Early Identification and Reduction of Patient Risk: The Cedars-Sinai Frail Elders Program

Jeff Borenstein, MD, Medical Director Applied Health Services Research
Harriet Aronow, Ph.D., Research Scientist, Nursing Research & Development
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Growing Challenge/Converging Storms

- Increasing population combined with aging population
- More people survive life-threatening illness/injury with resulting burden of chronic illness and/or disability
- By 2050 over 20 million people in U.S. aged 85+
# The Hospital Experience by Age

## Discharges FY 2012

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Length of Stay</th>
<th>All Cause 30d Readmission</th>
<th>Case Mix Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Discharges 18+ (N = 46,470)</td>
<td>5.16</td>
<td>12.08%</td>
<td>1.689</td>
</tr>
<tr>
<td>18 – 44 (n = 14,195; 30.5%)</td>
<td>4.01</td>
<td>7.79%</td>
<td>1.196</td>
</tr>
<tr>
<td>45 – 64 (n = 13,533; 29.1%)</td>
<td>5.56</td>
<td>13.42%</td>
<td>1.947</td>
</tr>
<tr>
<td>65 – 84 (n = 13,786; 29.7%)</td>
<td>5.97</td>
<td>13.96%</td>
<td>1.969</td>
</tr>
<tr>
<td>85 – 109 (n = 4,956; 10.7%)</td>
<td>6.60</td>
<td>16.43%</td>
<td>1.690</td>
</tr>
</tbody>
</table>

Focus on 85+
- Average age 89.5 years; n=594 aged 95 or older (12.1% of the 85+)
- 58.6% Female
- 56.6% Major or Extreme Admission Severity
- 94.8% Discharged Alive; 33.1% Home/Self-Care; 29.4% Home/Home Health Care; 27.5% Skilled or Acute Rehab
- 82.2% with NO days in Intensive Care; Average LOS in ICU = 0.66 days (3.72 days for those with any days)
What do we know about vulnerable, older patients?

• Adverse events during hospital stays increase with age\(^1\)
  – Rates were markedly higher in the elderly

• Approximately 12\% of patients 70 years and older lost independence in one or more ADLs during hospitalization\(^2\)
  – Permanent loss in ADL function was associated with older ages

• Older age is a risk factor for delirium, associated with
  – Higher rates of death, medical complications and prolongation of hospital stay\(^3,4\)
  – Greater risk of re-hospitalization and institutionalization

*Excluding Rehabilitation, Ob-Gyn, Pediatrics.
CS Medicine – Best Practices

• As part of Cedars-Sinai Medicine, evidence-based medicine is applied to all care. Aim is to improve the utilization profile without sacrificing quality.

• Over 50 teams with more than 300 physicians have been convened to establish these best practices that consider appropriateness, efficiency, effectiveness, progression and outcomes across the entire continuum.

• Best practices development and implementation are focused at high volume and/or high impact conditions or services. We look for opportunities to reduce utilization – and therefore cost – by eliminating aspects of diagnosis, treatment and care that are not supported by evidence.

• Sometimes doing the right thing for patients takes more resources rather than fewer—but often, the same or better outcomes

• Within the Medical Center, over 80% of the discharges are impacted by best practices.
Central Role of Nursing

• Nurses are the primary caregivers for older patients in hospitals
• Nurses are generally not fully prepared to care for older patients
• Nursing models can improve older patients’ care and decrease hospital costs
• Nursing can be a focal point for stimulating interprofessional care
Our Work at CSMC
Steps to Improve System of Care

• **Prepare Nursing Leaders and Champions**
  – UCLA research collaboration
  – Gerontological Nursing Certification class
  – NICHE Leadership Training Program
  – Become NICHE hospital

• **Collaborative, Interprofessional, Cross-cutting and Cross-setting Improvement Projects**
Research/Quality Improvement Question

Can an interprofessional team improve patient outcomes by identifying frail older adults and implementing preventive care plans in hospitalized older adults?
Team Based Design

