



Canadian Cardiovascular Society



Recommendations on Heart Failure 2006

Diagnosis and Management

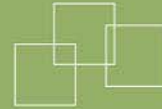
Arnold JMO, Liu P et al. *Can J Cardiol* 2006;22(1):23-45.

Faculty*

- **Malcolm O. Arnold, MD (Chair)**
- **Haissam Haddad, MD,**
- **David E. Johnstone, MD**
- **Gordon W. Moe, MD**
- **Michel White, MD**

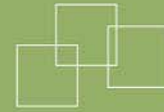
*This faculty has reviewed the slide kit on behalf of the Primary and Secondary Consensus Conference Multidisciplinary Panels.

Leadership. Knowledge. Community.

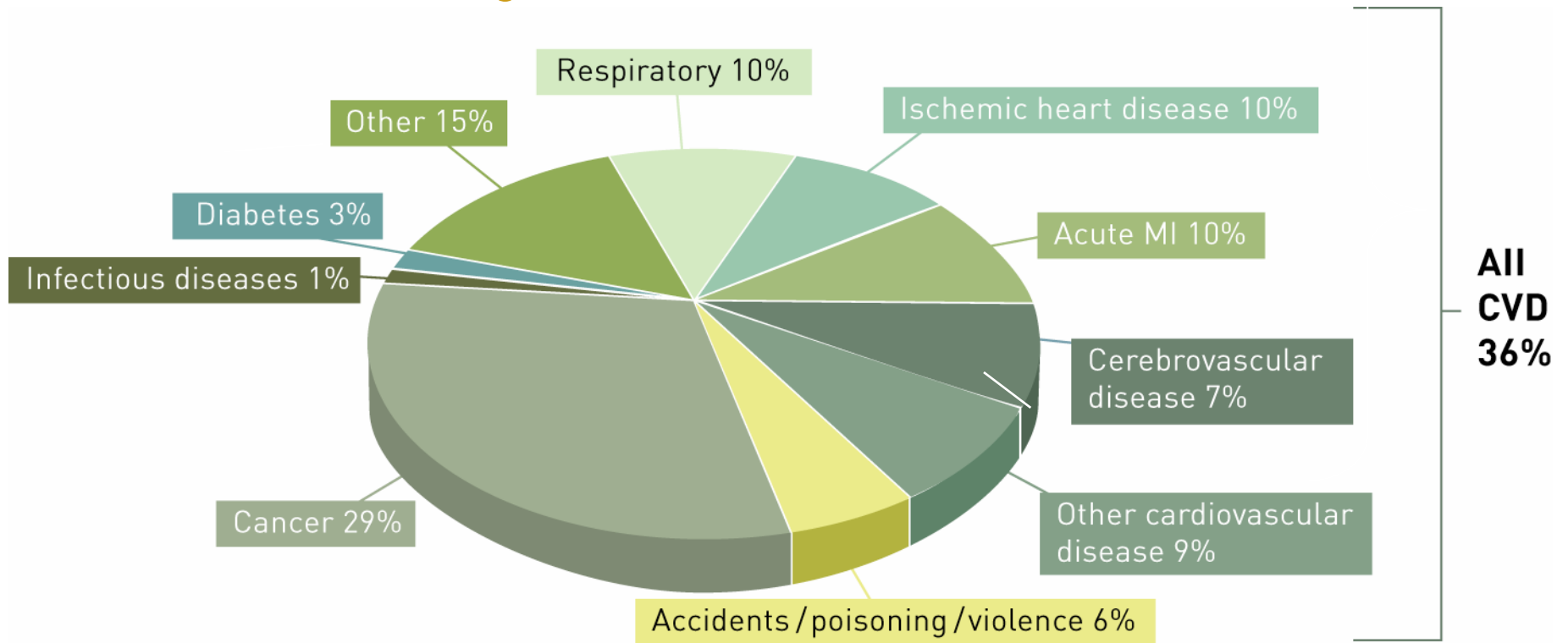


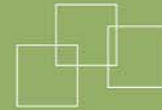
CCS HF Recommendations 2006 Slide List Content

- Background on HF and CV disease
- CCS Consensus Conference Process
- Key Recommendations
- Diagnosis, Causes and Risk factors for HF
- Education, Non-drug Management, Referral and HF Clinics
- Treatment of HF
 - ACE-I
 - BB
 - ARB
 - Combination therapies
 - Preserved systolic function
 - Acute HF
 - Device therapies
 - Surgical considerations
- Care of Elderly and End of Life
- Conclusion/Summary
- Additional Reference slides
- Case Studies

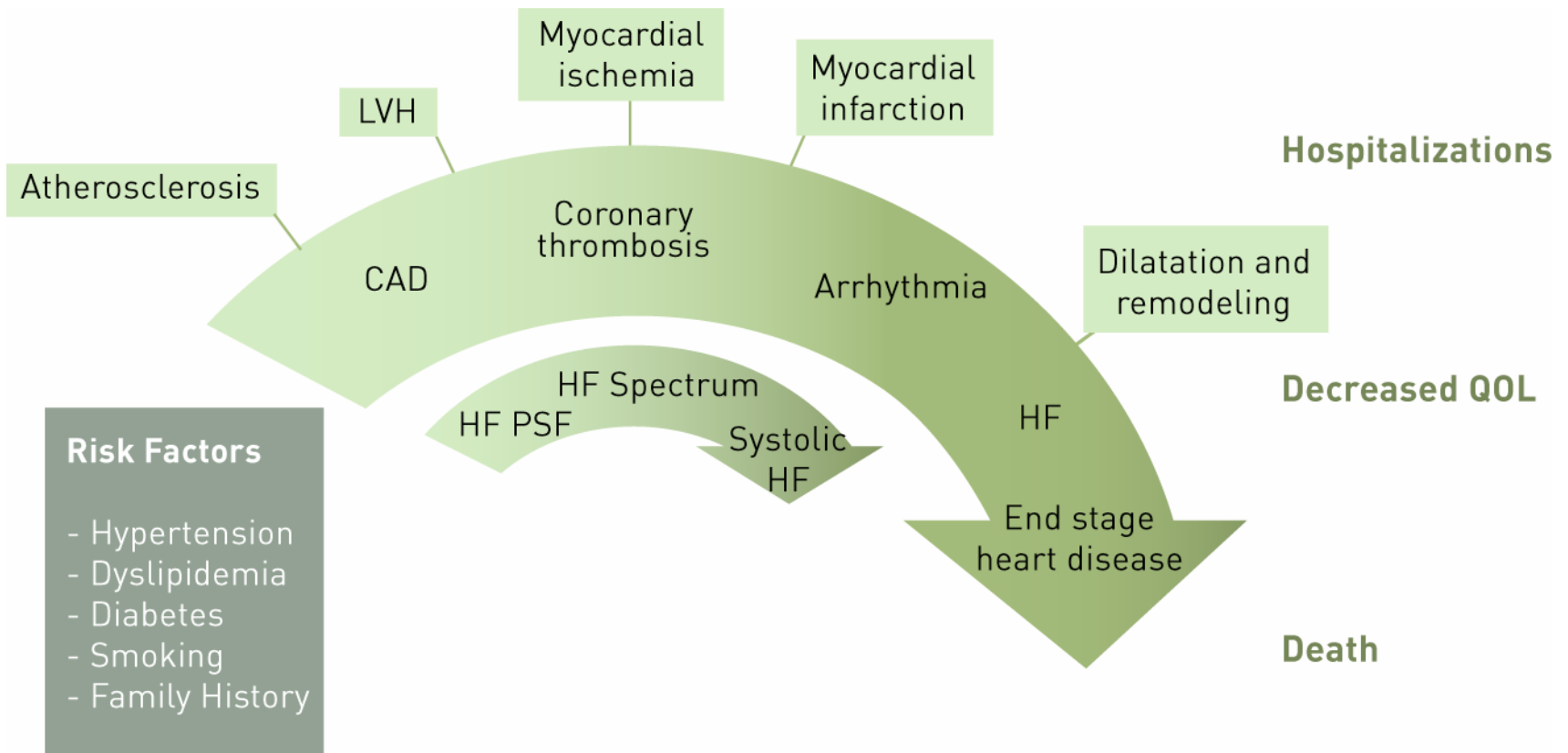


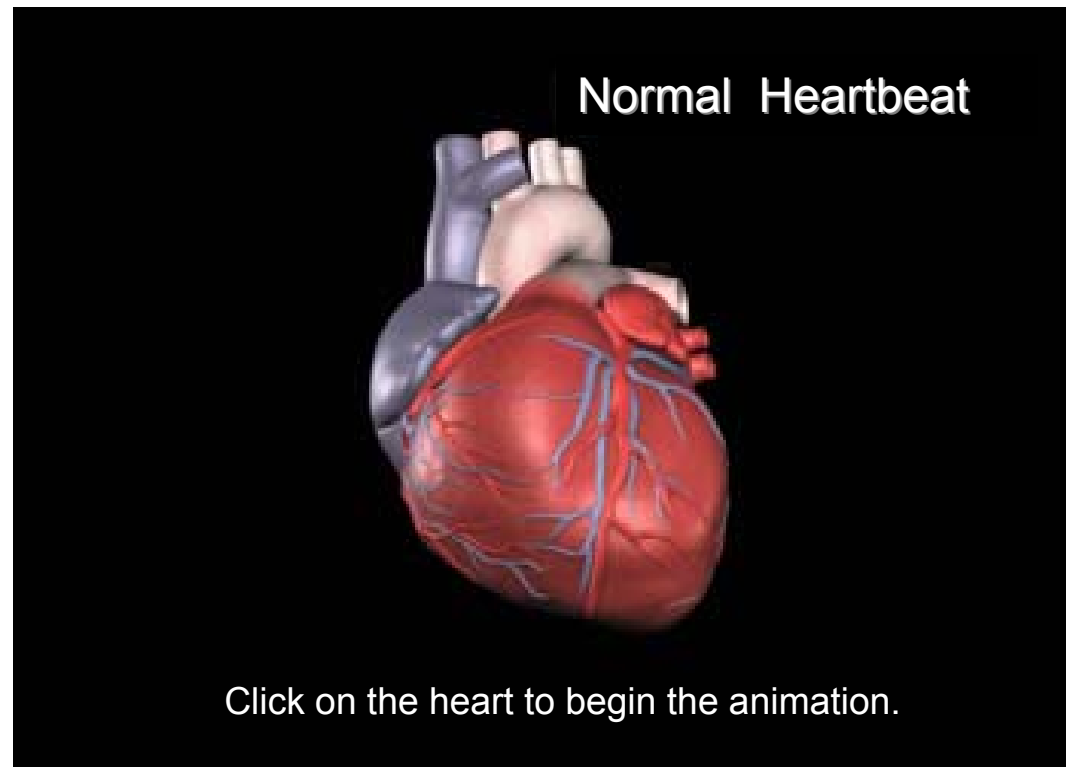
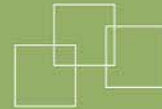
Cardiovascular Disease and Mortality in Canada



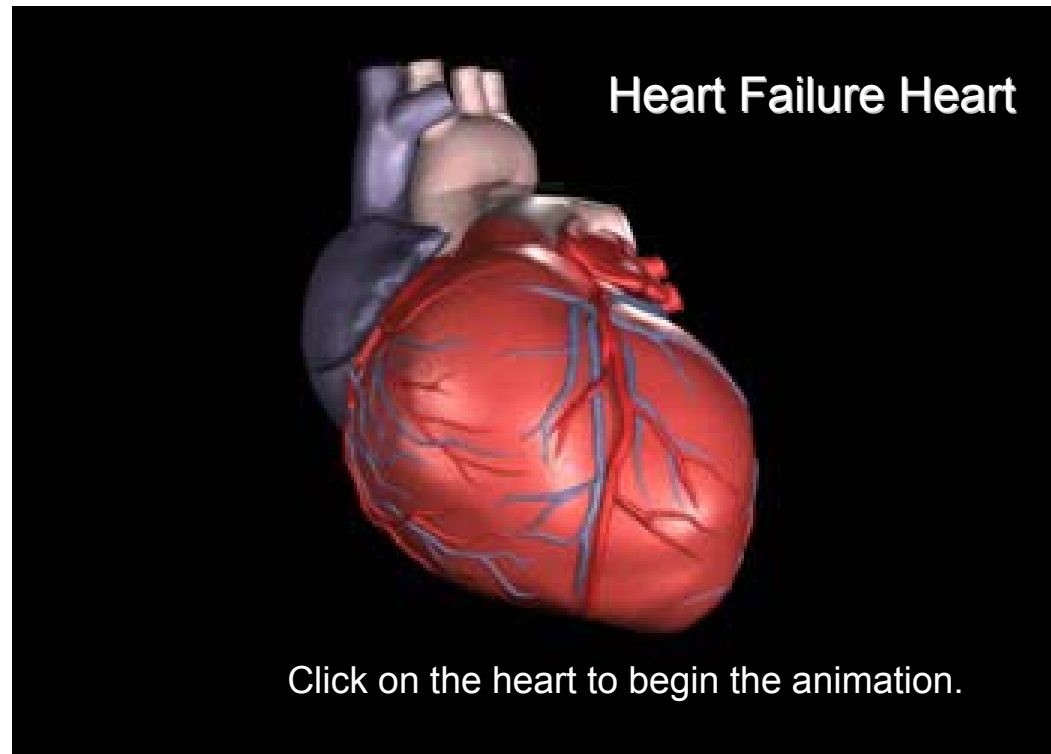
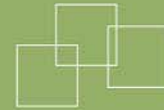


The Heart Failure Continuum

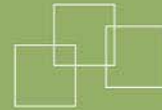




A normal heart pumps blood in a smooth and synchronized way.

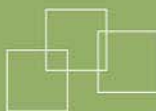


A heart failure heart has a reduced ability to pump blood.

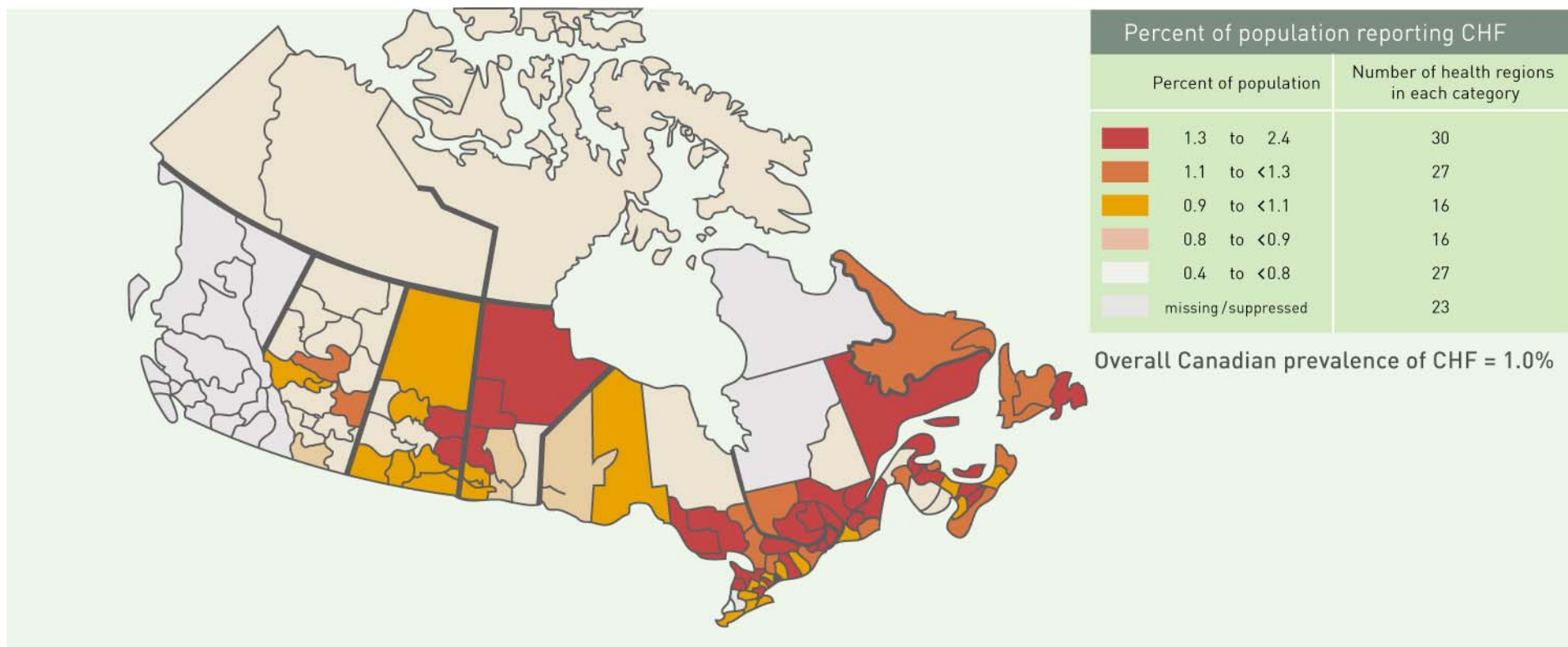


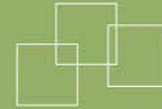
What is Heart Failure (HF)?

- HF is a complex syndrome in which abnormal heart function results in, or increases the subsequent risk of, clinical symptoms and signs of low cardiac output and/or pulmonary or systemic congestion
- HF is common and reduces quality of life, exercise tolerance and survival
- New treatments have greatly improved prognosis and many patients can now hope for long periods of stable, improved symptoms and improved heart function
- Evidence-based guidelines help in our ability to improve outcomes despite the challenges associated with the treatment and management of HF

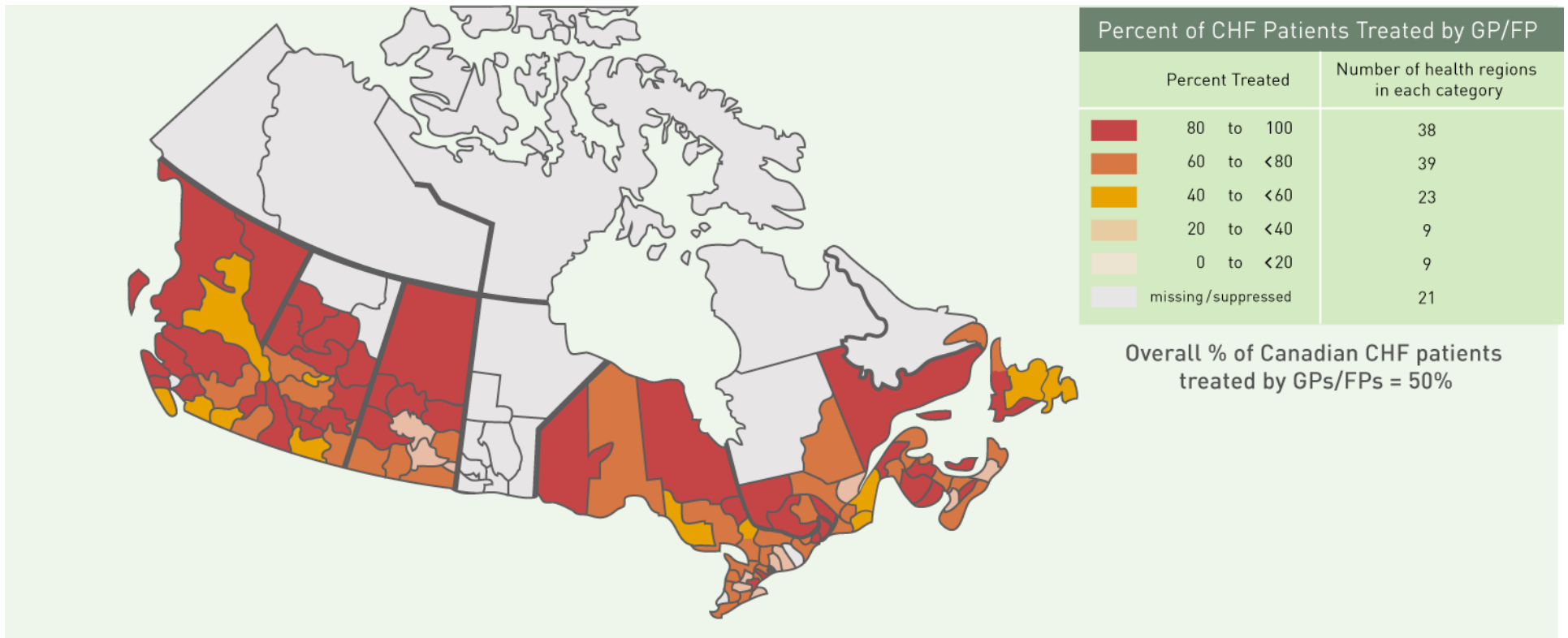


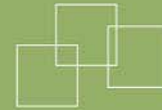
HF Prevalence in Canada





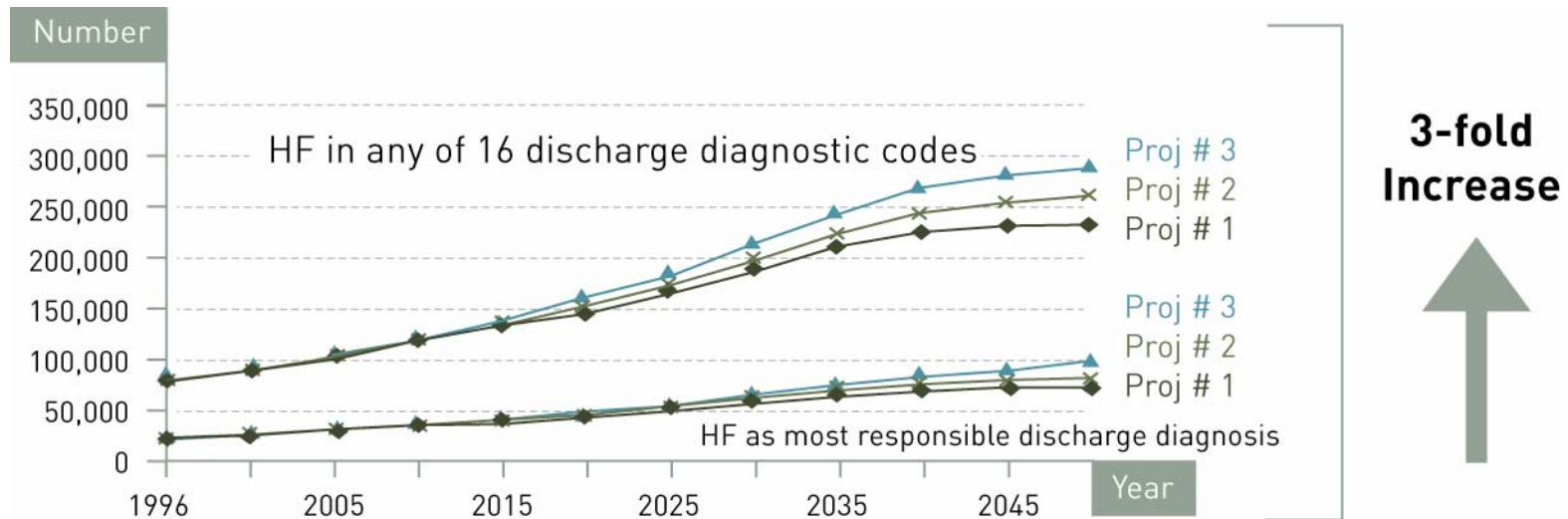
Majority of HF Patients Treated by GPs/FPs

