Outpatient Management of Chronic Heart Failure

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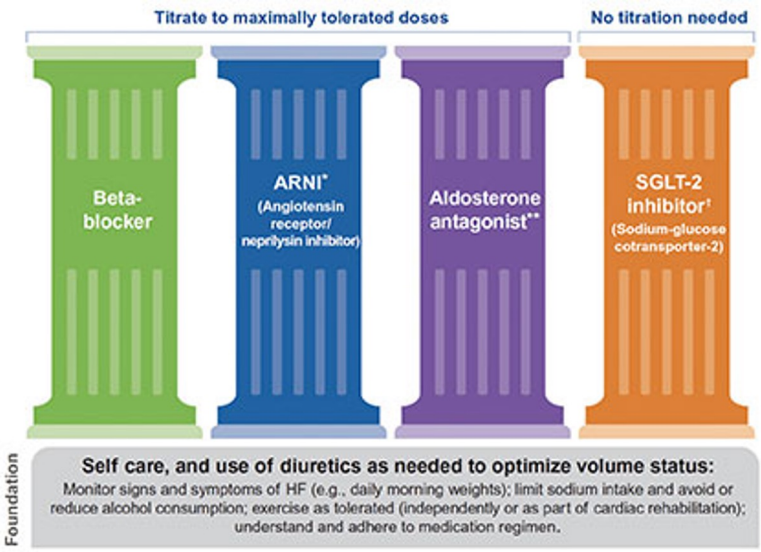
Advanced Heart Failure Cardiology

Patient Education At Follow-Up

- Reinforce current knowledge
- Identify/Correct misunderstandings
- Monitoring for safety
- Monitoring for tolerance
- Discuss lifestyle factors



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To start or not to start…

Know your:

- Initiation considerations
- contraindications
- adverse effects

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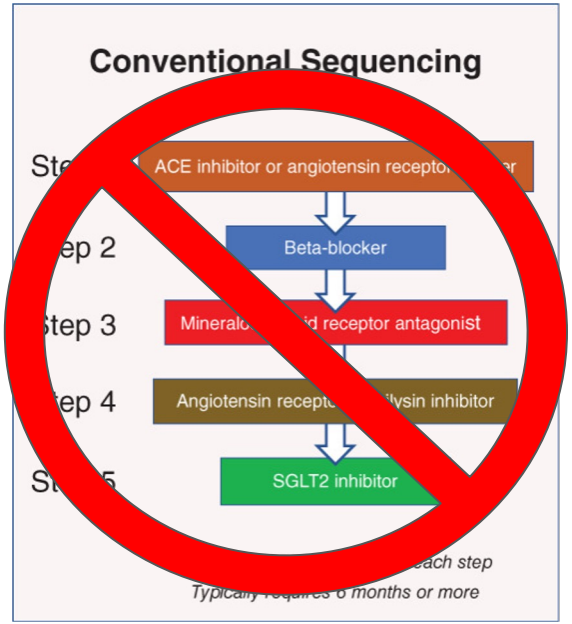
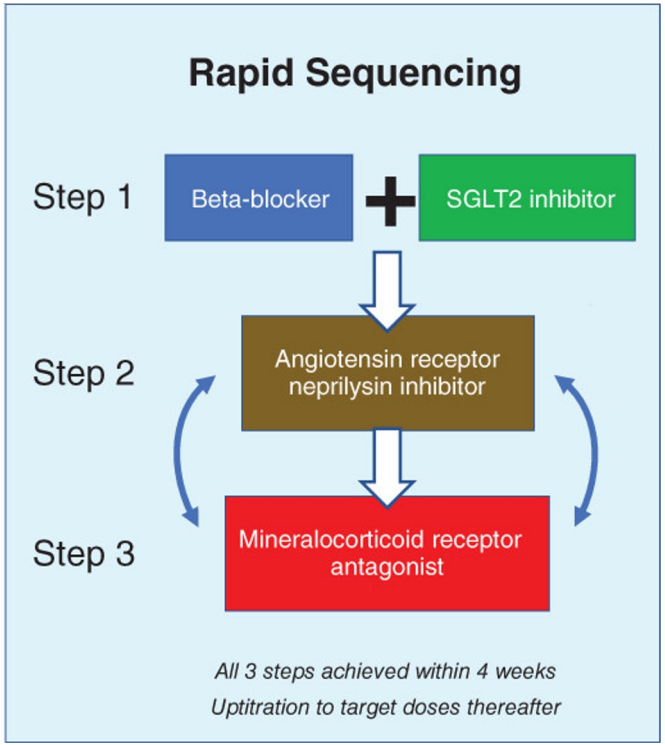
Rapid Titration…As Tolerated





