Outdoor Recreation in Oregon:
The Changing Face of the Future

January 2008

Chapter Five
Oregon's Physical Activity Crisis

Prepared by the Oregon Parks and Recreation Department

Issue Introduction: Oregon's Physical Activity Crisis

The U.S. Centers for Disease Control and Prevention (CDC), among many others, are concerned about dramatic increases in rates of physical inactivity, overweight and obesity in the U.S. These health issues are of equal concern to citizens in Oregon. Overweight and obesity are associated with increases in several chronic diseases such as coronary heart disease, type-2 diabetes, and various cancers. Physical activity significantly mediates many chronic diseases, regardless of weight-class. Given the beneficial effects of physical activity in preventing several chronic diseases, reducing sedentary lifestyles is a focus of public health programs.

Overweight and obesity also impose substantial costs on the United States' health care system. According to the Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity, the U.S. economic costs associated with being overweight or obese were more than $117 billion in the year 2000. In 2003, the state of Oregon spent an estimated $291 per person on medical costs related to obesity. Oregon's total estimated medical costs related to obesity in adults that year was $781 million, nearly 6 percent of the state's total health care bill[67].

Prescriptions for physical activity levels changed over a decade ago. The CDC and the American College of Sports Medicine in 1995 changed the recommended dose of physical activity. As reflected by the U.S. Surgeon General, recommended physical activity is an accumulation of at least 30 minutes of moderate physical activity or 20 minutes of vigorous physical activity most days of the week. Parks and other infrastructure (bikeways, sidewalks) provide opportunities to meet the recommended levels of physical activity through recreation.

Regular, moderate exercise has been proven to reduce the risk of developing coronary heart disease, stroke, colon cancer, hypertension, diabetes, osteoporosis, obesity, and depression. Physical activity need not be unduly strenuous for an individual to reap significant health benefits. Even small increases in light to moderate activity, equivalent to walking for about 30 minutes a day, will produce measurable benefits among those who are least active.

Public facilities such as trails, swimming pools and parks that are conveniently located have been found to be positively associated with vigorous physical activity in a number of studies, among both adults and children. By providing facilities and programs which encourage physical activity, park and recreation providers can directly contribute to the battle on physical inactivity, obesity, and rising health costs in Oregon.

Information about the public benefits of recreation is useful to managers and policymakers who are increasingly challenged both to describe the benefits resulting from recreation projects and to allocate their scarce resources to providing high-quality recreation opportunities in addition to other public services. This chapter will contribute to our understanding of the role of, and benefits from, outdoor recreation resources in general and trails in particular. It also will provide information describing the human health benefits of recreation resources, including scientifically-derived measures of these benefits for trails and other recreation resources in Oregon.

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[67] Finkelstein, EA, Fiebelkorn, IC, Wang, G. State-level estimates of annual medical expenditures attributable to obesity. *Obesity Research* 2004;12(1):18–24.

Summary of Key Literature Review Findings: Issue Introduction

1. In 2003, the state of Oregon spent an estimated $291 per person on medical costs related to obesity. Oregon's total estimated medical costs related to obesity in adults that year was $781 million, nearly 6 percent of the state's total health care costs.
2. Regular, moderate exercise has been proven to reduce the risk of developing coronary heart disease, stroke, colon cancer, hypertension, diabetes, osteoporosis, obesity and depression. Even small increases in light to moderate activity, equivalent to walking about 30 minutes a day, will produce measurable benefits among those who are least active.
3. Public facilities such as trails, swimming pools and parks that are conveniently located have been found to be positively associated with vigorous physical activity in a number of studies, among both adults and children.

The Health Effects of Physical Activity

The primary sources of information on the epidemiology of physical activity, overweight and obesity cited in this report are published summaries of the literature. These quantitative and qualitative summary articles provide indicators on scientific consensus to date, such as the effects of inactivity and obesity on morbidity and mortality[68].

Overweight and obesity are associated with increased health risks for certain chronic diseases such as coronary heart disease, type-2 diabetes, various cancers (e.g., endometrial, breast, and colon cancers), among other diseases and disorders[69]. Figure 49 shows the percentages of healthy weight individuals (40% of adults) with chronic diseases are substantially lower than the percentages of overweight/obese individuals (60% of adults) with chronic diseases in Oregon.

Physical activity at recommended levels mitigates many health risks, regardless of weight class. As Blair and Brodney (1999) conclude:

1) Regular physical activity clearly attenuates many of the health risks associated with overweight and obesity;
2) Physical activity appears to not only attenuate the health risks of overweight and obesity, but active obese individuals have lower morbidity and mortality than normal weight individuals who are sedentary; and
3) Inactivity and low cardiorespiratory fitness are as important as overweight and obesity as mortality predictors.

Figure 50 shows physically active adults (56% of adults) have lower rates of many chronic diseases than sedentary adults (44% of adults) in Oregon. There is strong evidence of an inverse, linear relationship between physical activity and reductions in all-cause mortality, total cardiovascular and coronary heart disease incidence and mortality, type-2 diabetes mellitus, and colon cancer[70] [71]. The linear

[68] Blair, SN and S Brodney. 1999. Effects of physical inactivity and obesity on morbidity and mortality: Current evidence and research issues. *Medicine & Science in Sports & Exercise* 31(11):S464-S662

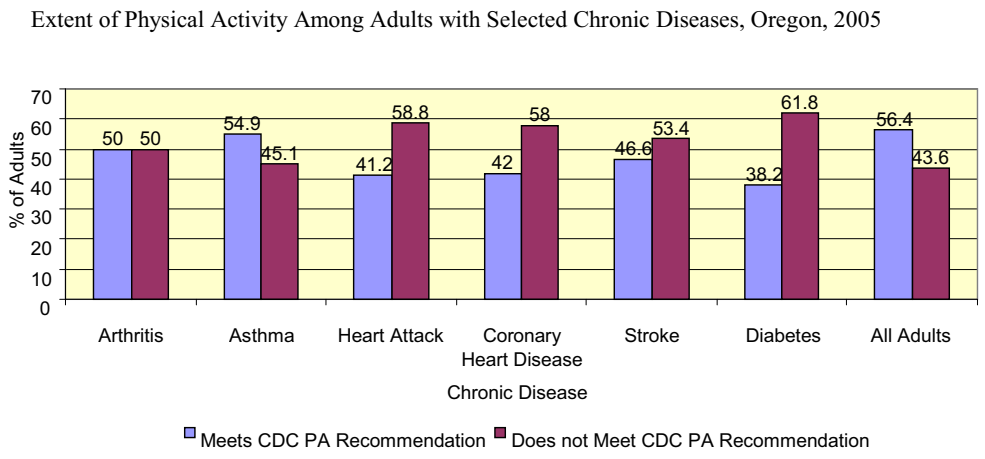
[69] Mokdad, AH, ES Ford, BA Bowman, WH Dietz, F Vinicor, VS Bales and JS Marks. 2003. Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *Journal of the American Medical Association* 289:76-79.

[70] Rankinen, T and C Bouchard. 2002. Dose-response issues concerning the relations between regular physical activity and health. President's Council on Physical Fitness and Sports, *Research Digest* 3(18):1-8.

relationship suggests that as people move away from sedentarism, the health benefits of being physically active accumulate immediately, and continue to accrue as they become more physically active. For example, physical activity levels that expend 500 kcal/week (about 100 minutes/week) provide slight favorable effects, whereas expending 1000 kcal/week (about 200 minutes/week) in physical activity provides a 30% reduction in all-cause mortality rates (Rankinen and Bouchard, 2002). Landers (1997)[72] and Fontaine (2000)[73] discuss literature on mental/psychological benefits of physical activity and show that physical activity is associated with moderate reductions in depression (decreases symptoms similar to psychotherapy); small to moderate decrease in anxiety; small decrease in panic disorder; a large increase in energy & vigor; a small to moderate increase in self-esteem; and a small to moderate increase in positive affect (especially if physical activity occurs in a social setting). Evidence on the relationship between physical activity and eating is unclear.

Also unclear is the relationship between physical activity and weight loss (Rankinen and Bouchard, 2002). Evidence suggests that physical inactivity is a strong contributing factor for overweight and obesity. Its effectiveness in promoting weight loss, however, is less than encouraging[74]. As Wing (1999)[75] concluded, exercising does not significantly increase initial weight loss over and above that obtained with diet only. Thus, a confusing message appears: physical activity helps prevent weight gain, but is ineffective at promoting weight loss. Overweight and obese

Figure 49: Chronic diseases among healthy weight and overweight/obese Oregonians, Source: ODHS, 2007



[71] Haennel, RG and R Lemire. 2002. Physical activity to prevent cardiovascular disease: How much is enough? *Canadian Family Physician* 48:65-71.

[72] Landers, DM. 1997. The influence of exercise on mental health. President's Council on Physical Fitness and Sports, *Research Digest* 2(12):1-6.

[73] Fontaine, KR. 2000. Physical activity improves mental health. *The Physician and Sportsmedicine* 28(1):1-3.

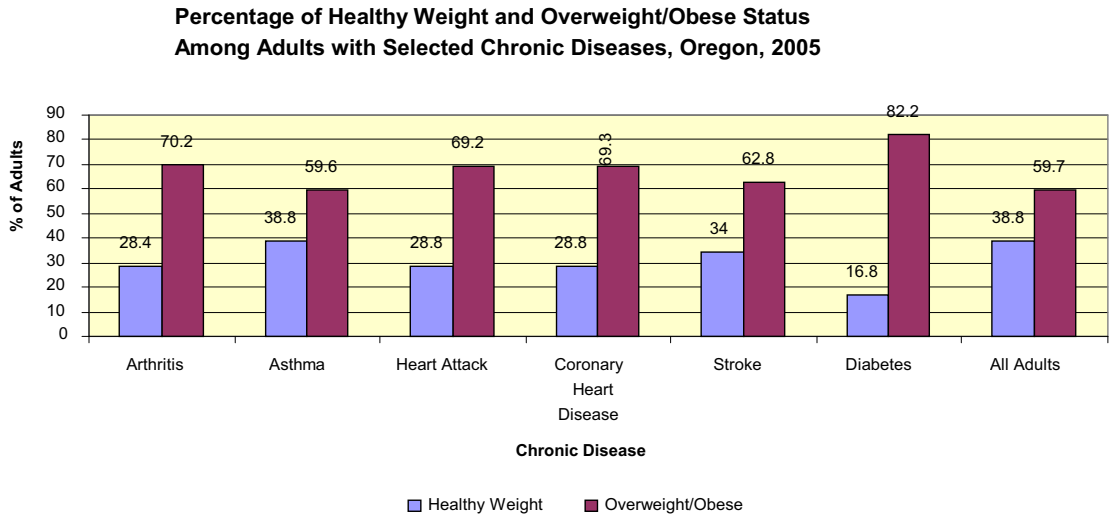
[74] Welk, GJ and SN Blair. 2000. Physical activity protects against the health risks of obesity. President's Council on Physical Fitness and Sports, *Research Digest* 3(12):1-8.

[75] Wing, RR. 1999. Physical activity in the treatment of the adulthood overweight and obesity: Current evidence and research issues. *Medicine and Science in Sports and Exercise* 31:S547-S552.

individuals that initiate a physical activity program may become discouraged if they do not realize weight loss. Their loss, however, may not be in terms of body weight, but in the health risks associated with inactivity—overweight and obese individuals can gain the same health benefits (low chronic disease risks) as normal weight individuals from physical activity.

Physical activity messages that focus on behavioral changes (increased physical activity and healthy diets) rather than outcomes (weight loss) may provide the appropriate motivation for sedentary individuals (normal weight, overweight, or obese) to become physically active. Increasing the proportion of physically active individuals in society (regardless of weight) would greatly reduce the public health care burden (Welk and Blair, 2000). Maiback (2007)[76], however, raises the issue whether the problem is inactive individuals, or whether it is inactive environments. The lack of places and social opportunities for physical activity may be equally to blame for the increasing rates of obesity and poor health in the U.S.

Figure 50: Extent of physical activity and chronic diseases in Oregon, Source: ODHS, 2007



[76] Maibach, E. 2007. The influence of the media environment on physical activity: Looking for the big picture. *American Journal of Health Promotion* 21(4S):353-362.

Summary of Key Literature Review Findings: The Health Effects of Physical Activity

1. Regular physical activity clearly lessens many of the health risks associated with overweight and obesity.
2. Physically active adults (56% of adults) in Oregon have lower rates of many chronic diseases than sedentary adults (44% of adults).
3. As people move away from being sedentary, the health benefits of being physically active accumulate immediately, and continue to accrue as they become more physically active.
4. Active obese individuals have lower morbidity and mortality than normal weight individuals who are sedentary.
5. Being physically active is associated with moderate reductions in depression, small to moderate decrease in anxiety, small decrease in panic disorder, a large increase in energy and vigor, a small to moderate increase in self-esteem, and a small to moderate increase in positive affect (especially if physical activity occurs in social settings).
6. Evidence suggests that physical inactivity is a strong contributing factor for overweight and obesity. However, exercising does not significantly increase initial weight loss over and above that obtained with diet only. As a result, physical activity messages that focus on behavioral changes (increased physical activity and health diets) rather than outcomes (weight loss) may provide the appropriate motivation for sedentary individuals to become physically active.

Physical Activity and the Environment

Leisure-time physical activity often connotes exercise. The Dictionary of Sport and Exercise Science operationally defines physical activity as "movement of the human body that results in the expenditure of energy at a level above the resting metabolic rate." Thus, physical activity can take place not only as deliberative exercise, but also at the workplace, in forms of transportation (walking, biking), in household activities, and in leisure-time, recreational activities.

Most epidemiological studies that link environmental factors with participation in physical activities have been conducted in urban environments that look at land use patterns, neighborhood designs, parks, and transportation infrastructure (sidewalks, bike lanes, trails). Humpel, Owen and Leslie (2002)[77] and Williams (2007)[78], after reviewing the literature, conclude that accessibility, opportunities, and aesthetic attributes have the strongest associations with physical activity. Weather and safety were found to have less-strong relationships with physical activity. Factors of accessibility that promoted physical activity included bike paths, local parks, density of facilities and shops within walking distance. Factors of accessibility that reduced

[77] Humpel, N, N Owen and E Leslie. 2002. Environmental factors associated with adults' participation in physical activity: A review. *American Journal of Preventive Medicine* 22(3):188-199.
[78] Williams, CH. 2007. The built environment and physical activity: What is the relationship? Research Synthesis Report No. 11. Princeton, NJ: The Robert Wood Johnson Foundation.

physical activity included busy streets, steep hills, lack of or inadequate facilities and distance from residence to resources. Opportunities that were positively associated with physical activity included home exercise equipment, awareness of facilities, satisfaction with facilities, and local clubs. Lack of equipment was found to be negatively associated with physical activity. Aesthetic attributes that promote physical activity included friendliness of neighborhood, attractiveness of local area, and enjoyable scenery.

Sallis and Kerr (2006)[79] summarize some of the findings from research on physical activity and the built environment. Access to parks and trails is consistently related to activity levels[80]. The more distant recreation facilities are from an individual's residence, the less likely they are to use it. However, parks with more natural attributes associated with them have disproportionately larger volumes of use than other parks. As Giles-Corti et al. (2005)[81] show, people are more likely to walk in parks when they are close, large, and have a variety of features. Parks and other public lands that provide recreational (and transportation) opportunities may promote health through physical activity. Users of public open space are three-times more likely to meet recommended physical activity levels (Giles-Corti et al., 2005).

Gordon, Zizzi and Pauline (2004)[82] found that 25% of respondents surveyed at a newly constructed rail trail in a rural city were sedentary prior to the trail's development. Habitually active rail trail users modestly increased their activity levels (0-26%), whereas new exercisers (i.e., previously sedentary) increased their activity levels 51-100%. Thus, parks and other areas to recreate help move people from sedentary-levels up the dose response function of health benefits from physical activity.

Summary of Key Literature Review Findings: The Health Effects of Physical Activity

1. In urban environments, factors of accessibility that promote physical activity include bike paths, local parks, and density of facilities and shops within walking distance. Factors of accessibility that reduced physical activity include busy streets, steep hills, lack of or inadequate facilities and distance from residence to resources.
2. Access to parks and trails is consistently related to activity levels. The more distant recreation facilities are from an individual's residence, the less likely they are to use it.
3. People are more likely to walk in parks when they are close, large, and have a variety of features.
4. Users of public open space are three-times more likely to meet recommended physical activity levels.
5. Parks and other areas to recreate help get more people physical activity.

[79] Sallis, JR and J Kerr. 2006. Physical activity and the built environment. President's Council on Physical Fitness and Sports, *Research Digest* 7(4):1-8.

[80] Roux, AVD, KR Evenson, AP McGinn, DG Brown, L Moore, S Brines and DR Jacobs. 2007. Availability of recreational resources and physical activity in adults. *American Journal of Public Health* 97(3):493-499.

[81] Giles-Corti, B, MH Broomhall, M Knuiman, C Collins, K. Douglas, K Ng, A Lange and RJ Donovan. 2005. Increasing walking: How important is distance to, attractiveness, and size of public open space? *American Journal of Preventive Medicine* 28(2S2):169-176.

[82] Gordon, PM, SJ Zizzi and J Pauline. 2004. Use of a community trail among new and habitual exercisers: A preliminary assessment. *Preventing Chronic Disease* 1(4):1-11.

Trends in Physical Activity, Overweight, and Obesity

The U.S. and Oregon

Behavioral Risk Factor Surveillance System (BRFSS) data reported by the CDC is used to compare levels and trends in health prevalence measures between Oregon and the U.S. In 2001, the CDC changed their question relating to physical activity. From 1990 to 2002, primarily every other year, BRFSS respondents were asked if they had no leisure time physical activity. U.S. leisure time physical inactivity was higher than Oregon's, with both falling over time. Oregon's rate of change was about 0.11% per year, while the U.S.'s proportion was falling twice as fast at about 0.22% per year. Figure 51 graphs the proportion of adults who reported meeting the CDC's minimum recommendation for physical activity from 2001 to 2005. Oregon's proportion of physical activity is higher than the U.S., with both trending upward. Oregon's increase in physical activity is about 0.9% per year, while for the U.S. it is 0.75% per year. Figure 52 shows Oregon is fairing better than the U.S. in proportion of adults physically active in 2005 (56.4% v. 49.1%, respectively).

Figure 53 graphs proportion and trends of overweight (BMI 25.0 to 29.9) for the U.S. and Oregon. Proportions of overweight are erratic, possibly due to differences in samples from year-to-year and that BMI is self-reported. There is little difference between the U.S. and Oregon, on average. In 2002, Oregon's and the U.S.'s proportion of overweight adults were nearly identical at 37% (Figure 54).

Figure 55 graphs proportion and trends of obesity (BMI >30) for the U.S. and Oregon. Proportions and trends of obesity are similar between the U.S. and Oregon. Figure 56 shows Oregon is doing a little better than the U.S. in 2002 with a lower proportion of obesity than the U.S. (20% v. 22%, respectively).
Rates of physical activity for Oregonians are higher than the U.S. regardless of gender. Rates of increase in physical activity are higher for females (Oregon: 1.12% per year; U.S.: 1.18% per year) than males (Oregon: 0.65% per year; U.S.: 0.25% per year). However, Oregon males' rate of increase is over twice as large per year as the U.S. Figure 52 shows that in 2005, the proportion of females in Oregon that are physically active is disproportionately higher than physically active males when compared to the relative proportions for the U.S.

Overweight data for females in the U.S. and Oregon are nearly identical in rates and trends. However, data for males is highly erratic, although males in Oregon appear to be doing better than the U.S. (Oregon: 0.06% per year; U.S.: 0.16% per year). Figure 54 shows the proportion of males that are overweight is 50% higher than the proportion of females that are overweight in the U.S. and in Oregon in 2002, with overweight rates by gender being nearly identical between Oregon and the U.S. (Females: 30%; Males: 44%).

