How to Decrease Rehospitalizations in Older Adults with Multiple Co-morbidities

National Association for Home Care and Hospice
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Disease Management Strategies
Common Reasons for Avoidable Hospitalizations
Evidence Based Care for Multiple Co-morbidities: Heart Failure (HF), COPD, Diabetes Mellitus (DM)

National Association for Home Care and Hospice
October 2014

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Associate Professor, QCC
**Overall Goals of Disease/ Health Management**

- Decrease *avoidable hospitalizations* and *emergent care visits*
  - 30 day readmission rate 20-25%
  - 15 day readmission rate 13%
- **Reduce** hospital LOS
- Promote patient empowerment to *self manage* their illness
- **Reduce** risk
  - Prevent disease progression
  - Prevent and treat exacerbations, complications
- **Reduce** symptoms
  - Improve exercise tolerance; functional status
  - Improve health status, QOL

**Reasons for Readmissions**

- **Break in Continuity of Care**
  - Poor interdisciplinary teamwork, communication, and collaboration
  - Poor Transition of Care
  - No or poor communication to community health care provider
  - Lag time to see community health care provider
- **Patient related**
  - Nonadherence
  - Psychosocial issues
  - Not identifying early signs and symptoms
  - Medication Related Reasons
  - Poor follow up
- **Comorbidities**
- **Vulnerability Post Hospitalization**
Reasons for Readmissions

- Complications of Care
  - Fluid / electrolyte imbalance
  - GI Bleed

- Medical Complications
  - Infection

  **For HF**
  - Syncope
  - Arrhythmias; Pulmonary Embolism

  **For COPD**
  - Respiratory infections
  - Improper use of inhalers or nebulizers
  - Inhaling irritants; environmental pollutants
  - Poor pulmonary rehabilitation

  **For Diabetes**
  - Hypoglycemia; Hyperglycemia
  - Specific complications related to Diabetes

Reasons for Readmissions

- Clinician Related Reasons
  - Not adhering to Protocols related to EBP
  - Poor optimization of medical therapy
  - Poor assessment
  - Lack of follow up on vital findings
  - Ineffective or no patient AND caregiver education
  - Poor communication; documentation
  - SBAR
    - (Situation, Background, Assessment, Recommendation)
  - Handling of after hour calls
Self Management Education

Self Management Education in the Hospital
- Obstacles
  - Patient not feeling well
  - Under stress
  - Environment not conducive to learning
- What to Do
  - Survival skills

Substantial self-management is required
- Advantages to Home Care
- Knowledge alone does not improve outcomes
- Patients have difficulty carrying out recommended care
- Patient Education is often NOT easy to read, understand, act on

“Show Me How Many Pills You Would Take in 1 Day”

<table>
<thead>
<tr>
<th>Understanding</th>
<th>Demonstration</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>38</td>
</tr>
</tbody>
</table>

Instructions on Label:
Take 2 tablets by mouth twice daily

Correct%:
- Patients with Low Literacy

Nonadherence or Lack of Self Care

- Compliance model – patient does what they are told
- A sizable number of patients do not adhere to treatment
- Lack of self care increases when there is lack of or minimal or inefficient education

Barriers to Self Care
- Lack of knowledge and/or confidence
- Complexity and demands of illness & treatment
- Know Reasons for readmissions
- Cognitive Distortions
- Lack of education
- Low literacy
  - Red flags – missing appointments; unclear history; difficulty with medications; asks fewer questions; lack of follow through on instructions given
- Cognitive Impairment

Strategies to Enhance Self Management (Empowerment Model)

- Avoid medical jargon; be specific
- Choosing Words
  - “Safe” vs. “Unsafe”
  - Data is “Information”
  - “Monitor” or “check” or “measure” rather than “test”
  - Meal plan vs. Diet
- Structure / Routine / Consistency
- Engage learner in critical thinking exercises
- Prioritize; incremental: ‘need-to-know’ & ‘need-to-do’
- Comprehensive Individualized Education
  - Options for learning; JCAHO and NCQA have guidelines
**Teach Back**

- Confirm understanding
- Asking patients to repeat in their own words what they need to know (demonstrate)
- Increases engagement
- NOT a test of the patient, but of how well YOU explained material
- If unable to Teach Back
- Documenting Response
- Repetition; Rehearsal

**Motivational Interviewing**

- Clinician attitude, knowledge & skills, self care
- Self Efficacy
- Collaborative Problem Solving
  - Direct Instruction
- Patient Centered, Patient Directed
- Strengthens motivation to change
- Doesn’t impose or pressure individual
- Supports change congruent with pt’s beliefs, values, culture
- Positive reinforcement
- Skillful style of counseling that facilitates productive conversations

**Behavior Change**
**Motivational Interviewing (MI)**

4 strategies: OARS

1. Asking open ended questions
2. Affirm
3. Reflective Listening / Active Listening
   1. Express Empathy, Hope, Respect
4. Summarize
   1. Develop Discrepancy
   2. Roll with Resistance
   3. Support Self Efficacy

*Only the individual can make behavior & lifestyle changes*

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**Evidence Based Practice**

<table>
<thead>
<tr>
<th>Heart Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Heart Failure Society of America (HFSA)</td>
</tr>
<tr>
<td>- American Heart Association (AHA)</td>
</tr>
<tr>
<td>- American College of Cardiology (ACC)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The GOLD Standard: Global Initiative for Chronic Obstructive Lung Disease</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diabetes</th>
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</thead>
<tbody>
<tr>
<td>- American Diabetes Association (ADA)</td>
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<tr>
<td>- American Association of Diabetes Educators (AADE)</td>
</tr>
<tr>
<td>- American Association of Clinical Endocrinologists</td>
</tr>
</tbody>
</table>

*Agency for Healthcare Research & Quality (AHRQ)*
*Joint Commission Core Measures (JCAHO)*
*National Committee for Quality Assurance (NCQA)*
Heart Failure Definitions