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Outpatient Titration Example

ED Visit Post-DC Day 1	PCP Hospital F/U Post-DC Day 10	HF Clinic Initial/NP Post-DC Day 15	HF Clinic F/U #1 Post-DC Day 22	HF Clinic F/U #2 Post-DC Day 33	HF Clinic F/U #3 Post-DC Day 53
Chief Complaint: syncopal event following dose of carvedilol Impression: orthostatic hypotension secondary to dehydration SCr 1.89 BUN 36 K 4.4 BNP 135 Medications: Carvedilol 50 mg BiD Entresto 24-26 mg BiD Empagliflozin 10 mg daily Furosemide 20 mg daily Hydralazine 50 mg TiD Isosorbide MN ER 60 mg daily Allopurinol 50 mg daily	Relevant information: Patient stopped carvedilol due to fear of syncope. BP 127/89 HR 54 Wt 108.4 kg SCr 1.55 BUN 36 K 4.5 BNP 118.7 Uric acid 11.2 Medications: **Carvedilol 12.5 mg BiD** Entresto 24-26 mg BiD Empagliflozin 10 mg daily Furosemide 20 mg daily Hydralazine 50 mg TiD Isosorbide MN ER 60 mg daily **Allopurinol 100 mg daily**	Interval History: Patient scared to increase carvedilol. Reports gout flare. BP 128/96 HR 97 Wt 109.9 kg SCr 1.66 BUN 32 K 4.6 BNP 118.1 Medications: Carvedilol 12.5 mg BiD **Entresto 49-51 mg BiD** Empagliflozin 10 mg daily **Spironolactone 12.5 mg daily** ~~**Furosemide 20 mg daily**~~ Hydralazine 50 mg TiD Isosorbide MN ER 60 mg daily Allopurinol 100 mg daily	Interval History: Reports urgent care visit for gout flare. BP log 123/87-174/113 Wt log 108.1-109.0 kg Medications: **Carvedilol 25 mg BiD** Entresto 49-51 mg BiD Empagliflozin 10 mg daily Spironolactone 12.5 mg daily Hydralazine 50 mg TiD Isosorbide MN ER 60 mg daily Allopurinol 100 mg daily	Interval history: Reports 2 urgent care visits for gout flare. BP log 122/78-155/105 Wt log 108.2-109.6 kg SCr 1.55 BUN 36 K 4.4 BNP 64.2 Medications: Carvedilol 25 mg BiD **Entresto 97-103 mg BiD** Empagliflozin 10 mg daily **Spironolactone 25 mg daily** Hydralazine 50 mg TiD Isosorbide MN ER 60 mg daily **Allopurinol 300 mg daily**	Chief Complaint: Occasional dizziness, no other complaints BP 122/88 HR 74 Wt 112.4 kg SCr 1.77 BUN 31 K 4.2 BNP 19.9 Medications: **Carvedilol 50 mg BiD** Entresto 97-103 mg BiD Empagliflozin 10 mg daily Spironolactone 25 mg daily ~~**Hydralazine 50 mg TiD**~~ **Isosorbide MN ER 30 mg daily** Allopurinol 300 mg daily

Misconception #1:
These medications are nephrotoxic!

- **ACEi**
- **ARBs**
- **ARNi**
- **SGLT2i**

Nephrotoxic?!

