NURSE PRACTITIONER
2021 Virtual CE Summit

# Effective Management of Patients With Heart Failure During and After the COVID-19 Pandemic: Updates and Key Considerations for the Nurse Practitioner

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## Supporter Acknowledgement

- This activity is supported by an educational grant from Novartis Pharmaceuticals Corporation

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## Learning Objectives

- Discuss the safety of RAAS antagonist use in patients with CV and related comorbidities during the ongoing COVID-19 pandemic
- Outline how to apply evidence-based GDMT into the management of patients with HF
- Explain the burden of COVID-19 on patients with CV and related comorbidities
- Discuss how to integrate telemedicine initiatives into the effective management of patients with HF

COVID-19, coronavirus disease 2019; CV, cardiovascular; GDMT, guideline-directed medical therapy; HF, heart failure; RAAS, renin-angiotensin-aldosterone system.

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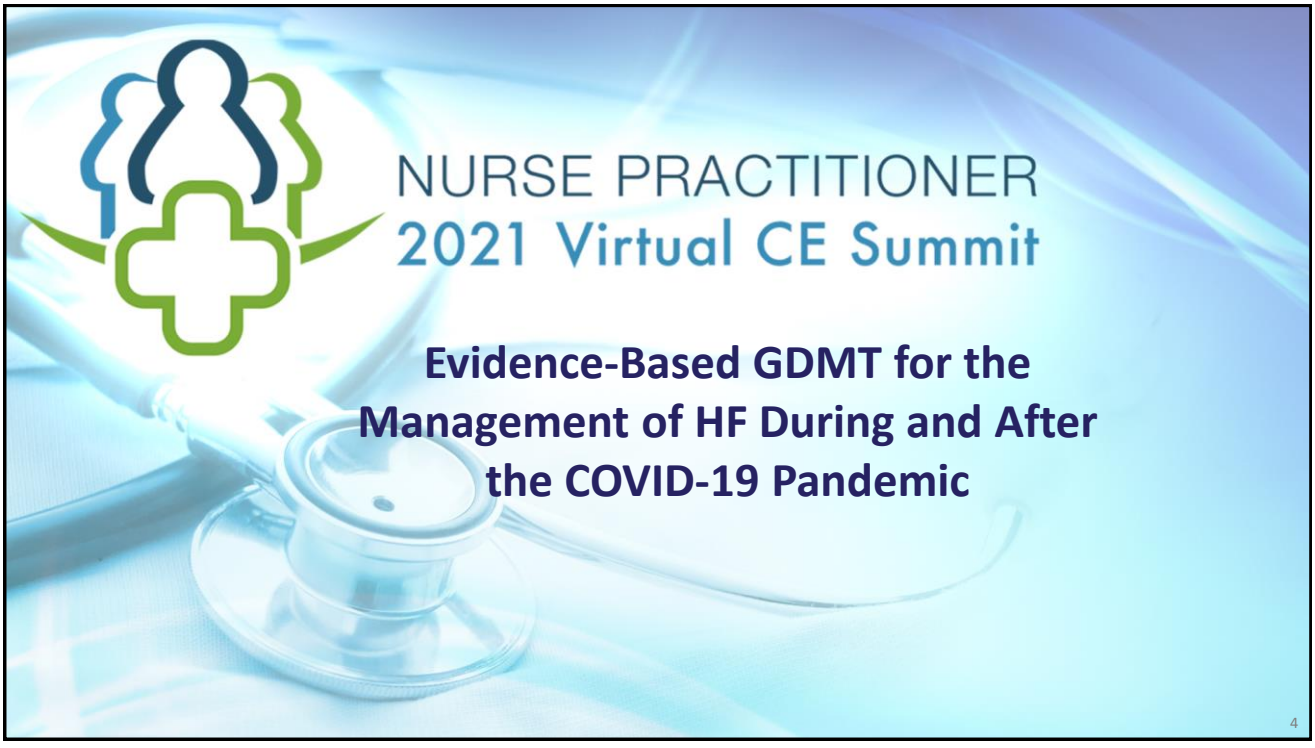
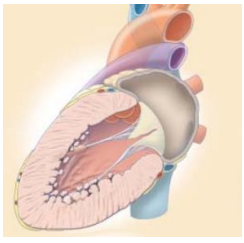
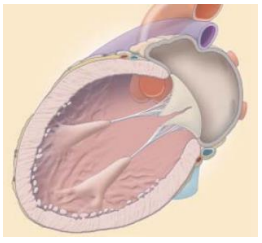


# Definition of HF

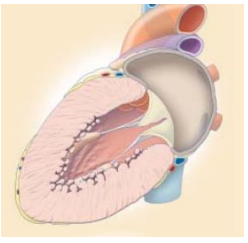
**A clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood**



**Normal Heart**



**HF with Reduced Ejection Fraction (HF*r*EF)**



**HF with Preserved Ejection Fraction (HF*p*EF)**

**Major clinical manifestations: dyspnea, fatigue, and fluid retention***

*Patient presentation varies.

Jessup M, Brozena SA. *New Engl J Med.* 2003;348:2007-2018; Yancy CW, et al. *Circulation.* 2013;128:e240-e327.



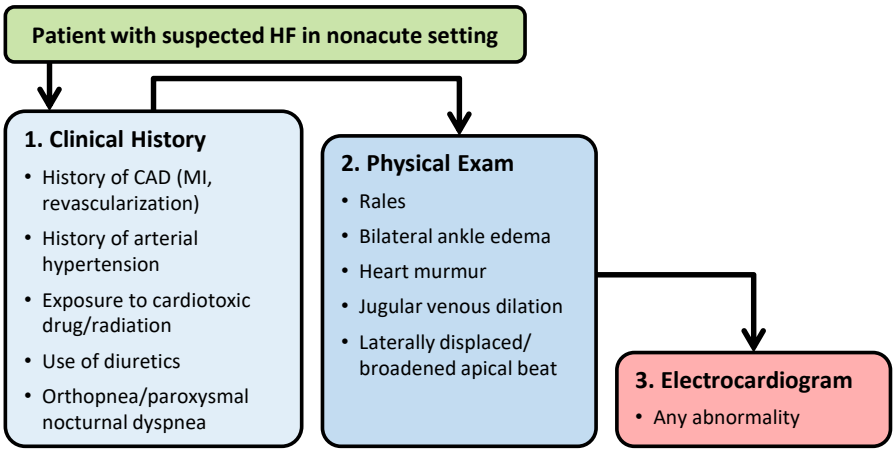
# Classification of HF

| Classification | EF (%) | Description |
|---|---|---|
| HF*r*EF | **≤40** | Also referred to as **systolic HF**. RCTs have mainly enrolled patients with HF*r*EF; to date, only in these patients have effective therapies been demonstrated. |
| HF*mr*EF | **41-49** | HF with **mid-range ejection fraction**. New category with overlapping characteristics of HF*r*EF and HF*p*EF. Clinical course and mortality are more like HF*r*EF than HF*p*EF. |
| HF*p*EF | **≥50** | Also referred to as **diastolic HF**. Several different criteria have been used to further define HF*p*EF. Diagnosis of HF*p*EF is challenging because it largely involves excluding other potential noncardiac causes of symptoms suggestive of HF. To date, no effective therapies have been identified. |

RCTs, randomized control trials.

Yancy CW, et al. *Circulation*. 2013;128:e240-e327; Bhambhani V, et al. *Eur J Heart Fail.* 2018;20(4): 651–659.

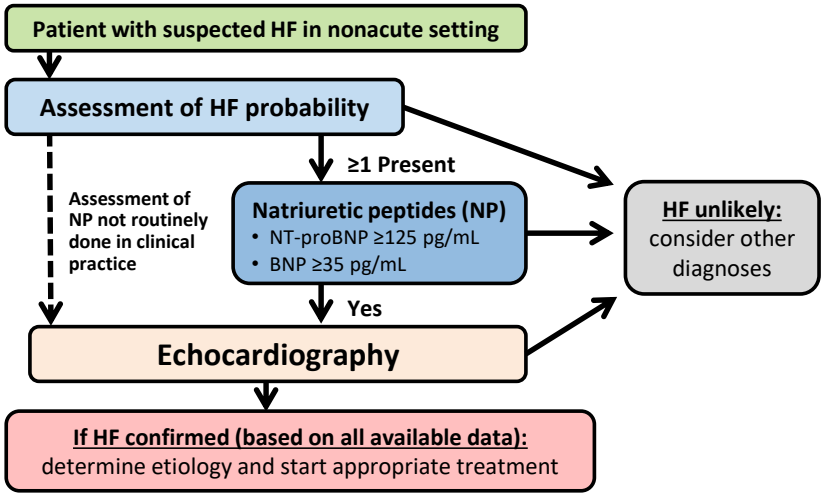
# Assessment of HF Probability




CAD, coronary artery disease; MI, myocardial infarction.
Ponikowski P, et al. *Eur J Heart Fail.* 2016;18(8):891-975.



