Medical comorbidity in the elderly

Chandini Sharma, MD, FACP
Geriatric Center of Tulsa
June 7, 2019
people with severe mental illness lose 25–30 years of normal life expectancy.
Definition

**Comorbidity**: is defined as “any distinct additional entity that has existed or may occur during the clinical course of a patient who has the index disease under study”

**MULTIMORBIDITY**
defined as the co-occurrence of multiple chronic or acute diseases and medical conditions in one person. Usually >2 disease qualify as Multimorbidity.
Total world population growth from 1800–2050
United States birth rate (births per 1000 population).[27] The United States Census Bureau defines baby boomers as those born between mid-1946 and mid-1964 (shown in red).[21]
The iconic image of the Baby Boom generation
On January 1, 2011, the oldest Baby Boomers turned 65. Every day for the next 19 years, about 10,000 more will cross that threshold. By 2030, when all Baby Boomers will have turned 65, fully 18% of the nation’s population will be at least that age, according to Pew Research Center population projections.
Multimorbidity is the new Co-morbidity
More than half of people 65 and older have 3+ chronic conditions

Boyd, CM, Fortin M. Public Health Reviews, 2011.
Number of chronic comorbidities by age stratum. The number of comorbidities increases with age and is larger in individuals 65 years and older. 2012
Prevalence, expenditures, and complications of multiple chronic conditions in the elderly.

Landmark study in 2002
National cross-sectional analysis
1.2 Million pts
Claims based
>65 yrs
Randomized sample

Method

Multiple logistic regression was used to analyze the influence of age, sex, and number of types of chronic conditions on the risk of incurring inpatient hospitalizations for ambulatory care sensitive conditions and hospitalizations with preventable complications among aged Medicare beneficiaries.
Prevalence

• 88% of the population aged 65 years and older have 1 chronic condition.
  Projected to be 157 M in 2020

• 65% of 65 yr had MULTIMORBIDITY ( 57M in yr 2000 )
  Projected to be 81M in 2020
Social determinants of health

Individuals with multiple chronic conditions have clinical needs that may differentiate them from persons with a single chronic condition.
Evidence of the impact of socioeconomic deprivation is also clear as onset of multimorbidity occurs 10-15 years earlier in people living in the most deprived areas compared with those living in the least deprived areas.
75% percent of all US health care expenditures are related to the treatment of chronic conditions.\textsuperscript{1}

\textsuperscript{1} Wolff JL \textit{Arch Intern Med.} 2002 Nov 11
Expenditure

Per capita Medicare expenditures increased with the number of types of chronic conditions from $211 among beneficiaries without a chronic condition to $13,973 among beneficiaries with 4 or more types of chronic conditions.
Expenditure

Nearly two thirds of elderly beneficiaries had 2 or more types of chronic conditions and accounted for 95% of Medicare expenditures.

66% of total health care spending is directed toward care for the approximately 27% of Americans with MCC.
Preventable admission & readmit

Medicare beneficiaries with 4 or more chronic conditions were 99 times more likely than a beneficiary without any chronic conditions to have an admission for an Ambulatory Care Sensitive Condition (95% confidence interval)
Approximately 10% of all hospitalizations were for ACSCs.

90% were for following 4 conditions: bronchopneumonia (48%), volume depletion (16%), ischemic heart disease and hypertension (19%), and cerebrovascular disease and hypertension (7%).
Prevalence, expenditures, and complications of multiple chronic conditions in the elderly