Heart Failure (HF)

- Clinical syndrome producing signs & symptoms when the heart is weak and can’t pump enough blood to meet the body’s demands
  - Characteristics: left ventricular dilation or hypertrophy or both
  - Remodeling - progressive without treatment

Backward HF vs Forward Failure and Manifestations

- Backward = Fluid Retention (peripheral or pulmonary)
- Forward = Decreased Perfusion

Congestive Heart Failure (CHF)

- Produces the signs and symptoms of congestion – circulatory overload that occurred secondary to activation of compensatory mechanisms
- Symptoms will vary with either pEF or rEF
Ejection Fraction (EF)

- Percentage of blood that is ejected out of the left ventricle with each heart contraction
- Measured by echocardiogram, cardiac imaging / stress test or cardiac catheterization
- Normal EF is 55% - 70%
- HFpEF (HF with preserved EF)
  - Diastolic HF
- HFrEF (HF with reduced EF) <40%
  - Systolic HF
- A low EF increases the risk of arrhythmias
- Medications used to treat HF increase EF

Pathophysiology of HF

Neurohormonal Compensatory Mechanisms

Sympathetic Nervous System

Renin Angiotensin System/Aldosterone (RAA)

Remodeling consisting of LV dilation & hypertrophy
Evidence Based Treatment for HFrEF (HFSA)

Control Volume: Symptom Relief

Improve Clinical Outcomes
Prevent disease progression
Neurohormonal

ACEI  ARB  BB
(EF < 40 %)

ALDOSTERONE ANTAGONIST

Treat Residual Symptoms
Symptom Relief

DIURETICS

Diuretics

- **Uses**
  - For patients with clinical evidence of volume overload, including those with preserved LVEF

- **Types**
  - **Loop** (e.g. furosemide (lasix), bumetamide (bumex), torosemide (demadex))
  - **Thiazide** – e.g. HCTZ
    - Zaroxolyn (Metolazone)
  - **K Sparing** (e.g. Spironolactone (Aldactone), Eplerenone (Inspra)) also called **Aldosterone Antagonists**

- **Diuretic Adjustments**
  - Excessive diuresis can lead to orthostatic hypotension or worsening renal function
  - Follow up after diuretic therapy instituted or changed
  - Self Titration
  - Lifestyle Management

- **Monitor** volume status, BP, Renal functioning, electrolytes, including K, Ca, Mg
**ACE-I (ACE Inhibitors) and ARB (Angiotensin Receptor Blockers)**

**Eg. -ACEI-**
- Captopril (Capoten)
- Enalapril (Vasotec)
- Lisinopril (Zestril, Prinivil)
- Ramipril (Altace)

**Eg -ARB -**
- Candesartan (Atancand)
- Losartan (Cozaar)
- Irbesartan (Avapro)
- Olmesartan (Benicar)
- Valsartan (Diovan)

### Beneficial Effects
- Improve symptoms; Reduces remodeling
- Reduce hospitalization; Improve survival
- Beneficial Effect on nephropathy R/T Diabetes

When treatment is implemented:
- Labs at baseline, 1 week, 1 mo, every 3 mos
  - K supp not recommended unless K < 4
- Avoid fluid retention / hypovolemia
- Diuretic dosages adjustment
- Sit or lie down for 2-4 hrs after first dose

### Adverse Effects
- Hypotension (1st dose effect)
- Dizziness
- Worsening Renal Function
- Hyperkalemia
- Rash, neutropenia
- Cough (ACEI)

### Contraindications
- Intolerance / severe hypotension
- Angioedema (ACEI)
- Pregnancy
- Renal Insufficiency (creatinine > 3mg/dl) / Renal Failure
- Hyperkalemia (K > 5.5)
- Bilateral renal artery stenosis
# Beta Adrenergic Blockers

**Metoprolol (Lopressor) (Toprol XL), Carvedilol (Coreg), Bisoprolol (Zebeta)**

## Mechanism of Action
- Decrease Neurohormonal Activation
- Decrease HR and BP
- Antiischemic; Antiarrhythmic

## Benefits
- Improve symptoms (only long term)
- Reduce remodeling / progression
- Reduce hospitalization
- Reduce sudden death; Improve survival

- **When patient is started on a BB**
  - Patient stable
  - No physical evidence of fluid retention
  - No need for IV inotropic drugs
  - ACE-I / diuretic started first
  - Dosage doubled every 2 weeks until target dose reached

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# Beta Adrenergic Blockers

## Adverse Effects
- Hypotension, Dizziness
- Fluid retention / worsening HF
- Fatigue
- Bradycardia
- Mask S/S of hypoglycemia

## Contraindications
- Asthma (Reactive Airway Disease) with active bronchospasm
- AV Block (unless a pacemaker)
- Symptomatic Hypotension / bradycardia
- Cautious use – hepatic and renal impairment
- Diabetes is not a contraindication
Other Medications Used in HF

Digoxin
- For most, 0.125mg daily & serum digoxin level recommended to be < 1.0mg/ml
- Cautious use in Hypokalemia
- Spirolactone, amiodorone can increase dig level

Nitrates plus Hydralazine
- When intolerance to ACE-I or ARB
- As standard therapy in addition to ACE-I or an ARB & BB in African Americans with LV systolic dysfunction or in those who remain symptomatic despite optimized therapy
  - CHF with myocardial ischemia, angina
  - Pulmonary congestion; Orthopnea and PND
  - Adverse Effects: Headaches, Dizziness, Tachycardia

Common Drug Related Precipitants to CHF

- Antiarrhythmics (except amiodorone)
- Calcium antagonists (except amlodipine and felodipine)
- Sympathomimetic drugs
- NSAIDs and COX-2 inhibitors
- Corticosteroids
- TZDs
- Tricyclic antidepressants
- Decongestants
- Diet pills or herbs; Energy drinks
Lab Evaluation: Metabolic Profile