# Diagnosis of HF




BNP, B-type natriuretic peptide; NT-proBNP, N-terminal pro BNP.
Ponikowski P, et al. *Eur J Heart Fail.* 2016;18(8):891-975.

# ESC Guidance on Management of CVD During the COVID-19 Pandemic

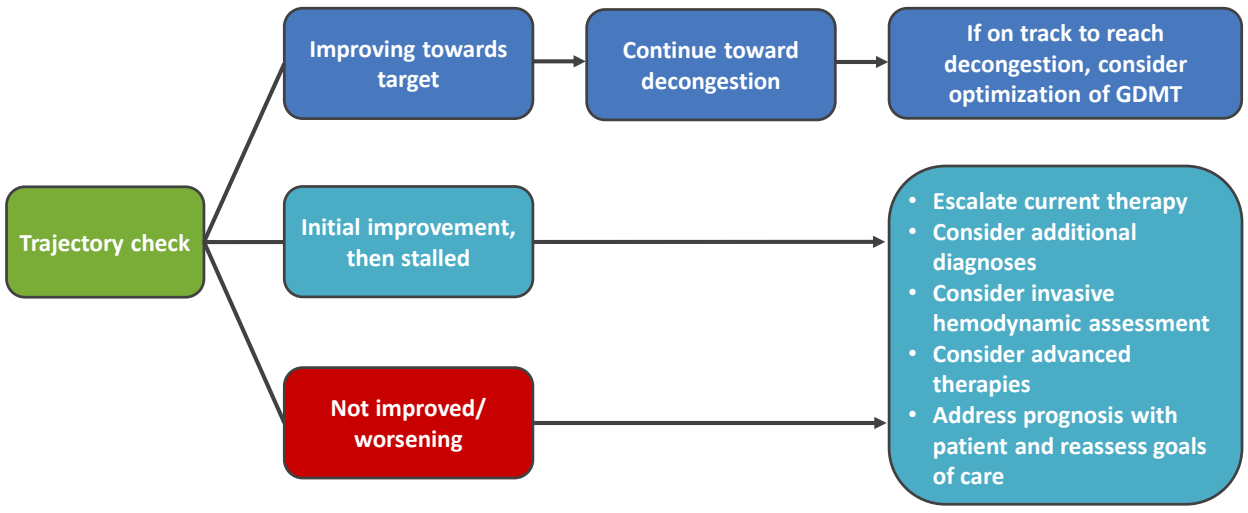
- The risk of COVID-19 infection may be higher in chronic HF patients due to the advanced age and presence of several comorbidities.
- Ambulatory stable HF patients (with no cardiac emergencies) should refrain from hospital visits.
- GDMT (including beta-blocker, ACE inhibitor, ARB, or sacubitril/valsartan and MRA), should be continued in chronic HF patients, irrespective of COVID-19.

ACE, angiotensin-converting enzyme; ARB, angiotensin receptor blocker; CVD, cardiovascular disease; MRA, mineralocorticoid receptor antagonist.

The European Society for Cardiology. ESC guidance for the diagnosis and management of CV disease during the COVID-19 pandemic. Updated June 10, 2020. https://www.escardio.org/Education/COVID-19-and-Cardiology/ESC-COVID-19-Guidance



# ESC Guidance on Management of CVD During the COVID-19 Pandemic

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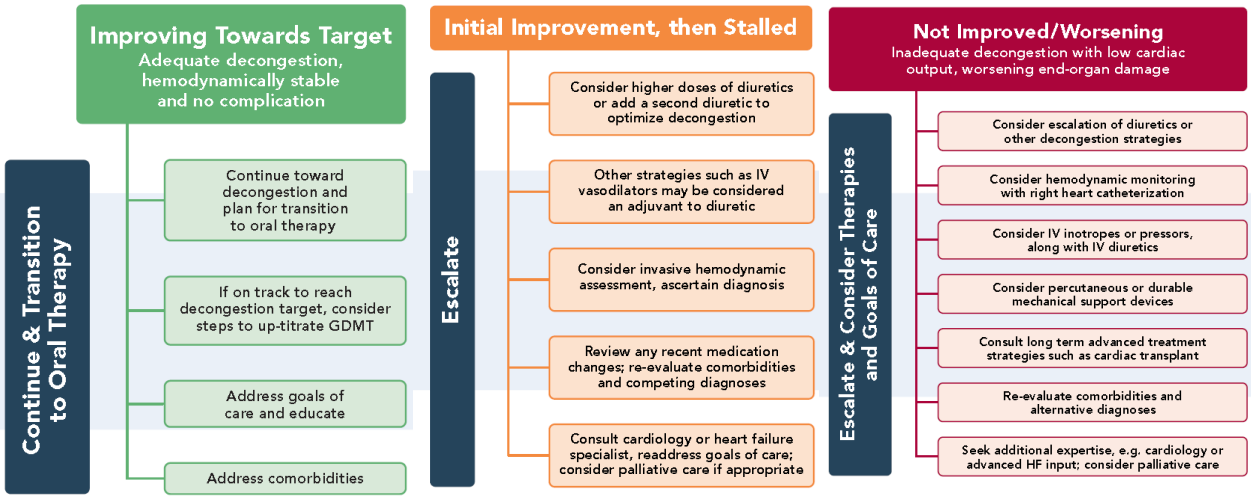
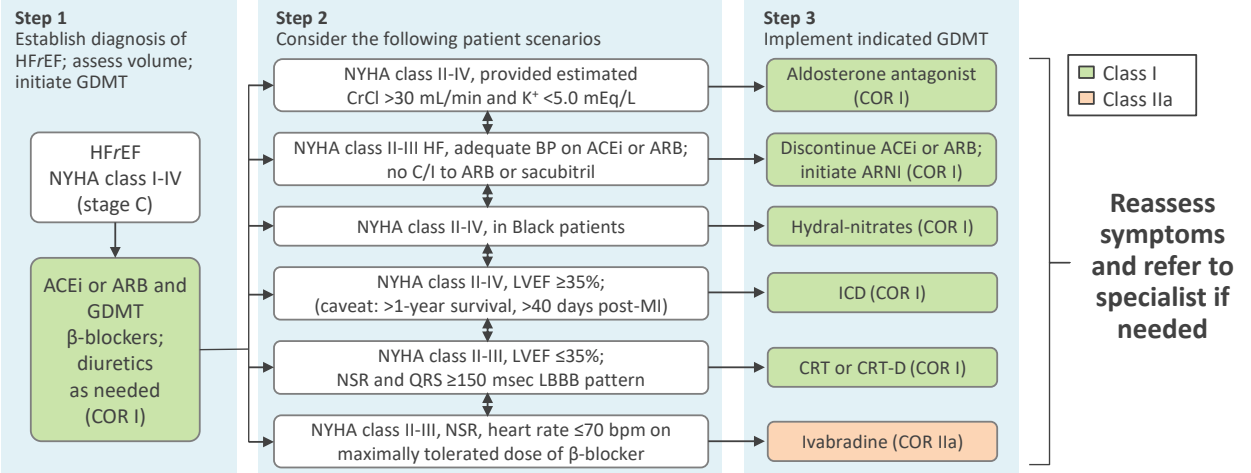



The European Society for Cardiology. ESC guidance for the diagnosis and management of CV disease during the COVID-19 pandemic. Updated June 10, 2020. https://www.escardio.org/Education/COVID-19-and-Cardiology/ESC-COVID-19-Guidance



# Treatment of Stage C-D HF*r*EF




ARNI, angiotensin receptor–neprilysin inhibitor; C/I, counterindication; COR, class of recommendation; CrCL, creatinine clearance; CRT, cardiac resynchronization therapy; CRT-D, CRT with device; ICD, implantable cardioverter-defibrillator, LBBB, left bundle branch block; LVEF, left ventricular ejection fraction; NSR, normal sinus rhythm; NYHA, New York hear association.
Yancy CW, et al. *Circulation*. 2013;128(16):e240-e327; Bloom MW, et al. *Nat Rev Dis Primers*. 2017;3:17058.