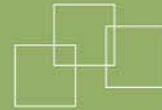




HF Cases on the Rise

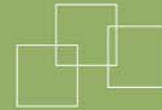
Projected number of incident hospitalizations for CHF patients, using high, medium and low population growth projections in Canada 1996-2050





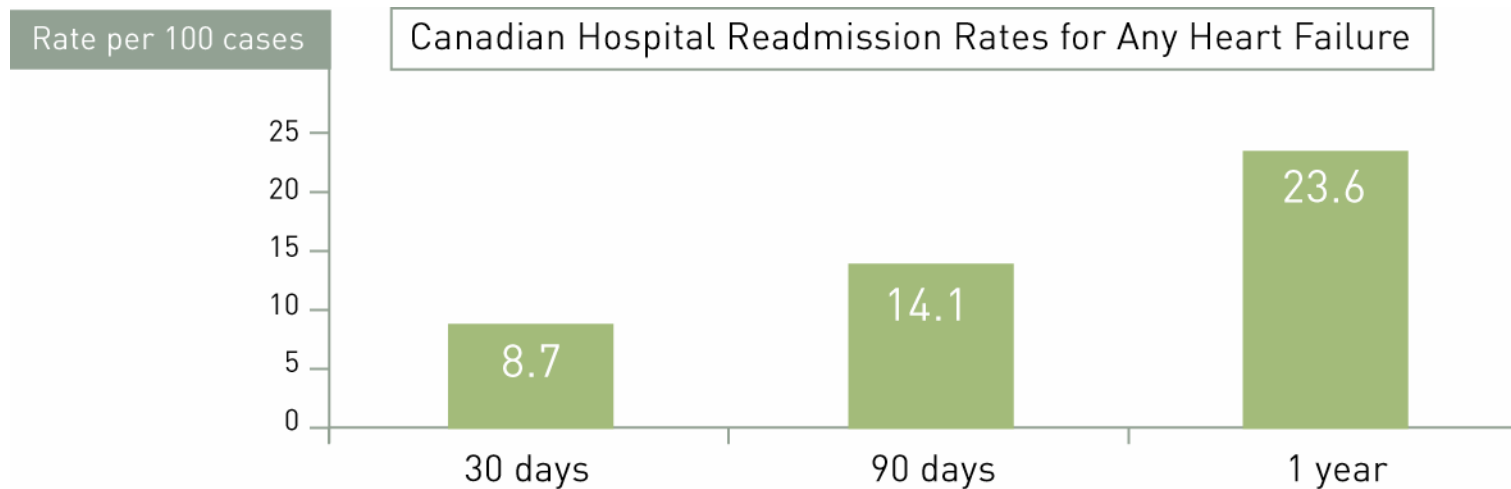
Heart Failure Mortality

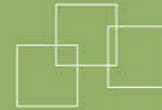
- Canada's average annual in-hospital mortality rate is:
 - 9.5 deaths/100 hospitalized patients >65 years of age
 - 12.5 deaths/100 hospitalized patients >75 years of age
- HF patients have a poor prognosis, with an average 1-year mortality rate of 33%



HF Readmissions

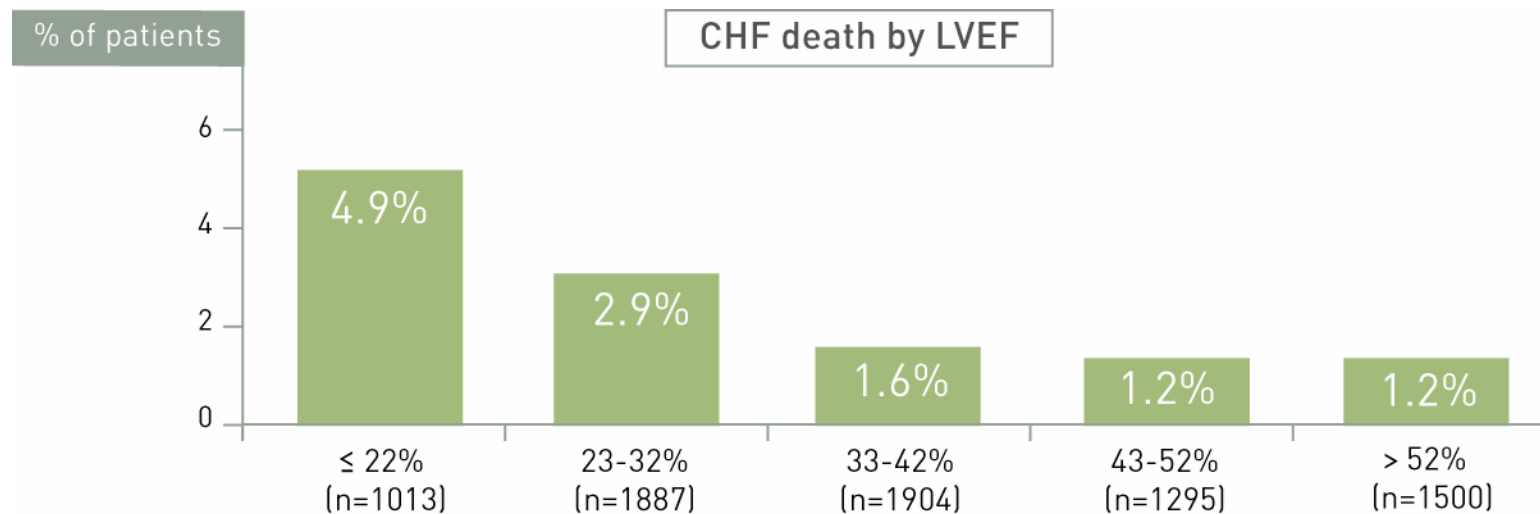
- Hospital readmission rates are high, and mainly due to recurrent heart failure

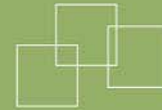




Mortality in HF Increases With Lower LVEF

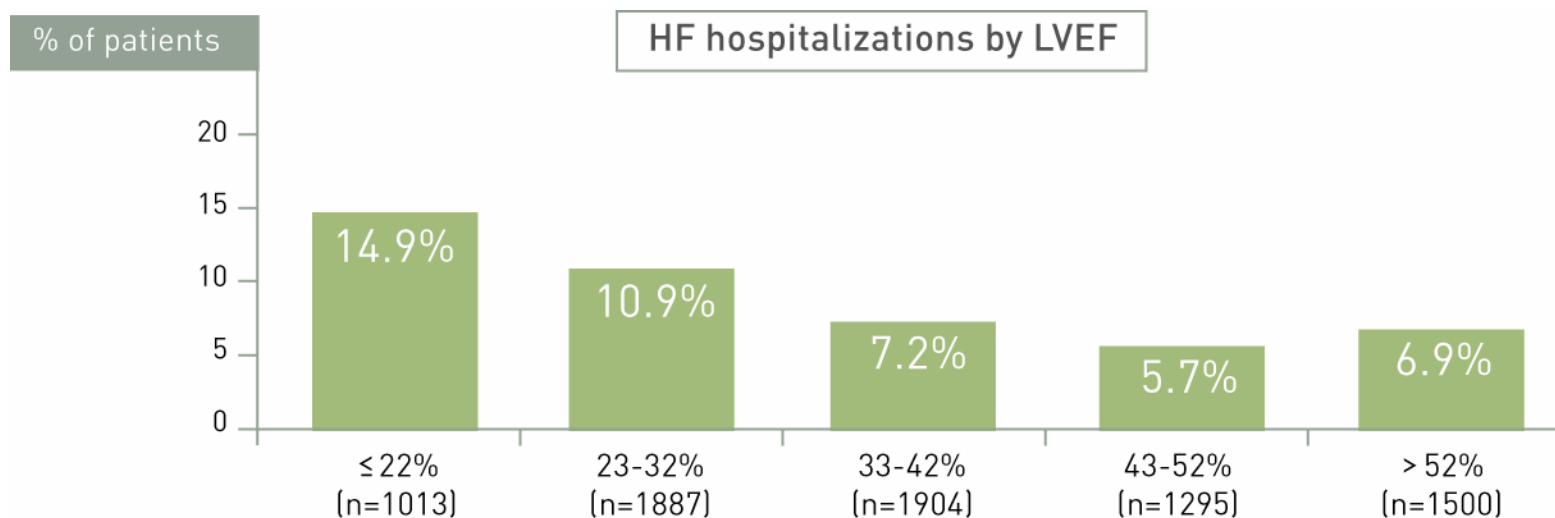
- Higher LVEF decreases the risk of death

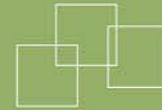




HF Hospitalizations Increase With Lower LVEF

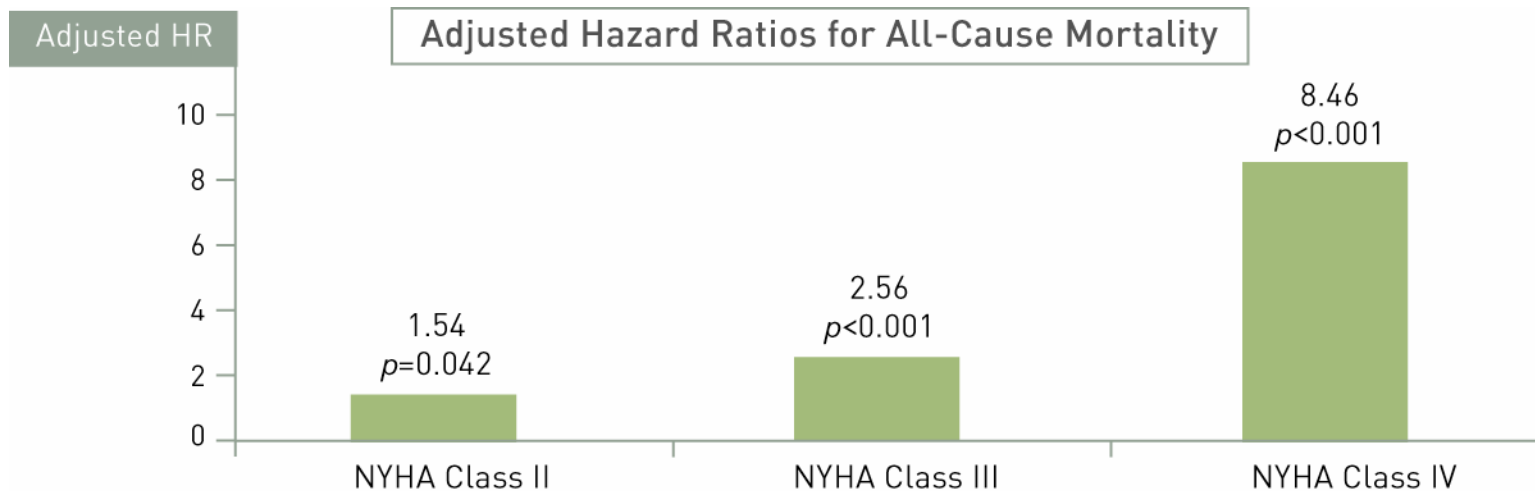
- Higher LVEF decreases the risk of HF hospitalization





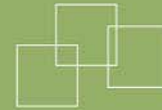
Mortality in HF Increases With Worsening NYHA Classification

- Worse NYHA classification associated with an increased risk of death



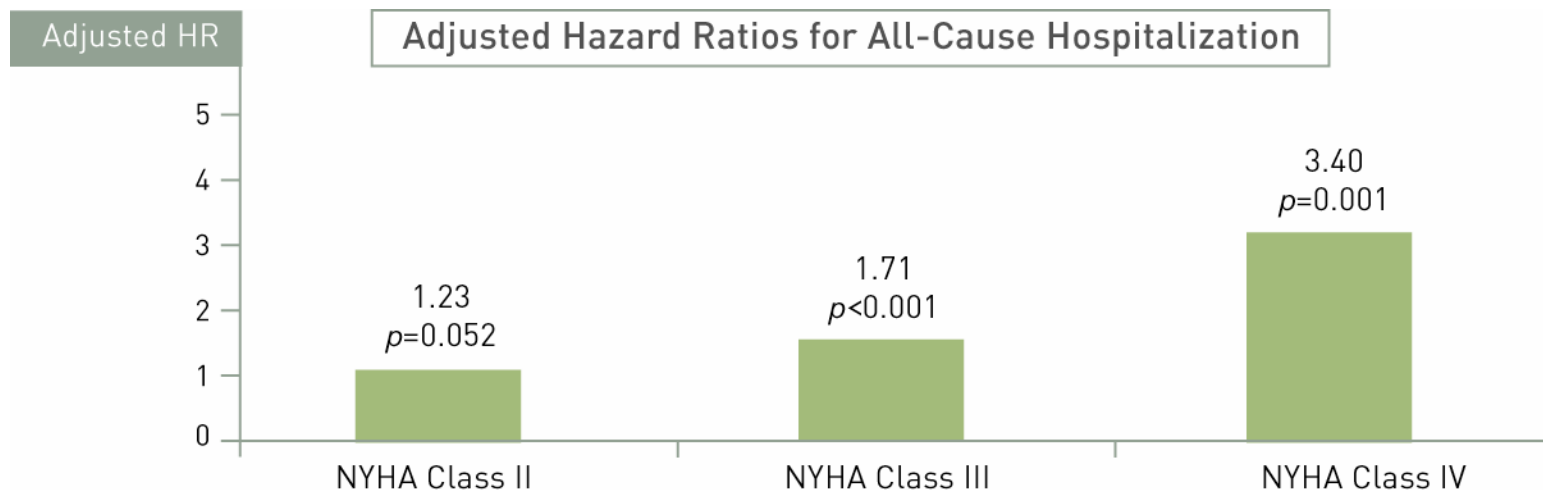
P vs Class I HF.

Data derived from DIG patients (n=988). Median follow-up of 38.5 months.
Ahmed A et al. *Am Heart J* 2006;151:444-50.



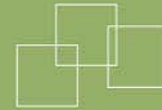
Hospitalization for HF Increases With Worsening NYHA Classification

- Worse NYHA classification associated with an increased risk of all-cause hospitalization

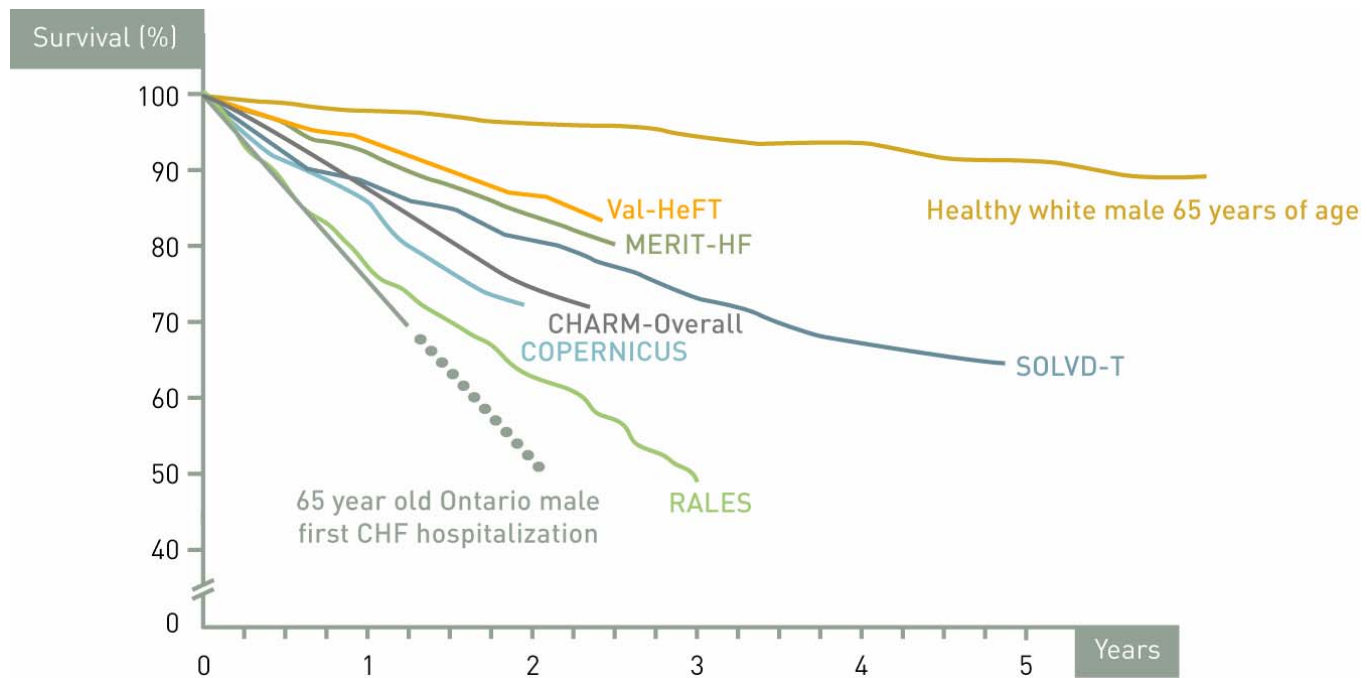


P vs Class I HF.

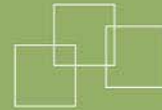
Data derived from DIG patients (n=988). Median follow-up of 38.5 months.
Ahmed A et al. *Am Heart J* 2006;151:444-50.



Comparative Survival in HF Trials (Placebo Arm)

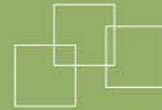


National Vital Statistics Report, 1999; Cohn JN et al. *N Engl J Med* 2001;345:1667-75; Pfeffer MA et al. *Lancet* 2003;363:759-66; MERIT-HF Study Group. *Lancet* 1999;353:2001-7; Packer M et al. *Circulation* 2002;106:2194-9; Pitt B et al. *N Engl J Med* 1999;341:709-17.



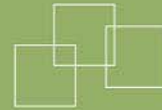
What Are CCS Consensus Conferences?

- Represent current recommendations for the prevention, diagnosis, treatment and ongoing management of heart disease
- Based upon detailed review of relevant published research and undertaken by healthcare professionals recognized for their expertise across Canada and around the world
- Useful for establishing patient care standards and serving as a balanced and trustworthy reference for Canadian healthcare professionals
- Each is developed independent of, and at arm's length from, third party interests which is considered essential to maintaining content objectivity and balance



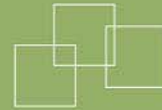
Who Are CCS Consensus Recommendations Developed For?

- Developed for Canadian healthcare professionals involved in research, teaching and, especially, day-to-day delivery of patient care
- Also available to patients and families who wish to acquaint themselves with evidence-based recommendations for patient care
- Made broadly available to constantly improve the quality of cardiovascular patient care across Canada



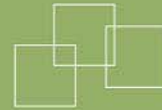
What is the CCS HF Consensus Program?

