

## HCSDB Issue Brief

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# The Importance of Quality-of-Life Measures for People with Chronic Conditions

Patient-reported health outcomes are vital to helping clinicians and public health officials understand the holistic burden of disease. Indeed, more federally funded studies now collect a range of patient-reported measures to assess the effects of chronic illness, disability, and treatment. One such measure is quality of life in the context of health and disease—known as health-related quality of life (HRQOL). Recent research recommends monitoring HRQOL to assess quality of care, particularly for patients with multimorbidity—two or more chronic conditions at the same time—given that the care of these patients may account for two-thirds of health care expenditures (Markovski et al. 2019). HRQOL is also a focus of the Healthy People 2020 initiative (Office of Disease Prevention and Health Promotion 2010).

This issue brief examines how poor health-related quality of life varies by number and types of chronic conditions that Military Health System beneficiaries face (including cardiovascular, metabolic, respiratory, mental health, and other diagnosed conditions).

- The share of beneficiaries with poor HRQOL was 10 to 15 percent overall, but higher if beneficiaries had less than a four-year college degree or were retirees, and lower if beneficiaries were under age 35, never married, or were either inactive reservists or family members of active duty or (active or inactive) reservists.
- Overall, 56 percent of beneficiaries reported at least one diagnosed health condition, and 13 percent reported 3 or more such conditions; beneficiaries with cardiovascular diseases were significantly more likely than those with other types of conditions to have 3 or more co-occurring conditions.
- Fair or poor general health and frequent physical distress were most common among beneficiaries with angina or CHD, followed by those with an autoimmune disease; more than one-quarter of beneficiaries with anxiety or depression reported frequent physical distress and frequent activity limitations, despite the fact that mental health conditions were less likely than physical health conditions to be co-occurring.
- Rates of poor HRQOL grew almost exponentially as the number of diagnosed conditions grew; after controlling for demographic differences, the odds of poor HRQOL were 7 to 20 times higher for beneficiaries with three or more conditions than for those with no reported conditions.

This issue brief examines how HRQOL varies by disease morbidity among beneficiaries in the military health system. In the Health Care Survey of Department of Defense Beneficiaries (HCSDB), the HRQOL measures consist of four questions from the Healthy Days Core Module, developed by the Centers for Disease Control and Prevention (CDC).<sup>1</sup> These measures have also been incorporated into national and state surveys such as the Behavioral Risk Factor Surveillance System (BRFSS).

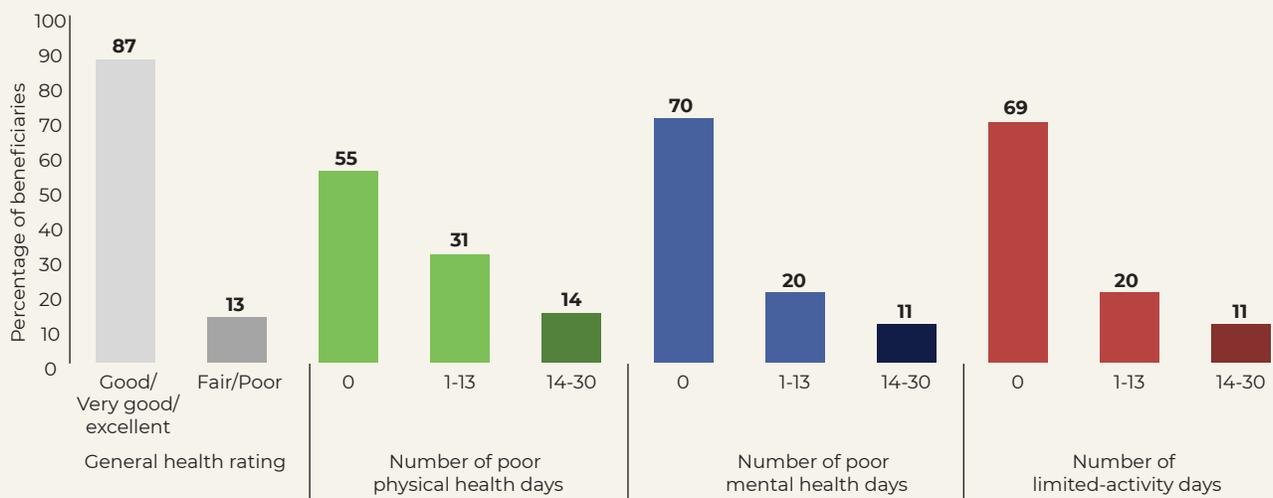
We used these measures to derive indicators for poor HRQOL. Based on CDC (2000) conventions, we defined poor HRQOL as (1) a general health rating of fair or poor (versus good, very good, or excellent), (2) frequent physical distress (that is, reports that physical health was not good for 14 or more days in the past month), (3) frequent mental distress (defined similarly as frequent physical distress, but based on mental health), or (4) frequent activity limitations (that is, reports that poor physical or mental health kept them from doing their usual activities for 14 or more days in the past month).

