

# Executive Summary

## Community Climate Choices Health Impact Assessment

Climate change may pose serious risks to public health. Significant shifts in the climate are already happening. The Third National Climate Assessment found that as the climate continues to change, Oregon will likely experience more frequent heat waves and wildfires, an increase in asthma and other respiratory diseases, changes in disease patterns, and diminishing water quality and quantity [1]. Curbing climate change is a critical public health issue and national public health officials support efforts across the nation to reduce greenhouse gas (GHG) emissions.

The recommendations offered in this Community Climate Choices Health Impact Assessment (CCC HIA) will be considered during Phase 3 of Metro's Climate Smart Communities Scenarios (CSCS) Project, underway in the Portland, Oregon metropolitan region. The focus of the project is to understand and choose the best way to reduce GHG emissions through transportation and land use strategies. The CSCS Project seeks to reduce GHG emissions by reducing per capita vehicle miles traveled (VMT) for light duty-vehicles and by investing in technologies that reduce emissions.

## Community Climate Choices Health Impact Assessment Scope

Geography: Portland, Oregon metropolitan region within the Urban Growth Boundary

Timeline: 2010 (base year) to 2035 (horizon year)

Scenarios - adopted local and regional plans with:

A: existing revenues

B: increased revenues from existing sources

C: new plans, policies and revenue sources

Exposure pathways: physical activity, traffic safety, air quality, land use

Quantitative tool: Integrated Transportation Health Impact Model (ITHIM)

Other considerations: magnitude of health costs associated with health pathways, vulnerable populations.

Health Impact Assessment (HIA) is a way to consider how a policy or plan affects community health before the final decision is made. By providing objective, evidence-based information, HIA can increase positive health effects and mitigate unintended health impacts. The Public Health Division of Oregon Health Authority (PHD) conducted this assessment at Metro's request, with funds provided by the Center for Disease Control and Prevention's Healthy Community Design Initiative.

Investments in land use and transportation systems that reduce GHG emissions positively impact health by increasing physical activity, reducing traffic collisions and improving air quality. PHD and Metro agreed that the CCC HIA is necessary to better inform Metro and its partners in the selection of a final scenario by December 2014.

## Key findings

This analysis found that the strategies under consideration to reduce GHG emissions also result in important health benefits in all exposure pathways, including increased physical activity, fewer traffic injuries and less exposure to air pollutants. These changes are likely to reduce illness and death in the region.

Through a literature review including 348 peer-reviewed articles and government reports linking the built environment to health, PHD found most of the land use strategies under consideration for the CSCS Project promote health. Evidence shows that elements such as level of residential density, land use mix, the number of nearby community destinations and ease of street connectivity are effective at promoting active transportation. Scenario B and C subsections labeled 'Complete Streets and Active Transportations Investments' support healthy behaviors the most. These strategies include better street connections, safer street crossings, wider sidewalks, safer street crossings, improved bus stops, more bikeways, trails and on-street bicycle facilities, and more efficient operation of transit signals.

The literature also aligns with advisory members' equity concerns. Low-income households in search of affordable housing options may locate in neighborhoods that are not well-served by affordable transportation options and have fewer health-supportive amenities. This underscores the need to create and preserve affordable housing options in areas that are well-served by transit.

## Integrated Transport and Health Impact Model (ITHIM)

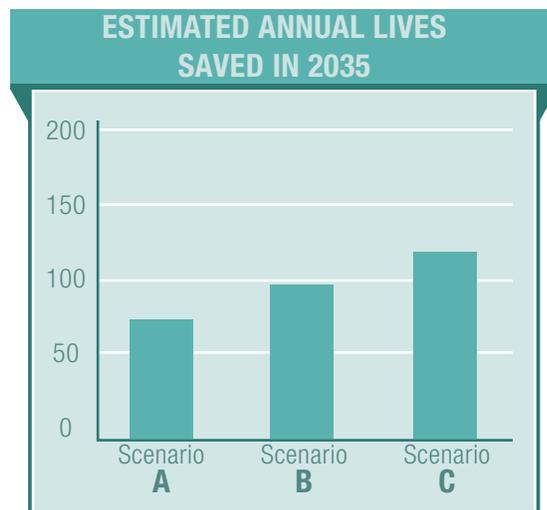
In addition to literature reviews for all pathways, PHD also used a quantitative model, ITHIM, to help understand the relative impact of each of three exposure pathways — physical activity, traffic safety and air pollution as measured by particulate matter (PM2.5) [2]. ITHIM uses relative risks and burden of disease to estimate avoided illnesses (as measured by disability adjusted life years) and deaths for nine conditions associated with physical activity, three conditions linked to PM2.5 exposure, and current traffic fatality rates. A clear limitation of ITHIM is it underestimates all health benefits by restricting calculations to certain pathways and diseases.

Results from ITHIM predict that strategies for reducing GHG emissions will promote health; health benefits occur in all exposure pathways for all scenarios. Scenario A levels of investment are expected to contribute to 64 avoided premature deaths annually. Scenarios B and C would result in 98 and 133 avoided premature deaths respectively. Every 12% decrease in GHG — the difference between each successive scenario — results in an approximate 0.65% decrease in illness among diseases studied.

