CLINICAL UPDATE HEART FAILURE AND COPD

A cardiopulmonary discussion

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Case 1

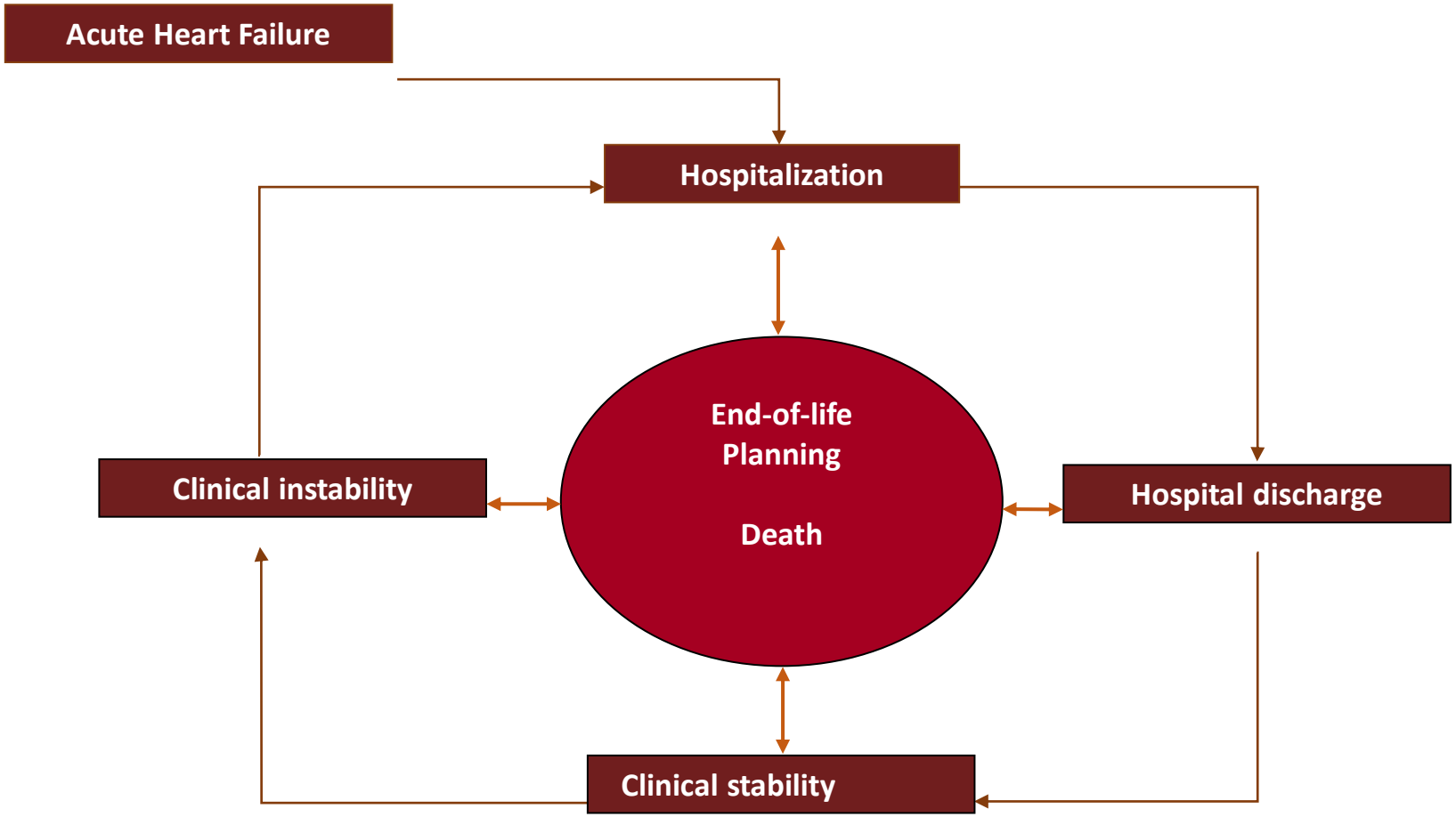
- **64 yr old male,**
  - Had **two exacerbations** within the last 12 months; was treated as an outpatient. Received antibiotics and steroids
  - No ED visit or hospitalization required

- Referred to your office for follow-up as patient also has a history of ischemic cardiomyopathy and diabetes
- 40 pack year history of smoking
- Previous PFTs demonstrated FEV1/FVC= .58
- Post bronchodilation FEV1= 41% of predicted, change in FEV1 =145ml
- COPD assessment score =20
- Eosinophil count =160
- Current treatment :Symbicort 400ug BID + Ventolin PRN, Entresto 97/103 BID, Bisoprolol 10 OD, Aldactone 25, Forxiga 10 OD, Lasix 40 OD, Metformin 500 BID.

Heart Failure Management:

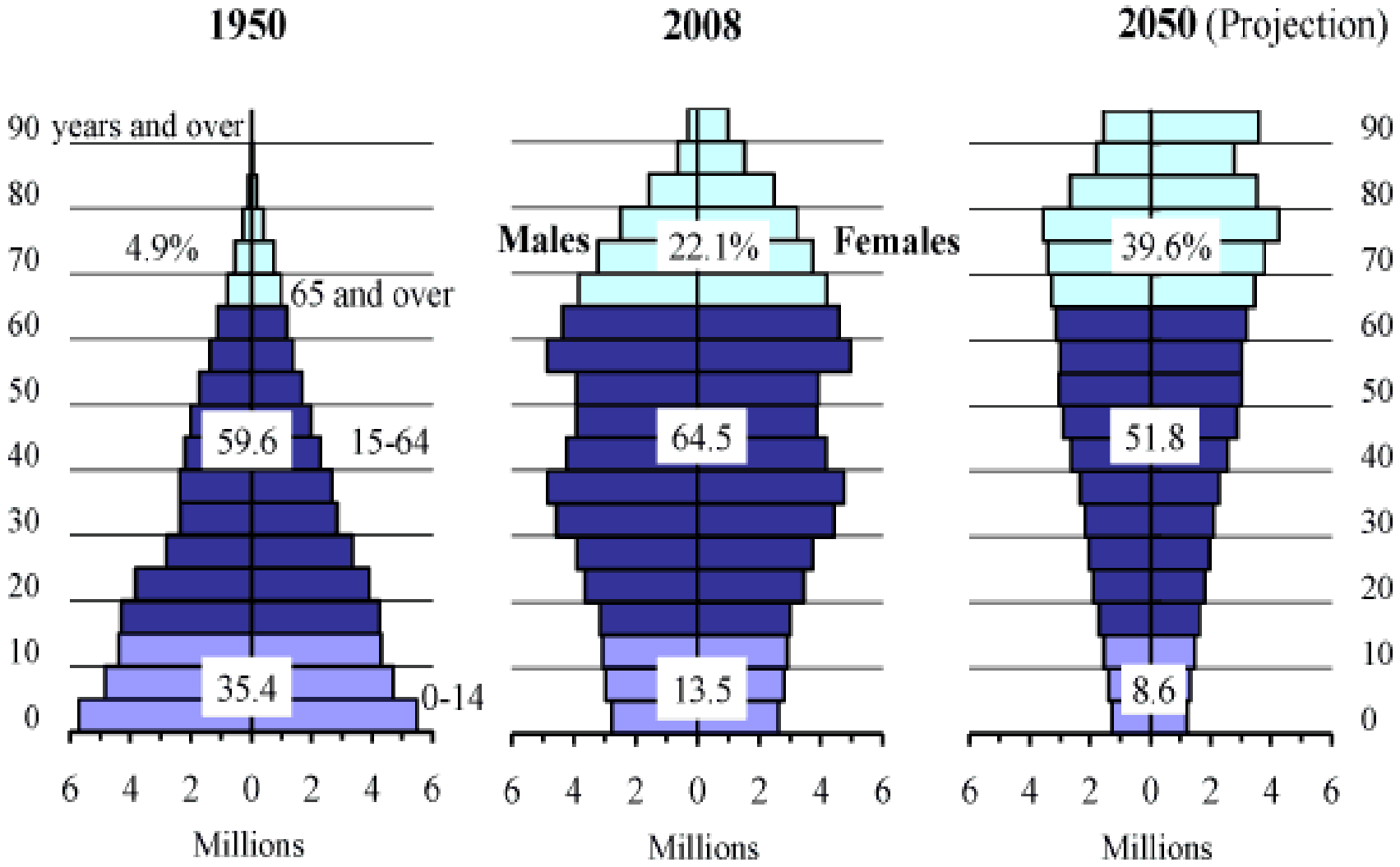
Do my patients need to take so many medications?

The Heart Failure Cycle



RS McKelvie 2017

Changes in the Population Pyramid



Source: Statistics Bureau, MIC; Ministry of Health, Labour and Welfare.

Burden of heart failure in Ontario

Population Ontario age 40+ years **7,206,368**

Approximately **280,000** people living with HF.

Incidence: 5 per 1000 in age 40+ years (about **38,000** new cases a year)

Prevalence: 39 per 1000 in age 40+ years

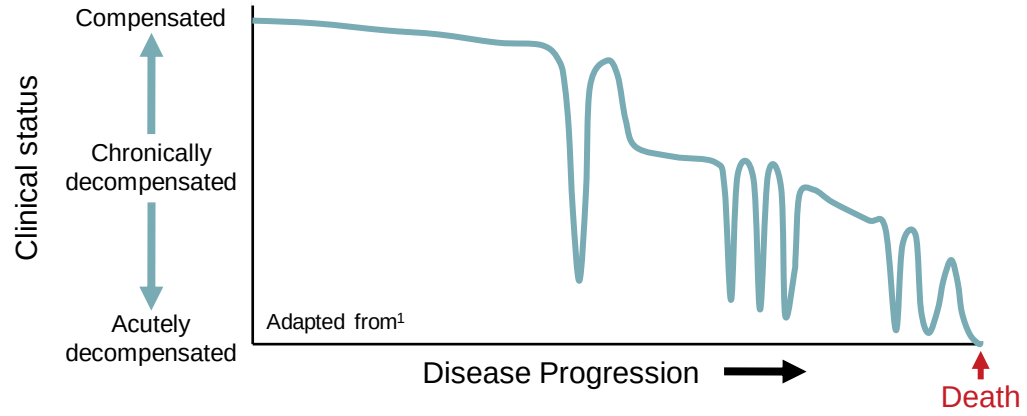
1 month mortality from diagnosis: 8%; 1 year mortality from diagnosis: 22.7%

30-day readmission following hospitalization: 21% (all cause)

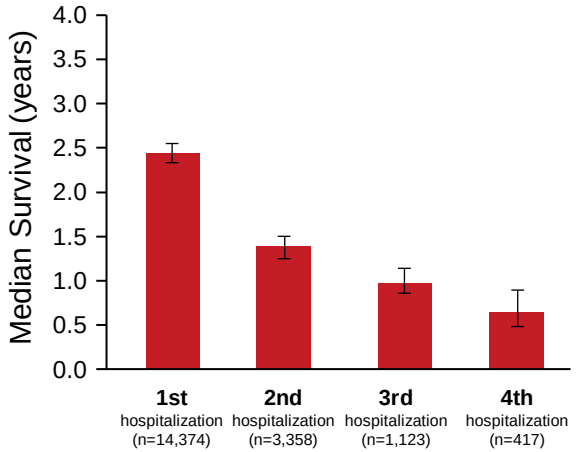
In 2019/20: 11,112 people in London Middlesex had HF and there were 956 admissions to LHSC for HF

Data source: Discharge Abstract Database (DAD), Heart Failure Cohort (Schultz et al. 2013); National Ambulatory Care Reporting System (NACRS), Ontario Drug Benefit Claims (ODB), Ontario Health Insurance Plan (OHIP) Claims Database, Registered Persons Database (RPDB)

RISK INCREASES AFTER EVERY ADHF EPISODE



50% mortality rate at 5 years[3,4]



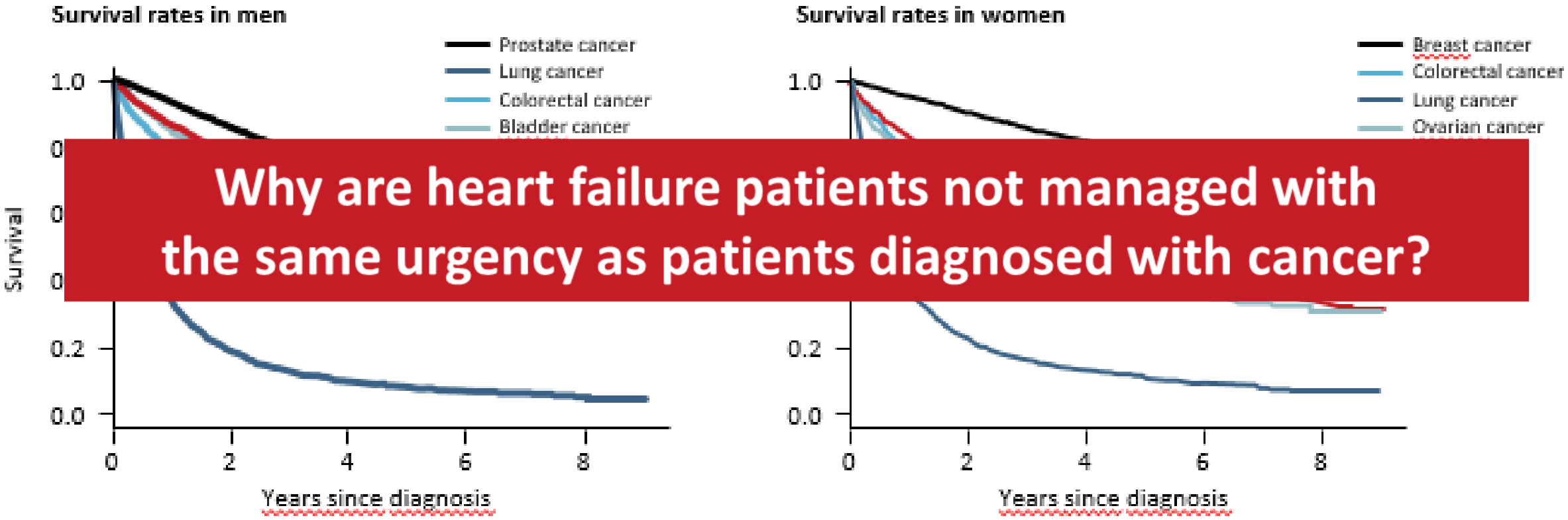
Median survival (50% mortality) and 95% confidence limits in patients with HF after each HF hospitalization.[2]

1. Gheorghiade et al. Am J Cardiol 2005;96:11G–17G; 2. *Setoguchi et al* Am Heart J 2007;154:26026; 3. Benjamin et al. Circulation 2017;135(10):e146-e603; 4. Roger et al. JAMA 2004;292:344–50

ADHF: Acute decompensated heart failure

Mortality Rate is Higher for Heart Failure Than Many Cancers

The mortality rate for patients with chronic HF is as high as 50% at 5 years post-diagnosis[1,2,3]



Why are heart failure patients not managed with the same urgency as patients diagnosed with cancer?

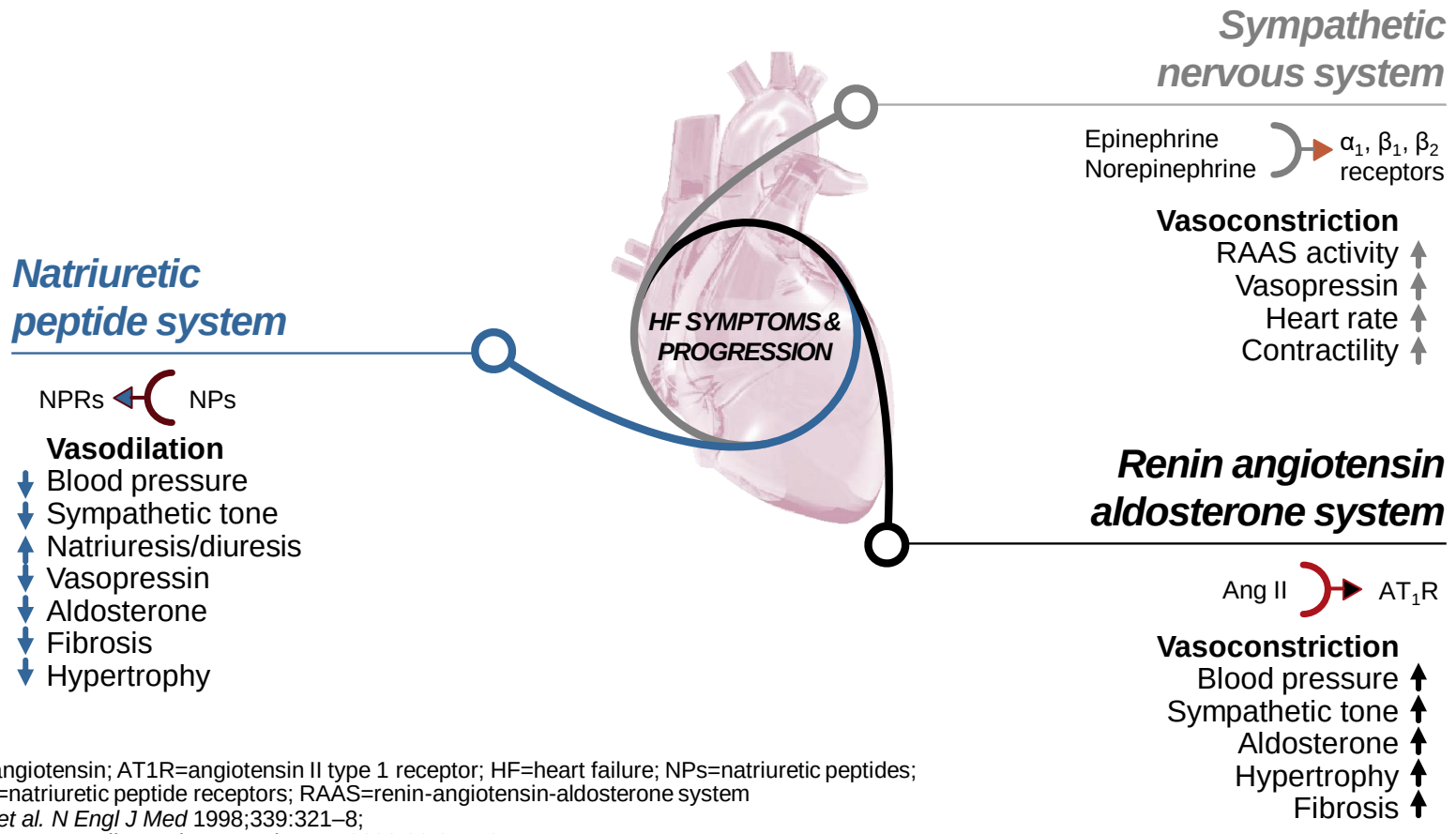
1. Mamas et al. Eur J Heart Fail. 2017;19(9):1095-1104; 2. Benjamin et al. Circulation 2017;135(10):e146-e603; 3. Roger et al. JAMA 2004;292:344–50

Goals of Therapy for Patients with Heart Failure

1. Improve symptoms ✓
2. Reduce hospitalizations ✓
3. Reduce mortality ✓
4. Prompt up titration to target ✓

Heart Failure reduced EF
Pathway to quadruple therapy

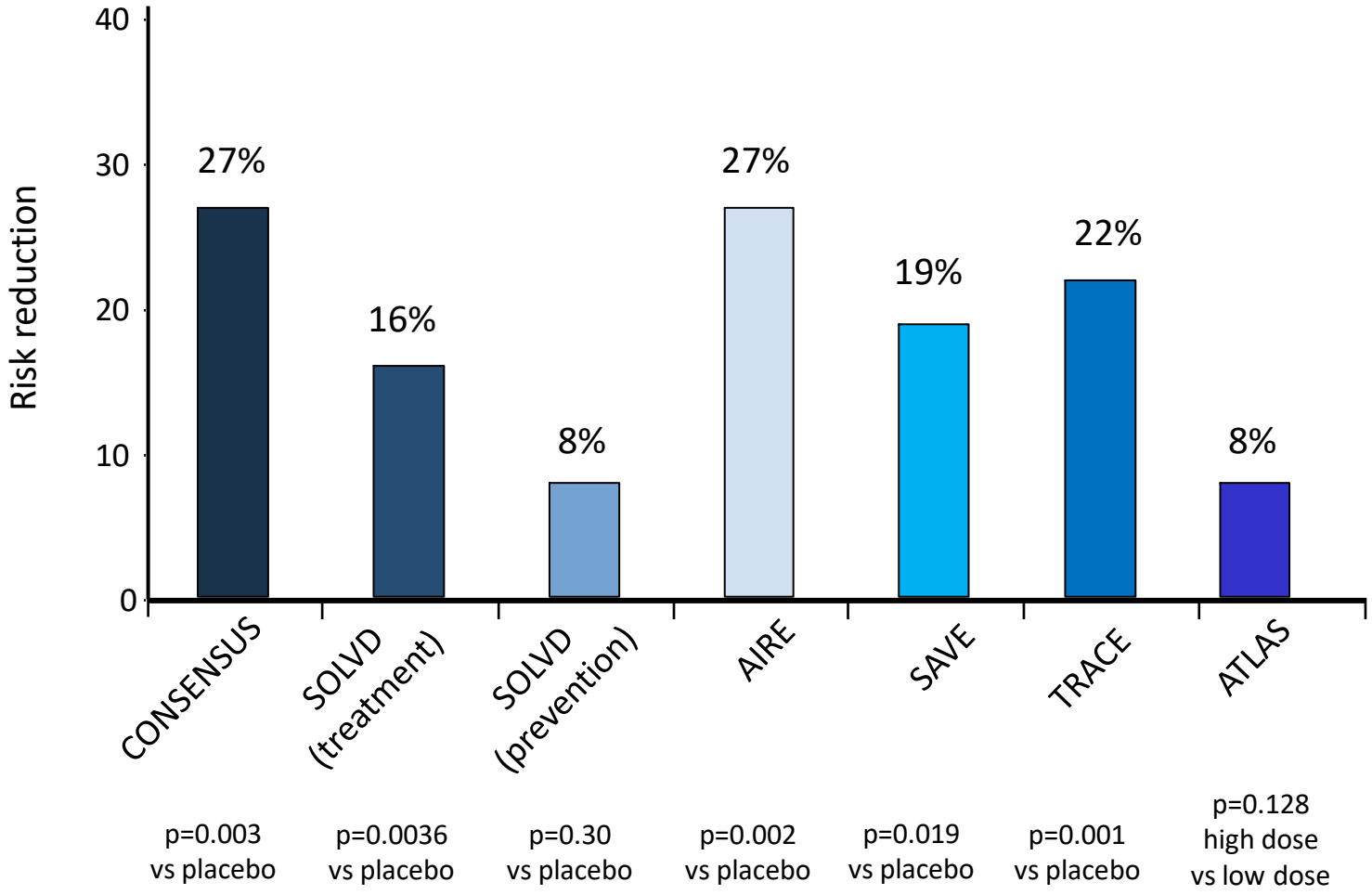
Decline In Systolic Function Leads To Activation Of Three Major Neurohormonal Systems