- **BMP – Basic Metabolic Profile** - evaluation of electrolytes & renal function (normal values may vary slightly between different labs)

<table>
<thead>
<tr>
<th></th>
<th>Na</th>
<th>CO₂</th>
<th>BUN</th>
<th>Glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>135-145 mEq/L</td>
<td>22-30 mmol/L</td>
<td>7-20 mg/dl</td>
<td>60-99 mg/dl</td>
</tr>
<tr>
<td>K</td>
<td>3.5 - 5.0 mEq/L</td>
<td>98 - 108 mmol/L</td>
<td></td>
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</tbody>
</table>

- **CMP** = BMP + calcium, albumin, protein, liver enzymes
  - Ca level 8.8-10.4 mg/dl

Recommendations for a Metabolic Profile

Assessment of Vital Signs and Edema

**Vital Signs**

- Blood Pressure – 2 positions
  - Correct size cuff and correct position of arm
  - BP control < 130/80
- Apical/Radial Pulse
- Abdominal girth
- Weight/Height

**Edema**

- Location, determine if it is pitting or non-pitting
- If non-pitting, measure in cm
- If pitting, use guidelines:
  - 1+ 0 to ¼ inch – disappears rapidly
  - 2+ ¼ to ½ inch – disappears in 10-45 seconds
  - 3+ ½ to 1 inch – disappears in 1-2 minutes
  - 4+ > 1 inch – disappears in 3-5 minutes
### KNOW YOUR HEART FAILURE ZONES

<table>
<thead>
<tr>
<th>Green Zone: All Clear</th>
<th>Green Zone Means:</th>
</tr>
</thead>
<tbody>
<tr>
<td>You have:</td>
<td>Your symptoms are under control</td>
</tr>
<tr>
<td>• No new or worsening shortness of breath</td>
<td>• Continue taking your medications as ordered</td>
</tr>
<tr>
<td>• No new or worsening swelling of your feet or legs</td>
<td>• Continue daily weights</td>
</tr>
<tr>
<td>• No weight gain</td>
<td>• Follow low-salt diet</td>
</tr>
<tr>
<td>• No chest pain or tightness</td>
<td>• Keep all physician appointments</td>
</tr>
<tr>
<td>• No decrease in your ability to maintain your activity level</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Yellow Zone: Caution</th>
<th>Yellow Zone Means:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAUTION:</strong> CONTACT YOUR DOCTOR OR HOME HEALTH CARE NURSE</td>
<td>Your symptoms may mean you need an adjustment of your medications</td>
</tr>
<tr>
<td>• Weight gain of 2 or more pounds in one day OR a gain of 3 or more</td>
<td>CALL YOUR PHYSICIAN, OR HOME HEALTH CARE NURSE.</td>
</tr>
<tr>
<td>pounds in one week</td>
<td>Doctor:</td>
</tr>
<tr>
<td>• Increased cough</td>
<td>Phone #:</td>
</tr>
<tr>
<td>• Increased swelling of feet or legs</td>
<td>Nurse:</td>
</tr>
<tr>
<td>• Increase in shortness of breath with activity</td>
<td>Phone #:</td>
</tr>
<tr>
<td>• Increase in the number of pillows needed to sleep at night</td>
<td>Please notify your home health nurse if you call or visit your doctor.</td>
</tr>
<tr>
<td>• New or more frequent chest pain or tightness</td>
<td></td>
</tr>
<tr>
<td>• New onset of dizziness or lightheadedness after standing up</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Red Zone: Medical Alert</th>
<th>Red Zone Means:</th>
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</thead>
<tbody>
<tr>
<td><strong>MEDICAL ALERT:</strong> CONTACT YOUR DOCTOR OR HOME HEALTH CARE NURSE</td>
<td>You may need to be evaluated by a doctor right away</td>
</tr>
<tr>
<td>• Unrelieved shortness of breath: shortness of breath at rest</td>
<td><strong>Call your Doctor right away</strong></td>
</tr>
<tr>
<td>• Unrelieved chest pain</td>
<td>Doctor:</td>
</tr>
<tr>
<td>• Wheezing or chest tightness at rest</td>
<td>Phone #:</td>
</tr>
<tr>
<td>• Need to sit in chair to sleep</td>
<td></td>
</tr>
<tr>
<td>• Weight gain or loss of more than 5 pounds or more in 7 or less days</td>
<td></td>
</tr>
</tbody>
</table>

### Daily Weight Chart: Record your Weight Here

1. If you gain 2 or more pounds in one day or 3 or more pounds in a week, or have more swelling, call your nurse or doctor.
   - Cut back even more on your sodium intake.
   - Decrease the amount of fluids you drink.
   - If your doctor has told you how to adjust your water pill at times like this, follow that advice.

2. Weigh yourself in the morning if you are physically able to:
   - at the same time every day, using the same scale
   - after you pass your urine with the same amount of clothing on
   - before you eat (unless it's crucial you eat right away)
   - wait for assistance if you are shaky on your feet. Always be safe.

3. If your weight slowly increases or decreases over time, also tell your doctor.

**Name** ___________________________________________  **Month** ____________________________

Record the date and your weight in each box.

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
</tr>
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<tbody>
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</tbody>
</table>
**Nutrition & Fluid Management**

- Usually, 2 gm Na meal plan (2000 mg = 2 gm sodium)
  - Salt & sodium are the same; 1 tsp salt = 2400mg sodium

- Low saturated fat, (300 mg cholesterol diet)
  - Not > 65g of total fat & 20g of saturated fat per day
    - < 300mg per day

- How much Fluids?

- Education
  - Daily weights

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**Keeping Track of Your Salt (Sodium)**

Keep track of what you eat for a few days. Write down the types and amounts of foods and fluids you are eating and drinking. If you know the amount of sodium in the foods, write that down too. Then review this with your nurse. This can help determine if the foods you are eating are too high in salt. If your intake is greater than 2000 mg in one day, this is too much sodium.

