Active Diuretic Management to Improve Heart Failure Outcomes

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Overview

- Case Study
- Heart Failure Background
- Physiology of Heart Failure
- Daily Weights & Diuretic Management
- MaineHealth Home Diuretic Protocol
- Discussion

The Case of Mary

- 82 woman, admitted acute heart failure
  - Hypertension, CAD, COPD, DM
- Readmitted 7 times over last 2 years
- Previous admission 2 months ago, LOS = 11 days

Mary's Story

- Went to dinner with friends last night
- Lovely ham with all the fixings
- Didn't take diuretic for fear she wouldn't be near a bathroom
- It was a long day, she was very tired when she got home
- Awoke short of breath, came to ED

Background

- About **5.1 million** people in the United States have heart failure.[1]
- One in 9 deaths in 2009 included heart failure as contributing cause.[1]
- **About half** of people who develop heart failure **die within 5 years** of diagnosis.[1]
- **$32 billion** to treat Heart failure each year, about 60% is hospitalization cost.[3]
- High rate of readmission

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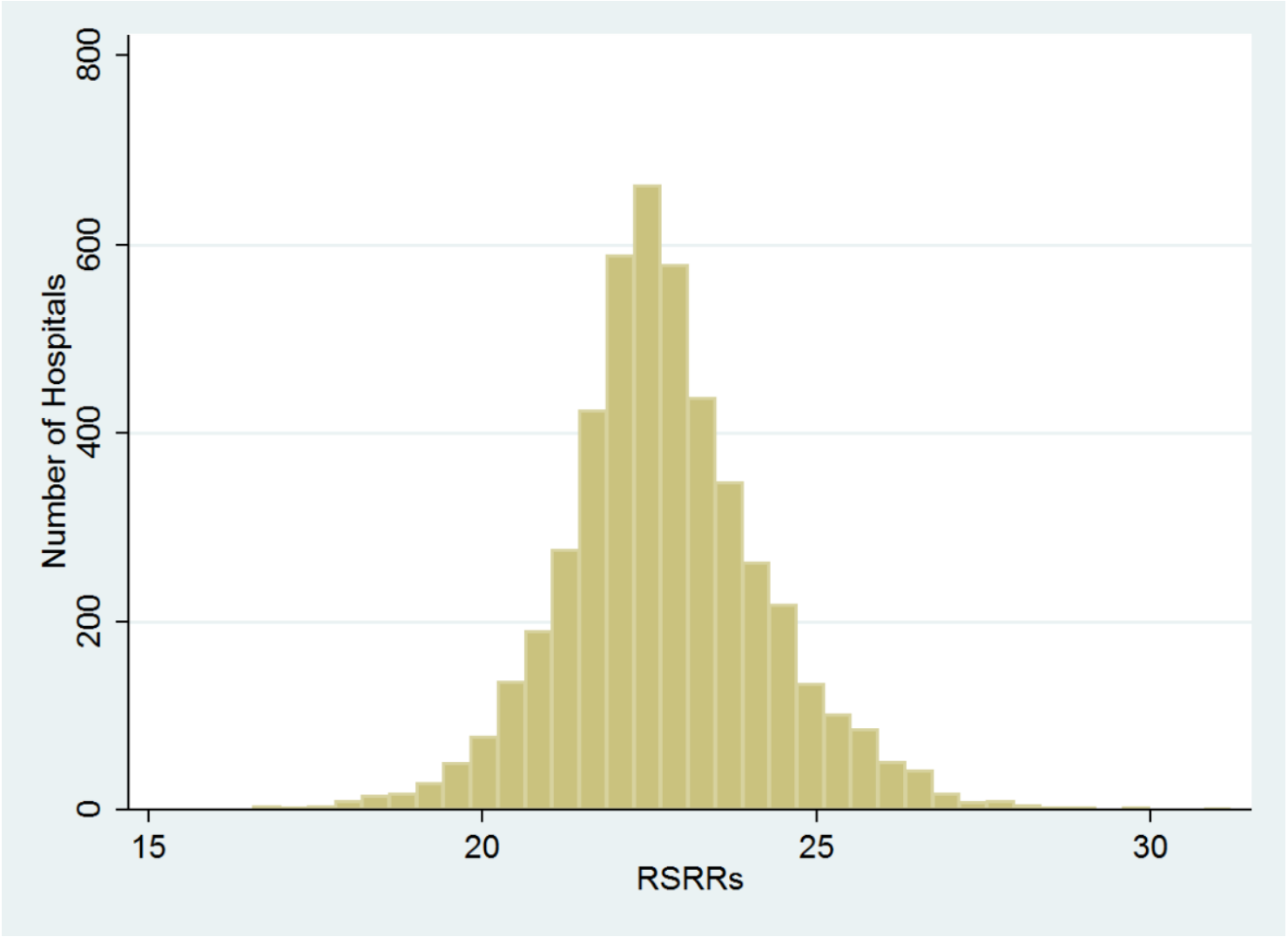
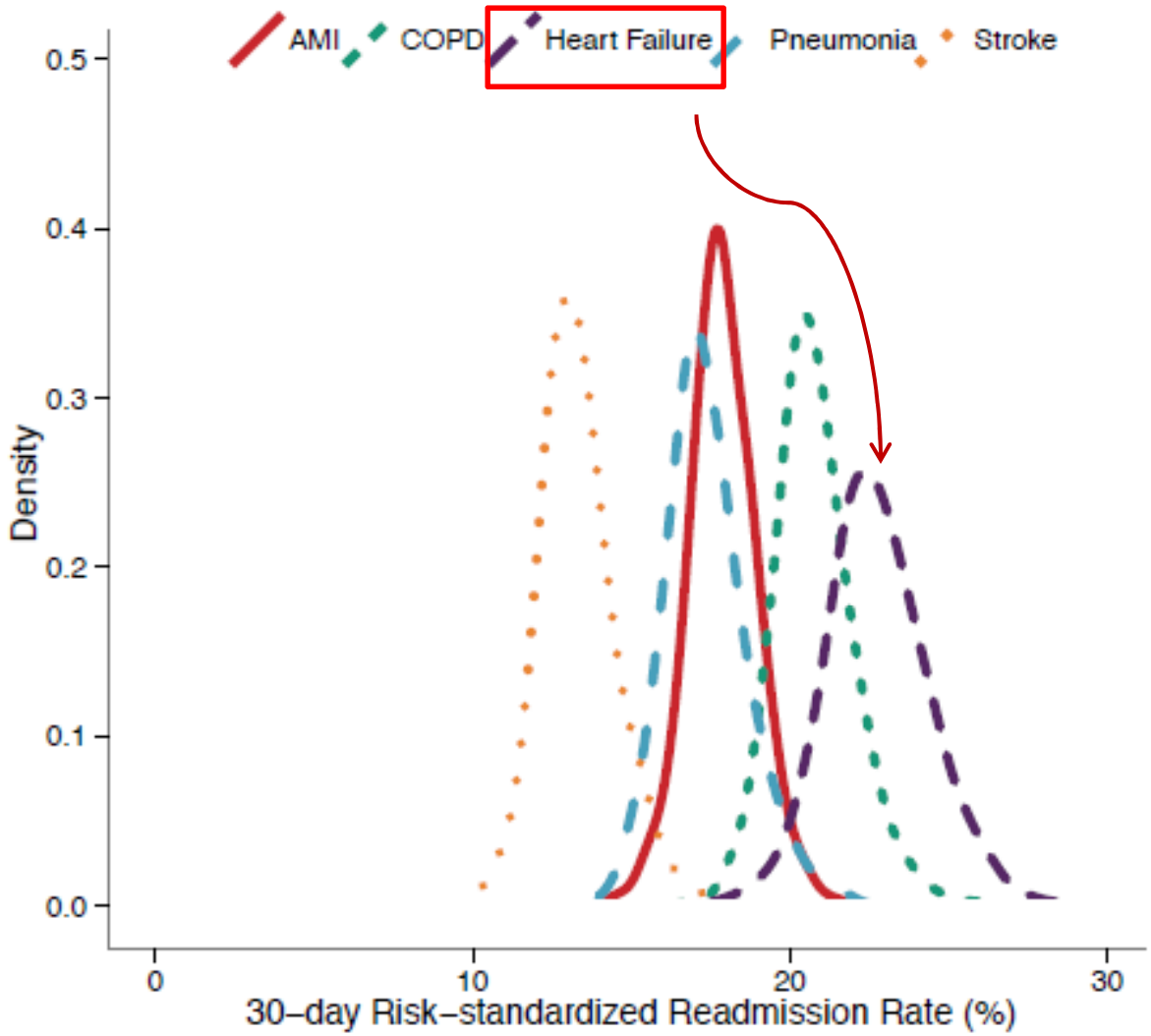
Distribution of Hospital 30-Day HF RSRRs between July 2010 and June 2013





Medicare Hospital Quality Chartbook

Performance Report on Outcome Measures

SEPTEMBER 2014

CMS Quality Based Initiatives

- Readmission penalties is single largest element of CMS' "incentives" program
- Up to 3% of Medicare hospital payments at risk
- Includes **Heart Failure**, along with Heart Attack, Pneumonia, COPD, Hip & Knee Replacement

Maine Hospital Readmission Penalties FY 2015

HOSPITAL	PENALTY	Pneumonia	Heart Failure	Heart Attack	Joint Replace.	COPD
A	■	■	■			
B	■		■	■		
C	■	■			■	
D	■	■				
E	■	■		■		
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Maine Health Efforts