Ang=angiotensin; AT1R=angiotensin II type 1 receptor; HF=heart failure; NPs=natriuretic peptides; NPRs=natriuretic peptide receptors; RAAS=renin-angiotensin-aldosterone system

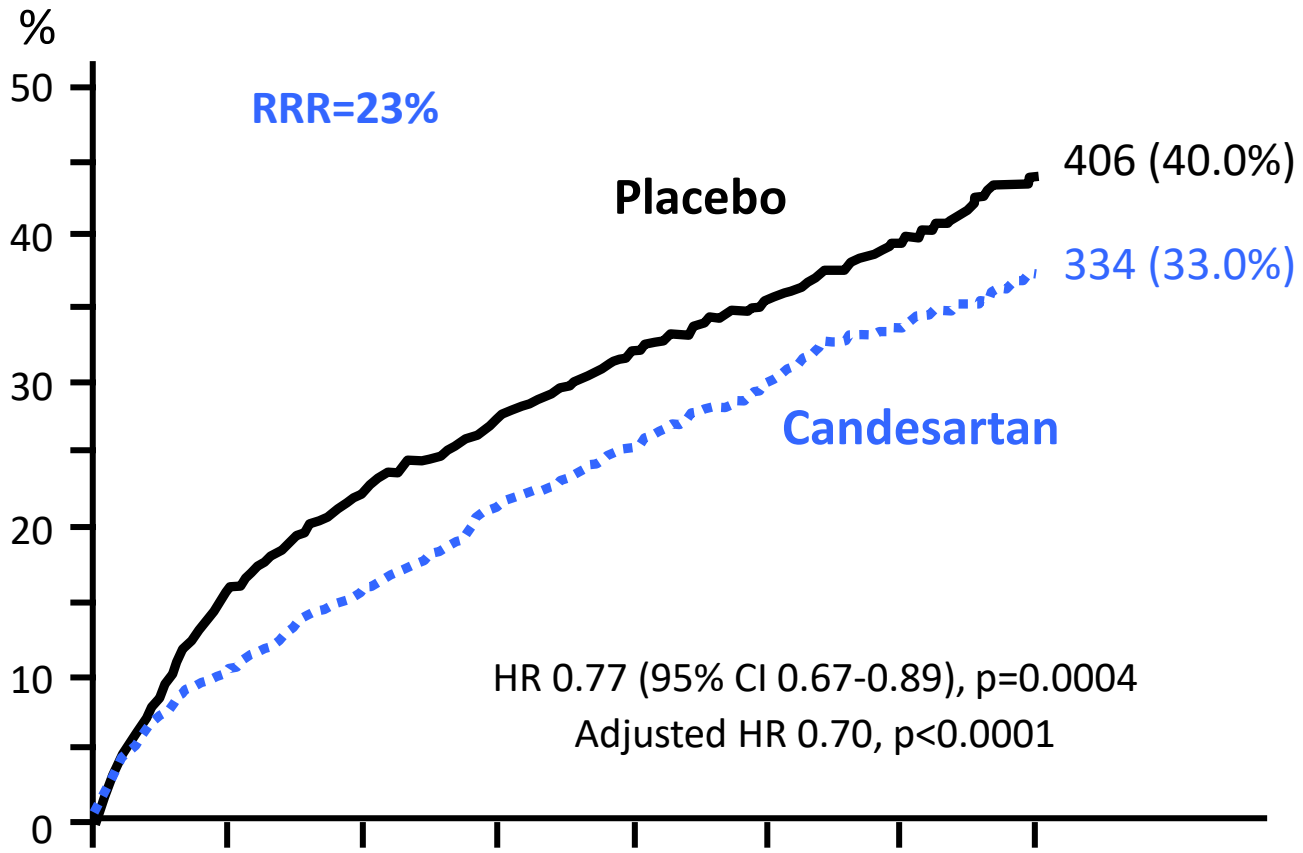
Levin *et al. N Engl J Med* 1998;339:321–8;
Nathisuwan & Talbert. Pharmacotherapy 2002;22:27–42;
Kemp & Conte. Cardiovascular Pathology 2012;365–371;
Schrier & Abraham. N Engl J Med 2009;341:577–85

Primary Outcomes of ACE Inhibitors in Heart Failure and/or LV Dysfunction: Mortality



RS McKelvie 2014

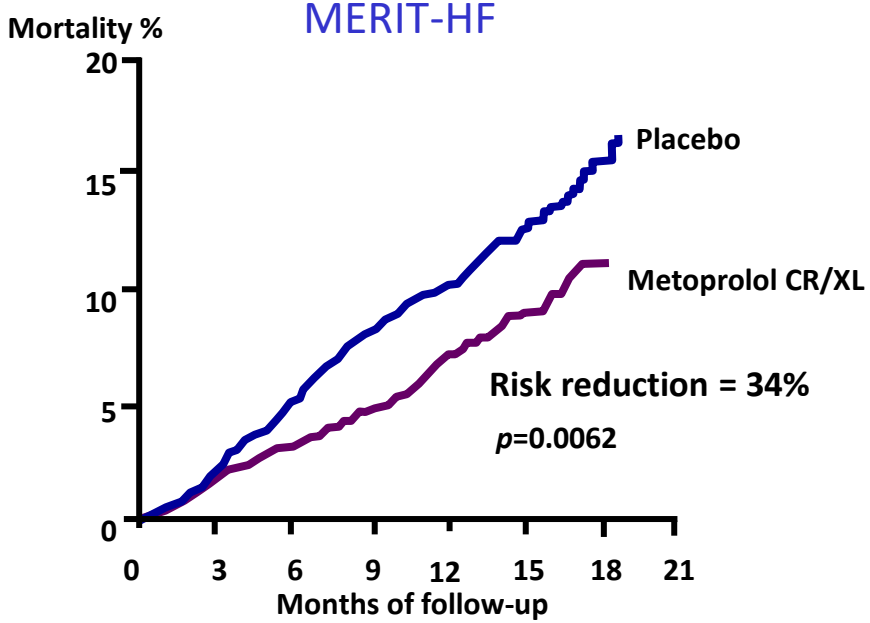
CHARM-Alternative: Primary outcome
CV death or CHF hospitalization



Number at risk	0	1	2	3	3.5	years
Candesartan	1013	929	831	434	122	
Placebo	1015	887	798	427	126	

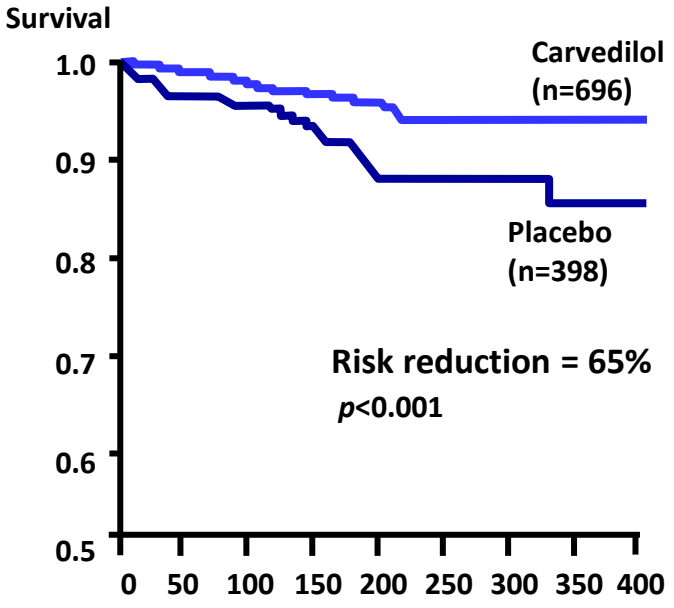
Granger et al Lancet 2003.

MERIT-HF



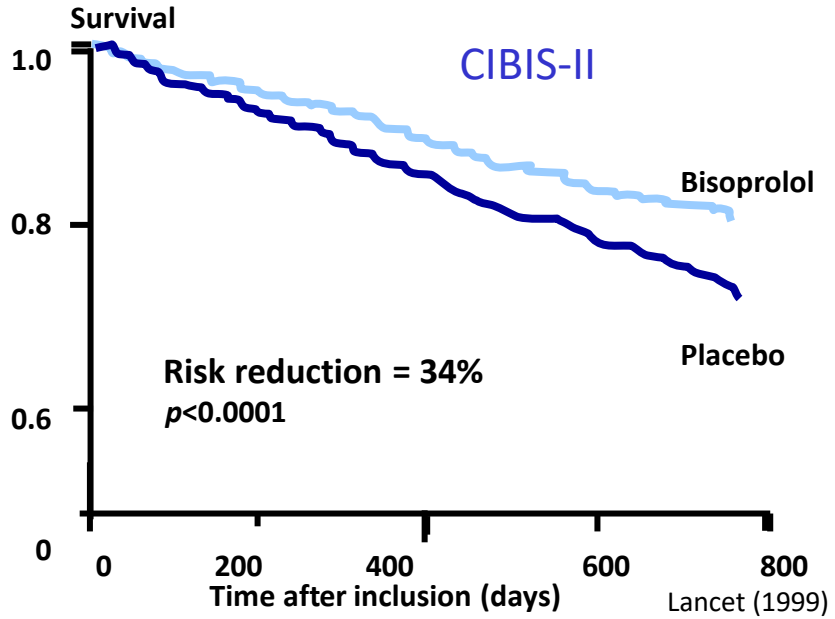
The MERIT-HF Study Group (1999)

US Carvedilol Study



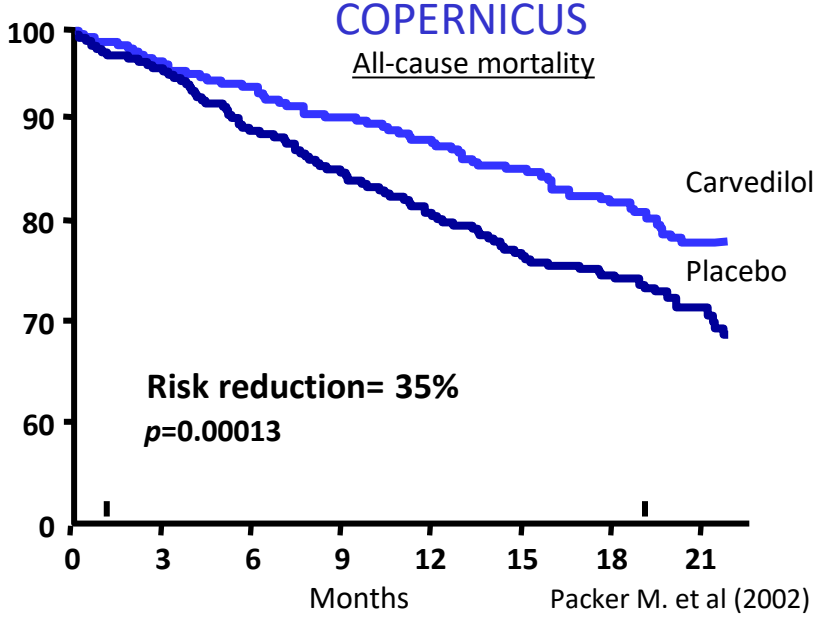
Packer et al (1996)

CIBIS-II



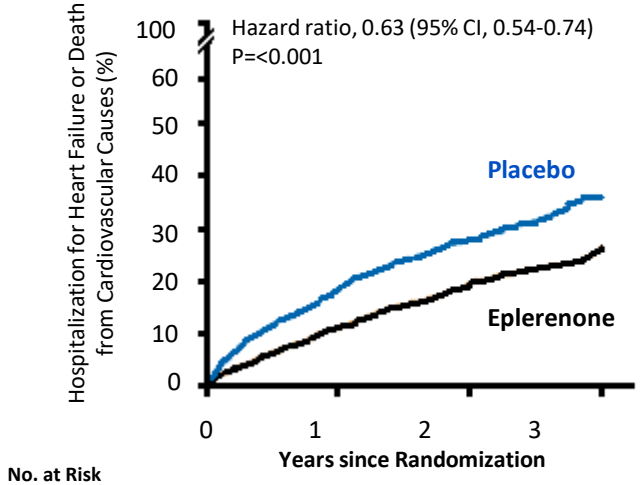
Lancet (1999)

COPERNICUS

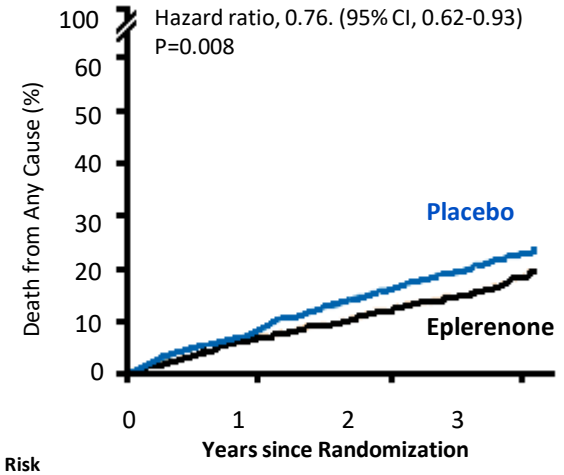


Packer M. et al (2002)

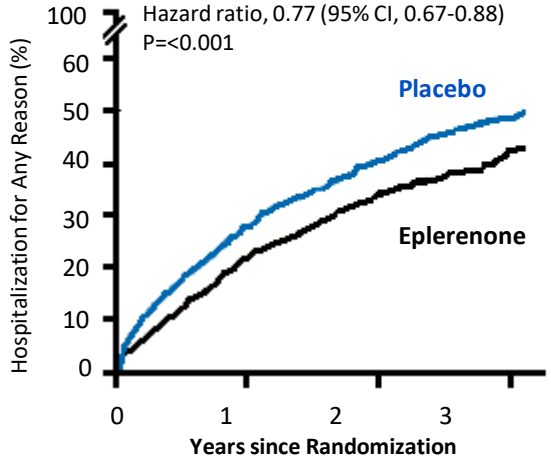
Rates of the Primary Outcome and Other Outcomes in EMPHASIS



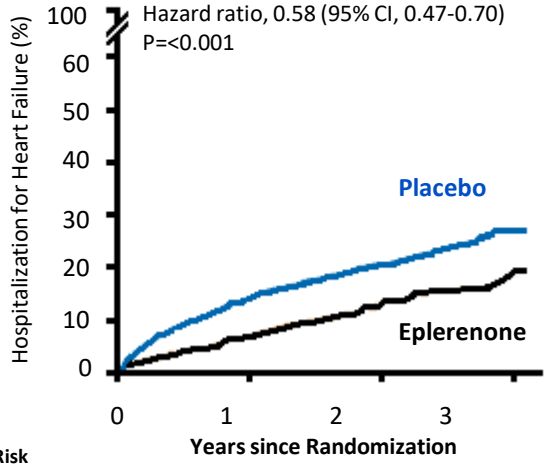
No. at Risk				
Placebo	1373	848	512	199
Eplerenone	1364	925	562	232



No. at Risk				
Placebo	1373	947	587	422
Eplerenone	1364	972	625	269



No. at Risk				
Placebo	1373	742	403	146
Eplerenone	1364	795	451	179



No. at Risk				
Placebo	1373	848	512	199 1364
Eplerenone	925	562	232	

RS McKelvie 2014

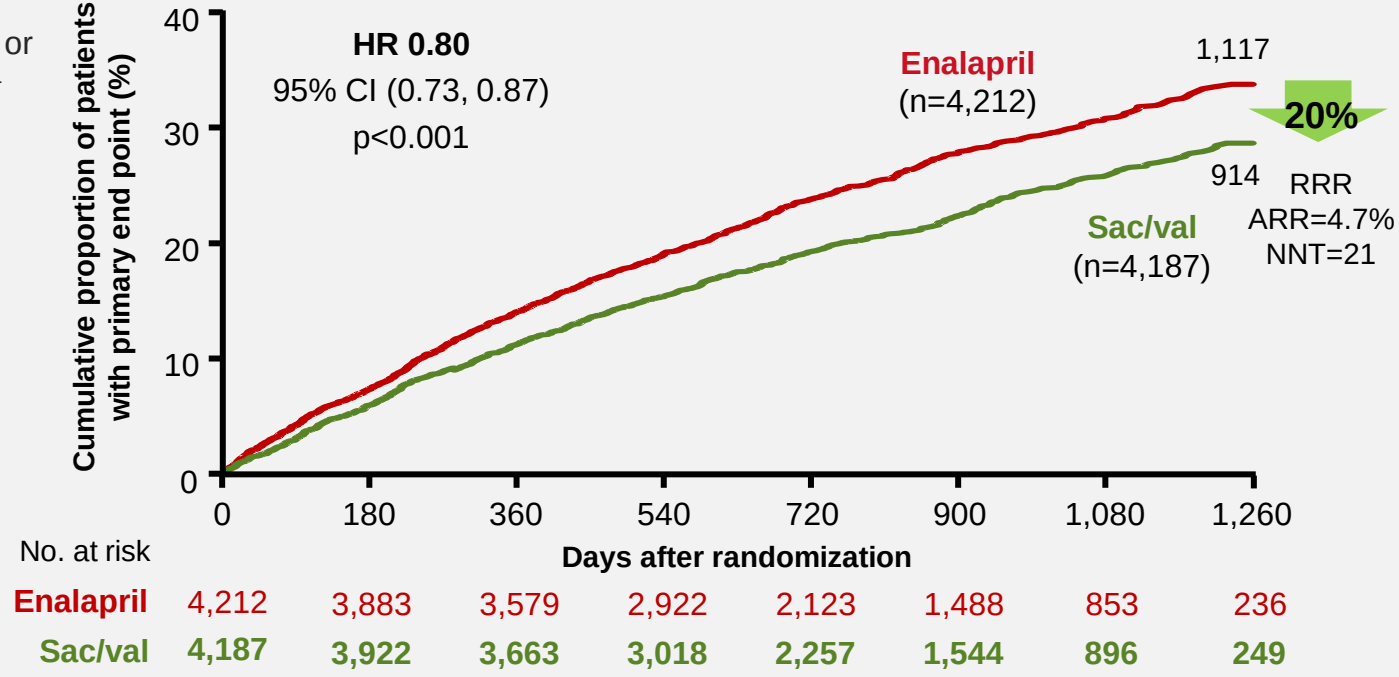
Zannad et al NEJM 2010.

