | Annually | • Lifestyle modification<br>• Statin therapy |
| ★ **Cardiovascular Disease** | Assess ASCVD Risk (using ASCVD Risk Calculator) and HF Risk (patient 40-79)[10]<br>Antiplatelet Therapy for Primary/Secondary Prevention | Annually | • ASA 75-162 mg daily for primary prevention if 50-75 yrs old and >1 additional risk factor<br>• ASA 75-162 mg daily for established ASCVD<br>• SGLT-2i or GLP-1 RA if multiple risk factors or known ASCVD and/or CKD<br>• SGLT-2i if heart failure present |

★ DM Treatment implications

# Checklist for DM Management for Front Line Providers

| Screening/ Management Target | Benchmark | Frequency | Next Step if uncontrolled/positive finding |
|---|---|---|---|
| ★ **Monitoring for Diabetic Kidney Disease (eGFR and UACR)** | eGFR >100<br>UACR <30 mg/g C | Annually (Consider semiannually if EGFR <60 or UACR >30 mg/g of C) | • ACE/ARB if eGFR <60 or UACR >30<br>• Consider use of SGLT-2i or GLP-1 RA<br>• Intensify anti-diabetic medications to optimize glycemic control<br>• Dietary intake of ~0.8 g protein/kg weight per day<br>• Consider Nephrology referral |
| **Retinopathy Screening** | Absence of retinopathy or macular edema | If retinopathy or macular edema present, annual dilated eye exam or retinal photography | • Annual evaluation by ophthalmologist if retinopathy or macular edema present |
| **Foot Exam** | No ulcerations or fungal infections, 2+ Pedal pulses, Normal sensory response with monofilament | Annually | • Referral to podiatrist for management of any abnormalities<br>• Refer for Ankle Branchial Index (ABI) if Peripheral Arterial Disease (PAD) suspected |

★ DM Treatment implications

# Establish Treatment Goals

## HgbA1c <6.5% - More stringent

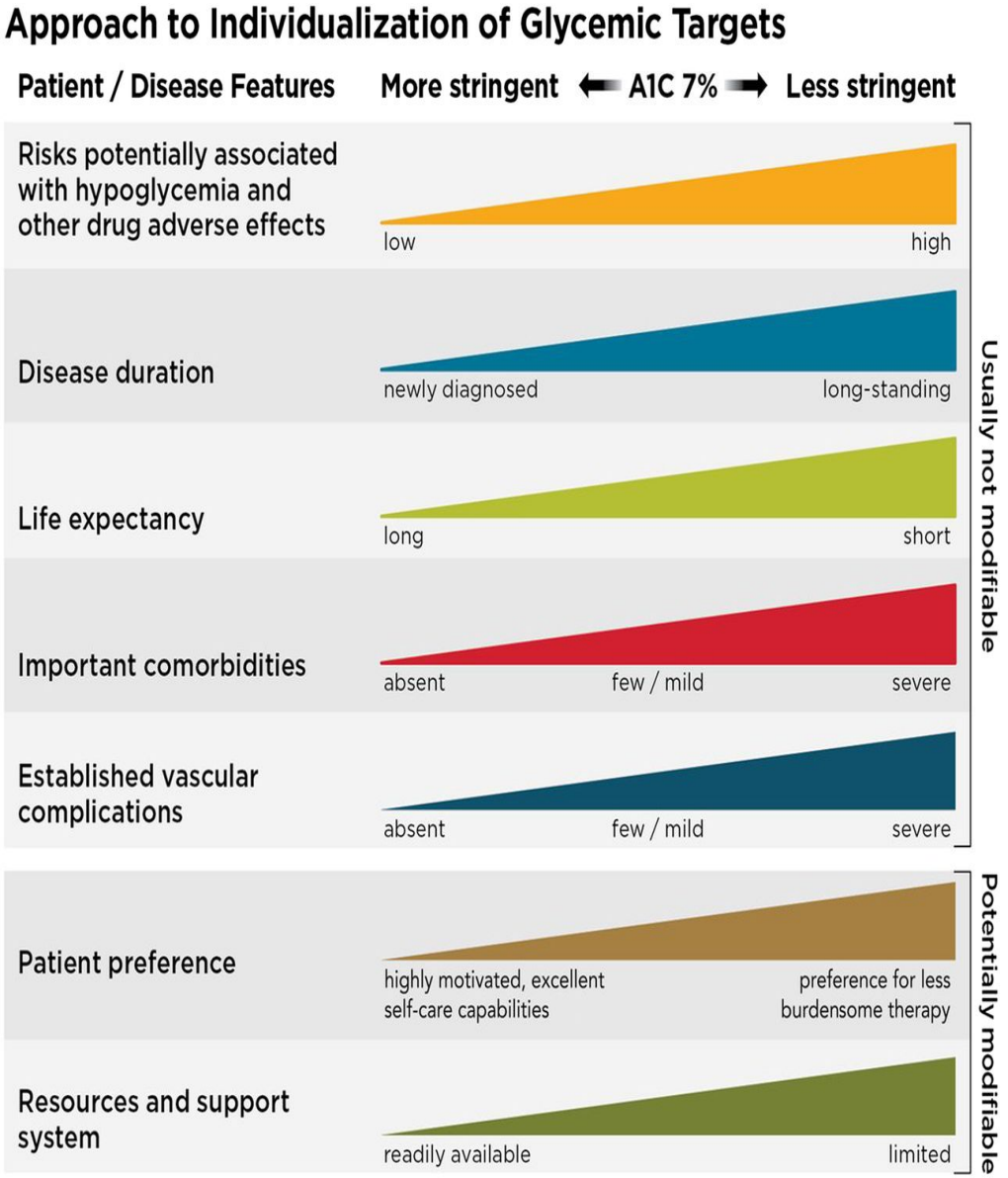
- Low risk of hypoglycemia and adverse effects of intensive treatment