# Medications for HF*r*EF

| Class | Mechanism of action | Drug | Initial daily dose(s) | Max dose(s) | Mean RCT dose |
|---|---|---|---|---|---|
| **ACEi's** | Inhibits the conversion of angiotensin I to angiotensin II, and upregulates bradykinin, thereby counteracting the overactivation of the RMS system and the effects of adverse cardiac remodeling | Captopril | 6.25 mg TID | 50 mg TID | 122.7 mg QD |
| | | Enalapril | 2.5 mg BID | 10-20 mg BID | 16.6 mg QD |
| | | Fosinopril | 5-10 mg QD | 40 mg QD | NA |
| | | Lisinopril | 2.5-5 mg QD | 20-40 mg QD | 32.5-35.0 mg QD |
| | | Perindopril | 2 mg QD | 8-16 mg QD | NA |
| | | Quinapril | 5 mg BID | 20 mg BID | NA |
| | | Ramipril | 1.25-2.5 mg QD | 10 mg QD | NA |
| | | Trandolapril | 1 mg QD | 4 mg QD | NA |
| **ARBs** | Inhibits angiotensin II AT1 receptors, thereby counteracting the overactivation of the RAAS system and counteracting the effects of adverse cardiac remodeling | Candesartan | 4-8 mg QD | 32 mg QD | 24 mg QD |
| | | Losartan | 25-50 mg QD | 50-150 mg QD | 129 mg QD |
| | | Valsartan | 20-40 mg BID | 160 mg BID | 254 mg QD |
| **ARNI** | Inhibits neprilysin and blocks angiotensin II receptor; inhibition of neprilysin leads to increased circulating levels of natriuretic peptides, vasodilation and natriuresis | Sacubitril/ valsartan | 49/51 mg BID Therapy may be initiated at 24/26 mg BID | 97/103 mg BID | 375 mg QD; target dose: 24/26 mg, 49/51 mg OR 97/103 mg BID |

AT1, angiotensin II receptor type 1; BID, twice daily; QD, daily; TID, three times daily; RMS, records management system.
Yancy CW, et al. *Circulation*. 2013;128(16):e240-e327.



# Medications for HF*r*EF (cont'd)

| Class | Mechanism of action | Drug | Initial daily dose(s) | Max dose(s) | Mean RCT dose |
|---|---|---|---|---|---|
| **$I_f$ Channel Inhibitor** | Inhibits the $I_f$ node, which slows the sinus nodal rate in patients who are in sinus rhythm | Ivabradine | 5 mg BID | 7.5 mg BID | 6.4 mg BID (at 28 days) 6.5 mg BID (at 1 year) |
| **Aldosterone antagonists (ie, MRAs)** | Competitively bind to the aldosterone receptor, which increases the secretion of water and sodium in the distal tubule, and decreases the secretion of potassium | Spironolactone | 4-8 mg QD | 32 mg QD | 24 mg QD |
| | | Eplerenone | 25-50 mg QD | 50-150 mg QD | 129 mg QD |
| **β-blockers** | Inhibits neprilysin and blocks angiotensin II receptor; inhibition of neprilysin leads to increased circulating levels of natriuretic peptides, vasodilation and natriuresis | Bisoprolol | 1.25 mg QD | 10 mg QD | 8.6 mg QD |
| | | Carvedilol | 3.125 mg BID | 50 mg BID | 37 mg QD |
| | | Carvedilol CR | 10 mg QD | 80 mg QD | NA |
| | | Metoprolol Succinate | 12.5-25 mg QD | 200 mg QD | 159 mg QD |
| **Isosorbide dinitrate (ID) and hydralazine (HYD)** | Arterial and venous vasodilation and a nitric oxide donor (isosorbide) | Fixed-dose combination | 20 mg ID/37.5 mg HYD TID | 40 mg ID/75 mg HYD TID | 90 mg ID/~175 mg HYD QD |
| | | ID and HYD | 20-30 mg ID/25-50 mg HYD TID or QD | 40 mg ID TID with 100 mg HYD TID | N/A |

Yancy CW, et al. *Circulation*. 2013;128(16):e240-e327.

# Diuretics Commonly Used in HF

| Class | Mechanism of action | Drug | Initial dose | Usual daily dose |
|---|---|---|---|---|
| **Loop diuretics** | Inhibits primarily the absorption of sodium and chloride not only in the proximal and distal tubules but also in the loop of Henle. | Furosemide | 20-40 mg | 40-240 mg |
| | | Bumetanide | 0.5-1.0 mg | 1-5 mg |
| | | Torsemide | 5-10 mg | 10-20 mg |
| **Thiazides** | Inhibits sodium chloride transport in the distal convoluted tubule. More sodium is then excreted in the kidney with accompanying fluid. | Bendroflumethiazide | 2.5 mg | 2.5-10 mg |
| | | Hydrochlorothiazide | 25 mg | 12.5-100 mg |
| | | Metolazone | 2.5 mg | 2.5-10 mg |
| | | Indapamide | 2.5 mg | 2.5-5 mg |

| Potassium-sparing diuretics | Initial Dose | Usual Daily Dose |
|---|---|---|
| Spironolactone/eplerenone | **+ ACEi/ARB**: 12.5-25 mg<br>**- ACEi/ARB**: 50 mg | **+ ACEi/ARB**: 50 mg<br>**- ACEi/ARB**: 100-200 mg |
| Amiloride | **+ ACEi/ARB**: 2.5 mg<br>**- ACEi/ARB**: 5 mg | **+ ACEi/ARB**: 5-10 mg<br>**- ACEi/ARB**: 10-20 mg |
| Triamterene | **+ ACEi/ARB**: 25 mg<br>**- ACEi/ARB**: 50 mg | **+ ACEi/ARB**: 100 mg<br>**- ACEi/ARB**: 200 mg |

Ponikowski P, et al. *Eur J Heart Fail*. 2016;18(8):891-975; Herman LL, Bashir K. Updated February 15, 2019. Accessed May 31, 2020. https://www.ncbi.nlm.nih.gov/books/NBK430766/



# 2017 Focused Update of the 2013 Guideline for the Management of HF

| Class (Strength) of Recommendation | | Level (Quality) of Evidence | |
|---|---|---|---|
| I (Strong) | Benefit >>> Risk | A | High quality |
| IIa (Moderate) | Benefit >> Risk | B-R | Moderate quality, randomized |
| IIb (Weak) | Benefit ≥ Risk | B-NR | Moderate quality, non-randomized |
| III: No Benefit (Moderate) | Benefit = Risk | C-LD | Limited data |
| III: Harm (Strong) | Risk > Benefit | C-EO | Expert opinion |

Yancy CW, et al. *Circulation*. 2013;128(16):e240-e327.

# Treatment of Stage C HF*r*EF

| | COR | LOE | Recommendation |
|---|---|---|---|
| NEW | I | ACE-I: A<br>ARB: A<br>ARNI: B-R | The clinical strategy of **inhibition of the RAAS with ACEi's, ARBs, or ARNIs in conjunction with evidence-based β-blockers and aldosterone antagonists in selected patients is recommended for patients with chronic HF*r*EF** to reduce morbidity and mortality. |
| | I | ACE-I: A | The **use of ACEi's is beneficial for patients with prior or current symptoms of chronic HF*r*EF** to reduce morbidity and mortality. |
| | I | ARB: A | The use of **ARBs to reduce morbidity and mortality is recommended in patients** with prior or current symptoms of chronic HF*r*EF **who are intolerant to ACEi's** because of cough or angioedema. |
| NEW | I | ARNI: B-R | In patients with chronic symptomatic HF*r*EF NYHA class II or III who tolerate an ACEi or ARB, **replacement by an ARNI is recommended to further reduce morbidity and mortality**. |
| NEW | III: Harm | B-R | **ARNI should not be administered concomitantly with ACEi's** or within 36 hours of the last dose of an ACEi. |
| NEW | III: Harm | C-EO | **ARNI should not be administered to patients with a history of angioedema**. |
| NEW | IIa | Iva: B-R | **Ivabradine can be beneficial to reduce HF hospitalization for patients with symptomatic (NYHA class II-III) stable chronic HF*r*EF (LVEF ≤35%) who are receiving GDMT**, including a β-blocker at maximum tolerated dose, and who are in sinus rhythm with a heart rate of 70 bpm or greater at rest. |

Iva, ivabradine; LOE, level of evidence.
Yancy CW, et al. *Circulation*. 2013;128(16):e240-e327.