The Evidence for Newer HF Medications - HFrEF

Sacubitril/valsartan as the standard of care with clear therapeutic benefits

20% risk reduction of CV death or first HF hospitalization[1]	20% risk reduction for sudden cardiac death[2]	16% risk reduction of death from any cause[1]	23% fewer admissions for HF[3]	18% fewer stays in intensive care[3]

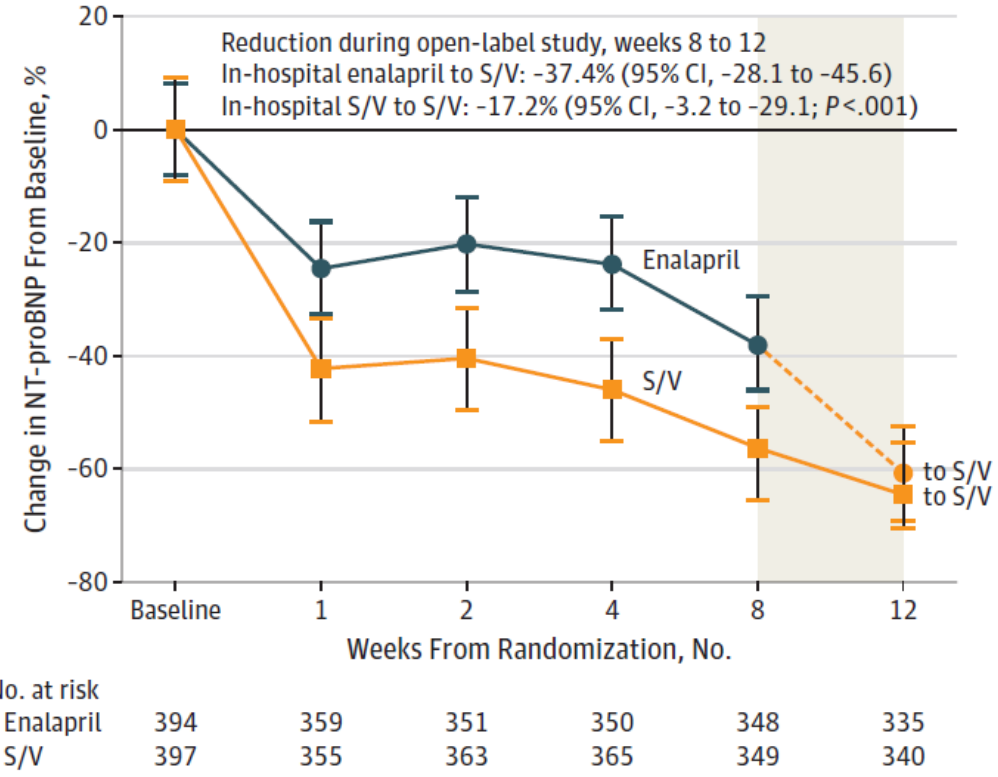
PARADIGM-HF
Reduction of CV death or first HF hospitalization[1]



ACEi, angiotensin converting enzyme inhibitor; ARR, absolute risk reduction; CI, confidence interval; CV, cardiovascular; HF, heart failure; HFrEF, HF with reduced ejection fraction; HR, hazard ratio; NNT, number needed to treat; RRR, relative risk reduction; QoL, quality of life

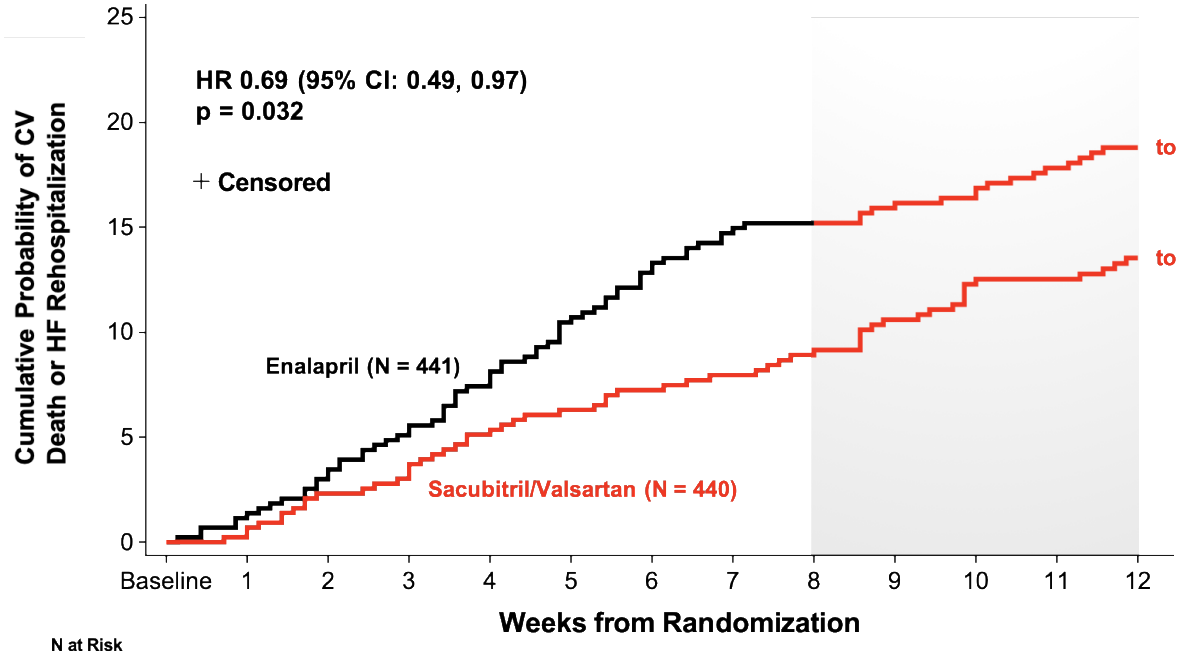
1. McMurray et al. N Engl J Med 2014;371(11):993-1004; 2. Desai et al. Eur Heart J 2015;36(30):1990-7; 3. Packer et al. Circulation 2015;131(1):54-61

PIONEER-HF Study and Analysis of Open Label Extension



No. at risk

Enalapril	394	359	351	350	348	335
S/V	397	355	363	365	349	340



N at Risk

Enalapril (n)	441	429	418	407	396	381	368	359	356	353	351	342	296
Sacubitril/Valsartan (n)	440	434	420	415	404	397	390	385	380	371	362	358	295

These data include adjudicated HF hospitalizations

880 patients, hospitalized for worsening HF randomized to enalapril vs sac-val once stabilized, 1/3 de novo HF

- Primary study: Sac-val initiation associated with greater reduction in NTproBNP
- Open label extension:
  - Further reduction in NTproBNP (both groups);
  - In-hospital sac-val group experienced lower incidence of death or re-hospitalization

Velazquez et al, N Engl J Med 2019
Devore et al, JAMA Cardiol 2020

CCS HF Guidelines 2021 Recommendations

- We recommend that an ARNI be used in place of an ACEI or ARB, in patients with HFrEF, who remain symptomatic despite treatment with appropriate doses of GDMT to decrease CV death, HF hospitalizations, and symptoms

  (Strong Recommendation; High- Quality Evidence)

- We recommend that patients admitted to hospital for acute decompensated HF with HFrEF should be switched to an ARNI, from an ACEI or ARB, when stabilized and before hospital discharge

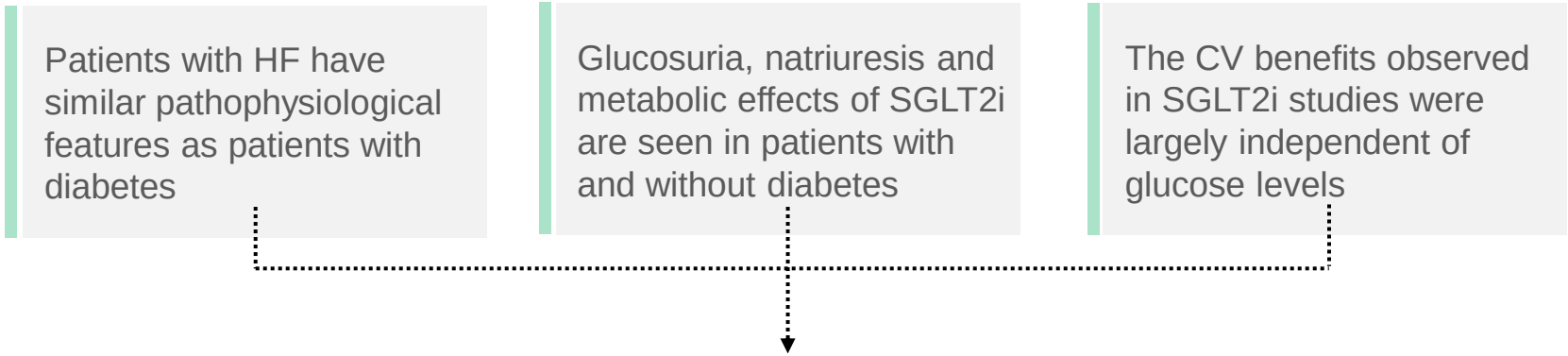
  (Strong Recommendation; Moderate-Quality Evidence)

- We suggest that patients admitted to hospital with a new diagnosis of HFrEF should be treated with ARNI as first-line therapy, as an alternative to either an ACEI or ARB

  (Weak Recommendation; Moderate-Quality Evidence)

McDonald, Virani, et al, Can J Cardiol 2021

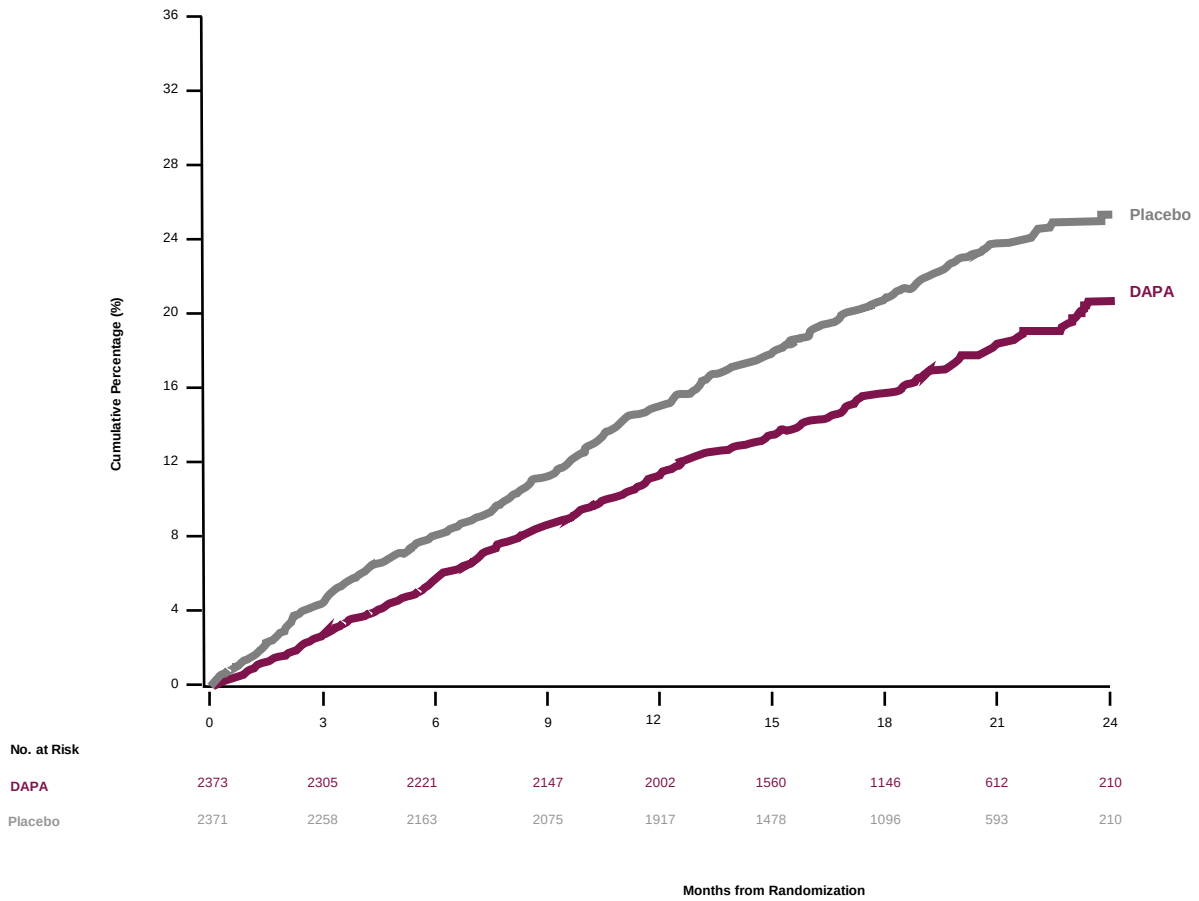
Rationale for exploring SGLT2i for the treatment of heart failure in patients without diabetes



Hypothesis: Patients with HF without diabetes may benefit from SGLT2i

There is mechanistic rationale to investigate the CV outcomes of SGLT2i beyond T2D

DAPA-HF Study: Primary Endpoint: CV Death or hHF or an Urgent HF Visit[1]



26% RRR

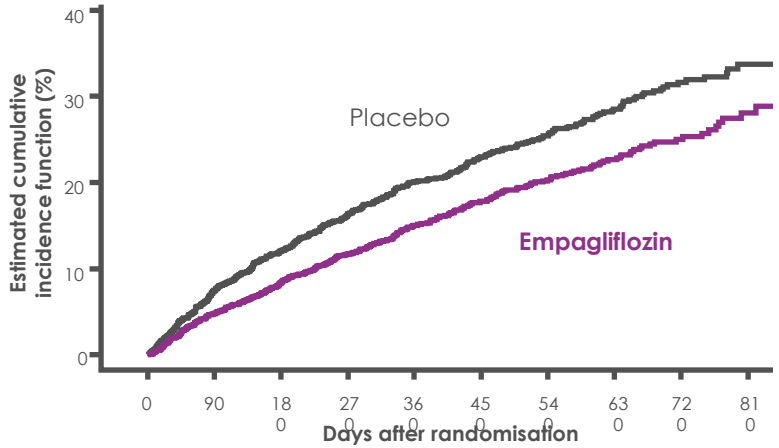
HR 0.74 (0.65, 0.85)
p=0.00001

NNT = 21

DAPA = dapagliflozin; HF = heart failure; hHF = hospitalization for heart failure; HR = hazard ratio; NNT = number needed to treat.

1. McMurray J. Presentation at: European Society of Cardiology Congress. September 1, 2019; Paris, France.

EMPEROR – Reduced Study:
Primary Endpoint: First adjudicated CV death or hospitalisation for heart failure



RRR 25%

ARR 5.2%

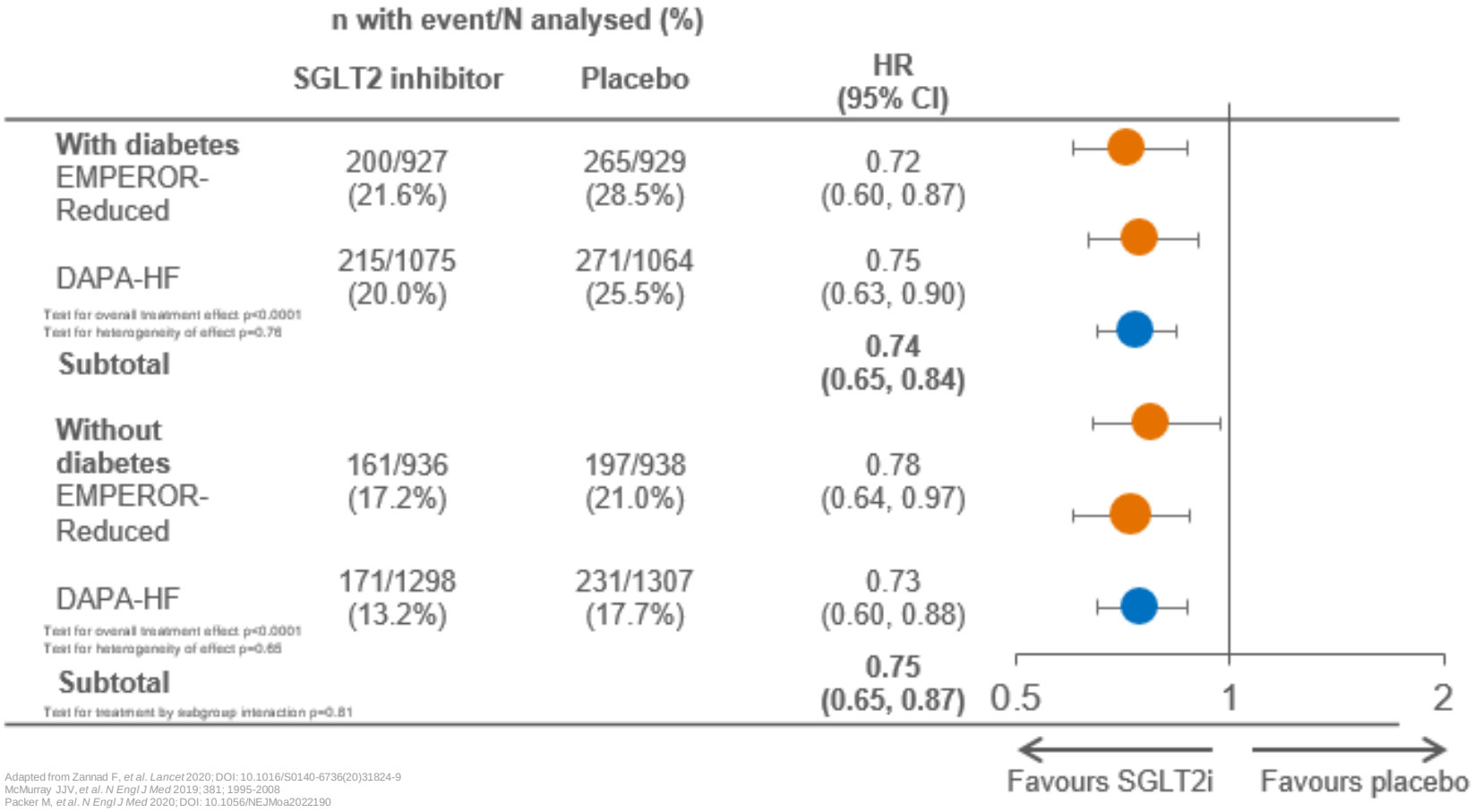
NNT = 19

HR 0.75
(95% CI 0.65, 0.86)
p<0.001

Empagliflozin:
361 patients with event
Rate: 15.8/100 patient-years
Placebo:
462 patients with event
Rate: 21.0/100 patient-years

Cox regression model including covariates age, baseline eGFR, geographic region, baseline diabetes status, sex, LVEF and treatment
CV, cardiovascular; eGFR, estimated glomerular filtration rate; LVEF, left ventricular ejection fraction; ARR, absolute risk reduction; RRR, relative risk reduction. NNT: Number needed to treat
Data on file

Pooled treatment effects of empagliflozin and dapagliflozin on the composite of first hospitalization for heart failure or cardiovascular death by diabetes status



Adapted from Zannad F, *et al. Lancet* 2020; DOI: 10.1016/S0140-6736(20)31824-9
McMurray JJV, *et al. N Engl J Med* 2019; 381; 1995-2008
Packer M, *et al. N Engl J Med* 2020; DOI: 10.1056/NEJMoa2022190

CCS HF Guidelines 2021 Recommendation SGLT2i

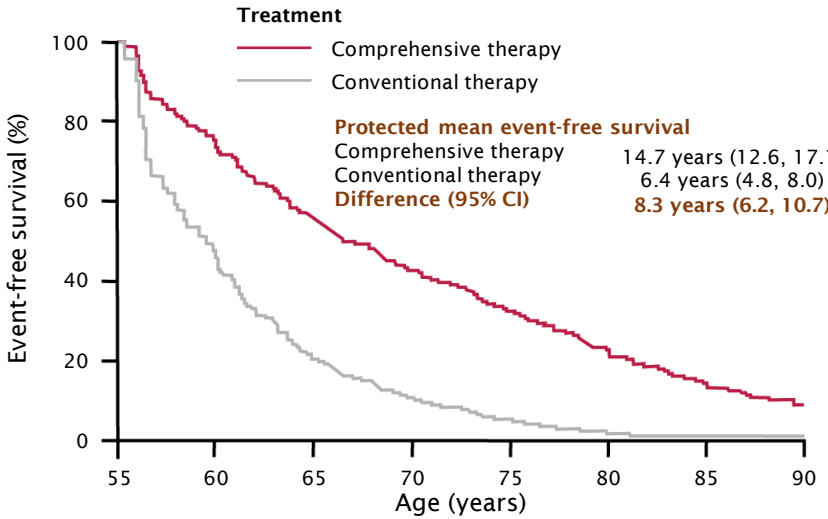
- We recommend an SGLT2 inhibitor, such as dapagliflozin or empagliflozin, be used in patients with HFrEF, with or without concomitant type 2 diabetes, to improve symptoms and quality of life and to reduce the risk of HF hospitalization and/or CV mortality

(Strong Recommendation; High-Quality Evidence).

McDonald, Virani, et al, Can J Cardiol 2021

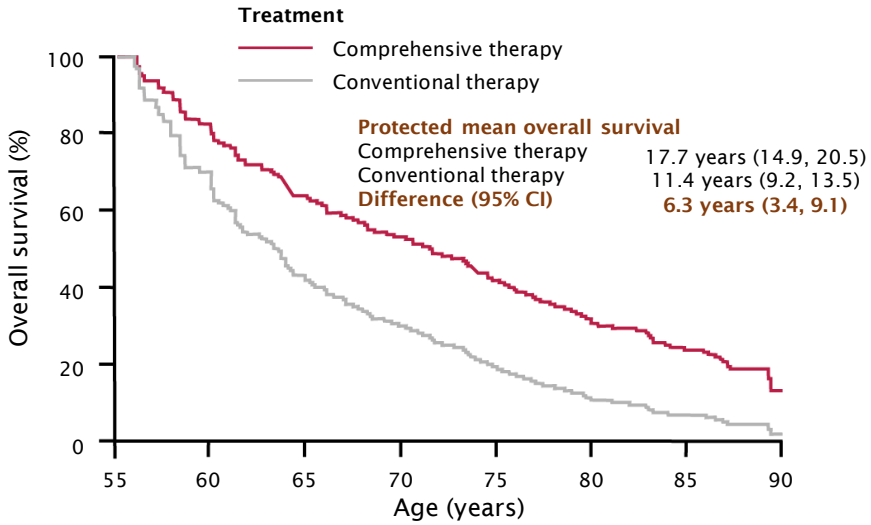
(ARNi + BB + MRA + SGLT2 inhibitor) vs limited conventional therapy (ACEi/ARB + BB)

Primary endpoint: Composite of CV death or first hHF



additional years free from CV death or HF hospitalization

Starting at age 55



6 additional years of overall survival

Starting at age 65

ACEi, angiotensin-converting enzyme inhibitor; ARB, angiotensin receptor blocker; ARNi, angiotensin receptor neprilysin inhibitor; BB, β blocker; CI, confidence interval; CV, cardiovascular; HF, heart failure; HFrEF, heart failure with reduced ejection fraction; MRA, mineralocorticoid receptor antagonist; SGLT2, sodium-glucose co-transporter 2

Adapted from Vaduganathan M, et al. *Lancet* 2020;396:121–128

New recommendation

- We recommend that in the absence of contraindications, patients with HFrEF be treated with combination therapy including 1 evidence-based medication from each of the following categories:
  a. ARNI (or ACEI/ARB);
  b. Beta-blocker;
  c. MRA;
  d. SGLT2 inhibitor.