Obesity data is fairly similar for both females and males, with Oregon performing slightly worse than the U.S. in trends (Oregon females: 0.97% per year; U.S. females: 0.85% per year; Oregon males: 0.99% per year; U.S. males: 0.97% per year). Figure 56 shows that the proportion of obese adults in Oregon is slightly lower than the national rate in 2002, with the proportion of males that are obese being disproportionately lower than females when compared to the relative proportions for the U.S.

Figure 51: Trends in meeting CDC's minimum recommendation for physical activity—the U.S. and Oregon, Source: BRFSS data

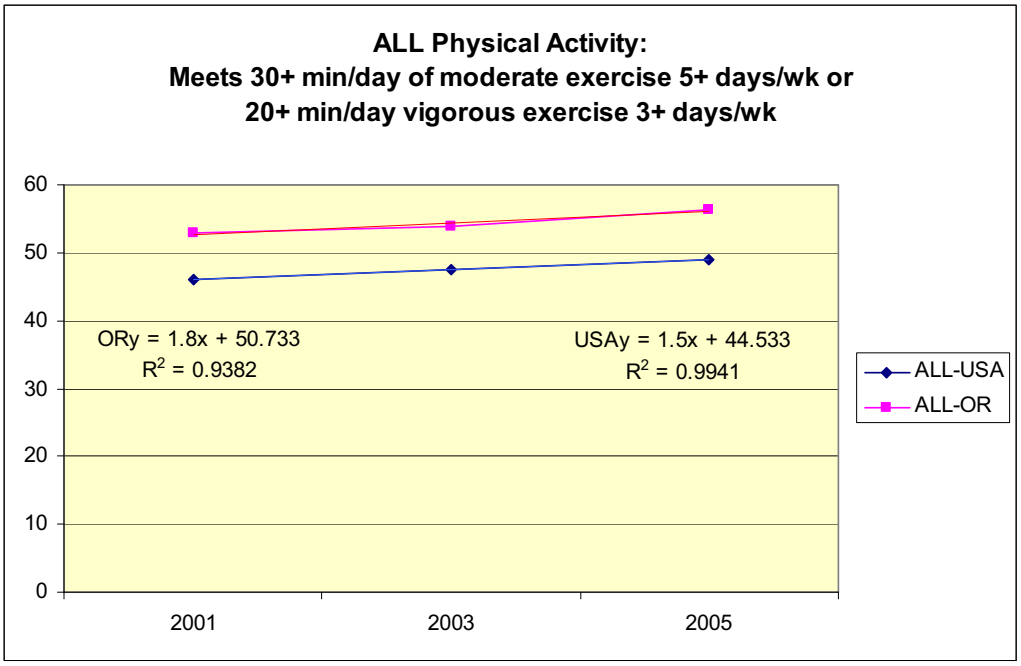


Figure 52: Physical activity proportion for U.S. and Oregon in total and by gender, 2005, Source: BRFSS data

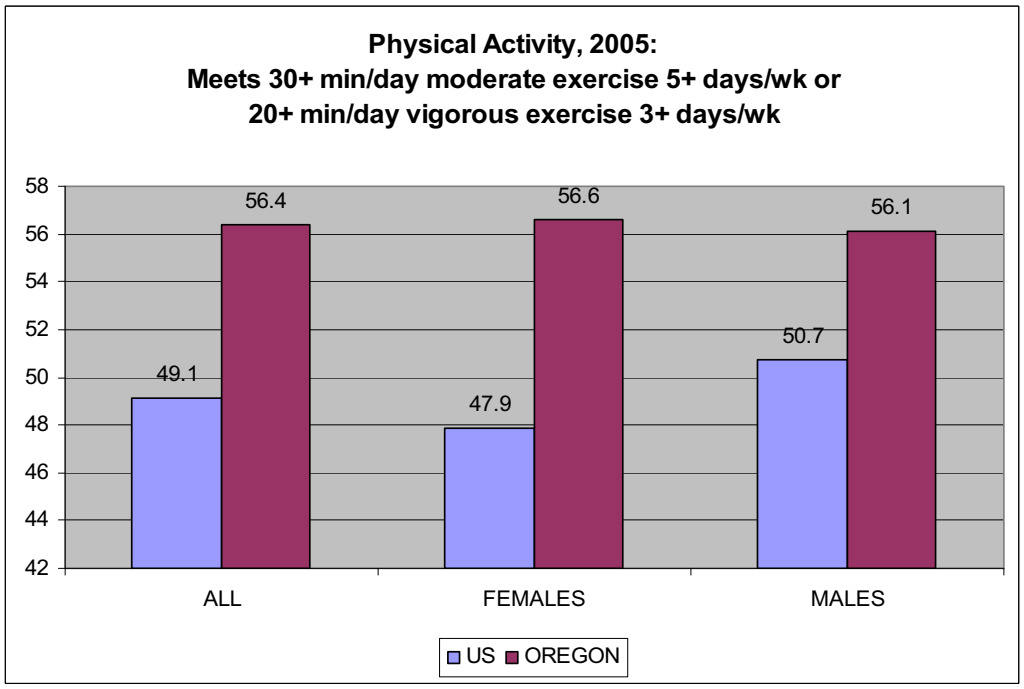


Figure 53: Trends in overweight for the U.S. and Oregon, Source: BRFSS data

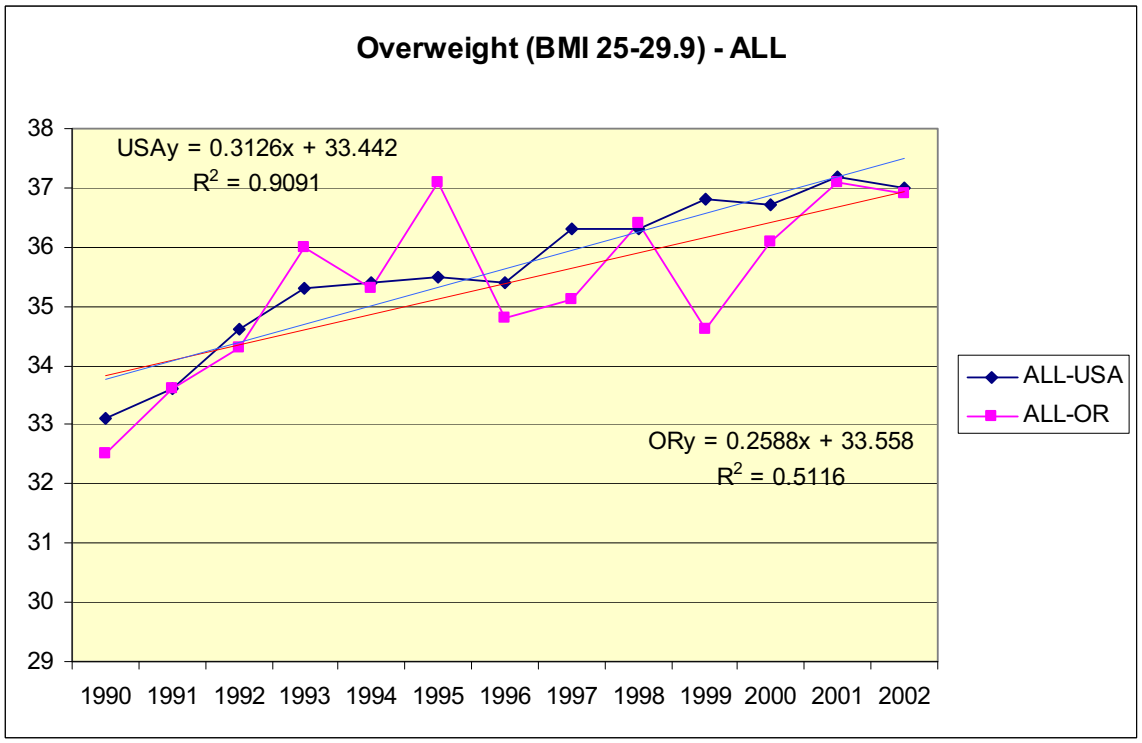


Figure 54: Overweight proportion in Oregon and the U.S. in total and by gender, 2002, Source: BRFSS data

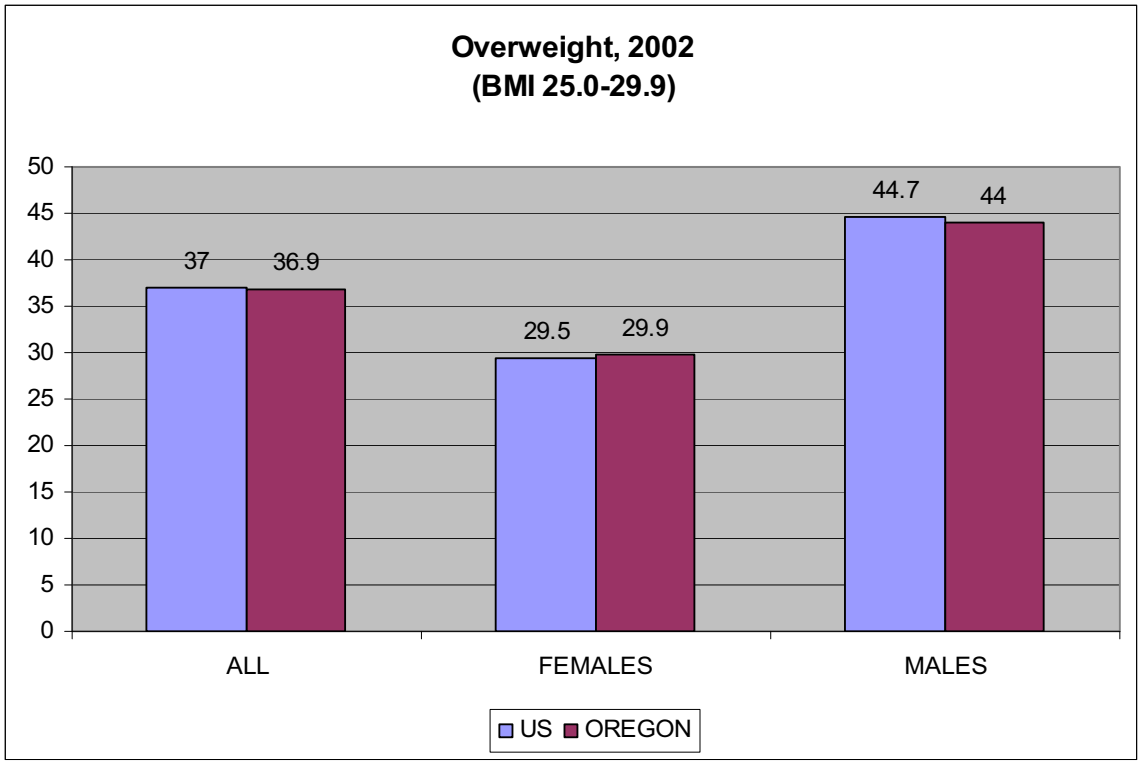


Figure 55: Trends in obesity for the U.S. and Oregon, Source: BRFSS data

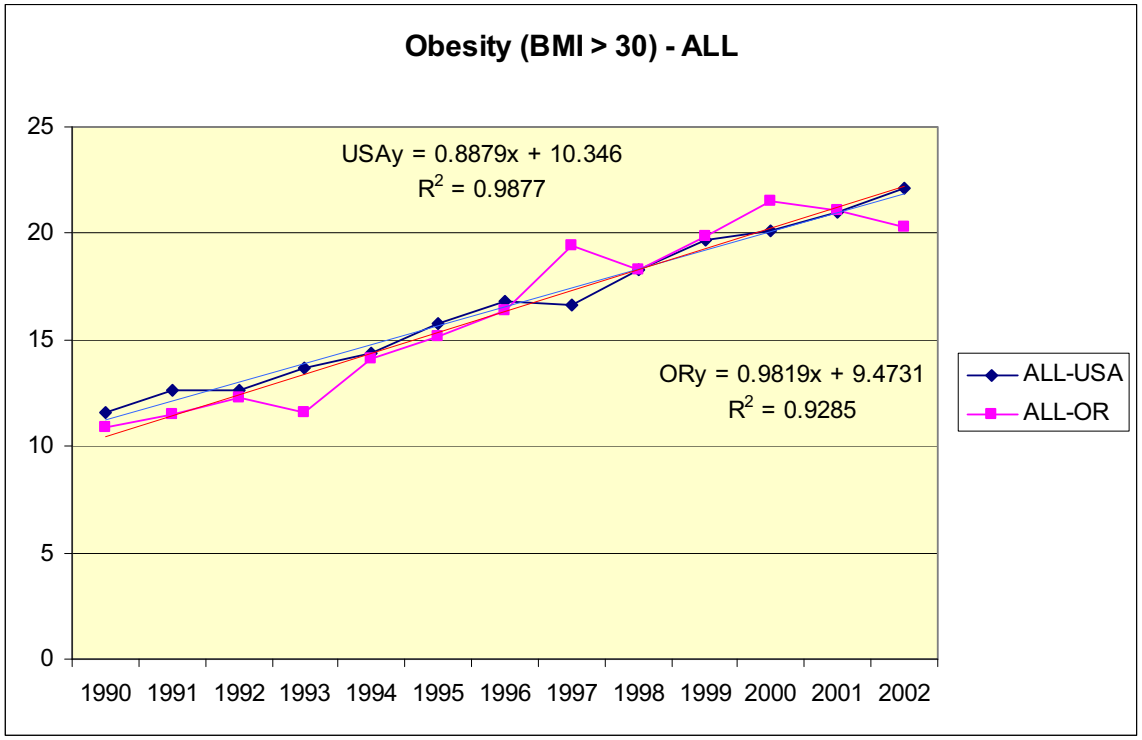


Figure 56: Obesity proportion for Oregon and the U.S. in total and by gender, 2002, Source: BRFSS data

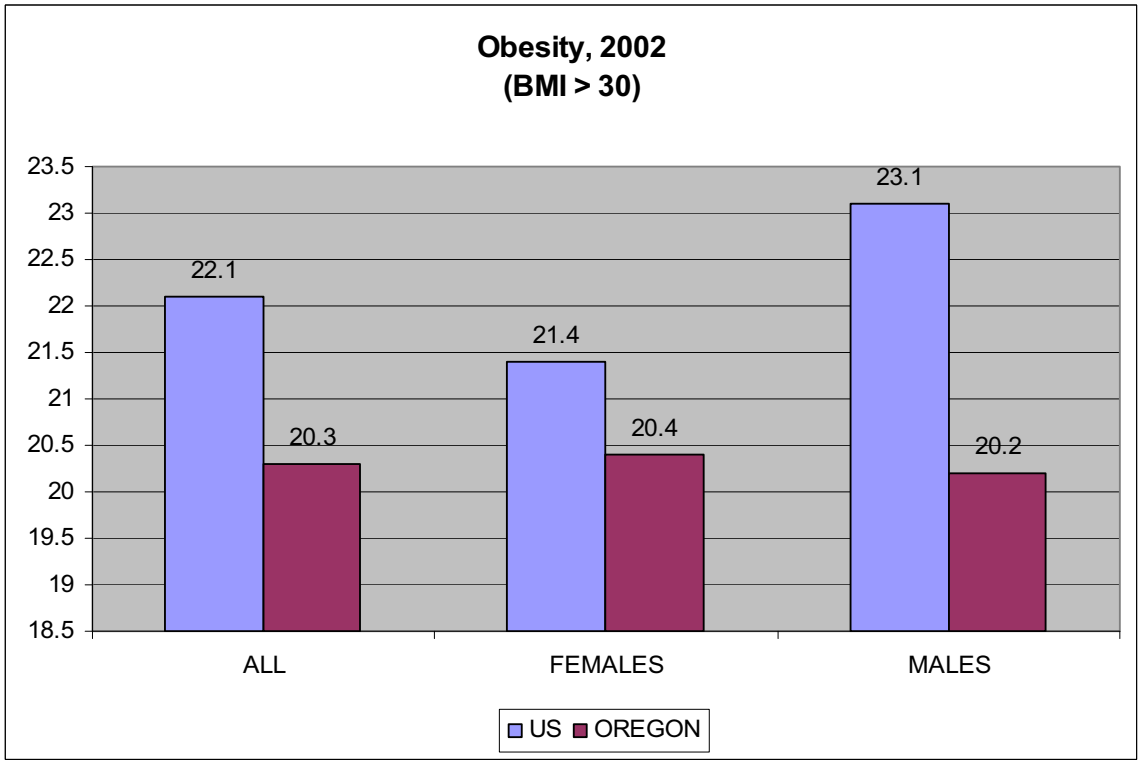


Figure 57 shows the proportions of physical activity by age class for Oregon and the U.S. in 2005. Oregon's proportions of physical activity exceed those for the U.S. across all age classes, with a downward trend in physical activity. Physical activity rates for 18-24 year olds in Oregon is growing four times faster than the U.S. (1.6% per year v. 0.4% per year, respectively). Rates for 25-34 year olds in Oregon are growing twice as fast as the U.S. (0.55% v. 0.25% per year, respectively). Oregon's 35-44 year olds have rates of physical activity increasing faster than the U.S.'s rates (1% per year v. 0.6% per year, respectively). However, Oregon's 45-54 year olds' rate of physical activity increase is lower than the U.S.'s rate (1% v. 1.25% per year, respectively). Oregon's 55-64 year olds are increasing their proportion of physically active adults faster than the U.S. (0.75% v. 0.38% per year, respectively). Oregon's 65+ year olds are not increasing their proportion in physical activity as fast as the U.S. (0.4% v. 0.7% per year, respectively).

Figure 57: Physical activity proportion for Oregon and the U.S. by age class, 2005, Source: BRFSS data

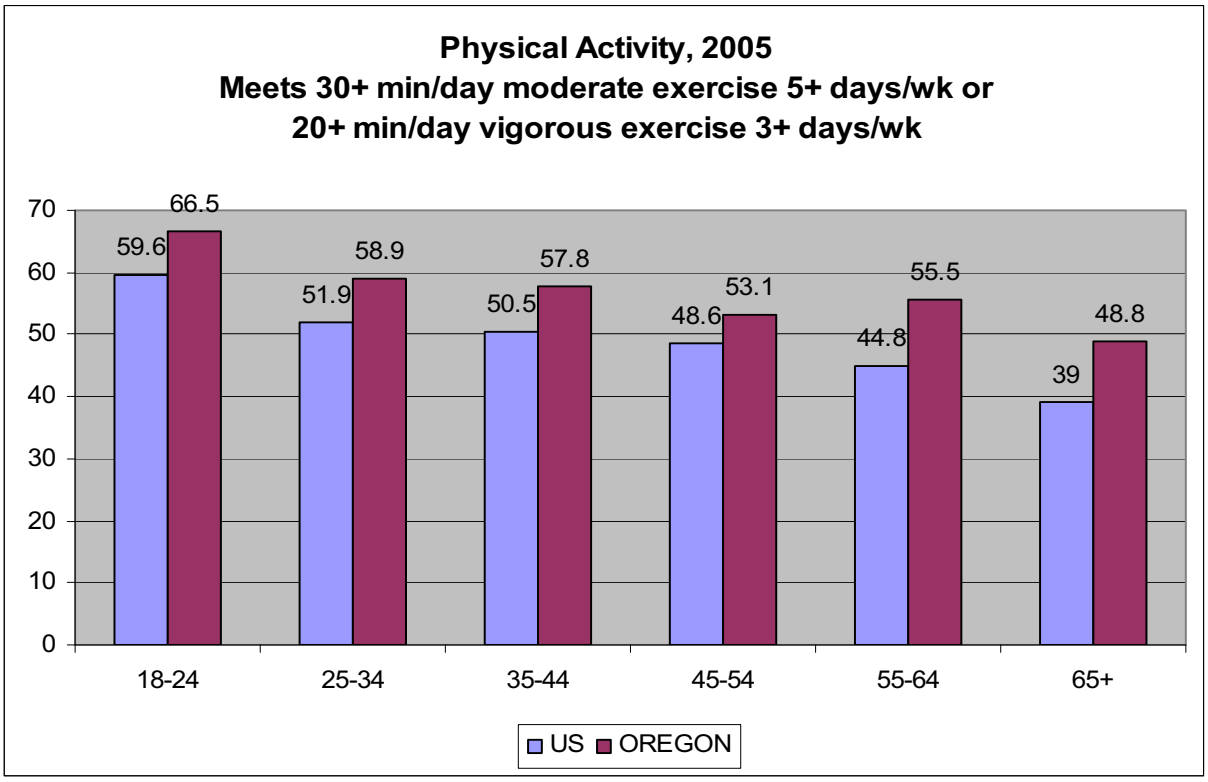


Figure 58 shows proportion of overweight for Oregon and the U.S. by age class. The proportions of adults that are overweight in Oregon and the U.S. in 2002 were nearly identical and increasing with age. 18-24 year olds and 65+ year olds have nearly identical rates of change in proportions of overweight adults for Oregon and the U.S., at about 0.35% per year increase in proportion of overweight individuals. Data for 35-49 year olds and 50-64 year olds are erratic, but the general trend seems to be about 0.22% per year for the U.S. and Oregon (ignoring the outliers in Oregon's data, the beginning and ending points are the same as the U.S. and therefore the trend would be similar). Oregon's and the U.S.'s 50-64 year olds seem to have a decreasing trend in proportion of overweight (-0.21% v. -0.04% per year, respectively).