<table>
<thead>
<tr>
<th></th>
<th>Breakfast</th>
<th>Lunch</th>
<th>Dinner</th>
<th>Snacks</th>
<th>Total of Sodium for the Day (in mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
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<tr>
<td>Day 2</td>
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<td>Day 3</td>
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<td>Day 4</td>
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<td>Day 5</td>
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<td>Day 6</td>
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<tr>
<td>Day 7</td>
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</tbody>
</table>
Exercise / Activity

- Improves weight, BP, and diabetes control
- Improves functional level
- Reduces cardiovascular risk
- Education
  - Safety

Disease / Health Management Strategies for COPD
Pathophysiology of COPD

Chronic bronchitis, emphysema or a combination of these

Characterized by persistent airflow limitation
- Narrowing and chronic inflammatory response
- Reduced Forced Expiratory Volume
- Air trapping and hyperinflation
- Gas exchange abnormalities with hypoxemia and hypercapnia
- Abnormal V/Q ratio
- Late – hypoxic vasoconstriction and pulmonary HTN

Manifestations of COPD

- Dyspnea: progressive, persistent, and worse with exercise
- Limitation of activity
- Chronic cough may be intermittent & may be unproductive
  - Coughing syncope and rib fractures
- Possible mucus hypersecretion
- Possible wheezing
- Fatigue and anorexia
- More frequent or Prolonged “winter colds”

Exacerbations and comorbidities contribute to the severity
Pharmacological Management

Bronchodilators
- Beta 2 Agonists
  - Short acting and long acting
  - Side effects: Tachycardia, restlessness
- Anticholinergics
  - Short acting and long acting
  - Few side effects; dry mouth
- Methylxanthines: Theophylline
  - Many side effects especially in older adult
  - Not recommended for first choice

Inhaled Corticosteroids
- Combination; may prevent exacerbations
- Increased risk: oral thrush; pneumonia, muscle weakness
  (oral)

Pharmacological Management

- Inhaled bronchodilators preferred over oral bronchodilators
- Combination inhalers may decrease side effects
- Long acting bronchodilators more effective for maintaining symptom relief
- If symptomatic, may need increase in dosage and or frequency of short acting
- Studies show no significant differences between nebulizer but may be more convenient for a sicker patient
- Antibiotics only for treating bacterial infections
- Inhalers
  - Use of a spacer with a MDI
  - How to tell if inhaler empty
  - User inhalers correctly
**Using inhalers correctly**

1. Wash hands
2. Remove caps from inhaler and spacer device. Shake inhaler.
3. Attach spacer if appropriate
4. Breathe out completely
5. Seal around mouthpiece
6. Press canister of the inhaler once to release the medicine. The medicine will be trapped in the spacer.
7. Breathe in slowly and completely through mouth. With some spacers, a horn-like sound occurs if breathing too quickly.
8. Hold breath for at least 10 seconds to allow the medication to deposit in lungs. Exhale slowly.
9. Wait for about 1 minute & then repeat steps for every puff.
10. Replace the caps on inhaler and spacer when finished.
11. Rinse mouth after, especially if MDI contains a steroid.

**Pulmonary Rehab**

- Exercise training
- Breathing Techniques
- Smoking cessation
- Nutrition counseling
- Education
### COPD Zones for Management

<table>
<thead>
<tr>
<th>Green Zone: All Clear</th>
<th>Green Zone Means:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Goal O2 saturation:</td>
<td>• Your symptoms are under control</td>
</tr>
<tr>
<td>• Able to do usual activities</td>
<td>• Continue taking your medications as ordered</td>
</tr>
<tr>
<td>• No new symptoms</td>
<td>• Keep all physician appointments</td>
</tr>
<tr>
<td>• No chest pain</td>
<td>• Increase in shortness of breath with usual activity level</td>
</tr>
<tr>
<td>• Your usual medications are controlling your symptoms</td>
<td>• Increase in the amount of quick relief medications used</td>
</tr>
<tr>
<td></td>
<td>• Change in usual energy level: increase in either fatigue or restlessness</td>
</tr>
<tr>
<td></td>
<td>• Anything else unusual that bothers you</td>
</tr>
</tbody>
</table>

#### Yellow Zone: Caution

If you have any of the following signs and symptoms:

- Increased cough and / or sputum production
- Increased shortness of breath with usual activity level
- Increase in the amount of quick relief medications used
- Change in usual energy level: increase in either fatigue or restlessness
- Anything else unusual that bothers you

**Call your home health nurse if you are going into the YELLOW zone**

<table>
<thead>
<tr>
<th>Yellow Zone Means:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Your symptoms may indicate that you need an adjustment of your medications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Call your home health nurse.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name: ______________________</td>
</tr>
<tr>
<td>Number: ____________________</td>
</tr>
<tr>
<td>Instructions: _______________</td>
</tr>
</tbody>
</table>

#### Red Zone: Medical Alert

- Unrelieved shortness of breath: shortness of breath at rest
- Unrelieved chest pain
- Wheezing or chest tightness at rest
- Need to sit in chair to sleep
- Weight gain or loss of more than 5 pounds
- Confusion

**Call your physician immediately if you are going into the RED zone**

<table>
<thead>
<tr>
<th>Red Zone Means:</th>
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<tbody>
<tr>
<td>This indicates that you need to be evaluated by a physician right away</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Call your physician right away</th>
</tr>
</thead>
</table>
| Physician: ___________________
| Number: _____________________ |

Source: [www.improvingchroniccare.org/toolkits/sheets/04_yellow](http://www.improvingchroniccare.org/toolkits/sheets/04_yellow)

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### Disease / Health Management Strategies for Diabetes Mellitus
Glucose Targets for Non-Pregnant Adults with Diabetes