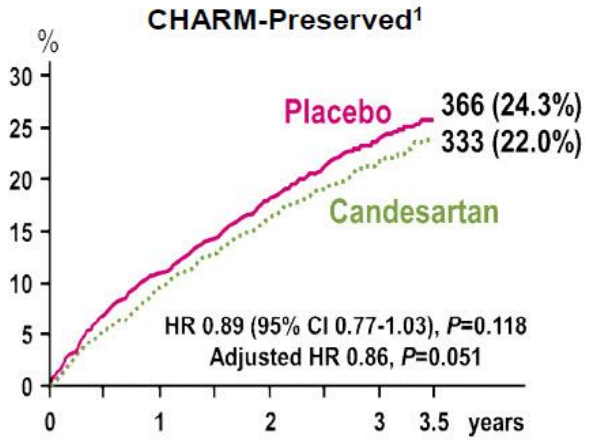
  Strong Recommendation, Moderate-Quality Evidence

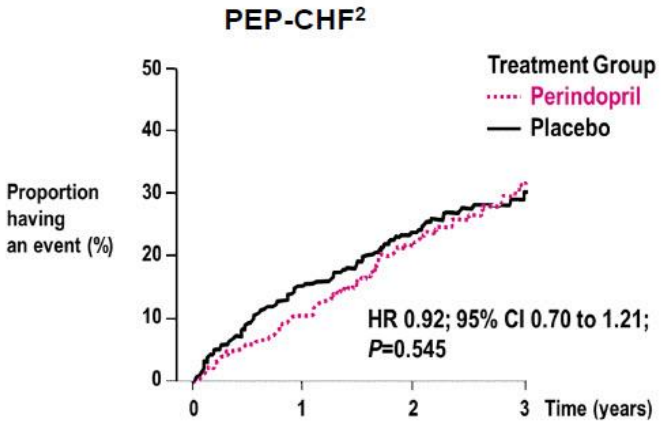
Over ~3-6 months: Initiate standard therapies as soon as possible and titrate to target or maximally tolerated doses

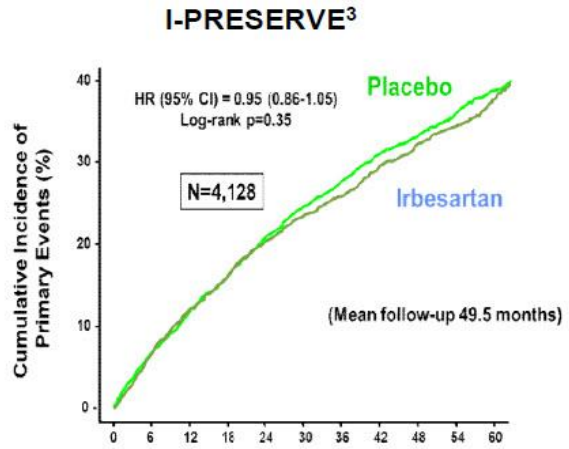
McDonald, Virani, et al., *Canadian Journal of Cardiology:* https://doi.org/10.1016/j.cjca.2021.01.017

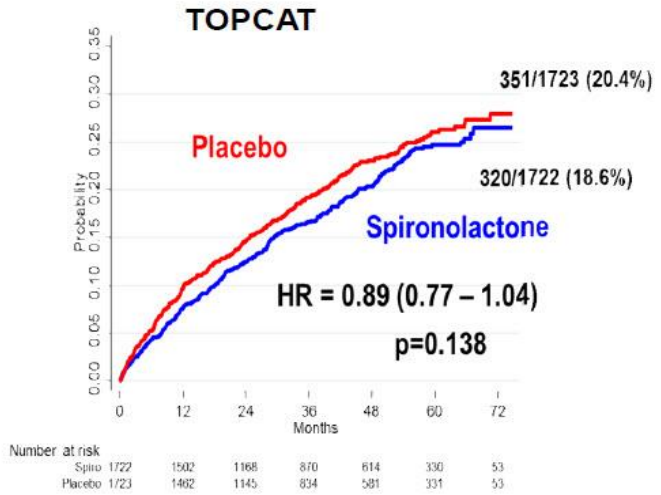
The Evidence for Newer HF Medications – HFpEF

What have we learned from previous HFpEF trials?



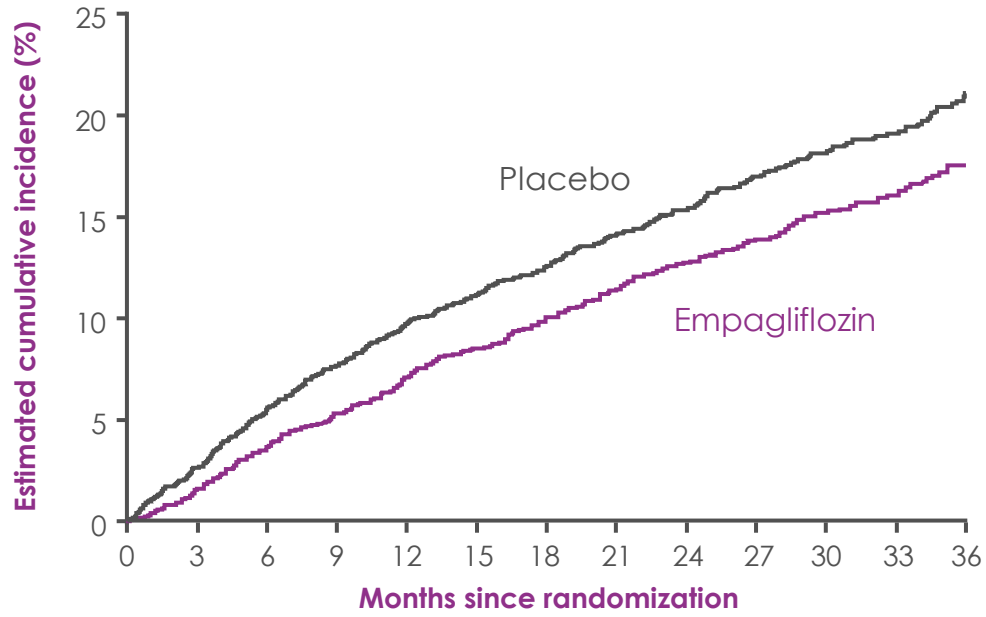






Yusuf et al., Lancet 2003; 362:777–81. Massie et al., N Engl J Med 2008; 359:2456–67. Cleland et al., Eur Heart J 2006; 27:2338–45. Pitt et al, N Engl J Med 2014;370:1383-92.

Empagliflozin demonstrated a significant 21% RRR in the composite primary endpoint of CV death or HHF



Patients at risk

Placebo	2991	2888	2786	2706	2627	2424	2066	1821	1534	1278	961	681	400
Empagliflozin	2997	2928	2843	2780	2708	2491	2134	1858	1578	1332	1005	709	402

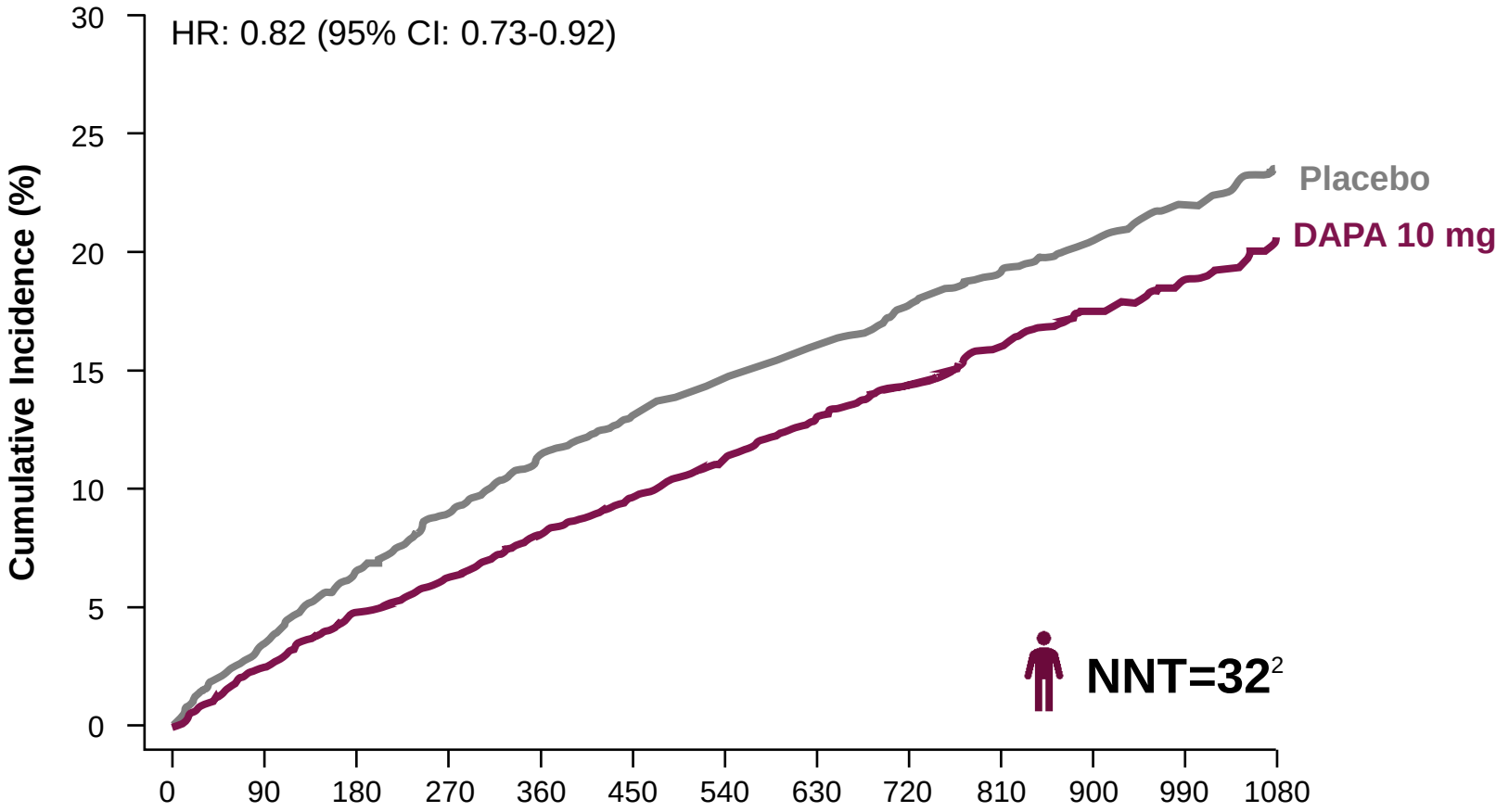
RRR 21% | **ARR 3.3%** | **NNT*=31**

HR: 0.79
(95% CI: 0.69, 0.90)
p<0.001

Empagliflozin:
415 (13.8%) patients with event
Rate: 6.9/100 patient-years
Placebo:
511 (17.1%) patients with event
Rate: 8.7/100 patient-years

*During a median trial period of 26 months.
ARR, absolute risk reduction; CI, confidence interval; HR, hazard ratio; NNT, number needed to treat; RRR, relative risk reduction.
Anker S et al. N Engl J Med. 2021. DOI:10.1056/NEJMoa2107038

Primary Composite of CV Death, hHF or Urgent HF Visit[1]



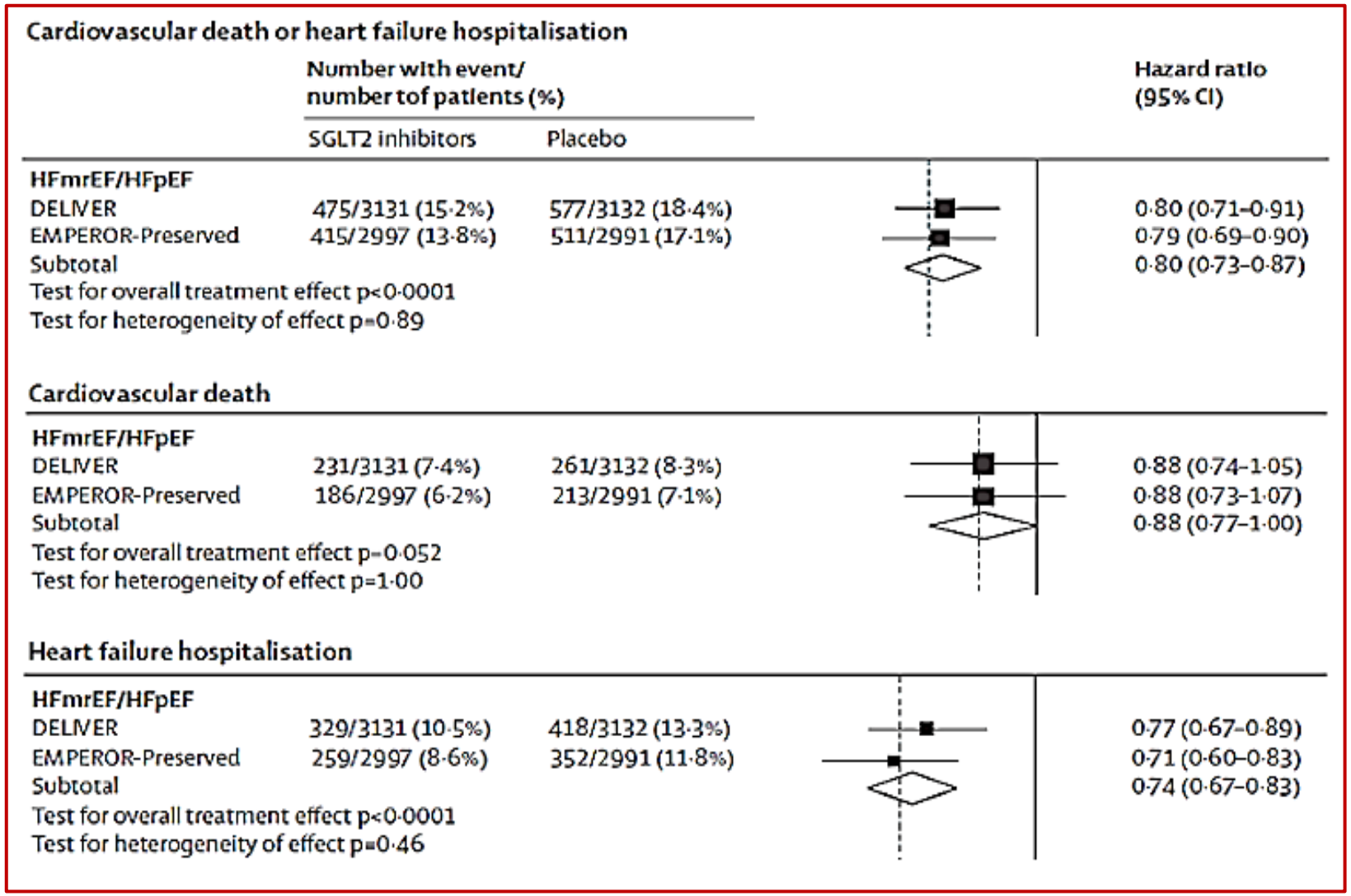
Number at Risk													
DAPA 10 mg	3131	3040	2949	2885	2807	2716	2401	2147	1982	1603	1181	801	389
Placebo	3132	3007	2896	2799	2710	2608	2318	2080	1923	1554	1140	772	383

18% RRR

3.1% ARR
p=0.0008[2]

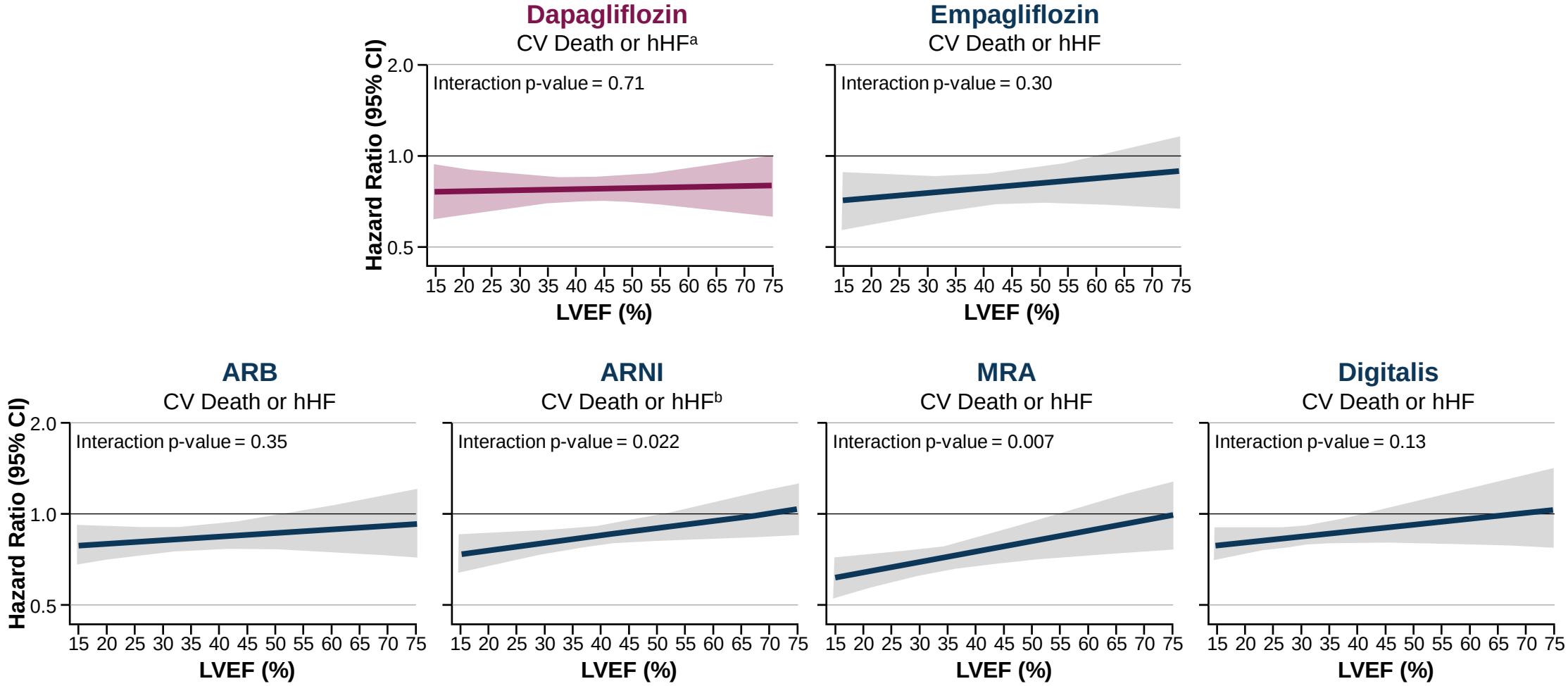
1. Solomon SD et al. Online ahead of print. *N Engl J Med*. 2022; 2. Solomon SD. Presented at: ESC Congress; August 26-29, 2022; Barcelona, Spain.

Pooled Treatment Effect Estimates of SGLT2i compared to Placebo In Patients With HFmrEF/HFpEF



Vaduganathan et al HFpEF, Lancet 2022

Benefit of Various Molecules Across LVEF[1,2]



Differences among trial design, patient population, and treatment groups impact ability to directly compare results across different trials.

[a]Data utilizing linear modelling to ensure consistency across trials; [b]All data is in comparison to placebo, except for ARNI which is in comparison to enalapril or valsartan.