Figure 58: Overweight proportion for Oregon and the U.S. by age class, 2002,
Source: BRFSS data

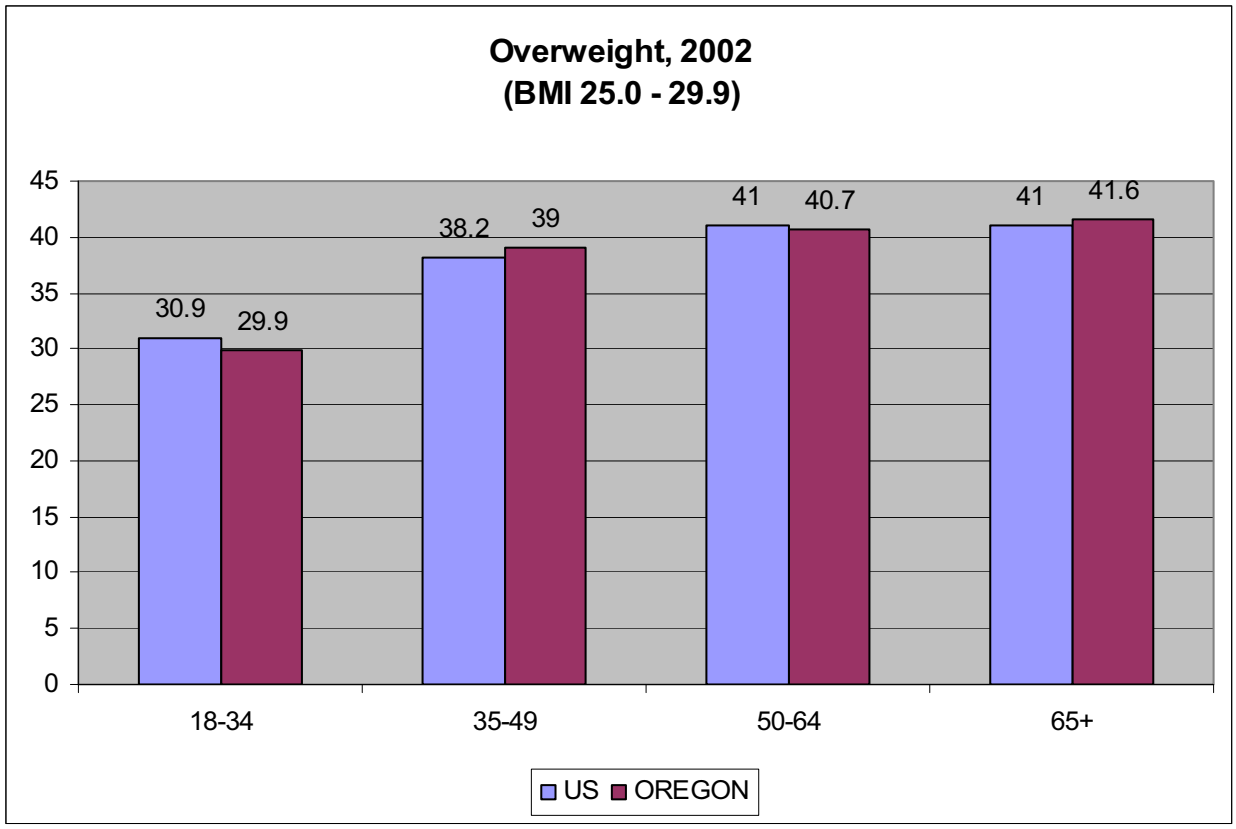
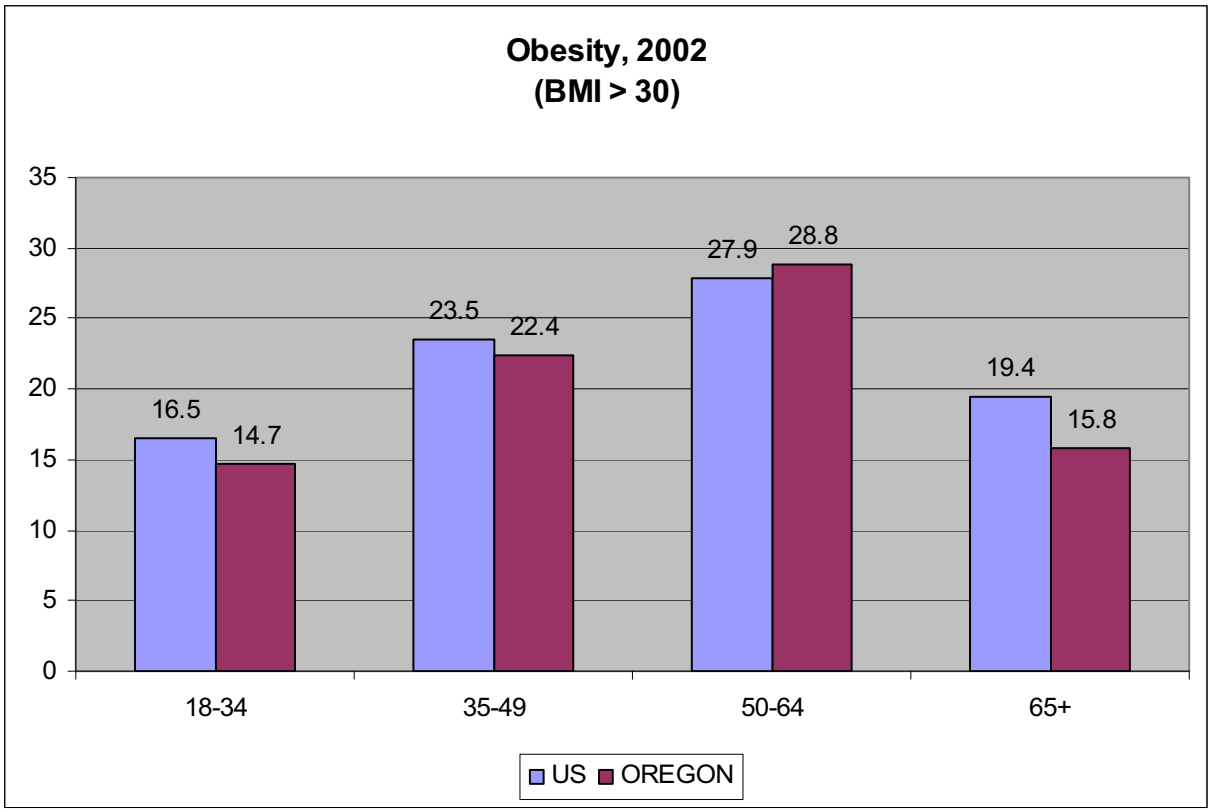


Figure 59 shows obesity proportions in 2002 are slightly lower for Oregon in all age classes except 50-64 year olds than the U.S.; however, these differences are likely not significant. Rates of increase in obesity proportions are nearly identical between Oregon and the U.S., and are about 1% per year (18-34 years: 0.8%; 35-49 years: 0.9%; 50-64 years: 1.2%; and 65+: 0.7% per year for Oregon—national trends are slightly lower than Oregon).

Figure 59: Obesity proportion for Oregon and the U.S. by age class, 2002, Source: BRFSS data



Summary of Key Findings: Trends in Physical Activity and Obesity, the U.S. and Oregon.

1. In 2005, Oregon was doing better or at least doing no worse than the U.S. on health prevalence measures of physical activity, overweight and obesity.
2. The proportion of Oregon adults that are physically active in their leisure time was 56% compared to the U.S. at 49%.
3. Oregon was identical to the U.S. in the proportion of adults that were overweight (37%), while rates of obesity were slightly lower than the U.S. (20% v. 22%, respectively).
4. These general patterns of health prevalence measures between Oregon and the U.S. held up across gender and age classes.
5. Trends in the proportion of adults that are physically active, overweight or obese are all increasing at nearly identical rates between Oregon and the U.S.

Oregon Counties

Proportions of physical activity, overweight and obesity are provided by county within Oregon, along with rates of change between 2001 and 2005. These rates of change may not be indicative of the long-term trends in any specific county due to the limited number of data points, inherent sampling issues in the BRFSS survey, and/or changing demographics within each county.

Figure 60 displays proportions of physical activity by county in 2001 and Figure 61 displays data for 2005. In 2001, the average proportion for physical activity was 44%, ranging from 23% to 54%. The five counties with the highest proportions of physical activity in 2001 included Columbia, Harney and Polk (52%), Baker (53%), and Sherman/Wasco (54%). Counties with the lowest proportion of physical activity included Douglas (23%), Yamhill (31%), Linn and Marion (35%), and Josephine, Multnomah and Washington (37%).

Figure 60: Proportion of physical activity by Oregon counties, 2001

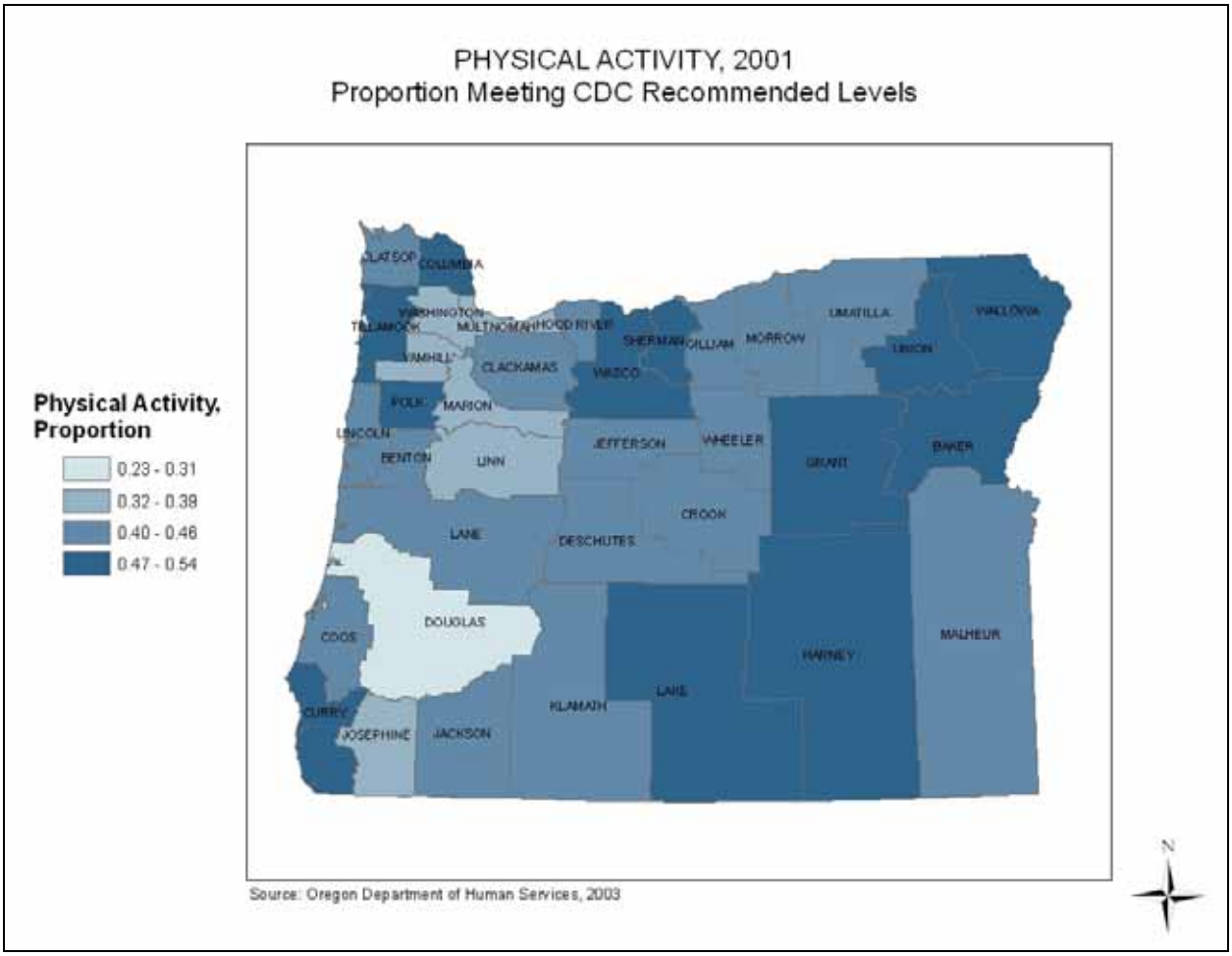
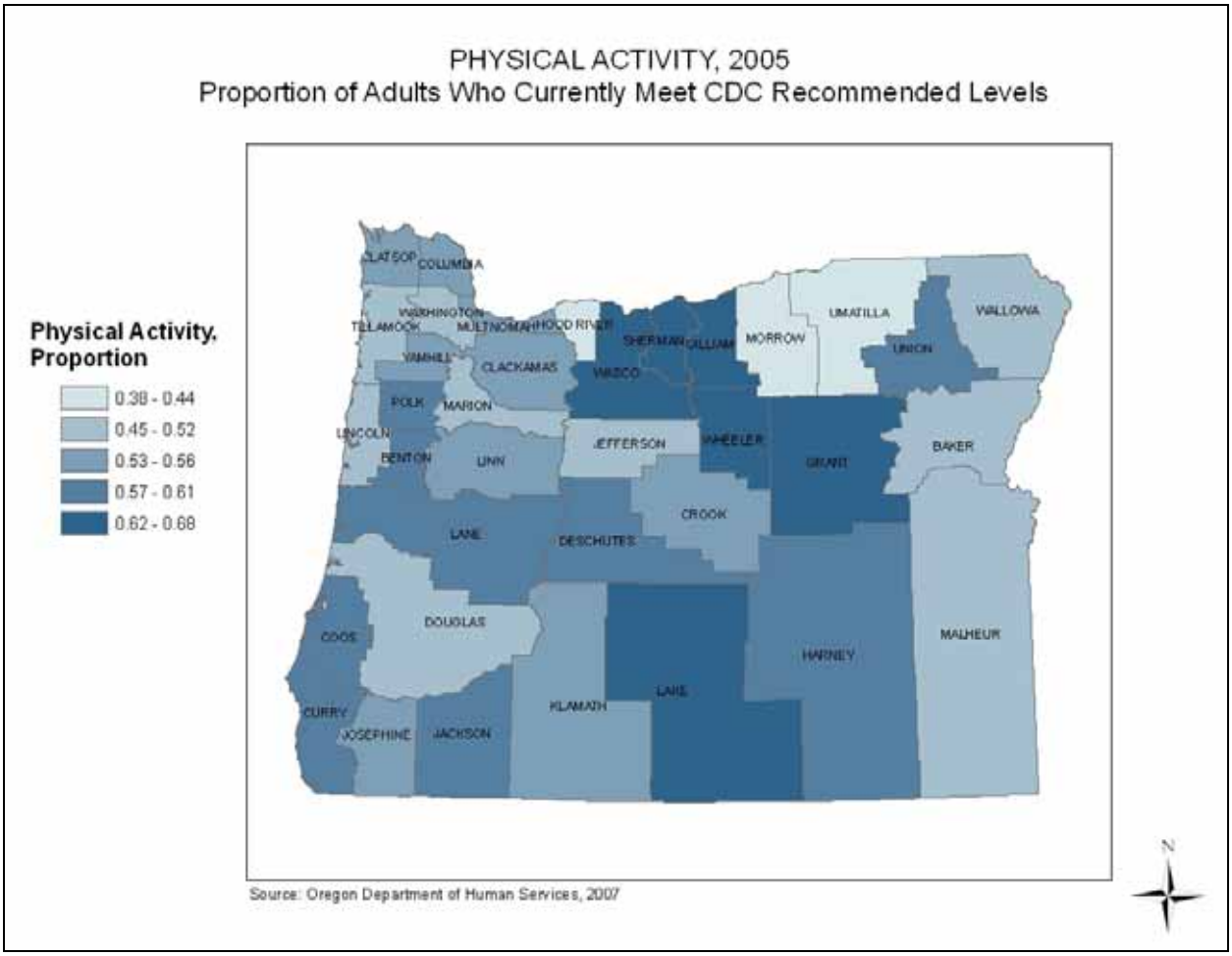


Figure 61: Proportion of physical activity by Oregon counties, 2005



In 2005, the average proportion for physical activity was 55%, ranging from 38% to 68%. The five counties with the highest proportions of physical activity in 2005 were Union (61%), Lake and Sherman/Wasco (63%), Gilliam/Wheeler (65%), and Grant (68%). Counties with the lowest proportion of physical activity included Umatilla (38%), Morrow (40%), Hood River (44%), and Malheur and Baker (47%).