<table>
<thead>
<tr>
<th></th>
<th>The American Diabetes Association</th>
<th>The American Association of Clinical Endocrinologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before meals</td>
<td>70 to 130 mg/dl</td>
<td>Before meals: &lt; 110 mg/dl</td>
</tr>
<tr>
<td>1- to 2-hours after meals</td>
<td>&lt; 180 mg/dl</td>
<td>&lt; 140 mg/dl</td>
</tr>
<tr>
<td>A1C</td>
<td>&lt;7% in general</td>
<td>As close to &lt; 6.5% as possible without hypoglycemia</td>
</tr>
</tbody>
</table>

SMBG (Self Monitoring of Blood Glucose)

Frequency – Daily vs. 2-4 times / day ??
- (ADA) intensive: > 3 x/ day when on frequent insulin

Potential times: before meals, post meals, bedtime, overnight
- Individualize
- Pre and post meal or activity pair checking
- Post Meal BG Checking
  - Pre to post meal rise should be 30 to 60 mg / dl

User Error
- BG above or below limit – repeat
- Strips: use and storage
- Site rotation
- Cleaning finger; Milk finger – do not squeeze
- Lancing device selection
- Recording
Hypoglycemia Treatment
Teach 15/15 Rule

- (Instruct to not leave home without this)

15 gm of CHO

4 glucose tablets
1 (15gm) glucose gel
½ cup fruit juice or 4-6 oz regular soda

- Re-check / Re-treat every 15 min
  until BG > 80 w/o Sx or > 100 w/ Sx.
  Meal or snack

- Recheck again in 60 min

Severe hypoglycemia or declining cognition – Glucagon IM

Hypoglycemia Unawareness

- Onset of neuroglycopenia w/o appearance of autonomic warning symptoms

- Causes:
  ◦ T1 > 5 yrs lose response
  ◦ Blunted in insulin-induced hypoglycemia
  ◦ Medication related
  ◦ Frequent hypoglycemia reduces response

- Treatment
  ◦ Avoid hypoglycemia for several weeks (short term relaxation of BG goals)
  ◦ Increase frequency and timing of SMBG
Sick Day Guidelines

- **Monitoring** - Check BG every 2-4 hrs.
- Most patients need to take insulin even if not eating
- Fluids
- Electrolytes
- Replace carbohydrates
- Hospitalization needed if:
  - Significant hyperglycemia, Signs of dehydration, ketoacidosis, N/V, inability to eat or drink for 4 hours

Hyperglycemia

Moderate BG Elevations 180-200 mg/dl
- Increased sugar coated blood cells (A1C)
- Increased platelet adhesion
- Clumping of RBCs
- Defective WBC response to infection
- Releases hormones and enzymes that lower the efficiency of the immune system
- Wounds heal slower
- Stiffens and narrows the arteries
- Affects the nerves

**Chronic:** Microvascular and Macrovascular Complications

Important Teaching Points
- Foot Care
### ADA Standards of Care

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review BG</td>
<td>Every visit</td>
<td>Premeal 70-130 mg/dl (AACE says &lt; 110)</td>
</tr>
<tr>
<td>SMBG- Review</td>
<td></td>
<td>Postmeal &lt; 180 mg/dl (AACE says &lt; 140)</td>
</tr>
<tr>
<td>BP</td>
<td></td>
<td>&lt; 130/80 mmHg</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
<td>BMI &gt; 18.5 &lt; 25</td>
</tr>
<tr>
<td>Foot Exam</td>
<td></td>
<td>Visual inspection</td>
</tr>
<tr>
<td>Physical activity</td>
<td></td>
<td>Review level</td>
</tr>
<tr>
<td>AIC</td>
<td>Every 3-6 mos.</td>
<td>&lt; 7% ADA; &lt; 6.5% AACE</td>
</tr>
<tr>
<td>Dental Exam</td>
<td>Every 6 mos.</td>
<td></td>
</tr>
</tbody>
</table>

### ADA Standards of Care

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lipid Profile</td>
<td>Annual</td>
<td>LDL &lt; 100 mg/dl; &lt; 70 mg/dl if high risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HDL M &gt; 40 mg/dl W &gt;50mg/ dl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Triglycerides &lt; 150 mg/dl</td>
</tr>
<tr>
<td>Kidney &amp; Liver Function Tests</td>
<td>Sometimes more often</td>
<td></td>
</tr>
<tr>
<td>Urine albumin screening</td>
<td></td>
<td>Possible Nephrologist</td>
</tr>
<tr>
<td>Dilated Eye Exam</td>
<td></td>
<td>Ophthalmologist</td>
</tr>
<tr>
<td>Comprehensive foot exam</td>
<td></td>
<td>Possible Podiatrist</td>
</tr>
<tr>
<td>Flu vaccine</td>
<td></td>
<td>Pneumococcal vaccines once</td>
</tr>
<tr>
<td>Action</td>
<td>Insulin Name</td>
<td>Onset</td>
</tr>
<tr>
<td>-----------------</td>
<td>-----------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Bolus</td>
<td>Rapid Acting Analogs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aspart (Novolog)</td>
<td>5-15 min</td>
</tr>
<tr>
<td></td>
<td>Lispro (Humalog)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glulisine (Aphidra)</td>
<td></td>
</tr>
<tr>
<td>Short acting</td>
<td>Regular</td>
<td>30-60 min</td>
</tr>
<tr>
<td>Basal</td>
<td>Intermediate</td>
<td>2-4 hrs.</td>
</tr>
<tr>
<td></td>
<td>NPH</td>
<td></td>
</tr>
<tr>
<td>Long Acting</td>
<td>Can’t be mixed w any other insulin</td>
<td>2-4 hrs.</td>
</tr>
<tr>
<td></td>
<td>Giargine (Lantus)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Detemir (Levemir)</td>
<td>1-2 hrs.</td>
</tr>
<tr>
<td>Bolus + Basal</td>
<td>Intermediate + rapid (Pre Mix Analogs)</td>
<td>5-15 min</td>
</tr>
<tr>
<td></td>
<td>Novolog Mix 70/30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>70/30 = 70% NPA + 30% aspart</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humalog Mix</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75/25 = 75% NPL + 25% lispro</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50/50 = 50% NPL + 50% lispro</td>
<td></td>
</tr>
<tr>
<td>Intermediate + short (Pre Mix Regular)</td>
<td>Combo of NPH + Reg</td>
<td>30-60 min</td>
</tr>
<tr>
<td></td>
<td>70/30 = 70% NPH + 30% Reg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50/50 = 50% NPH + 50% Reg</td>
<td></td>
</tr>
</tbody>
</table>