1. Kondo T et al. *Eur Heart J.* 2022;43(5):427-429; 2. In House Data, AstraZeneca.

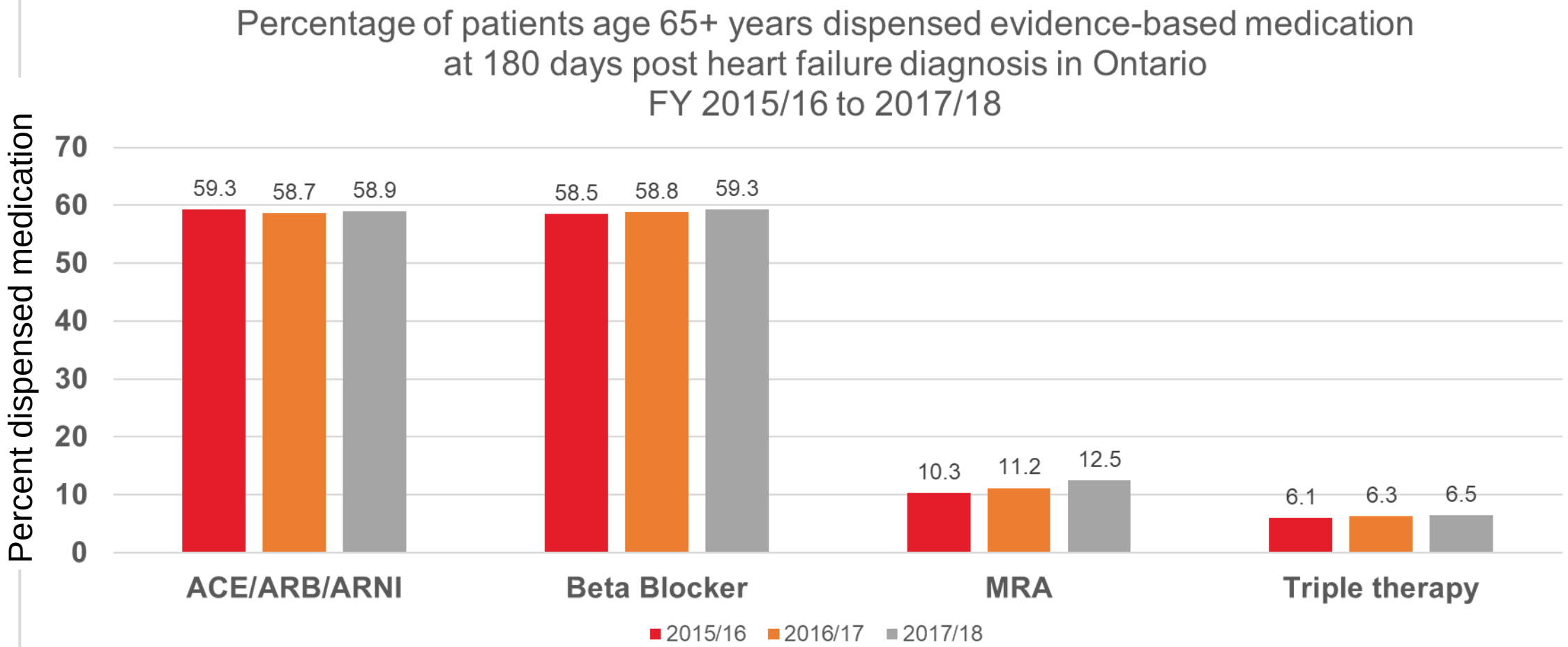
Case 1

- **64 yr old male,**
  - Had **two exacerbations** within the last 12 months; was treated as an outpatient. Received antibiotics and steroids
  - No ED visit or hospitalization required

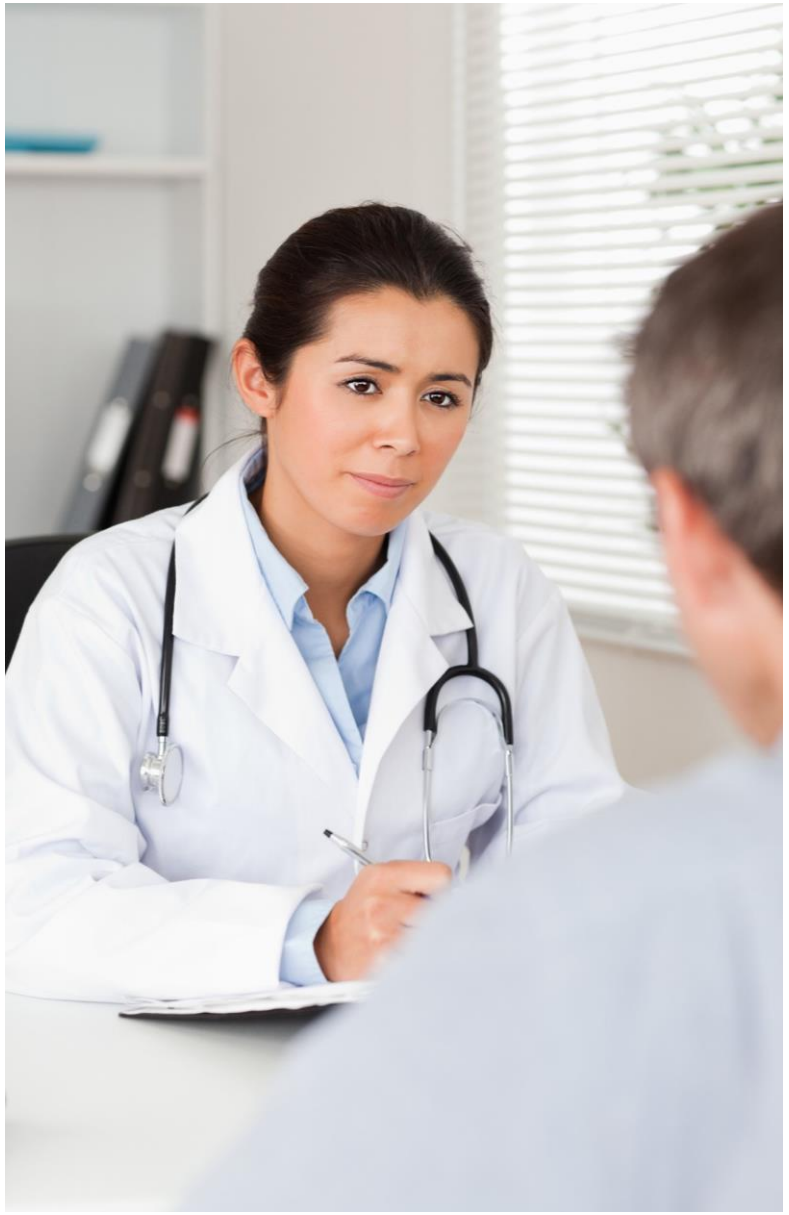
- Referred to your office for follow-up as patient also has a history of ischemic cardiomyopathy and diabetes
- 40 pack year history of smoking
- Previous PFTs demonstrated FEV1/FVC= .58
- Post bronchodilation FEV1= 41% of predicted, change in FEV1 =145ml
- COPD assessment score =20
- Eosinophil count =160
- Current treatment :Symbicort 400ug BID + Ventolin PRN, Entresto 97/103 BID, Bisoprolol 10 OD, Aldactone 25, Forxiga 10 OD, Lasix 40 OD, Metformin 500 BID.

Permission to proceed to titrate

Ontario Landscape- Medications



Data source: Discharge Abstract Database (DAD), Heart Failure Cohort (Schultz et al. 2013); National Ambulatory Care Reporting System (NACRS), Ontario Drug Benefit Claims (ODB), Ontario Health Insurance Plan (OHIP) Claims Database, Registered Persons Database (RPDB)

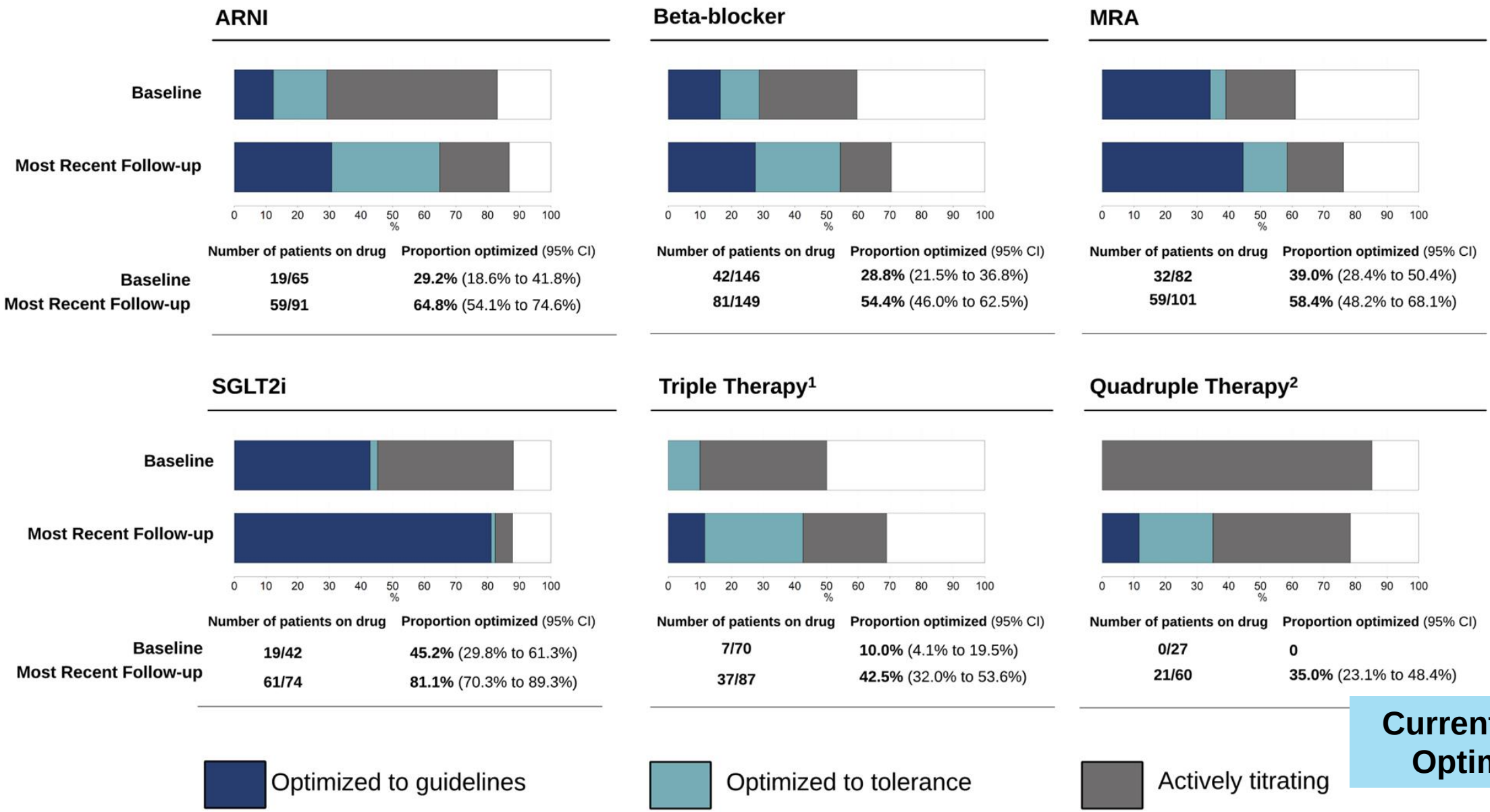


BestCare

BEST CARE PROGRAM IN PRIMARY CARE

A PROVEN & MEASURABLE VALUE-BASED CHRONIC DISEASE MANAGEMENT MODEL

Best Care HF Program – HFrEF Medication Management

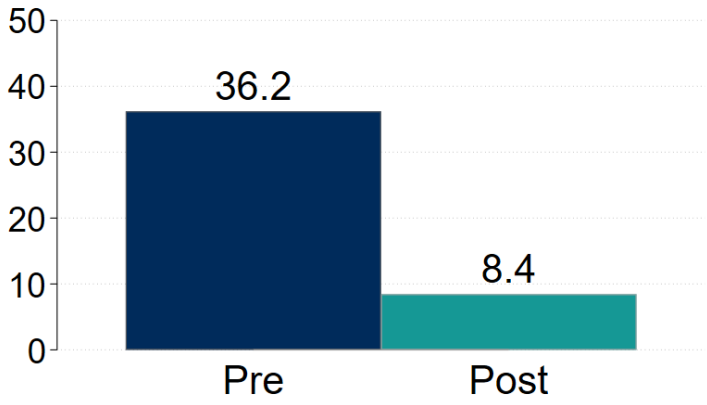


Currently 53% Optimized

HF-Related Health Service Use and Quality of Life

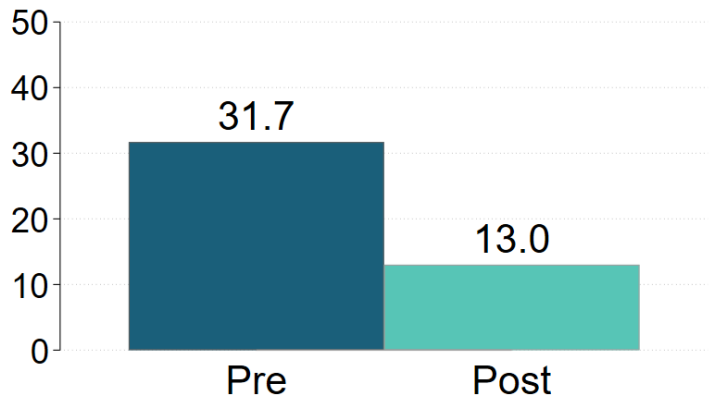
Number of events / 100 patients with heart failure / year

Hospital Admissions



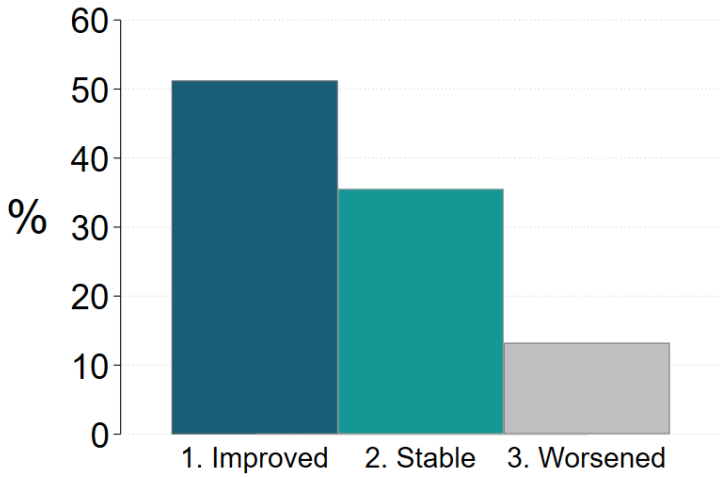
P<0.0001

ED Visits
(not leading to a hospital admission)



P<0.0001

Quality of Life



Tested for significance between the pre vs post rate using the Wilcoxon Signed Rank test

Licskai, C; Hussey, A. An innovative patient-centred approach to heart failure management: the Best Care heart failure integrated disease management program. DOI: https://doi.org/10.1016/j.cjco.2024.03.015

1) There is no such thing as a stable HF patient

2) Is there a stable COPD patient?

COPD Management:

Do my patients need to take so many medications?

Goals of Therapy for Patients with COPD

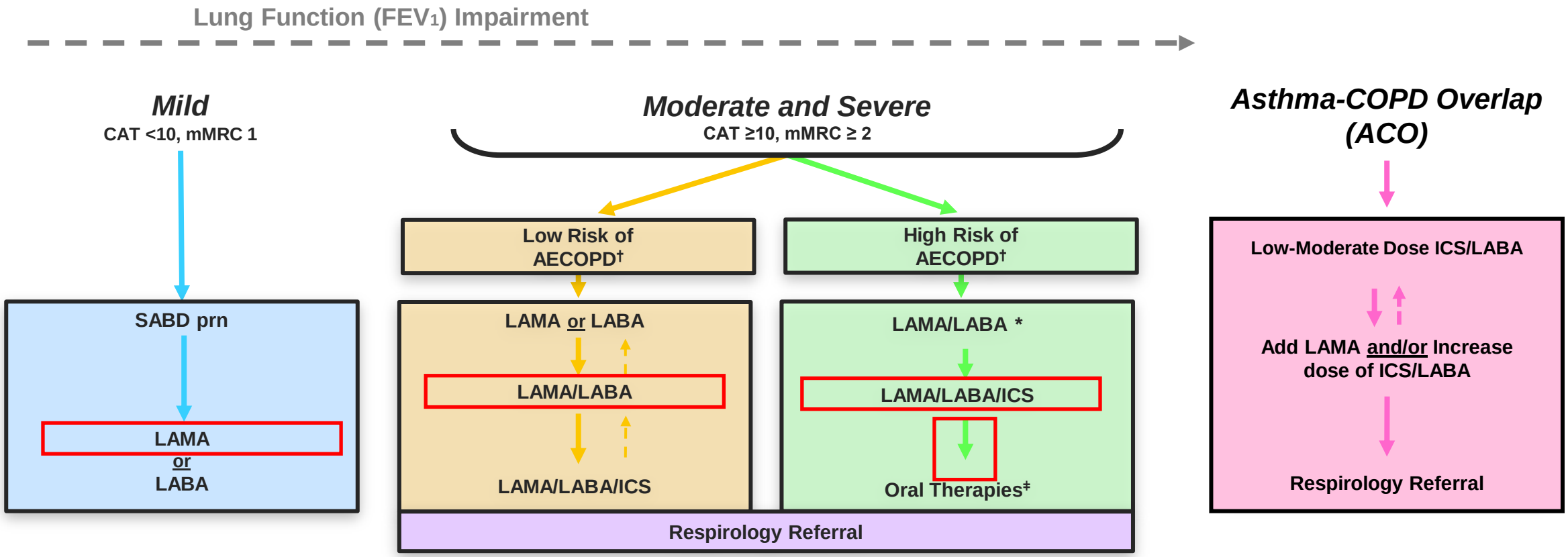
1. Improve symptoms ✓
2. Reduce hospitalizations (exacerbations) ✓
3. Reduce mortality YES ✓
4. Prompt up titration to target YES ✓

Moderate to Severe COPD

Pathway to triple therapy

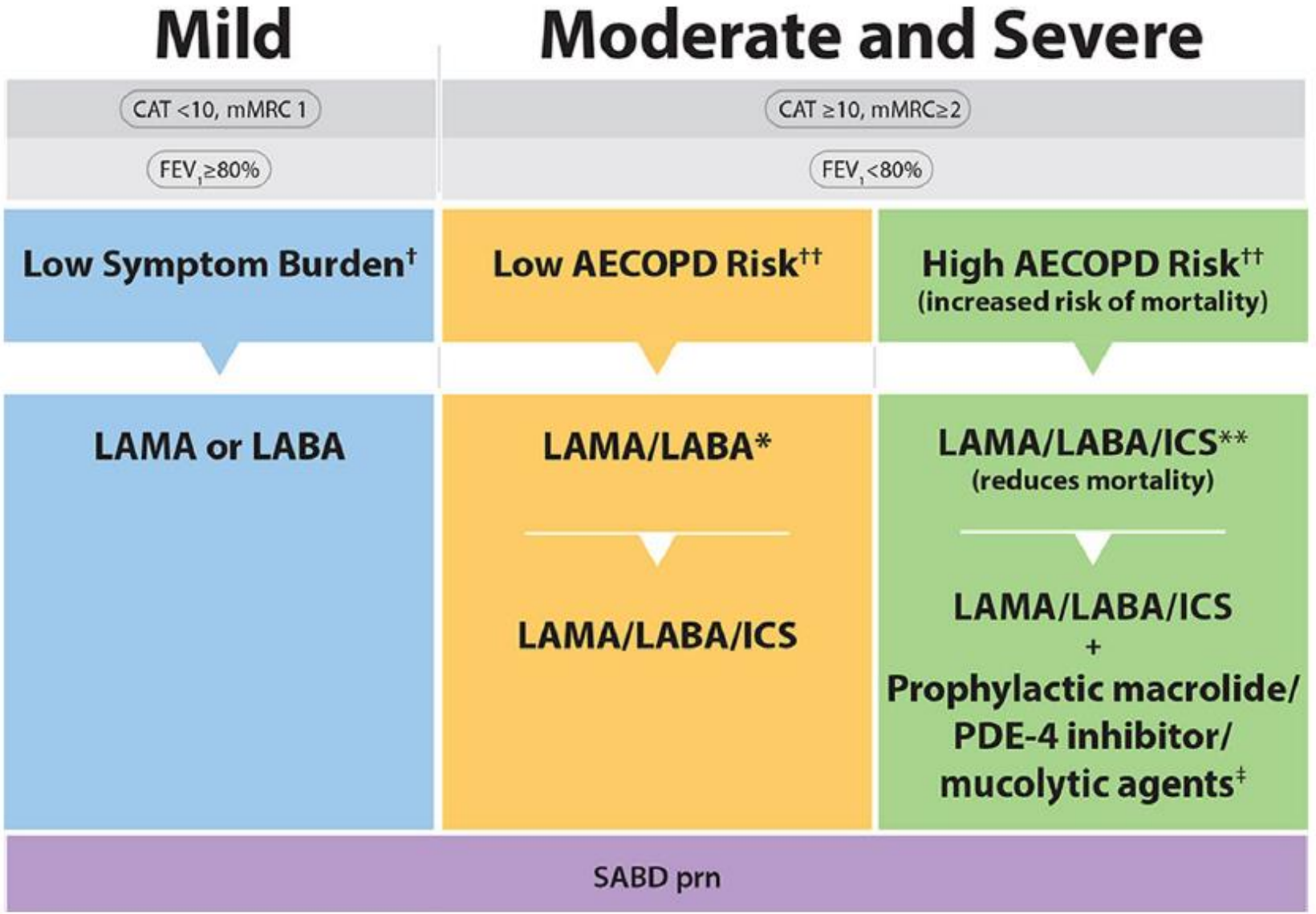
Canadian Guidelines 2017 & 2019 & 2023

lung health starts now lung health foundation



AECOPD: acute exacerbation of chronic obstructive pulmonary disease; ICS: inhaled corticosteroid; LABA: long-acting beta-agonists; LAMA: long-acting muscarinic agent; mMRC: Modified Medical Research Council; SABD: short-acting bronchodilator.

COPD Pharmacotherapy: Initial and Step-up

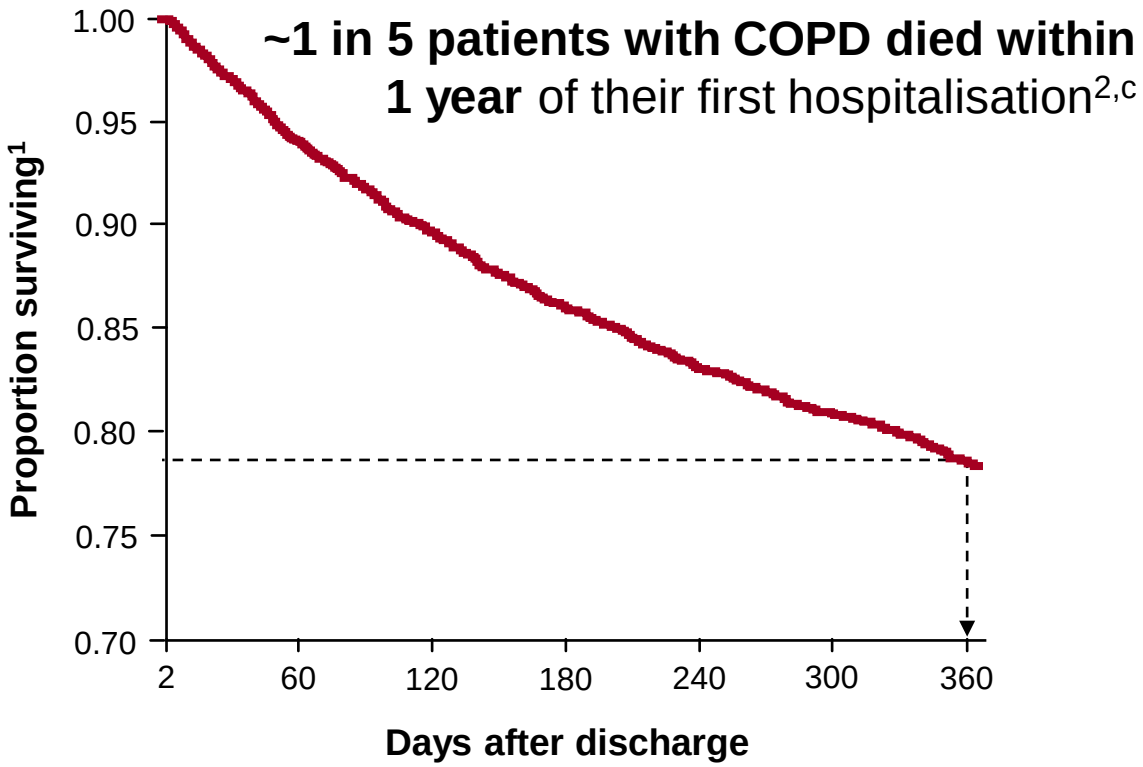


1 Hosp or ED
2 Abx or Prednisone

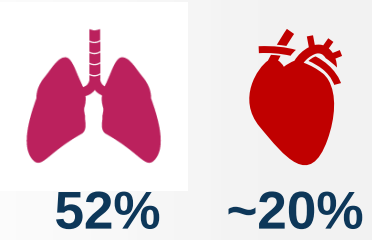
Bourbeau et al., 2023. Canadian Thoracic Society Guideline on Pharmacotherapy in Patients with Stable COPD, Canadian Journal of Respiratory, Critical Care, and Sleep Medicine, DOI: 10.1080/24745332.2023.2231451

Exacerbations are associated with increased all-cause mortality

2 Moderate Exacerbations[ab] Within 1 Year Increased Risk of Death by 80% [Adjusted OR 1.80 (95% CI 1.19, 2.70)][1]



Another study found that **respiratory** and **CV disorders** were the **most frequent causes of death** within 1 year of an exacerbation[3,d]



Note: Figure adapted from Ho TW et al. *PLoS ONE*. 2014;9:e114866; [a]Moderate exacerbations defined as those managed outside hospital, and severe exacerbations as those requiring hospitalization; [b]based on adjusted ORs for comparison of exacerbation frequency in the prior 12 months versus those with no exacerbations in the prior 12 months during a cohort study; [c]A population-based cohort study in 4204 patients with COPD who had their first-ever exacerbation requiring hospitalization was conducted to describe the in-hospital and 1-year outcomes from the LHID in Taiwan; [d]Exacerbation requiring hospitalization. 1. Rothnie KJ et al. *Am J Respir Crit Care Med*. 2018;198:464–471.; 2. Ho TW et al. *PLoS ONE*. 2014;9:e114866; 3. Garcia-Sanz MT et al. *J Thorac Dis* 2017;9:636-645.