ACEi/ARB

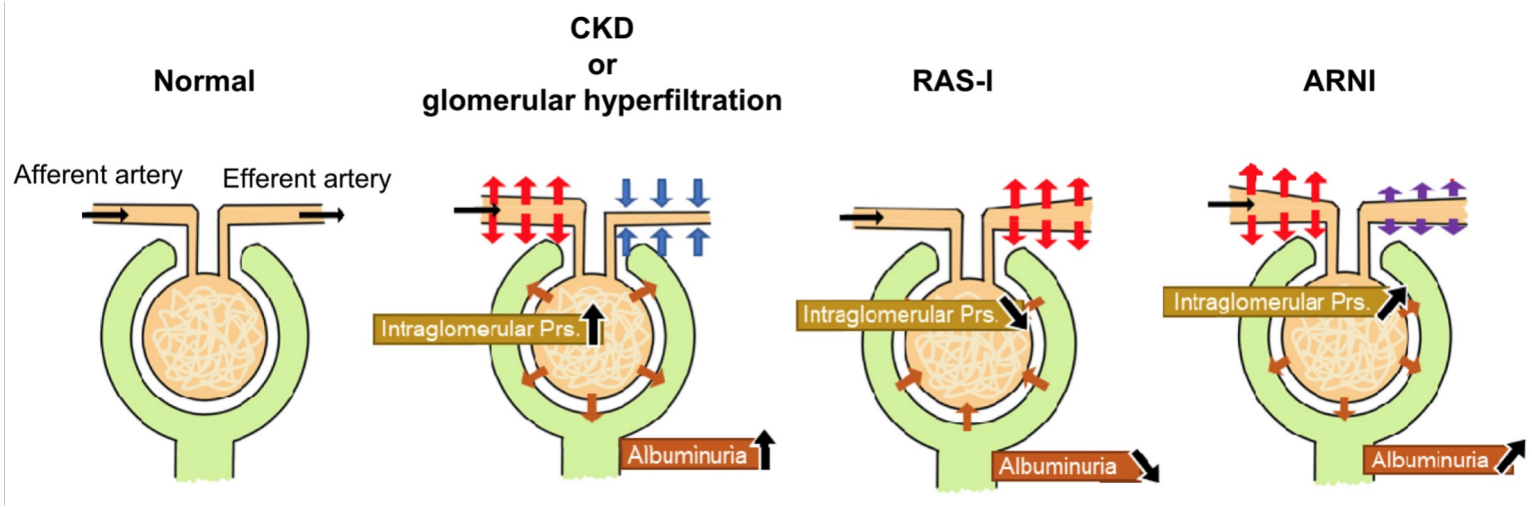
- Mechanism for initial rise in Scr:
  - inhibition of ANG II → vasodilation of efferent renal arteriole
  - **REVERSIBLE / TRANSIENT** drop in glomerular filtration (GFR) due to changes in hemodynamics
  - no structural damage!
- Nephroprotective!
  - reduces hyperfiltration and proteinuria
  - slow progression of kidney disease

Nephrotoxic?!

What about ARNi?

Neprilysin inhibition → ↑ natriuretic peptides

- afferent artery dilation
- **↑ intraglomerular pressure and GFR**



Nephrotoxic?!

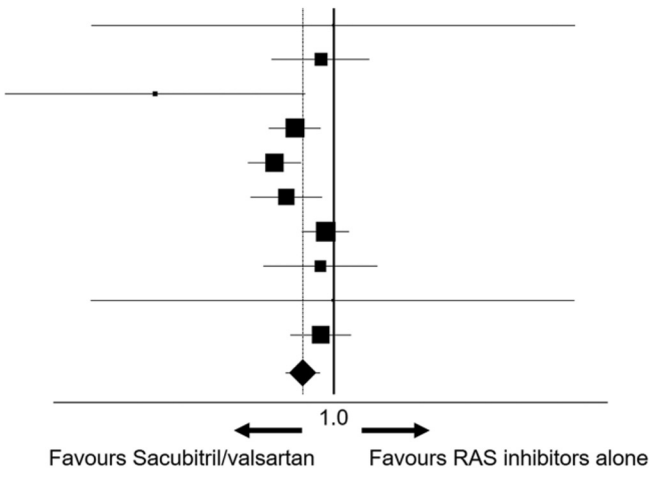
What about ARNi?