• V.P. & Chief Nursing Officer
• Chairman Department of Medicine
• Research Scientist
• Nurse Managers
• Data analyst
• Medical Director, Health Services Research
• Nurse Education Coordinators
• Palliative Care Practitioner
• Nursing Directors (3)
• Private Physicians

• Staff nurses
• Pharmacy leadership
• Psychiatric Liaison
• Acute Rehabilitation services
• Acute (PT/OT/SLP) therapy
• Respiratory therapy
• Information specialists in EHR
• HID
• Clinical Social Worker
• Case Management
Dual Project Tracks

1. Clinical Practice Enhancement / Improvement
   - Early identification of frailty
   - Prompt provision of care
   - Follow-along and discharge hand-off
   - Spread and sustainability of assessment and interventions

2. Evidence Based Research / Evaluation
   - Epidemiology of Frailty
   - Evaluation of interventions / patient outcomes
   - Evaluation of organizational outcomes
     - Training, culture, infrastructure i.e. workflow
Project Aim

Develop a preventive approach to frailty in acute care settings that would result in improved patient outcomes for “at risk” adults

→ Reliable identification of risk factors and frailty criteria
→ Design of clinical care and supportive care interventions based on individualized needs
→ Improved care team communication, patient/family communication and coordination

→ Desired outcomes
  → Decreased adverse events
  → Decreased unplanned readmissions
  → Improved progression of care and patient status
  → Improved care transitions
  → Improved patient/family satisfaction
Prospective Cohort Study of Frailty in Acute Hospital Care – Patient Risks and Adverse Outcomes

Purpose

• Create local evidence of the cross-cutting “frailty factor”
• Demonstrate that we could assess frailty risk in a timely manner
• Identify specific associations of risk factors and adverse hospital outcomes
• Is the prevalence of these patients sufficient to support a unit-based TOC?
Mixed Methods

• Derivation of risk factors/ literature + consensus process

• Patient screening and interviews
  – Three weeks
  – Prospective admissions
  – Within 48 hours of admission

• Chart review
Baseline Risk Factors

• Age 80+
• Admitted from SNF
• Prior unplanned admission w/in 30 days
• 2+ unplanned admissions w/in 6 months
• 4+ active, chronic conditions with one or more not well controlled
• 7+ prescription meds POA
• Unintentional recent weight loss
• PEG tube POA
• Decubitus ulcer(s) POA
• Katz Index of ADL Independence
• PHQ-2 screen for depression
• Cognitive impairment (per BIMS or interviewer)

and the 13 questions of the Vulnerable Elders Survey
Other Chart-based Measures

<table>
<thead>
<tr>
<th>RN Assessments</th>
<th>Modified Beers List Medications*</th>
<th>Co-morbid Conditions Present on Admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PT mobility protocol</td>
<td>• Analgesics</td>
<td>• Charlson Comorbidity Index</td>
</tr>
<tr>
<td>• OT ADL protocol</td>
<td>• Antidepressants</td>
<td>• Other co-morbid conditions associated</td>
</tr>
<tr>
<td>• SLP Communication protocol</td>
<td>• Urinary prescriptions</td>
<td>with Frailty</td>
</tr>
<tr>
<td>• Dysphagia (swallowing) protocol</td>
<td>• Muscle relaxants</td>
<td>– Anemia</td>
</tr>
<tr>
<td>• DC Planning screen → Social Work/Case</td>
<td>• Major tranquilizers</td>
<td>– Deconditioning</td>
</tr>
<tr>
<td>Management referral</td>
<td>• GI prescriptions</td>
<td>– Dehydration</td>
</tr>
<tr>
<td></td>
<td>• Antihypertensives</td>
<td>– Delirium (per chart, CAM data not</td>
</tr>
<tr>
<td></td>
<td>• Cardiac prescriptions</td>
<td>reliable)</td>
</tr>
<tr>
<td></td>
<td>• Antihistamines</td>
<td>– Hemorrhagic CVA</td>
</tr>
<tr>
<td></td>
<td>• Total number of MBL meds</td>
<td>– Hyponatremia</td>
</tr>
<tr>
<td></td>
<td>• 1+ MBL medication</td>
<td>– Altered mental status</td>
</tr>
</tbody>
</table>