**Figure.** Inpatient hospitalizations associated with avoidable events. ACSCs indicates ambulatory care sensitive conditions; MDC, major diagnostic category.
<table>
<thead>
<tr>
<th>MDC</th>
<th>% With ≥4 Conditions</th>
<th>Mean Expenditures for All Patients, $</th>
<th>Prevalence of Type of Condition, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myeloproliferative</td>
<td>80</td>
<td>19,839</td>
<td>2</td>
</tr>
<tr>
<td>Kidney</td>
<td>74</td>
<td>18,896</td>
<td>6</td>
</tr>
<tr>
<td>Hepatobiliary</td>
<td>72</td>
<td>17,123</td>
<td>1</td>
</tr>
<tr>
<td>Blood and immunological</td>
<td>67</td>
<td>13,366</td>
<td>4</td>
</tr>
<tr>
<td>Nervous system</td>
<td>66</td>
<td>13,516</td>
<td>12</td>
</tr>
<tr>
<td>Digestive</td>
<td>63</td>
<td>13,093</td>
<td>4</td>
</tr>
<tr>
<td>Mental</td>
<td>62</td>
<td>12,537</td>
<td>13</td>
</tr>
<tr>
<td>Ear, nose, throat</td>
<td>62</td>
<td>9,686</td>
<td>2</td>
</tr>
<tr>
<td>Respiratory</td>
<td>60</td>
<td>14,303</td>
<td>15</td>
</tr>
<tr>
<td>Female reproductive</td>
<td>59</td>
<td>10,364</td>
<td>1</td>
</tr>
<tr>
<td>Skin, subcutaneous tissue, and breast</td>
<td>54</td>
<td>8,978</td>
<td>8</td>
</tr>
<tr>
<td>Eye</td>
<td>50</td>
<td>6,296</td>
<td>20</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>48</td>
<td>8,230</td>
<td>25</td>
</tr>
<tr>
<td>Male reproductive</td>
<td>46</td>
<td>6,668</td>
<td>11</td>
</tr>
<tr>
<td>Endocrine, nutritional, and metabolic</td>
<td>41</td>
<td>6,941</td>
<td>43</td>
</tr>
<tr>
<td>Circulatory</td>
<td>38</td>
<td>7,521</td>
<td>58</td>
</tr>
</tbody>
</table>

*The following MDCs were excluded: pregnancy (MDC14), newborn (MDC15), infectious and parasitic diseases (MDC18), alcohol/drug (MDC20), injury (MDC21), burns (MDC22), other factors (MDC23), and human immunodeficiency virus (MDC25).*
Table 2. Summary of Chronic Disease Prevalence and Annual Costs by Age Group

<table>
<thead>
<tr>
<th>No. of Chronic Conditions*</th>
<th>65-69</th>
<th>70-74</th>
<th>75-79</th>
<th>80-84</th>
<th>≥85</th>
<th>Total</th>
<th>%</th>
<th>Mean Expenditures, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>25.7</td>
<td>195</td>
<td>18.9</td>
<td>203</td>
<td>15.2</td>
<td>205</td>
<td>12.6</td>
<td>222</td>
</tr>
<tr>
<td>1</td>
<td>20.4</td>
<td>999</td>
<td>18.0</td>
<td>1073</td>
<td>16.0</td>
<td>1175</td>
<td>14.9</td>
<td>1271</td>
</tr>
<tr>
<td>2</td>
<td>22.2</td>
<td>2055</td>
<td>22.5</td>
<td>2186</td>
<td>21.6</td>
<td>2348</td>
<td>20.9</td>
<td>2677</td>
</tr>
<tr>
<td>3</td>
<td>16.0</td>
<td>4227</td>
<td>18.7</td>
<td>4328</td>
<td>19.9</td>
<td>4597</td>
<td>20.4</td>
<td>4997</td>
</tr>
<tr>
<td>≥4</td>
<td>15.7</td>
<td>14109</td>
<td>21.9</td>
<td>13774</td>
<td>27.3</td>
<td>13857</td>
<td>31.2</td>
<td>13975</td>
</tr>
<tr>
<td>Overall age group</td>
<td>100.0</td>
<td>3609</td>
<td>100.0</td>
<td>4548</td>
<td>100.0</td>
<td>5424</td>
<td>100.0</td>
<td>6160</td>
</tr>
</tbody>
</table>

*Mean number of chronic conditions for age groups were as follows: 65-69 years, 1.88; 70-74 years, 2.25; 75-79 years, 2.52; 80-84 years, 2.71; ≥85 years, 2.71; and total group, 2.34.
Conclusion

Better primary care, especially coordination of care, could reduce avoidable hospitalization rates, and ACSC
Evidence indicates that chronic conditions cluster, and that persons with 1 chronic condition are more likely to have other conditions.
Patterns of Multimorbidity in Middle-Aged and Older Adults

Conditions such as diabetes, hypertension, and asthma are the epicenter of disease clusters for multimorbidity

Dawit T. Zemedikun, Mayo clinic proceedings July 2018
eCQM measures for 2019 are HgA1c and HTN control.
Conclusion

Clinicians whose specialty focuses on these conditions need to be aware of the high proportion of their patients with multiple chronic conditions and to know how to coordinate their care with other clinical providers.
Rapid decline