# Treatment of Stage C HF*p*EF

| | COR | LOE | Recommendation |
|---|---|---|---|
| | I | B | **Systolic and diastolic blood pressure should be controlled** in patients with HF*p*EF in accordance with published clinical practice guidelines to prevent morbidity. |
| | I | C | **Diuretics should be used for relief of symptoms due to volume overload** in patients with HF*p*EF. |
| | IIa | C | Coronary revascularization is reasonable in patients with CAD in whom symptoms (angina) or demonstrable MI is judged to be having an adverse effect on symptomatic HF*p*EF despite GDMT. |
| | IIa | C | Management of AF according to published clinical practice guidelines in patients with HF*p*EF is reasonable to improve symptomatic HF. |
| | IIa | C | The **use of β-blockers, ACEi's, and ARBs in patients with hypertension is reasonable** to control blood pressure in patients with HF*p*EF. |
| NEW | IIb | B-R | In appropriately selected patients with HF*p*EF, **aldosterone receptor antagonists might be considered to decrease hospitalizations**. |
| | IIb | B | The use of **ARBs might be considered to decrease hospitalizations** for patients with HF*p*EF. |
| NEW | III: No Benefit | B-R | **Routine use of nitrates or phosphodiesterase-5 inhibitors to increase activity or QoL** in patients with HF*p*EF is **ineffective**. |
| | III: No Benefit | C | Routine **use of nutritional supplements is not recommended** for patients with HF*p*EF. |

AF, atrial fibrillation; QoL, quality of life.
Yancy CW et al. *Circulation*. 2013;128(16):e240-e327.

# Recommendations for Hypertension

| | COR | LOE | Recommendation |
|---|---|---|---|
| NEW | I | B-R | In patients at increased risk, stage A HF, the optimal blood pressure in those with hypertension should be **<130/80 mm Hg**. |
| NEW | I | C-EO | Patients with HF*r*EF (stage C) and hypertension should be prescribed GDMT titrated to **attain systolic blood pressure <130 mm Hg**. |
| NEW | I | C-LD | Patients with HF*p*EF and persistent hypertension after management of volume overload should be **prescribed GDMT titrated to attain systolic blood pressure <130 mm Hg.** |

Yancy CW, et al. *Circulation*. 2013;128(16):e240-e327.

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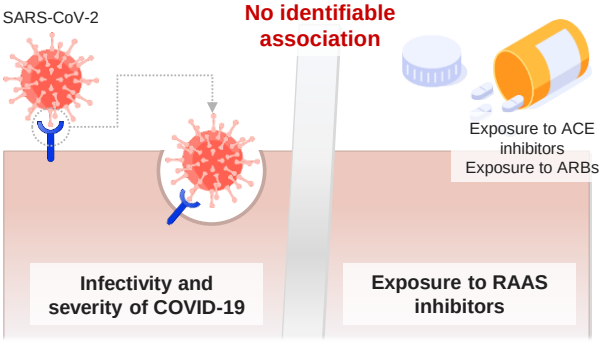
# Use of RAAS Inhibitors & COVID-19

- Previous treatment with ACEi/ARB in patients with COVID-19 has ***no effect*** on mortality, HF, hospitalization, or ICU admission




SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

Son M, et al. *Hypertension.* 2020;76:742–749; Lopez-Otero D, et al. *Rev Esp Cardiol* (Engl Ed). 2020 Jun 5; Sriram K, et al. *Clin Pharmacol Ther*. 2020 Aug;108(2):236-241

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# CV Society Recommendations on RAAS Antagonists in the COVID-19 Patient

| Society | Pub Date | Recommendation |
|---|---|---|
| **AHA/HFSA/ACC** | Mar 17, 2020 | Continuation of ACEis/ARBs in COVID-19 patients with preexisting indications (HF, HTN, CAD)<br>Careful consideration prior to addition/ discontinuation of any CVD treatments in COVID-19 patients |
| **Canadian CV Society** | Mar 20, 2020 | Continuation of ACEi/ARB/ARNi unless clinically contraindicated (symptomatic hypotension, shock, AKI, hyperkalemia) |
| **ESC Council on HTN** | Mar 13, 2020 | Continue antihypertensive treatment |
| **European Society of HTN** | Apr 15, 2020 | Stable COVID-19 patients should continue ACEi/ARB treatment according to 2018 ESC/ESH guidelines<br>Assess COVID-19 patients with severe symptoms, sepsis, or hemodynamic instability on a case-by-case basis for the discontinuation of blood pressure lowering drugs, with consideration for current guidelines |
| **HTN Canada** | Mar 13, 2020 | Continue antihypertensive treatment |
| **International Society of HTN** | Mar 16, 2020 | Routine use of ACEi's/ARBs in hypertensive patients despite COVID-19 concerns |

ACC, American College of Cardiology; AHA, American Heart Association; AKI, acute kidney injury; ESC, European Society of Cardiology; ESH, European Society of Hypertension; HFSA, Heart Failure Society of America; HTN, hypertension.

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# New Indications for HF*p*EF

- Sacubitril/valsartan
  - FDA advisory committee voted 12-1 to approve for **treatment of HF*p*EF**
  - PARAGON-HF trial
- Spironolactone
  - FDA advisory committee voted 8-4 to approve for **reduction of HF hospitalization**
    - **HF with mildly-reduced or midrange EF: LVEF of 40% to 57%**
  - TOPCAT Trial

Keown A. Novartis' Entresto on track for new FDA approval following successful AdComm. Biospace. Dec 16, 2020. https://www.biospace.com/article/novartis-entresto-clears-fda-adcomm-for-hfpef
Buzby S. FDA advisory panel endorses spironolactone for HF hospitalization reduction HFpEF. Healio. Dec 16, 2020. https://www.healio.com/news/cardiology/20201216/fda-advisory-panel-endorses-spironolactone-for-hf-hospitalization-reduction-in-hfpef

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# New Indications for HF*p*EF

| | CHARM-P<br>N = 3023 | TOPCAT<br>N = 3445 | PARAGON-HF<br>N = 4800 |
|---|---|---|---|
| **Treatment Arms** | Candesartan vs Placebo | Spironolactone vs Placebo | Sacubitril/Valsartan vs Placebo |
| **LVEF Inclusion Criteria** | LVEF > 40% | LVEF ≥ 45% | LVEF > 45% |
| **Endpoint** | First of either CVD or HFH | First of either CVD, HFH, or RSD | CVD and total HFH (first and recurrent) |
| **Hospitalizations HR (95% CI)** | HR 0.78 (0.59–1.03) | HR 0.98 (0.74–1.30) | HR 0.85 (0.72–1.00) |
| **LVEF Subgroup** | LVEF 40–49%<br>HR 0.48 (0.33-0.70) | LVEF <50%<br>HR 0.76 (0.46-1.27) | LVEF <57%<br>HR 0.78 (0.64-0.95) |

HFH, heart failure hospitalization.

Gronda E, et al. *Eur Heart J Suppl*. 2020;22(suppl):L77-L81.

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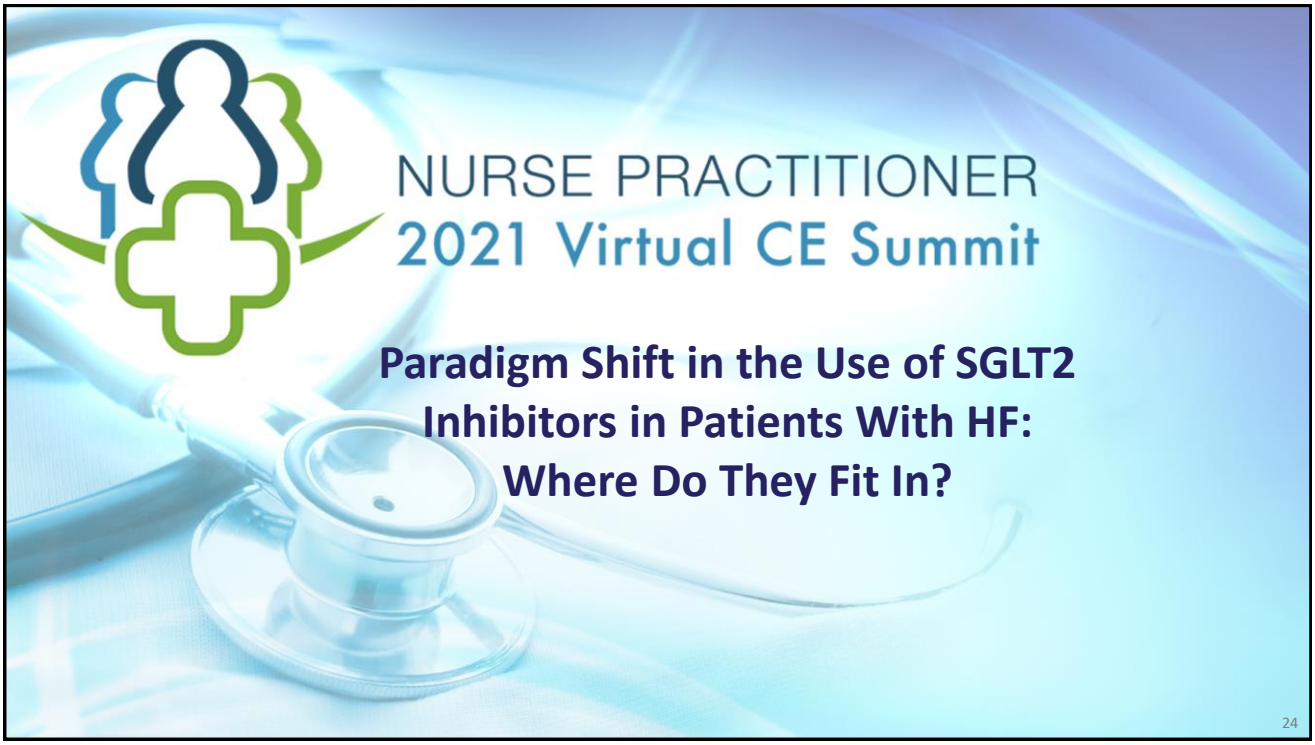