* medications with known risks among older adults, listed by drug category

Co-morbid Conditions Present on Admission

- Charlson Comorbidity Index
- Other co-morbid conditions associated with Frailty
  - Anemia
  - Deconditioning
  - Dehydration
  - Delirium (per chart, CAM data not reliable)
  - Hemorrhagic CVA
  - Hyponatremia
  - Altered mental status
Outcome Measures

- **Hospital-acquired infections**
  - pneumonia
  - catheter-associated UTI
  - iv catheter infection
  - bacteremia or sepsis
  - cellulitis
  - MRSA/VRE
  - Clostridium difficile colitis

- **Hospital-acquired pressure ulcers**

- **Falls**

- **Procedure-associated complication**

- **Transfer to a higher level of care (e.g., wards to ICU)**

- **Death**

- **Readmission by 7, 14, and 30 days post-discharge**
Results: Demographics and Hospital Care

- 214 patients interviewed in three weeks
- 58% female
- Mean age = 75 (±13) years
- 31% non-Caucasian
- Majority (74%) discharged home
  - 22% with home health care referral
- Average length of stay = 6 (±6) days
Prevalence of Risk Factors

- Feeding Tube POA
- Decubitus Ulcer(s) POA
- Admitted from a Skilled Nursing...
- Evidence of Recent Unintended...
- 2+ Hospital Admissions with 180 days...
- Cognitive Impairment by BIMS score or...
- 1+ Unplanned Hospital Admission...
- PHQ-2 Depression Screen Positive...
- Katz Activities of Daily Living (ADL)...
- Age 80 years or older
- 7+ Prescription Medications Present...
- 4+ Active Chronic Conditions, with 1+...
# Frailty Risk Factors and Outcomes

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Direction</th>
<th>Outcome Cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recent Unintentional Weight Loss</td>
<td>▲</td>
<td>Falls, HAPU, Procedural Complications, Transfer to ICU</td>
</tr>
<tr>
<td>Potentially Inappropriate Medications</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Cognitive Impairment</td>
<td>▼</td>
<td></td>
</tr>
<tr>
<td>≥ 4 active co-morbid conditions</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Anemia</td>
<td>▲</td>
<td>Hospital Acquired Infections, Adverse Drug Events, LOS &gt;7 days</td>
</tr>
<tr>
<td>Cognitive Impairment</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Decubitus ulcer present on admission</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Functional Impairment</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Malnutrition</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Recent Unintentional Weight Loss</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Anemia</td>
<td>▲</td>
<td>Readmission within 30 days</td>
</tr>
<tr>
<td>Decubitus ulcer present at admission</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Functional impairment</td>
<td>▲</td>
<td></td>
</tr>
<tr>
<td>Hyponatremia</td>
<td>▲</td>
<td></td>
</tr>
</tbody>
</table>
Incidence of Adverse Events and Number of Patient Frailty Characteristics

% Adverse Hospital Events

Number of frailty characteristics

% Readmission within 30 days

Number of frailty characteristics
Conclusions

• No “unified theory” of frailty

• Outcome clusters suggest specific team interventions

• Ample evidence on which to design a test of change
SPICES®

1988; Terry Fulmer PhD, RN, FAAN

“Framework for assessing older adults”

S = Sleep disorders
P = Problems with eating
I = Incontinence
C = Confusion
E = Evidence of falls
S = Skin breakdown
Frailty Inpatient Intervention Overview

**Identification**
- SPICES+, Age 65+
- Primary RN initiates process by reporting a SPICES positive patient

**Assessment**
- Geriatric RN completes assessment with patient
- SW completes social assessment with patient
- PharmD completes medication assessment
- Physician reviews electronic health record

**Huddle**
- RN, SW, MD, PharmD, Frailty Coordinator
- Findings discussed and recommendations summarized

**Care Plan Communication**
- Recommendations for inpatient care communicated and documented in a CS Link note
- Attending MD contacted by one team member to discuss recommendations
- Primary RN notified about unit care team interventions, volunteers, or requests for MD orders