Moreover, persons with multiple chronic conditions may have more rapid declines in health status and a greater likelihood of disability.
Conclusion

Poor coordination of clinical services may predispose persons with multiple chronic conditions to errors of both omission and commission, such as adverse drug-drug interactions.
Changing landscape

While single-disease prevalence has increased slightly, multimorbidity has increased significantly 10 times higher
Possible reasons

There are many potential reasons for this 40% increase in the prevalence of multimorbidity including

Unhealthy behaviors as well as

Improved understanding of conditions and advances in medical technology leading to longer survival

Greater aptitude to live with many conditions
Epidemiology

The demand placed on health services by increasing numbers of older adults with chronic diseases is compounded by earlier onset of chronic disease that is accompanying increasingly sedentary lifestyles and undesirable dietary behaviors.
Sophisticated pharmacological therapies, disease management programs, and patient education efforts have been developed in an attempt to prevent progression of specific chronic conditions and to improve ongoing disease management.\textsuperscript{3,4}

BUT NO SUCH PROGRAMS EXIST FOR MCC
Other influences on MCC

living alone has been shown to be independently associated with hospital use

LONELINESS IS A DISEASE
Health literacy, multimorbidity, and patient-perceived treatment burden in individuals with cardiovascular disease

• A Danish population-based study by Karina Friis
• 2017
• Population based survey
Highlights

• Treatment burden is defined as everything that patients do to manage a condition.

• The treatment burden is high in multimorbid patients with cardiovascular disease.

• The treatment burden is high in patients with low health literacy.

• Individuals with both low health literacy and multimorbidity are the most burdened.
Conclusion of the study

If individuals find it difficult to understand health information, there is a risk they might feel overwhelmed by the treatment. Which then places them at added risk of non-adherence and worsening of ALL conditions.
Practice implications

Healthcare professionals should be aware of health literacy challenges in planning medical treatment particularly for patients with both low health literacy levels and multimorbidity.
MultiCare Cohort Study

• Multicenter, prospective, observational cohort study of 3,189 multimorbid patients aged 65+ randomly selected from 158 GP practices
• Multimorbidity is a phenomenon with high burden and high prevalence in the elderly
The influence of age, gender and socio-economic status on multimorbidity patterns in primary care

Multimorbidity is a phenomenon with high burden and high prevalence in the elderly. Previous research has shown that multimorbidity can be divided into the multimorbidity patterns of

1) anxiety, depression, somatoform disorders (ADS) and pain, and
2) cardiovascular and metabolic disorders.

However, it is not yet known, how these patterns are influenced by patient characteristics.
Two patterns of multimorbid patients

Cardiovascular and metabolic disorders
- more often male,
- older age
- lower socio-economic status

ADS and pain-related morbidity
- more often female
- Equally distributed across age
- Equally distributed across socio-economic groups.

Schafer, BMC Health Services Research 2012, 12:89
IMPACT

The impact of multiple chronic conditions represents more than the sum of their parts
Evidence for nonlinearity of relationship of number of systems abnormal with frailty

Fried 2008
Multimorbidity

• For an elderly when you review a chart, see a lots of chronic diseases. Then you enter the room. You are greeted by a robust elderly who enthusiastically sat up in bed, eager to tell you all that happened to them and what brought them to the ER!

• That is Multimorbidity
• Chart looks sicker than the patient
## Impact - GERD, CAD stable, OAB

### GI
- Scope
- Pills
- Diet
- Excercise

### Cardio
- PCI
- Pills
- Diet
- Excercise

### Urology
- Scope
- Pills
- Bladder training

**FULL TIME JOB**
- Of patient
- And Caregiver

**Dementia**

---
Multimorbidity and HRQOL

- Simple counts of diseases don’t tell the whole story
- Physical more than mental health deteriorated with increasing multimorbidity
- Perceived social support and self-perception of economic status were significantly related to all scales of the SF-36 ($p < 0.05$)

- Increased multimorbidity adversely affected HRQOL
Impact of Number of Chronic Conditions on Life Expectancy

Average Life Expectancy at Age 67
By Leading Causes of Chronic Disease Death

Chronic Conditions
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10+

Average Life Expectancy (Years)

Heart  Cancer  COPD  Stroke  Alzheimer's

What is Multimorbidity?