Figure 62: Rates of change in physical activity proportions by Oregon counties, 2001-2005

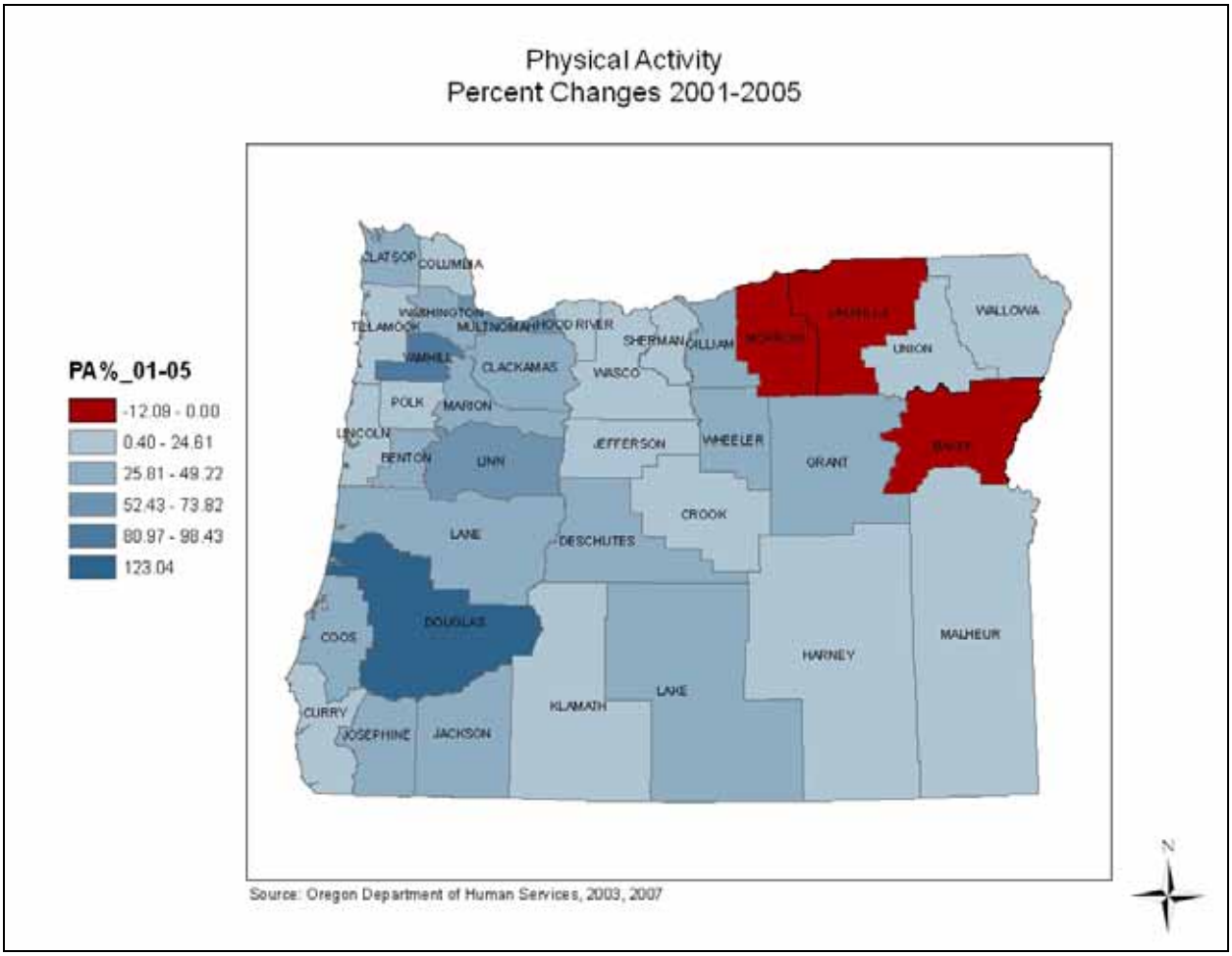


Figure 62 shows the rates of change in proportions for physical activity between 2001 and 2005 by county. The average rate of change for physical activity was 27%, ranging from -12% to 123%. Umatilla (-12%), Baker (-11%), Morrow (-8%) had decreasing proportions of physical activity from 2001-2005, while Tillamook's (0%) proportion remained unchanged. Josephine (46%), Multnomah (52%), Linn (55%), Yamhill (81%) and Douglas (123%) had the largest increase in physical activity proportions.

Counties may be labeled as at-risk due to relatively low physical activity participation rates. Counties that have been identified as "in need" based on adult physical activity rates and trends projected by the Population Research Center, Portland State University for Oregon Parks and Recreation Department. These counties include Baker, Columbia, Crook, Douglas, Harney, Hood River, Josephine, Morrow, Tillamook, Umatilla and Wallowa and are supported with data provided in this report.

Figure 63: Proportion of overweight by Oregon counties, 2001

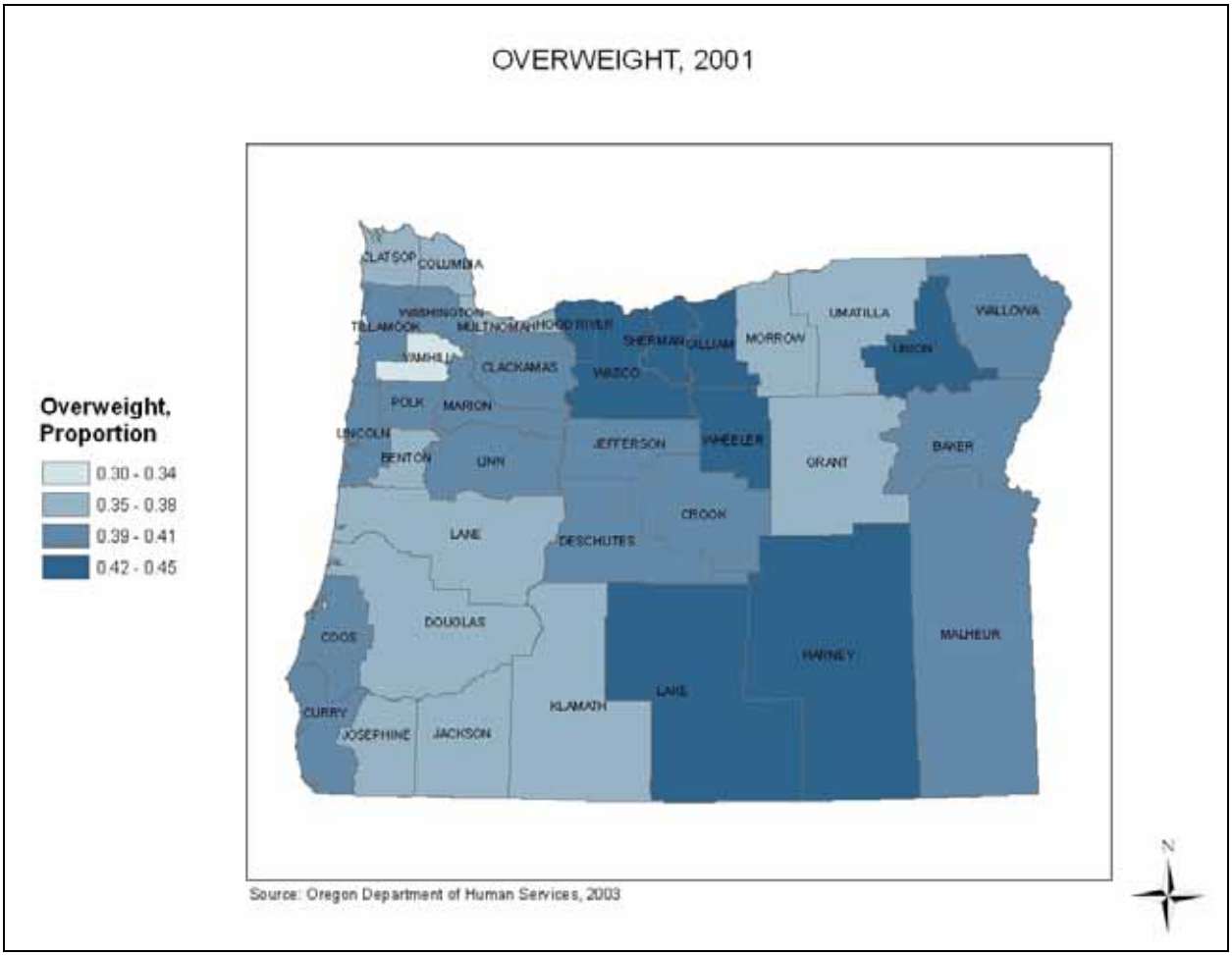
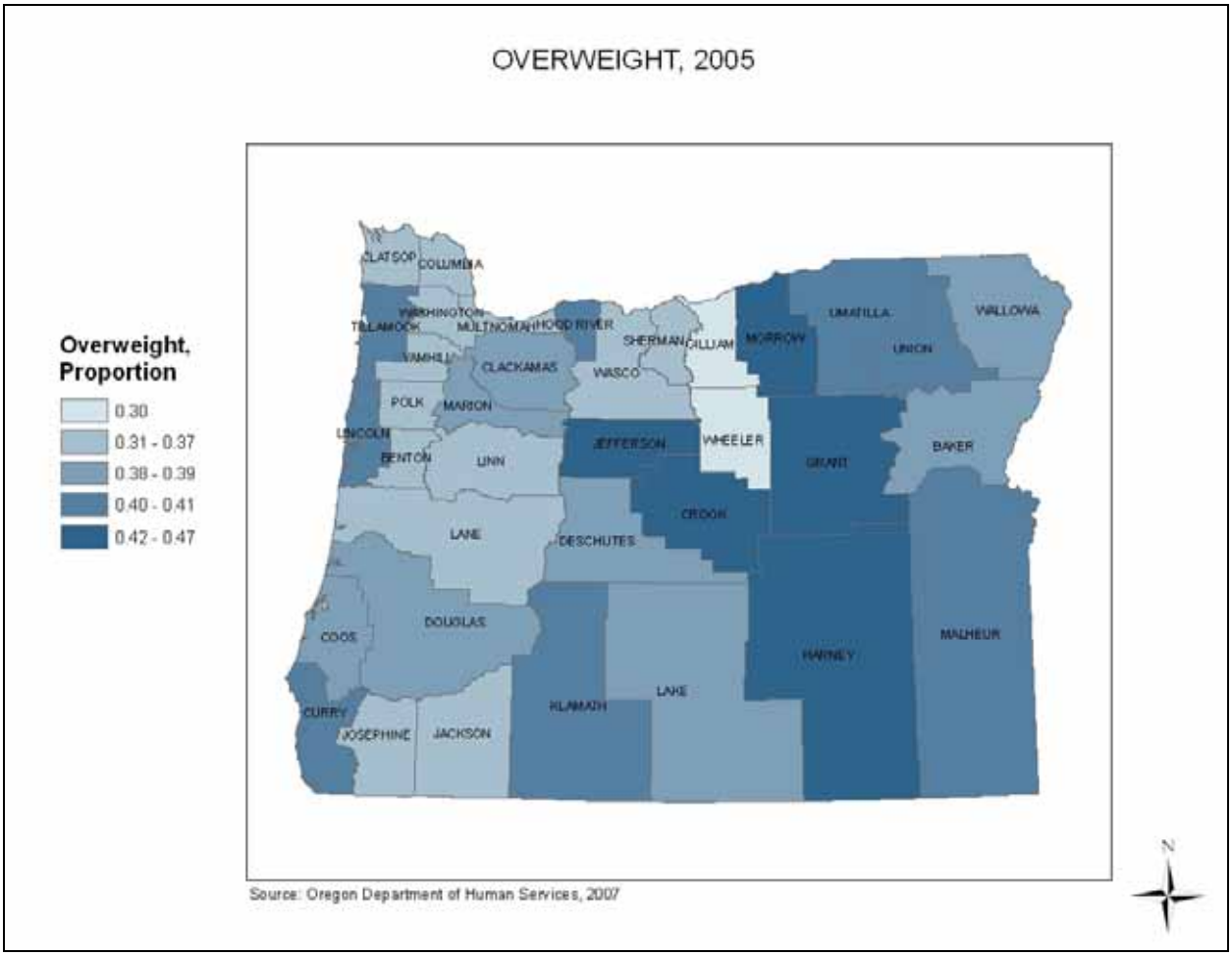


Figure 63 displays proportions of overweight by county in 2001 and Figure 64 displays data for 2005. In 2001, the average proportion for overweight was 39%, ranging from 30% to 45%. The five counties with the highest proportions of overweight in 2001 included Lake, Union and Hood River (42%), Harney and Gilliam/Wheeler (43%), and Sherman/Wasco (45%). Counties with the lowest proportion of overweight included Yamhill (30%), and Klamath, Columbia, Multnomah, and Jackson and Benton (35%).

Figure 64: Proportion of overweight by Oregon counties, 2005



In 2005, the average proportion for overweight was 38%, ranging from 30% to 47%. The five counties with the highest proportions of overweight in 2005 included Jefferson (43%), Crook and Grant (45%), Morrow (46%), and Harney (47%). Counties with the lowest proportion of overweight included Gilliam/Wheeler (30%), Clatsop and Multnomah (34%), and Josephine and Linn (35%).

Figure 65: Rates of change in overweight proportions by Oregon counties, 2001-2005

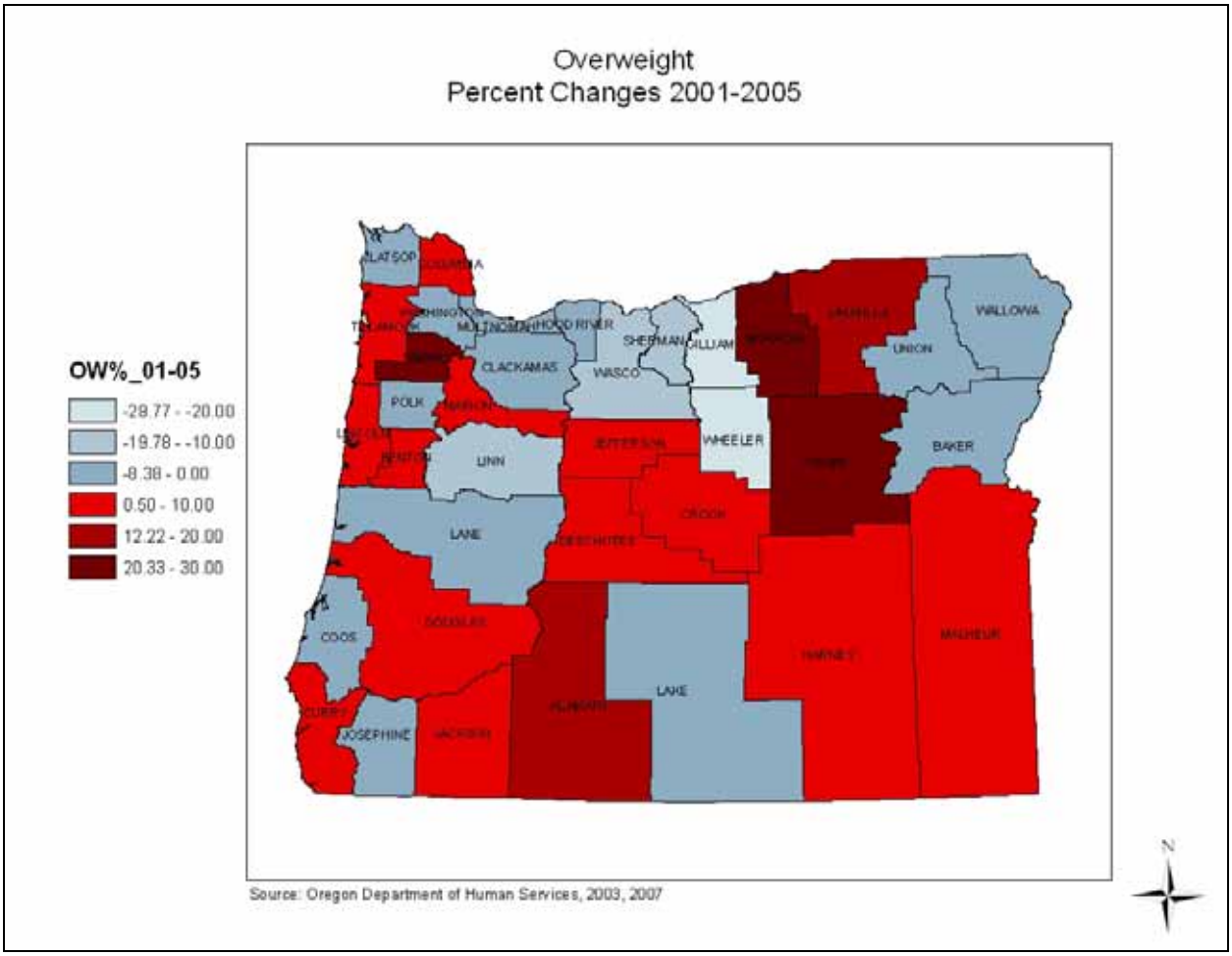


Figure 65 shows the rates of change in proportions for overweight between 2001 and 2005 by Oregon County. The average rate of change for overweight was -1%, ranging from -30% to 25%. The counties with the highest increases in overweight included Umatilla (12%), Klamath (13%), Yamhill (20%), Grant (23%), and Morrow (25%). Counties with the largest decreases in proportions of overweight included Gilliam/Wheeler (-30%), Sherman/Wasco (-20%), Linn (-12%), Clatsop (-8%), and Lake (-7%).

Figure 66: Proportion of obesity by Oregon counties, 2001

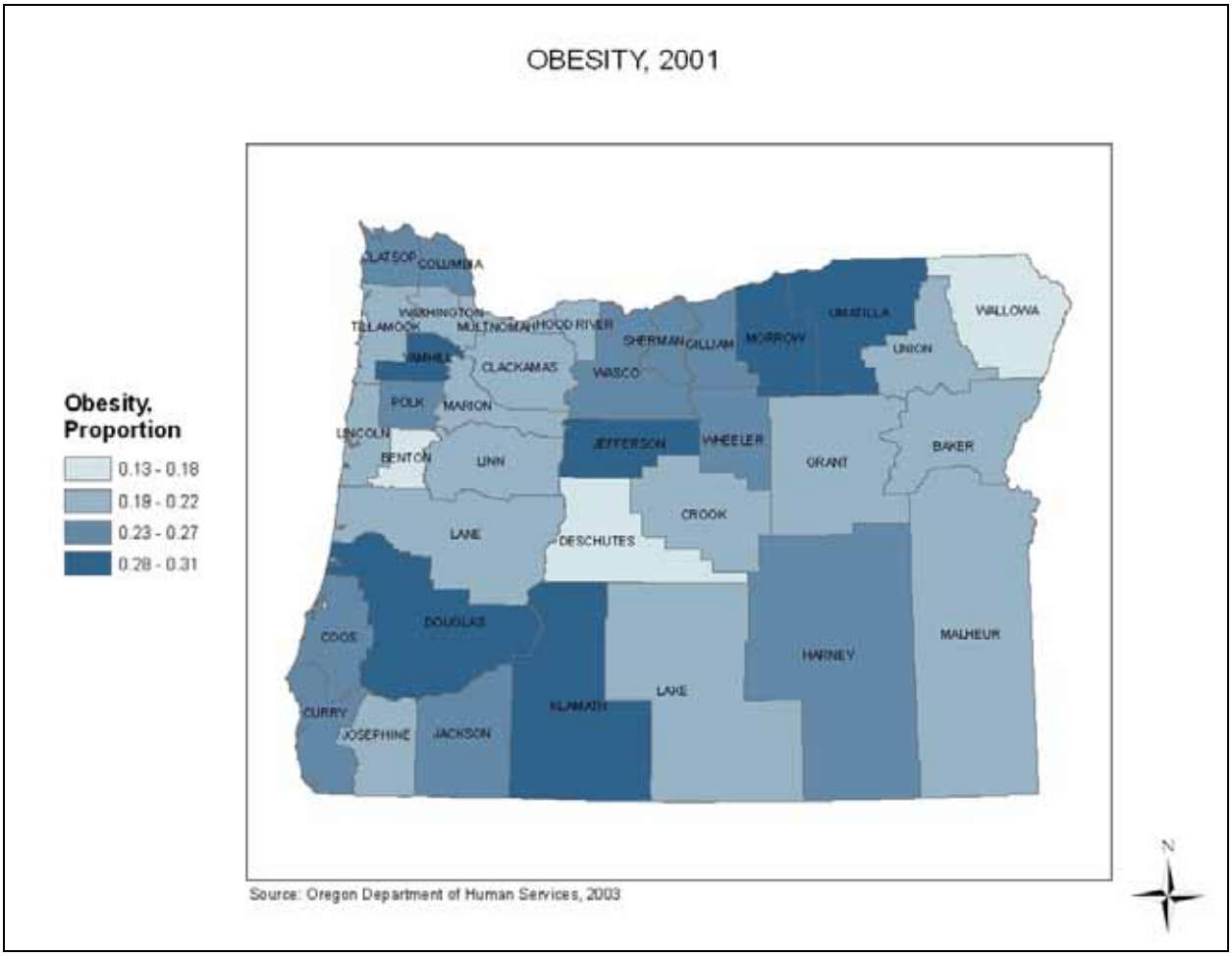


Figure 66 displays proportions of obese by county in 2001 and Figure 67 displays data for 2005. In 2001, the average proportion for obese was 22%, ranging from 13% to 31%. The five counties with the highest proportions of obese in 2001 included Yamhill and Umatilla (27%), Douglas and Klamath (28%), Jefferson (30%), and Morrow (31%). Counties with the lowest proportion of obese included Deschutes (13%), Benton (14%), Wallowa (17%), and Clackamas and Grant (18%).