## HgbA1c <7% is general target for adults

*Corresponds to **pre-prandial plasma glucoses between 80-130** mg/dl and **postprandial** (1-2 hrs.) plasma glucose **<180 mg/dl.***

## HgbA1c <8% - Less stringent

- Increased risk of hypoglycemia
- Limited life expectancy
- Well established complications
- Other compelling reasons




*Source: American Diabetes Association Standards of Medical Care. Diabetes Care 2020 Jan; 43(Supplement 1): S66-S76*

# Establish Treatment Goals – Older Adult Considerations

- Optimize nutrition
- Screen for geriatric syndromes: polypharmacy, cognitive impairment, depression
- Dementia – Annual screening after 65
- Hypoglycemia – medication class selection
- Burden of diabetes medications – frequency, numeracy requirements

# 49 y/o African American Male with T2D, HbA1C 8.9%, HTN, HLD

Medications:

Metformin 1000 mg BID

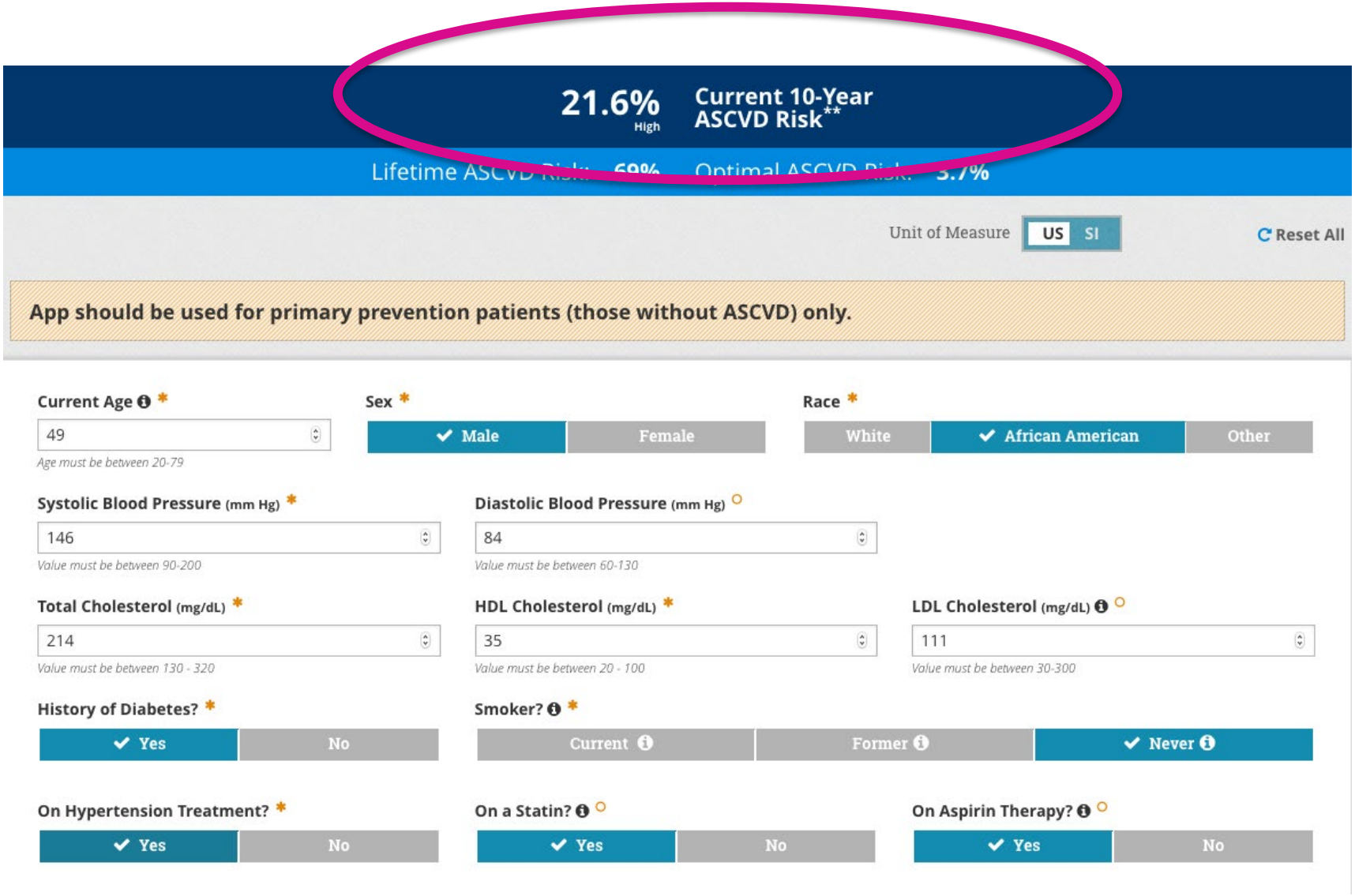
ASA 81 mg Qday

Lisinopril 40 mg Qday

Atorvastatin 40 mg QHS

Poll Question: ***What agent would you recommend to add?***

A) Glipizide
B) Sitagliptin (Januvia®)
C) Liraglutide (Victoza®)
D) Insulin Glargine


21.6%
High
Current 10-Year ASCVD Risk**
Lifetime ASCVD Risk: 69%
Optimal ASCVD Risk: 3.7%
Unit of Measure
US
SI
Reset All
App should be used for primary prevention patients (those without ASCVD) only.
Current Age *
49
Age must be between 20-79
Sex *
Male
Female
Race *
White
African American
Other
Systolic Blood Pressure (mm Hg) *
146
Value must be between 90-200
Diastolic Blood Pressure (mm Hg)
84
Value must be between 60-130
Total Cholesterol (mg/dL) *
214
Value must be between 130 - 320
HDL Cholesterol (mg/dL) *
35
Value must be between 20 - 100
LDL Cholesterol (mg/dL)
111
Value must be between 30-300
History of Diabetes? *
Yes
No
Smoker? *
Current
Former
Never
On Hypertension Treatment? *
Yes
No
On a Statin?
Yes
No
On Aspirin Therapy?
Yes
No