# DAPA-HF Trial

- Phase 3 placebo-controlled trial
- First to examine benefit of SGLT2 inhibitors in patients with HF
  - Regardless of DM status
- 4744 patients with HF*r*EF
  - NYHA Class II, III, or IV HF and LVEF ≤40%
- Dapagliflozin (10 mg once daily) or placebo
- Primary outcome: composite of worsening HF* or CV death

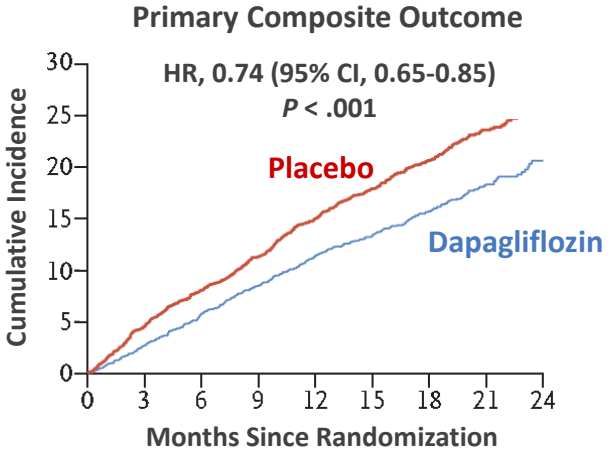
*Hospitalization or an urgent visit resulting in intravenous therapy for HF.
DM, diabetes mellitus; SGLT2, sodium-glucose transport protein 2.
McMurray JJV, et al. *N Engl J Med*. 2019;381(21):1995-2008.



# DAPA-HF: Primary Outcome

Median follow-up: **18.2 months**

| | HR or RR or difference (95% CI) |
|---|---|
| **Primary composite outcome** | **0.74 (0.65 to 0.85) *P* < .001** |
| Hospitalization or an urgent HF visit | 0.70 (0.59-0.83) |
| HHF | 0.70 (0.59-0.83) |
| Urgent HF visit | 0.43 (0.20-0.90) |
| CV death | 0.82 (0.69-0.98) |




RR, risk ratio.
McMurray JJV, et al. *N Engl J Med*. 2019;381(21):1995-2008.

# EMPORER-Reduced Trial

- Results announced at ESC 2020
- Empagliflozin 10 mg daily vs placebo in 3730 patients
  - HF*r*EF
  - With or without diabetes
  - Already receiving standard of care for HF
- Median follow-up: 16 months
- Primary endpoint: CV death or HHF
  - HR 0.75, 95% CI 0.65-0.86, P < .0001
- Total risk of hospitalizations for HF reduced by 30%
- Adverse renal outcomes reduced by 50%

European Society of Cardiology. Hot line: not just in diabetes – empagliflozin improves outcomes in patients with heart failure in the EMPEROR-Reduced trial. Aug 29, 2020. https://www.escardio.org/Congresses-&-Events/ESC-Congress/Congress-resources/Congress-news/hot-line-not-just-in-diabetes-empagliflozin-improves-outcomes-in-patients-with-heart-failure-in-the-emperor-reduced-trial



# Expanding Opportunities for SGLT2 Inhibitors in HF
## 2018 ACC Expert Consensus

**Considerations for Drug Initiation and Monitoring in Patients Starting an SGLT2 Inhibitor With Demonstrated CV Benefit**

- If A1c well-controlled at baseline, or known history of frequent hypoglycemic events, reduce dose of sulfonylurea by 50% or basal insulin dose by 20% when starting therapy
- Avoid hypovolemia. May need to reduce thiazide or loop diuretic dose
- Educate patients regarding symptoms of low blood pressure (light headedness, orthostasis, weakness)
- Instruct patients to more closely monitor glucose at home for the first 4 weeks of therapy
- Educate patients regarding symptoms of diabetic ketoacidosis and that diabetic ketoacidosis can occur even if blood glucose readings are in the 150–250 mg/dL range
- Educate patients regarding foot care and follow-up foot pulse examination (particularly canagliflozin)
- Monitor kidney function
- Educate patients regarding potential for genital mycotic infections

Das SR, et al. *J Am Coll Cardiol*. 2018;72(24):3200-23.

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# Understanding COVID-19 and Cardiovascular Comorbidities

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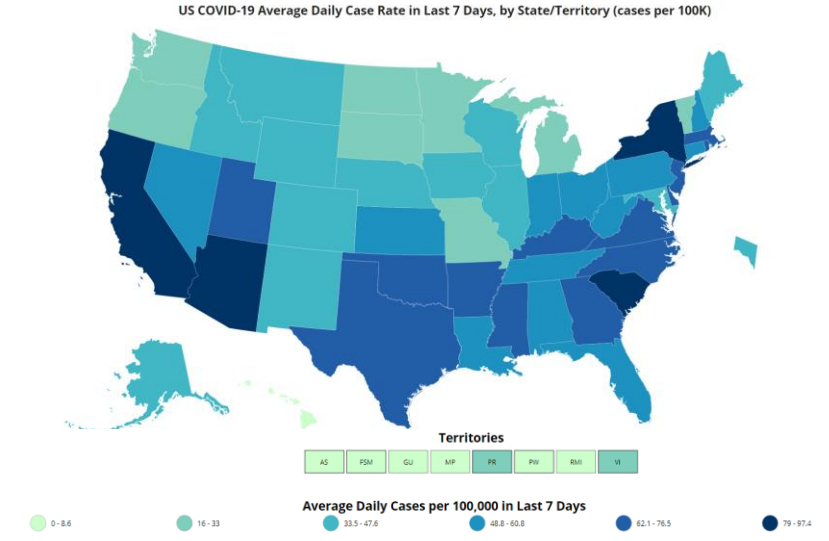
## Current COVID-19 Cases and Deaths




TOTAL CASES
24,135,690
+153,106 New Cases

AVERAGE DAILY CASES PER 100K IN LAST 7 DAYS
60.1

TOTAL DEATHS
400,306
+2,297 New Deaths

Centers for Disease Control. United States COVID-19 cases and deaths by state. https://covid.cdc.gov/covid-data-tracker/#cases_casesper100klast7days

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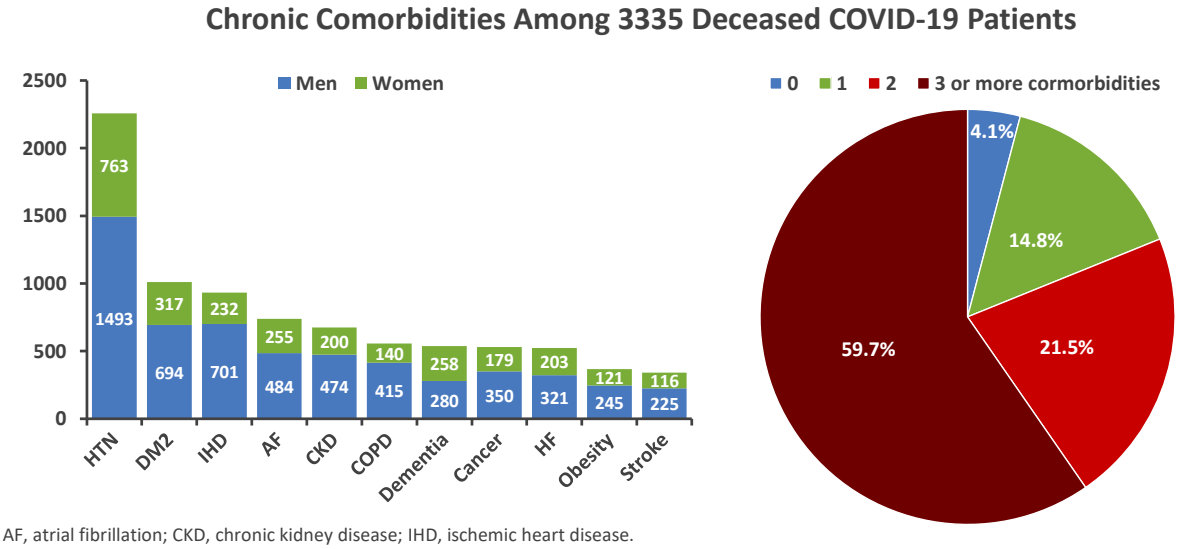
# CV-Related Comorbidities and COVID-19




AF, atrial fibrillation; CKD, chronic kidney disease; IHD, ischemic heart disease.