In 2005, the average proportion for obese was 24%, ranging from 11% to 34%. The five counties with the highest proportions of obese in 2005 included Jefferson and Morrow (29%), Malheur (30%), Linn and Columbia (31%), and Gilliam/Wheeler (34%). Counties with the lowest proportion of obese included Wallowa (11%), Benton (15%), Curry (17%), Deschutes (18%), and Baker and Multnomah (19%).

Figure 67: Proportion of obesity by Oregon counties, 2005

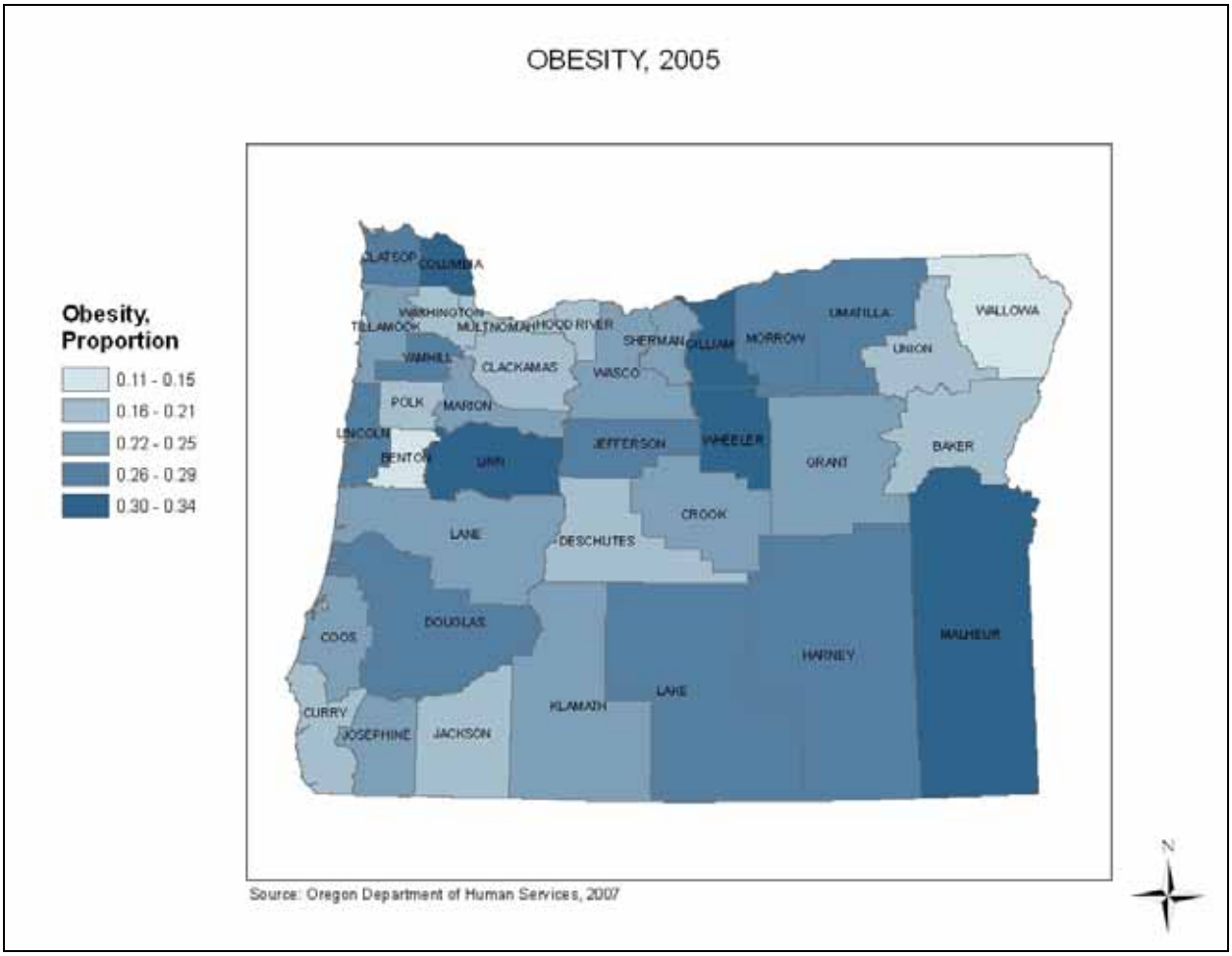
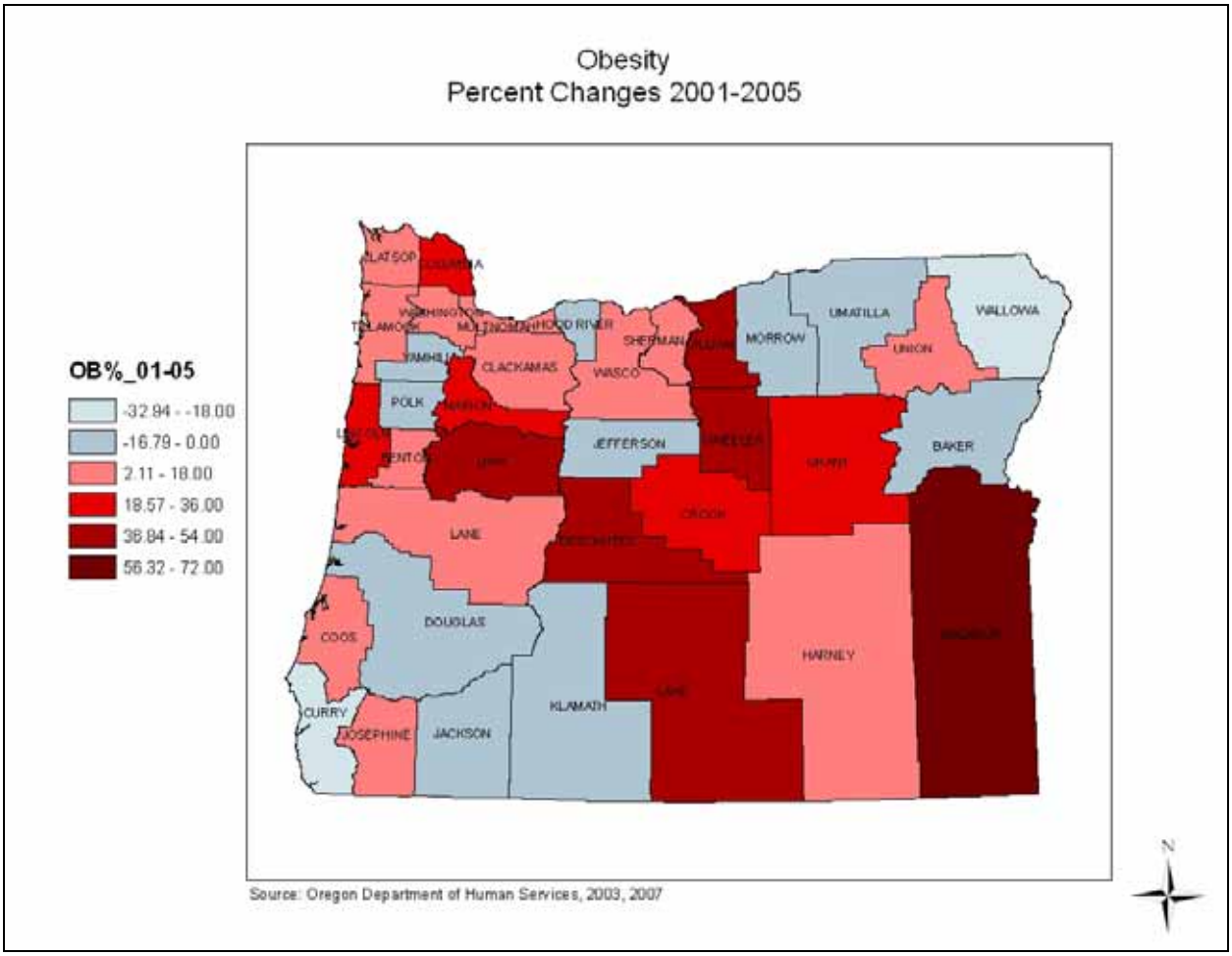


Figure 68 shows the rates of change in proportions for obese between 2001 and 2005 by county. The average rate of change for obesity was 10%, ranging from -33% to 56%. The counties with the highest increases in obesity included Lake (37%), Gilliam/Wheeler (40%), Deschutes (42%), Linn (46%), and Malheur (56%). Counties with the largest decreases in proportions of obesity included Wallowa (-33%), Curry (-28%), Klamath (-17%), Polk (-13%), and Jackson (-12%).

Figure 68: Rates of change in obesity proportions by Oregon counties, 2001-2005



Summary of Key Findings: Trends in Physical Activity and Obesity, Oregon Counties.

1. Rates of physical activity, overweight and obesity vary across Oregon's counties.
2. The average county proportion of physical activity increased from 44% in 2001, to 54% in 2005.
3. Counties that have been identified as "in need" based on adult physical activity rates and trends include Baker, Columbia, Crook, Douglas, Harney, Hood River, Josephine, Morrow, Tillamook, Umatilla and Wallowa.
4. The average county proportion of overweight slightly decreased from 39% in 2001 to 38% in 2005.
5. The average county proportion of obesity slightly increased from 22% in 2001 to 24% in 2005. Some counties' proportions of physical activity decreased and some counties' proportions of overweight and obesity increased during this period.

Research Project: Health and Recreation Linkages in Oregon: Physical Activity, Overweight and Obesity

This research project, conducted by Dr. Randy Rosenberger of Oregon State University, tests the hypothesis that people in Oregon with ready access to outdoor recreation opportunities are healthier than people residing in areas without access to such resources. The objective of this study was to evaluate the relationship between the supply and demand of recreation opportunities in Oregon and measures of health status (physical activity, overweight, and obesity) at the county-level. Data were collected from secondary sources at the county-level or below and a regression[83] model used for hypothesis testing. A full research report is included on the OPRD SCORP planning web site at: http://egov.oregon.gov/OPRD/PLANS/docs/scorp/Health_and_Rec_Report_websize.pdf.

The following is a summary of key findings from the health and recreation linkages study.

Linkages Between Physical Activity, Overweight, Obesity and Recreation Supply in Oregon

Introduction

Proportion of physical activity, overweight and obesity vary across counties in Oregon. The supply of recreation opportunities likewise vary. This analysis measures the association among physical activity, overweight, obesity and recreation supply while holding other potential confounding factors constant.

Conceptually, our model measures the direct effect of natural areas/recreation supply on physical activity and weight status, while controlling for the indirect relationships, or dependence, of physical activity on weight status. There are many other factors associated with overall health and weight, including dietary habits, neighborhood design, social/cultural influences, among other factors (Wells et al., 2007),[84] that are not accounted for in our model. Instead, we are interested in isolating the relationship between recreation supply and demand and health indicators.

Data

This analysis was conducted with data collected in the 2000-2001 period. We are restricted to this period due to data availability: 2000 U.S. Census data, 2001 SCORP inventory data (OPRD, 2001),[85] and the 2002 SCORP participation survey (OPRD, 2003)[86]. Table 40 provides descriptions of variables and sources of data used in this analysis. Appendix D in the full on-line report provides pairwise correlation tests for health prevalence indicators, county classifications, and recreation supply measures, which contain a broader list of variables tested in this analysis.

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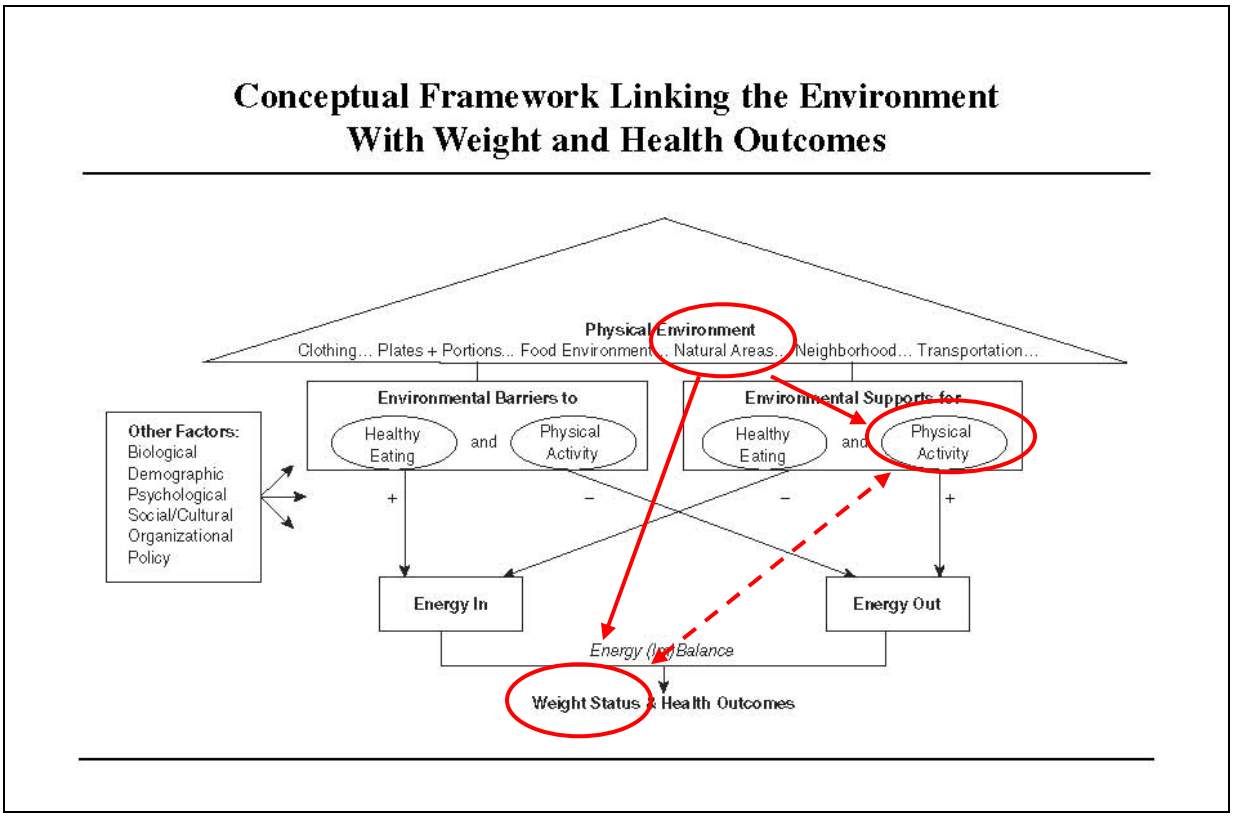
[83] In statistics, regression analysis examines the relationship of a dependent variable (response variable) to specific independent variables (explanatory variables). This technique allows a researcher to isolate the effect of individual and multiple explanatory variables on a response variable.

[84] Wells, N.M., S.P. Ashdown, E.H.S. Davies, F.D. Cowett and Y. Yang. 2007. Environment, design, and obesity: Opportunities for interdisciplinary collaborative research. *Environment and Behavior* 39(1):6-33.

[85] OPRD. 2001. 2001 Oregon Statewide Outdoor Recreational Resource/Facility Inventory Bulletin. Salem, OR: Oregon Parks and Recreation Department.

[86] OPRD. 2003. Oregon Statewide Comprehensive Outdoor Recreation Plan: 2003-2007. Salem, OR: Oregon Parks and Recreation Department.

Figure 69: Focus on direct effect of natural areas on physical activity and weight status, Source: Wells et al. (2007)



Appendix Table D1 (see full on-line report) shows health prevalence data are not strongly correlated with the majority of the demographic, county profile and recreation supply and demand variables in pairwise correlation tests. Appendix Table D2 (full on-line report) shows that METRO, HHAC (household density per acre), and RURAL are highly correlated with several demographic characteristics of counties, such as age and age distribution, income levels, housing values, and racial profiles. Therefore, METRO, HHAC and RURAL will serve as proxies for demographic profiles of counties. Appendix Table D3 (full on-line report) shows the volume of recreation supply measures, in miles and number of facilities, are correlated with metropolitan classification, household density, and public land ownership patterns. These recreation supply measures have been normalized by household density as number of miles per household.

Table 40: Variable descriptions and sources of data

Variable	Description	Source
PA	Physical Activity, proportion of adults meeting CDC requirements, 2000-2001	Oregon Dept of Human Services, 2003
OW	Overweight (BMI 25.0-29.9), proportion of adults, 2000-2001	Oregon Dept of Human Services, 2003
OB	Obesity (BMI≥30.0), proportion of adults, 2000-2001	Oregon Dept of Human Services, 2003
HIKTRL	Hiking Trails, miles, 2001	OR SCORP Inventory, 2001
HIKTRLHH	Hiking Trail miles per household, 2001	Calculated from OR SCORP Inventory, 2001
URBTRL	Urban Trails, miles (bike, walking and jogging trails), 2001	OR SCORP Inventory, 2001
URBTRLHH	Urban Trail miles per household, 2001	Calculated from OR SCORP Inventory, 2001
PUBAC	Density of public lands (per acre), 1997	USDA NRCS, Natural Resources Inventory
TRAILP	Proportion of adults participating in Trail or Off-Trail Activities (hiking, mountain biking, cross-country skiing, etc.), 2002	OR SCORP Phone Survey 2002
ROADP	Proportion of adults participating in Road & Street Activities (walking, jogging, skating, skateboarding, etc), 2002	OR SCORP Phone Survey 2002
SPORTSP	Proportion of adults participating in Outdoor Sports & Games (soccer, football, golf, basketball, tennis, etc), 2002	OR SCORP Phone Survey 2002
TRAILD	Annual days per household participating in Trail & Off-Trail Activities, 2002	Calculated from OR SCORP Phone Survey 2002
ROADD	Annual days per household participating in Road & Street Activities, 2002	Calculated from OR SCORP Phone Survey 2002
SPORTSD	Annual days per household participating in Outdoor Sports & Games, 2002	Calculated from OR SCORP Phone Survey 2002
HHAC	Density of households (per acre), 2000	Calculated from U.S. Census
COLLEGE	College, % 25+ years old with bachelor's degree, 2000	US Census
COMMUTE	Mean travel time to work (minutes), workers aged 16+, 2000	US Census
METRO	Metropolitan Status (0, 1), 2003	USDA Economic Research Service
RURAL	Rural Status (0,1), 2003	USDA Economic Research Service

Models

For a full description of models used in this analysis, please see the full on-line report available at: http://egov.oregon.gov/OPRD/PLANS/docs/scorp/Health_and_Rec_Report_websize.pdf.

Results

Table 41 provides summary statistics for variables used in this analysis along with measures for participation in recreation activities and number of recreation facilities. Maps showing the distribution of the recreation supply and demand variables across Oregon are provided below. Based on the 2001 SCORP Inventory (OPRD, 2001), there was an average of 270 miles of hiking trails per county, ranging from 0 miles to 1,150 miles. Figure 70 shows the distribution of reported hiking trail miles, with higher miles clustered around Lane County and Wallowa County. Low miles were reported in the northwest and southeast portions of the state. Urban trail (biking, walking and jogging trails) miles averaged 106 miles per county, although there is likely

double-counting for multi-purpose trails. They ranged from a reported 0 miles to 474 miles. Figure 71 shows the distribution of reported urban trail miles, with higher miles in the mid-valley region and low numbers in the eastern and northwestern portions of the state. We also used SCORP Inventory data to estimate the number of recreation facilities, which averaged 263 per county. These facilities included the number of baseball/softball fields; football/rugby/soccer fields; indoor and outdoor swimming pools; outdoor basketball nets; outdoor tennis courts; public and private golf courses; miscellaneous recreation centers; and baseball batting cages. Figure 72 shows the distribution of reported recreation facilities, with higher populated counties reporting more facilities and lower populated counties reporting fewer facilities.