- CCS has adopted an innovative ‘closed-loop’ model of CC development which accommodates end-user and stakeholder input and evaluation on an ongoing basis
- The development processes identified will be of utility and interest to those dedicated to closing the gap ‘between what we know and what we do’
- CCS has elicited the support and active participation of 12 national health professional societies and organizations, patient support and advocacy groups, Federal, Provincial and Regional health governments, national health outcomes databases, international and national IT companies, national medical communications companies and pharmaceutical industries
- To learn more about this important initiative, please visit the CCS HF Consensus Program Website (<http://hfcc.ccs.ca>) or contact John Parker, Director Knowledge Translation (parker@ccs.ca)



Process and Purpose of New CCS HF Recommendations 2006

- First CCS recommendations were published in 1994 with updates in 2001 and 2003
- New clinical trial evidence and meta-analyses were critically reviewed by a multidisciplinary primary panel whose recommendations and practical tips were reviewed by a secondary panel
- Practical advice for specialists, family physicians, nurses, pharmacists and others involved in HF care
- Goal is to translate best evidence-based therapies into clinical practice with a measurable impact on the health of HF patients in Canada



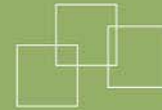
Panelists

Primary panelists:

J Malcolm O Arnold, Peter Liu, Catherine Demers, Paul Dorion, Nadia Giannetti, Haissam Haddad, George A Heckman, Jonathan G Howlett, Andrew Ignaszewski, David E Johnstone, Philip Jong, Robert S McKelvie, Gordon W Moe, John D Parker, Vivek Rao, Heather J Ross, Errol J Sequeira, Anna M Svendsen, Koon Teo, Ross T Tsuyuki, Michel White

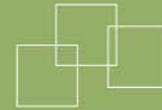
Secondary panelists:

Tom Ashton, Victor Huckell, Debra Isaac, Marie-Helene Leblanc, Gary E Newton, Joel Niznick, Sherryn N Roth, Denis Roy, Stuart Smith, Bruce A Sussex, Salim Yusuf



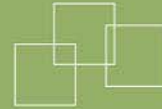
Class of Recommendation and Grade of Evidence

Class I	Evidence or general agreement that a given procedure or treatment is beneficial, useful and effective.
Class II	Conflicting evidence or a divergence of opinion about the usefulness or efficacy of a procedure or treatment.
Class IIa	Weight of evidence in favour of usefulness or efficacy.
Class IIb	Usefulness or efficacy is less well established by evidence or opinion.
Class III	Evidence or general agreement that the procedure or treatment is not useful or effective and in some cases may be harmful.



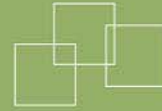
Class of Recommendation and Grade of Evidence

Level of Evidence A	Data derived from multiple randomized trials or meta-analyses
Level of Evidence B	Data derived from a single randomized clinical trial or nonrandomized studies
Level of Evidence C	Consensus of opinion of experts and/or small studies



Key Recommendations

- Management of HF begins with an accurate diagnosis
- Aggressive treatment of all known risk factors (e.g. hypertension, DM)
- Treatment requires rational combination drug therapy
- Care should be individualized for each patient based on:
 - Symptoms
 - Clinical presentation
 - Disease severity
 - Underlying cause
- Patient and caregiver education should be tailored and repeated
- Mechanical interventions (e.g. revasc. and devices) should be available
- Collaboration is required among healthcare professionals
- Accessibility to primary, emergency and specialist care must be timely

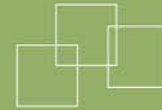


Diagnosis and Investigation



- Clinical history, physical examination and laboratory testing
- Transthoracic echocardiography (ventricular size and function, valves, etc.)
- Coronary angiography in patients with known/suspected CAD
- NYHA classification should be used to document functional capacity in all patients

(Class I, Level C)

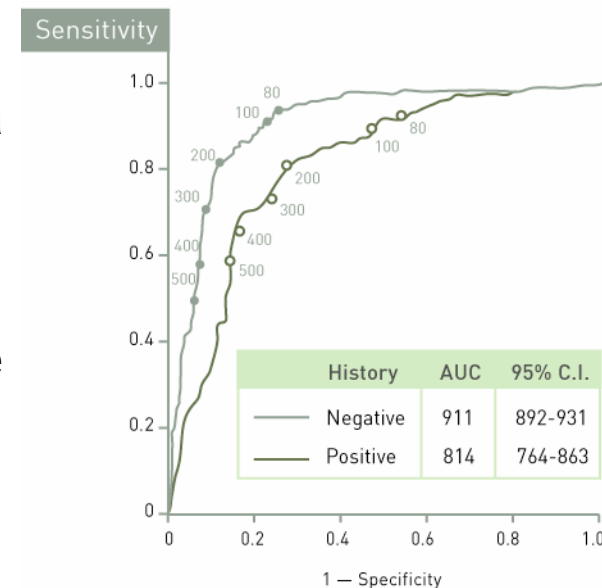


What is BNP and How Does It Help?

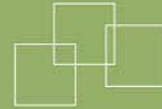
- B-type natriuretic peptide (BNP) is a 32-amino-acid polypeptide secreted by the ventricles of the heart in response to excessive stretch of ventricular myocytes
- Elevated blood levels of BNP are used as a diagnostic test for heart failure
- Measurement of blood levels of BNP or the amino terminal fragment of pro-BNP (NT-pro-BNP) should be considered, where available, in patients with suspected heart failure when clinical uncertainty exists

(Class I, Level C)

BNP Trial — ROC curves for BNP predicting diagnosis of CHF in patients with or without CHF history

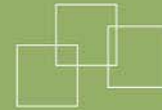


Strunk A et al. *Am J Med* 2006;119:69:e1-11.



Practical Tips in HF Diagnosis

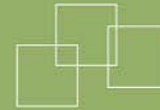
- HF can be diagnosed without a history or current evidence of volume overload. Thus, the term ‘heart failure’ is generally preferred over ‘congestive heart failure’
- A normal LVEF does not exclude HF as a diagnosis (e.g., HF with preserved systolic function – PSF)



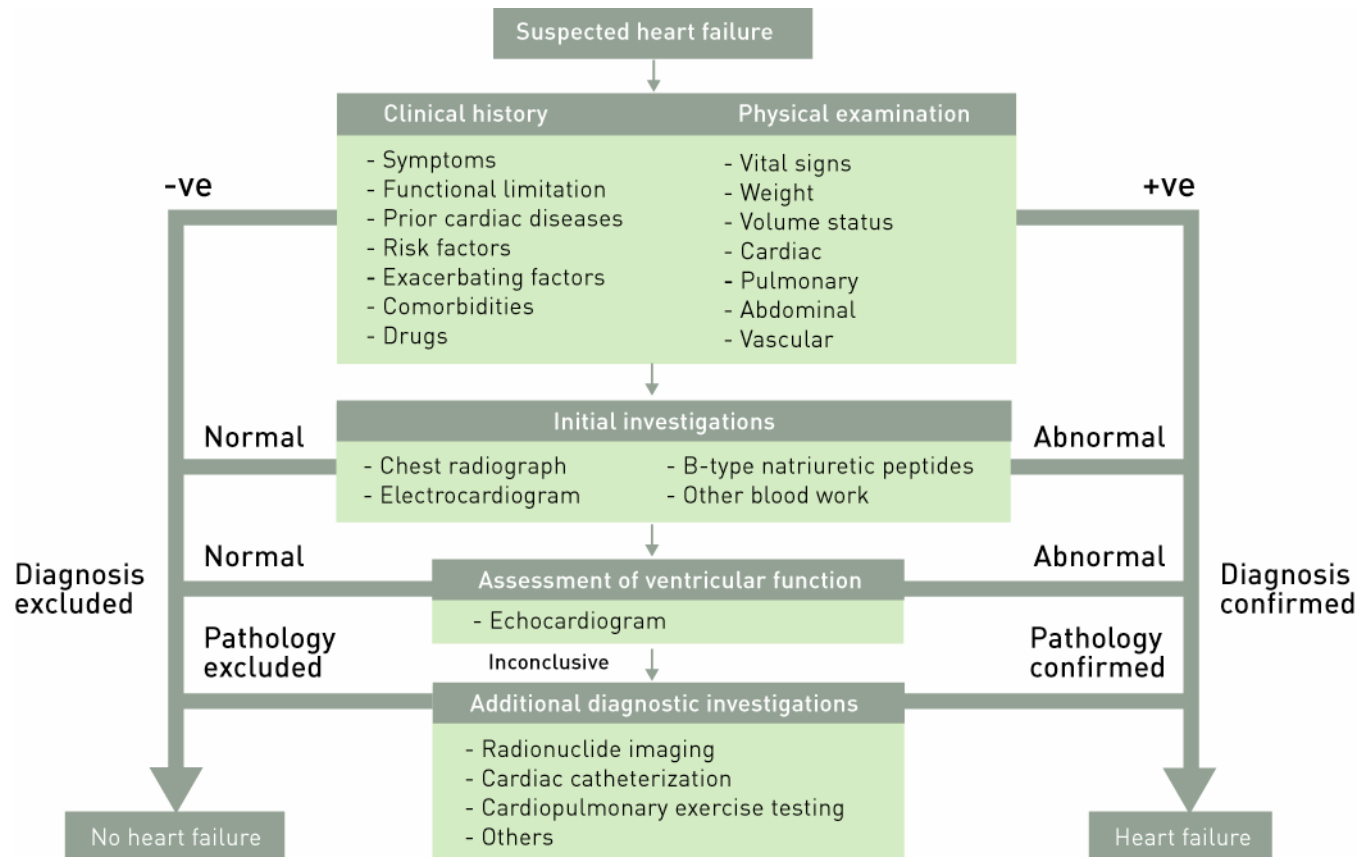
Clinical Presentations of Heart Failure

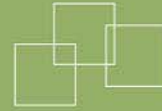
Common	Less Common
Dyspnea	Cognitive impairment*
Orthopnea	Altered mentation or delirium*
Paroxysmal nocturnal dyspnea	Nausea
Fatigue	Abdominal discomfort
Weakness	Oliguria
Exercise intolerance	Anorexia
Dependent edema	Cyanosis
Cough	
Weight gain	
Abdominal distension	
Nocturia	
Cool extremities	

* May be more common presentation in elderly patients.



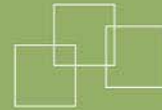
Diagnosis of HF





Causes of Heart Failure

- Coronary artery disease
- Myocardial infarction
- Hypertension
- Diabetes
- Valvular heart disease
- Dilated or hypertrophic cardiomyopathy, myocarditis
- Congenital heart disease
- Severe lung disease

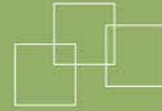


Risk Factors for HF



- Cardiovascular risk factors should be aggressively managed with appropriate drugs and lifestyle modifications to targets identified in current disease-specific national guidelines

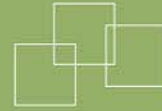
(Class I, Level A)



What Should I Look For and Talk About?



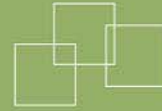
- Talk to patients about their priorities
- Identify specific targets for therapy
- Look for, and treat, depression
- Discuss advance directives, living wills and substitute decision-makers
- Follow patients closely and systematically



What Should I Look For and Talk About?



- Educate about early warning signs of decompensation and how to respond
- Discuss salt and fluid intake
- Use daily morning weights with a diary and tailored prn diuretic dosing
- Measure supine and erect BP
- Follow creatinine and K^+ closely
- Eliminate harmful drugs



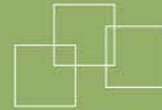
Non-Pharmacological Management



- Regular physical activity is recommended for all patients with stable symptoms and impaired LV systolic function
- Before starting a training program, all patients should have a graded exercise stress test to assess functional capacity, ischemia, and optimal heart rate

(Class IIa, Level B)



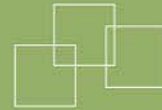


Non-Pharmacological Management



- All patients with symptomatic HF should not add salt to their diet and patients with advanced HF should reduce salt to <2 g/day
- Daily morning weight should be monitored in HF patients with fluid retention or congestion not easily controlled with diuretics, or with significant renal dysfunction or hyponatremia

(Class I, Level C)

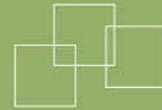


Non-Pharmacological Management



- Restriction of daily fluid intake to 1.5-2 L/day should be considered for patients with fluid retention or congestion not easily controlled with diuretics, or in patients with severe renal dysfunction or hyponatremia
(Class I, Level C)

- Forced fluid intake beyond normal needs to prevent thirst is *not* recommended
(Class III, Level C)

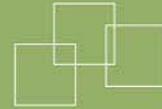


Immunization



- Physicians should immunize HF patients against influenza (annually) and pneumococcal pneumonia (if not done in last six years) to reduce the risk of respiratory infections that may seriously aggravate HF

(Class I, Level C)

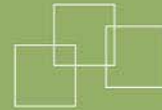


Which Patients Should be Referred to a Heart Failure Specialist?



- New onset HF
- Recent HF hospitalization
- HF associated with ischemia, hypertension, valvular disease, syncope, renal dysfunction, other multiple comorbidities
- HF of unknown etiology
- Intolerance to recommended drug therapies
- Poor compliance with treatment
- First degree family members if family history of cardiomyopathy or sudden cardiac death

(Class I, Level C)



HF Disease Management Programs

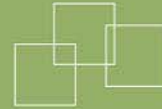


- Specialized hospital-based clinics or disease management programs, staffed by physicians, nurses, pharmacists and other healthcare professionals with expertise in HF management should be developed and used for assessment and management of higher risk patients with HF

(Class I, Level A)

- The optimal care model should reflect local circumstances, present resources, and available healthcare personnel

(Class I, Level C)



Follow-up: How soon?

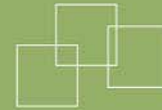


- Patients with recurrent HF hospitalizations should be referred to a specialized HF clinic by family physicians, internists, and cardiologists for follow-up within 4 weeks of hospital discharge, or sooner when feasible

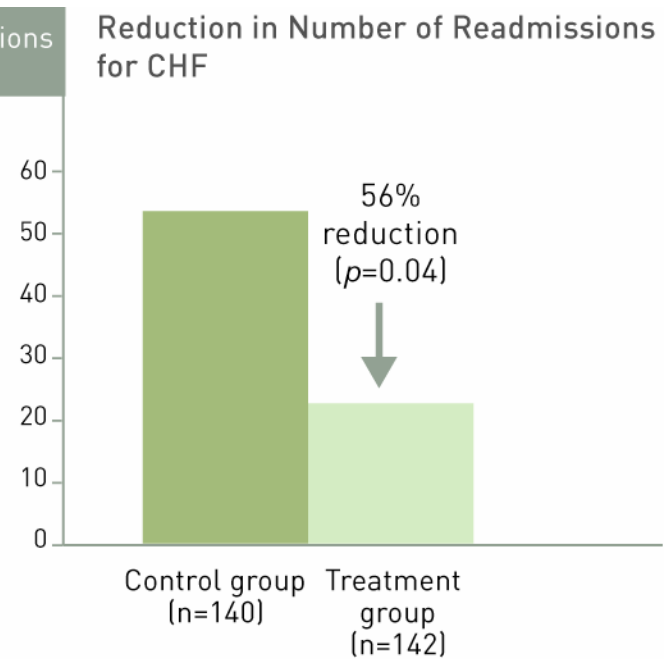
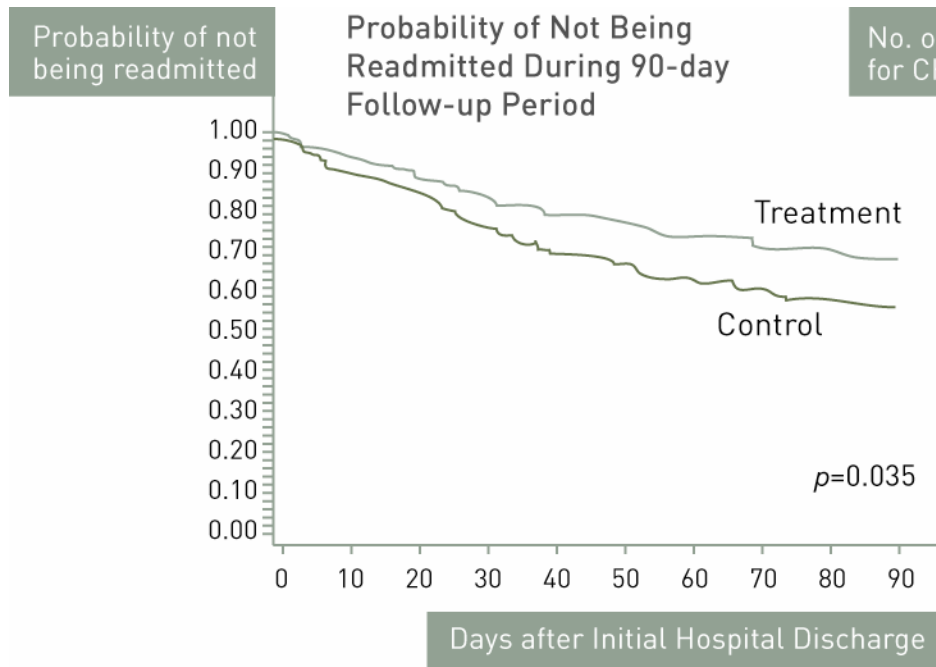
(Class I, Level A)

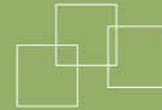
- Care should include close follow-up, patient and caregiver education, telemanagement or monitoring, and home visits by specialized staff where resources are available

(Class I, Level A)



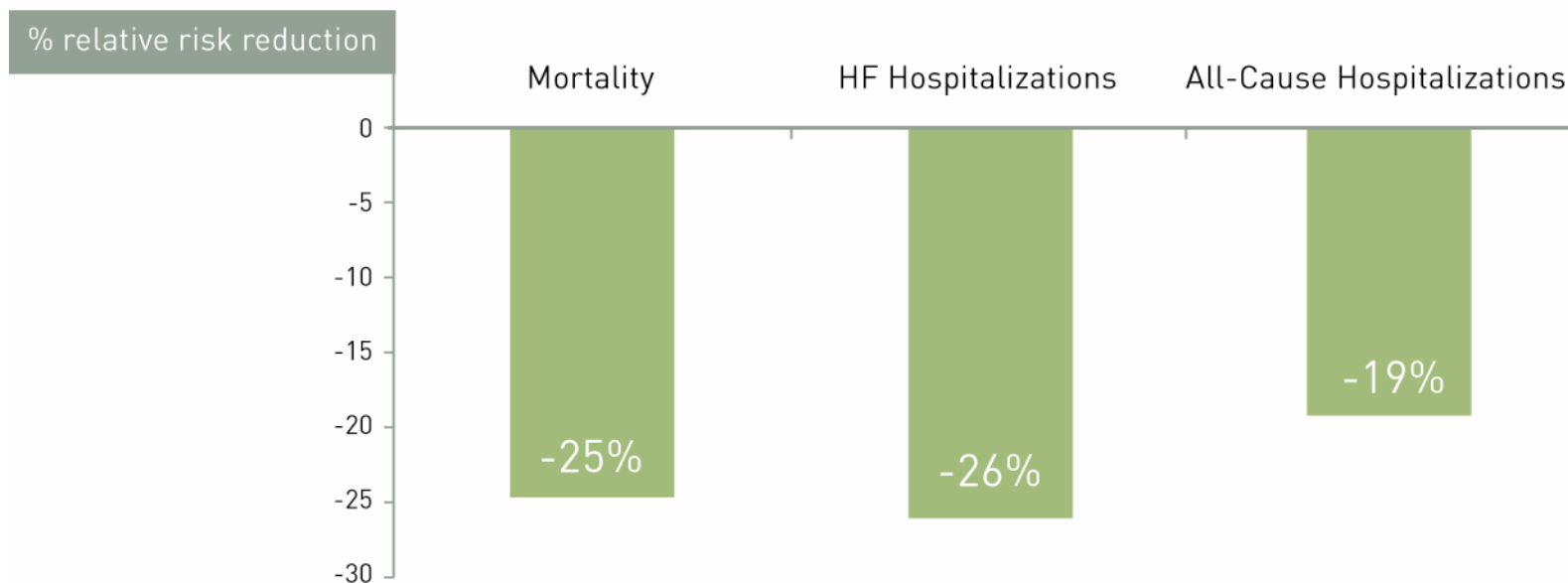
Multidisciplinary Interventions – Mortality and Hospitalization Benefits



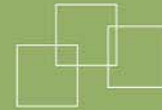


Multidisciplinary HF Management – Meta-Analysis

Relative Risk Reductions Achieved With Multidisciplinary Teams

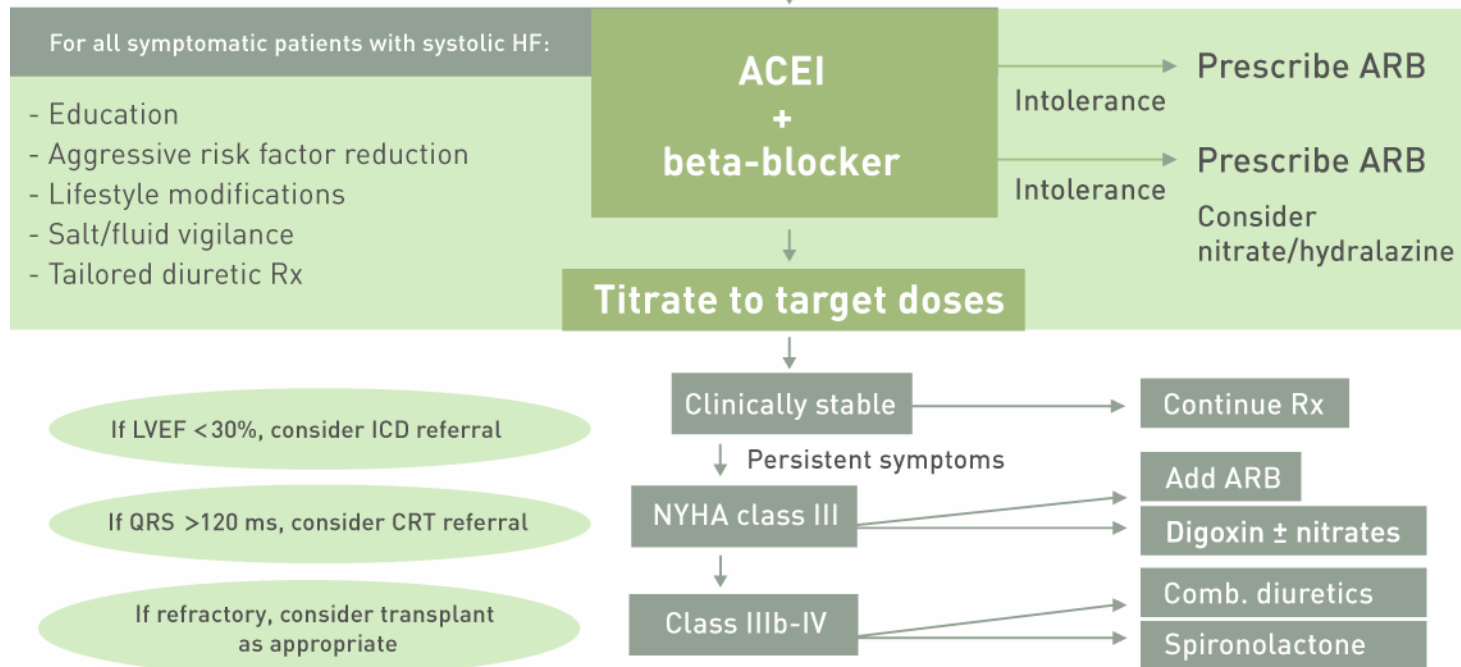


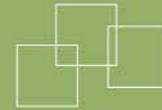
Duration of interventions in the pooled studies ranged from one visit to 30 months.