Mai F, et al. *J Cardiol.* 2020 Nov;76(5):453-458.



# Increased Risks of Severe Illness

- Study of 6439 patients admitted for COVID-19
  - **422 (6%) had history of HF**
- Compared to those *without HF* and **independent of LVEF and RAASi treatment**, patients with HF had increased:
  - mLOS: 8 vs 6 days, *P*<0.001
  - Frequency of ICU care: OR 1.52, 95% CI 1.20-1.92, *P*=0.001
  - Intubation/mechanical ventilation: OR 2.18, 95% CI 1.71-2.77, *P*<0.001
  - Mortality: OR 2.02, 95% CI 1.65-2.48, *P*<0.001

**33% Longer Hospitalization**

**52% Increase in ICU Care**

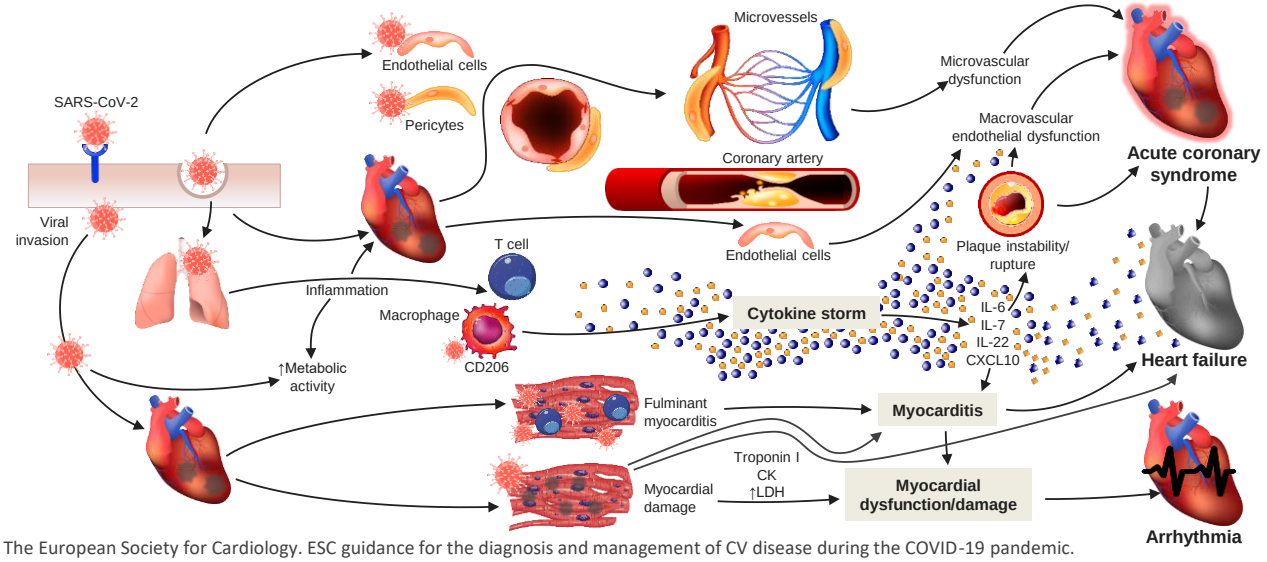
**2x Intubation/ Mech. Vent.**

**2x Mortality**

mLOS, minimum length of stay.

Alvarez-Garcia J, et al. *J Am Coll Cardiol*. 2020;76(20):2334-2348.

# SARS-CoV-2 and COVID-19




The European Society for Cardiology. ESC guidance for the diagnosis and management of CV disease during the COVID-19 pandemic. Updated June 10, 2020. https://www.escardio.org/Education/COVID-19-and-Cardiology/ESC-COVID-19-Guidance

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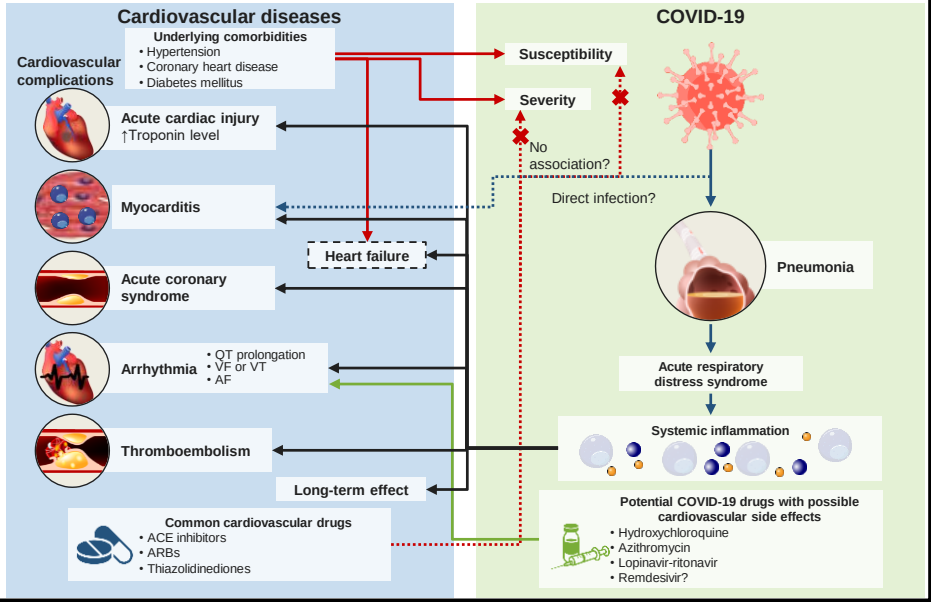
# A Dangerous Cycle

Growing evidence suggests that ***patients who contract COVID-19 are at increased risk of developing CV-related comorbidities <u>as a result of infection</u>.***

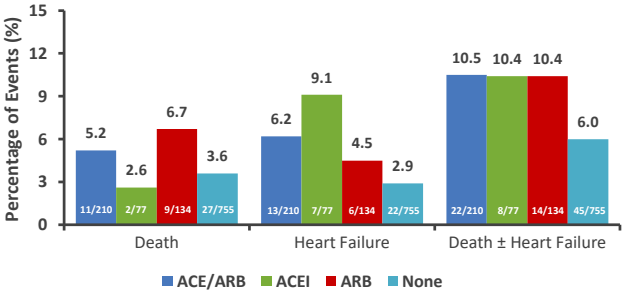


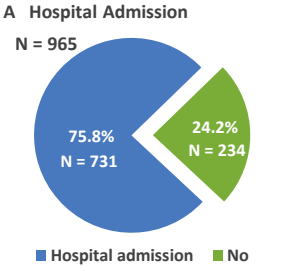

VF, ventricular fibrillation;
VT, ventricular tachycardia.

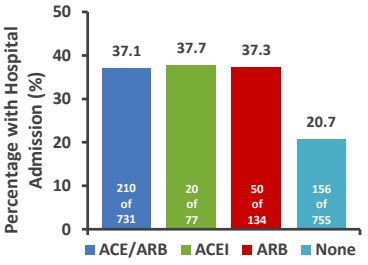
Nishiga M, et al. *Nat Rev Cardiol*. 2020;17(9):543-558.

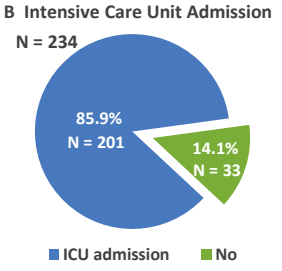
# Use of RAAS Inhibitors & COVID-19

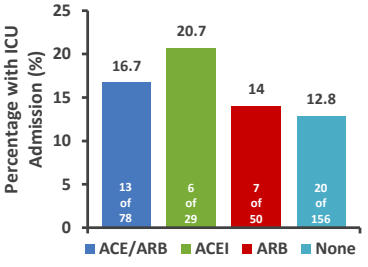
| Outcome | OR (95% CI) | P-value |
|---|---|---|
| Mortality | 0.62 (0.17-2.26) | *P* = .486 |
| HF | 1.37 (0.39-4.77) | *P* = .622 |
| Hospitalization | 0.85 (0.45-1.64) | *P* = .638 |
| ICU admission | 1.06 (0.39-2.83) | *P* = .915 |




Lopez-Otero D, et al. *Rev Esp Cardiol* (Engl Ed). 2020 Jun 5.