Table 41: Summary statistics, Oregon counties (n = 36)

Variable	Mean	Std.Dev.	Min	Max
PA	0.44	0.07	0.23	0.54
OW	0.39	0.03	0.30	0.45
OB	0.22	0.04	0.13	0.31
HIKTRL	269.50	271.32	0	1150.00
HIKTRLHH	0.03	0.06	0	0.30
URBTRL	106.22	118.70	0	474.00
URBTRLHH	0.01	0.02	0	0.08
FACILITY	262.72	339.60	15.00	1265.00
FACILITYHH	0.01	0.01	0	0.03
PUBAC	0.46	0.21	0.09	0.78
TRAILP	0.49	0.07	0.34	0.65
ROADP	0.73	0.09	0.53	0.92
SPORTSP	0.47	0.07	0.34	0.60
TRAILD	6.44	2.53	2.80	12.37
ROADD	31.49	5.25	21.58	44.69
SPORTSD	8.30	1.96	3.72	13.87
HHAC	0.06	0.16	0	0.91
COLLEGE	0.19	0.07	0.11	0.47
COMMUTE	20.26	3.67	14.40	30.80
METRO	0.31	0.47	0	1
RURAL	0.14	0.35	0	1

Figure 70: Miles of hiking trails in Oregon

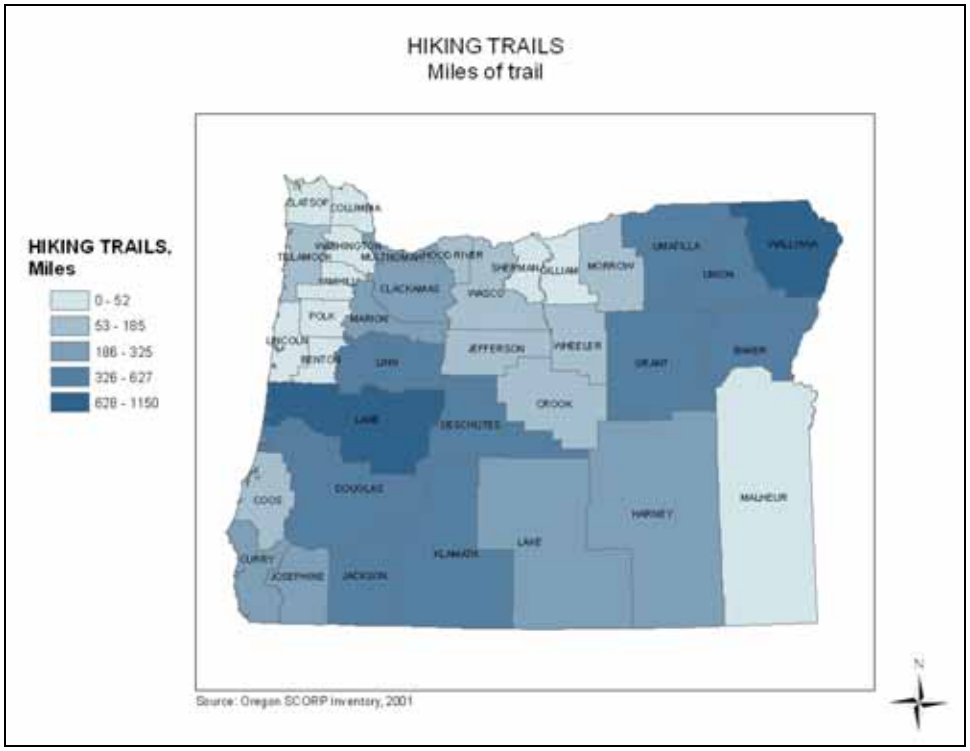


Figure 71: Miles of urban trails in Oregon

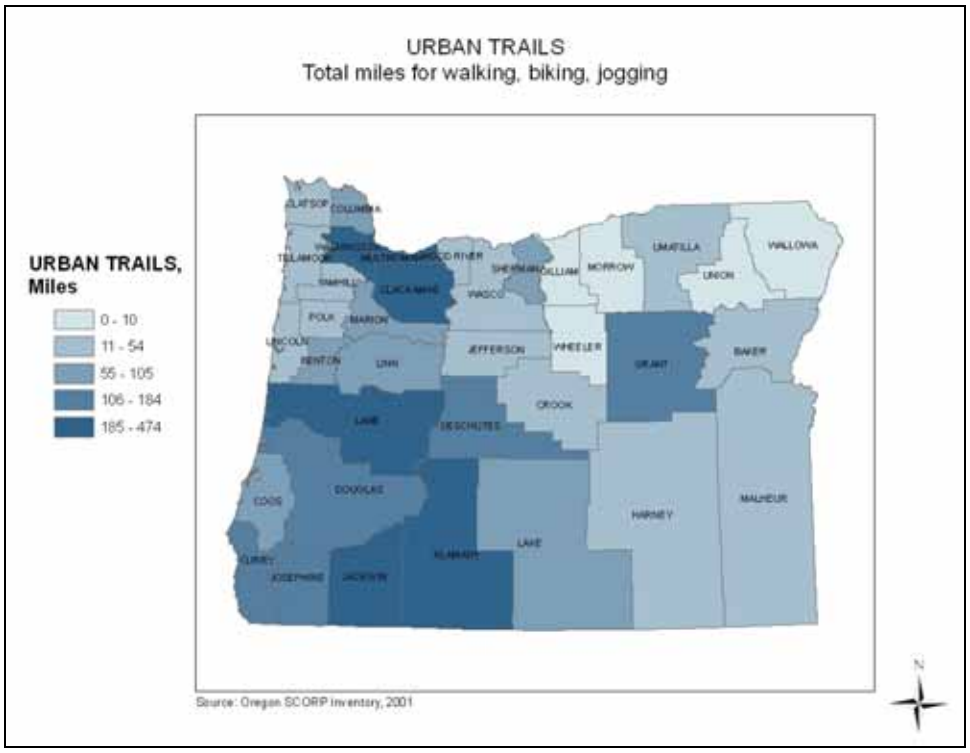
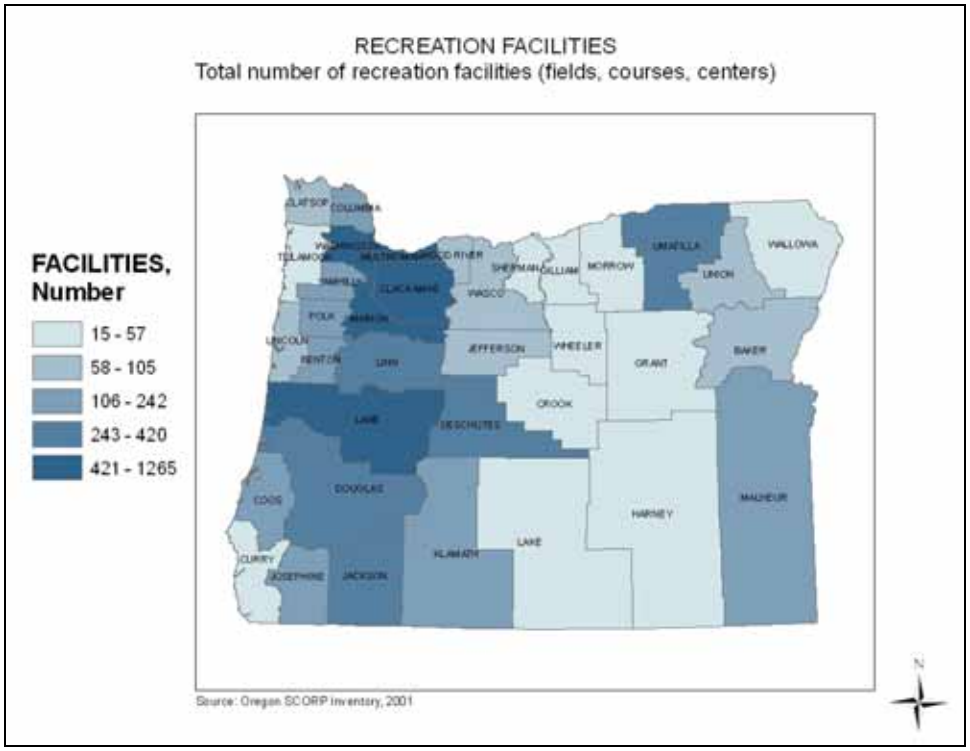


Figure 72: Total number of recreation facilities in Oregon



The total estimated miles of trails and numbers of facilities are correlated with the number of households (Appendix D, Table D3 in on-line report). Therefore, we normalize the recreation supply data by converting them to per household measures. Figure 73 shows the distribution of household density (per acre) across the state. Higher densities are centered on counties with metropolitan and urban centers. Hiking trail miles density averaged 0.03 miles per household, ranging from 0 to 0.3 miles per household. Figure 74 shows a more even distribution of these data across household density differences. Urban trail miles density averaged 0.01 miles per household, ranging from 0 to 0.08. Figure 75 shows how the distribution of these data is more evenly represented when accounting for population differences. Recreation facilities density averaged 0.01 facilities per household, ranging from 0 to 0.03. The normalized facility data were ultimately dropped from the estimated models because they remained highly correlated with metro and household density measures.

Figure 73: Household density (number of households per acre)

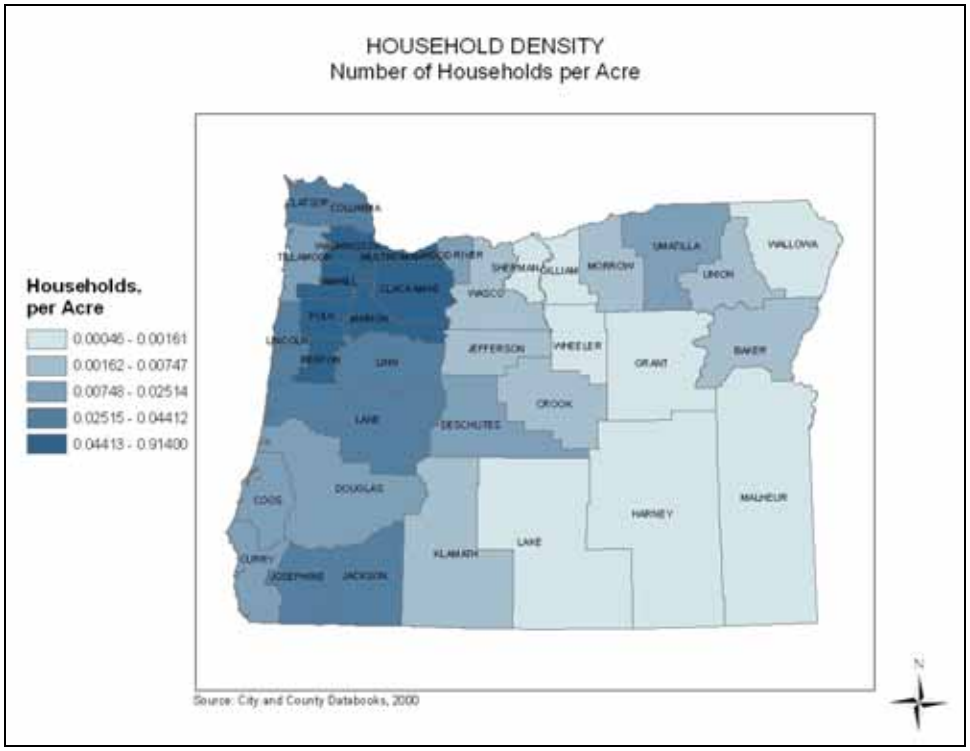


Figure 74: Hiking trail miles density (miles of trail per household)

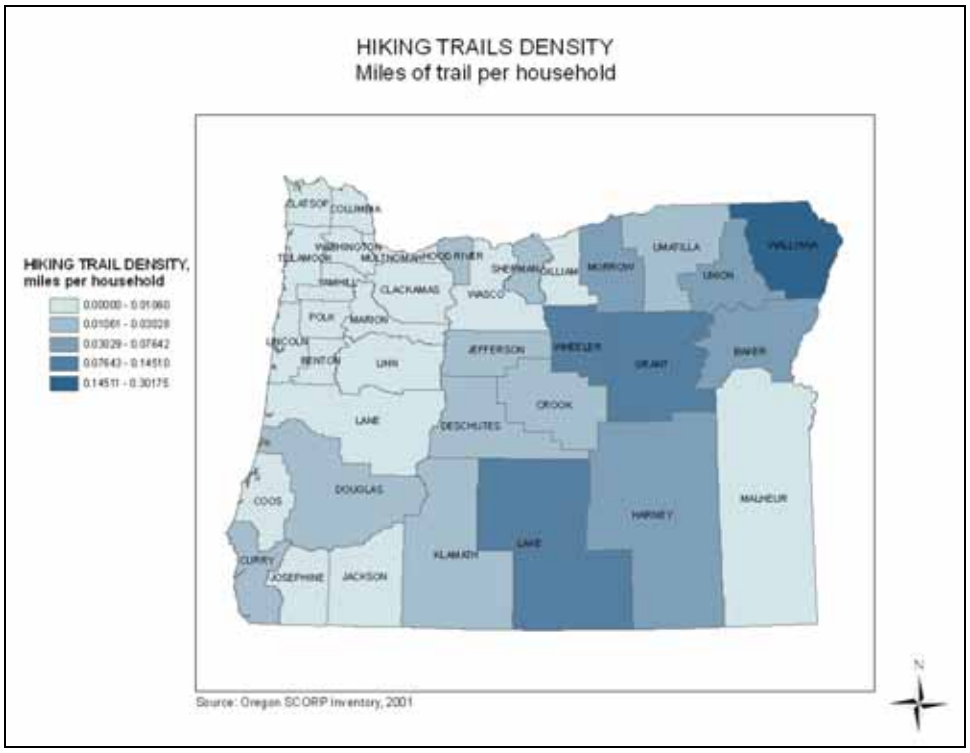
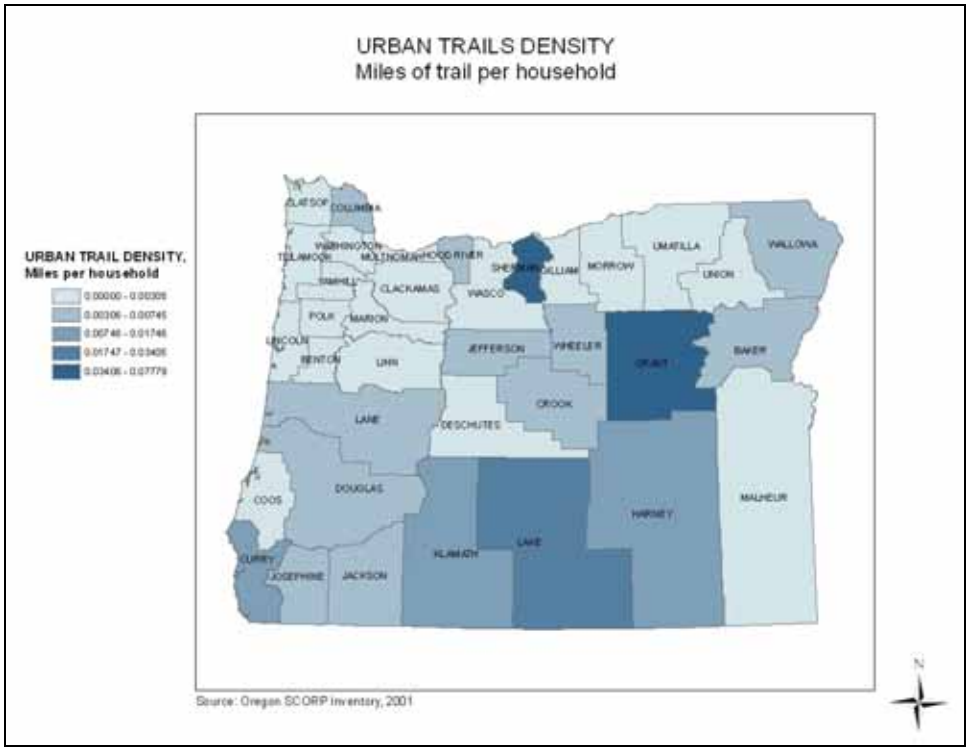


Figure 75: Urban trail miles density (miles of trail per household)



Recreation demand measures were derived from the 2002 SCORP participation survey (OPRD, 2003). An average of 49% of adults participated in trail or off-trail activities, including hiking, backpacking, mountain biking, cross-country skiing, orienteering, or horseback riding. Trail participation ranged from 34% to 65%, with no general visual patterns observable in the data (Figure 76). The average number of days of participating in trail or off-trail activities per year was about 6 days. Annual days in trail activities ranged from 3 to 12 days. Figure 77 shows higher days per household in the central and southeast portions of the state with the exception of Crook County (low rate), and Benton and Clatsop Counties (high rate). An average of 73% participated in road or street activities, including running or walking for exercise, walking for pleasure, in-line skating, or skateboarding. Road and street activity participation ranged from 53% to 92%, with higher rates clustered in the northwest portion of the state (Figure 78). The average number of days of participating in road or street activities per year was about 31 days, ranging from 22 to 45 days. These data were scattered across the state with no discernible pattern (Figure 79). An average of 47% participated in outdoor sports and games, including golf, baseball, softball, football, rugby, tennis, soccer, volleyball, Frisbee games, hang gliding, skydiving, rock climbing, or using children's playground equipment. Sports and games participation ranged from 34% to 60%, clustered around urban centers (Figure 80). The average number of days of participating in outdoor sports and games activities per year was about 8 days, ranging from 3 to 14 days. Figure 81 shows these data are highest in the northern portion of the state. Participation variables were not significant in the models and therefore dropped from the final models. Duration of use is a better measure of physical activity and is retained in the following models.

