

# Appendix 11

## HEALTH BENEFITS LITERATURE REVIEWS

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## Introduction

The City of Eugene Community Climate and Energy Action Plan (CEAP) will foster significant emissions reductions in Eugene by recommending specific actions to mitigate and adapt to climate change. The implementation of certain actions in the CEAP can be linked to health benefits as described in this report.

This report is intended to complement the Health Impact Assessment completed by Upstream Public Health that analyzes health impacts of land use and transportation recommendations included in the CEAP. This report is an effort to demonstrate that there are likely health impacts associated with many of the recommendations in the CEAP.

The literature reviews include information about the health impacts associated with three CEAP actions, one each from the Urban Natural Resources, Food and Agriculture, and Health and Social Services sections. The recommendations that are reviewed are:

- 1) Increase planting, preservation, and maintenance of trees and shrubs;
- 2) Educate community members on the importance of food choice as a significant component of a climate-friendly lifestyle (e.g., encourage less consumption of carbon intensive foods such as red meat and dairy);
- 3) Strengthen current hunger relief systems to handle increased short-term and long-term demand.

## Scope

The limited resources available for this report restricted the scope of the literature reviews to three actions from the CEAP. It is likely that additional literature reviews covering other recommendations in the CEAP would be informative.

## Methodology

Actions were selected for this literature review based on advice from several experts regarding the extent of existing research relating to each action. The actions selected were those expected to have related peer reviewed research that could demonstrate significant findings.

Once an action was selected, related peer-reviewed research papers were gathered and reviewed for evidence of the possible health impacts. Literature reviews were conducted for one action each of the Urban Natural Resources, Food and Agriculture, and Health and Social Services sections of the CEAP.

## Findings

A summary of the literatures reviews of the Urban Natural Resources, Food and Agriculture, and Health and Social Services sections of the CEAP are detailed in this report. Key findings from this review include:

- Eating less meat and dairy products contributes to decreased risk of cardiovascular disease, obesity, type II diabetes, and some cancers.
- Urban trees can reduce extreme heat events and associated heat illness and improve air quality, reducing respiratory illness.
- Personal access to sufficient quantity and quality of foods is likely to prevent some chronic diseases.

## Food & Agriculture

**What are the health benefits of reducing consumption of carbon intensive foods (those associated with high greenhouse gas emissions, such as red meat and dairy products)?**

Research indicates that eating less meat and dairy products contributes to a wide range of health benefits including lowered risk of cardiovascular disease, obesity, type 2 diabetes, and some cancers.<sup>1</sup>

Lowering red meat consumption can decrease the level of total fat and protein intake, which can lead to lower weight, cholesterol levels, and blood pressure.<sup>2</sup> Eating red meat increases the risk for heart related diseases<sup>3</sup>, elevated risk of certain cancers, and increased odds of premature death.<sup>4</sup>

Individuals who avoid meat but consume dairy products have lower cholesterol levels than those who consume meat.<sup>5</sup> Additionally, the consumption of dairy products has been linked to certain cancers.<sup>6</sup> For instance, a study indicated that women consuming more than one glass of milk per day have a 73 percent greater chance of ovarian cancer than women who drink less than one glass per day.<sup>7</sup>

Individuals that do not eat food of animal origin consume greater quantities of fruit and vegetables providing a variety of health benefits including lower blood cholesterol concentrations, a lower incidence of stroke, and a lower risk of mortality from stroke and heart disease.<sup>8</sup> Such foods and nutrients can also be protective against certain cancers.<sup>9</sup>

Encouraging reduced consumption of red meat and dairy products will not only have an impact on greenhouse gas emissions but may also improve overall public health.

## Urban Natural Resources

What are the health benefits to increasing planting, preservation, and maintenance of trees and shrubs?

Urban trees benefit public health in two key ways by helping to reduce extreme heat events and associated heat-related illness, and by improving air quality and reducing associated respiratory illness.

High temperatures can have negative effects on public health in urban areas. Numerous epidemiological studies of extreme temperatures conducted in Europe and North America have shown a positive association between heat waves and mortality.<sup>10</sup> Vulnerable populations such as senior citizens, women, children, and people with mental illness or physical disabilities are often the most greatly affected.<sup>11</sup> Increasing tree cover in urban areas can help moderate the heat island effect and reduce temperatures.<sup>12</sup> The heat island effect occurs when inner urban environments absorb and retain heat often resulting from a pavement dominated city landscape.

In addition to causing heat related illness, higher temperatures can make air-quality problems more severe and can increase the production of ground-level ozone and smog. Recent studies suggest there are serious risks from long-term *exposure* to high levels of ozone. One study found that in urban areas across the United States, the amount of ozone in the air is sufficient to cause measurable changes in lung function, respiratory symptoms, and airway inflammation in healthy people engaged in normal outdoor exercise and recreational activities.<sup>13</sup>

Finally, urban tree plantings have been shown to decrease particulate air pollution. Because small changes in air pollution can have relatively considerable impacts on air quality and human health, the effects of urban forests on air pollution can be significant.<sup>14</sup> The size of particles is directly linked to their potential for causing health problems. Small particles, less than 10 micrometers in diameter, can get deep into lungs and may even enter the bloodstream affecting both the lungs and heart.<sup>15</sup> A nationwide modeling study found that urban trees remove approximately 711,000 *metric tons* of air pollution annually in the US.<sup>16</sup> The combined effects of trees on air pollutants are significant enough that increasing urban trees could be a viable means to improving air quality and helping meet clean air standards in the United States.<sup>17</sup>

Because trees improve air quality and reduce exposure to extreme temperatures, there is strong evidence that planting and maintaining urban trees will improve overall public health.

## Health & Social Services

What are the health benefits to strengthening current hunger relief systems to handle increased short-term and long-term demand:

Access to appropriate quantities of nutritious food is important for the health of all members of the community. While proper nutrition for adults may improve general health and contribute to the prevention and treatment of chronic diseases, food security is even more critical for children. An inadequate food supply in a child's early years decreases his/her chance of enjoying good health throughout his/her life. According to one study, food-insecure infants and toddlers showed an increased likelihood of fair to poor general health and of experiencing health problems requiring hospitalization. Definitive results from the study suggest that ensuring food security will reduce health problems, including the need for hospitalizations.<sup>18</sup>

The benefits of adequate food intake for school age children have been confirmed by a study investigating relationships between food insufficiency and cognitive, academic, and psychosocial outcomes for US children. The study found that children from 6 to 11 years old, from food-sufficient households, had significantly higher math scores, were less likely to have repeated a grade, seen a psychologist, or had difficulty getting along with other children.

The benefits of secure access to food are relevant in both genders and all age groups as demonstrated in a 2003 study examining the relationship between food insufficiency and physical, mental, and social health in Canada. Individuals from food-sufficient households had significantly lower odds of having poor functional health, restricted activity, beneficial multiple chronic conditions, and of suffering from major depression and distress. Individuals in food-insufficient households were more likely to report heart disease, diabetes, high blood pressure and food allergies, and women in food-insufficient households were and more likely to be obese.<sup>19</sup>

Alleviating hunger and providing more secure access to food at the community level can increase quality of life and decrease the incidence of chronic illness in the community.

## Conclusion

Improved public health serves as one of the many co-benefits of implementing selected actions from the Urban Natural Resources, Health and Social Services and Food and Agriculture sections of the CEAP. Current research indicates there are positive health benefits resulting from eating less meat and dairy products, increasing planting, preservation, and maintenance of trees and shrubs, and strengthening current hunger relief systems.

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