**Follow Up Hand Over**
- Progression of Care rounds to follow recommendations
- Monitor for new findings, new recommendations
- Discharge frailty plan is created summarizing frailty findings and recommendations for hand over to continuing care providers
Table of Assessments and Interventions

<table>
<thead>
<tr>
<th>TEAM ASSESSMENT</th>
<th>SUGGESTED INTERVENTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium Risks</td>
<td>Delirium prevention protocol</td>
</tr>
<tr>
<td>• Sweet-16 score &lt;14 = cognitive impairment</td>
<td>• Sleep hygiene</td>
</tr>
<tr>
<td>• Hearing or vision problems</td>
<td>• Early mobilization protocol</td>
</tr>
<tr>
<td>• Pain that is intolerable or greatly bothers</td>
<td>• Mealtime mates, Volunteer visit</td>
</tr>
<tr>
<td>• Nausea that is intolerable or greatly bothers</td>
<td>• Management of Beers List medications</td>
</tr>
<tr>
<td>• Problems sleeping</td>
<td>• Frequent cognitive reorientation by Nursing Unit staff</td>
</tr>
<tr>
<td>• Foley / restraints present</td>
<td>• Discontinue Foley, use restraint alternatives, if possible</td>
</tr>
<tr>
<td>• Pain that is intolerable or greatly bothers</td>
<td>• Treatment for unremitting symptoms (e.g., pain management)</td>
</tr>
</tbody>
</table>

CAM (delirium screen) positive

<table>
<thead>
<tr>
<th>Psychiatry Consultation/Delirium Prevention Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risks for Adverse Hospital Outcomes</td>
</tr>
<tr>
<td>• Braden score &lt;=18, recent weight loss, Beers List medications</td>
</tr>
<tr>
<td>• Morse score &gt;=45, Beers List medications</td>
</tr>
<tr>
<td>• Lack of Social Support</td>
</tr>
<tr>
<td>• Lack of ADL’s – Katz</td>
</tr>
<tr>
<td>• Nutritional triggers met</td>
</tr>
<tr>
<td>• PT and/or OT triggers met</td>
</tr>
<tr>
<td>• Communication triggers met</td>
</tr>
<tr>
<td>• Swallowing triggers met</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pharmacy assessment</th>
<th>Medication management</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Beers List medication</td>
<td>• Discontinuation, equivalent substitution, dose reduction</td>
</tr>
<tr>
<td>• Non-Beer’s list medication</td>
<td>• Dosing adjustment or other recommendations as appropriate</td>
</tr>
</tbody>
</table>

Continued ...
### Social work assessment

- Evidence of downward health trajectory
- Caregiver burden, cultural accommodation, community resource underutilization
- ≥ 4 active co-morbid conditions, anemia, cognitive impairment, decubitus ulcer present on admission, functional impairment, malnutrition, recent unintentional weight loss

### Social work interventions

- Advanced care planning, palliative care referral, as appropriate
- Case management referral, patient/caregiver education
- Early discharge planning; establish goals of therapy if not clear or agreed among patient, family, and caregivers

<table>
<thead>
<tr>
<th>Interprofessional, post-acute care recommendations</th>
<th>Frailty post-acute care plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Anemia, decubitus ulcer present at admission, functional impairment, hyponatremia</td>
<td>- Emphasis on coordination with primary care physician for close follow-up, evaluation and management of underlying health and psychosocial issues</td>
</tr>
</tbody>
</table>
Frailty Assessment SmartText Screenshot

<table>
<thead>
<tr>
<th>Call Sedation</th>
<th>Date of Assessment: 6/19/2012</th>
</tr>
</thead>
</table>

### Skin Breakdown
- **Braden Score:** 16
  - A score of <18 indicates a risk for pressure ulcers
- **Skin Assessment:** Wound + With Symptoms