This brief summarizes the prevalence of poor HRQOL overall and by type of disease morbidity, based on the presence of any of the following chronic health conditions:

- **Cardiovascular:** Heart attack, angina or coronary heart disease (CHD), stroke
- **Metabolic:** Diabetes or high blood sugar, high cholesterol
- **Respiratory:** Asthma, chronic obstructive pulmonary disease (COPD), emphysema
- **Mental health:** Depression, anxiety
- **Other:** Cancer, osteoporosis, autoimmune disease

We also discuss the relationship between poor HRQOL and the number of diagnosed health conditions to estimate how multimorbidity affects HRQOL. Although the cross-sectional nature of the HCSDB precludes us from determining if disease morbidity contributes to poor HRQOL or vice versa, poor quality of life is known to be a major consequence of multimorbidity; in particular, this is because people who have several conditions might need to visit many providers and

**Figure 1. Prevalence of good versus poor HRQOL, by measure**



Note: We defined poor HRQOL (denoted by the darkest bars) as a fair or poor general health rating or 14 or more days in the past month with either poor physical health, poor mental health, or activity limitations.

**Table 1. Prevalence of fair or poor health, by demographic characteristic**

| Characteristic   | Fair or poor general health rating |                             |
|--|------------------------------------|-----------------------------|
|  | 2017–2019 HCSDB<br>(n = 3,064)     | 2014 BRFSS<br>(n = 201,781) |
| <b>Gender</b>  |                                    |                             |
| Men  | 14%                                | 14%                         |
| Women  | 13%                                | 16%                         |
| <b>Age category*</b>   |                                    |                             |
| 18–24  | <b>8%</b>                          | 8% <sup>1</sup>             |
| 25–34  | <b>8%</b>                          | 12% <sup>1</sup>            |
| 35–44  | 14%                                |                             |
| 45–54  | 14%                                |                             |
| 55–64  | 15%                                | 20% <sup>1</sup>            |
| 65+  | 16%                                | n.a.                        |
| <b>Race and ethnicity*</b>   |                                    |                             |
| Latino   | 17%                                | 23% <sup>2</sup>            |
| Non-Latino white   | <b>12%</b>                         | 13% <sup>2</sup>            |
| Non-Latino black   | 16%                                | 19% <sup>2</sup>            |
| Non-Latino Asian   | <b>12%</b>                         |                             |
| Non-Latino multiracial   | 15%                                | 13% <sup>2</sup>            |
| Other/unknown  | 17%                                |                             |
| <b>Marital status*</b>   |                                    |                             |
| Never married  | <b>7%</b>                          | 14%                         |
| Married  | 15%                                | 12%                         |
| Divorced/annulled/separated/widowed  | 15%                                | 26%                         |
| Unknown  | 14%                                | n.a.                        |
| <b>Education attainment*</b>   |                                    |                             |
| High school graduate/GED/less  | <b>16%</b>                         | 21% <sup>3</sup>            |
| Some college/two-year degree   | <b>16%</b>                         |                             |
| Four-year college graduate   | 9%                                 | 10% <sup>3</sup>            |
| Some graduate school/more  | 10%                                |                             |
| <b>Beneficiary type*</b>   |                                    |                             |
| Active duty/active reservist   | 9%                                 | n.a.                        |
| Inactive reservist/family of active duty or (active or inactive) reservist | 6%                                 | n.a.                        |
| Retiree (age < 65) or dependent of retiree                                 | <b>16%</b>                         | n.a.                        |
| <b>Insurance plan type</b>   |                                    |                             |
| Prime enrollee with military primary care manager                          | 10%                                | n.a.                        |
| Prime enrollee with civilian primary care manager                          | 11%                                | n.a.                        |
| Standard/Extra   | 9%                                 | n.a.                        |
| Age 65+ (Medicare)   | 13%                                | n.a.                        |

Note: Beneficiaries self-report their general health rating (which was missing for 552 beneficiaries analyzed). Statistical significance is based on an omnibus chi-square test, but bolding reflects demographic subgroups that had a 5 percent difference or more in the share with fair/poor health compared with other demographic subgroups for that characteristic.