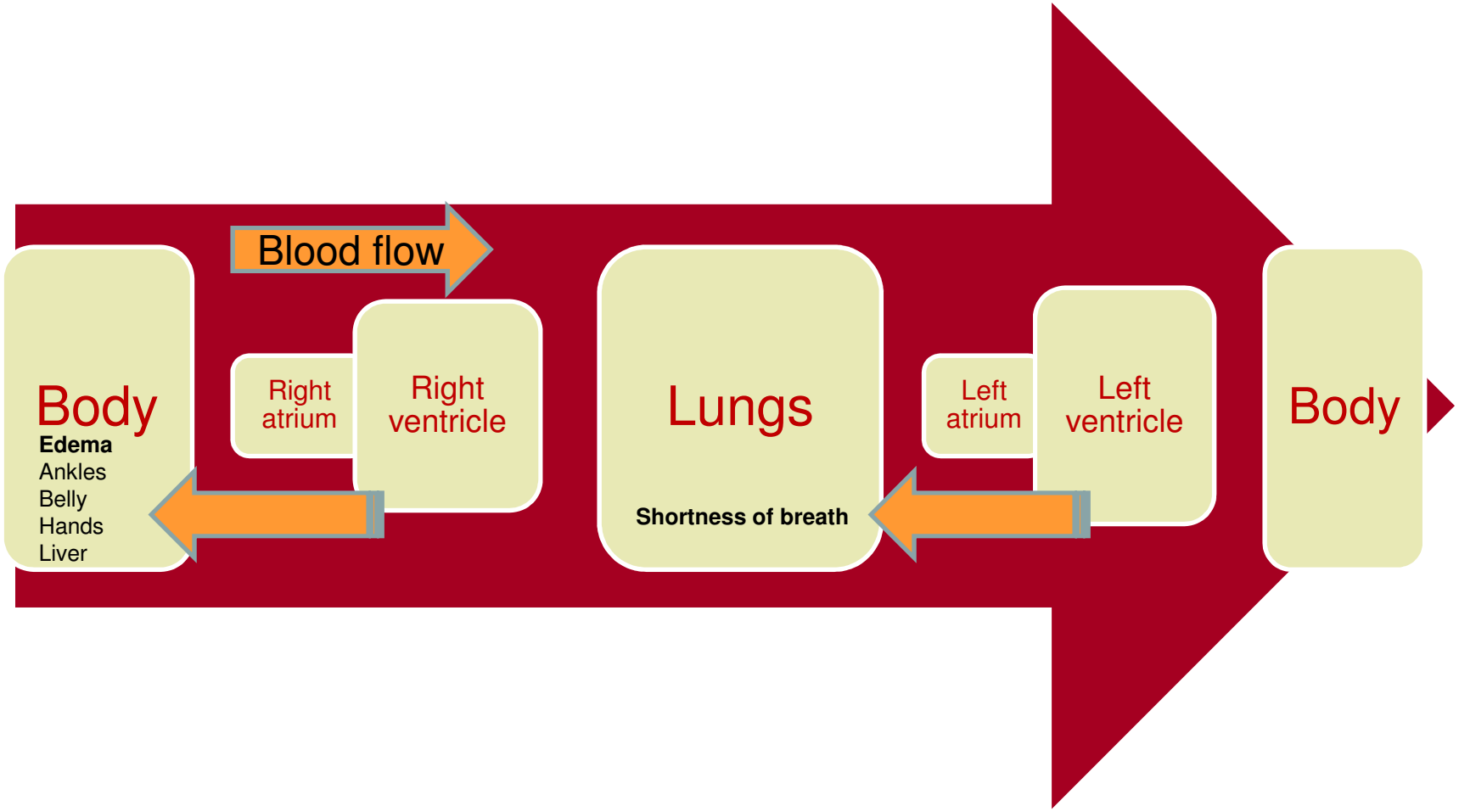
- System Wide Strategic Approach
- Guiding principles:
  - Patient and family centered
  - Standardized cross continuum care
  - Strengthened communication/ties
  - Interdisciplinary engagement cross continuum
- ***Use and adapt best available resources***

What is Heart Failure?

The heart is unable to pump enough blood to meet the body's needs due to structural/mechanical changes:

Cardiomyopathy (CM)