### Problem Eating
- **BMI:** 25-31
- Less than 80% ideal weight or BMI less than 18, Yes
- Recent unintentional weight loss (greater than 10 lbs OR other evidence) over the past year, Yes
- **Nutritional Screen:** Unexplained weight loss (Recent) / Anorexia / Bulimia, Difficulty maintaining adequate oral food intake, Debilitated surgical patient (80 years old or older), Pressure ulcer Stage I - IV or full thickness non-pressure wound
- **Other evidence of problem eating:** Yes (Comment)

### Incontinence
- **Urinary Incontinence:** Yes (Comment)
- **Fecal Incontinence:** No
- **Other evidence of incontinence:** No

### Risk Factors for Delirium
- **Impaired Hearing:** Yes
- **Foley Present:** Present - No Symptoms
- **Restraints Present:** No
- Patient has pain that is intolerable or greatly bothers, Yes
- Patient has nausea that is intolerable or greatly bothers, Yes

### Confusion
- **Mental Status:** Presence of Deconditioning, Delirium
- **Impaired cognition of daily activities:** Yes
- **Other evidence of confusion:** Yes (Comment)
- **SWEET16 Total Score = 10**
  - A score of <14 indicates cognitive impairment
- **CAM POSITIVE:** No
- Consider Diagnosis of Delirium if either 1a or 1b are positive and either 2 is positive and either 3a or 5b are positive.

### Evidence of Falls
- **MORSE = 25**
  - A score of = or > 45 indicates a risk for falls
- **Katz Total Score:** 5
  - A score of < 5 indicates lack of independence in ADL
- **Other evidence of Falls:** Yes (Comment)

### Sleep Disorders
- Less than 4 hrs/nights, states difficulty falling or staying asleep = Yes
- **Other evidence of Sleep Disorders:** Yes (Comment)

### Other Risk Factors
1. Use of prescribed or over-the-counter drugs in excess of the directions, or any non-medical use of drugs: Yes (Comment)
2. Physical Therapy Screen Total Score = 3
   - A score of = or > 3 suggests a need for PT consult
3. **Occupational Therapy Screen Total Score:** 3
   - A score of = or > 3 suggests a need for OT consult
4. **Triggers for Speech/Language Pathology:** Difficulty expressing wants/needs, Difficulty understanding basic commands or information, Slurred speech
5. **Triggers for Swallowing Evaluation:** Complaints of swallowing problems, Coughs during eating, Swallowing, or taking medications, and/or slurred speech. Unable to handle secretions or has persistent wet/dry cough.
6. Patient has experienced a decline in functioning: Yes
7. **Social Support:** Positive for lack of support if < 2 people on any items asked - ask patient about social interaction with family (relatives), friends, and neighbors. Yes, positive for lack of support

### Psycho-social Frailty Assessment:
- [PSYCHO-SOCIAL ASSESSMENT: 20473](#)

### Summary of Problems Identified:
- [PROBLEMS IDENTIFIED: 20473](#)

### Summary of Interdisciplinary Recommendations:

#### Pharmacy Recommendations:
- [PHARMACY RECOMMENDATION: 20480](#)

#### Non-Pharmacy Recommendations:
- [INTERDISCIPLINARY RECOMMENDATION: 20493](#)

### Follow-up:
- [PRESENT AT THE HUDDLE (FULL NAME AND CREDENTIALS): ](#)
# SmartList

## Psycho-social Frailty Assessment:
- Per ***: {PSYCHO-SOCIAL ASSESSMENT:20478}

## Summary of Problems Identified:
- {PROBLEMS IDENTIFIED:20479}

## Summary of Interdisciplinary Recommendations:

### Pharmacy Recommendations:
- Per ***:

### Non-Pharmacy Recommendations:
- {INTERDISCIPLINARY RECOMMENDATIONS:20480}

## Follow-up:
- ***

## Present at the Huddle (Full Name and Credentials):

### Evidence of Downward health/functional trajectory over last three months
- Concern for safe discharge/transition
- Evidence of caregiver coping and/or burden issues affecting ability to safely provide care
- Concern regarding cultural accommodations and affect on health
- Inadequate existing/accessed community resources
- Non-compliant with prior recommendations