Treatment of Heart Failure

If symptoms severe, refer to specialist: acute to ER, chronic to HF clinic
 If HF symptoms but LVEF >40%, treat cause (eg, hypertension, ischemia).
 If systolic HF LVEF <40%:





Principles of Drug Therapy

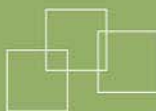
- Drugs proven in large-scale clinical trials are recommended as they have known effective target doses

(Class I, Level A)

- Large-scale clinical trial doses should be used, or a lesser but maximum tolerated dose (see table on next slide)

(Class I, Level A)

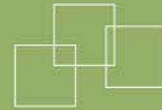
ACE-I HF
CONSENSUS I SOLVD V-HeFT II
ACE-I Post MI
SAVE AIRE TRACE
BB HF
COPERNICUS MERIT-HF CIBIS-2
ARB HF, Post MI
Val-HeFT CHARM VALIANT



What Dosages of Drugs Should Be Used?

Drug	Start dose	Target dose
ACE inhibitor		
Captopril	6.25 mg to 12.5 mg tid	25 mg to 50 mg tid
Enalapril	1.25 mg to 2.5 mg bid	10 mg bid
Ramipril	1.25 mg to 2.5 mg bid	5 mg bid*
Lisinopril	2.5 mg to 5 mg od	20 mg to 35 mg od
Beta-blocker		
Bisoprolol	1.25 mg od	10 mg od
Carvedilol	3.125 mg bid	25 mg bid
Metoprolol CR/XL [†]	12.5 mg to 25 mg od	200 mg od
ARB		
Candesartan	4 mg od	32 mg od
Valsartan	40 mg bid	160 mg bid
Aldosterone antagonist		
Spironolactone	12.5 mg od	50 mg od
Eplerenone [†]	25 mg od	50 mg od
Vasodilator		
Isosorbide dinitrate	20 mg tid	40 mg tid
Hydralazine	37.5 mg tid	75 mg tid

* The Healing and Early Afterload Reduced Therapy (HEART) trial showed that 10 mg od was effective for attenuating left ventricular remodeling. † Not available in Canada.



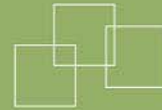
Principles of Drug Therapy

- If a drug with proven mortality or morbidity benefits is not tolerated (e.g., low BP, low heart rate, or renal dysfunction), concomitant drugs with less proven benefit should be carefully re-evaluated to determine if their dose can be reduced or the drug discontinued to allow better tolerance of the proven drug

(Class I, Level B)

- Contraindications to the use of a drug in an individual patient should be carefully evaluated before prescribing and emergent new signs or symptoms should be assessed to determine whether they could be side-effects related to the drug

(Class I, Level C)



Where to Start?

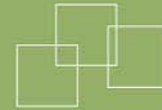


- Evidence-based *combination* drug therapy is recommended in most patients with HF

(Class I, Level A)

- All HF patients with LVEF <40% should be treated with an ACE-I and a beta-blocker, unless a specific contraindication exists

(Class I, Level A)



When to Use ACE Inhibitors?

- All HF patients with LVEF <40% should be treated with an **ACE-I** and a beta-blocker, unless a specific contraindication exists (Class I, Level A)

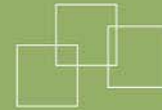


CONSENSUS Trial . *N Engl J Med* 1987;316:1429-35.

SOLVD Investigators. *N Engl J Med* 1991;325:293-302.

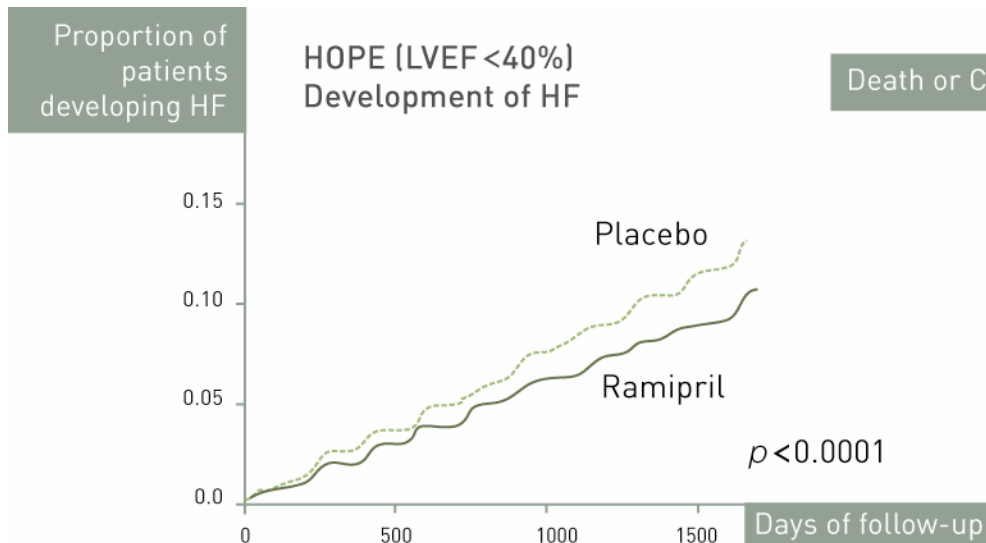
Flather MD et al. *Lancet* 2000;355:1575-81.

These trials form the basis of ACE-I use in HF with LVEF < 40% and/or post-MI with reduced LVEF and/or HF

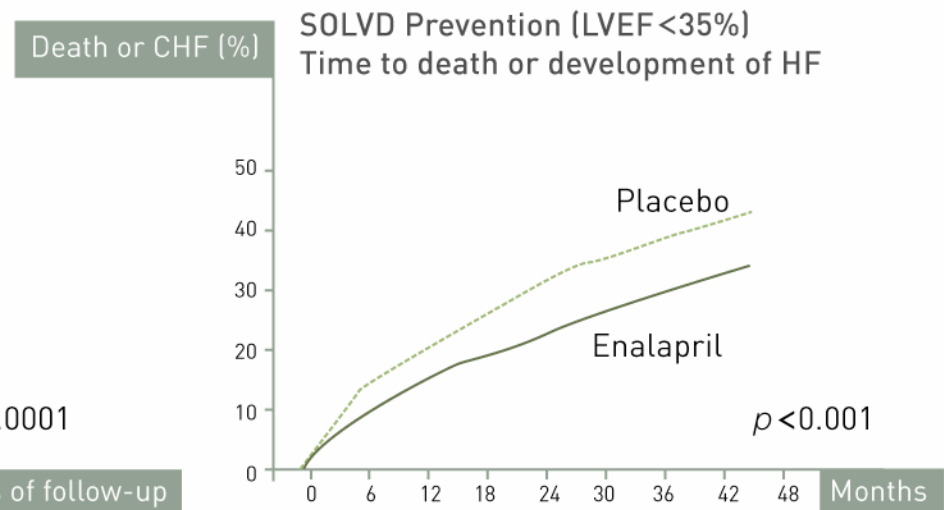


When to Use ACE Inhibitors?

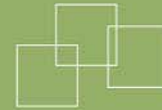
- ACE-Is prevent occurrence of HF in patients at risk



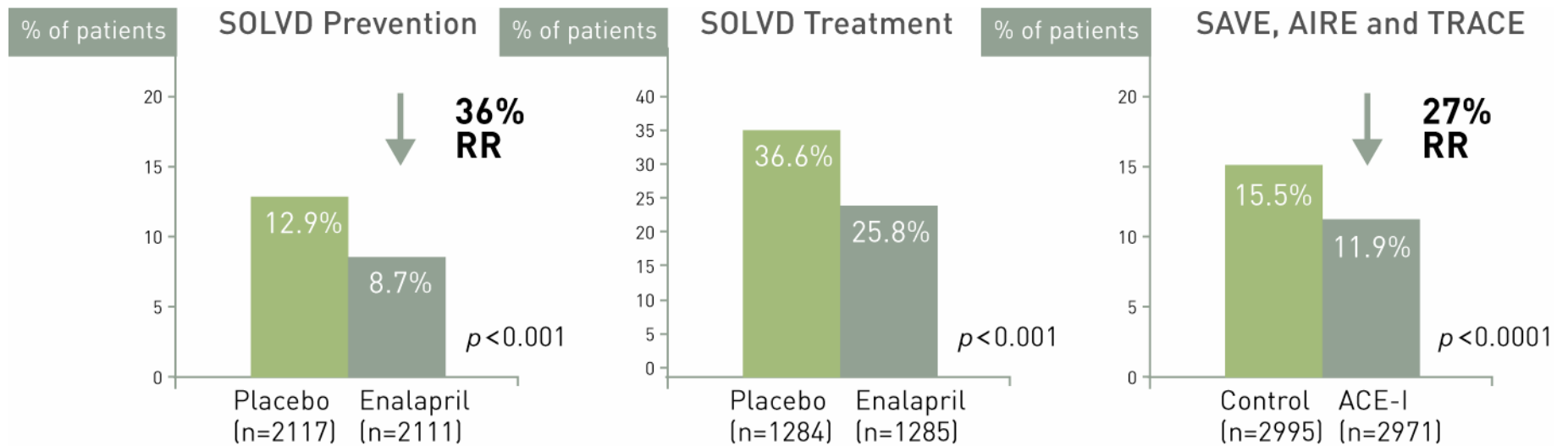
Arnold JMO et al. *Circulation* 2003;107:1284-90.



SOLVD Investigators. *N Engl J Med* 1992;327:685-91.



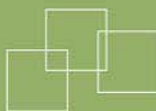
ACE Inhibitors – Reductions in HF Hospitalizations



SOLVD Investigators. *N Engl J Med* 1991;325:293-302.

SOLVD Investigators. *N Engl J Med* 1992;327:685-91.

Flather MD et al. *Lancet* 2000;355:1575-81.



Extension Studies Show Sustained Benefits with ACE Inhibitors

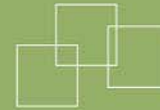
	AIRE-X 1997	CONSENSUS 1999	X-SOLVD 2003	HOPE-TOO 2005
Treatment	Ramipril	Enalapril	Enalapril	Ramipril
Follow-up	5-10 years	10 yrs	12 yrs	7.2 yrs
Characteristic	Clinical HF, post-MI	NYHA class IV HF	HF, LV dysfunction	High CV risk, no LV dysfunction, no HF
Results	RRR 36% in mortality	Overall survival prolonged by 50%	Extended survival by 9.4 mo	Reduced major CV events and new diabetes
Summary	Substantial long-term mortality reduction with ACE-I treatment post-MI	Beneficial effect maintained for at least 4 years	Sustained improvement in survival	Sustained CV and metabolic benefit in vascular disease patients without HF or LV dysfunction

Hall AS et al. *Lancet* 1997;349:1493-7.

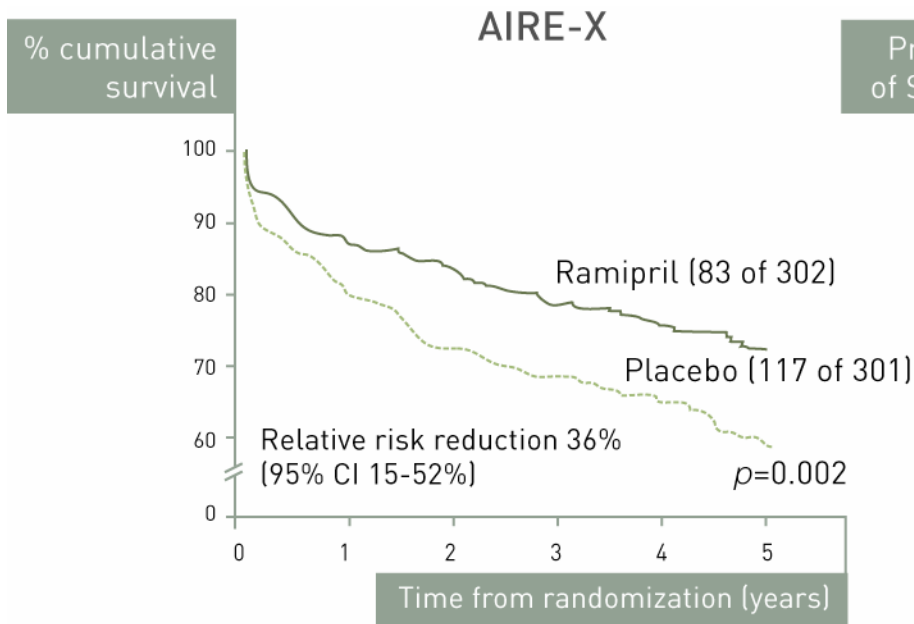
Swedberg K et al. *Eur Heart J* 1999;20:136-9.

Jong P et al. *Lancet* 2003;361:1843-8.

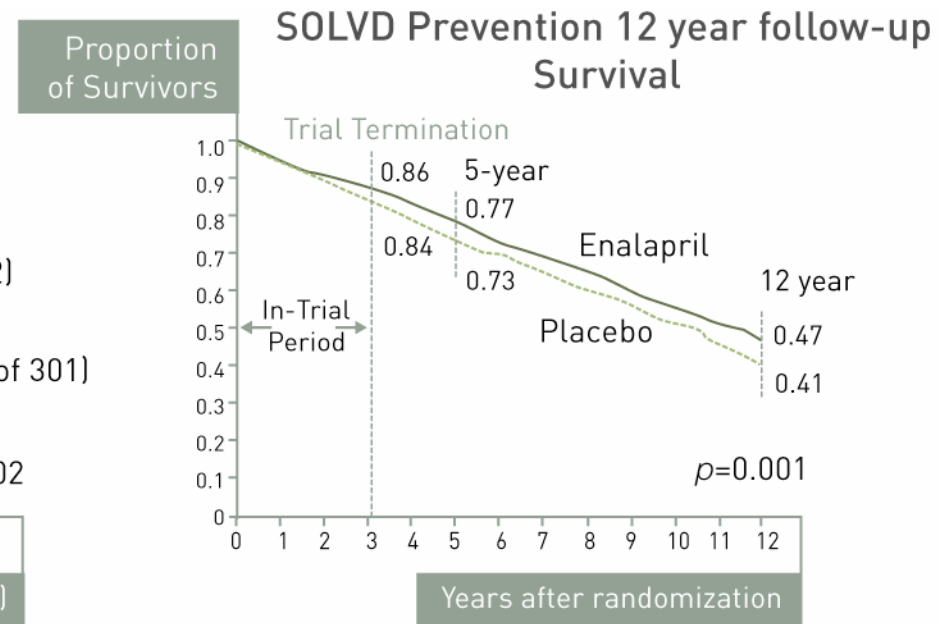
HOPE/HOPE-TOO Study Investigators. *Circulation* 2005;112:1339-46.



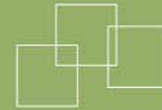
ACE Inhibitors – Long-Term Mortality Benefits



Hall AS et al. *Lancet* 1997;349:1493-7.

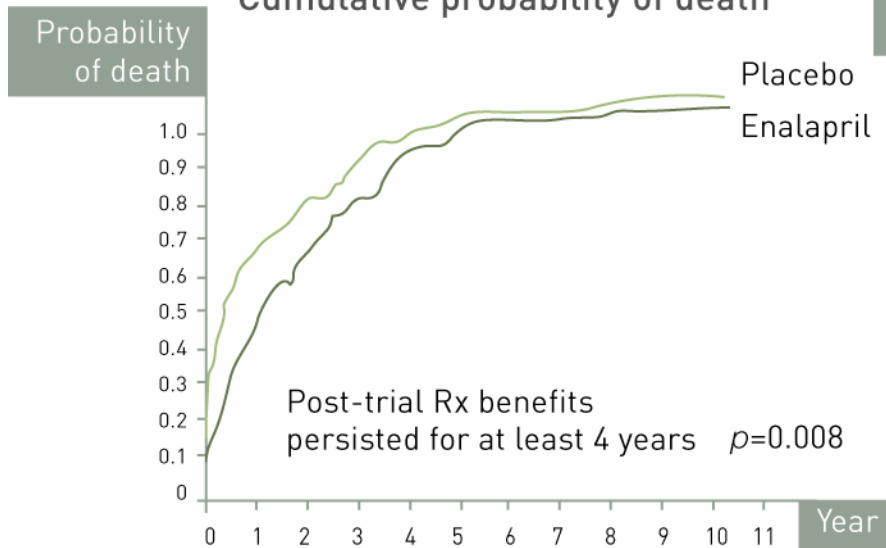


Jong P et al. *Lancet* 2003;361:1843-8.



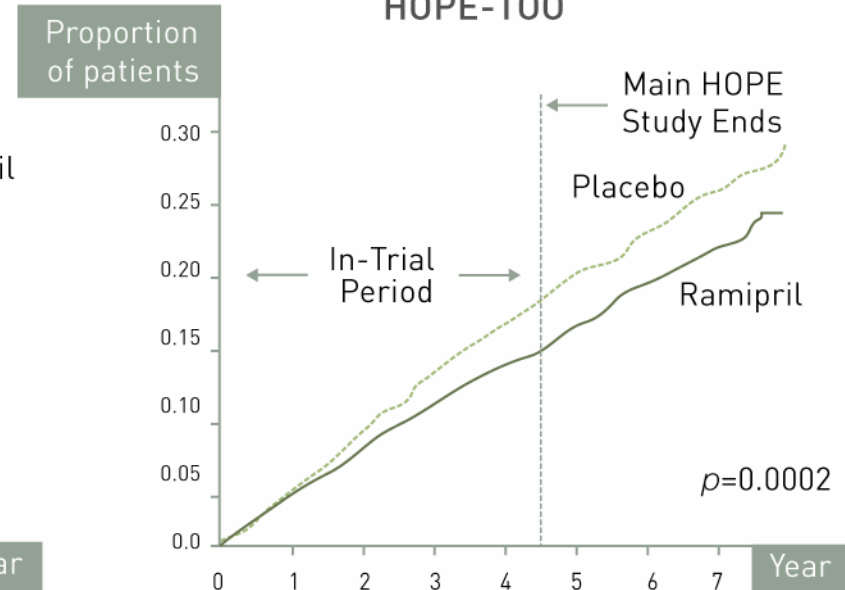
ACE Inhibitors – Long-Term Mortality Benefits

CONSENSUS 10-year follow-up — Cumulative probability of death

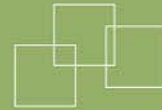


Swedberg K et al. *Eur Heart J* 1999;20:136-9.

HOPE-TOO

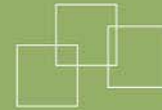


HOPE/HOPE-TOO Study Investigators. *Circulation* 2005;112:1339-46.



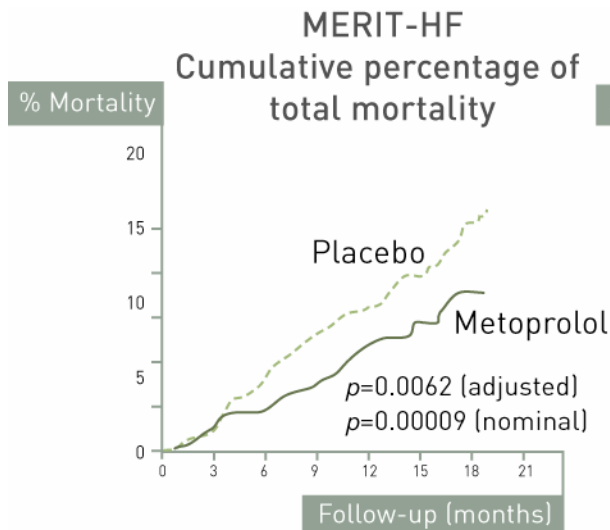
Practical Tips for ACE-I/ARB Use

- Check supine and erect BP for symptomatic hypotension
- If symptomatic hypotension persists, separate timing of dose from other medications that could also lower BP
- Reduce dose of diuretic if patient stable and reassess need for other vasodilators (e.g., long-acting nitrates)
- An increase in creatinine of up to 30% is not unexpected after introduction of an ACE-I/ARB
- Adding spironolactone to an ACE-I plus an ARB is discouraged, unless followed closely in a specialist HF clinic

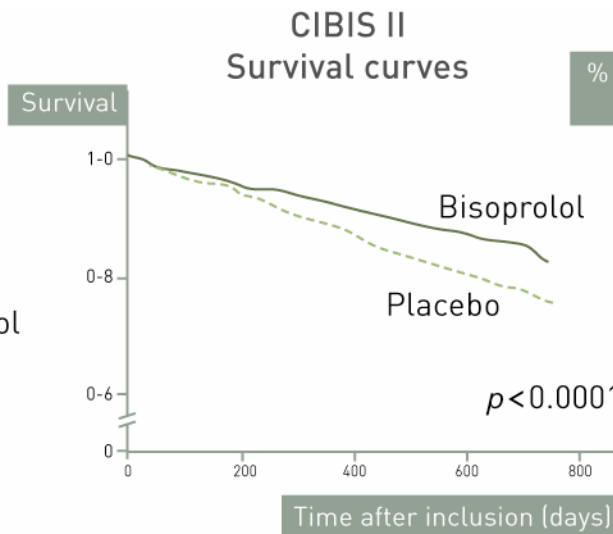


When to Use Beta-blockers?

