INTRODUCTION

- Diabetes is among the most prevalent and costly conditions worldwide.
  - 7.2% of the United States (US) population (23.1 million people) was diagnosed with diabetes in 2015.
  - The estimated total economic cost of diagnosed diabetes in 2012 was $245 billion in the US.
- Diabetes is one of the major risk factors for cardiovascular disease (CVD), which has been the leading cause of death for Americans for decades.
- Plant-based, or vegetarian, diets, have been shown to be associated with reduced risk of diabetes, CVD, and cancer.
- As a result of improvements in health outcomes, the direct and indirect costs associated with these diseases can be avoided with appropriate nutritional modifications.

OBJECTIVES

- The aim of the study was to evaluate the economic impact of switching to vegetarian diets among patients with type 2 diabetes from the US societal perspective.

METHODS

Overview

- The annual direct and indirect costs due to type 2 diabetes are initially calculated based on the following:
  - US population size
  - Type 2 diabetes prevalence
  - Annual per-patient costs associated with diabetes
- Based on diabetes rate reductions reported in the literature, and assuming that 50% of patients follow a vegetarian diet, the number of patients with diabetes is reported with and without vegetarian diet uptake, and costs are recalculated.
- Calculations were carried out using Microsoft Excel 2013.

Inputs

- Model inputs are shown in Table 1.
- The percentage of diabetics among the vegetarians and non-vegetarians is calculated as 5.21% and 6.89%, respectively, assuming that overall type 2 diabetes prevalence (7.2% x 95%) is a weighted average based on the percentage of vegetarians and the odds ratio for the association between a vegetarian diet and diabetes.
- Annual per-patient costs were calculated based on the reported number of diabetics in the US in 2012 (23.2 million), the overall direct and indirect costs ($176 billion and $69 billion, respectively), and the consumer price index to inflate the estimates to 2017 US dollars.

Outcomes and Analyses

- Total direct, indirect, and overall costs are reported in 2017 US dollars.
- Sensitivity analyses are conducted for diabetes rate reductions reflecting different diet types and by varying diet uptake rates.

RESULTS

- A 12% reduction (~2.7 million patients) in the number of patients with diabetes was estimated with the adoption of a vegetarian diet (Figure 1).
- This led to $23.8 billion and $9.3 billion in savings of direct and indirect costs, respectively, summing to an overall $33.1 billion in savings (Figure 2).
- In sensitivity analyses, the savings doubled with 100% adoption and varied between $3.2 billion and $6.6 billion when different risk reduction figures and vegetarian diet types were considered (Table 2).

CONCLUSION

- The results from this economic assessment suggest that the adoption of a vegetarian diet will result in considerable savings in direct and indirect costs in the US.
- The type of vegetarian diet chosen may have a significant role in the amount of savings predicted.

REFERENCES


Table 1. Model Inputs

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>US population size</td>
<td>326,098,770</td>
<td>10</td>
</tr>
<tr>
<td>Percent vegetarian</td>
<td>3.2%</td>
<td>11</td>
</tr>
<tr>
<td>Diabetes prevalence</td>
<td>7.2%</td>
<td>2</td>
</tr>
<tr>
<td>Percent of diabetics with type 2 diabetes</td>
<td>95%</td>
<td>2</td>
</tr>
<tr>
<td>Odds ratio for the association between a vegetarian diet and diabetes</td>
<td>0.756</td>
<td>5</td>
</tr>
<tr>
<td>Annual per-patient direct cost associated with diabetes</td>
<td>$9,946</td>
<td>2.9</td>
</tr>
<tr>
<td>Annual per-patient indirect cost associated with diabetes</td>
<td>$3,507</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Table 2. Sensitivity Analyses Results

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Net Economic Impact (billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25% vegetarianism uptake</td>
<td>-$16.5</td>
</tr>
<tr>
<td>100% vegetarianism uptake</td>
<td>-$66.1</td>
</tr>
<tr>
<td>OR*: 0.589 (lower CI)</td>
<td>-$69.0</td>
</tr>
<tr>
<td>OR*: 0.971 (upper CI)</td>
<td>-$55.4</td>
</tr>
<tr>
<td>OR*: 0.593 (regen diet)</td>
<td>-$61.8</td>
</tr>
</tbody>
</table>

* Odds ratio for the association between a vegetarian diet and diabetes. Key CI = confidence interval, OR = odds ratio.