### Delirium Risk
- Delirium
- Nutrition
- Mobility
- Activities of Daily Living
- Vision
- Hearing
- Communication
- Swallowing
- Cognition
- Sleep
- Alcohol/Substance abuse
- Social support
- Other: ***

### Early mobilization Protocol
- Pressure Ucer Precautions
- Sleep Hygiene
- Fall Precautions
- Volunteer Visit
- Request for Psychiatry C&L
- PT consult
- OT consult
- Speech/ Language Pathology consult
- Clinical Nutrition consult
- Swallowing consult
- Request order to discontinue foley
- Consider alternatives to restraints due to high risk for delirium
- Frequent cognitive reorientation
- Palliative care consult
- Advance care planning
- Other: ***
Frailty Completed Note

<table>
<thead>
<tr>
<th>Psycho-social Frailty Assessment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per Concern for safe discharge/transition, Evidence of caregiver coping and/or burden issues affecting ability to safely provide care, Inadequate existing/accessed community resources and Non-compliant with prior recommendations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Summary of Problems Identified:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility, Activities of Daily Living and Social support</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Summary of Interdisciplinary Recommendations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacy Recommendations: Per no recomendations,</td>
</tr>
<tr>
<td>Non-Pharmacy Recommendations: Early mobilization Protocol, Fall Precautions, Volunteer Visit, PT consult, OT consult, Speech/ Language Pathology consult and Advance care planning</td>
</tr>
</tbody>
</table>
Risks Identified

Frequently occurring risks identified among patients seen by Frailty Team through May 2012 included:

<table>
<thead>
<tr>
<th>Frailty Risk</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Therapy Trigger</td>
<td>74</td>
<td>86.0%</td>
</tr>
<tr>
<td>Occupational Therapy Trigger</td>
<td>59</td>
<td>68.6%</td>
</tr>
<tr>
<td>Psychosocial</td>
<td>54</td>
<td>62.8%</td>
</tr>
<tr>
<td>Medication-Related</td>
<td>53</td>
<td>61.6%</td>
</tr>
<tr>
<td>Problem Sleeping</td>
<td>50</td>
<td>58.1%</td>
</tr>
<tr>
<td>Cognitive Impairment</td>
<td>46</td>
<td>53.5%</td>
</tr>
<tr>
<td>Nutrition Trigger</td>
<td>42</td>
<td>48.8%</td>
</tr>
<tr>
<td>Lack Independence in ADLs (Katz)</td>
<td>41</td>
<td>47.7%</td>
</tr>
<tr>
<td>Decline in Function</td>
<td>35</td>
<td>40.7%</td>
</tr>
</tbody>
</table>
Recommendations

Frequently occurring recommendations among patients seen by Frailty Team through May 2012 included:

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep Hygiene</td>
<td>56</td>
<td>65.1%</td>
</tr>
<tr>
<td>Physical Therapy Evaluation</td>
<td>54</td>
<td>62.8%</td>
</tr>
<tr>
<td>Medication-Related</td>
<td>46</td>
<td>53.5%</td>
</tr>
<tr>
<td>Volunteer Services</td>
<td>45</td>
<td>52.3%</td>
</tr>
<tr>
<td>Occupational Therapy Evaluation</td>
<td>43</td>
<td>50.0%</td>
</tr>
<tr>
<td>Palliative Care</td>
<td>36</td>
<td>41.9%</td>
</tr>
</tbody>
</table>

- May occur in clusters addressing a specific risk, e.g.,
  Delirium risk ➔ Sleep Hygiene, Volunteer Services, Frequent rounding, Discontinue Foley/restraints, etc.
- Average number of recommendations = 4.9 (median = 4, range = 1 – 12)
## Identifying Vulnerable Health States