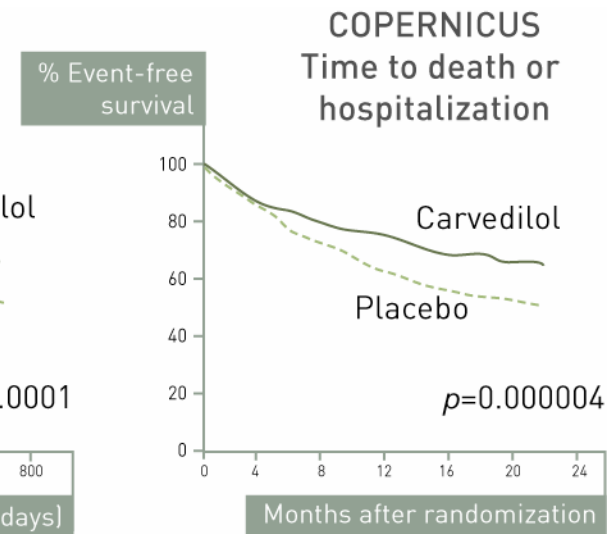
- All HF patients with LVEF $\leq 40\%$ (use clinically proven beta-blocker) **(Class I, Level A)**
- In stabilized HF patients with NYHA Class IV symptoms **(Class I, Level C)**



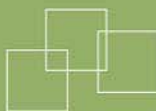
MERIT-HF Study Group. *Lancet* 1999;353:2001-7.



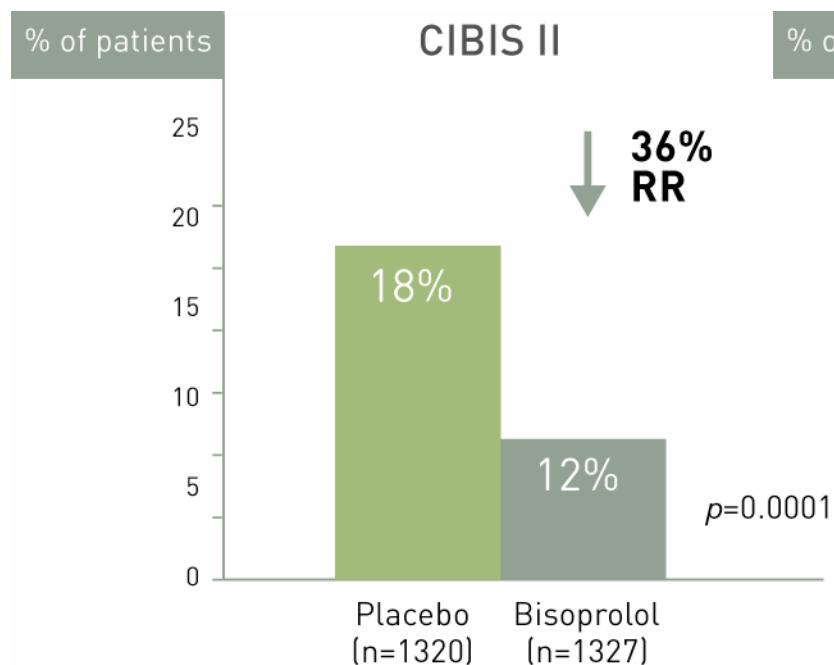
CIBIS II Investigators. *Lancet* 1999;353:9-13.



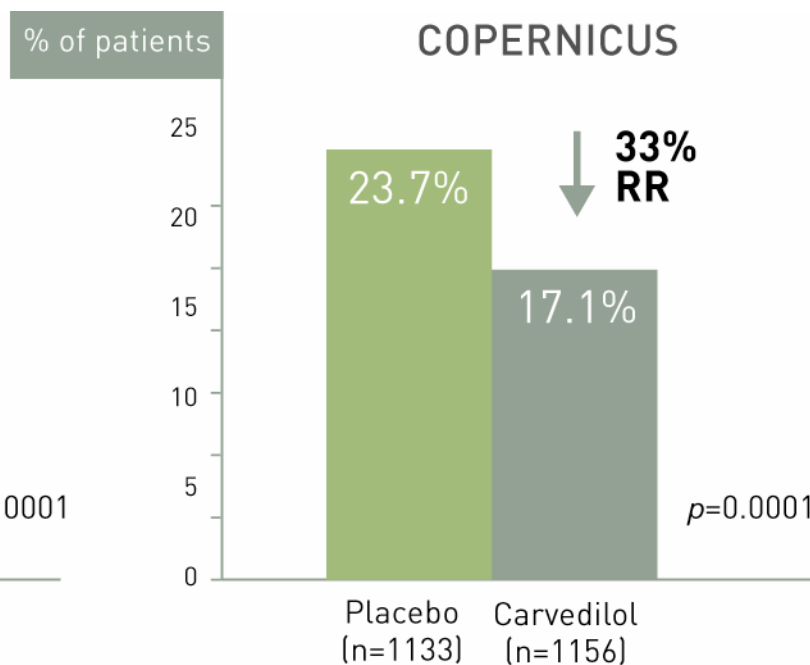
Packer M et al. *Circulation* 2002;106:2194-9.



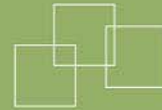
Beta-blockers – Reductions in HF Hospitalizations



CIBIS II Investigators and Committee. *Lancet* 1999;353:9-13.

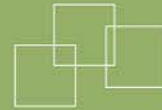


Packer M et al. *Circulation* 2002;106:2194-9.



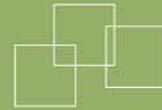
Practical Tips for BB Use

- Non-specialist physicians can safely initiate and titrate BB in NYHA Class I or II patients
- Dose of BB should be increased slowly, e.g., double dose every 2-4 weeks if stable
- If reactive airways disease is present, use more selective BB, e.g., bisoprolol
- If bradycardia or AV block is present, reduce or stop digoxin or amiodarone (where appropriate)
- If hypotensive, consider reducing other medications or change timing of doses



Practical Tips for BB Use

- Objective improvement in LV function may not be apparent for 6-12 months or longer
- Major reduction of BB dose or abrupt withdrawal should generally be avoided
- In acute decompensated HF, BB dose down-titration may be required (including those on beta-agonist +ve inotrope support), but not necessarily discontinued unless patient is in cardiogenic shock
- BB should be considered in patients where it has often been underutilized, e.g., the elderly and those with asymptomatic LV dysfunction

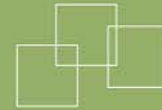


Combination Use of ACE-Is plus BBs

- All HF patients with LVEF <40% should be treated with an ACE-I and a beta-blocker, unless a specific contraindication exists

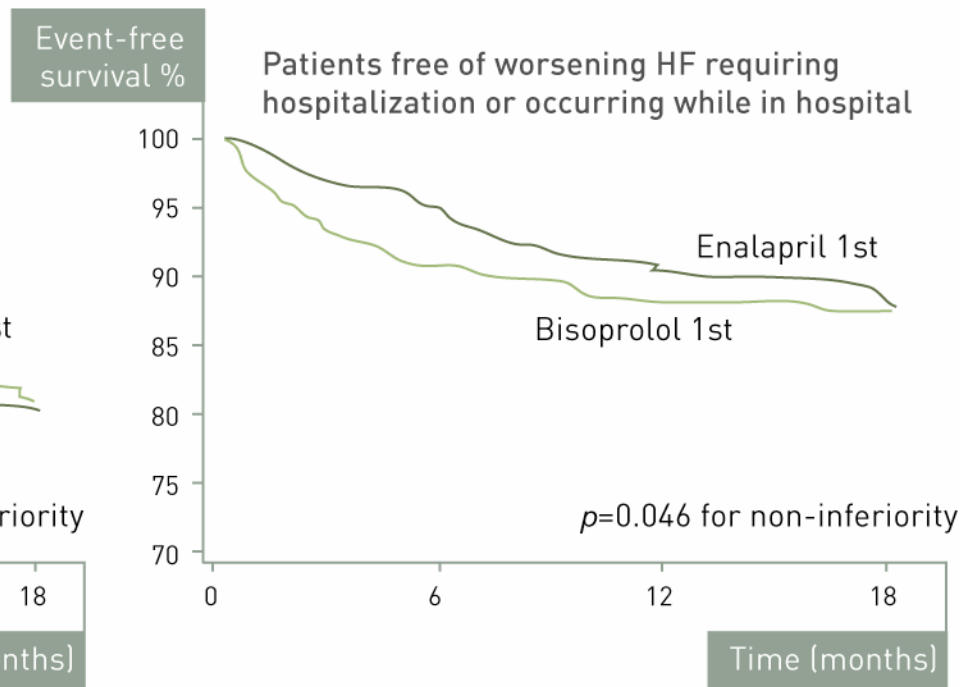
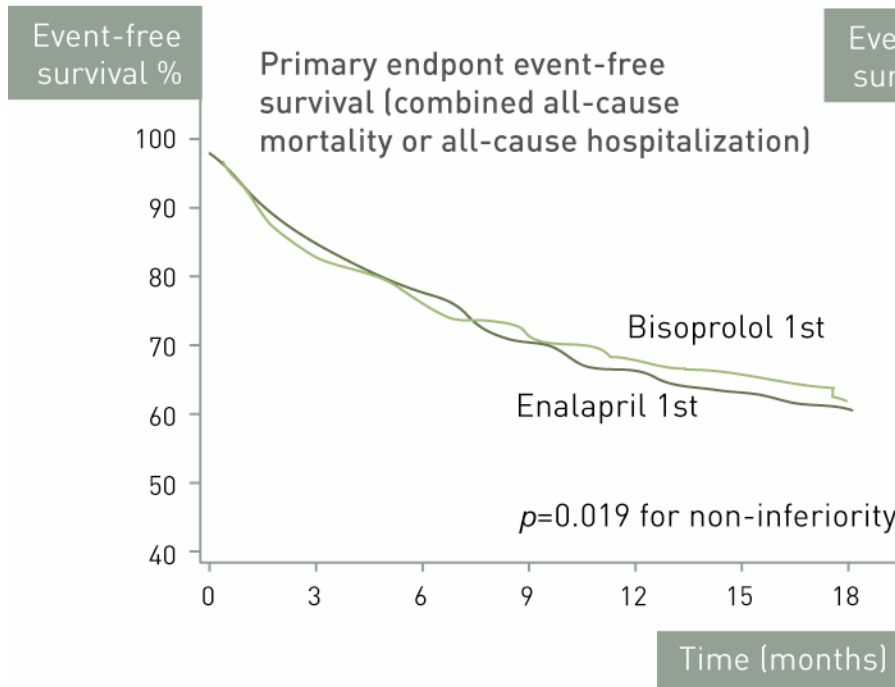
(Class I, Level A)

- All major BB HF trials recommended ACE-I therapy as background therapy
- It is recommended to initiate ACE-I first, although CIBIS III showed that initiating therapy with BB alone might also be appropriate

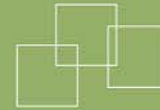


Combination Use of ACE-Is plus BBs

CIBIS III (ITT Analysis)

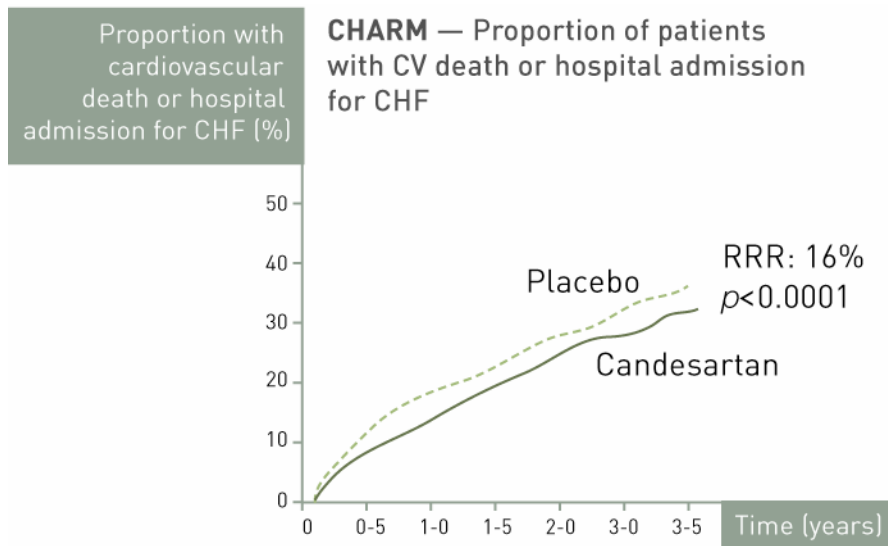


61 Willenheimer R et al. *Circulation* 2005;112:2426-35.
Arnold JMO, Liu P et al. *Can J Cardiol* 2006;22(1):23-45.

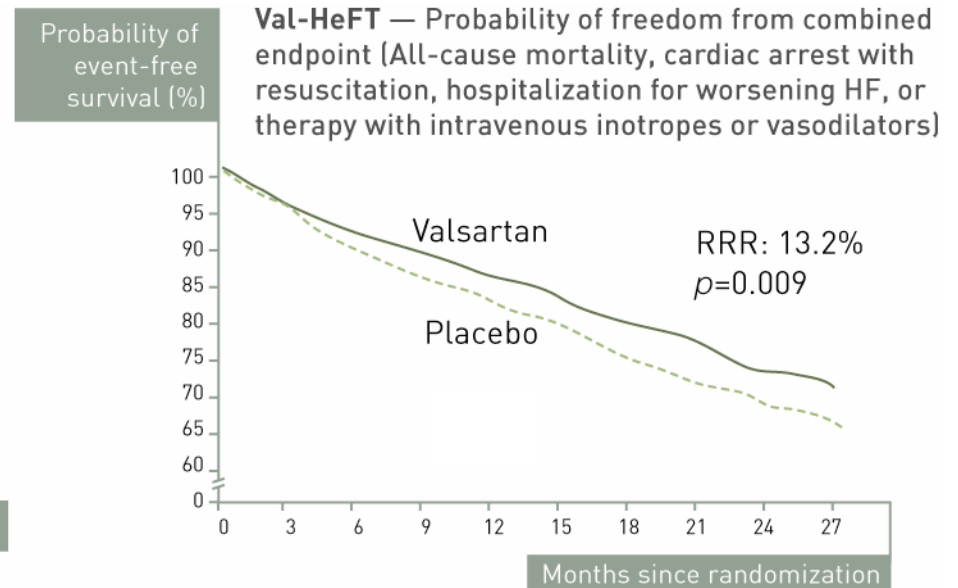


When to Use ARBs as Add-on Therapy?

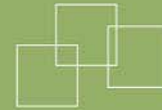
- In patients with persistent HF symptoms, and who are at increased risk of HF hospitalization, despite optimal treatment with ACE inhibitors and beta-blockers (Class I, Level A)



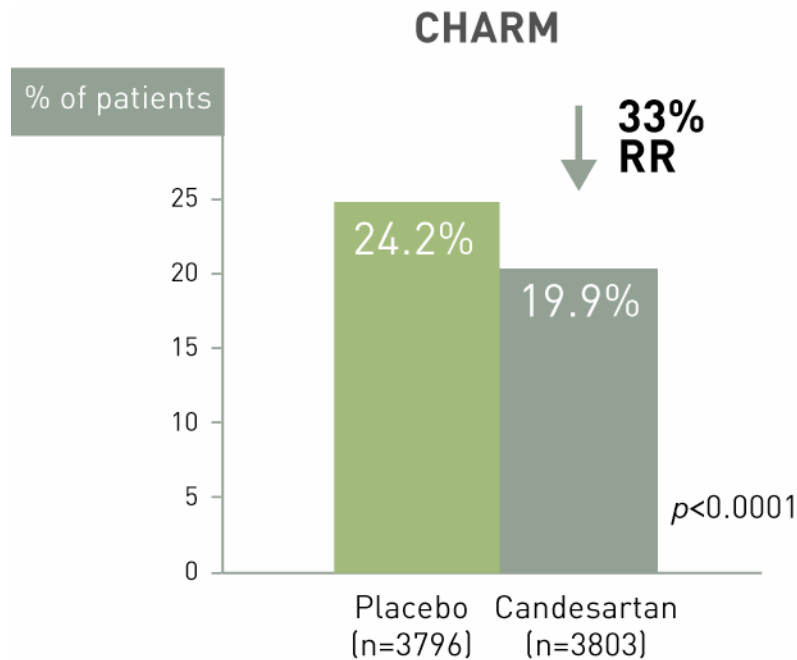
Pfeffer MA et al. *Lancet* 2003;363:759-66.



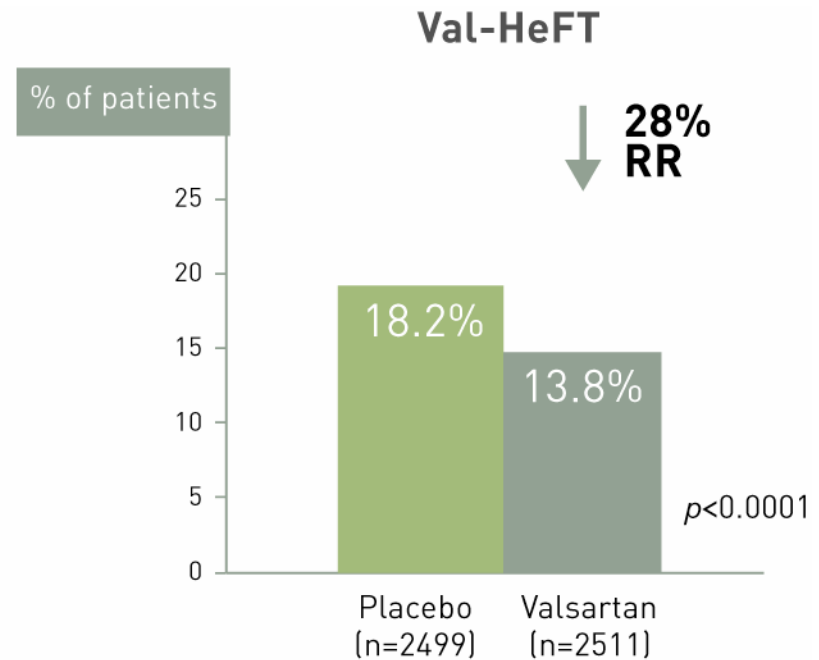
Cohn JN et al. *N Engl J Med* 2001;345:1667-75.



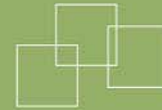
ARBs - Reductions in HF Hospitalizations



Pfeffer MA et al. *Lancet* 2003;363:759-66.



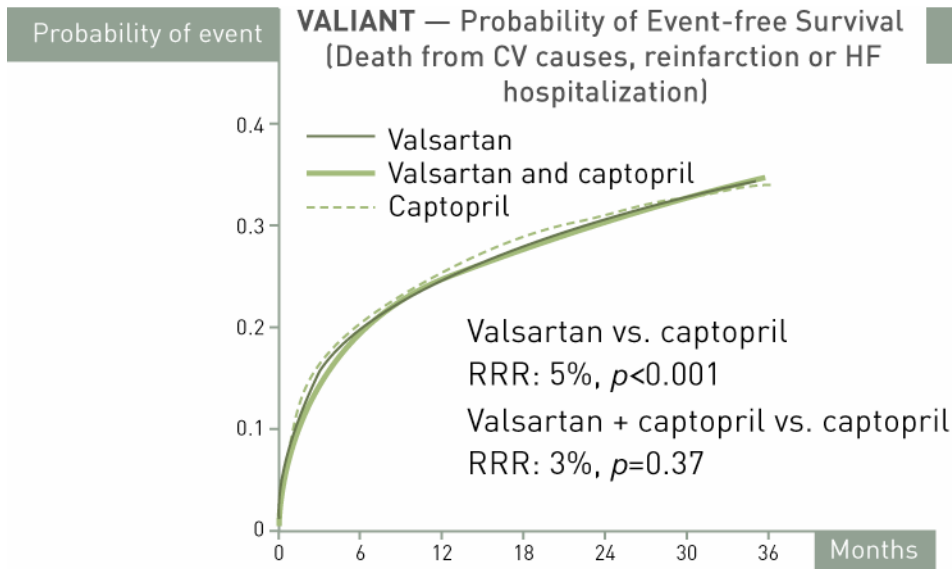
Cohn JN et al. *N Engl J Med* 2001;345:1667-75.