Heart Failure Hemodynamics



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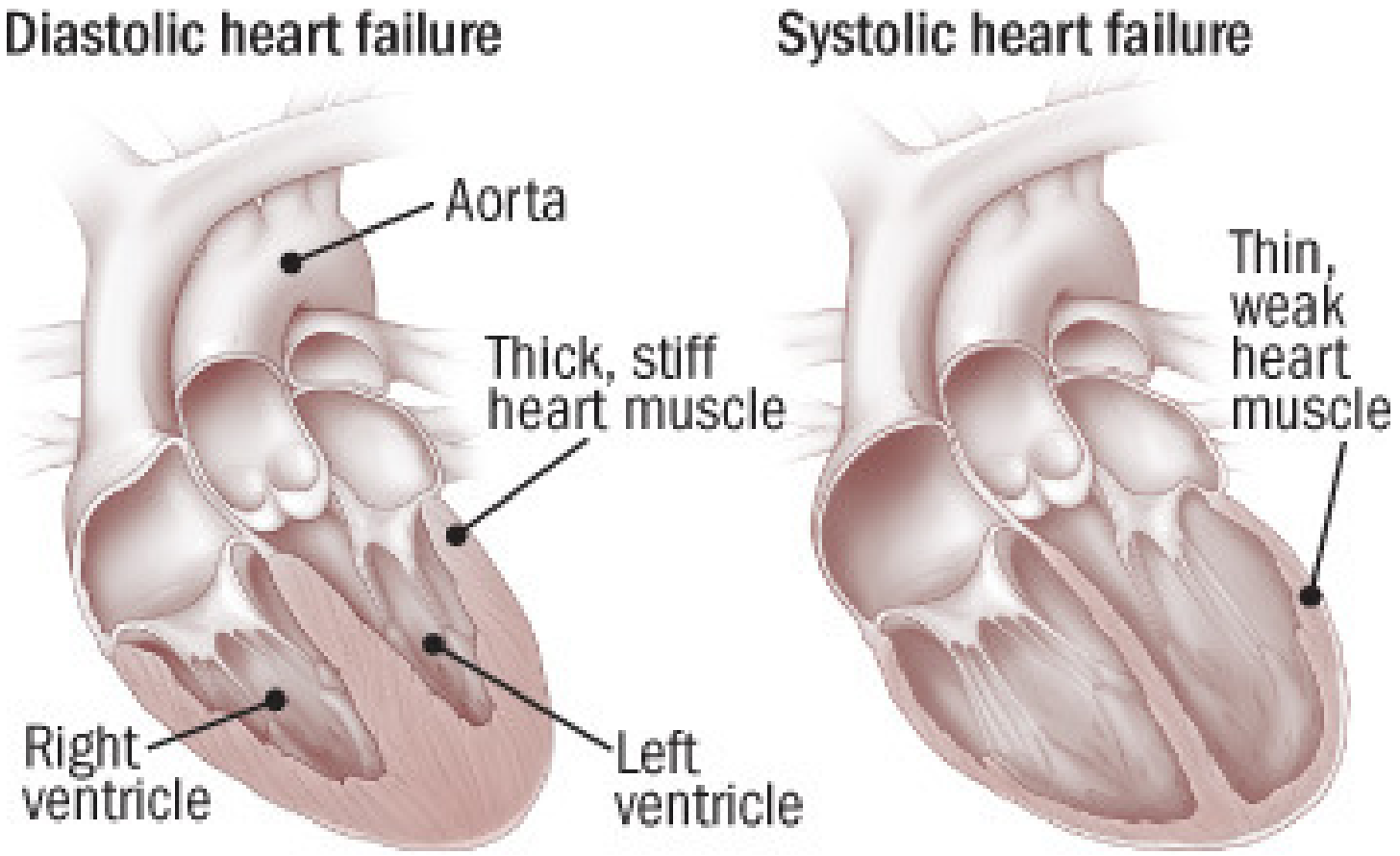
Causes of Cardiomyopathy

- Heart Attack or heart disease
- High Blood Pressure
- Valve disease
- Viral
- Alcoholism
- Thyroid disease
- Chronic Kidney Disease
- Diabetes
- Sleep Apnea
- Congenital
- Medications (e.g. chemotherapy agents)
- Familial
- Idiopathic

Not all heart failure is the same

Patient Characteristics in Diastolic & Systolic Heart Failure	
Diastolic HF	Systolic HF
normal EF (> 50%)	reduced EF (< 40%)
concentric remodeling or hypertrophy	chamber dilation & eccentric remodeling
frequently elderly	all ages, typically 50-70 yr
frequently female	more often male
4th heart sound	3rd heart sound

