INTRODUCTION
Patient characteristics and comorbidity were similar between patients with and without depression symptoms. Among patients with T2DM with depression symptoms, the Charlson Comorbidity Index (CCI) was 2.3 (1.9) compared to 2.0 (1.5) among those without depression symptoms (p<0.001). There were no significant differences in age (60.3 vs. 60.1 years), race (24.2% Hispanic, 62.1% Non-Hispanic White, 13.6% Non-Hispanic Black), or gender (53.0% female, 47.0% male). Study Limitations
Health-Related Quality of Life
Among patients with T2DM, depression symptoms were associated with poorer health-related quality of life (HRQOL) compared to those without depression symptoms (p<0.001). Among patients with T2DM and depression symptoms, the mean SF-12v2 physical component summary score was 47.4 (9.3) compared to 52.6 (10.2) among those without depression symptoms (p<0.001). A greater percentage of respondents with depression symptoms reported greater daily activity impairment compared to those without depression symptoms (Figure 1).

RESULTS
Depression symptoms in patients with T2DM were associated with poorer diet, exercise, glucose monitoring, and medication adherence, which result in worse clinical outcomes.

OBJECTIVE
The purpose of this analysis was to quantify the additive burden associated with experiencing depression symptoms in patients with type 2 diabetes mellitus (T2DM) on healthcare utilization, work productivity, and health-related quality of life (HRQOL).

METHODS
Study Design
Data were obtained from the 2008 U.S. National Health and Wellness Survey (NHWS), an annual cross-sectional study of the health status, healthcare attitudes, behaviors, and outcomes of a nationwide sample of adults (aged 18+). Data were collected through self-administered, Internet-based questionnaires.

Study Measures
Depression Symptoms
Among patients with T2DM who were employed full-time, those with depression symptoms experienced substantial work impairment that was significantly greater than that experienced by those without depression symptoms. Adjusting for demographics and comorbidity, depression symptoms were associated with a 4.3% (p<0.001) greater lost productivity while working, 15.2% (p<0.001) greater lost productivity while working, and 19.4% (p<0.001) greater work impairment.

Comorbidity and Severity
Depression symptoms also experienced significantly greater impairment in their daily activities. Adjusting for demographics and comorbidity, patients with depression symptoms also experienced 21.4% (p<0.001) greater impairment in daily activities when compared to T2DM patients without depression symptoms. The Work Productivity and Activity Impairment (WPAI) questionnaire was used to assess absenteeism (work time missed), presenteeism (impairment at work), and work productivity loss (overall work impairment) for full-time employees and activity impairment for all respondents.

RESULTS (continued)
Healthcare Resource Utilization
Among patients with T2DM and depression symptoms, those who experienced depression symptoms were 1.7 (p<0.001) times as likely to visit the emergency room, 1.6 (p<0.001) times as likely to be hospitalized, and had 2.2 (p<0.001) additional provider visits compared to T2DM patients without depression symptoms. Patients with T2DM and depression symptoms were also more likely to visit the emergency room, be hospitalized, and have additional provider visits compared to patients with T2DM without depression symptoms.

Work Productivity and Activity Impairment
Among patients with T2DM who were employed full-time, those with depression symptoms experienced significantly greater work impairment compared to those without depression symptoms. Adjusting for demographics and comorbidity, depression symptoms were associated with a 4.3% (p<0.001) greater lost productivity while working, 15.2% (p<0.001) greater lost productivity while working, and 19.4% (p<0.001) greater work impairment.

Stressful Events
The Work Productivity and Activity Impairment (WPAI) questionnaire was used to assess absenteeism (work time missed), presenteeism (impairment at work), and work productivity loss (overall work impairment) for full-time employees and activity impairment for all respondents.

Healthy Resource Utilization
Among patients with T2DM who were employed full-time, those with depression symptoms experienced substantial work impairment that was significantly greater than that experienced by those without depression symptoms. Adjusting for demographics and comorbidity, depression symptoms were associated with a 4.3% (p<0.001) greater lost productivity while working, 15.2% (p<0.001) greater lost productivity while working, and 19.4% (p<0.001) greater work impairment.

Work Productivity Loss and Activity Impairment
Among patients with T2DM, depression symptoms were associated with poorer diet, exercise, glucose monitoring, and medication adherence, which result in worse clinical outcomes.

DISCUSSION and CONCLUSION
Among patients with T2DM, depression symptoms are associated with a significant burden on healthcare resource utilization, work productivity, and HRQOL.

The greater healthcare resource utilization corresponds to an increase in direct healthcare costs. Assuming a 40 hour work week and a work year of 50 weeks, the 13.4% greater work productivity loss of T2DM patients with depression symptoms was associated with an additional 26.8 hours or 6.7 weeks of lost productivity per year per person compared to patients with depression but no depression symptoms.

It has been suggested that a three point change in SF-36 score, and by extension in SF-12v2 score, is clinically meaningful. The adjusted differences in SF-12v2 physical and mental component summary scores between T2DM patients with and without depression symptoms were not only statistically significant but had meaningful clinical implications.

Follow-up analyses of T2DM patients with both depression symptoms versus patients with neither demonstrated even greater burden of illness.

Proper management of patients with both T2DM and comorbid depression may reduce humanistic and economic burden of disease.

REFERENCES

RESULTS
Health-Related Quality of Life
Among patients with T2DM, those experiencing depression symptoms had greater healthcare resource utilization than those without depression symptoms. Adjusting for demographics and comorbidity, T2DM patients with depression symptoms were 1.7 (p<0.001) times as likely to visit the emergency room, 1.6 (p<0.001) times as likely to be hospitalized, and had 2.2 (p<0.001) additional provider visits compared to T2DM patients without depression symptoms.

Figure 1: Unadjusted Effects of Depression Symptoms on HealthCare Resource Utilization in the Past Six Months

Figure 2: Unadjusted Effects of Depression Symptoms on Work Productivity Loss and Activity Impairment

Figure 3: Unadjusted Effects of Depression Symptoms on HRQOL (SF-8)

Table 1: Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>With Depression Symptoms (n=2,712)</th>
<th>Without Depression Symptoms (n=4,410)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female</td>
<td>48.2%</td>
<td>48.5%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age – Mean (SD)</td>
<td>55.0 (12.4)</td>
<td>55.3 (12.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>% Non-white</td>
<td>24.5%</td>
<td>21.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CCI – Mean (SD)</td>
<td>2.3 (1.9)</td>
<td>2.0 (1.5)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Among respondents who are employed full-time.

Table 1: Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>With Depression Symptoms (n=2,712)</th>
<th>Without Depression Symptoms (n=4,410)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female</td>
<td>48.2%</td>
<td>48.5%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age – Mean (SD)</td>
<td>55.0 (12.4)</td>
<td>55.3 (12.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>% Non-white</td>
<td>24.5%</td>
<td>21.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CCI – Mean (SD)</td>
<td>2.3 (1.9)</td>
<td>2.0 (1.5)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Among respondents who are employed full-time.

Table 1: Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>With Depression Symptoms (n=2,712)</th>
<th>Without Depression Symptoms (n=4,410)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Female</td>
<td>48.2%</td>
<td>48.5%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age – Mean (SD)</td>
<td>55.0 (12.4)</td>
<td>55.3 (12.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>% Non-white</td>
<td>24.5%</td>
<td>21.7%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CCI – Mean (SD)</td>
<td>2.3 (1.9)</td>
<td>2.0 (1.5)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Among respondents who are employed full-time.