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## Expanding Role of NPs in HF Telemedicine in the Wake of COVID-19

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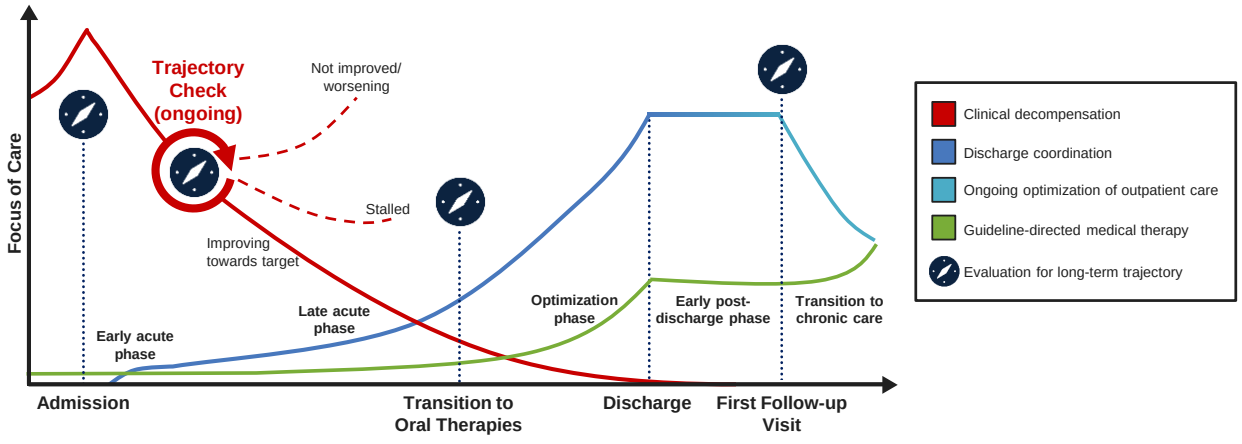
# Telemedicine: CMS & How We Got Here

- To reduce transmission of COVID-19, healthcare systems have transitioned to noncontact care delivery
- In early March 2020, CMS broadened access to telehealth services
  - Coronavirus Preparedness and Response Supplemental Appropriations Act
- Through telehealth, physicians can
  - Maintain face-to-face interactions with their patients
  - Gain familiarity with patients' domestic circumstances
  - Obtain vital sign measurement through home blood pressure cuffs, pulse oximeters, and scales
  - Perform limited physical examinations for jugular venous distention, peripheral edema, peripheral catheter and driveline site integrity, and functional capacity
  - Reconcile medications through direct visualization of pill containers
  - Interact with caregivers

Centers for Medicare & Medicaid Services (CMS). Medicare telemedicine health care provider fact sheet. Mar 17, 2020. https://www.cms.gov/newsroom/fact-sheets/medicare-telemedicine-health-care-provider-fact-sheet



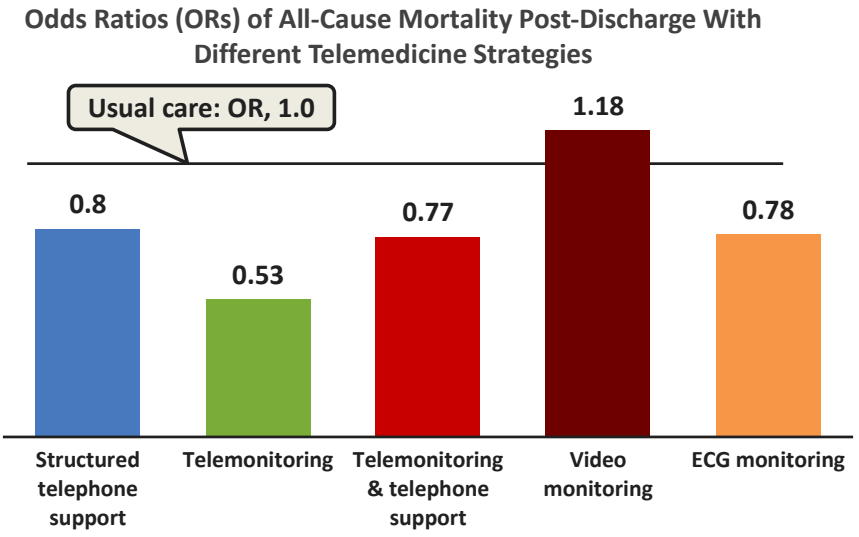
# Clinical Course of HF




Hollenberg SM, et al. *J Am Coll Cardiol*. 2019;74(15):1966-2011.

# Telemedicine Is an Effective Care Component

- Improve CV outcomes
- Reduces
  - Hospitalizations
  - ED visits
  - Illness severity
  - Financial burden



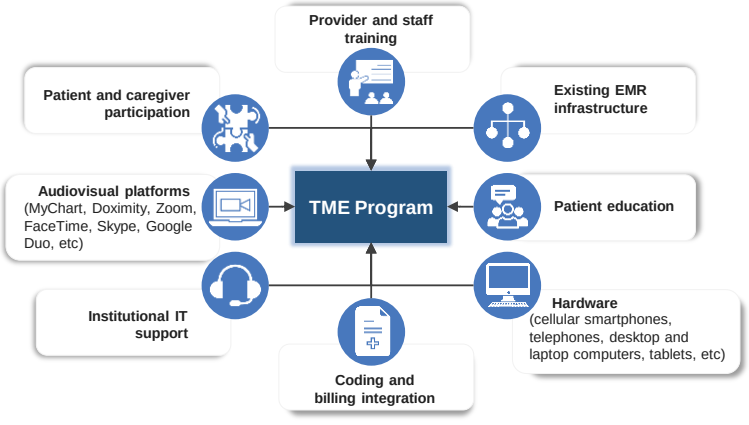

ECG, electrocardiogram; ED, emergency department.
Kotb A, et al. *PLoS One.* 2015;10(2):e0118681.



# Implementation Guide for Rapid Integration of an Outpatient Telemedicine Program amidst the COVID-19 Pandemic

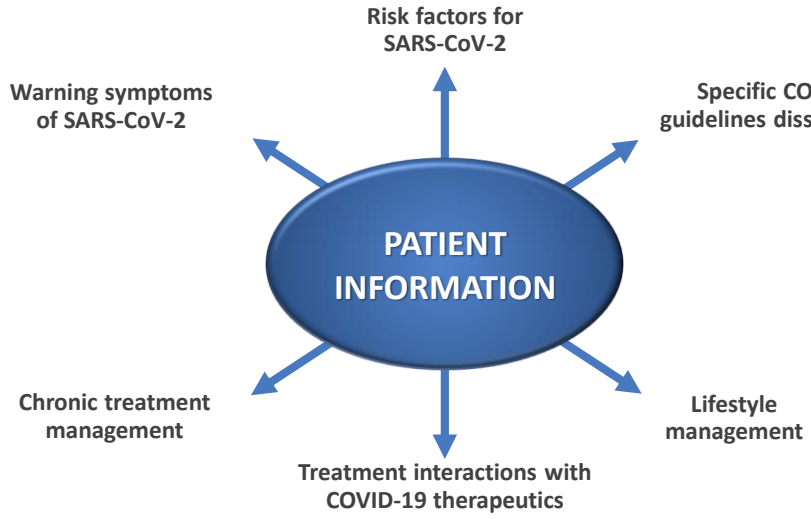
***"Telemedicine should be considered whenever possible to provide medical advice and follow up of stable HF patients."***

*–ESC Guidance on Management of CVD During the COVID-19 Pandemic*




The European Society for Cardiology. ESC guidance for the diagnosis and management of CV disease during the COVID-19 pandemic. Updated June 10, 2020. https://www.escardio.org/Education/COVID-19-and-Cardiology/ESC-COVID-19-Guidance
Adapted from Smith WR, et al. *J Am Coll Surg.* 2020;231(2):216-222.e2. Available at: https://www.eurekalert.org/multimedia/pub/230767.php

# ESC Guidance on Patient Information During the COVID-19 Pandemic

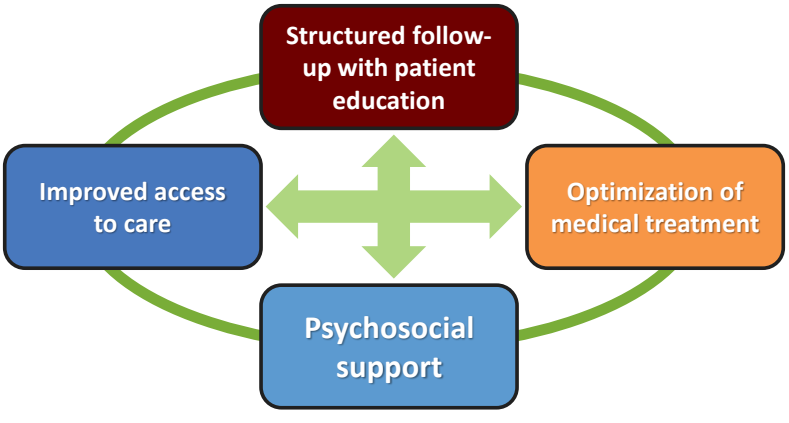



The European Society for Cardiology. ESC guidance for the diagnosis and management of CV disease during the COVID-19 pandemic. Updated June 10, 2020. https://www.escardio.org/Education/COVID-19-and-Cardiology/ESC-COVID-19-Guidance