Heart Failure Pathophysiology



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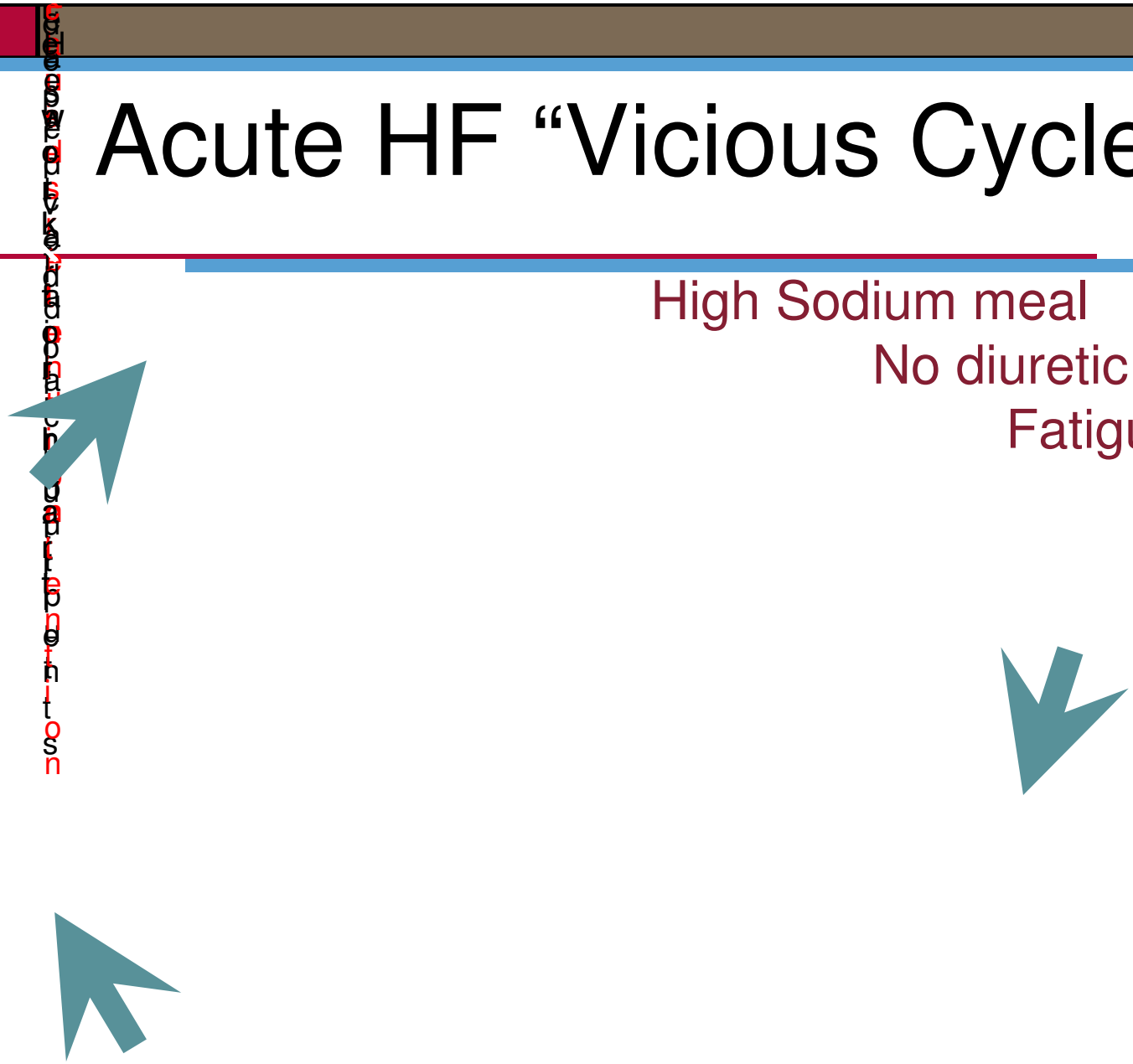
Acute HF “Vicious Cycle”



It Can Snowball…!

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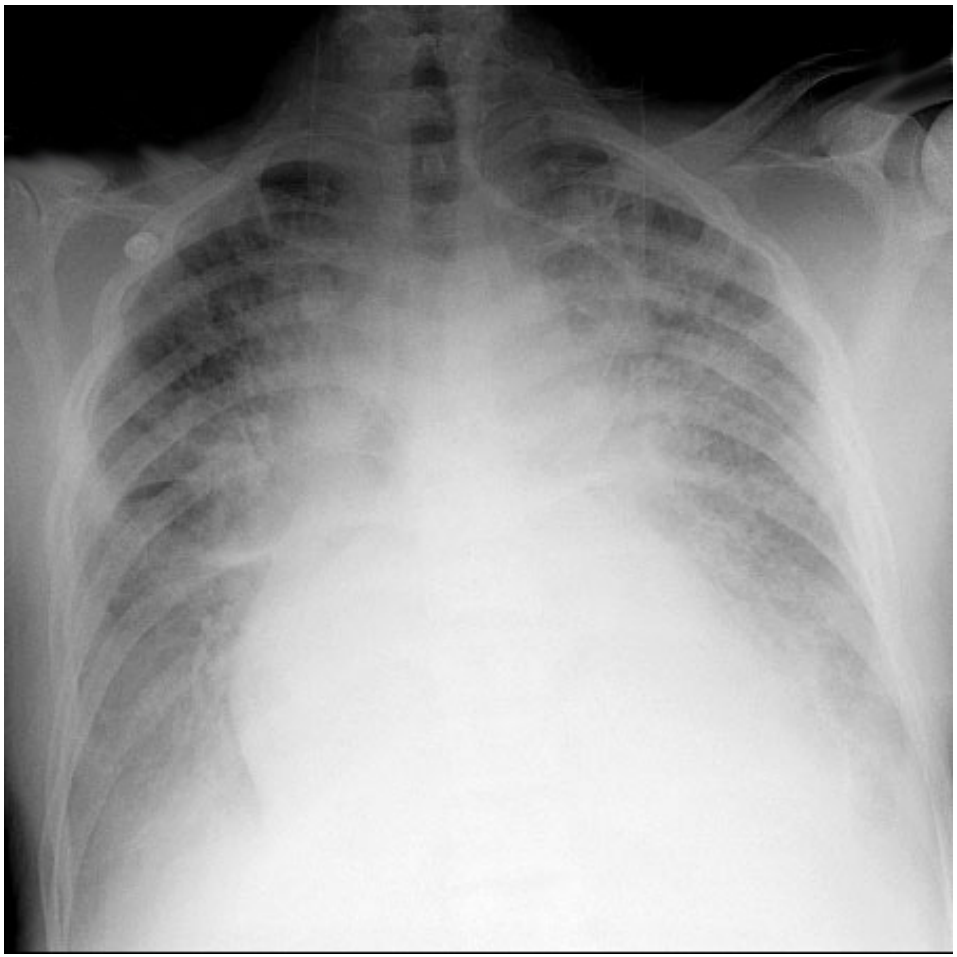
Goal to Interrupt the Cycle and Avoid This!