Spannella et al. 2020

- meta-analysis of 10 RCTs - compared ARNi with RAASi in 16,456 patients
- ARNi resulted in lower risk of renal dysfunction
- Potential increase in albuminuria (unclear if less nephroprotective long-term)

	ES	95% CI	W	Sig.
Cheung et al. 2018	0.99	0.06 , 15.96	0.50%	0.997
EVALUATE-HF 2019	0.86	0.49 , 1.50	8.72%	0.591
Gao et al. 2019	0.13	0.02 , 0.72	1.26%	0.020
PARADIGM-HF 2014	0.64	0.47 , 0.86	17.65%	0.003
PARAGON-HF 2019	0.50	0.37 , 0.69	17.16%	<0.001
PARAMOUNT 2012	0.58	0.38 , 0.87	12.90%	0.009
PIONEER-HF 2019	0.91	0.70 , 1.19	19.05%	0.483
PRIME Study 2019	0.85	0.44 , 1.64	6.96%	0.637
Supasyndh et al. 2017	0.99	0.06 , 15.81	0.50%	0.992
UK HARP-III trial 2018	0.86	0.61 , 1.22	15.30%	0.397
Overall (random-effects model)	0.70	0.57 , 0.85	100.00%	<0.001

Q (9) =15.18, p=0.086, I^2= 40.73%



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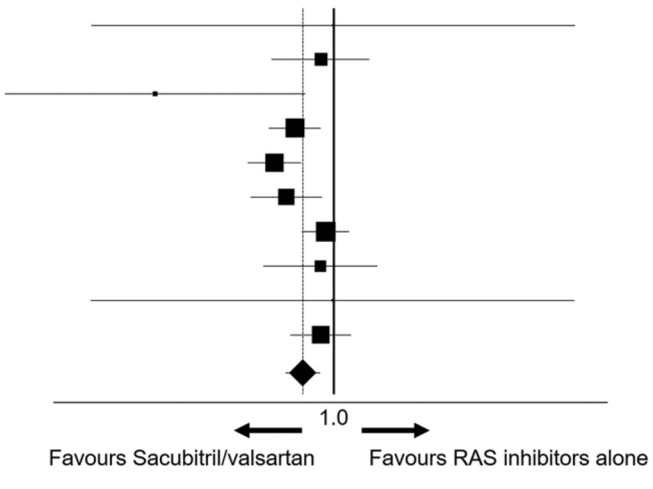

Nephrotoxic?!

What about SGLT2i?

- inhibit SGLT2 protein in proximal tubule → ↓ sodium reabsorption
- similar to ACEi/ARB - nephroprotective in the long run!
  - afferent arteriolar vasoconstriction
  - ↓ intraglomerular pressure and glomerular hyperfiltration
- initial ↓ eGFR of 3 to 6 ml/min/1.73m^2 within first 2 to 4 weeks expected
- Transient drop in eGFR has **NOT** been shown to be harmful

Nephrotoxic?! .... NO!

General Guidance

- "AKI" occurs in around 13% of HF patients but long-term benefit outweighs risk of temporary reduction in renal function
  - GDMT should be continued if SCr increases < 30% after initiation
  - For SCr > 30%, doses can be reduced or temporarily held and re-trialed once renal function improves

- SGLT2i
  - trials did not enroll patients with HD or eGFR < 20 ml/min/1.73m^2 for empagliflozin or < 25 for dapagliflozin ml/min/1.73m^2
  - no requirement for discontinuation for HD initiation or drop in eGFR