- If NPO, can’t stop basal insulin
- Basal – suppresses hepatic glucose production (HGP) Controls BG between meals & nighttime. Efficacy reflected in FBG
- Bolus – “correct” highs, around meals. Rapid Acting (Bolus) lowers pc BG. Reflected in 2 hr pc BG
- Longer duration of action – more chance for hypoglycemia

### Insulin Administration

- Alternate sites
- 90 degree angle
- Insulin Pen
  - Prime 2 U; Count to 10
  - Clean top with alcohol before attach needle
- Absorption affected by:
  - FAST: Abdomen, Arm; SLOW: Thigh, Buttock
  - Don’t rub or massage injection site
- Unopened vials / pens in refrigerator – good until exp date
  - Prefilled syringes: Up to 3 wks with needle up except long acting (can’t prefill)
- Opened vials room temp 28 days
- Insulin Pen Once Opened
  - Humulin & Novolin 70/30, Humalog Mix – 10 days
  - Humulin & Novolin N, Novolog Mix – 14 days
  - Humulin & Novolin R, Humalog, Novolog, Lantus, Aphidra – 28 days
  - Levemir – 42 days
What happens in Type 2 Diabetes

Cells don't use insulin properly. The insulin can't fully "unlock" the cells to allow glucose to enter. Muscle cells and other tissues are resistant to insulin
- Increased by obesity

Type 2 Diabetes

Insulin Resistance

Liver puts too much sugar into the blood

Stomach empties 50% faster than normal

Impaired Insulin Secretion

Pancreas can't make enough insulin

What happens in Type 2 Diabetes

TZDs (Thiazolidinediones)
- Pioglitazone (Actos)
- Rosiglitazone (Avandia)

Biguanides
- Metformin (Glucophage)
- Glucophage XR

Insulin Resistance

Liver puts too much sugar into the blood

Type 2 Diabetes

Stomach empties 50% faster than normal

Impaired Insulin Secretion
What happens in Type 2 Diabetes

TZDs (Thiazolidinediones)
Biguanides

Liver puts too much sugar into the blood

Type 2 Diabetes

Stomach empties 50% faster than normal

Insulin Resistance

Impaired Insulin Secretion

Secretagogues: Sulfonylureas (Long Acting)
Glyburide (Micronase; Diabeta)
Glyburide Glipizide
(Glucotrol) (Glucotrol XL)
Glimpiride (Amaryl)
Meglitinides (Short Acting)
(Repaglinide (Prandin); Nateglinide (Starlix))

Incretin Mimetics:
- Exenatide (Byetta)
- Liraglutide (Victoza)

Amylin Mimetic:
Pramlintide (Symlin)

DPP-4 Inhibitors:
- Januvia (Sitagliptin)
- Onglyza (Saxagliptin)
- Tradjenta (Linagliptin)

Alpha-Glucosidase Inhibitors (Starch Blockers)
- Acarbose (Precose)
- Miglitol (Glyset)
### Important to Know

<table>
<thead>
<tr>
<th>Medication</th>
<th>Clinical considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biguanides</strong></td>
<td></td>
</tr>
<tr>
<td>Metformin (Glucophage)</td>
<td>No weight gain</td>
</tr>
<tr>
<td>Glucophage XR</td>
<td>No hypoglycemia First line of treatment Prevent lactic acidosis GI s/e – take with food. Titrate slowly Caution: impaired renal or liver function</td>
</tr>
<tr>
<td><strong>TZDs</strong></td>
<td></td>
</tr>
<tr>
<td>Pioglitazone (Actos)</td>
<td>Restricted access Black box warning with CHF</td>
</tr>
<tr>
<td>Rosiglitazone (Avandia)</td>
<td>Weight gain; fluid retention</td>
</tr>
<tr>
<td><strong>Secretagogues</strong></td>
<td></td>
</tr>
<tr>
<td>Glyburide; Glipizide; Amaryl Prandin; Starlix</td>
<td>Hypoglycemia; weight gain Reliable eater Fast acting vs. short acting</td>
</tr>
<tr>
<td><strong>Incretin Mimetics</strong>: Exenatide (Byetta); Liraglutide (Victoza) (type 2)</td>
<td>Adverse effects: GI effects, pancreatitis, thyroid tumor Contraindicated in gastroparesis</td>
</tr>
<tr>
<td><strong>Amylin Mimetic</strong></td>
<td></td>
</tr>
<tr>
<td>Pramlintide (Symlin) (type 1 and 2)</td>
<td>Symlin has hypoglycemia risk; insulin adjustment</td>
</tr>
<tr>
<td><strong>Alpha-Glucosidase Inhibitors (Starch Blockers)</strong></td>
<td>No hypoglycemia unless in combination GI side effects – titrate up slowly</td>
</tr>
<tr>
<td>Acarbose (Precose) Maltitol (Glyset)</td>
<td></td>
</tr>
<tr>
<td><strong>DPP-4 Inhibitors</strong></td>
<td></td>
</tr>
<tr>
<td>Januvia (Sitagliptin)</td>
<td>Low risk of hypoglycemia &amp; weight gain If PP glucose high, good addition for combination therapy</td>
</tr>
<tr>
<td>Onglyza (Saxagliptin)</td>
<td></td>
</tr>
<tr>
<td>Tradjenta (Linagliptin)</td>
<td></td>
</tr>
</tbody>
</table>
**Consistent Carbohydrate Meal Plan**