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IV Diuretics Cornerstone of Acute Decompensated HF with Fluid Overload

8.4. Diuretics in Hospitalized Patients: Recommendations

CLASS I

1. Patients with HF admitted with evidence of significant fluid overload should be promptly treated with intravenous loop diuretics to reduce morbidity (737,738). *(Level of Evidence: B)*
2. If patients are already receiving loop diuretic therapy, the initial intravenous dose should equal or exceed their chronic oral daily dose and should be given as either intermittent boluses or continuous infusion. Urine output and signs and symptoms of congestion should be serially assessed, and the diuretic dose should be adjusted accordingly to relieve symptoms, reduce volume excess, and avoid hypotension (739). *(Level of Evidence: B)*

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Weight Gain as Indicator of Pending Decompensation

- Often slow, over days to week or longer
- 2 pounds in 24 hours
- 4 pounds from baseline (up or down)

Opportunity to intervene before symptoms occur

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The Basis of the Home Diuretic Protocol

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MH Home Diuretic Protocol

- Weight gain triggers protocol
  - 2 lbs in 24 hours or 4 lbs from baseline
- Labs monitored
- Close communication with provider

Day 1: Increase oral diuretic

Day 2: Add metolazone

Day 3: IV diuretic if needed

DIURETIC PROTOCOL FOR HEART FAILURE

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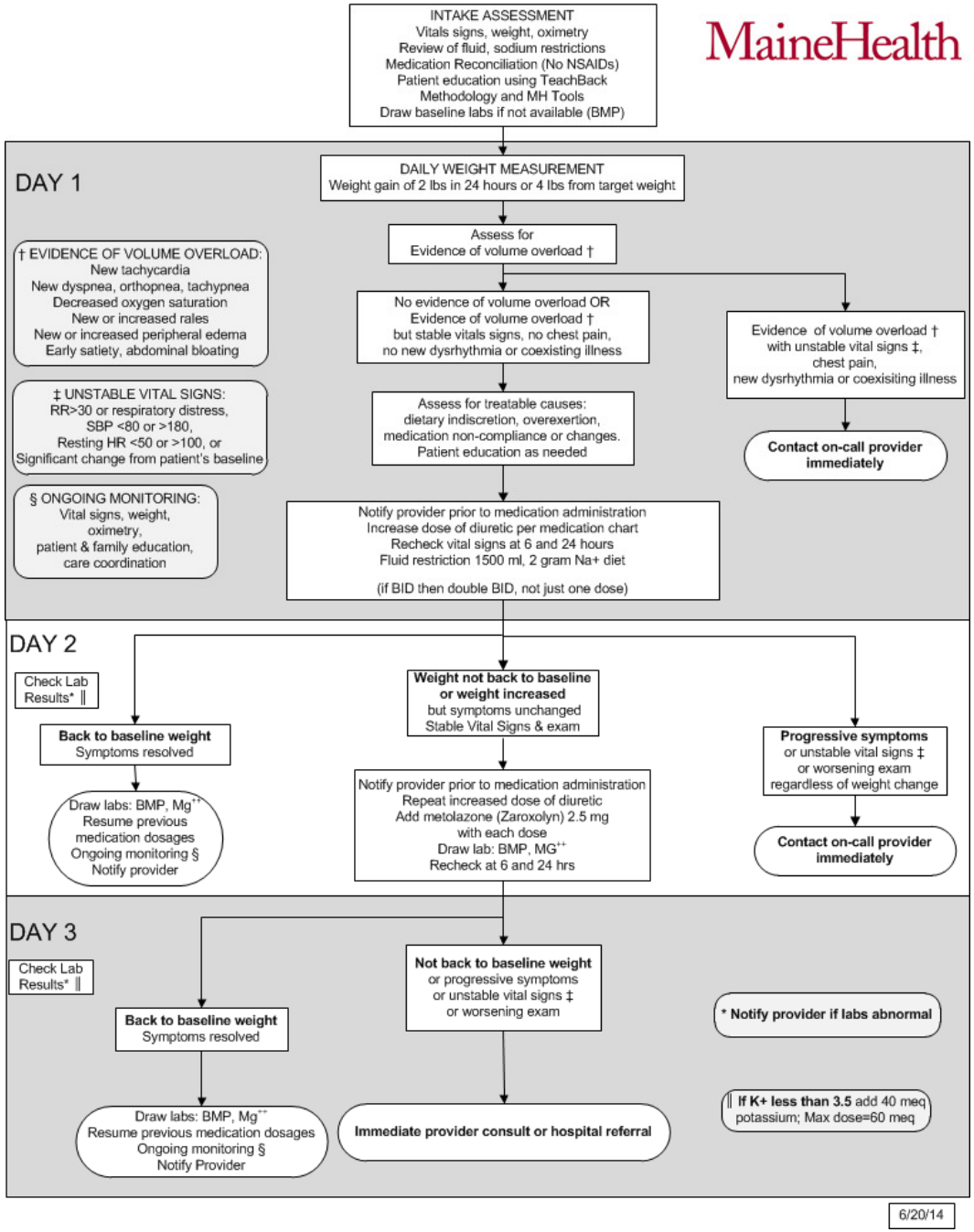