Reducing Exacerbations and Mortality in COPD

ETHOS Study Population - Moderate to very severe COPD

Patient Population

Moderate to very severe COPD with a **history of moderate or severe exacerbation(s)**

Key Inclusion Criteria

- 40-80 years of age
- Current or former smoker (≥10 pack-year history)
- Symptomatic (CAT ≥10)
- On ≥2 inhaled maintenance therapies[a] for COPD for ≥6 weeks prior to screening
- Postbronchodilator FEV_1 25-65% of predicted normal
- History of moderate or severe COPD exacerbations in the 12 months prior to screening:
  - ≥1 moderate/severe if FEV_1 <50% of predicted normal or
  - ≥2 moderate or ≥1 severe if FEV_1 ≥50% of predicted normal

Key Exclusion Criteria

- Current diagnosis of asthma
- COPD due to α_1-antitrypsin deficiency
- Significant diseases or conditions other than COPD
- Acute worsening of COPD ≤6 weeks prior to screening, resulting in treatment with OCS or antibiotics

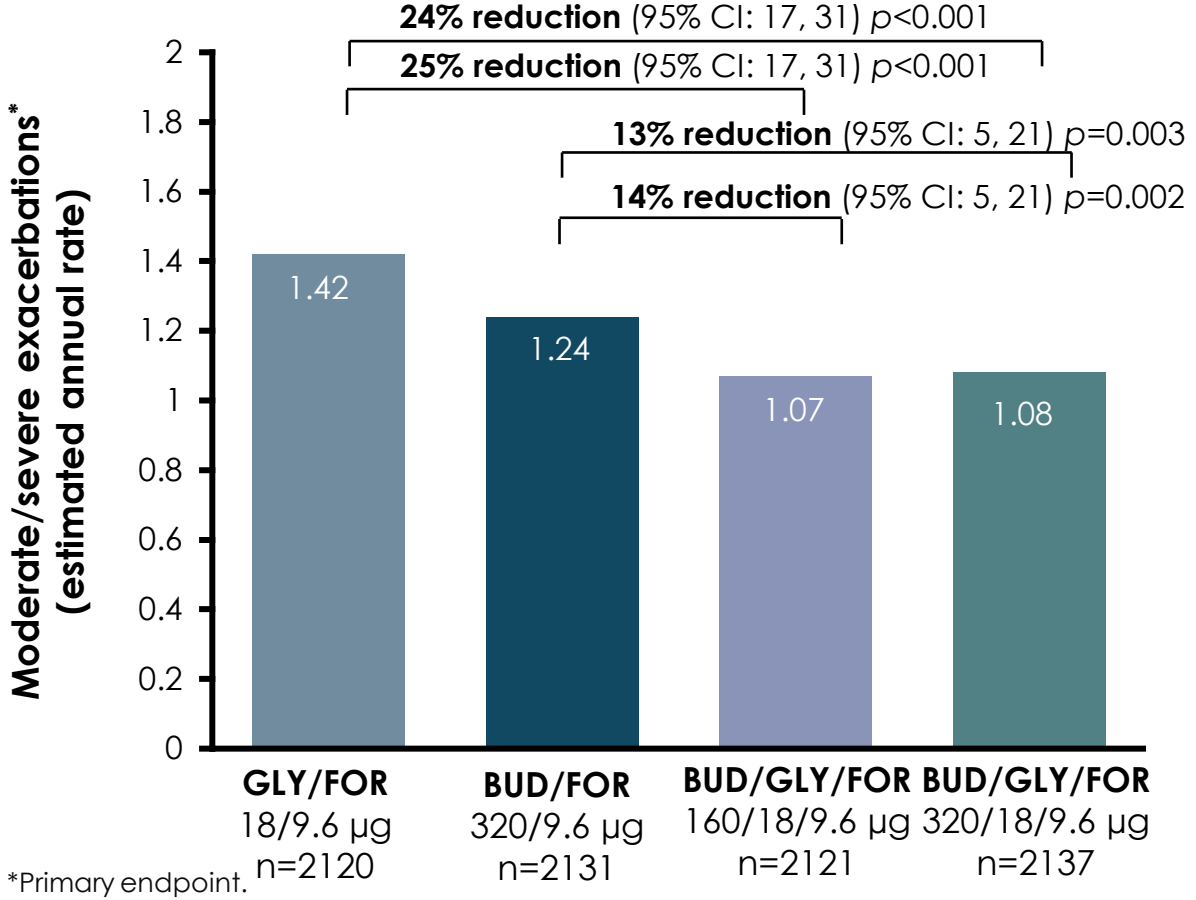
[a]Included scheduled SABAs and/or SAMAs.

1. Rabe KF et al. *Respir Med*. 2019;158:59-66. 2. Rabe KF et al. Article and supplementary appendix. *N Engl J Med*. 2020;383:35-48.

ETHOS: Exacerbation Rates with Triple Therapy vs. ICS/LABA and LAMA/LABA

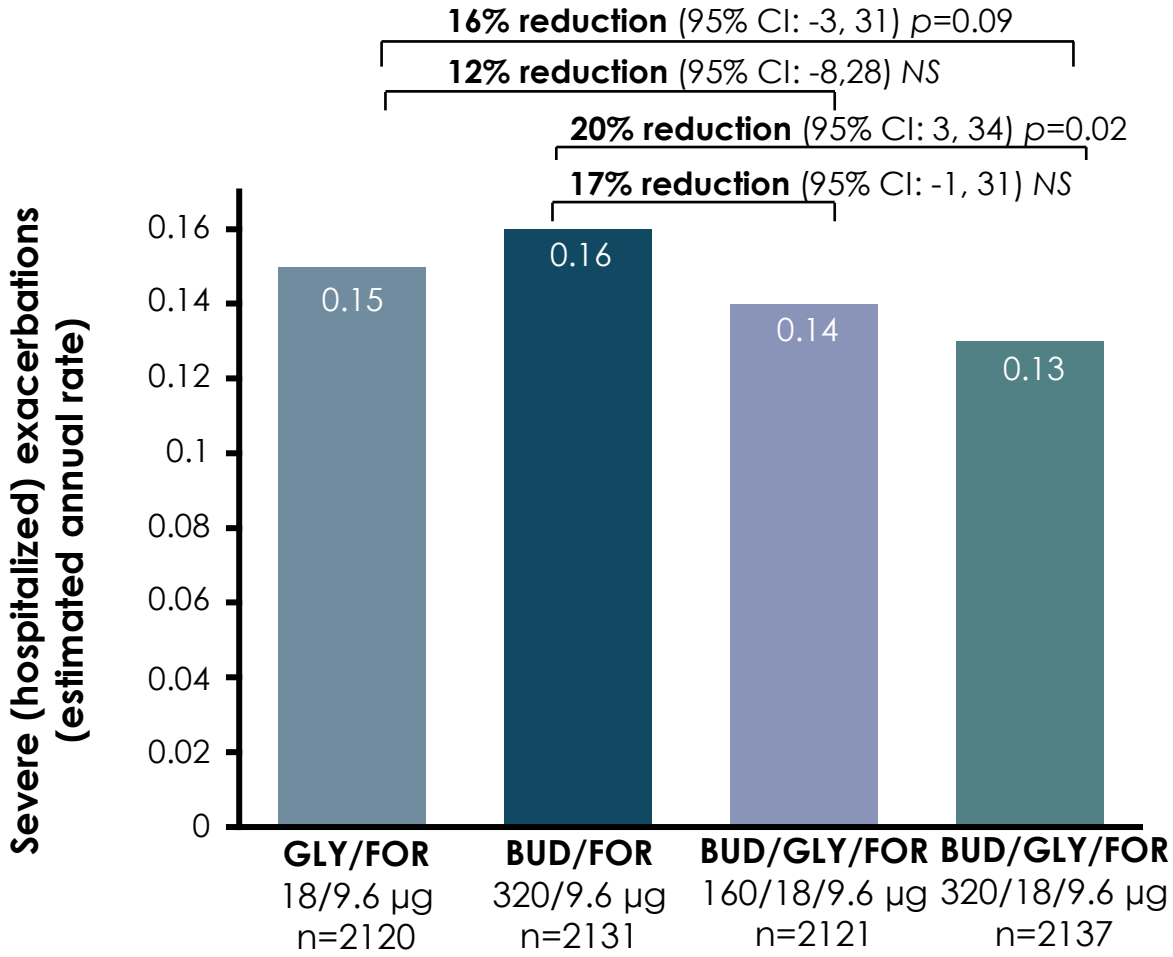
ETHOS: Estimated annual rate of moderate/severe exacerbations

BUD/GLY/FOR vs. GLY/FOR vs. BUD/FOR



ETHOS: Estimated annual rate of severe exacerbations

BUD/GLY/FOR vs. GLY/FOR vs. BUD/FOR



*Primary endpoint.

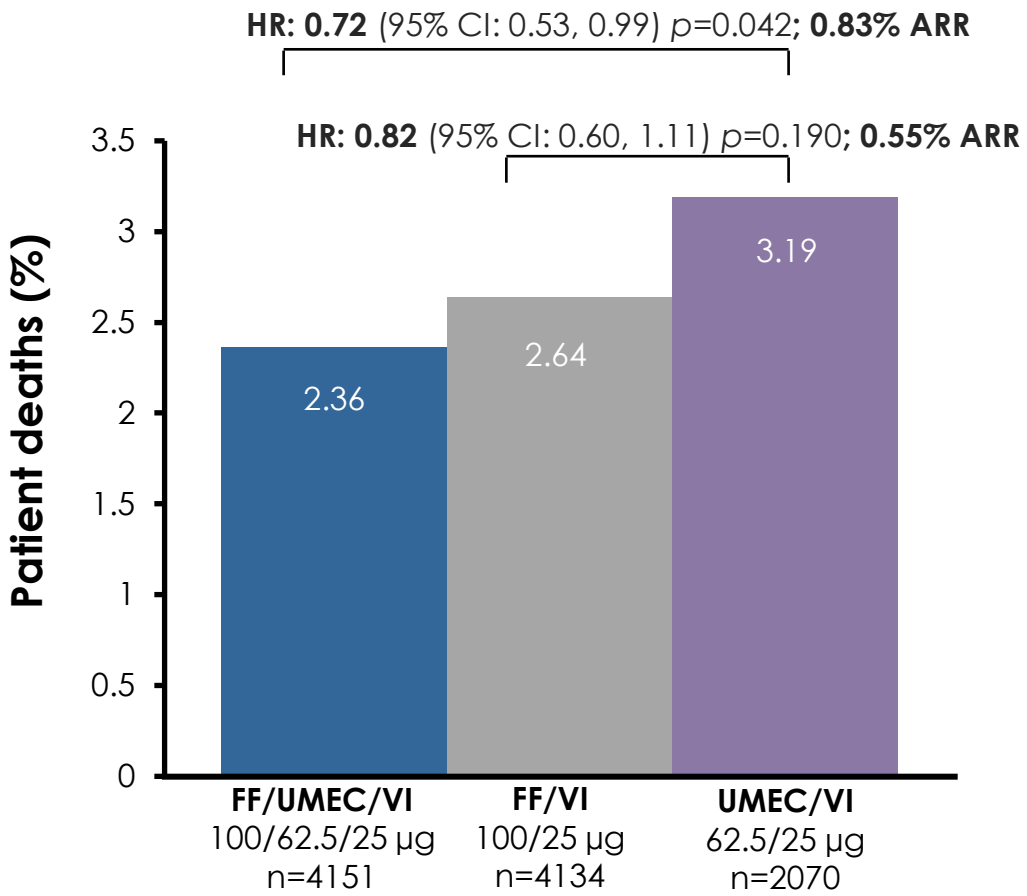
BUD: budesonide; CI: confidence interval; FOR: formoterol; GLY: glycopyrrolate; ICS: inhaled corticosteroid; LABA: long-acting β agonist; LAMA: long-acting muscarinic antagonist; NS: not significant.

1. Rabe et al. N Engl J Med. 2020;383:35-48.

Reduction in the Risk of All Cause Mortality is a Class-effect of Triple Therapy in COPD*

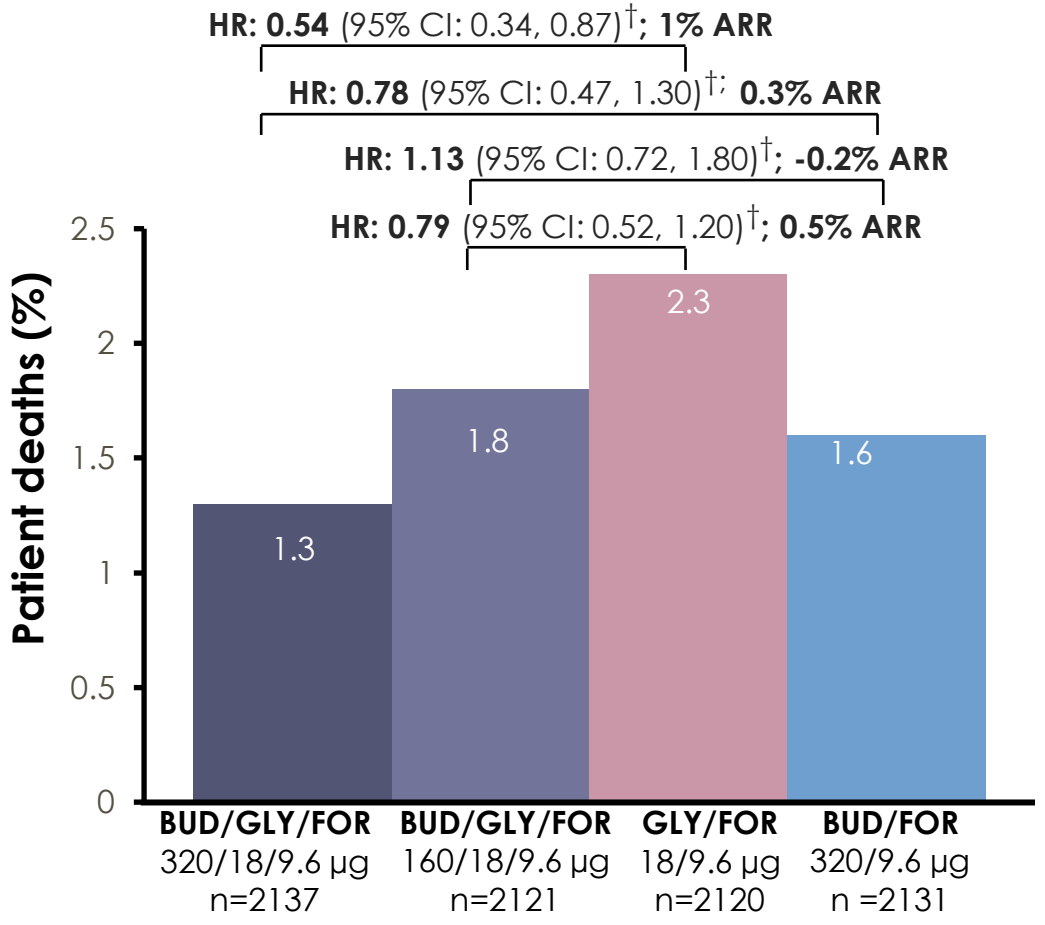
IMPACT:[1] Relative reduction in the risk of death

38%



ETHOS:[2] Relative reduction in the risk of death

46%

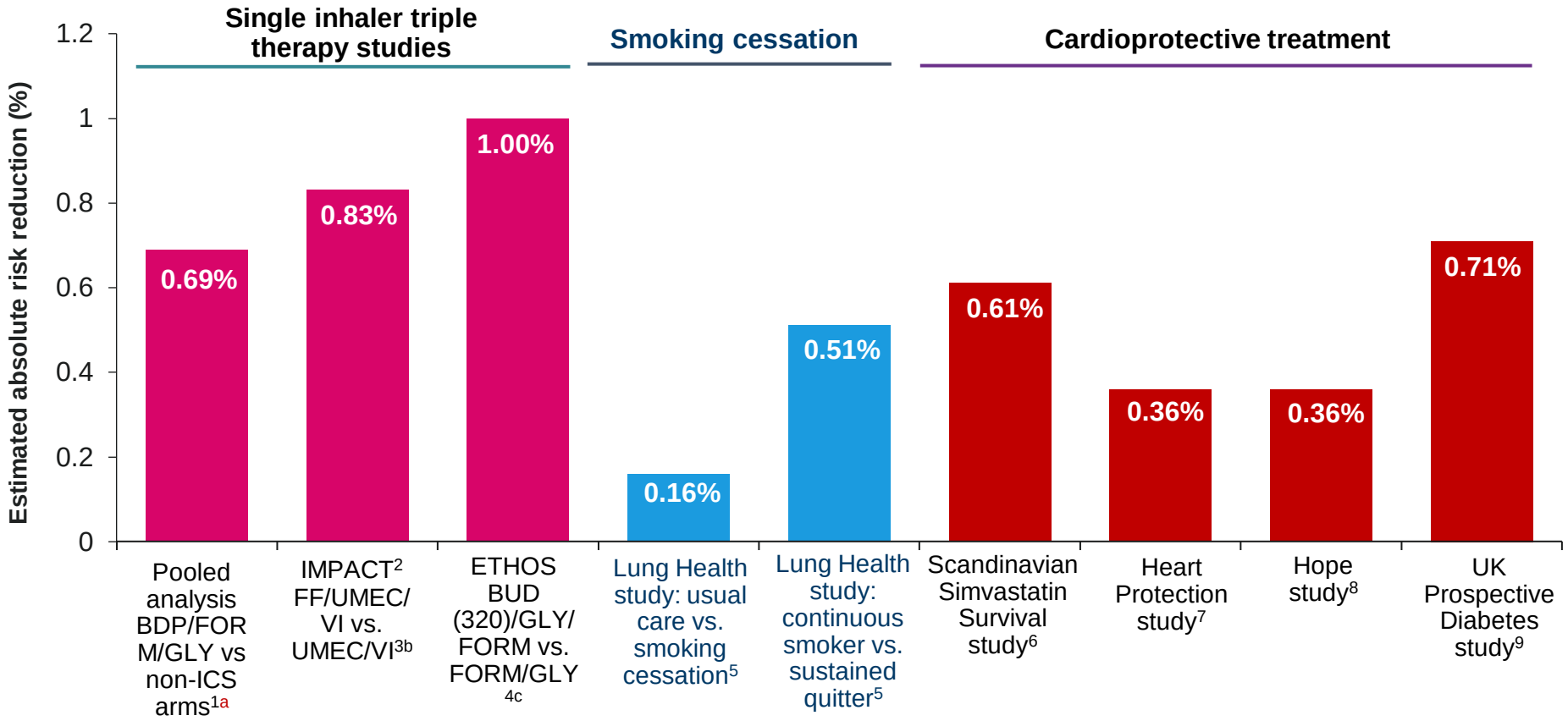


*Across-study comparisons should be treated with caution due to differences in study design and patient population; †The analysis of time to death from any cause over 52 weeks was performed in the intention-to-treat population with the use of a treatment policy estimand, which included all observed data from the patients regardless of whether they continued to receive their assigned treatment.

ACM: all-cause mortality; ARR: absolute risk reduction; BUD: budesonide; CI: confidence interval; ETHOS: the efficacy and safety of triple therapy in obstructive lung disease; FF: fluticasone furoate; FOR: formoterol; GLY: glycopyrrolate; HR: hazard ratio; ICS: inhaled corticosteroid; IMPACT: informing the pathway of COPD treatment; LABA: long-acting beta2-agonist; LAMA: long-acting muscarinic; NS: not significant UMEC: umeclidinium; VI: vilanterol.