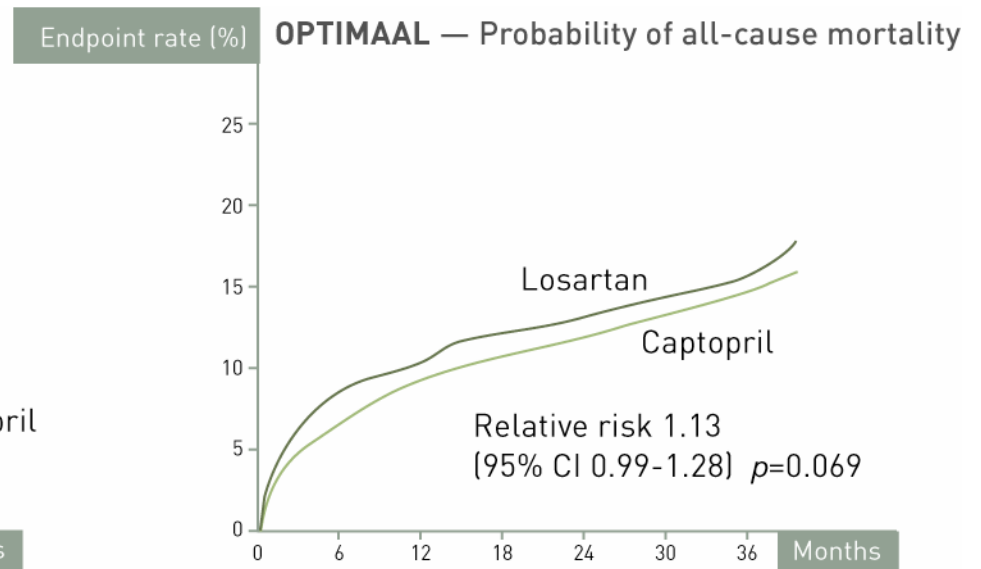
When to Use ARBs instead of ACE-I?

- May be considered as an alternative to an ACE inhibitor in patients with acute MI with acute HF or LVEF <40%

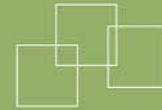
(Class I, Level B)



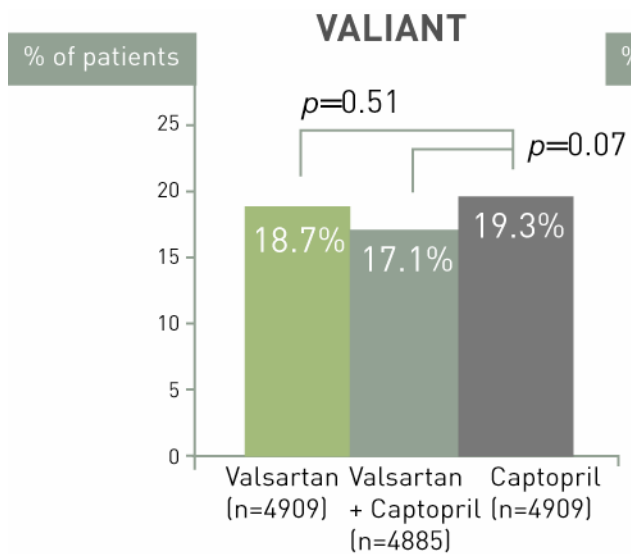
Pfeffer MA et al. *N Engl J Med* 2003;349:1893-906.



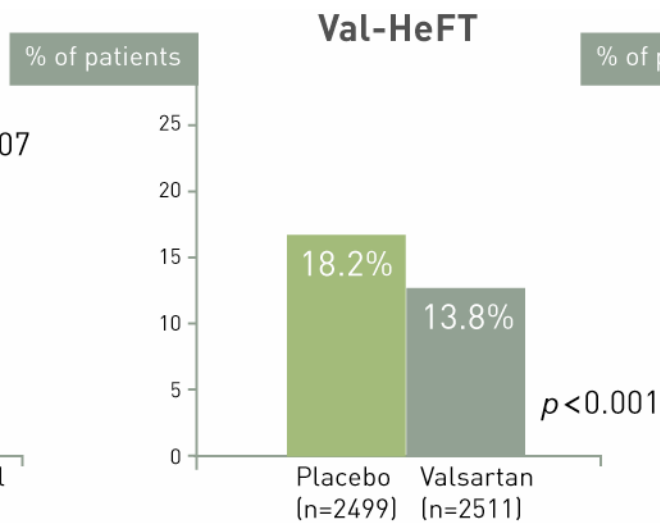
Dickstein K et al. *Lancet* 2002;360:752-60.



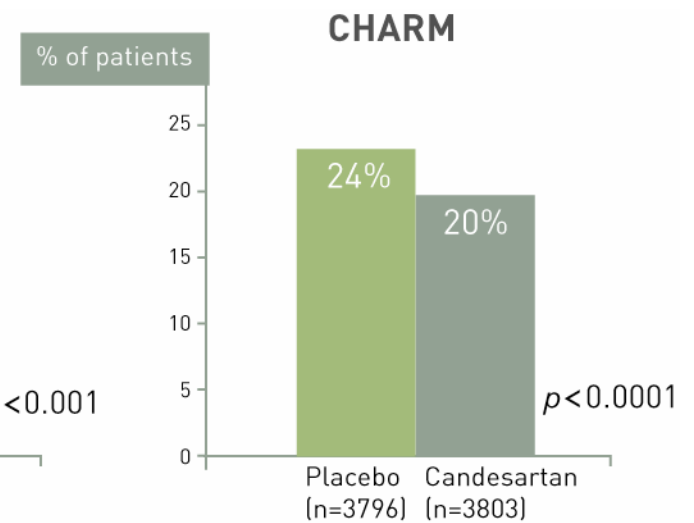
ARBs – Reductions in HF Hospitalizations



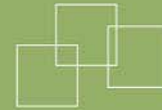
Median duration of follow-up 24.7 months.
Cohn JN et al. *N Engl J Med* 2001;345:1667-75.



Mean duration of follow-up 23 months.
Pfeffer MA et al. *N Engl J Med* 2003;349:1893-906.

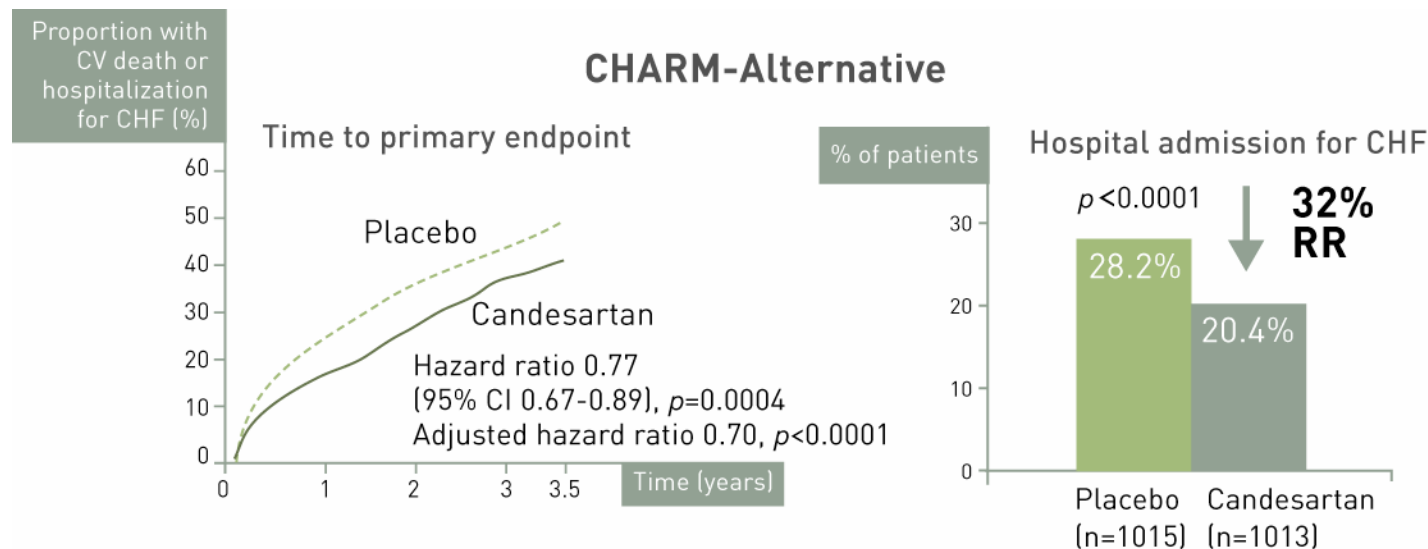


Median duration of follow-up 37.7 months.
Pfeffer MA et al. *Lancet* 2003;363:759-66.

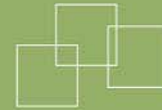


Other Indications for ARBs

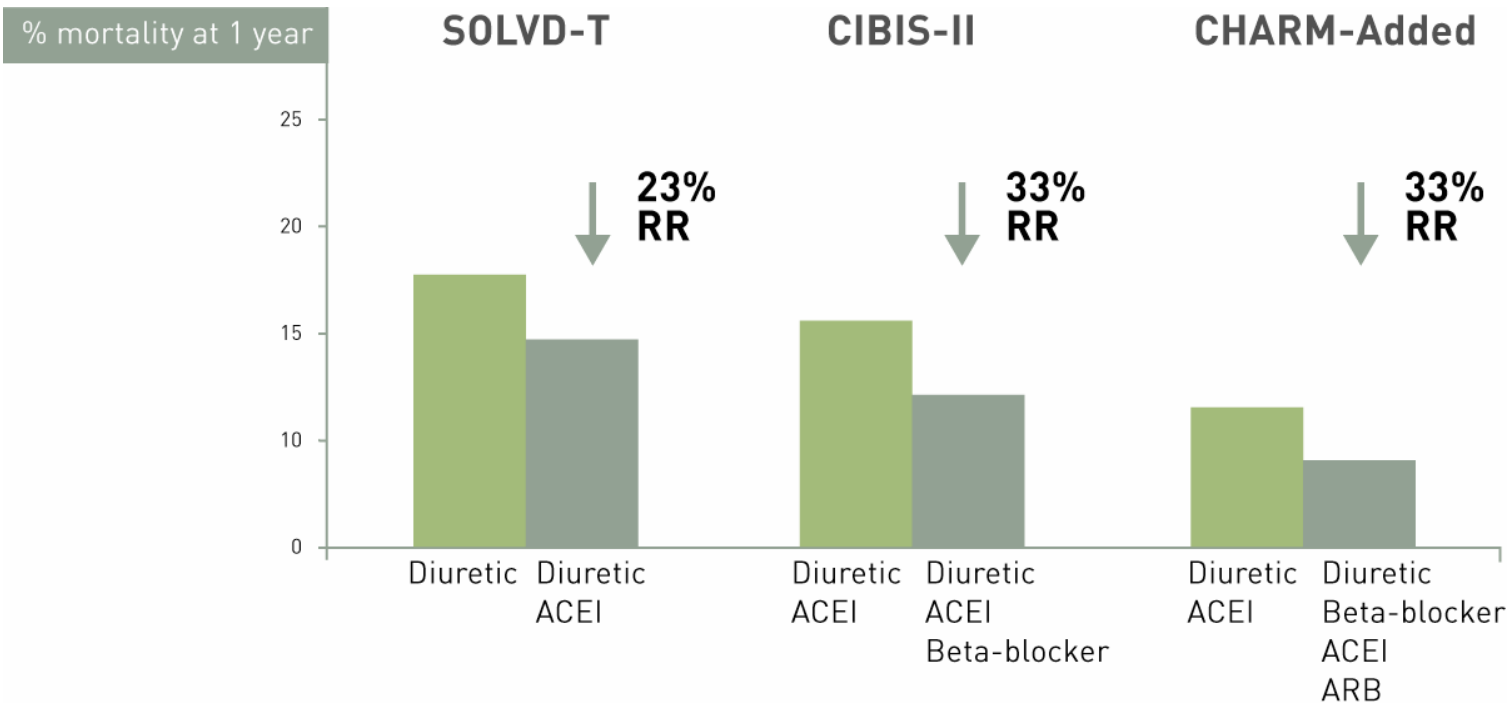
- With ACE inhibition intolerance (renal dysfunction and hyperkalemia may recur) (Class I, Level A)



- As adjunctive therapy to ACE-I when beta-blockers are either contraindicated or not tolerated after careful attempts at initiation (Class IIa, Level B)



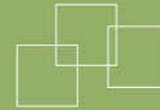
Improving CHF Outcomes With Combination Drug Therapy



Mean duration of follow-up 41.4 months. SOLVD *N Engl J Med* 1991;325:293-30

Mean duration of follow-up 1.3 year s. CIBIS II. *Lancet* 1999;353:9-13

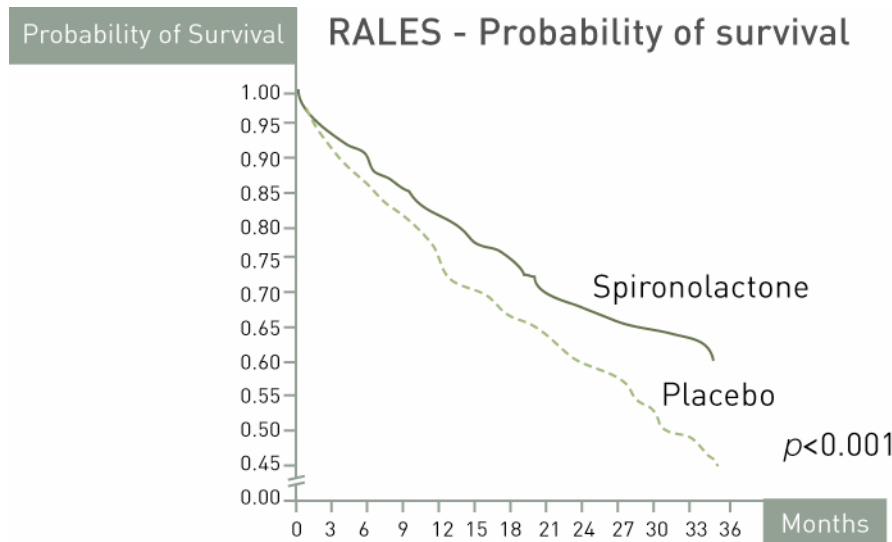
Median duration of follow-up 40 months. Young JB et al. *Circulation* 2004;110:2618-26.



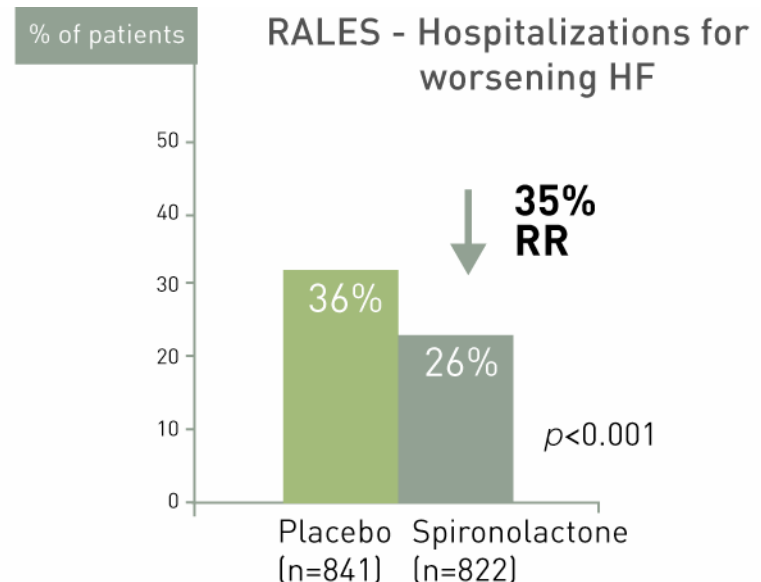
When to Use Aldosterone Blockers?

Spironolactone:

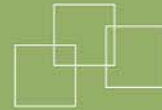
- Patients with LVEF $\leq 30\%$ and severe symptoms despite optimized other therapies (Class I, Level B)



Pitt B et al. *N Engl J Med* 1999;341:709-17.



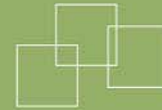
Leadership. Knowledge. Community.



When and How to Use Diuretics?



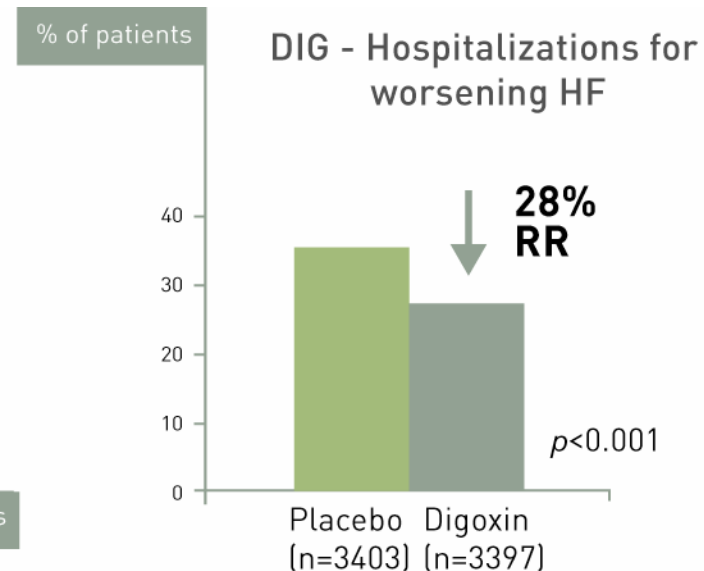
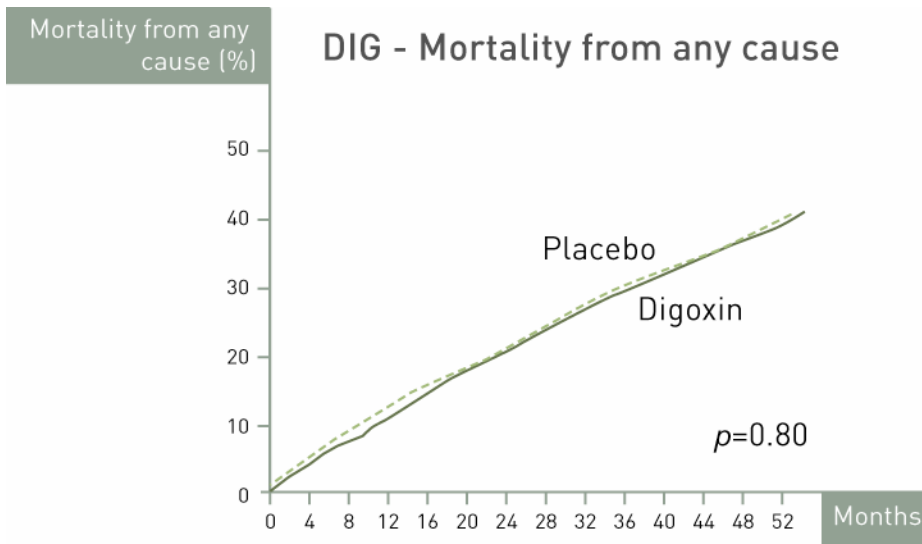
- A loop diuretic, such as furosemide, is recommended for most patients with HF and congestive symptoms. Once acute congestion is cleared, the lowest dose should be used that is compatible with stable signs and symptoms
(Class I, Level C)
- For patients with persistent volume overload despite optimal other medical therapy and increases in loop diuretics, cautious addition of a second diuretic (e.g., a thiazide or low-dose metolazone) may be considered as long as it is possible to closely monitor renal function, serum potassium and daily morning weight
(Class IIb, Level B)

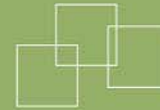


When To Use Digoxin?

- To relieve symptoms and reduce hospitalizations in patients in sinus rhythm who have persistent moderate-to-severe symptoms despite optimized HF medical therapy

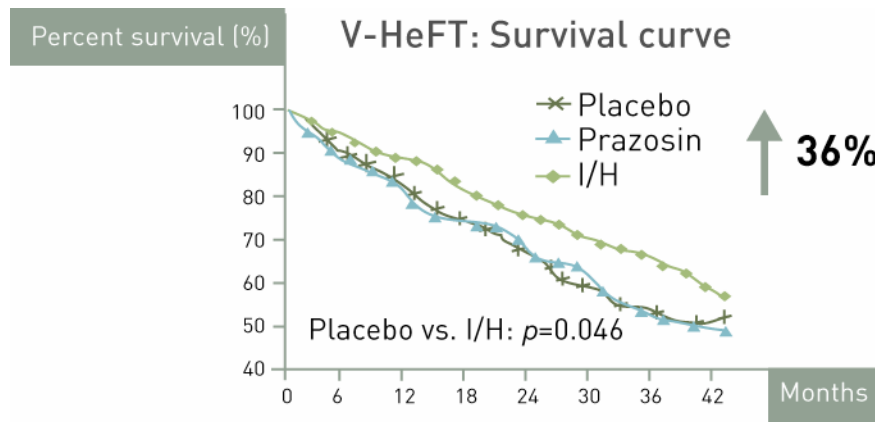
(Class I, Level A)



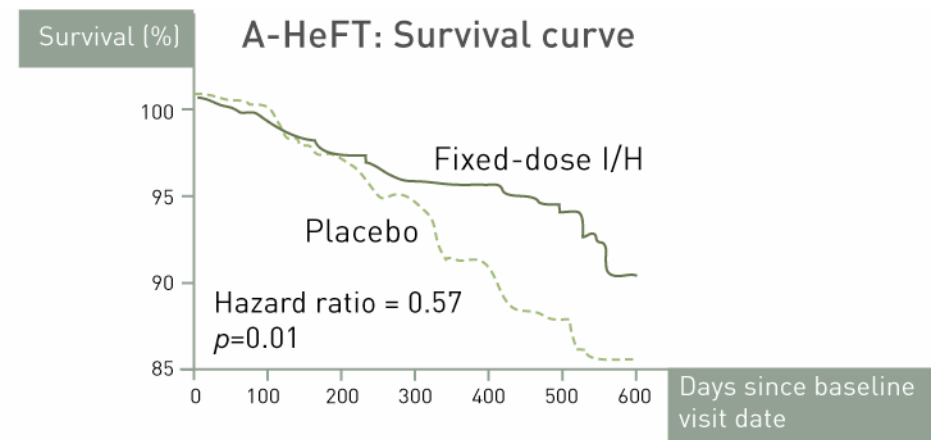


When To Use Nitrates + Hydralazine?