Misconception #2: We should discontinue GDMT if hyperkalemia occurs

- **ACEi**
- **ARB**
- **ARNi**
- **MRA**

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Hyperkalemia

- Common / known adverse effect of MRAs and RAASi
- Incidence 10-50%, higher when MRA and RAASi used in combination
- Mechanism:
  - RAASi: blockage of angiotensin II prevents downstream secretion of aldosterone
  - MRAs: Competes with aldosterone for binding to the mineralocorticoid receptor, thereby inhibiting the exchange of sodium for potassium in the distal convoluted renal tubule and preventing potassium excretion
- Dose-dependent and reversible

Hyperkalemia

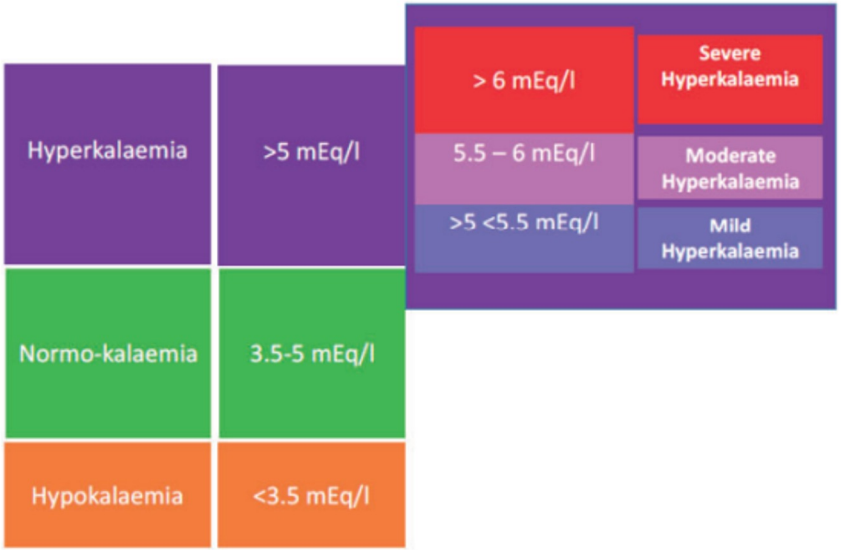

Figure 1 Definitions of normo-kalaemia, hyperkalaemia, and hypokalaemia. Hyperkalaemia can be classified as mild, moderate, or severe. Thresholds for the definition of the severity of hyperkalaemia differ between different classifications. This may mainly be due to different methods used to determine K^+ levels.

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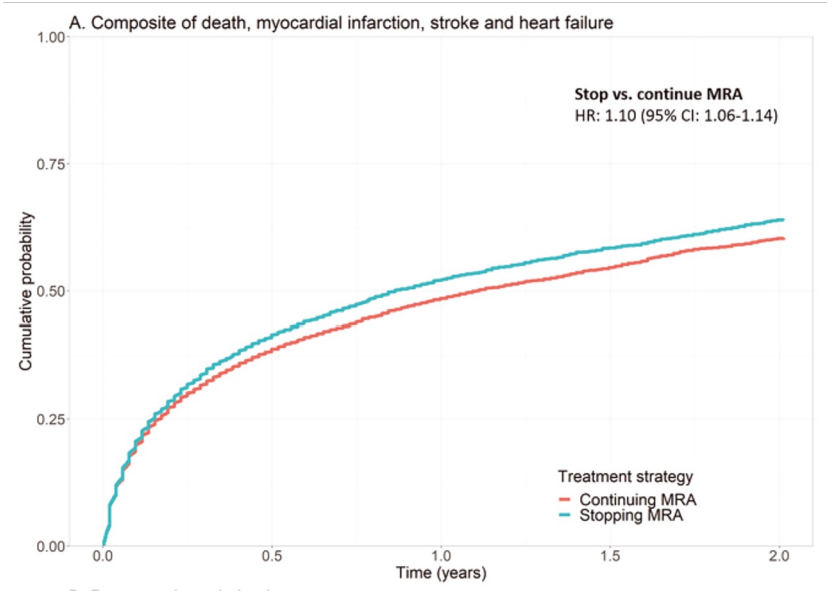
Hyperkalemia