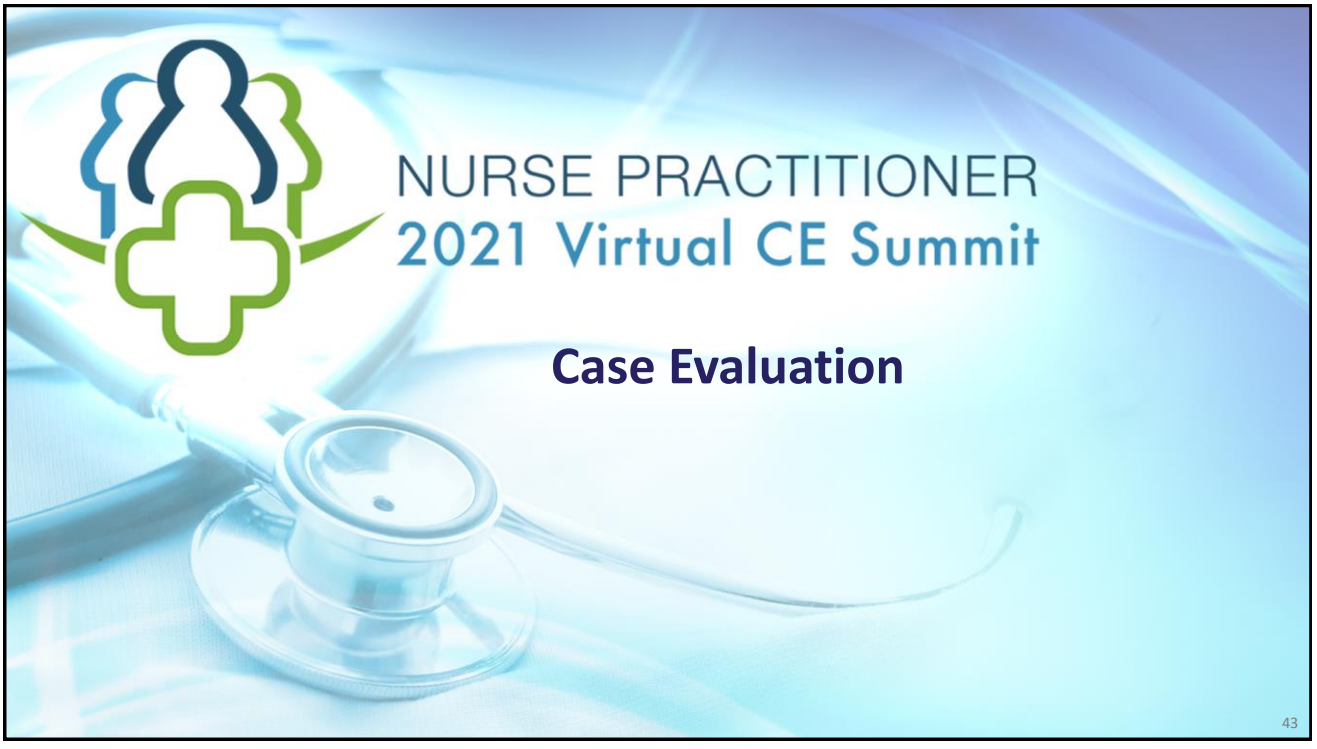


# Effective Transitions of Care

***"The goal of management of HF is to provide a 'seamless' system of care that embraces both the community and hospital throughout the health care journey."***




Ponikowski P, et al. *Eur J Heart Fail.* 2016;18(8):891-975.




## Patient Case Scenario

- Aubrey is a 52-year-old obese woman (BMI 31.3) with a history of HF*r*EF and T2DM. Last year, she had an MI and was hospitalized for 2 weeks. Today, she presents to your practice with flu-like symptoms and a fever of 103.2, and she mentions she was unable to smell her coffee this morning. Aubrey is currently taking lisinopril and metformin and tolerating both agents well. Her recent HbA1c was 8.5%.
  - What concerns do you have about Aubrey's use of lisinopril given she might have COVID-19?
  - What modifications (if any) do you make to her medications?

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## Summary

- Echocardiography is key to the diagnosis of HF
- Therapy initially relies on the use of ACE inhibitors and beta blockers
- Patients with NYHA class II or III HF and on ACE inhibitors should be transitioned to ARNI
  - ARNI further reduces morbidity and mortality
  - Must have 36-hour washout period between ACE inhibitor and ARNI
  - Sacubitril/valsartan and spironolactone are now approved for HF*p*EF
  - No established risk to patients with RAAS inhibitors/COVID-19
- SGLT2 inhibitors have evolved into cardiovascular risk reduction therapies independent of glycemic control

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## Summary

- COVID-19 has radically altered the world, particularly healthcare
- Dangerous cycle: COVID-19 infection increases risk of CV comorbidities, and CV comorbidities increase risk of COVID-19 infection
  - Maintaining GDMT more important now than ever
- Telemedicine
  - CMS broadened telehealth in wake of pandemic
  - Should be used whenever possible
  - Important implementation takeaways
  - Patient information

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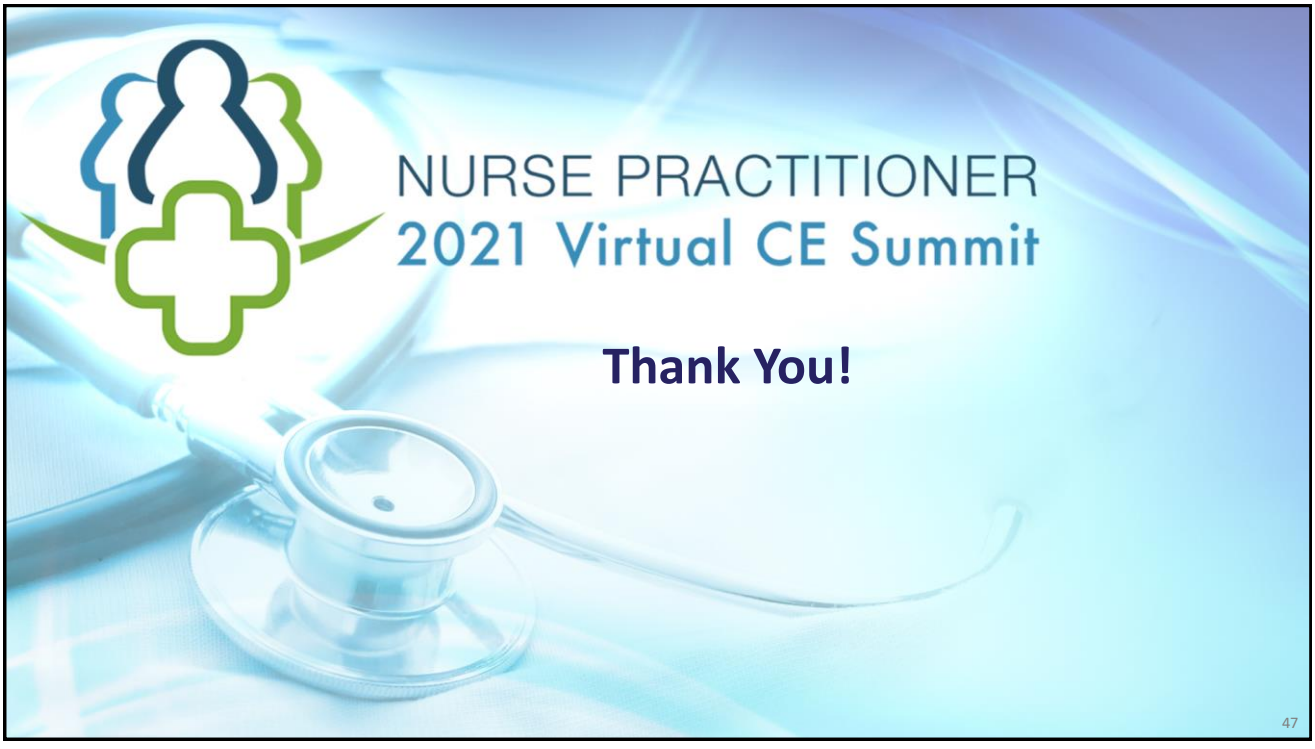
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Thank You!
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