- ADA diet, NCS is no longer appropriate
- A meal planning approach where one is allowed a certain amount of carbohydrate choices or grams per meal & snack
  - Timing of meals; Portion sizes; Reading labels
- Basic CHO counting: 1 carb choice = 15 gm CHO
  - Monitoring CHO is the Key strategy to glycemic control
    - Greatest impact on post-prandial glucose level
- Food Sources:
  - Dairy products like milk, soymilk and yogurt
  - Fruit: fresh, frozen, dried, canned, juice
  - Starches & Grains: beans, rice, oats, barley, wheat, rye, pasta, croutons, tortillas, pita, matzah, crackers, bread starchy vegetables: corn, peas, potato, squash, lentil, yuca
  - Nuts
  - Sweets and snack foods like chips, candy, soda, syrup, jelly
  - There are No carbs in nonstarchy vegetables, meat, fish, chicken, or fat

**Determining Amount of Carbs per Meal**

Dependent on age, height, weight, activity level (6 or more servings / day)
- Grains – 6 or more servings /day – half as whole grains
- Low in fat and calories; High in nutrients & fiber

<table>
<thead>
<tr>
<th>Population</th>
<th>Carb choices (meal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactive women</td>
<td>2-4</td>
</tr>
<tr>
<td>Active women or inactive men</td>
<td>3-5</td>
</tr>
<tr>
<td>Active men</td>
<td>4-6</td>
</tr>
<tr>
<td><strong>Carb choices (snack)</strong></td>
<td></td>
</tr>
<tr>
<td>Between meal or HS snacks</td>
<td>1-2</td>
</tr>
</tbody>
</table>

1 serving = 15 gm CHO
- W–30–45 gm CHO per meal; M–45-60 gm/meal; Very active 60-75 gm
Plate Method

- Fill ½ of the plate with non-starchy vegetables
  - Include vegetables and fruits picking from the rainbow of colors available to maximize variety
- Choose a carb serving
- Add a serving of a protein food
- Finish with a fruit if not included
- Don’t forget the dairy! (non fat)

Welcome to the World of Telehealth

Utilizing digital information, communication and collaboration to promote optimal health and decrease rehospitalizations

National Association for Home Care and Hospice
October 2014

Kathleen Pecinka RN, MSN
North Shore LIJ Home Care Network
Assistant Professor, QCC
**Telehealth**

- Method/Additional Tool Utilized to Provide
  - Care, Education and Monitoring
- Tele-Visits / Virtual Visits
- Utilized as an adjunct/addition to in-home visits
- Specially Trained Registered Nurse Case Manager
- Broadband Connection or Air Card
- From the Home Care Office to the Patient’s Home
- Audio and Video Technology
- Medical Peripheral Equipment

**Goals**

- **Improve Quality of Care and Clinical Outcomes**
  - Reduce hospital readmissions and ER visits (Focus – first 30 days)
  - Early detection, physician collaboration and intervention

- **Improve Patient Compliance**
  - Medications, diet, symptom management, weight monitoring
Telehealth Devices

Video Patient Station

Provider Station

American TeleCare ®

BP Monitor
Glucose Meter
Pulse Oximeter
Digital Scale

The Power of Interactive Video

640 x 480 Resolution
Reconciliation
Injections

Resolution
Evaluation
Comparisons
Telehealth Population

- Medicare as Primary Insurance
- Managed Care on an individual basis
- Cardiopulmonary (HF/COPD) or Diagnosis of Diabetes
- IV Lasix
- LVAD
- Life Vests
- Frequent Flyers
- Cognitive/Functional Abilities
- Appropriate Home Environment
- Caregiver Preferred
The Global Initiative for Chronic Obstructive Lung Disease (GOLD)

- Works with health care professionals and public health officials to raise awareness of (COPD)
- To improve prevention and treatment of this lung disease for patients around the world.

COPD
- A common preventable and treatable disease
- Characterized by persistent airflow limitation that is usually progressive
- Associated with an enhanced chronic inflammatory response in the airways/lungs to noxious particles or gases
- Exacerbations and comorbidities contribute to the overall severity in individual patients
- Assessment of COPD is based on the patient's symptoms, risk of exacerbations and the identification/management of the comorbidities.
G.O.L.D. Key Points
Indications for Telehealth

- An exacerbation of COPD
  - An acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day to day variations and leads to a change in medication.

- Appropriate pharmacologic therapy
  - Reduce COPD symptoms, reduce the frequency and severity of exacerbations, and improve health status and exercise tolerance

- COPD often coexists with other diseases (comorbidities) that may have a significant impact on management and prognosis.

Meet Mr. James Lister

78 year old male referred for home care services after a 4 day hospitalization for a COPD exacerbation. Arrived in the ED in severe respiratory distress, speaking only in 1-2 word sentences and using accessory muscles. He has had 6 hospitalizations in the last 18 months for exacerbation of COPD symptoms.
Home Care Referral

Diagnosis: COPD Exacerbation

- PMH
  - Type 2 Diabetes Mellitus
  - HF
  - HTN
  - Arthritis

- Current Medications:
  - Furosemide 20 mg once a day
  - Advair Discus 250/50mcg (fluticasone & salmeterol) 1 puff every 12 hrs
  - Ventolin 100 mcg (albuterol) metered dose inhaler – 2 puffs every 6 hours as needed
  - Lantus insulin 10 units SC every night
  - Metoprolol succinate 50 mg once daily
  - Enalapril 10mg twice daily
  - Prednisone 40 mg once daily for five days
  - Azithromycin 250 mg once a day times 2 days then discontinue
  - Nexium 40mg twice a day (esomeprazole)
  - Acetaminophen 350 mg every 4-6 hrs as needed for pain
  - Oxygen 2L/min as needed via nasal cannula/O2 concentrator