Figure 76: Proportion participating in trail or off-trail activities

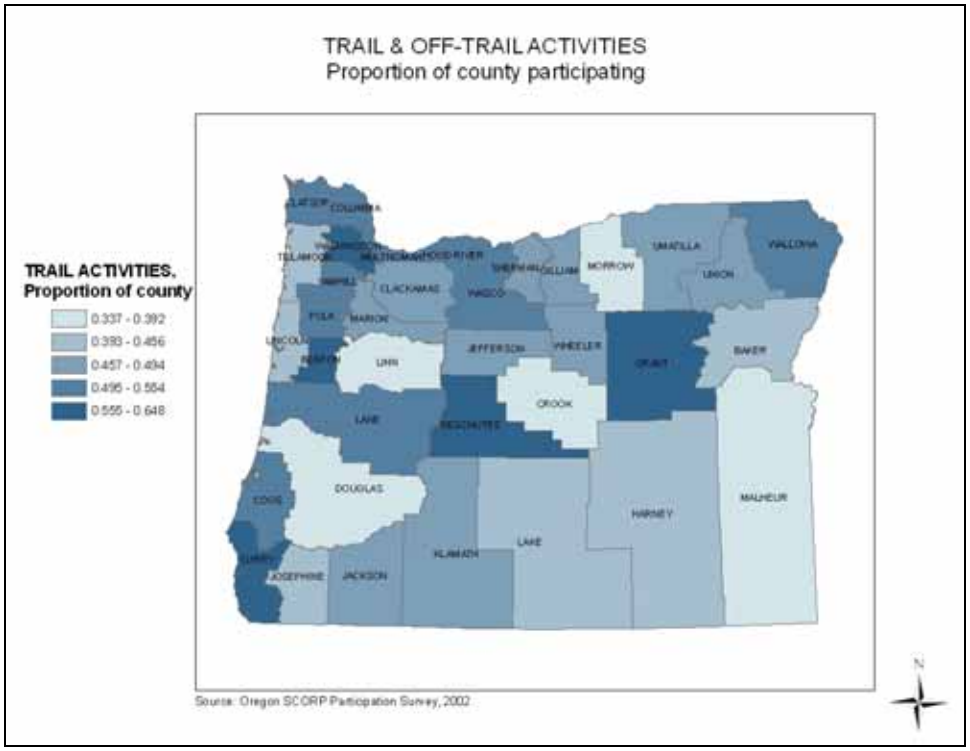


Figure 77: Average annual days per household in trail or off-trail activities

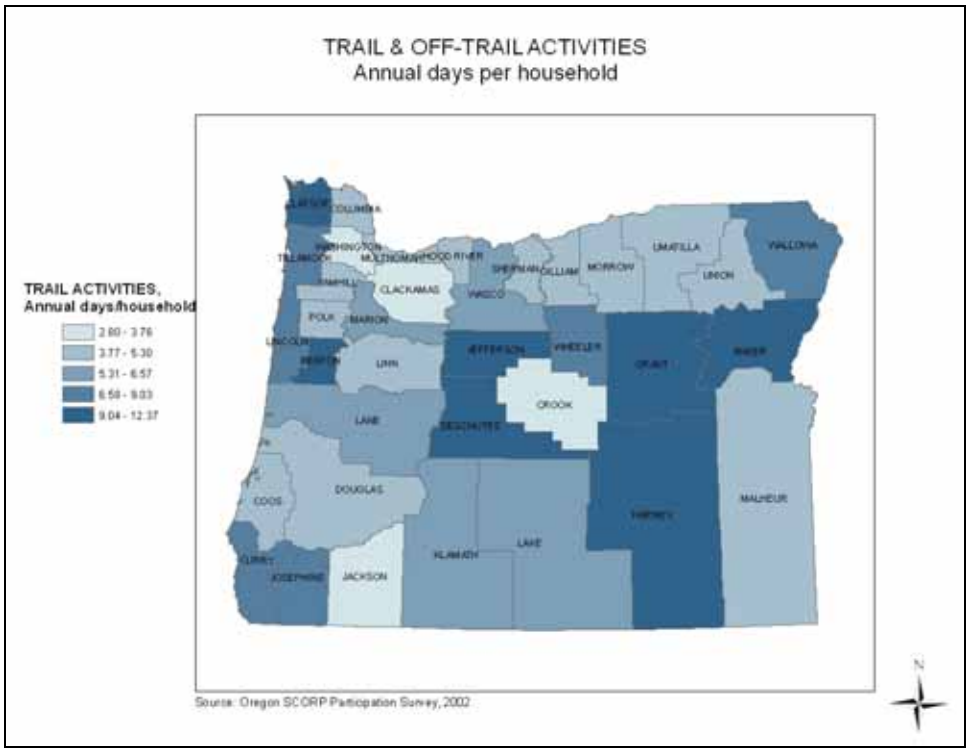


Figure 78: Proportion participating in road and street activities

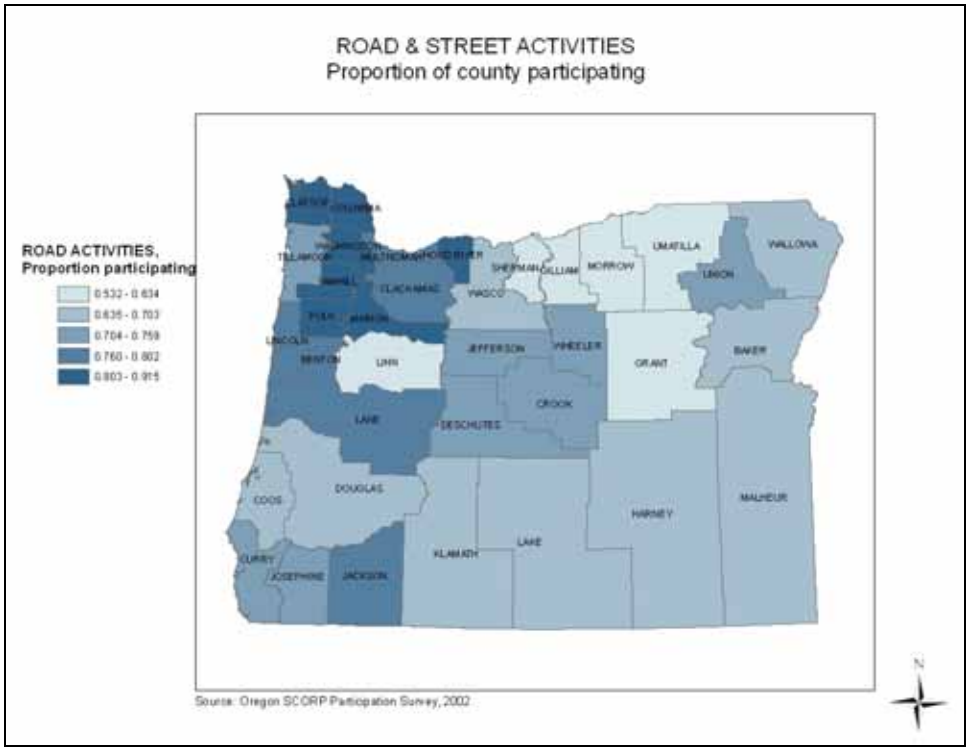


Figure 79: Average annual days per household in road and street activities

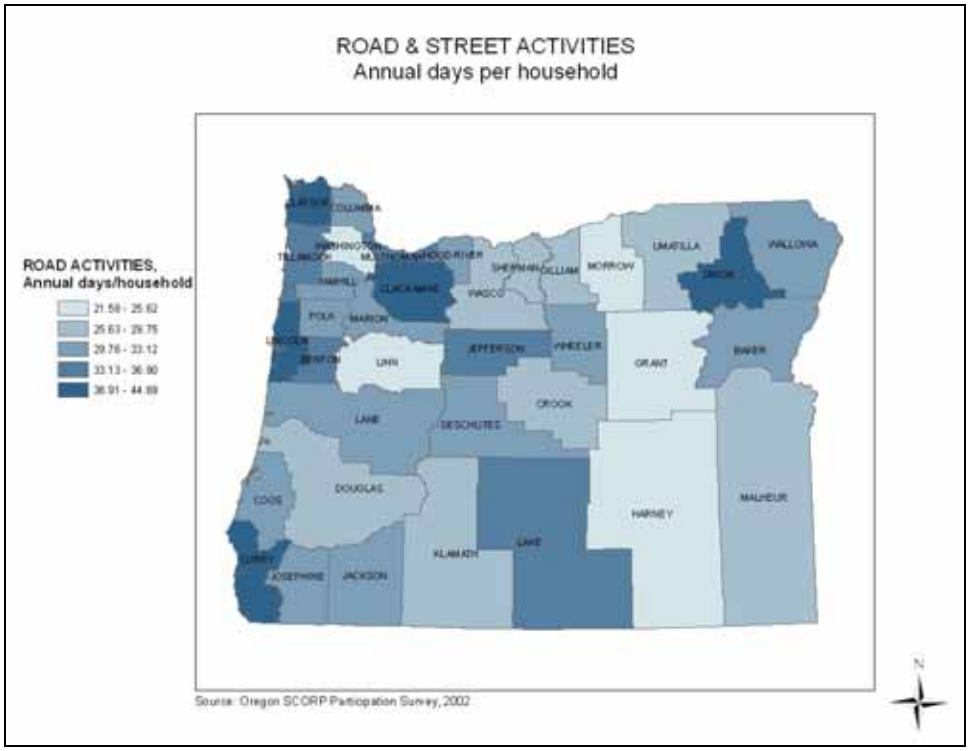


Figure 80: Proportion participating in outdoor sports and games activities

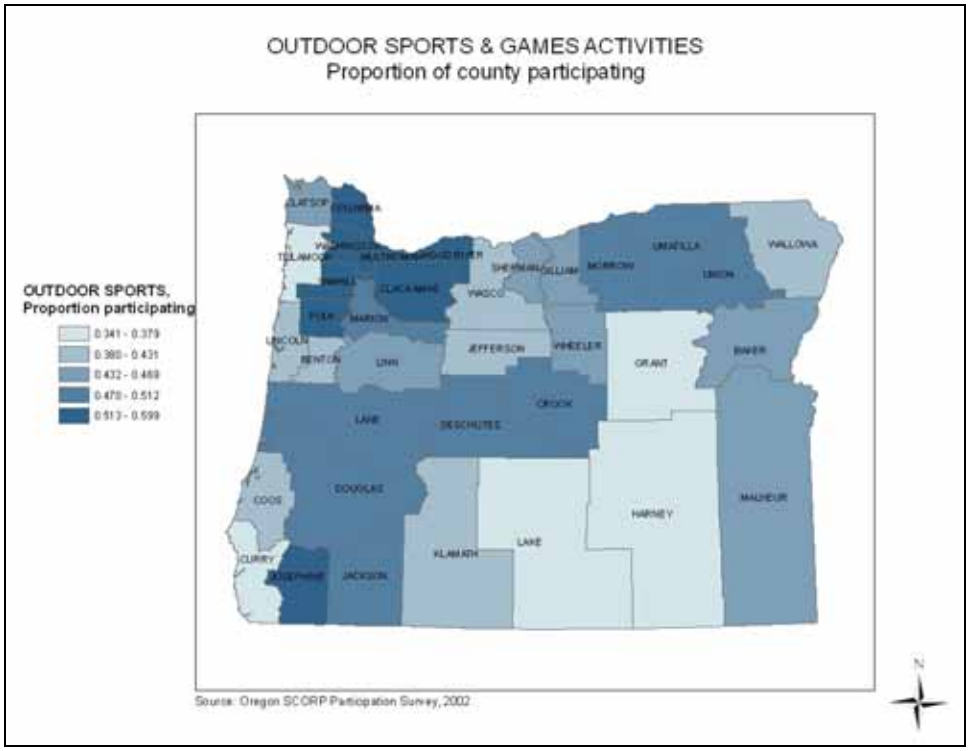
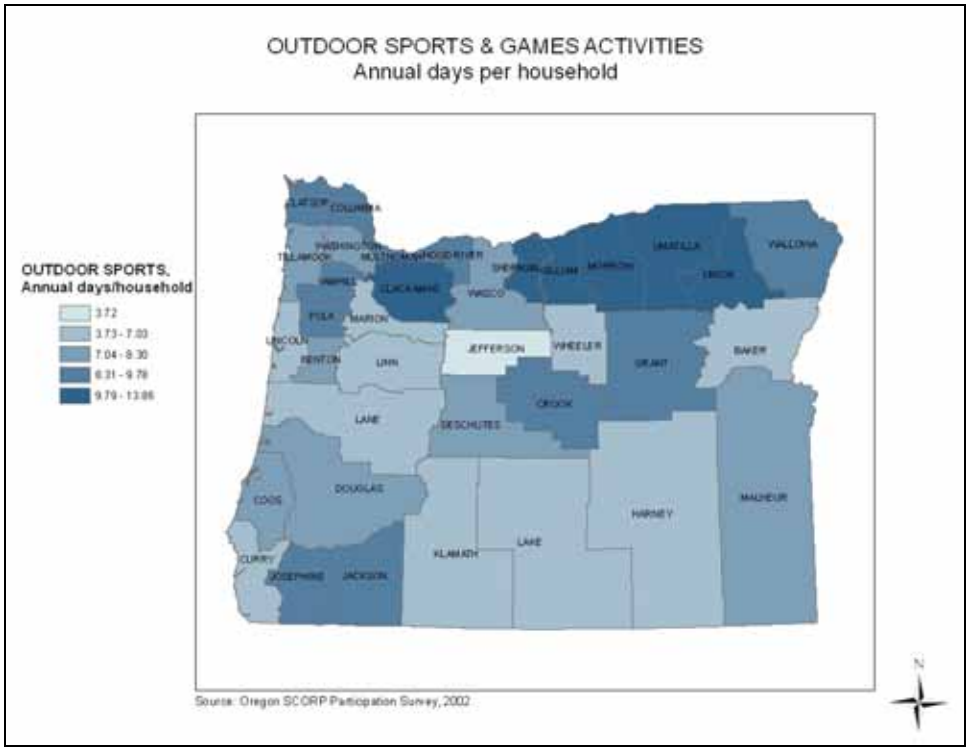


Figure 81: Average annual days per household in outdoor sports and games activities



There was an average of 0.06 households per acre, ranging from 0 to 0.91. About 19% have a college education, and average commute times was a little over 20-minutes one-way. Thirty-one percent of counties are classified as metropolitan, while 14% are classified as rural. Public acres (federal, state, county, and municipal) made up 46% of the total land base in each county on average, ranging from a low of 9% to a high of 78%.

Results of the models using Ordinary Least Squares are reported in Table 42. The estimated coefficients represent the change in the dependent variable (PA, OW, or OB) for a one-unit change in the independent variables. The sign on the coefficient is the direction of the association. These coefficients are estimated associations between the dependent variable and the independent variable, not to be confused with causality. While some of the independent variables may cause changes in the dependent variable, we cannot prove causality with our data. However, patterns in associations in county-level data mirror physical and behavioral results reported for individual-level data (Rosenberger et al., 2005)[87].

Those coefficients that are statistically different than zero are identified with asterisks (*), where statistical significance tests the hypothesis that the estimated coefficient is different than zero. Standard errors of coefficient estimates are provided in parentheses. Elasticity measures are provided in square-brackets. Elasticities are unitless measures of the relationship between the dependent variable and the independent variables, where the estimated elasticity may be interpreted as the percent change in the dependent variable associated with a one-percent change in the independent variable, evaluated at the mean values for the variables. That is, as we move from county to county, elasticities tell us the general effect of changes in recreation supply and demand on the counties' average physical activity and weight status rates. Overall model goodness of fit is provided by the adjusted-R^2, which may be interpreted as the percent of the variation in the dependent variable explained by the independent variables.

The estimated physical activity model (PA MODEL) explained 30% of the variation in physical activity proportions (PA) as reflected in the adjusted-R^2 value. Overweight (OW) is positively associated with PA—for every 1% increase in OW an associated 0.83% increase in PA. We should be very cautious with interpreting this relationship—one plausible explanation is that as people enter the overweight class, they may become more physically active in an attempt to offset their weight gain, although given the elasticity is less than one, not everyone becomes physically active. Obesity proportions (OB) are not associated with PA. Trails are strongly, positively associated with physical activity. Counties with higher per household densities of trail miles have higher proportions of physically active adults. A 1% increase in hiking trails (HIKTRLHH) or urban trails (URBTRL) is associated with a 0.01% higher physical activity rate. The density of public land (PUBAC) in a county is not significantly related to PA. The frequency of participation in various recreation activities is positively associated with PA across counties. The average annual days households participate in trail or off-trail related activities

[87] Rosenberger, RS, Y Sneh, TT Phipps and R Gurvitch. 2005. A spatial analysis of linkages between health care expenditures, physical inactivity, obesity and recreation supply. *Journal of Leisure Research* 37(2):216-235.

(TRAILD), in road and street activities (ROADD), and in outdoor sports and games (SPORTSD) are associated with higher PA rates—elasticities range from 0.10% to 0.13% for a 1% increase in annual participation in the various activities. Household density per acre in a county is negatively associated with PA rates, meaning more densely populated counties have lower PA rates.

The estimated overweight model (OW MODEL) explained 46% of the variation in overweight proportions (OW) as reflected in the adjusted-R^2 value. Physical activity (PA) is positively associated with OW—for every 1% increase in PA an associated 0.27% increase in OW. Again, interpretation of this relationship should be cautious—recall PA was found to be endogenously determined. Obesity proportions (OB) are negatively associated with OW—for every 1% increase in OB an associated 0.15% decrease in OW follows—reflecting movement of people into OB from OW. Trails are strongly, negatively associated with physical activity. Counties with higher per household densities of trail miles have lower proportions of overweight adults. A 1% increase in miles/household of hiking trails (HIKTRLHH) is associated with a 0.01% lower overweight rate. Urban trails (URBTRL) are not statistically associated with OW. The frequency of participation in various recreation activities is negatively associated with OW across counties, although road and street activities are not statistically significant. A 1% increase in trail or off-trail related activities (TRAILD) and in outdoor sports and games (SPORTSD) are associated with 0.07% and 0.08% decreases in OW, respectively. Metropolitan counties had lower OW rates, while rural counties had higher OW rates.

The estimated obesity model (OB MODEL) explained 53% of the variation in obesity proportions (OB) as reflected in the adjusted-R^2 value. This is the only model that explicitly needed to correct for spatial dependence in the form of a spatial error model. Physical activity (PA) and overweight (OW) are not statistically associated with OB. Likewise, trail densities (HIKTRLHH and URBTRLHH) are not significantly associated with OB patterns at the county-level. Only annual days per household participating in trail or off-trail activities (TRAILD) is statistically, negatively associated with OB—a 1% increase in trail or off-trail is associated with a 0.18% reduction in OB. Household density is negatively associated with OB. The more educated a county is as measured by the proportion of 25 or older adults with at least a bachelor's degree (COLLEGE), the lower its OB rate—a 1% increase in COLLEGE has a -0.30% response in OB. Also, counties with longer commute times (COMMUTE), the higher their OB rates—a 1% increase in COMMUTE results in a 0.23% response in OB.

Table 42: Regression results (n = 36)

VARIABLE	PA MODEL	OW MODEL	OB MODEL
Constant	-0.05426 (0.1259)	0.4296*** (0.0397)	0.3689*** (0.0700)
PA	Dependent variable	0.2374*** (0.0690) [0.2714]	-0.0803 (0.0835) [-0.1621]
OW	0.9531*** (0.2559) [0.8342]	Dependent variable	-0.1804 (0.1399) [-0.3186]
OB	-0.0448 (0.2232) [-0.0222]	-0.2688** (0.0994) [-0.1522]	Dependent variable
HIKTRLHH	0.1612** (0.0792) [0.0119]	-0.1348** (0.0500) [-0.0113]	-0.1160 (0.0806) [-0.0172]
URBTRLHH	0.7185** (0.2988) [0.0133]	-0.2298 (0.2748) [-0.0048]	0.0049 (0.3712) [0.0002]
PUBAC	-0.0461 (0.0496) [-0.0478]	---	---
TRAILD	0.0070** (0.0030) [0.1016]	-0.0043** (0.0020) [-0.0713]	-0.0060** (0.0029) [-0.1757]]
ROADD	0.0018* (0.0010) [0.1277]	-0.0005 (0.0008) [-0.0405]	0.0002 (<0.0001) [0.0286]
SPORTSD	0.0059* (0.0031) [0.1103]	-0.0037** (0.0018) [-0.0790]	0.0014 (0.0024) [0.0528]
HHAC	-0.0556** (0.0251) [-0.0073]	---	-0.0669** (0.0291) [-0.0177]
METRO	---	-0.0368*** (0.0081)	---
RURAL	---	0.0272** (0.0122)	---
COLLEGE	---	---	-0.3457*** (0.0606) [-0.3014]
COMMUTE	---	---	0.0025** (0.0012) [0.2302]
λ	---	---	-0.9900*** (0.2075)
Adj-R^2	0.30	0.46	0.53

Standard errors in parentheses; elasticities in square-brackets calculated at mean values.
***p-value<0.01; **p-value<0.05; *p-value<0.1

Summary of Key Findings: Regression Models

1. Recreation supply and demand are strongly associated with higher rates of physical activity, somewhat associated with lower rates of overweight, and weakly associated with rates of obesity.
2. More hiking and urban trail miles per household were associated with increased rates of physical activity.
3 More days spent in trail, road and sports related activities were associated with higher physical activity rates.
4 Hiking trail miles per household were negatively associated with overweight, but not obesity.
5. Days spent in trail and sports activities were negatively associated with overweight, while only days spent in trail activities was negatively associated with obesity.