## Physical activity

The most significant and attainable health benefit of active transportation is increased physical activity. Increased physical activity from active transportation could account for as much as 86–91% of avoided deaths and 69–84% of avoided illness resulting from implementing the CSCS project.

We can improve our region's health and reduce premature deaths by increasing the number of people who regularly walk or bike to the library, school, work, church or store. A safe and convenient transportation system provides individuals with the flexible and healthy options they need to routinely



choose more active modes of transportation. Prioritizing non-automobile users in the design and maintenance of streets increases the safety of all users and will facilitate walking, bicycling and use of public transit.

## Traffic safety

Reduced GHG emissions through lower per capita vehicle miles traveled (VMT) results in fewer overall traffic fatalities and injuries. Scenario A results in one avoided traffic fatality per year and decreases disabilities from serious injuries (measured by disability adjusted life years or DALYs) by 2.0%. Scenario C would help avoid 12 traffic fatalities and 12.5% of DALYs from serious injuries a year.

Due to the increase in miles covered in active transportation modes, ITHIM shows the absolute numbers of pedestrian and bicycle fatalities will rise even as the rate decreases due to population growth. While physical activity benefits outweigh the risks of active transportation, effort should be made to mitigate traffic hazards for pedestrians and cyclists through traffic calming, street design and mode separation. Efforts should also be made to capture the 53% of 'interested but concerned' individuals in the region who would like to bike, but are worried about safety issues.

## Air quality

Improved air quality is an important benefit of addressing GHG. Metro is targeting aggressive GHG emission reductions of 12, 24 and 36% for Scenarios A, B and C respectively. However, Metro's scenarios result in only modest PM2.5 reductions of 2.8, 3.2 and 3.6% due to population growth and reliance on fleet change and fuel technologies. ITHIM results predict a modest decrease in respiratory illness, heart disease cases associated with air pollution, and premature death of lung cancer patients from long-term PM2.5 exposure.

ITHIM only incorporates long-term exposure to PM2.5 and may underestimate health benefits associated with improved air quality. As suggested by the Portland Air Toxics Solutions Project, additional benefits may accrue from lower ambient ozone and air toxic concentrations.

There is no safe level of PM2.5 exposure and current average concentrations of ozone are above safe levels. Episodic PM2.5 (winter) and ozone (summer) events require regional solutions such as leading public efforts to change travel behavior in order to minimize health risk. Poor air quality can be localized and many vulnerable populations live near transportation corridors. Care should be taken to influence increased physical activity while minimizing exposure when designing active transportation facilities and adjoining transportation corridors.

## Recommendations

Climate change poses a risk to the future health of Oregonians. Proposed strategies to mitigate climate change will also increase health benefits associated with physical activity, traffic safety and improved air quality. Based upon the findings of this report and with the support of the CCC HIA Advisory Committee, PHD has developed a series of recommendations to preserve and promote healthy communities throughout the region.

By developing and implementing a preferred scenario that meets or surpasses the GHG emissions reduction target set by the Department of Land Conservation and Development, PHD anticipates an improvement in public health.

The majority of health benefits from the CSCS Project can be attributed to active transportation such as walking and biking to work, transit, school and community destinations. Based on this evidence, this HIA recommends that Metro maximize opportunities for active transportation for all communities by:

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- Adopting and identifying stable funding for the design elements listed in the subsection ‘Complete Streets and Active Transportation Investments’ of Scenarios B and C: street connections, wider sidewalks, safer street crossings, improved bus stops, bikeways, transit signal priority, and on-street bicycle facilities and trails.
- Improving transit service miles to meet levels recommended in Scenario C.
- Using an equity analysis to plan and develop equal access to active transportation throughout the region.
- While the benefits of physical activity far outweigh the risks, active modes of transportation can lead to increased exposure to traffic injury and air pollution. In order to reduce the risk of increased exposure to traffic injury and air pollution for all road users, this HIA recommends that Metro prioritize the design and maintenance of non-automobile facilities by:
  - Including safety features for pedestrians and bicyclists, such as separation from motorized traffic, when possible. Prioritize non-automobile users in design and maintenance of streets.
  - Providing a parallel bicycle route one block removed from high-volume roads where feasible to reduce exposure to localized pollution while still maintaining access to community destinations.

Per capita VMT reduction is expected to modestly improve air quality as measured by many pollutants including air toxics, but temporal and localized air quality concerns remain. Due to temporal and spatial air quality concerns, this HIA recommends that Metro maximize overall improvements in air quality through actions such as:

- Aligning the CSCS preferred alternative to PATS goals. In collaboration with DEQ, determine how the preferred alternative helps meet Oregon’s adopted ambient benchmark concentrations.
- Reducing exposure by using zoning and incentives to improve indoor filtration systems in new buildings along transportation corridors.
- Convening a regional committee to further address episodic air quality events. Solutions should be season specific and could promote incentives for short-term, alternative commute arrangements.
- Finally, to improve health equity, this HIA recommends Metro ensure social and health goals are considered when prioritizing investments by:
  - Explicitly and transparently addressing how investment links low-income and other vulnerable households to health-promoting resources.



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