6/20/14

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Home Diuretic Protocol – Medication Chart

Furosemide

Maximum Single Dose (Oral or IV)–160 mg
Maximum Daily Dose (Oral or IV) –320 mg

Day 1 – increase each dose per chart below	
Usual Oral Dose	**Increased Oral dose**
20 mg	40 mg
40 mg	80 mg
60 mg	120 mg
80 mg – 100 mg	160 mg

Day 2 – repeat increased oral dose per chart above, add metolazone

Metolazone 2.5 mg with each dose

Day 3 – Discontinue metolazone. Administer IV furosemide **(10mg/mL)** per chart below Administration rate = 40 mg/min	
Usual Oral dose	**IV Dose (1.5 times usual oral dose)**
20 mg	30 mg (3mL)
40 mg	60 mg (6mL)
60 mg	90 mg (9mL)
80 mg – 100 mg	120 mg (12mL)

Bumetanide

Maximum Single Dose (Oral or IV) – 5 mg
Maximum Daily Dose (Oral or IV) – 10 mg

Day 1 – increase each dose per chart below	
Usual Oral Dose	**Increased Oral dose**
0.5 mg	1 mg
1 mg	2 mg
1.5 mg	3 mg
2 mg	4 mg
2.5 mg – 5 mg	5 mg

Day 2 – repeat increased oral dose per chart above, add metolazone

Metolazone 2.5 mg with each dose

Day 3 – Discontinue metolazone. Administer IV bumetanide **(0.25mg/mL)** per chart below Administration rate = 0.5 to 1 mg/min	
Usual Oral dose	**IV Dose (1.5 times usual oral dose)**
0.5 mg	1 mg (4mL)
1 mg	1 mg (4mL)
1.5 mg	2 mg (8mL)
2 mg	3 mg (12mL)
2.5 mg	4 mg (16mL)
3 mg	4 mg (16mL)
3.5 mg – 5 mg	5 mg (20mL)

Torsemide

Maximum Single Dose (Oral only) – 100 mg
Maximum Daily Dose (Oral only) – 200 mg

Day 1 – increase each dose per chart below	
Usual Oral Dose	**Increased Oral dose**
10 mg	20 mg
20 mg	40 mg
30 mg	60 mg
40 mg	80 mg
50 mg – 100 mg	100 mg

Day 2 – repeat increased oral dose per chart above, add metolazone

Metolazone 2.5 mg with each dose

Day 3 – Discontinue metolazone. Administer IV bumetanide **(0.25mg/mL)** per chart below Administration rate = 0.5 to 1 mg/min	
Usual Oral Torsemide dose	**IV Bumetanide Dose**
5 mg – 20 mg	1 mg (4mL)
21 mg - 40 mg	2 mg (8mL)
41 mg - 60 mg	3 mg (12mL)
61 mg – 80 mg	4 mg (16mL)
81 mg - 100 mg	5 mg (20mL)

Potassium – If K+ less than 3.5 give 40 meq potassium; If patient on daily potassium, max dose = 60 meq

HDP Experience as of 8/30/14

- 85 patients enrolled
- 52 activated protocol 127 times
- Increased oral diuretic (day 1): 117
- Added metolazone (day 2): 52
- Received IV diuretic (day 3): 17
- 6 readmissions during an activation 7%
  - 4.7% of 127 activations
- 19 readmissions within 30 days 22%

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But not all patients eligible for HDP

- Patient self-management essential in all chronic diseases
- Our role is to guide them and to provide them with tools they need
- Many patients can watch their own weight and adjust their own diuretic dosages
  - No different that a patient with diabetes adjusting insulin dose based on glucose levels

Healing Hearts

Living Well with Heart Failure

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Heart Failure Zone Chart

Write your weight and zone on the back of this page every day.