# 49 y/o AA M With T2D A1C 8.9% with ASCVD 10 year risk 21.6%

**FIRST-LINE Therapy is Metformin and comprehensive lifestyle (including weight management and physical activity)**

## ASCVD Predominates

- Established ASCVD
- Indicators of high ASCVD risk (age ≥55 years with coronary, carotid or lower extremity artery stenosis >50%, or LVH)

**PREFERABLY**
GLP-1 RA with proven CVD benefit

**OR**
SGLT2i with proven CVD benefit if eGFR adequate

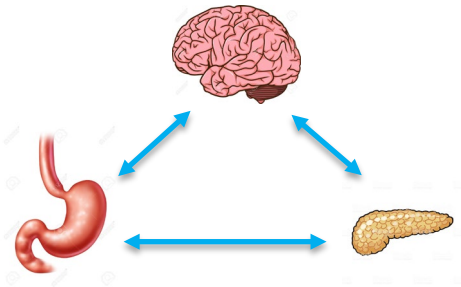
# GLP-1 Receptor Agonists (GLP1RA)

## Native GLP-1

- Gut derived hormone
- Augments glucose mediated insulin response

## GLP1-RA

- **Mechanism**
  - Mimic native GLP-1
  - Decrease glucagon production
  - Slow gastric emptying
  - Increase satiety/decrease appetite
- **Effect**
  - -0.42% to -1.09% HbA1C reduction
  - Weight loss (-0.5 to -3.6kg)
  - Mixed results in individual CVOT (neutral to beneficial)



| Generic Name | Trade Name | Frequency |
|---|---|---|
| Dulaglutide | Trulicity | Weekly |
| Exenatide | Byetta | Twice Daily |
| Exenatide Extended-Release | Bydureon | Weekly |
| Liraglutide | Victoza | Daily |
| Lixisenatide | Adlyxin | Daily |
| Degludec/Liraglutide | Xultophy | Daily (insulin + GLP1RA) |
| Glargine/Lixisenatide | Soliqua | Daily (insulin + GLP1RA) |
| Semaglutide | Ozempic / Rybelsus | Weekly injection / Oral daily |

Current FDA approved drugs containing GLP1RA (Nov 2020)

# GLP1RA – Adverse Effects & Precautions

## Adverse effects

- Gastrointestinal - Nausea & vomiting
- Pancreatitis

## Contraindications

- Personal or family history of *medullary* thyroid cancer, personal history of MEN-2

## Impaired renal function

- Exenatide should not be used in CrCl < 30 and ESRD
- Limited data for liraglutide, dulaglutide, lixisenatide, semaglutide

## Impaired hepatic function

- No dose adjustments

# 49 y/o African American Male with T2D, HbA1C 8.9%, HTN, HLD

## Medications:

- Metformin 1000 mg BID
- ASA 81 mg Qday
- Lisinopril 40 mg Qday
- Atorvastatin 40 mg QHS

***Next Step: Add GLP1-RA with CV risk reduction benefit***

| Generic Name | Trade Name | Dosing Freq | CVOT | Population | Key Outcomes |
|---|---|---|---|---|---|
| Dulaglutide | Trulicity | Weekly | REWIND | w/ ASCVD event or risk factors | 3 point MACE 0.88 (0.79-0.99)<br>Stroke 0.76 (0.61-0.95)<br>Composite microvascular 0.87 (0.79-0.95) |
| Exenatide Extended-Release | Bydureon | Weekly | EXSCEL | w/ or w/o CVD | 3 point MACE 0.91 (0.83-1.0) |
| Liraglutide | Victoza | Daily | LEADER | Preexisting CVD, CKD or HF at ≥ 50 years or CV risk ≥ 60 years | 3 point MACE 0.87 (0.78-0.97)<br>CV Death 0.78 (0.66-0.93)<br>All cause mortality 0.85 (0.74-0.97) |
| Lixisenatide | Adlyxin | Daily | ELIXA | History of ACS < 180 days | 4 point MACE 1.02 (0.89-1.17) |
| Semaglutide | Ozempic / Rybelsus | Weekly injection / Oral daily | SUSTAIN-6/ PIONEER | Preexisting CVD, CKD or HF at ≥ 50 years or CV risk ≥ 60 years | 3 point MACE 0.74 (0.58-0.95)<br>Stroke 0.61 (0.38-0.99) |