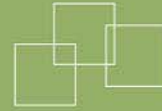
- Other HF patients unable to tolerate ACE inhibitors and ARBs
(Class IIb, Level B)
- African-Americans with systolic dysfunction in addition to standard therapy
(Class IIa, Level A)



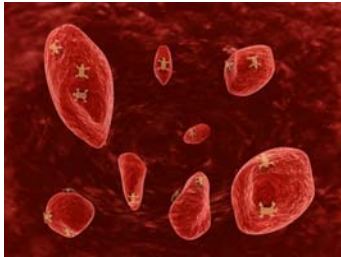
Cohn et al. *N Engl J Med* 1986;314:1547-52.



Taylor AL et al. *N Engl J Med* 2004;351:2049-57.



When to Anticoagulate?

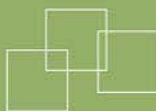


- Anticoagulant therapy (international normalized ratio of 2 to 3) should be given to all patients with HF and associated atrial fibrillation

(Class I, Level A)

- Anticoagulation is not recommended routinely for patients with sinus rhythm, but should be considered for patients with intracardiac thrombus, spontaneous echocardiographic contrast or severe reduction in left ventricular systolic function

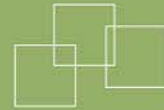
(Class IIa, Level C)



Drug Interactions and Additive Adverse Effects of Common Medications

Drug	Effect
Calcium channel blockers (nifedipine, verapamil, diltiazem)	Negative inotropic effect
Thiazolidinediones (glitazones)	Cause fluid retention
Antiarrhythmic agents (especially flecainide, propafenone, disopyramide and calcium channel blockers, and less so for amiodarone, dofetilide and ibutilide)	Negative inotropic effect
Doxorubicin	Direct cardiotoxic effect
Nonsteroidal anti-inflammatory drugs, including cyclooxygenase-2 inhibitors (celecoxib)	Cause fluid retention
Beta-blockers	Negative inotropic effect initially

(Class I, Level B)



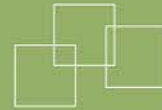
HF with Preserved Systolic Function

- Diagnosis is generally based on typical signs and symptoms of HF in patient with normal LVEF and no valvular abnormalities
- Important to control comorbidities, such as hypertension and diabetes, which are often associated with HF with PSF
- Systolic and diastolic hypertension should be controlled according to published guidelines

(Class I, Level A)

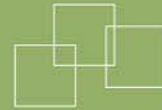
- The ventricular rate should be controlled in patients with atrial fibrillation at rest and during exercise

(Class I, Level C)



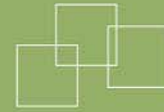
HF with Preserved Systolic Function

- Diuretics should be used to control pulmonary congestion and peripheral edema
(Class I, Level C)
- ACE inhibitors, ARBs, and beta-blockers should be considered for most patients
(Class IIa, Level B)
- Coronary revascularization may be considered for patients with symptomatic or demonstrable ischemia that is judged to have an adverse effect on cardiac function
(Class IIa, Level C)
- Excessive diuresis should be avoided as this can easily lead to reduced CO and renal dysfunction

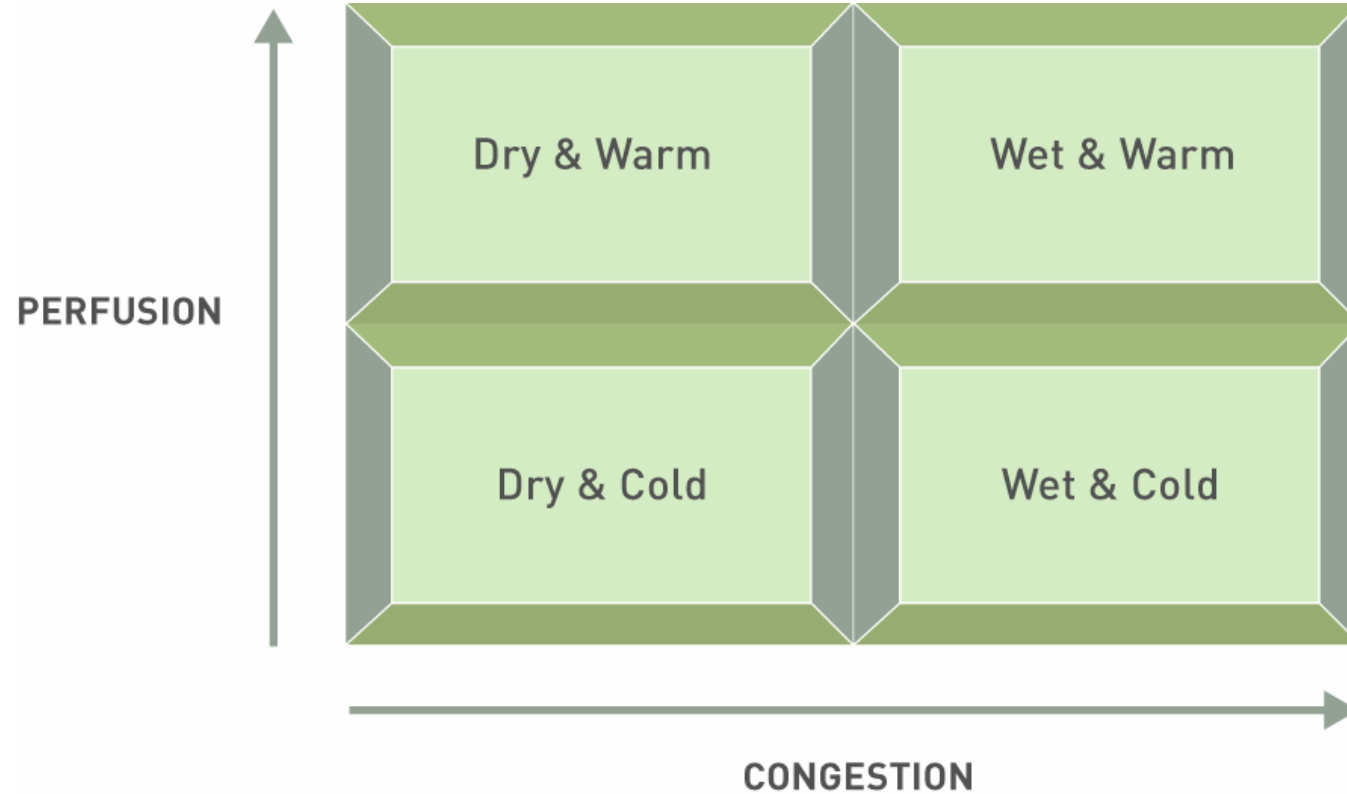


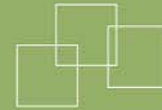
Management of Acute HF

- The diagnosis of AHF should be established in <2 hours of the initial contact in the emergency department
(Class IIa, Level C)
- Treatment for AHF should be initiated as soon as possible after diagnosis. Assessment of response to initial therapy and the need for additional therapy should be made <2 hours after treatment initiation. Plans for patient disposition should be determined <8 hours after the first medical contact.
(Class IIb, Level C)
- Measurement of plasma B-type natriuretic peptides should be considered, where available, in patients with suspected HF but when clinical uncertainty exists
(Class IIa, Level A)

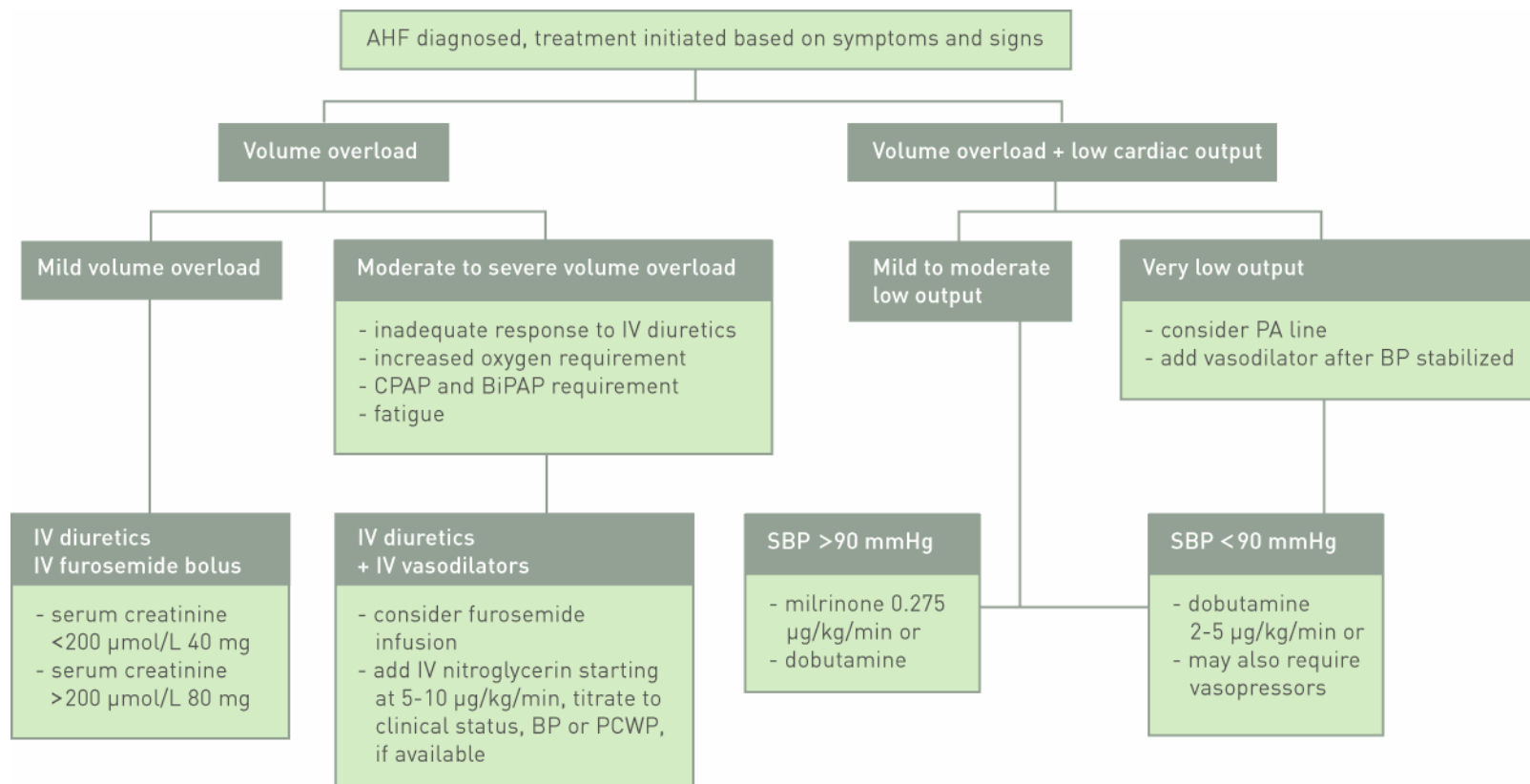


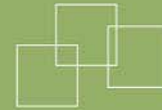
Quick Assessment of AHF





Treatment Algorithm for Acute HF

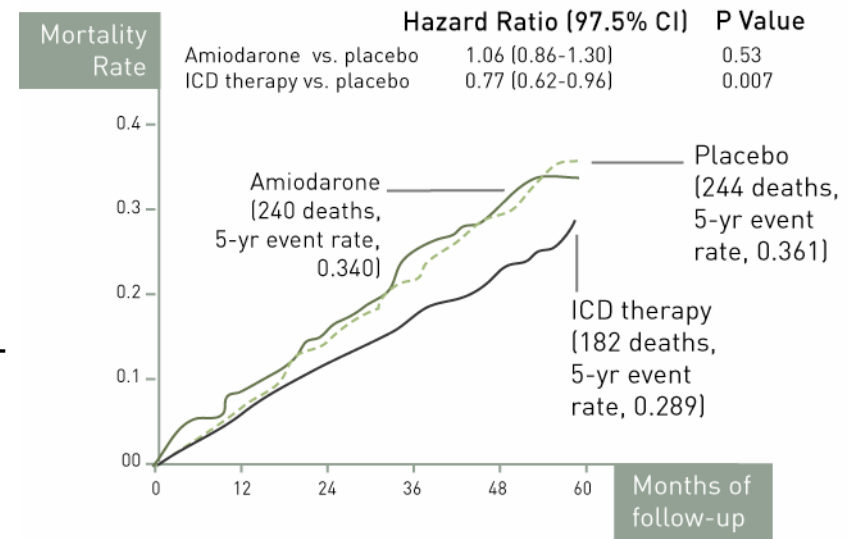




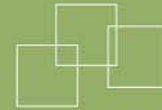
Shock-only ICD Therapy – Mortality Benefits

- The decision to implant an ICD in any given patient must be individualized as some patients may not benefit from an ICD
- An ICD should be considered in patients with IHD with or without mild to mod. HF symptoms and LVEF $\leq 30\%$, measured >1 month post-MI and >3 months post-coronary revascularization
(Class I, Level A)
- An ICD may be considered in patients with non-ischemic cardiomyopathy present for at least 9 months, NYHA functional class II-III HF, and LVEF $\leq 30\%$ (Class IIa, Level B) or LVEF 31-35% (Class IIb, Level C)

SCD HeFT Death from any cause

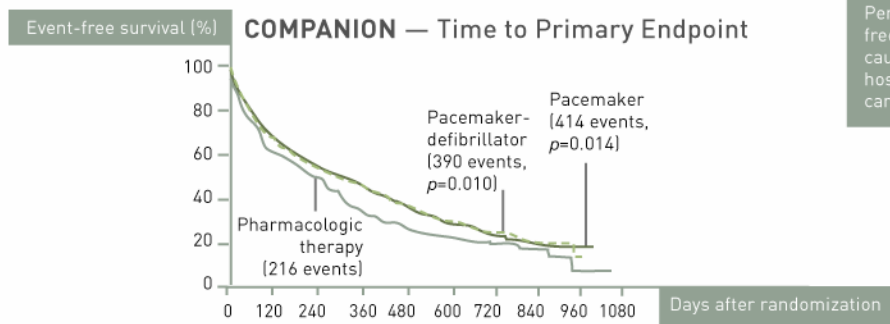


Bardy GH et al. *N Engl J Med* 2005;352:225-37.

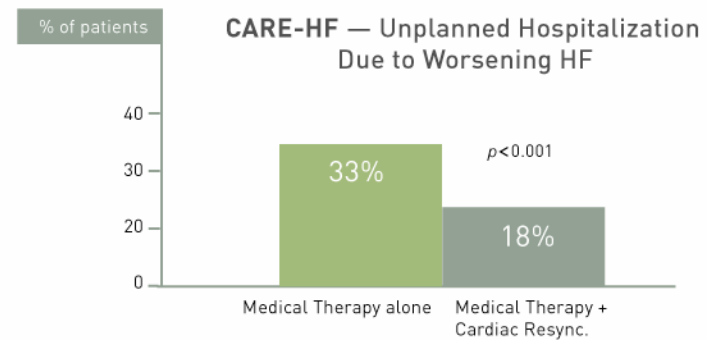
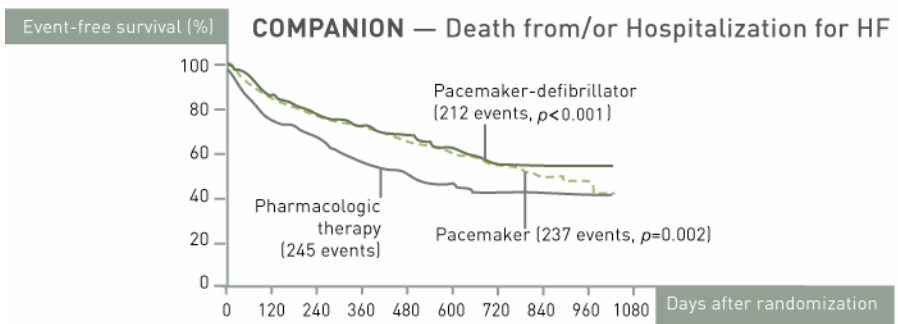
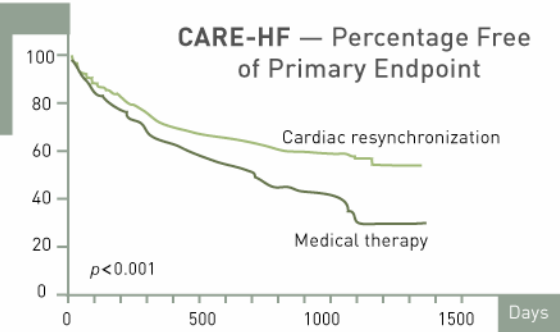


Cardiac Resynchronization Therapy

- Patients with symptomatic (NYHA III-IV) HF despite optimal medical therapy, and who are in normal sinus rhythm with QRS duration ≥ 120 msec and LVEF $\leq 35\%$, should be considered for CRT-ICD (Class I, Level A)

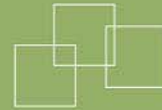


Percentage of patients free of death from any cause or unplanned hospitalization for a major cardiovascular event



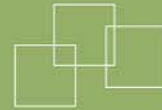
Cleland JGF et al. *N Engl J Med* 2005;352:1539-49.

Bristow MR et al. *N Engl J Med* 2004;350:2140-50.



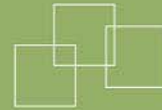
Other Arrhythmia Caveats

- Addition of ICD should be considered in patient referred for CRT who meet ICD requirements
(Class IIa, Level B)
- An ICD should not be implanted in NYHA class IV HF patients who are not expected to improve with any further therapy and who are not candidates for cardiac transplantation
(Class III, Level C)
- Antiarrhythmic drug therapy is discouraged in HF patients unless symptomatic arrhythmias persist despite optimal medical therapy with ACE-I plus beta-blocker and correction of any ischemia or electrolyte and metabolic abnormalities
(Class I, Level B)



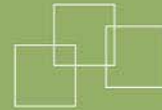
Practical Tips for Device Therapy

- Patients being considered for ICD should have a reasonable quality of life and a life expectancy greater than one year
- Patients with significant co-morbidities may not benefit from an ICD
- LVEF in most trials of CRT was very low at around 20-25%
- ECHO may become helpful in identifying patients and predicting response to CRT



Surgical Considerations in HF

- HF patients with severe refractory symptoms despite optimal medical therapy, and an otherwise good life expectancy, should be considered for heart transplant
(Class I, Level A)
- HF patients with persistent symptomatic ischemia or large areas of viability should be evaluated for revascularization, either percutaneous or surgical
(Class I, Level C)
- CABG in patients with severe LV dysfunction should be considered only by surgical teams with extensive surgical experience in these patients
(Class I, Level B)
- The role of surgical revascularization in patients with ischemic HF and no evidence of reversible ischemia or viable myocardium remains unknown



Care of the Elderly



- Primary focus of care on symptom reduction and quality of life, rather than mortality reduction in patients with high comorbid burden

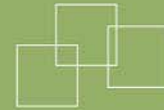
(Class I, Level C)

- Elderly HF patients should be screened for cognitive impairment

(Class I, Level C)

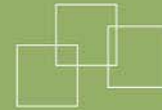
- Elderly HF patients with chronic physical complaints despite optimal HF therapy should be screened for depression

(Class I, Level C)



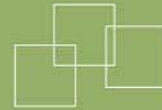
Atypical Clinical Features of HF in the Frail Elderly

Symptoms and syndromes	Signs
Delirium	Ankle edema: may reflect venous insufficiency, drug effects, immobility, malnutrition
Falls	
Sudden functional decline	Sacral edema
Sleep disturbances	Pulmonary rales/crackles are nonspecific
Nocturia or nocturnal incontinence	
Dyspnea less likely if patient is sedentary	



Causes of Orthostatic Hypotension

Medications	Antipsychotics Tricyclics Diuretics Antihypertensives and vasodilators Alpha-antagonists Antiparkinsonian agents
Medical conditions	Adrenal insufficiency Bed rest, deconditioning Postprandial hypotension Heat-induced vasodilation Systolic hypertension Volume depletion Peripheral neuropathy Parkinsonian syndromes Autonomic failure



Ethical and End-of-Life Issues

- Patients with HF should be approached early in the disease process regarding their prognosis, advanced medical directives and wishes for resuscitative care. These decisions should be reviewed regularly and specifically after any change in the patient's condition.

(Class I, Level C)

- A substitute decision maker (proxy) should be identified

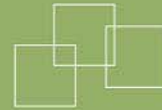
(Class I, Level C)

- Where possible, a living will should be discussed with patients to clarify wishes for end-of-life care

(Class I, Level C)

- As patients near end-of-life, physicians should re-address goals of therapy, balancing quantity and quality of life, with shift of focus to quality of life. Palliative care consultation should be considered.