1. Lipson et al. Am J Respir Crit Care Med. 2020;201(12):1508-16; 2. Rabe et al. N Engl J Med. 2020;383:35-48.

All-cause mortality benefits with single inhaler triple therapy are similar, or better than, smoking cessation and cardioprotective treatments



Adapted from Bourbeau J, Bafadhel M, Barnes NC, Compton C, Di Boscio V, Lipson DA, Jones PW, Martin N, Weiss G, Halpin DMG. Benefit/Risk Profile of Single-Inhaler Triple Therapy in COPD. Int J Chron Obstruct Pulmon Dis. 2021 Mar 1;16:499 517. doi: 10.2147/COPD.S291967. PMID: 33688176; PMCID: PMC7935340.

[a]Pooled analysis of AEs leading to a fatal outcome (safety population); [b]on- and off-treatment deaths in post hoc analysis with additional vital status follow-up (vital status available for 99.6% of patients at nominal Week 52); [c]analysis included all observed data regardless of whether patients continued to receive their assigned treatment.

1. Vestbo J, Fabbri L, Papi A, et al. Inhaled corticosteroid containing combinations and mortality in COPD. Eur Respir J. 2018;52(6):6. doi:10.1183/13993003.01230-2018. 2. Lipson DA, Barnhart F, Brealey N, et al. Once-daily single-inhaler triple versus dual therapy in patients with COPD. N Engl J Med. 2018;378(18):1671–1680. doi:10.1056/NEJMoa1713901 . 3. Lipson DA, Crim C, Criner GJ, et al. Reduction in all-cause mortality with fluticasone furoate/umeclidinium/vilanterol in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2020;201(12):1508–1516 . 4. Rabe KF, Martinez FJ, Ferguson GT, et al. Triple Inhaled Therapy at Two Glucocorticoid Doses in Moderate-to-Very- Severe COPD. N Engl J Med. 2020;383(1):35–48. doi:10.1056/ NEJMoa1916046. 5. Anthonisen NR, Skeans MA, Wise RA, et al. The effects of a smoking cessation intervention on 14.5-year mortality: a randomized clinical trial. Ann Intern Med. 2005;142(4):233–239. 6. Randomised trial of cholesterol lowering in. 4444 patients with coronary heart disease: the Scandinavian Simvastatin Survival Study (4S). Lancet. 1994;344(8934):1383–1389. 7. Heart Protection Study Collaborative G. MRC/BHF Heart Protection Study of cholesterol lowering with simvastatin in 20,536 high-risk individuals: a randomised placebo-controlled trial. Lancet. 2002;360 (9326):7–22. 8. Yusuf S, Sleight P, et al.; Heart Outcomes Prevention Evaluation Study I. Effects of an angiotensin-converting-enzyme inhibitor, ramipril, on cardiovascular events in high-risk patients. N Engl J Med. 2000;342(3):145–153. 9. UK Prospective Diabetes Study (UKPDS) Group. Effect of intensive blood-glucose control with metformin on complications in overweight patients with type 2 diabetes (UKPDS 34). UK Prospective Diabetes Study (UKPDS) Group. Lancet. 1998;352(9131):854–865.

Case 1

- **64 yr old male,**
  - Had **two exacerbations** within the last 12 months; was treated as an outpatient. Received antibiotics and steroids
  - No ED visit or hospitalization required

- Referred to your office for follow-up as patient also has a history of ischemic cardiomyopathy and diabetes
- 40 pack year history of smoking
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- Current treatment :Symbicort 400ug BID + Ventolin PRN, Entresto 97/103 BID, Bisoprolol 10 OD, Aldactone 25, Forxiga 10 OD, Lasix 40 OD, Metformin 500 BID.

Permission to proceed to titrate

BEST CARE IN PRIMARY CARE - ENHANCED PHARMACOLOGICAL THERAPY

Patients classified as GOLD E at initial visit, with a confirmed or suspected COPD diagnosis with their most recent visit in the last fiscal year.

COPD - Pharmacological Therapy	Patients with a confirmed or suspected diagnosis			
Controller Medications	Initial Visit		Most Recent Follow-up	
	N=912		N=912	
Closed Triple (ICS/LABA/LAMA)	138	15%	462	51%
Open Triple (ICS/LABA/LAMA)	369	40%	264	29%
Total Triple (Open & Closed)	**507**	**55%**	**726**	**80%**
Dual (LABA/LAMA)	90	10%	63	7%
Dual (ICS/LABA)	116	13%	63	7%
Single (ICS)	0	0%	0	0%
Single (LAMA)	11	1%	0	0%
Single (SABA/SAMA)	159	17%	54	6%
No Therapy	29	3%	6	1%

CHALLENGE QUESTION

1) There is evidence of mortality reduction for closed triple (SIT)

2) Can we assume that open triple provides the same result

3) Should we be switching to closed triple (SIT)

Results: Exacerbations and Mortality

TABLE 3] Exacerbation Rates and All-Cause Mortality During 12-Month Follow-up

Study Cohort	Single-Inhaler Triple Therapy (SITT) (n = 1,011)	Multiple-Inhaler Triple Therapy (MITT) (n = 3,614)	Total (N = 4,625)	P[a]
No. of exacerbations, mean (SD)	0.56 (0.87)	0.71 (1.00)	0.67 (0.97)	< .001
Patients with exacerbations, No. (%)	385 (38.1)	1,605 (44.4)	1,990 (43.0)	< .001
0 exacerbations	626 (61.9)	2,009 (55.6)	2,635 (57.0)	< .001
1 exacerbation	270 (26.7)	1,043 (28.9)	1,313 (28.4)	
≥ 2 exacerbations	115 (11.4)	562 (15.6)	677 (14.6)	
Patients with moderate exacerbations, No. (%)	302 (29.9)	1,210 (33.5)	1,512 (32.7)	.031
Moderate exacerbations, mean (SD)	0.34 (0.55)	0.39 (0.62)	0.38 (0.6)	.013
Patients with severe exacerbations, No. (%)	117 (11.6)	557 (15.4)	674 (14.5)	.002
Severe exacerbations, mean (SD)	0.22 (0.83)	0.32 (0.81)	0.29 (0.79)	.003
Time until first exacerbation, d, mean (SD)	203.3 (98.5)	179.3 (99.1)	183.9 (99.4)	< .001
Deaths, No. (%)	29 (2.9%; 95% CI: 1.8-3.9)	159 (4.4%; 95% CI: 3.8-5.1)	190 (4.1%; 95% CI: 3.5-4.7)	.027
Time until death, d, mean (SD)	238.8 (88.1)	196.2 (93)	202.8 (93.3)	.023
HR (95% CI) for exacerbations	0.683 (0.607-0.769)	...		.001
HR, (95% CI) for mortality	0.668 (0.625-0.712)	...		.027

[a]Statistical tests comparing independent groups for qualitative (χ^2) or quantitative (analysis of variance) data. Analyses are adjusted for covariates: age, sex, BMI, smoking status, time from diagnosis, FEV_1, eosinophil count, heart failure, renal failure, Charlson Comorbidity Index, and previous exacerbations.

Should we be increasing the pace of up titration in COPD on the pathway to triple?

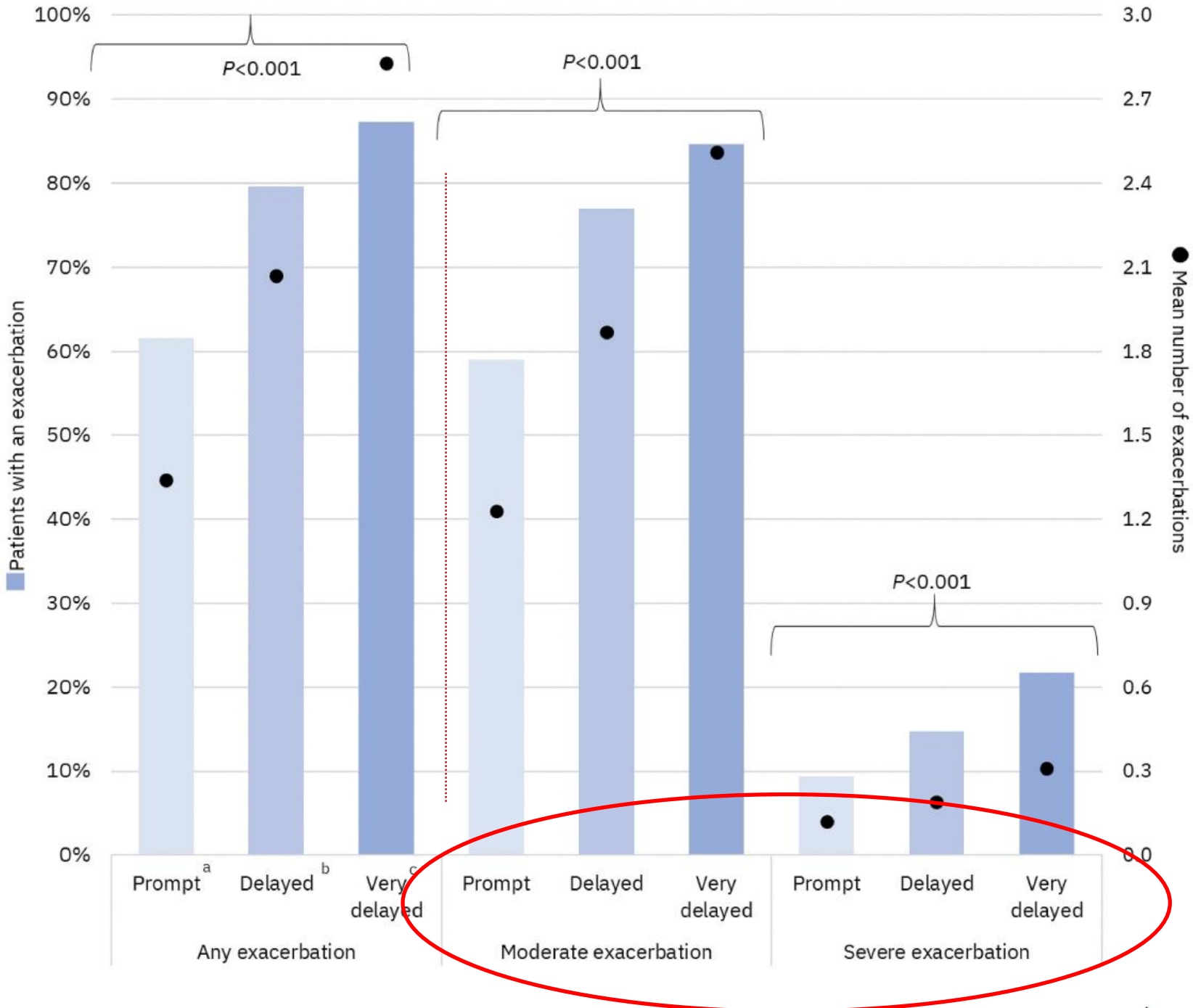
Triple Therapy Escalation

Escalation to triple therapy in COPD - E.

Prompt: ≤ 30 days
Delayed: 31-180 days
Very delayed: 181-365

Prompt escalation leads to better patient outcomes.

Tkacz et al. IJ COPD 2022;17:329-342.



HOW CAN I IMPLEMENT THESE RECOMMENDATIONS IN MY PRACTICE?

BEST CARE IN PRIMARY CARE

BestCare

Best Care in Primary Care

is a front-line clinical program

operated by a
not-for-profit corporation

lead by a
community board of governors
since 2003

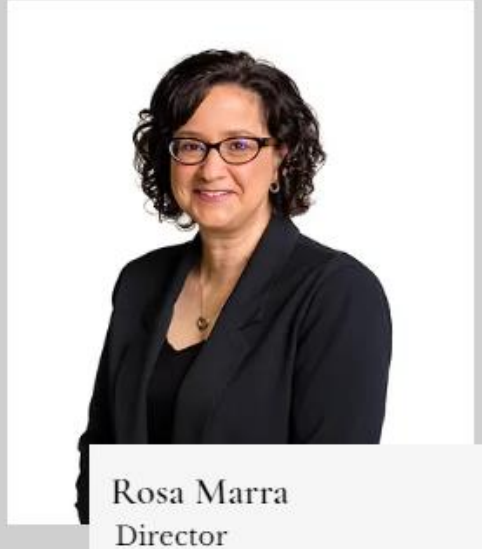
funded by the
Ontario Ministry of Health

at
270 sites across Ontario

Dr. Cathy Faulds
Chair Director

Ian McIntosh
Director

Paul Huras
Director



Rosa Marra
Director

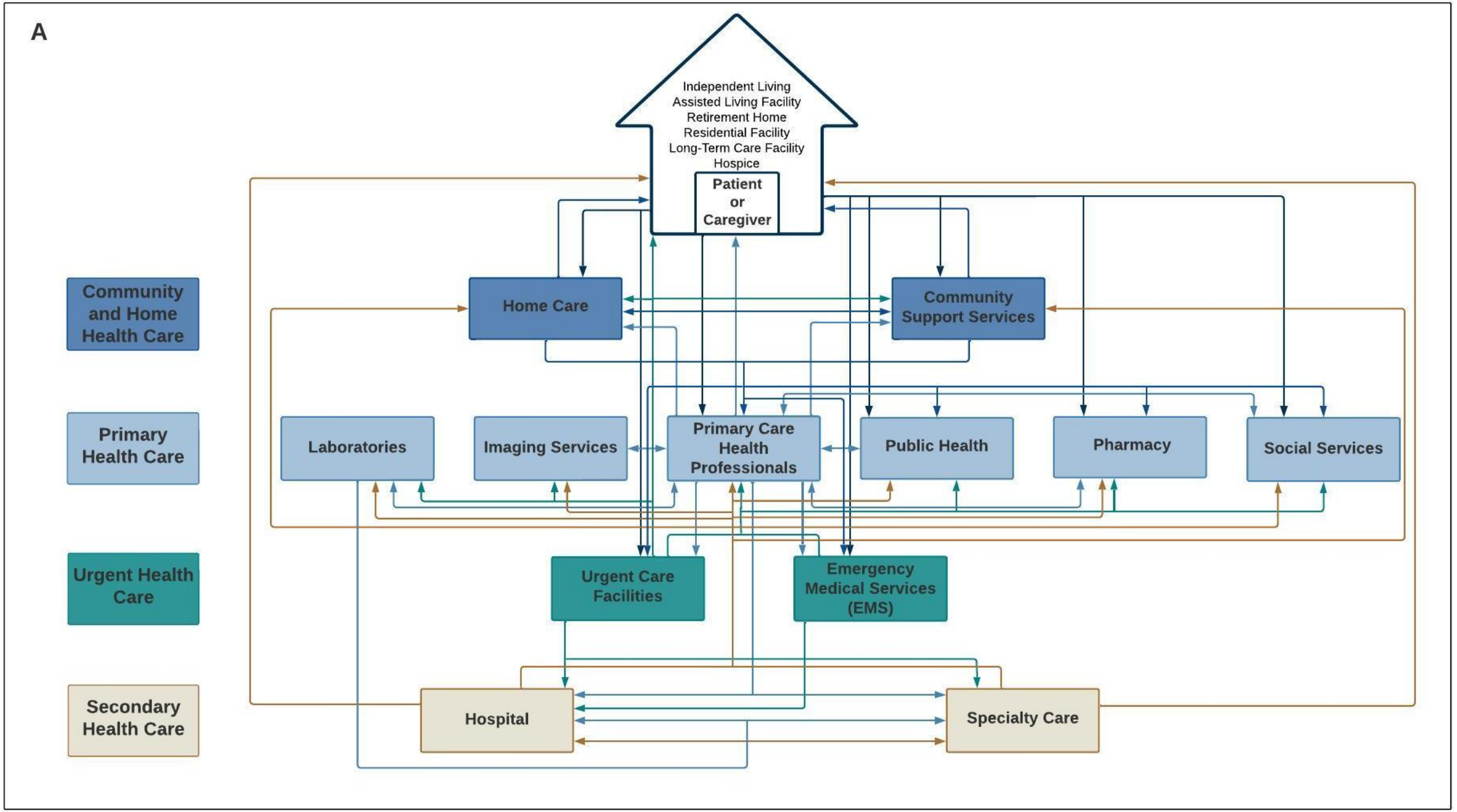
Dr. Timothy O'Callahan
Director

Glenn Lanteigne
Director

WHY DOES THE HEALTH SYSTEM NEED BEST CARE IN PRIMARY CARE

- The vast majority of patients are managed by primary care
- There are significant capacity limitations in primary care
- The health system is more reactive, than proactive, preventive
- Chronic disease management is complex - requires a team
- Structured, standardized chronic disease management strategy is required to improve patient outcomes and health system performance

"This is the program that I have been looking for, for the last 30-years"
Dr. Robert McKelvie Cardiology



Hussey, A. J., Sibbald, S. et al (2021). Confronting complexity and supporting transformation through health systems mapping : a case study. *BMC Health Services Research*, *8*, 1–15.

Middlesex/London Heart Failure Current State

SPOKE
Stable, low risk, few co-morbidities
Community provider office or clinic

Internal Medicine Clinics

Primary Care

Best Care (Primary Care)

Cardiology Clinics

Victoria Hospital

Victoria Hospital:
- CHF Admissions from the Community through the ED to Cardiology or Internal Medicine

Strathroy Middlesex General Hospital

SMGH Hospital:
- CHF Admissions from the Community through the ED to Internal Medicine

COMMUNITY HUB
Moderate risk multiple, stable co-morbidities
Local hospital or community setting

Lack of Hub Structure to connect Spoke and Node

TERTIARY NODE
High risk, multiple co-morbidities, complex needs
Advanced cardiac hospital

LHSC NP HF Clinic Eligibility:
- Primary diagnosis of HF
- Discharged from UH
- Cardiologist follow-up delayed (>3 months)
- EF>20%

LHSC HF NP Clinic

University Hospital

COACH

St. Joseph's HC London HF Clinic

University Hospital:
- CHF Admissions from the Community through the ED to Cardiology or Internal Medicine
- CHF Admissions directly from Cardiology OP or SJHC Advanced HF Clinic

COACH Eligibility:
- Primary diagnosis of HF
- Stable enough to manage outpatient within 48hrs
- Discharged from ED or short stay (<48 hrs.) admission
- Low/intermediate EHMRG

SUPPORTIVE SERVICES

Community Paramedicine
- HF patients on active LTC waiting lists

Community Para-Medicine (CP)

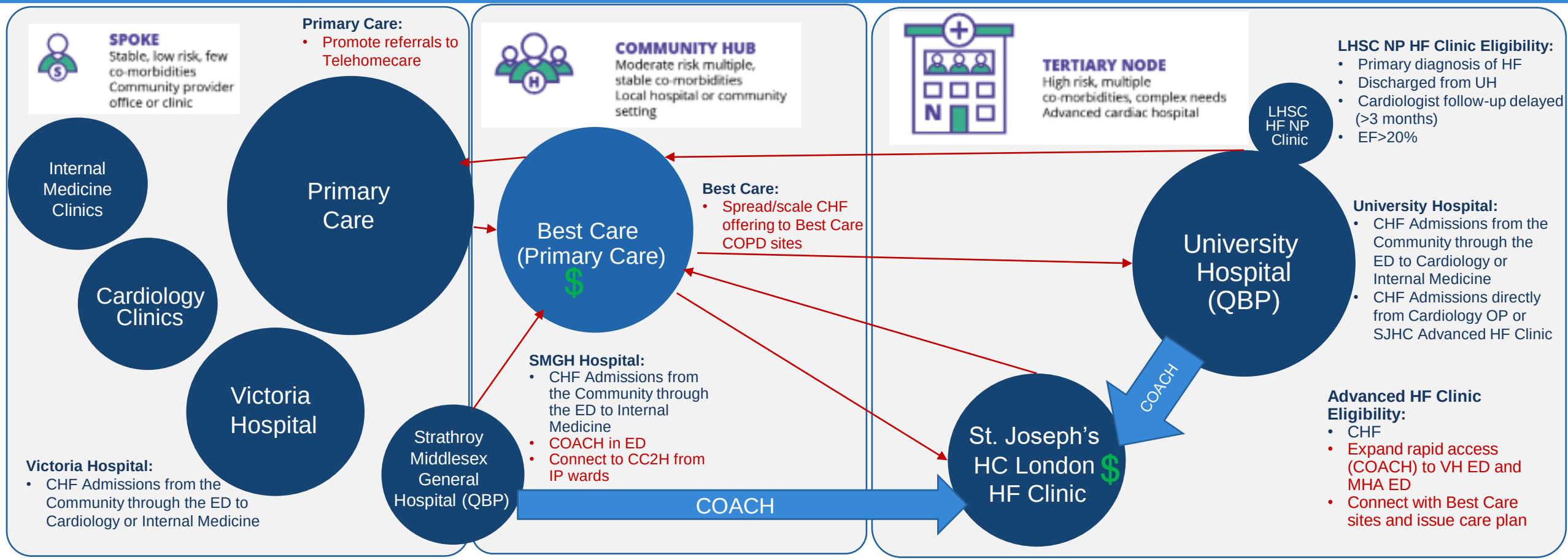
Tele-Homecare Eligibility:
- Primary diagnosis of HF
- Mild/moderate care needs

Tele-homecare

Connecting Care to Home Eligibility:
- Primary diagnosis of HF
- Moderate care needs
- In London/Middlesex
- Discharged from UH/VH

CC2H

Middlesex/London Heart Failure Future State



SUPPORTIVE SERVICES

Community Paramedicine
- HF Patients on LTC WL

Community Para-Medicine (CP)

Telehomecare Eligibility:
- Primary diagnosis of HF
- Mild/moderate care needs

Tele-homecare

Step Down

CC2H

CC2H Eligibility:
- Primary diagnosis of HF
- Moderate care needs
- In London/Middlesex
- Expand access to MHA
- Expand access to EDs
- Include Best Care/Telehomecare in rounds

WHAT IS BEST CARE IN PRIMARY CARE

- **An effective model of care for chronic disease management**
- **A repeatable platform for multiple chronic diseases**
- **An instrument of health system transformation that empowers primary care**