# 65 y/o Caucasian Female with T2D, HbA1C 8.9%, no known complications, HFrEF (EF = 40%), HTN, HLD, here for follow-up

**Medications:**

- Metformin 1000 mg BID
- ASA 81 mg Qday
- Lisinopril 20 mg Qday
- Atorvastatin 80 mg QHS

Poll Question: ***What agent would you recommend to add?***

A) Glimepiride
B) Insulin Detemir
C) Linagliptin (Tradjenta®)
D) Dapagliflozin (Farxiga®)

# 65 y/o Caucasian Female with T2D (A1C 8.9%) HFrEF (EF 40%) HTN HLD

**FIRST-LINE Therapy is Metformin and comprehensive lifestyle (including weight management and physical activity)**

## HF or CKD Predominates

- Particularly HFrEF (LVEF <45%)
- CKD: Specifically eGFR 30-60 mL/min/1.73m$^2$ or UACR >30mg/g, particularly UACR > 300 mg/g

**PREFERABLY**
SGLT2i with evidence of reducing HF and/or CKD progression in CVOTs if eGFR adequate

**OR**
If SGLT2I not tolerated or contraindicated…

# SGLT2 inhibitors (SGLT2i)

Sodium-glucose co-transporter 2 (SGLT2) is expressed in proximal tubule, responsible for glucose reabsorption

## Mechanism

- SGLT2i promote renal excretion of glucose (inhibit glucose reabsorption)

## Effects

- 0.5 – 0.9% HbA1C decrease
- Weight loss (2-3 kg)
- Decrease risk of major adverse cardiovascular events (Empa[1], Cana[2]), cardiovascular morbidity and mortality (Empa[1], Dapa[3]) in high risk population
- Decrease in kidney failure (Cana[4]) progression of kidney disease (Empa[5])

| Drug | Brand |
|---|---|
| Canagliflozin | Invokana |
| Dapagliflozin | Farxiga |
| Empagliflozin | Jardiance |
| Ertugliflozin | Steglatro |


1. Zinman B Et al. NEJM 2015. (EMPA-REG)
2. Neal B et al. NEJM 2017. (CANVAS)
3. Wiviott SD et al. NEJM 2019 (DECLARE-TIMI)
4. Perkovic V et al. NEJM 2019. (CREDENCE)
5. Wanner C et al. NEJM 2016. (EMPA-REG OUTCOME)

# SGLT2i – Adverse effects and precautions

## Adverse effects

- Genitourinary infections
- Hypotension
- Acute kidney injury
- Bone Fracture
- Amputations
- Euglycemic DKA (DKA but with blood glucose < 250 mg/dL)

## Contraindications

Type 1 diabetes ** be vigilant for possible off-label use*

## Renal Impairment

Ertugliflozin eGFR > 60 mL/min/1.73m$^2$ , Cana Dapa and Empa > 45 mL/min/1.73m$^2$

## Hepatic Impairment

Dapa requires dosing adjustment

Most ok with mild hepatic impairment

| Generic Name | Trade Name | CVOT | Population | Key Outcomes |
|---|---|---|---|---|
| Canagliflozin | Invokana | CANVAS | Preexisting CVD at ≥ 30 years or > 2 CV risk factors at ≥ 50 years | 3 point MACE 0.86 (HR 0.75-0.97)<br>Lower HF hospitalization, renal composite outcome |
| Dapagliflozin | Farxiga | DECLARE TIMI 58 / DAPA-HF | Established CVD > 40<br>or multiple risk factors<br>men ≥ 55<br>women ≥ 60 | Did not lower 3 point MACE<br>Lower HF hospitalization, renal composite outcome, all cause mortality<br>* Lower CV death and hospitalization for adult HFrEF (no DM) |
| Empagliflozin | Jardiance | EMPA-REG / EMPA-REDUCED | Preexisting CVD | 3 point MACE 0.86 (0.74-0.99)<br>Lower CV death, HF hospitalization, all cause mortality, renal composite outcome |
| Ertugliflozin | Steglatro | VERTIS CV | Established CVD > 40 years | Non inferior to placebo |