My target weight is _____ pounds.

Every day, I will use this chart to check my weight, swelling, breathing, and energy level. I will take action if **ONE** or **MORE** of these is in the yellow or red zone.

	Green Zone You are doing OK and in control.	Yellow Zone **Take action–call today.** Dr. _____ Phone _____	Red Zone **Take action–call NOW!**
WEIGHT 	No change in my weight.	My weight is _____ pounds or more. My weight is _____ pounds or less.	My weight is _____ pounds or more. My weight is _____ pounds or less.
SWELLING 	I do not have swelling.	I have swelling in my: • foot, ankle or shin • knee or thigh	I have swelling in my: • belly, I feel boated or pants are tighter • hands or face
BREATHING 	I do not feel short of breath. Breathing is normal. Sleep is normal.	I feel short of breath or cough while: • walking or talking • eating • bathing or dressing I need to use more pillows when I sleep.	I feel short of breath or wheeze at rest. I feel less alert. I need to sleep sitting up to breathe.
ENERGY LEVEL 	My energy level is normal.	I am too tired to do most of my normal activities.	I am so tired that I can hardly do any of my normal activities.

Daily Weight and Zone Log

Check your weight and heart failure zone every day.

Write your weight each day and mark the zone you are in (instructions on other side of this page). Tear this page out and keep it near your scale. Bring it when you visit your doctor.

My target weight is _____ pounds.

I will call my doctor if my weight goes UP to _____ pounds or more.

I will call my doctor if my weight goes DOWN to _____ pounds or less.

Date	Weight	My Zone (√)		

Date	Weight	My Zone (√)		

Water Pill Guide

Please fill out this form together with your doctor.

My target weight is 181 **pounds.**

My Water Pill name and strength is Furosemide 40 **mg.**

If I am in the **YELLOW ZONE** or **RED ZONE** I will call:

Call Dr. Bachman Phone 1-800-Bachman

If symptoms are **severe I will call 911** or go to the emergency room.

Weight	Number of pills in morning	Number of pills in afternoon	
190	2 pills	2 pills	**Red Zone** **Take action—call your doctor NOW!** If symptoms are severe call 911 or go to the emergency room
188	2 pills	1 pill	
187	1 pill	1 pill	**Yellow Zone** **Take action—call your doctor today.**
185	1 pill	½ pill	
183	1 pill		**Green Zone** **You are in control.**
181	1 pill		This is your Target Weight.
179	1 pill		You are doing OK and are in control.
177	½ pill		**Yellow Zone** **Take action—call your doctor today.**
175	½ pill		
173	No pill		**Red Zone** **Take action—call your doctor NOW!** If symptoms are severe call 911 or go to the emergency room
172	No pill		

Mary's Discharge Plan

- Home Health
  - Assessment, med reconciliation, self management education, emotional support
- Telehealth monitoring
  - Daily weight, vital signs, O2 saturation, emotional support
- Home Diuretic Protocol

Mary's Experience

- Telehealth nurse noted 3 pound weight gain 2 weeks after discharge
- Instructed Mary to take increased dose of furosemide
- Nurse to home to assess Mary and draw labs
- Mary found to be more short of breath than usual, slight increased swelling in her ankles. O_2 sats, lungs sounds and VS normal
- Provider notified that protocol activated

Day 2

- Weight not back to baseline per telehealth
- Mary instructed to repeat increased furosemide and add metolazone
- Nurse to home to assess Mary and draw labs
- Ankle edema slightly improved, still slightly short of breath. Other signs normal.

Day 3

- Telehealth nurse finds weight back to baseline
- Mary instructed to resume usual dose of furosemide
- Mary feeling better, glad that she didn’t have to go to the hospital
- Provider notified of outcome of protocol

Mary's Experience Since HDP

- Activated protocol 3X over next 3 months
- Mary's doctor adjusted daily diuretic dose
- No readmission in over a year
- Feels better, home with her family
- Reaching her health care goals
- Improved quality of life

Other Initiatives in Development

- Skilled Nursing Facility Diuretic Protocol
- Hospice HF Protocol
- Outpatient IV Diuretic Therapy

Thank you for your kind attention

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