Potential Problem Areas Appropriate for Telehealth Intervention

Based on the Referral and Confirmed during the VN Initial Visit

- Causes of frequent hospitalizations
  - Medication
    - Difficulty with management/does not use inhaler correctly
    - States he has no difficulty in administering his single daily dose of insulin in the evening but the most recent HgA1C is outside of acceptable limits.
    - Adequate knowledge of disease management (COPD, diabetes, heart failure, HTN, arthritis)
      - He does not recognize early signs of COPD exacerbation that could be managed at home
      - He is a frequent ER user, believing that if you feel sick, this is where you go.
      - Early recognition of exacerbation is essential to allow early treatment and reduce the risk of hospitalization.

- Home Safety
  - Access to health care and providers
  - Access to food/medication
  - Increased weakness/dyspnea – increased risk for falls
    - Has significant dyspnea when performing ADLs and with ambulating distances in the home greater than 20 feet.

Based on all the above information, the VN determines at the initial visit that Mr. Lister would be an excellent candidate for Telehealth. She reviews the fact sheet with him and his daughter, they accept as does his physician and installation is scheduled ASAP
Mr. Lister’s Telehealth Encounter

- Metrics – BP, Pulse Ox, Weight
- Heart and Lung Sounds
- System Review (Comorbidities)
- Medication Reconciliation/Education
- Equipment review – O2, nebulizer

Heart and Lung Sounds
Focusing on the Pulmonary Assessment

Assessment of:

- Cough (current/prior)(triggers)
- Dyspnea (current/prior)(triggers)
  Dyspnea has been referred to as the 6th vital sign for patients with COPD.
  Dyspnea is a disabling symptom associated with great distress and suffering for patients with COPD which is a progressive disease.
  Exacerbations occur with increasing frequency over time.
  Increasing dyspnea is the major symptom associated with COPD exacerbation.
  Utilization of a fatigue/breathlessness scale at every home/Telehealth visit
- Level of SOB with exertion (current/prior)
- Level of endurance (current/prior)
- Edema (locations)
The telehealth visit continues......

Via Audio/Video feed

- The nurse asks about the circumstances surrounding the frequent hospitalizations.
  - He explains that when he begins feeling short of breath, and it worsens he panics and goes to the ER.
- The patient is due for a puff of his inhaler during the visit so the nurse asks Mr. L to show her how he uses and maintains his inhaler.
- The nurse has obtained a medication organizer for Mr. Lister and his daughter was present to learn the weekly filling process. His daughter is also present during this visit and they again go over medication reconciliation comparing the printed list left in the home with those listed in the EMR.
- The nurse asks Mr. L about meals and how he adheres to his diabetic and low sodium diet, noting on the referral information the his most recent HgA1C level was outside of acceptable guidelines, reflective of poor control.

The telehealth visit continues......

Patient and Caregiver Education

Because the patient's dyspnea is the symptom that causes the patient to seek care, patient education addressing early identification of worsening breathlessness is critical to early intervention. Use of a “Zone” tool is helpful to many patients as it ties in symptoms green, yellow or red.
Wrapping up the visit….

- Answer any questions
- Confirm next provider visit
- Review with patient and daughter their goals and what they expect from home care.
- Plan for next visit
  - Type of visit
  - When
- Communicate visit information to other members of the health care team (MD, NP, PT, OT, SW) who also have the potential to utilize Telehealth as part of their practice.

A Bump in the Road

Findings during a telehealth visit about 3 weeks into home care services

- Mr. L rates his shortness of breath as worse
- He has had a dry cough over the weekend.
- The nurse points out that these are symptoms in his yellow zone of his action plan.
- Mr. L has orders for use of his as-needed bronchodilator inhaler.
- The nurse instructs him to use a dose during the telehealth visit, which he does with good technique.
- The nurse completes a respiratory assessment
  - Notes no evidence of accessory muscle use
  - Mr. L's other vital signs are stable other than a slight decrease in his oxygen saturation to 91%.
A Hospitalization Avoided!

- The physician is notified immediately
  - This represents a change in his condition
  - There are no further orders at this time other than activating the as-needed inhaler use.
- The nurse collaborates with the physician
  - Home visit scheduled for the next day to reassess Mr. L's respiratory status/response to the medication intervention
- The next day - symptoms are improved.
  - Opportunity for patient education, helping the patient recognize the importance of early intervention in averting symptoms
  - Helps the patient recognize that while the outcome was good, he should not have waited 2 days before letting the nurse know about his worsening dyspnea/cough.
- A telehealth visit is scheduled for the next day but can also be done at the end of the day if needed.
  - When treating a potential exacerbation, it is important to assess Mr. L's response to the as-needed inhaler treatment. A thorough reassessment of his respiratory status will be the primary goal for the visit.
  - If there is no improvement or if the symptoms significantly worsen, the physician will again be notified and an intervention initiated as prescribed.
- Management via both in home/Telehealth visits will continue as the patient’s clinical warrants

Goal Attainment

By utilizing Telehealth as an adjunct to in home nursing visits, the goal is to improve the patient’s self-care management of his disease, keep him safe at home and avoid hospitalizations.

- Improve Quality of Care and Clinical Outcomes
  - Reduce hospital readmissions and ER visits
    - (Focus – first 30 days)
  - Early detection, physician collaboration and intervention
- Improve Patient Compliance
  - Medications, diet, symptom management, weight monitoring
- Provide Immediate Access to Care and Caregivers
- Improve Patient Satisfaction
  - Self-management behavior, quality of life, and confidence
- Improve Physician Satisfaction
  - Providing them with real-time clinical information
Questions

Thank you for joining us today!

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