# 65 y/o Caucasian Female with T2D, HbA1C 8.9%, no known complications, HFrEF (EF = 40%), HTN, HLD, here for follow-up

**Medications:**

- Metformin 1000 mg BID
- ASA 81 mg Qday
- Lisinopril 20 mg Qday
- Atorvastatin 80 mg QHS

***Next Step: Add SGLT-2 inhibitor with HF benefit***

# FIRST-LINE Therapy is Metformin and comprehensive lifestyle (including weight management and physical activity)

## ASCVD Predominates

- Established ASCVD
- Indicators of high ASCVD risk (age ≥55 years with coronary, carotid or lower extremity artery stenosis >50%, or LVH)

**PREFERABLY**

GLP-1 RA with proven CVD benefit

**OR**

SGLT2i with proven CVD benefit if eGFR adequate

## HF or CKD Predominates

- Particularly HFrEF (LVEF <45%)
- CKD: Specifically eGFR 30-60 mL/min/1.73m$^2$ or UACR >30mg/g, particularly UACR > 300 mg/g

**PREFERABLY**

SGLT2i with evidence of reducing HF and/or CKD progression in CVOTs if eGFR adequate[3]

**OR**

If SGLT2I not tolerated or contraindicated…

## ASCVD Predominates

If further intensification is required or patient is now unable to tolerate GLP-1 RA and/or SGLT2i, choose agents demonstrating CV safety:

- For patients on a GLP-1 RA, consider adding SGLT2i with proven CVD benefit[1]
- DPP-4i if not on GLP-1 RA
- Basal insulin[4]
- TZD[5]
- SU[6]

## HF or CKD Predominates

If SGLT2I not tolerated or contraindicated or if eGFR less than adequate[2] add GLP-1 RA with proven CVD benefit[5]

Avoid TZD in the setting of HF

Choose agents demonstrating CV safety:
For patients on a SGLT2i, consider adding GLP-1 RA with proven CVD benefit[1]

DPP-4i (not saxagliptin) in the setting of HF (if not on GLP-1 RA)

Basal insulin[4]

SU[5]

# DPP-4 Inhibitors

## DPP-4

- Ubiquitous Serine protease which acts on multiple substrates but notably GLP-1 and GIP
- DPP-4 inhibitors inhibit breakdown of GLP
- **Mechanism**
  - Increase endogenous levels of GLP-1
  - Reduce glucagon
  - Reduce post prandial hyperglycemia
- **Effect**
  - -0.5-0.8% HbA1C
  - Weight neutral
  - No effect on gastric emptying, appetite
  - Neutral CVOT

| Generic Name | Trade Name | Additional Notes |
|---|---|---|
| Alogliptin | Nesina | |
| Saxagliptin | Onglyza | Possible increase in HF , SAVOR-TIMI 53 HR 1.27 (1.07-1.61) |
| Linagliptin | Tradjenta | |
| Sitagliptin | Januvia | |

# Diabetes Care for the Busy Clinician

- Have a management checklist
- Establish treatment goals
- Utilize evidenced based treatment algorithms
- Enlist help

## Chronic Care

- Primary Care Provider
- Endocrinologist

## Referral Care

- Ophthalmology
- Podiatry
- Hepatology
- Nephrology

**The Complex Care for Patients with Diabetes**

## Allied Specialties

- Diabetes Educator
- Dietician
- Pharmacist
- Medication access programs
- Visiting Nurse