Stopping MRA? - Trevisan et al (2021)

- Observational study in 7366 pts with hyperkalemia (K > 5 mEq/L) from MRAs (69% had HF)
- 30% discontinued MRA within 6 months
- Stopping therapy associated with:
  - lower 2-year risk of recurrent hyperkalemia
  - BUT higher risk of
    - 1° outcome (hospital admission with HF, stroke, MI, or death)
    - all-cause death
    - MACE (CV death, MI, stroke, and HF)
- Risk vs benefit - **consider maintaining therapy for mild hyperkalemia**

Severity of the index hyperkalaemia	
Mild (potassium >5.0–5.5 mmol/L)	5533 (75%)
Moderate (potassium >5.5–6.0 mmol/L)	1309 (18%)
Severe (potassium >6.0 mmol/L)	524 (7%)



Mitigating Hyperkalemia - Summary

- Use ARNi over ACEi/ARB
- Combine RAASi with SGLT2i
- Low dose initiation and slow titration
- Reduce dose in mild- to moderate-hyperkalemia events and reassess
- Dietary factors
- Consider adding a potassium binder

Misconception #3:
We should avoid or discontinue GDMT if SBP < 100 mmHg

- **ACEi / ARB / ARNi**
- **MRA**
- **BB**
- **SGLT2i**

Borderline BP

- All four GDMT pillars has potential to decrease BP
- 3 to 10% of hospitalized HF patients have SBP < 100 mmHg
  - Izumi et al 2023 - GDMT with SBP < 100 mmHg still with mortality benefit
- Treat the patient, not the number!
  - possible to up-titrate / initiate even if SBP < 100 mmHg
  - concern if **SYMPTOMATIC**
    - dizziness, lightheadedness, blurred vision, etc.
- **Caution** if baseline SBP < 80 mmHg

Don’t worry about the MRA!

- Fear of starting due to concerns of hypotension
- Serenelli et al. 2020 compiled outcomes of RALES and EMPHASIS-HF
  - SBP between-treatment difference was **2.6 mmHG**
  - Hypotension was NOT more common than placebo
- Bazoukis et al 2018 meta-analysis of 7 HF RCTs (13,354 pts)
  - MRAs were NOT significantly associated with BP reduction

At HF dosages MRA have minimal to no BP lowering effects…START IT!

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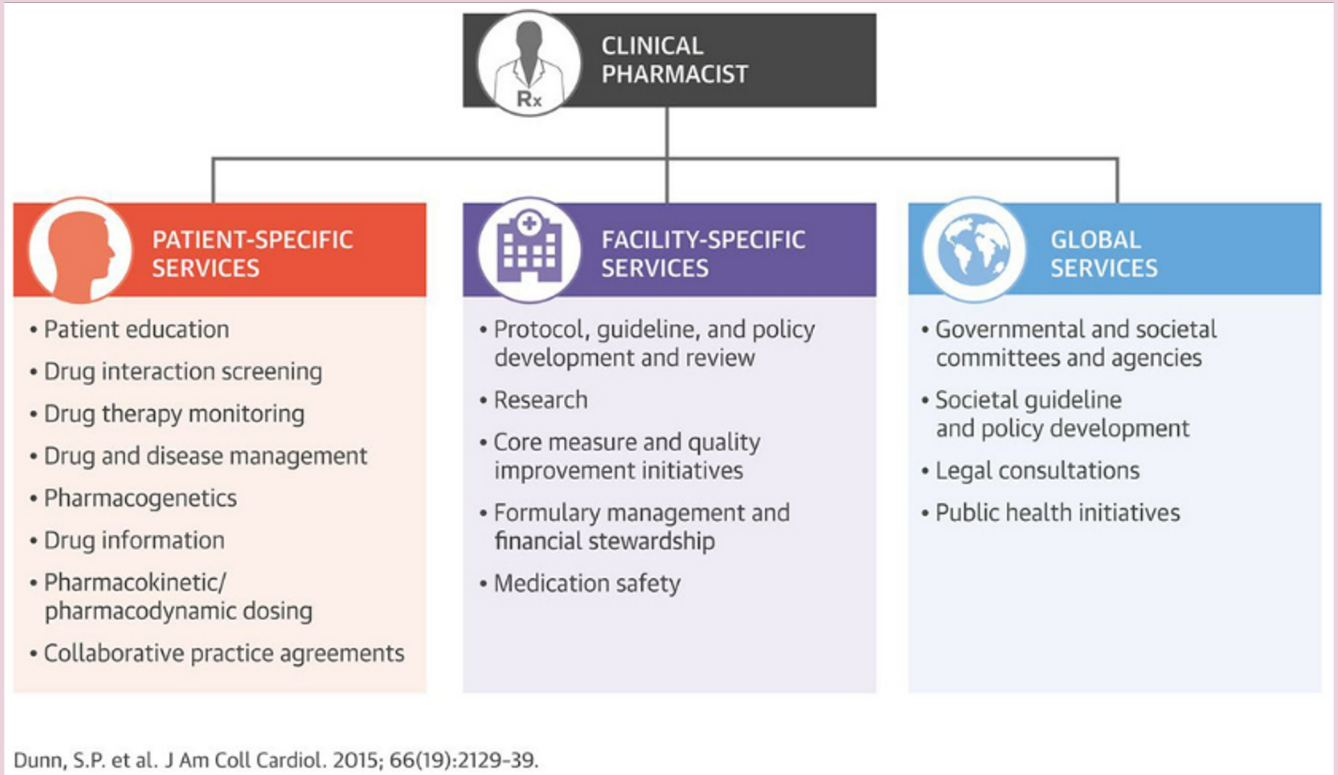
Potential Roles of the Pharmacist