<sup>1</sup>The BRFSS age categories reported were 18–25, 26–44, and 45–64.

<sup>2</sup>The BRFSS race/ethnicity categories reported were Hispanic, non-Hispanic white, non-Hispanic black, and other.

<sup>3</sup>The BRFSS education categories reported were less than high school, high school graduate/GED, and more than high school. We used a weighted average to calculate the prevalence reported in the table for high school or less.

\*Statistically significant difference in the prevalence of fair or poor health across demographic subgroups ( $p < 0.05$ ).

n.a. = not available or not applicable.

follow varying and sometimes conflicting treatment recommendations (Markovski et al. 2019). To maximize our sample size (given the low prevalence of some of the health conditions), we combined three years of data from the HCSDB administered in the third quarter of 2017, 2018, and 2019.<sup>2</sup>

## Prevalence of poor HRQOL

HCSDB respondents' general health ratings were in line with measures of distress (Figure 1). The vast majority reported having good, very good, or excellent general health. The share of beneficiaries with poor HRQOL was 10 to 15 percent.

Fair or poor general health was least common among beneficiaries who were under age 35, never married, or were either inactive reservists or family members of active duty or (active or inactive) reservists; it was also less common among Non-Latino white and non-Latino Asian beneficiaries than other racial or ethnic groups (Table 1). Fair or poor general health was most common among beneficiaries who had less than a four-year college degree or were retirees.

The prevalence of fair or poor health among the demographic subgroups shown in Table 1 was largely similar to estimates that Zhao et al. (2018) reported among working-age adults, based on their analysis of

the 2014 BRFSS (BRFSS respondents had a mean age of 41 versus 51 among HCSDB respondents). But the BRFSS showed a higher rate of fair or poor health than the HCSDB for respondents who were ages 45 to 64, Latino, either previously married or never married, and for those with a high school education/GED or less.

## Types and Extent of Disease Morbidity

The prevalence of diagnosed health conditions ranged from 2 percent for stroke to 31 percent for high cholesterol (Table 2). Overall, 44 percent of beneficiaries had none of the 10 reported conditions, whereas 26 percent had 1 condition, 16 percent had 2 conditions, and 13 percent had 3 or more conditions (data not shown).<sup>3</sup> Beneficiaries with cardiovascular diseases (specifically, a heart attack or angina/CHD) were significantly more likely than beneficiaries with other types of conditions to have 3 or more diagnosed conditions ( $p < 0.05$ ).

## Variation in HRQOL by Disease Morbidity

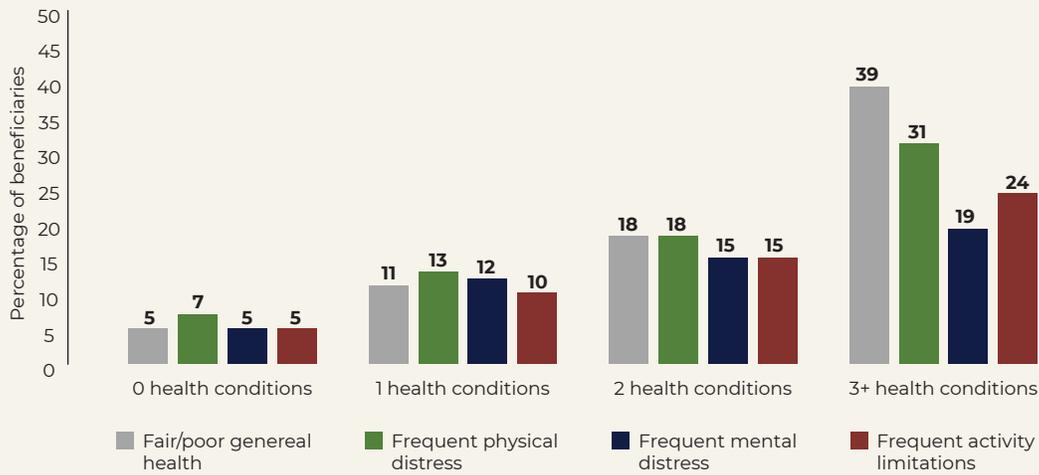
We found that the rates of poor HRQOL grew as the number of diagnosed conditions grew (Figure 2). The rise in fair or poor general health was greater than the rise in other poor HRQOL measures, but