(Class I, Level C)



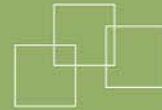
Social Considerations

- Psycho-social issues (e.g., depression, fear, isolation, home supports, need for respite care, etc.) should be routinely re-evaluated

(Class I, Level C)

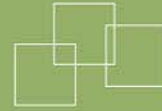
- Caregivers of patients with advanced HF should be evaluated for coping and degree of caregiver burden

(Class I, Level C)



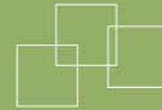
Conclusions

- Make an accurate and timely diagnosis
- Initiate treatment to
 - Reduce HF risk factors
 - Reduce HF symptoms
 - Reduce hospitalizations
 - Improve quality of life
 - Prolong survival
- Refer patients at higher risk to specialist or HF clinic
- Continue to translate new knowledge into practice
- Combine available healthcare resources to improve delivery of best care and practices to HF patients
- Improve HF outcomes in Canada

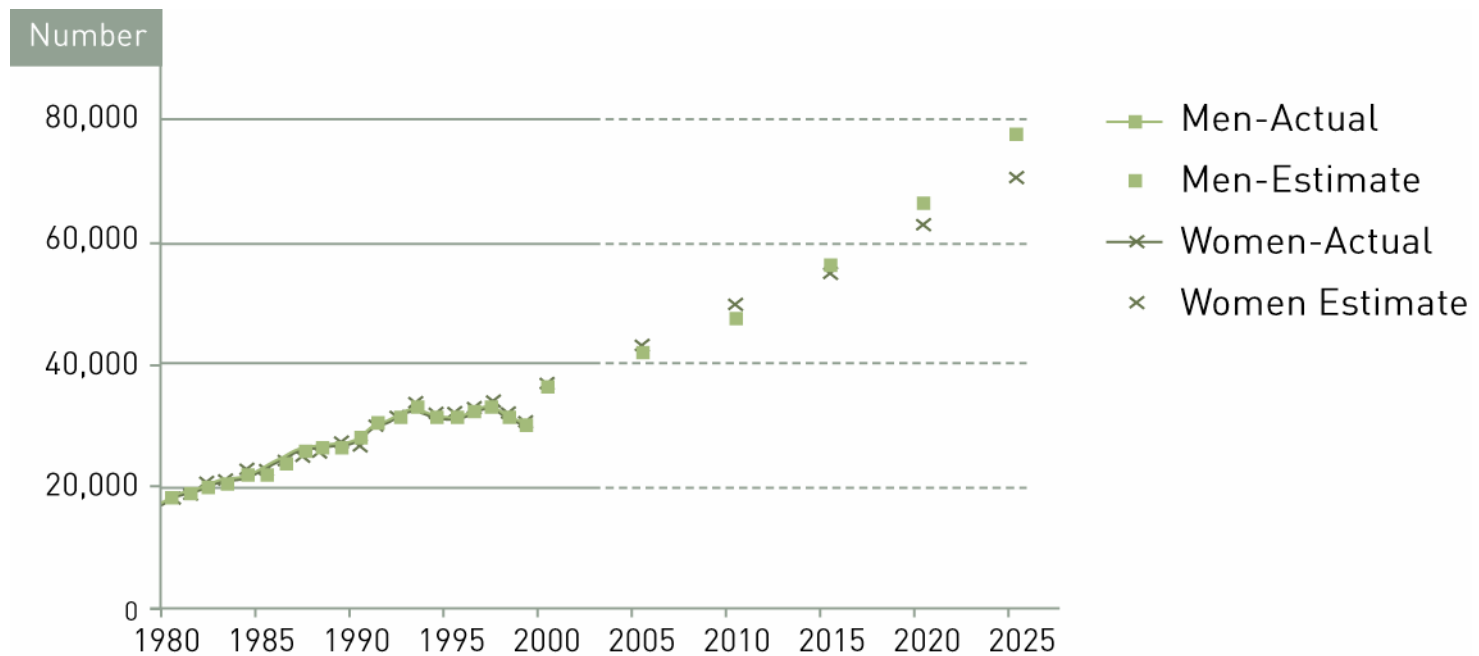


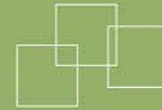
Background Slides

- Epidemiology
- Clinical Trials
- HF prognosis

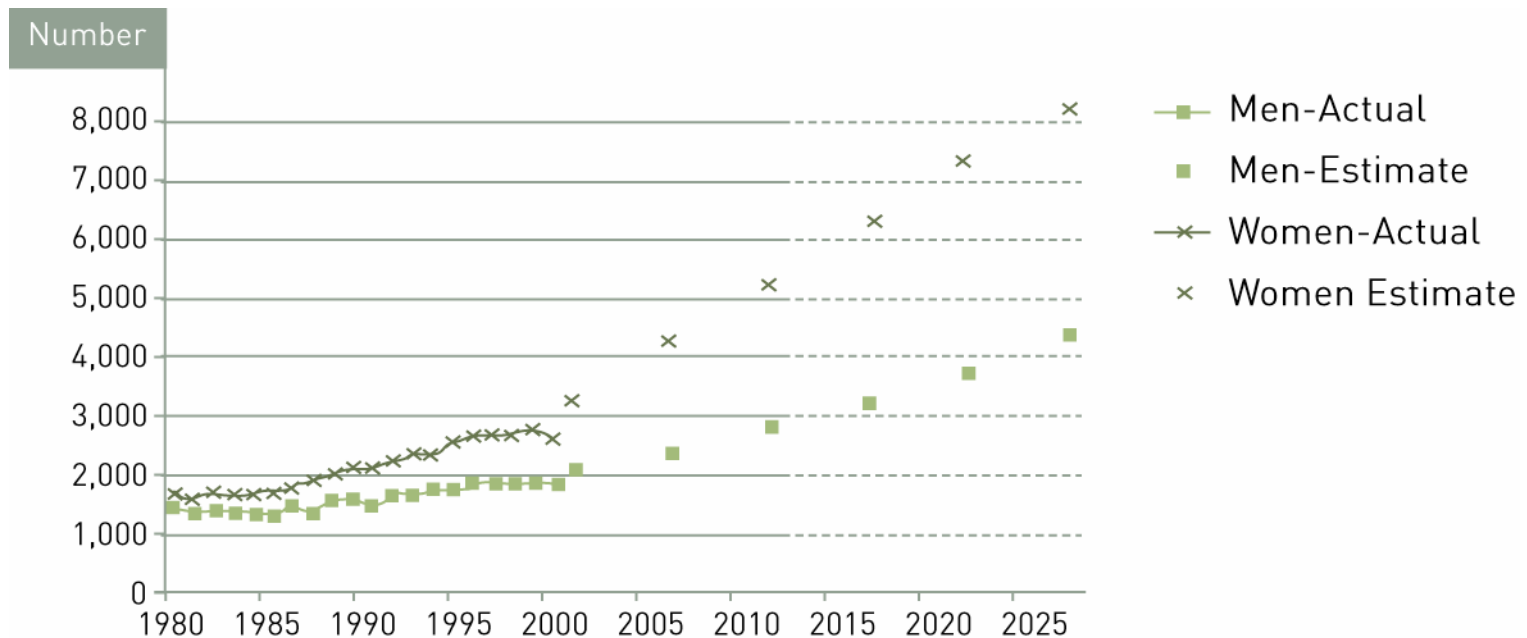


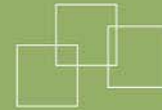
Number of Hospitalizations for CHF (actual and projected) in Canada 1980-2025



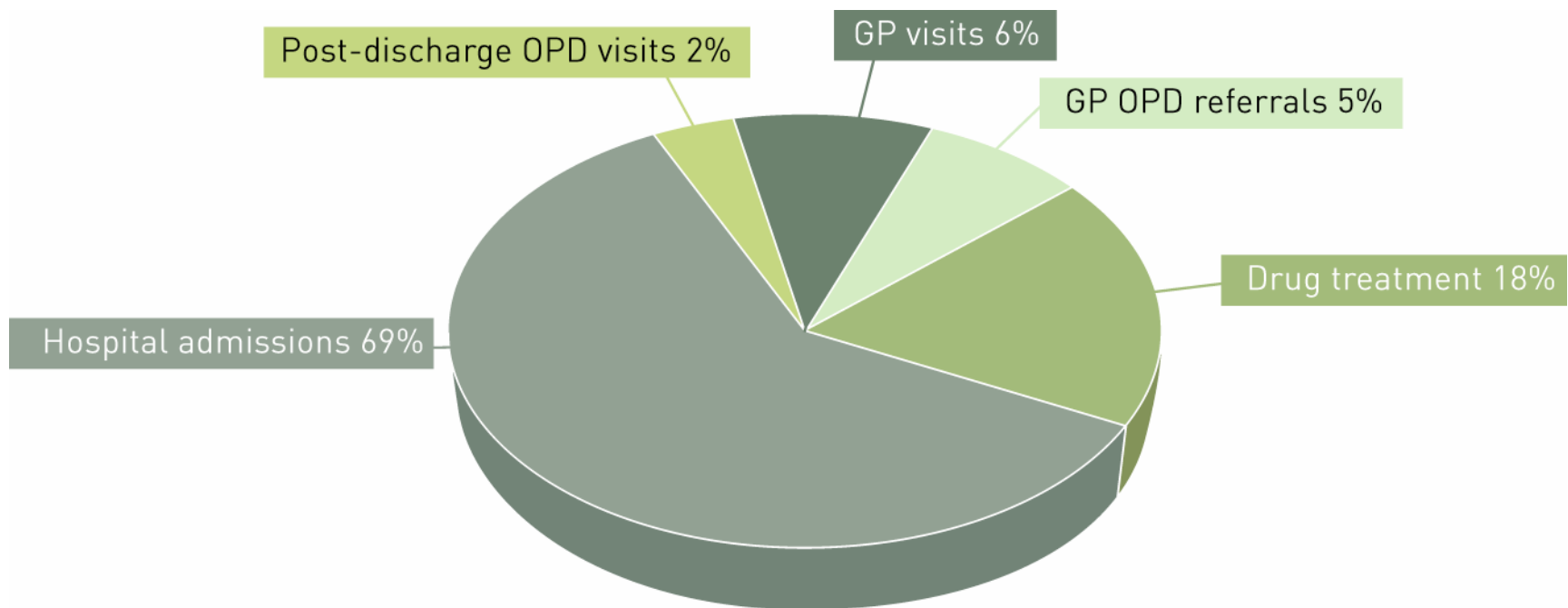


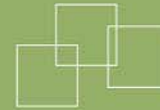
Number of CHF Deaths (actual and projected) in Canada, 1980-2025



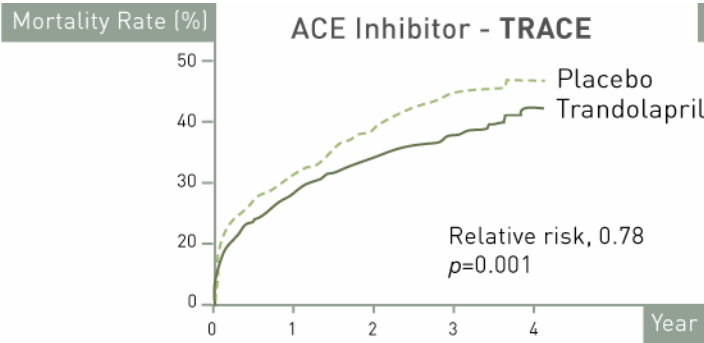


Heart Failure Costs in the UK

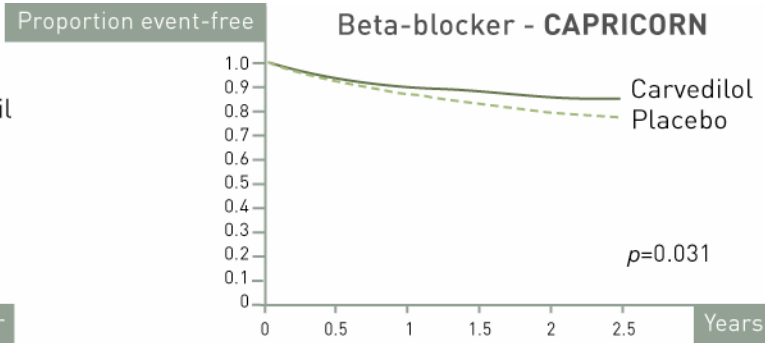




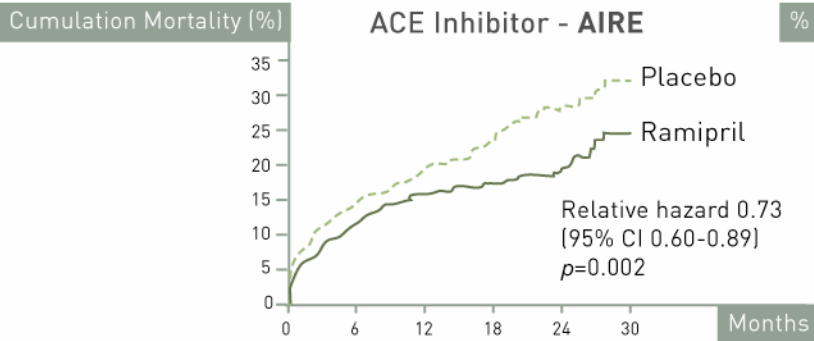
Post-MI Therapy – Mortality Benefits



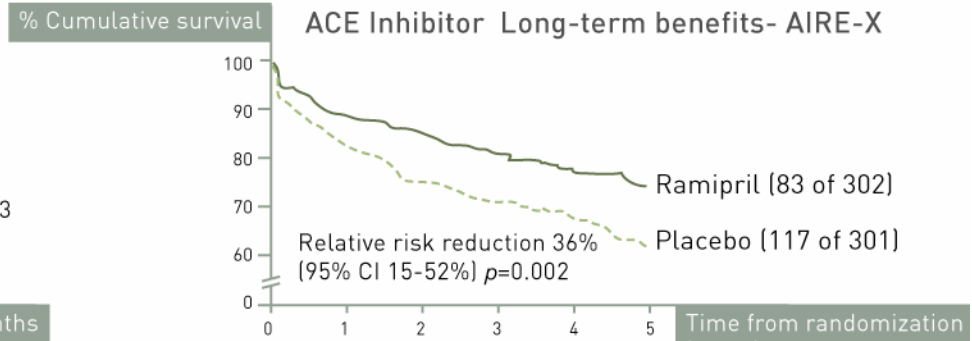
Køber L et al. *N Engl J Med* 1995;333:1670-6.



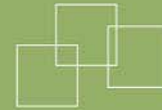
The CAPRICORN Investigators. *Lancet* 2001;357:1385-90.



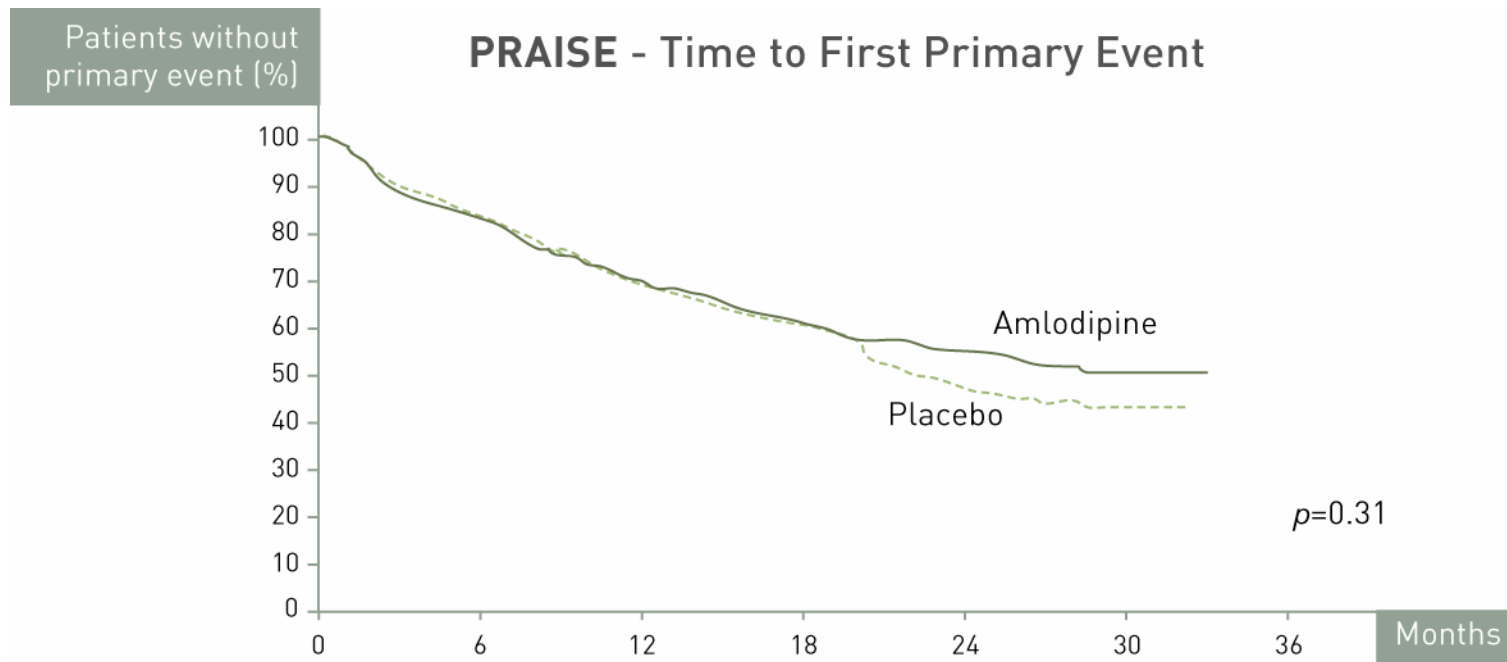
The AIRE Study Investigators. *Lancet* 1993;342:821-8.

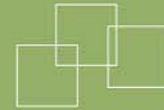


Hall AS et al. *Lancet* 1997;349:1493-7.

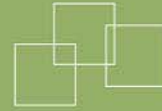


Other Therapies





Case Study One

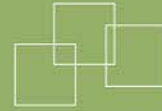


Illustrative Case of the Appropriate Use of Biomarkers



65 year old male, long standing COPD, no history of HF, previously known normal LV systolic function, presented to emergency room with increasing dyspnea

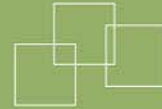
Physical examination revealed diffuse crackles and wheeze. Systolic BP = 145 mm Hg, RR = 25, HR = 105, no peripheral edema. JVP could not be assessed properly.



Chest radiograph: hyperinflation and
“prominent lung markings”

EKG: sinus tachycardia

Laboratory: SaO₂, 93%;
Hb, 120; WBC, 17,000
Na, 131; creatinine, 116
Troponin I, 0.13

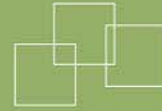


Timely Diagnosis and Institution of Appropriate Management Plan are Mandatory

Diagnostic possibilities in this case

- a) Exacerbation of COPD
- b) Acute MI
- c) Acute decompensated HF
- d) Infection
- e) Pulmonary embolism
- f) Combinations of above

Patients with suspected HF often have co-morbid conditions with manifestations that mimic HF



Illustrative Case

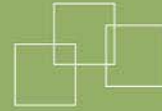


Blood NT-proBNP level = 12,500 ng/mL

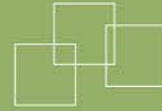
There is a very high probability that this patient has HF as one of the etiologies of his dyspnea



Canadian Cardiovascular Society



Case Study Two



Case Study Two



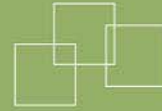
- 44 year-old male engineer with a familial cardiomyopathy evolving for 12 months

Symptoms:

- Stable NYHA class II symptoms
- LVEF = 27% twelve months ago, and now at 18%

Physical examination:

- Heart rate: 68 bpm
- BP: 104/64
- Soft S₃

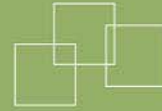


Case Study Two



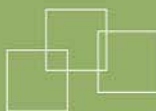
Medications:

- Digoxin 0.25 mg od
- Lasix 40 mg od
- Carvedilol 6.25 mg po bid
- Ramipril 10 mg po hs

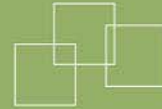


Case Study Two - Questions

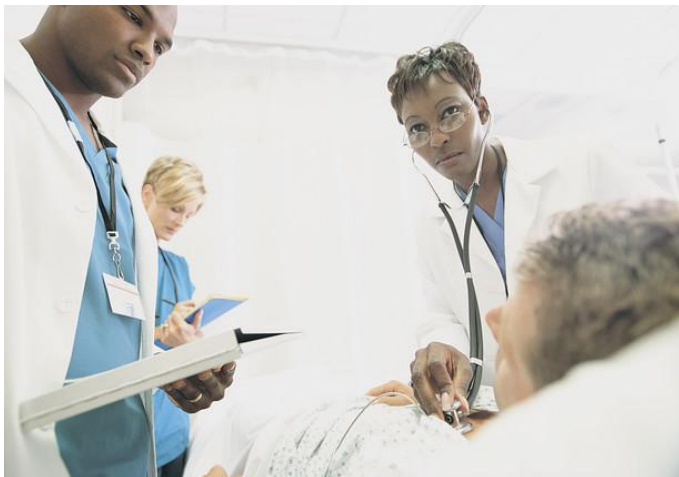
- Would you suggest any change in the drug treatment?
- Is this patient a candidate to receive an ARB in addition to an ACE inhibitor therapy?
- Would you consider spironolactone?



Case Study Three



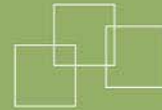
Case Study Three



- 65 year-old woman presents with depressed LVEF = 30% on echo requested for LV hypertrophy on the EKG
- She has minimal dyspnea but does little physical activity

Past medical history:

- Diabetes for 15 years
- Systemic hypertension for 10 years
- Metabolic syndrome



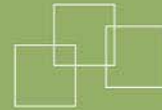
Case Study Three

Physical examination:

- BP 152/90 mm Hg, S₄
- Chest clear
- No peripheral edema

Medications:

- Metformin 850 mg bid
- ASA 80 mg pod od



Case Study Three - Questions

- What would be your initial pharmacologic approach at this point? More specifically, would you consider:
 - a) ACE versus ARB
 - b) ACE plus ARB
 - c) ACE plus beta-blocker
 - d) Beta-blocker alone
 - e) Other