Dunn, S.P. et al. J Am Coll Cardiol. 2015; 66(19):2129-39.

Weight Loss Therapy for Heart Failure Patients

Alice Siqueira-Benzow WA-Seattle,

Pharmacy led Heart Failure Weight loss service as a part of the Comprehensive Heart Failure Service at VMFH

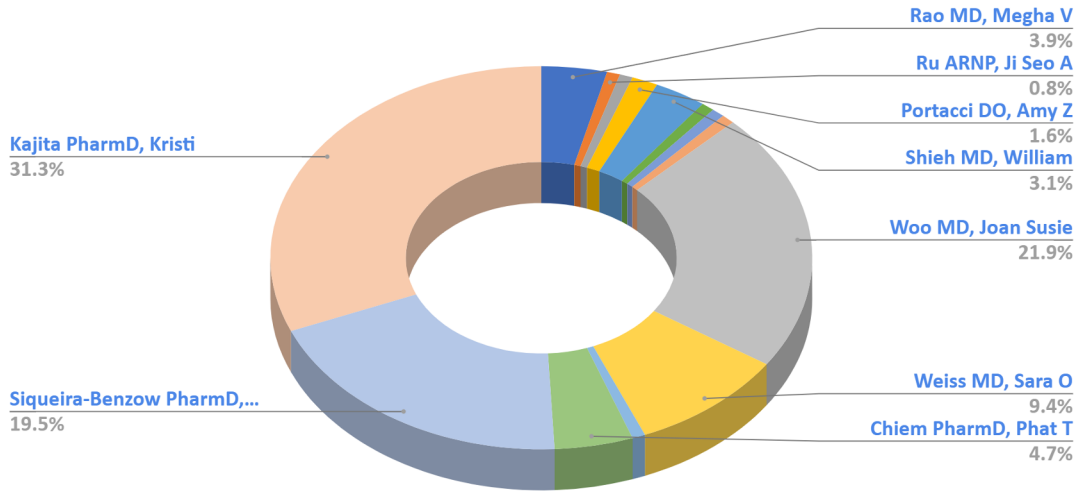
Inclusion criteria:

1. Stable heart failure (on max tolerated GDMT without new symptoms).
2. Obesity class 1, 2, or 3.
3. If type 2 diabetes, send a message to endocrine/primary care who also manages their diabetes medications to ensure other medications are adjusted and managed properly in the setting of new GLP-1 medication.
4. If no type 2 diabetes, cardiology will prescribe and manage the GLP-1 medication.