**Table 2. Prevalence of comorbidity, by diagnosed health condition**

| Condition                    | Overall | Number of diagnosed conditions among beneficiaries with any condition |              |               |
|------------------------------|---------|---|--------------|---------------|
|                              |         | 1 condition   | 2 conditions | 3+ conditions |
| Stroke                       | 2%      | 9%  | 31%          | 60%           |
| Heart attack                 | 4%      | 9%  | 17%          | 74%           |
| Angina or CHD                | 5%      | 5%  | 19%          | 76%           |
| Autoimmune disease           | 5%      | 24%   | 27%          | 48%           |
| Osteoporosis                 | 6%      | 17%   | 30%          | 53%           |
| Asthma, COPD, or emphysema   | 10%     | 23%   | 32%          | 45%           |
| Cancer                       | 10%     | 23%   | 32%          | 45%           |
| Diabetes or high blood sugar | 15%     | 16%   | 33%          | 50%           |
| Depression or anxiety        | 19%     | 36%   | 30%          | 34%           |
| High cholesterol             | 31%     | 31%   | 34%          | 35%           |

Note: Percentages may not sum to 100 because of rounding.

**Figure 2. Prevalence of poor HRQOL, by number of diagnosed conditions**

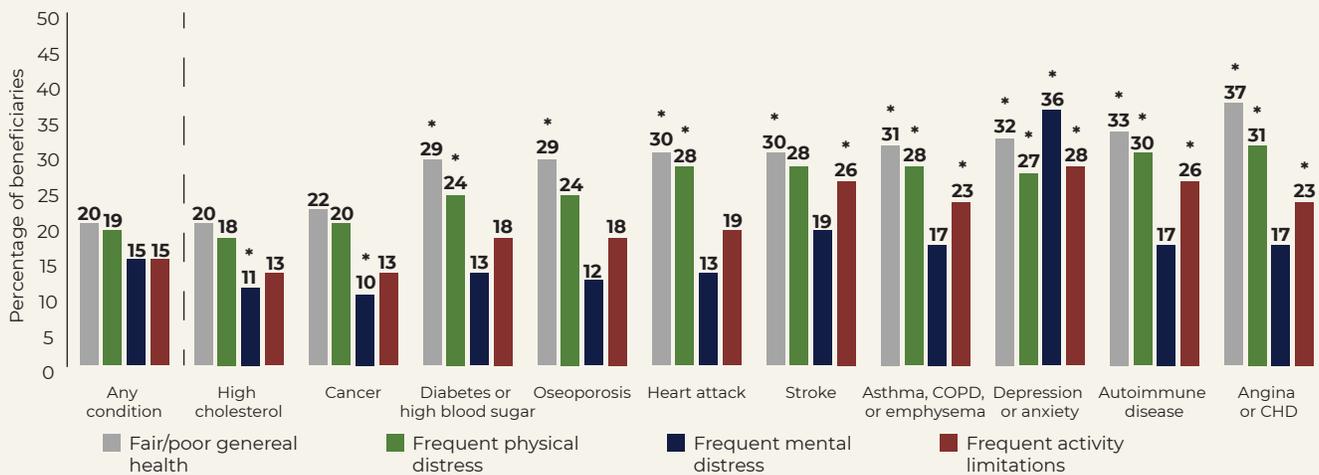


was not as extreme as that seen among working-age adults in the 2014 BRFSS (Zhao et al. 2018). In the 2014 BRFSS, the prevalence of fair or poor general health was 4 percent (vs. 5 percent in the HCSDB) for people with none of the reported chronic conditions or disability, 11 percent (same as in HCSDB) for people with one chronic condition or disability, 25 percent (vs. 18 percent in the HCSDB) for people with

two chronic conditions or disability, and 55 percent (vs. 39 percent in the HCSDB) for people with three or more chronic conditions or disability.<sup>4</sup>

We also estimated the prevalence of poor HRQOL among beneficiaries with any of the 10 health conditions reported and among beneficiaries with each specific condition (Figure 3). Fair or poor general health and frequent physical distress were

**Figure 3. Prevalence of poor HRQOL, by diagnosed health condition**



\*Statistically significant difference in the prevalence of poor HRQOL compared with beneficiaries with any condition ( $p < 0.05$ ).