- A complete knowledge translation, interdisciplinary program – team care - measurable
- In person, whole of person, evidenced-based care
- Embeds educator / case managers / guideline experts in the patients' medical home
- Proactive, upstream, preventative care, reducing hospitalization and ED visits.
- Supports system integration building from primary care

A COMPLETE KT PROGRAM DELIVERING ALL ELEMENTS OF CARE

PHARMACOLOGIC AND NON - PHARMACOLOGIC

STANDARDIZED PROGRAMMING

ROBUST QUALITY ASSURANCE

ONTARIO HEALTH QUALITY STANDARDS REPORTING

BestCare

COPD Quality Standards

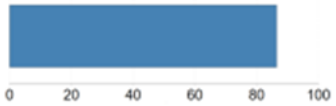
WEST REGION

Unique Patients	Total Visits	Initial Visits
6,418	10,722	3,254

Quality Standards met by the Best Care Program

Quality Statement 1: Diagnosis confirmed with spirometry

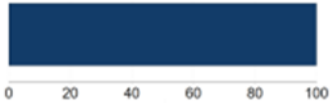
Spirometry (%)



Denominator: total having COPD. Nu denominator who confirm a diagnosi Best Care program

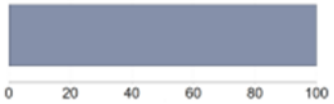
Quality Statement 2: Comprehensive Assessment

***Disability assessed (%)**



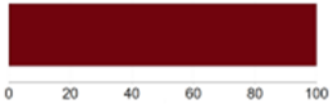
Denominator: total number of people disability has been score and MRC)

***Exacerbation risk assessed (%)**



Denominator: tota number of people exacerbation of C months (antibiotic

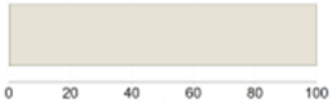
***Comorbidities assessed (%)**



Denominator: total number of people evaluation of comc

Quality Statement 3: Goals of Care and Individualized Care Planning

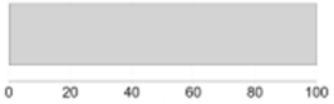
***Goals of care discussed (%)**



Denominator: total number of people goals of care with respiratory educat

Quality Statement 4: Education and Self-Management

***Received self-management interventions (%)**



Denominator: total number of people more interventions health care profes

BestCare

Heart Failure Quality Standards Report

WEST REGION

01/04/2023 - 31/03/2024

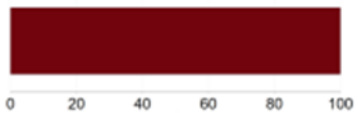
Unique Patients	Total Visits	Initial Visits	Follow-up Visits
643	1,333	339	994

Quality Standards met by the Best Care Program

Ontario Health Quality Ontario

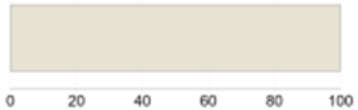
Quality Statement 1: Diagnosing Heart Failure

***Medical History (%)**



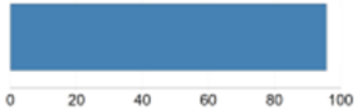
Denominator: total number of people clinically suspected of having heart failure and are referred to the Best Care program. Numerator: number of people in the denominator whose initial evaluation included a medical history to inform their heart failure diagnosis

***Physical Examination (%)**



Denominator: total number of people clinically suspected of having heart failure and are referred to the Best Care program. Numerator: number of people in the denominator whose initial evaluation includes a physical examination to inform their heart failure diagnosis

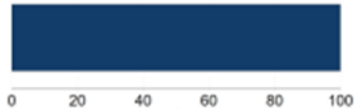
Echocardiogram (%)



Denominator: total number of people clinically suspected of having heart failure and are referred to the Best Care program. Numerator: number of people in the denominator who have received an echocardiogram to inform their heart failure diagnosis

Quality Statement 2: Individualized, Person-Centered, Comprehensive Care Plan

***Care Plan (%)**



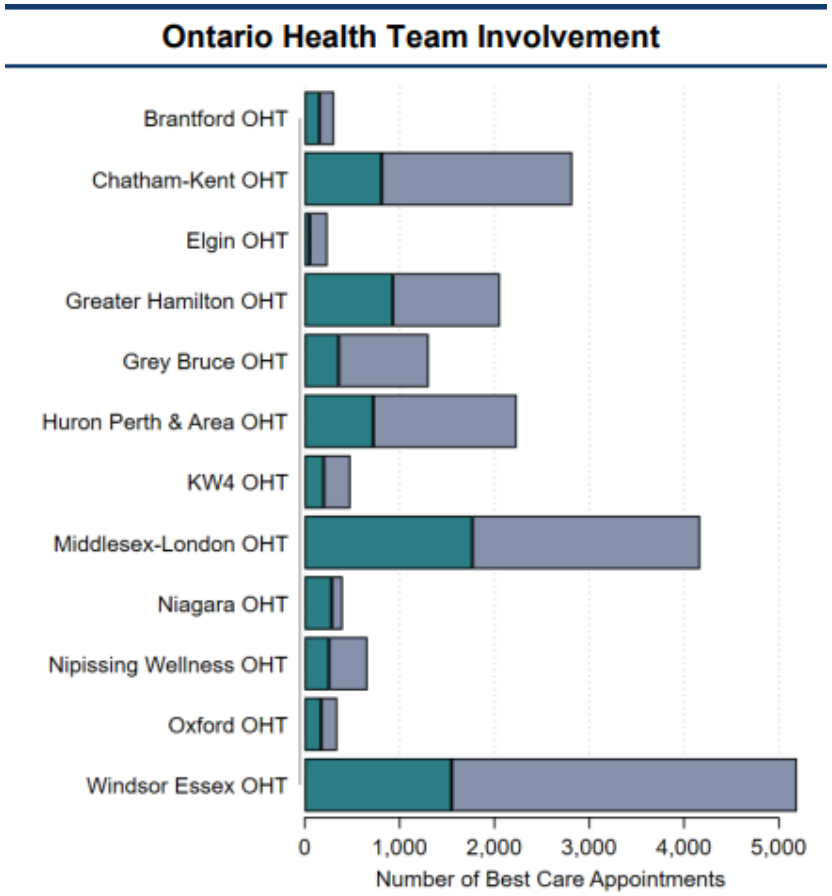
Denominator: total number of people with heart failure. Numerator: number of people in the denominator who have a care plan that guides their care

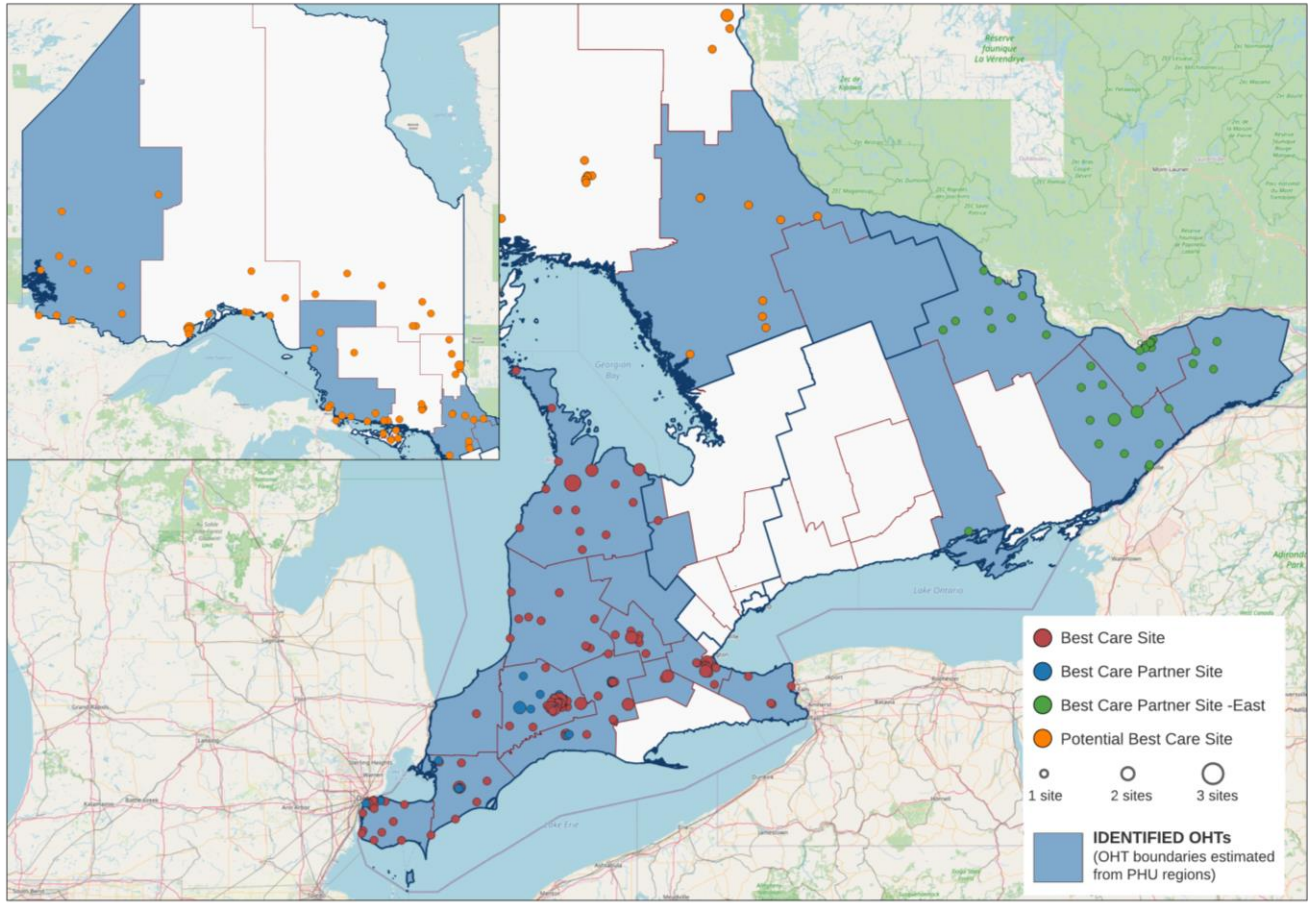
Care Plan reviewed in the last 6 months (%)

Denominator: total number of people with heart failure who have a care plan. Numerator: number of people in the denominator whose care plan has been reviewed in the past 6 months

Quality Statement 3: Empowering and Supporting People with Heart Failure to Develop Self-Management Skills

A PROGRAM TRUSTED BY 1,300 PRIMARY CARE PROVIDERS



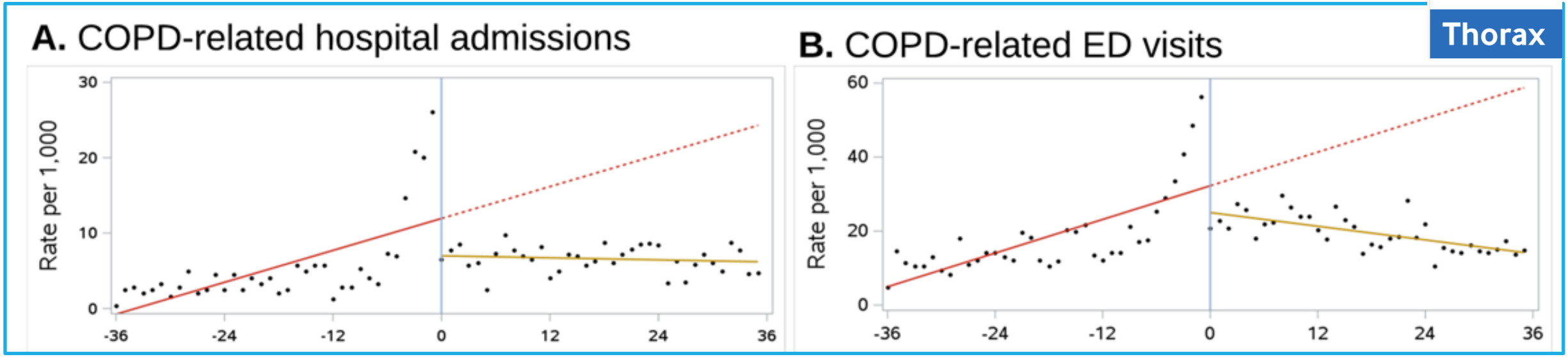


Best care is a trusted partner for >1,300 primary care providers at >270 sites, served 16,000 patients in 26,000 visits last fiscal and is collaborating on the primary care integration plans of 12 OHTs - NOW

A WORLD LEADING PRIMARY CARE PROGRAM

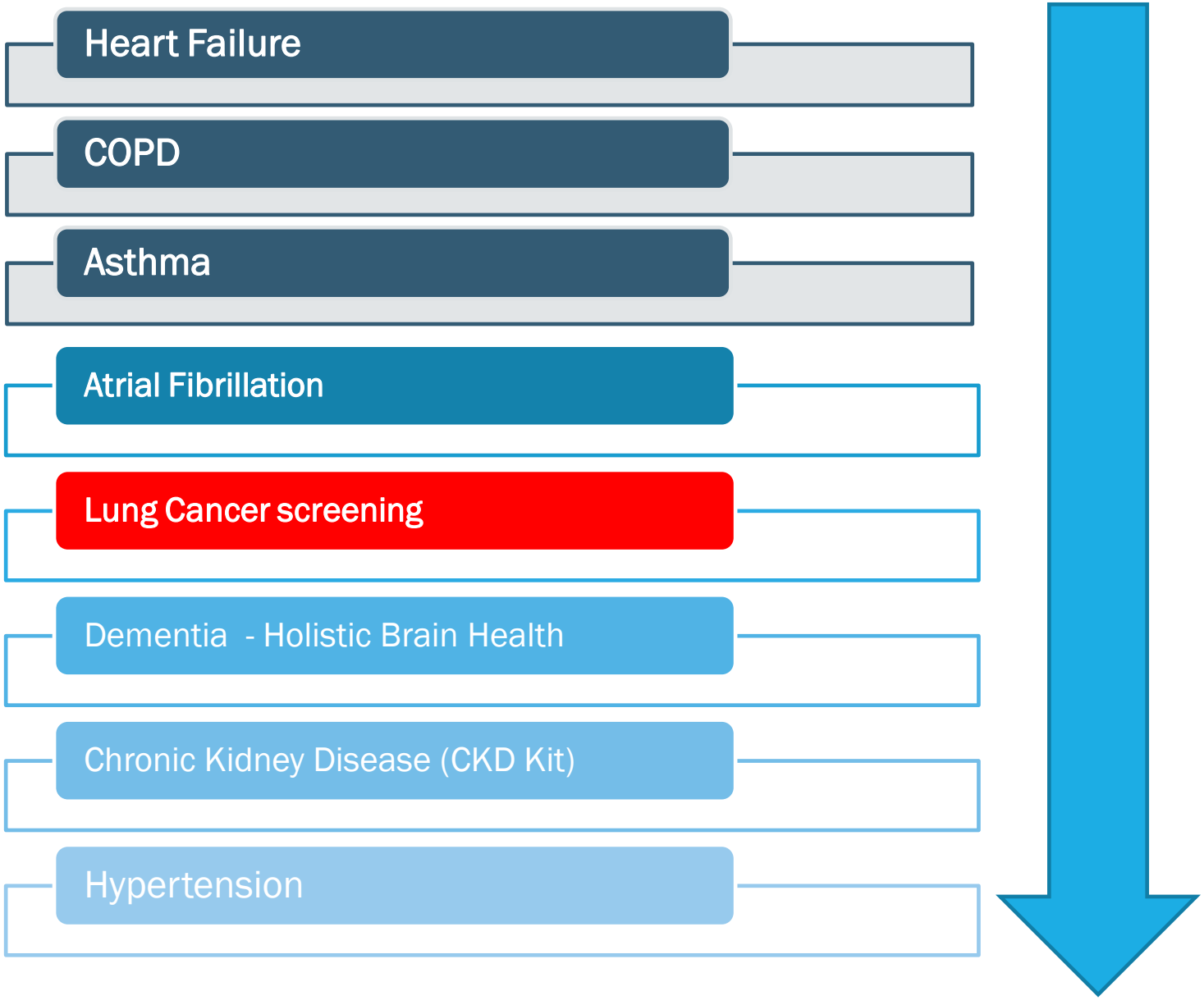
- Delivering the Quadruple Aim (Proven effective, highest levels of scientific evaluation)
  - Provider Experience (Two peer-reviewed publications and 1,300 physicians fiscal 2023-2024)
  - Patient Experience (Two direct peer-reviewed publications and four QoL studies)
  - Improves Health Outcomes (Five peer-reviewed publications, highest levels of scientific evaluation)
  - Lowers Costs (Two peer-reviewed cost-effectiveness studies examining 4 countries)
- Impact of Best Care on the Ontario Health System

BMJ Journals
Thorax



THE BEST CARE MODEL CAN BE EXPANDED TO ADDITIONAL DISEASE STATES

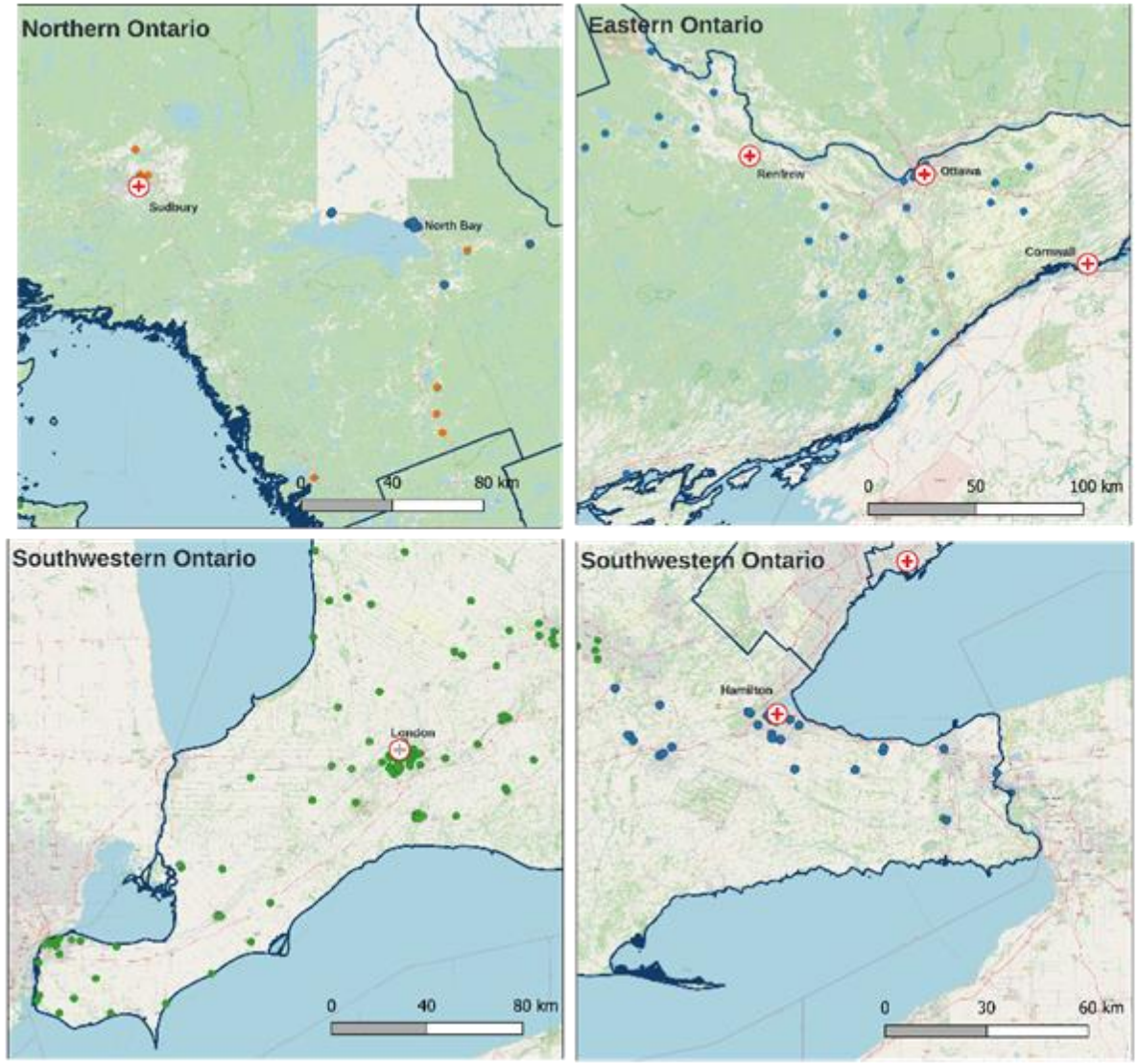
By building on a model of care that provides easier access to specialists, enhanced team-based care coordination, and reduced hospital use, Ontario could enhance its position as a leader in all aspects of chronic disease care.



NORTHERN EXEMPLAR - HEALTH SYSTEM TRANSFORMATION

EXISTING REMOTE OLSP + BEST CARE + ONE-LUNG EARLY DIAGNOSIS

- Existing OLSP – Sudbury (126km) - expect low penetration – The only OLSP in the north
- Started Best Care HF - in 18-months - 800 visits, 300 patients
- Created a network of primary care clinics in North Bay, Mattawa, Sturgeon Falls, Indigenous Hub, Powassan.
- Shared Care –specialist Dr. Jari Tuomi
- Unattached patient clinic at the hospital .
- 2024 + COPD Case Manager / Educator
- 2024 + Early Diagnosis COPD / Lung Cancer Screening



BEST CARE PROVINCIAL PROGRAM ASSETS

- Active, early case identification, diagnosis and treatment for asthma, COPD, HF, lung cancer and other chronic conditions
- In the patients' medical home – primary care
- Implementing care standards – optimizing pre and post cancer care
- Creating effective care networks – communities of care
- Creating primary care capacity – reinforcing primary care
- Improving system capacity, specialty care, hospital and ED beds
- Cost effective
- A repeatable platform

THANK YOU FOR THIS OPPORTUNITY!

DISCUSSION AND QUESTIONS