## Associated Procedure Care

- Transplant Nephrology
- Cardiac Catheterization/Surgery
- Bariatric Surgery

# What can multi-disciplinary care do for your patients?

- The **Mount Sinai Diabetes Alliance** provides personalized support for those living with and at risk for diabetes
  - Led by Abby Schwartz RN BSN MBA
  - Network of 7 Registered Dietician, Certified Diabetes Educators (CDE) working at 26 practice locations across Mount Sinai Health System
  - Co-management of patients with PCP/Endocrinologist/Cardiologist to the maximum of their certification

- Impact of multi-disciplinary and collaborative care after 12 months of enrollment
  - 1.7% absolute **HbA1C decrease** for those with HbA1C $\geq$ 8%
  - 59% of patients with **weight loss**
  - 17% **reduction in patients with obesity** (BMI > 30 kg/m$^2$)

*Source: Unpublished Data, courtesy of Abby Schwartz. N = 1084 for A1C $\geq$ 8%, N= 7837 for weight loss, N = 7688 for BMI > 30 kg/m$^2$*

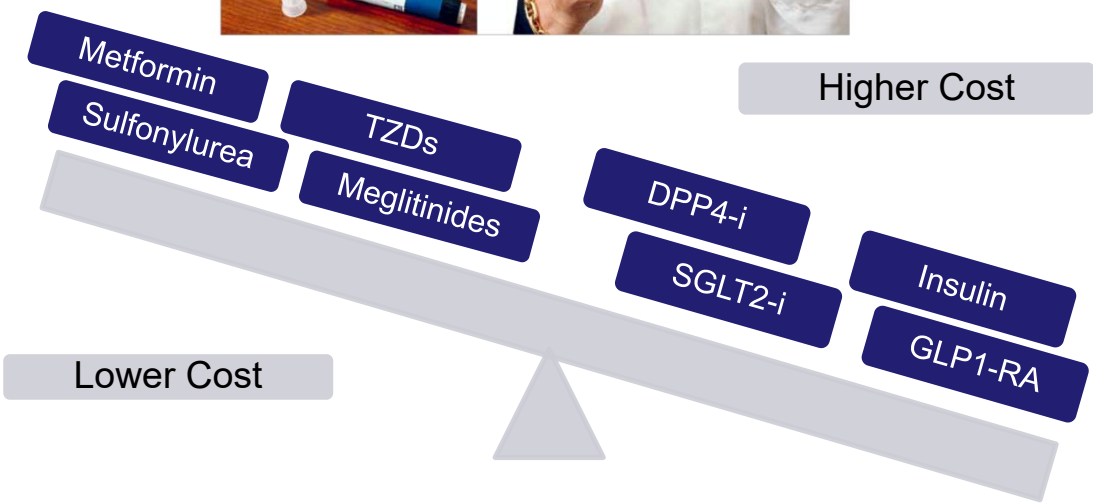
# Troubleshooting Diabetes

- Medication Adherence
  - **Cost**
  - Adverse effects
  - Appropriate ***education*** & ***training***
  - Work/Life schedule
- Diet
  - High glycemic index foods
  - Fruits
  - "Sugar free" foods

**A Nurse Practitioner Solves a $72,000 Mystery**

Cynthia Esrig, NP, holds the double-cap insulin pen while David W. Lam, MD, looks on.

Inset: A close-up showing the first (blue) and second (clear) caps. If a patient fails to remove the second cap, no insulin will be injected.



# Conclusions

- The care of a patient with diabetes is complex and multi-faceted – a challenge to do effectively in today's health care environment
- Utilize a systematic, evidence based approach in selecting medications based on the individual patient factors
- Recognize cost and the burden of therapy when selecting medications
- Enlist the help of allied professionals and specialists

**Thank you!**
**Questions?**

**My Contact: David.W.Lam@mssm.edu**

# New! Condition Management Hub

Condition Management in Primary Care

Mount Sinai Ambulatory Care Pathways

Team-Based Care

Managing Multiple Comorbidities


CME Materials

Why Standardize Care?

Routine Care in the COVID-19 Era

Patient Education & Self-Management

Ask the Experts

*Full condition pathways document may be downloaded

Link: https://mshp.mountsinai.org/web/mshp/condition-management-hub