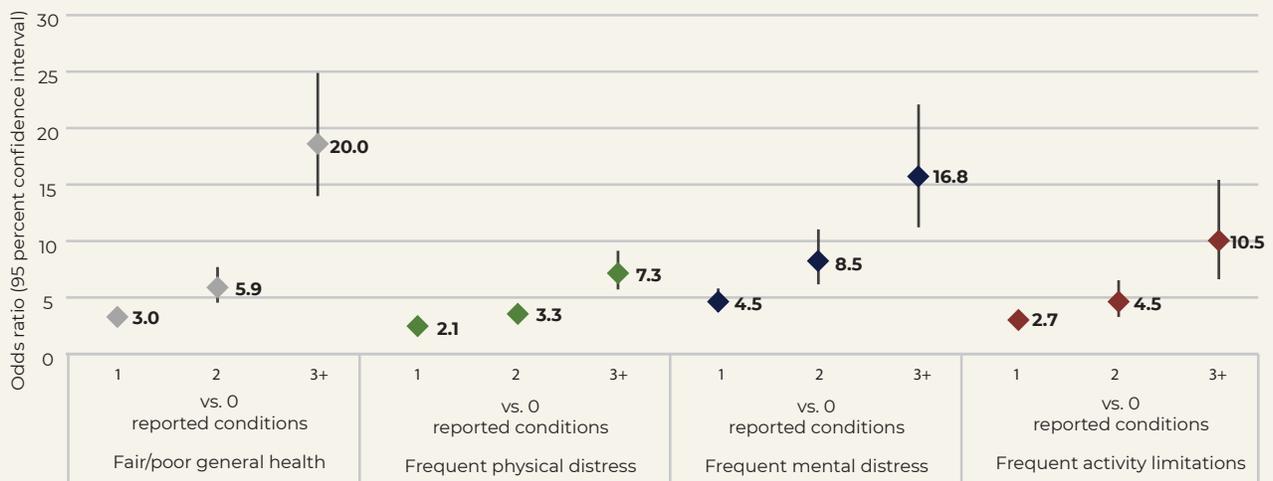
most common among beneficiaries with angina or CHD, followed by those with an autoimmune disease. Frequent mental distress was most common among beneficiaries with depression or anxiety and was least common among beneficiaries with high cholesterol or cancer. Although mental health conditions were less likely than physical health conditions to be co-occurring (Table 2), more than one-quarter of HCSDB beneficiaries with anxiety or depression reported frequent physical distress. Frequent activity limitations were most common among beneficiaries with depression/anxiety, stroke, or autoimmune disease.

Finally, to examine the association between poor HRQOL and the extent of disease morbidity, we ran four logistic regression models, one for each HRQOL measure. These models had an indicator for poor HRQOL as the outcome measure and the number of diagnosed conditions as the covariate of interest, and they controlled for gender, age category, race/ethnicity, marital status, education attainment, and beneficiary

type. Based on the models, we calculated adjusted odds ratios, defined as the odds of having versus not having poor HRQOL among beneficiaries with 1, 2, or 3 or more diagnosed health conditions, divided by the odds of having versus not having poor HRQOL among those with none of the 10 reported conditions.

After controlling for demographic differences, we found that the odds of poor HRQOL increases almost exponentially as the number of chronic conditions increases. Having one diagnosed condition doubled the odds of the beneficiary reporting frequent physical distress, almost tripled the odds of a fair or poor general health rating or activity limitations, and nearly quintupled the odds of frequent mental distress, compared with beneficiaries with none of the reported conditions (Figure 4). The odds of poor HRQOL were even higher for beneficiaries with two conditions, and for those with three or more conditions, the odds of poor HRQOL were 7 to 20 times higher. All odds ratios were statistically significant ( $p < 0.05$ ).

**Figure 4. Adjusted odds of poor health, by number of diagnosed conditions**



Note: The odds ratio reflects the odds of having versus not having poor HRQOL among people with one, two, or three or more conditions, divided by the odds of having versus not having poor HRQOL among people with none of the reported conditions. All odds ratios were greater than 1.0 and were statistically significant ( $p < 0.05$ ).