### Most Common Discharge Diagnoses (≥3% prevalence)

**Patients in the Frailty Pilot Evaluation**

<table>
<thead>
<tr>
<th>Base MS-DRG</th>
<th>Cases (n,%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal Failure</td>
<td>20 (5.8%)</td>
</tr>
<tr>
<td>Heart Failure/shock</td>
<td>18 (5.2%)</td>
</tr>
<tr>
<td>Septicemia w/o mechanical ventilation 96+ hrs</td>
<td>17 (5.5%)</td>
</tr>
<tr>
<td>Kidney/Urinary tract infections</td>
<td>15 (4.4%)</td>
</tr>
<tr>
<td>Intracranial hemorrhage/cerebral infection</td>
<td>12 (3.5%)</td>
</tr>
<tr>
<td>Respiratory infection/Inflammation</td>
<td>12 (3.5%)</td>
</tr>
<tr>
<td>Esophagitis, gastroenteritis/miscellaneous</td>
<td>12 (3.5%)</td>
</tr>
<tr>
<td>digestive disease</td>
<td></td>
</tr>
</tbody>
</table>
## Pilot Program Demographics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases (n)</td>
<td>51</td>
<td>292</td>
</tr>
<tr>
<td>Age (years)</td>
<td>81.9</td>
<td>80.8</td>
</tr>
<tr>
<td>% Female</td>
<td>62.7%</td>
<td>62.3%</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>3.9%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Black</td>
<td>21.6%</td>
<td>15.4%</td>
</tr>
<tr>
<td>White</td>
<td>72.5%</td>
<td>79.5%</td>
</tr>
<tr>
<td>Other</td>
<td>2.0%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Medicare/Traditional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indemnity (%)</td>
<td>98.0%</td>
<td>92.8%</td>
</tr>
</tbody>
</table>
## Pilot SPICE Demographics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SPICE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin Breakdown</td>
<td>68.6%</td>
<td>43.7%</td>
</tr>
<tr>
<td>Problems eating</td>
<td>31.4%</td>
<td>28.7%</td>
</tr>
<tr>
<td>Incontinence</td>
<td>31.4%</td>
<td>22.9%</td>
</tr>
<tr>
<td>Confusion</td>
<td>19.6%</td>
<td>13.3%</td>
</tr>
<tr>
<td>Evidence of falls</td>
<td>96.1%</td>
<td>92.5%</td>
</tr>
</tbody>
</table>
Severity of Illness

APR-DRG Severity of Illness on Admission

% of Cases

Intervention  Control

Severity of Illness:
- Minor
- Moderate
- Major
- Extreme
Severity of Illness

Numbers of SPICES Present within 24 Hours of Admission

% of Cases

Intervention  Control

1 2 3 4 5

1 2 4 5

0% 10% 20% 30% 40% 50%
Preliminary Pilot Results

<table>
<thead>
<tr>
<th>Group</th>
<th>Cases (n)</th>
<th>Average # of SPICES on Admission</th>
<th>Length of Stay Expected (days)</th>
<th>Length of Stay Observed (days)</th>
<th>Average ICU Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>51</td>
<td>2.5</td>
<td>6.92</td>
<td>5.57</td>
<td>0.1</td>
</tr>
<tr>
<td>Control</td>
<td>292</td>
<td>2.0</td>
<td>5.39</td>
<td>5.70</td>
<td>0.3</td>
</tr>
</tbody>
</table>

*SPICES = Skin breakdown, Problems eating, Incontinence, Confusion, Evidence of falls, Sleeping disorder recorded within 24 hours of hospital admission by Nursing

Average Difference in Expected and Observed LOS in Intervention versus Control Groups = -1.7 days (p=0.011)
Building Systems to Achieve Greater Efficiency and Reliability

• Internal stakeholder engagement, evolution of team-based, interprofessional care
• Streamlining and augmenting inpatient processes
  – Revising Frailty assessment note
  – Building a follow-up note and post-acute care plan
• Examining effectiveness and sustainability through a rigorous program evaluation
  – Cluster, randomized controlled trial of 10 Nursing units to study impact on adverse inpatient events, adjusted length of stay, and readmissions
• Implementing the post-acute frailty care plan as part of a transitional model including advanced practice nurses and post-discharge follow-up
• Partnering with community-based service providers and other community resources