POLICY BACKGROUND
In 2007, Oregon passed a bill requiring MPOs to implement greenhouse gas (GHG) reduction strategies to reduce carbon emissions by 10 percent below 1990 levels by 2020, and to 75 percent below 1990 levels by 2050. To meet these targets, Oregon enacted the Clean Air Act in 2001, which required the Oregon Department of Environmental Quality to develop a plan for a Clean Air Program. This plan includes a strategy to reduce GHG emissions in the transportation sector. The plan is based on the best available science and technology, and it includes a mix of direct and indirect strategies to achieve the desired reductions. The plan is updated every five years to ensure that the state is on track to meet its GHG reduction targets. The plan includes strategies for reducing GHG emissions from transportation, including strategies for reducing vehicle miles traveled, increasing the use of public transportation, and improving the efficiency of vehicles.

CLIMATE SMART COMMUNITIES SCENARIOS HIA
Oregon's state public health agency, the Oregon Health Authority (OHA), collaborated with Metro on a health impact assessment of the Climate Smart Communities Scenarios planning process in 2012 and 2013. The HIA focused on three areas: active transportation and physical activity, roadways-related injuries and fatalities, and particulate air pollution. The primary goal of the HIA was to ensure that public health and health equity are considered in the selection and implementation of transportation and land use options related to GHG reduction policy in the Portland metropolitan region and throughout the state.

HIA METHODS
The HIA methods included a profile of existing conditions, a literature review, pathway diagrams, and the Integrated Transport and Health Impacts Modelling tool (ITHIM). ITHIM, developed by Dr. James Woodcock, estimates the health impacts of planning and policy decisions in a variety of sectors. ITHIM is a unique and reliable tool for modeling and comparing the health impacts of planning and policy scenarios. This tool is based on the best available science and technology, and it includes a mix of direct and indirect strategies to achieve the desired reductions. The tool is updated every five years to ensure that the state is on track to meet its GHG reduction targets. The tool includes strategies for reducing GHG emissions from transportation, including strategies for reducing vehicle miles traveled, increasing the use of public transportation, and improving the efficiency of vehicles.

RESULTS
A summary of ITHIM's health impact results for the six sample scenarios that OHA tested show reductions in premature deaths, years of life lost (YLL), years living with disability (YLD), and disability adjusted life years (DALY) for changes in physical activity, particulate air pollution exposure, and road traffic crashes. OHA found that, compared to existing conditions, almost all the policies under consideration could improve health, and that certain policy combinations were more beneficial than others.

The majority of the health benefits result from increased physical activity, followed by reductions in motor vehicle-related injuries and particulate air pollution. The health promoting scenarios have similar elements: ambitious levels of community design policies, intermediate and ambitious levels of pricing and incentives, high levels of active transportation (including transit), low levels of single occupancy vehicle driving, and low levels of particulate air pollution.

Some of the policies under consideration, or the way they are implemented, may also negatively affect health. For example, some communities in the Portland metropolitan region have poor access to active transportation infrastructure (sidewalks, bike routes, transit service). If these areas are not prioritized, implementation could aggregate existing inequities. The ITHIM results showed positive health impacts due to reductions in motor vehicle crashes, but also revealed potential negative impacts from increased bike and pedestrian injuries for some scenarios. The HIA recommendations suggest ways to mitigate this increase.

LIMITATIONS
ITHIM is a unique and reliable tool for modeling and comparing the health impacts of planning scenarios. This is especially true when ITHIM’s outputs are considered alongside local health data, such as those described in the HIA's existing conditions summary. However, ITHIM was developed using World Health Organization U.S. burden of disease data, and OHA did not adapt the tool to use Oregon or Portland metropolitan region health data. Additionally, ITHIM uses particulate air pollution, specifically PM<sub>2.5</sub>, as the most harmful element of total transportation-related air pollution. Although such an assessment is outside of the scope of the HIA, additional analyses on the reduction of toxic air pollutants and ozone precursors from transportation and transportation specific policies (such as fleet turnover and advances in fuel technology) would likely show additional health benefits. In addition, it is possible that future advances in clean fuels and vehicle technology will make a big difference in reducing emissions; however the timeline and size of effects for such developments is unknown.

NEXT STEPS
OHA will continue its partnership with Metro during the next phase of scenario planning with an additional HIA. The new HIA will build on the success of the Climate Smart Communities Scenarios HIA project by using improved air pollution data (to include air toxics), as well as including an economic impact model to assess the costs and benefits of the health effects of Oregon’s GHG emissions reductions policy. OHA is also developing a community/neighborhood-level tool for assessing the health impacts of planning and policy decisions in a variety of sectors.

REFERENCES