## Conclusions and Implications

The HCSDB population is not fully representative of the general U.S. population (because, for example, there are more young males among the survey respondents). However, the results of our analyses follow similar patterns to those seen in previous studies of representative samples of the U.S. population. For example, our findings on the prevalence of cardiovascular diseases, asthma, and diabetes and the extent of co-occurring conditions were similar to the estimates from the 2007 BRFSS for a sample of almost 431,000 adults (Chen et al. 2011). We also found that quality of life diminishes as the number of chronic conditions grows, which is consistent with findings from a recent meta-analysis by Markovski et al. (2019).<sup>5</sup> However, our findings diverged from those of Markovski et al. (2019) in that, among the HCSDB beneficiaries, the extent of disease morbidity had a greater impact on the mental health measure of poor HRQOL than on the physical health measure.

Caring for patients who have several co-occurring conditions is immensely resource intensive—not only because of age, clinical complexity, and activity limitations (Johns Hopkins Bloomberg School of Public Health 2010), but also because of uncoordinated care, duplicated tests, and unnecessary hospitalizations (Markovski et al. 2019). An analysis by Johns Hopkins (2010) revealed that 66 percent of total health care spending goes toward about 27 percent of Americans who have multimorbidity; compared with patients who have

no chronic conditions, spending for patients with one chronic condition is almost 3 times greater—and about 17 times greater for patients with five or more chronic conditions. Compounding the issue is that health care systems are still largely oriented toward treating single diseases, and some systems lack clinical guidelines for dealing with multimorbidity (Markovski et al. 2019).

Guidelines such as those from the National Institute for Health and Care Excellence (2016) could help providers better tailor care for people with multiple chronic conditions. For example, providers should be aware of the treatment burden that these patients face. They should think about how different health conditions interact, whether treatments for those conditions could cause dangerous side effects when used together, and the risks and benefits of treating a single health condition only. They should also seek to organize care more efficiently, considering the need for care coordination and the relative disease burden of specific conditions (which may change over time). Finally, they should consider how all of these factors affect the patients' HRQOL, and they should actively involve patients in planning their care.

The number of Americans living with chronic conditions is expected to rise quickly—from about 155 million at present to over 170 million by 2030 (Johns Hopkins Bloomberg School of Public Health 2010). It is therefore critical to ensure that physicians have the proper training to care for people with multiple chronic conditions, especially as the population ages.

## Source

"Q3 FY2019 Health Care Survey of Department of Defense Beneficiaries." N = 8,708. The response rate was 8.6 percent. The survey was fielded from March 5 to May 21, 2019.

"Q3 FY2018 Health Care Survey of Department of Defense Beneficiaries." N = 11,840. The response rate was 11.8 percent. The survey was fielded from March 1 to May 18, 2018.

"Q3 FY2017 Health Care Survey of Department of Defense Beneficiaries." N = 11,691. The response rate was 11.7 percent. The survey was fielded from March 1 to May 15, 2017.

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## Endnotes

<sup>1</sup> For details on the CDC HRQOL-4 scale, see [https://www.cdc.gov/hrqol/hrqol14\\_measure.htm](https://www.cdc.gov/hrqol/hrqol14_measure.htm).

<sup>2</sup> For people who were surveyed in more than one year, we prioritized the year with the highest number of health conditions reported, or if the number was equal across years, the most recent year.

<sup>3</sup> Among beneficiaries with one or more health conditions, the most frequent diagnoses and comorbid conditions were as follows: high cholesterol (17 percent), depression/anxiety (12 percent), diabetes/high blood sugar with high cholesterol (6 percent), diabetes/high blood sugar (4 percent), cancer (4 percent), high cholesterol with depression/anxiety (4 percent), asthma/COPD/emphysema (4 percent), high cholesterol with cancer (3 percent), autoimmune disease (2 percent), and asthma/COPD/emphysema with depression/anxiety (2 percent).

<sup>4</sup> Chronic conditions reported in the 2014 BRFSS were diabetes, coronary heart disease, stroke, current asthma, arthritis, cancer, COPD, a history of depression, and kidney disease; disability was defined as any type of limitation in any activities because of physical, mental, or emotional problems, or any health problem that required the use of special equipment

<sup>5</sup> Markovski et al. (2019) examined the effect of the number of chronic diseases on either quality of life or HRQOL, whichever was measured in the 39 studies analyzed.