Target: Patient weight loss of 5-15% total body weight to improve HF symptoms and cardiac risk.

Heart Failure and Obesity Clinic

Total Prescription of GLP-1 Receptor Agonists: Total 134 in 2024 Heart Failure Clinic



Virginia Mason Franciscan Health

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Management of Comorbid Conditions

- Iron Deficiency
- Hypertension
- Diabetes
- Lung Diseases
- Arrhythmias
- Valve Abnormalities

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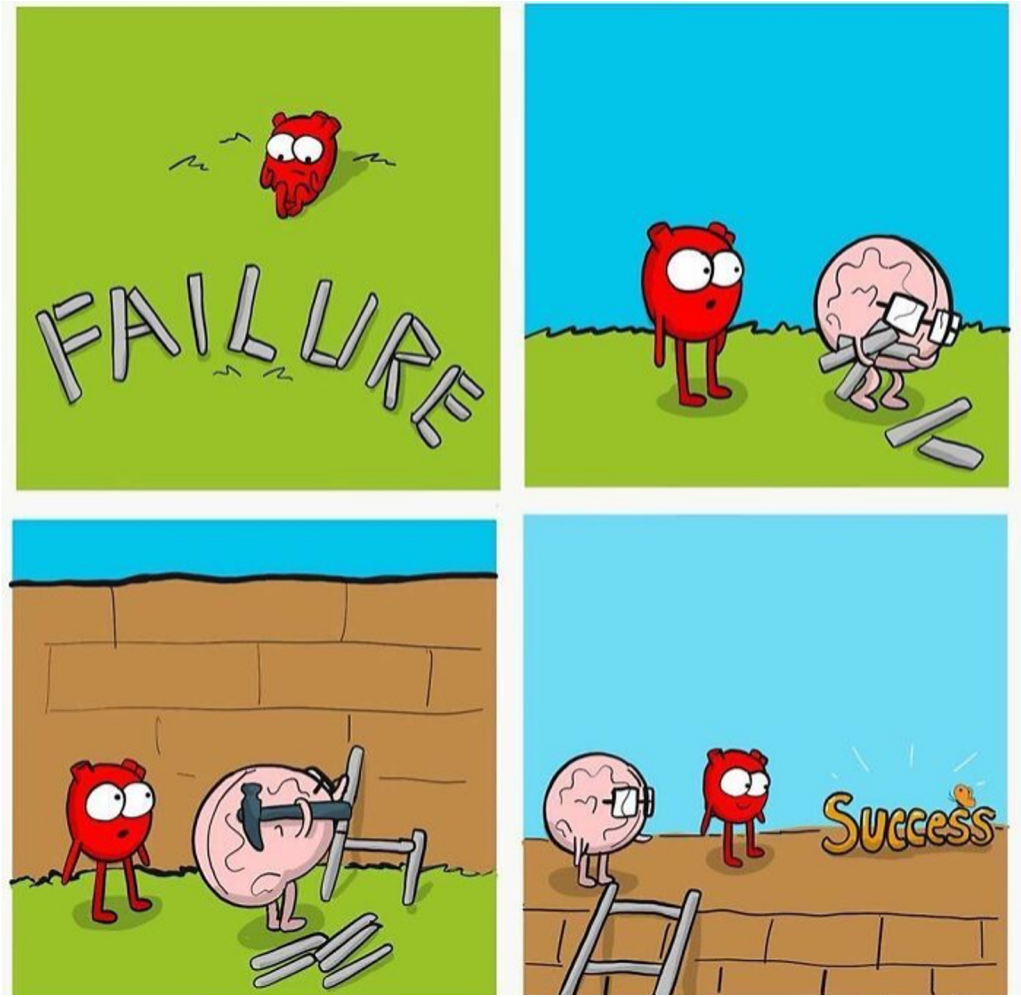
Thank you!



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