SUMMARY

The objective of this study was to evaluate the relationship between the supply and demand of recreation opportunities in Oregon and measures of health status (physical activity, overweight, and obesity) at the county-level. Overweight and obesity are significant health concerns in the U.S. However, regular physical activity can attenuate many of the health risks associated with weight status. In fact, the literature shows that physical activity lowers health risks regardless of weight class. Therefore, compelling arguments to get people active are the health benefits derived from a physically active lifestyle. While Oregon is doing better, on average, than the nation regarding proportion of adults that are physically active, there are still significant health benefits to be gained by increasing the physical activity levels of adults in Oregon.

Recreation is one mode through which people may accumulate their recommended daily doses of physical activity. Multivariate regression analyses show that more hiking and urban trails are associated with higher physical activity rates. The models also show that counties in which people are more engaged in trail-related activities, road and street activities (walking, jogging, biking), and outdoor sports, their overall physical activity rates are higher. Therefore, parks and recreation providers have a significant social role to play in the health and well-being of Oregon's residents.

Recommendations

1. *Support close-to-home non-motorized trail development.* Trails provide an important opportunity for people to be physically active. Accessibility is one of the primary attributes of trails, including distance from home. Close-to-home trails provide opportunities for daily doses of physical activity, where remote trails provide other opportunities not available in local trails.
2. *Identify at risk communities*. Health risks, as proportions of county residents, vary across Oregon. We show that this pattern is associated with the distribution and use of recreation opportunities in the form of trail mile density and intensity of use (annual days of participation). Therefore, at risk communities might be those with higher proportions of adults in health risk categories, whose trends in health risk categories are flat or trending in the wrong direction, and/or are associated with inactive environments (low recreation opportunities in terms of availability, accessibility and diversity).

The Population Research Center, Portland State University has projected health status indicators to 2020 for Oregon Parks and Recreation Department. Those counties with relatively low (<50%) proportions of adults that meet recommended levels of physical activity and/or are trending downward over time have been identified as 'in need' counties. This classification could be used to target funds in support of trail development, educational programs, and marketing aimed at getting people active in their environments.

3. *Promote the use of existing trail networks by providing information on existing trails.* People may not be aware of places to recreate. Increasing their awareness may help them become more active. An example is the trails web site development by Oregon Parks and Recreation Department that is currently underway.

4. *Market the health benefits of outdoor recreation, but note the importance of nutrition in a weight loss regimen.* Physical activity promotes good health, regardless of weight class. While physical activity may help prevent weight gain, it may be necessary, but is not sufficient for weight loss. Therefore, a media campaign should focus on health, not weight. For example, a chart that shows the potential health gains from various types of activities by frequency and duration of participation may help keep people motivated. People need to be aware that even though they may not be lowering their weight, they are lowering their health risks of various chronic diseases. Furthermore, recreation may be prescribed by physicians as an important disease prevention program.

5. *Target at-risk people and communities.* Target at-risk people and communities by identifying their preferences for trail attributes, supply gaps in trail networks, and their physical and perceived barriers to participating in physical activity/recreation. Getting sedentary people physically active will lead to health benefits for them and a reduction in the health care burden on society.

Gaps in recreation supply are not simply the lack of facilities (although this is important), but also their location (accessibility) and diversity of opportunities (trails, settings, social events, etc.). Identifying gaps may need to be user driven—who is using resources and why; who is not using resources and why; and what resources would they use that are currently not available to them.

Key Planning Recommendations for Addressing Oregon's Physical Activity Crisis

Following completion of the research studies, the Physical Activity Advisory Committee met to develop a final set of planning recommendations for assisting recreation providers across the state to facilitate an increase in the numbers of Oregonians that meet CDC physical activity requirements. During the August 15, 2007 Advisory Committee meeting, committee members identified the following set of key recommendations based on a thorough review of existing literature related to the issue, SCORP research findings, and members' practical experience and knowledge regarding the issue. Copies of meeting notes and planning recommendations were sent to each Advisory Committee member for review following the meeting.

Key recommendations are divided into two categories; statewide recommendations and local recommendations. Statewide recommendations are relevant for all recreation providers across the state of Oregon. Because rates of physical activity vary across Oregon's counties, local recommendations apply to those high-priority counties in the state that have been identified as "in need" based on adult physical activity rates and trends projected by the Population Research Center at Portland State University.

Statewide Recommendation #1: Develop a statewide marketing plan to encourage Oregonians to become physically active by using park and recreation facilities and services.

Physical activity reduces the prevalence and risk of many chronic diseases, regardless of weight class. Oregon SCORP research has identified that participation in recreational trail activities and outdoor sports and games are important ways in which active Oregonians accumulate their recommended daily doses of physical activity. Other research shows parks are a contributing factor in getting people moving and enjoying the health benefits associated with physical activity. There are ample social benefits to be gained if the 44% of Oregon adults that are currently below suggested physical activity levels become more physically active. As a result, a marketing strategy promoting recreational trail and outdoor sports and games participation could prove to be a cost-effective preventative health strategy for Oregon.

The 2004 Oregon Statewide Non-motorized Trail Users Survey[88] identified that one-third (33%) of Oregon households have a person reporting non-motorized recreational trail use. Hiking, walking for pleasure, bicycling (other than mountain biking), and jogging or running are the top trail activities in terms of extent of participation (percent participation in activity) and frequency of yearly participation. The 2002 SCORP participation survey identified that 40% of the Oregon population participates in outdoor sports and games. Golf, using park playground equipment, baseball/softball, soccer and basketball are top outdoor sports and games activities in terms of extent of participation and frequency of yearly participation.

The Advisory Committee recommended development of a statewide marketing plan to encourage Oregon's sedentary adult population to begin participation in selected park and

[88] OPRD. 2005. Oregon Trails 2005-2014: A Statewide Action Plan. Salem, OR: Oregon Parks and Recreation Department.

recreation programs and services. Based on Oregon recreation participation survey results, the marketing promotion should encourage regular adult participation among sedentary Oregonians in the following park and recreation programs and services:

- Trail hiking or day hiking;
- Walking for pleasure on trails;
- Bicycling on trails;
- Jogging or running on trails;
- Golfing;
- Organized baseball/softball leagues;
- Organized soccer leagues or clubs; and
- Organized basketball leagues or clubs.

Committee members also suggested that it would be of value to seek the expertise of marketing professionals to provide specific direction on how to strategically reach this important target market.

Statewide Recommendation #2: Develop and institutionalize the statewide trails web site and add information about physical activity related recreation programs and facilities following completion of the recreational trails work.

Statewide Recommendation #1 in the Aging Population Chapter describes the creation the Oregon Statewide Trails Web site ─ a one-stop web site for trail opportunities in the state of Oregon. The web site, to be housed on the Oregon State Park web site, will include an interactive map of Oregon allowing users to find trail opportunities in their particular area of the state and neighborhood.

The Physical Activity Advisory Committee members stated that the statewide trails web site was a good first start in providing information to encourage daily physical activity. Following the creation of the statewide trails web site OPRD should continue to collect information for a wider array of close-to-home recreational facilities and programs to facilitate daily physical activity. This effort will include gathering and disseminating statewide information on park programs, facilities (e.g., parks, playgrounds, sports fields), recreation clubs, and volunteer opportunities.

The Oregon Physical Activity Web site project will provide the citizens of Oregon with comprehensive, quality assured, accessible, on-line park and recreation facility and program information both directly and in partnership with other organizations. The vision is to be the leading Internet gateway to information on where Oregonians can get and stay physically active for life. The overall project mission is to improve, promote, and maintain the health and well-being of Oregonians through the development of a recreation resource and referral directory. The project goal seeks to reduce the prevalence of obesity and physical inactivity in Oregon by enabling more Oregonians to become active.

This project will satisfy a strong need identified in recent statewide recreation planning efforts (Oregon Statewide Comprehensive Outdoor Recreation Plan and Statewide Recreational Trails Plan) for easy to access information on where Oregonians can identify and learn about close-to-home recreational facilities and programs to facilitate daily physical activity. The web site will use a unique model of information "pull" (having information on-site rather than providing links to other sites) based on the cooperative development of information with content partners, which will be quality assured and posted on the Physical Activity Web site. The one-stop-shop nature of the proposed web site model will allow consumers to quickly access consistent information on a single web site, rather than having to sort

through a lot of information and numerous sites to find what they are looking for.

Information will be tailored for specific audiences including children, teenagers, families, adults, and older adults, and under-represented populations. In addition to recreation information, the site will also contain up-to-date information on the health benefits of regular physical activity for each of the specific target audiences. A marketing strategy will be developed to introduce the web site to the general public.

OPRD will manage this project with assistance from an interagency Advisory Committee including health professionals, recreation providers and university researchers. Federal, state, and local partners will provide information on their facilities and programs that fit specific facility and program criteria determined by the advisory team, which will be entered into a database designed and maintained by the Department.

Statewide Recommendation #3: Work with the medical community to get outdoor recreation participation information into medical offices and physician referrals.

Research clearly shows that regular physical activity lessens many of the health risks associated with overweight and obesity. However, physicians cannot treat overweight and obesity in a doctor's office. Advisory Committee members felt that Oregon's park and recreation providers have the facilities and programs in place across the state to assist physicians in preserving patient health through facilitating their involvement in active recreation activities.

A program which successfully links physicians with recreation facilities and programs is the Healthy Activities for Wake County[89] developed in Raleigh, North Carolina by the Wake County Health Department's Health Promotion and Chronic Disease Prevention Program, the NC Recreation Resources Service and local Parks and Recreation Departments. In this program, physicians have the option to literally prescribe physical activity to their patients. The program provides physicians with a database of available physical activity opportunities available through local parks and recreation departments in Wake County. Physicians are able to print out a list of opportunities with specific information about where and how to access these recreation facilities or programs for their patients.

Advisory Committee members felt that a similar physician referral program should be developed in Oregon as an intervention tool to target Oregonians at risk of becoming overweight. They recommended beginning with a pilot test at a Health Maintenance Organization (HMO) such as Kaiser Permanente in a specific community such as Portland or Salem to gain insight into the best methods for implementing the referral program into medical practices across the state. The Pacific Northwest Therapeutic Recreation Association should be a key partner in development of the referral program.

Prior to referral program implementation, Advisory Committee members recommended that all local park and recreation providers begin work on an individual basis to place recreation brochures in medical offices in their service areas.

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[89] A description of this program is available online at: http://www.eatsmartmovemorenc.com/programs_tools/healthcare/success_stories/wake_youthCD.html.

Statewide Recommendation #4: Identify ways to fund recreation maintenance and facility development on school grounds.

A recent study by Powell et al.[90] determined that "communities with lower incomes, higher poverty rates, and higher proportions of racial/ethnic minorities ─ those most at risk to be sedentary and overweight ─ also have the fewest community-level physical activity-related opportunities." According to a recent report by the Prevention Institute[91], "Access to sports fields and courts, playgrounds, swimming pools, and gyms appear to affect activity level. Opening existing facilities such as schools and recreation centers for expanded drop-in hours can be achieved without extensive capital investment." The report suggests that a key policy area to pursue is the use of existing programming and facilities through joint-use agreements allowing school grounds and facilities to be open for public use during non-school hours.

According to Advisory Committee members, there are many Oregon School Districts that close and lock outdoor school grounds and recreational facilities during the summer months. A primary reason for these closures is a lack of funds available to maintain these grounds and facilities. In communities with adequate park and recreation resources, municipalities use strategies such as adding use schedules in partnership agreements and having parks and recreation departments maintain fields and facilities for the schools to open these facilities to the general public.

Advisory Committee members stated a need to identify a funding source for recreation maintenance and facility development on school grounds to facilitate statewide public access to outdoor recreation grounds and facilities on public school properties.

Statewide Recommendation #5: Develop a strategy to strengthen the role of parks and recreation agencies in the state's Safe Routes to Schools grant program.

Only a generation ago, children routinely traveled around their neighborhoods either on foot or by bike. Today, fewer children are walking and biking and more parents are driving. In 1969, 42% of children five to18 years of age walked or bicycled to school ─ in 2001, the rate fell to 16% (CDC, 2005). This trend of children replacing a routine of physical activity with motor-powered transportation has led to lifestyle changes impacting children, families, schools, neighborhoods and the broader community.

The Oregon Safe Routes to School (SRTS) Program has $3.5 million over 2005-2009 for projects at schools, serving grades K-8. $2.1 million in funds is available for award in 2007. The program administers funds received from the 2005 SAFETEA-LU transportation bill for Safe Routes to School programs. The goals of the program are to increase the ability and opportunity for children to walk and bicycle to school; promote walking and bicycling to school and encourage a healthy and active lifestyle at an early age; and facilitate the planning, development and implementation of projects and activities that will improve safety and reduce traffic, fuel consumption and air pollution within two miles of the school.

According to the National Recreation and Park Association (NRPA), local park and recreation departments are one of the best untapped

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[90] Powell, L., Slater, S. and Chaloupka, F. The relationship between physical activity settings and race, ethnicity, and socioeconomic status. Evidence-Based Preventative Medicine, 2004. 1(2), 135-144.

[91] Mikkelsen, L., Chehimi, S. and Cohen, L.Healthy eating and physical activity: Addressing inequities in urban environments. May 2007. Prevention Institute.

potential partners for the SRTS program, and could help enable not only better neighborhood connections to schools, but also connections to after-school activities, parks, trails, recreation programs and organized sports. An informal survey by NRPA of local and municipal park and recreation agencies in 2006 indicated that there are a very large number of local park and recreation agencies that own or manage much of the land surrounding local schools and connecting to local neighborhoods. In Oregon, the Bend Metro Park and Recreation District has 10 park properties that are adjacent to schools.

The Advisory Committee recommends that the Oregon Recreation and Park Association (ORPA) begin discussions with the ODOT to place a parks and recreation representative on the statewide Advisory Committee for the Oregon SRTS program and to modify grant evaluation criteria to encourage parks and recreation department proposals. ORPA could also identify ways for local parks and recreation departments to better complete for available SRTS grant funding resources and to disseminate information about successful park and recreation projects receiving SRTS funding from across the country.

At the local level, parks and recreation providers should begin conversations with school districts about potential SRTS grant projects involving park properties and facilities.

Statewide Recommendation #6: Create a pilot project to identify how to increase under-represented population access to outdoor sports fields.

Note: This statewide physical activity recommendation is the same as Statewide Recommendation #2 in the Diversity chapter. Since individual chapters may serve as stand-alone documents, this recommendation is the same as presented in the Diversity chapter.

The statewide survey of Hispanic and Asian households identified that with respect to youth outdoor programs, the majority (59%) of respondents with children indicated that their children have participated in outdoor sports programs. Outdoor sports programs were also the activity that most of these children were most likely to participate in the future. Lack of information and cost were reported as the main constraints to participate in such activities. When considering programs for children to participate in outside class time, Hispanic parents place highest priority on staying safe and out of trouble and getting physical activity. Asian parents place highest priority on getting physical activity and having fun.

According to Advisory Committee members, soccer is a gateway outdoor activity for Oregon's Hispanic youth population. However, many low-income under-represented families lack the necessary financial resources to pay fees associated with participation in traditional youth soccer programs. As a result, many of Oregon's children are missing out on the opportunity to connect with local park and recreation programs and getting more physically active. Research has identified that being overweight as a child significantly increases the risk for coronary heart disease in adulthood as early as age 25. This health threat is of particular concern with the Hispanic and African-American populations with relatively higher levels of overweight and obesity.

Non-profit organizations such as Oregon State University's 4-H Youth Development Program have attempted to fill the youth soccer service void, by providing low-cost opportunities for Hispanic youth to participate in youth soccer leagues in the Willamette Valley. However, such non-profit groups often experience difficulties in making arrangements with park and recreation providers to access pubic soccer

fields because of high liability insurance costs. Advisory Committee members felt that there were ways to address the liability issue through partnership agreements between non-profit organizations and park and recreation departments where the department becomes the sponsor for the soccer program. They felt that many park and recreation departments were simply not aware of how to structure such legal arrangements to cover liability insurance requirements.

Advisory Committee members recommended that a pilot project be developed and tested to remove barriers for under-represented population sports clubs to access public outdoor sports fields managed by local park and recreation departments in Oregon. The pilot project should include model partnership language for local park and recreation providers to use to reduce the high liability insurance costs associated with sports clubs using their sports fields; and a method for providing limited funding for under-represented population outdoor sports teams in Oregon.

Statewide Recommendation #7: Identify ways to fund and maintain bicycle trails on Oregon Department of Transportation (ODOT) right-of-ways which are separated from the roadway using excess corridor.

Committee members recommended that as traditional funding sources such as the Land and Water Conservation Fund (LWCF) and the Urban Park and Recreation Recovery (UPAR) programs diminish, park and recreation providers need to take a strategic look at the federal Transportation Bill as a source of funding for recreational trail projects. In the present cycle of authorization of SAFETEA-LU that goes to bicycle and pedestrian trails, there are about 10 different program categories of eligibility such as transportation alliances, air quality, job access, safe routes to school and 12 eligible categories of transportation enhancement. At the national level, there is approximately $1 billion dollars in dedicated funding that is now available — with a lot of un-obligated funding as a result of too few project applications. Park and recreation providers need to link up with transportation planners and the ODOT to allow park and recreation projects to help contribute to their priorities, solutions and needs.

For safety reasons, park and recreation designers want to separate bicycle trails from the side of the roadway and automobile traffic. From a recreational design perspective, such trails could still be in the right-of-way, but separate from the highway. However, according to committee members recreational trail projects submitted to ODOT for SAFETEA-LU federal grant programs are not successful when trail designs are separate from the roadway.

Due to challenges associated with identifying and developing bicycle/pedestrian corridors in the state, it is important that all players, including federal, state, and local agencies, non-profit and private-sector organizations, join together in planning efforts to make the most efficient use of existing transportation and recreation trail infrastructure. As a result, the Advisory Committee members recommend that park and recreation providers work with the ODOT to identify ways to fund and maintain bicycle trails on ODOT right-of-ways (non-operational and operational) which are separated from the roadway using excess corridor.

Local Recommendation #1: Greater priority for close-to-home non-motorized trail acquisition and development projects in OPRD-administered grant programs.

Trail activities such as walking, jogging or running, in-line skating, cross-country skiing, and bicycling are well documented to help improve health and fitness when done on a regular basis. Exercise derived from trail-related activities lessens health related problems and subsequent health care costs. Non-motorized trails provide a safe, inexpensive avenue for regular exercise for people living in rural, urban and suburban areas.

Support for close-to-home non-motorized trail development is a key recommendation included the SCORP Health and Recreation Linkages study. According to the report, "Trails provide an important opportunity for people to be physically active. Accessibility is one of the primary attributes of trails, including distance from home. Close-to-home trails provide opportunities for daily doses of physical activity, where remote trails provide other opportunities not available in local trails." The study identified that urban trail density was positively associated with physical activity rates and that trail activities were positively associated with physical activity rates; and negatively associated with physical activity rates and obesity rates within the Oregon population.

The need for more trails in close proximity to where people live was also a top statewide concern identified in the 2005-2014 Trails Plan. Recreation providers and other workshop attendees in issues workshops across the state voiced a need for more trails non-motorized trails in close proximity to where people live. This need is clearly in line with the findings of the 2002 Oregon Outdoor Recreation Survey that identified running and walking for exercise and walking for pleasure as the most popular everyday outdoor recreation activities of Oregonians. According to the OSU report, these activities are generally engaged in near home, and on a regular basis and state residents demand these opportunities in the communities in which they live.

As pointed out in this chapter, health risks, as proportions of county residents, vary across Oregon. To better understand this variation in health risks, the Population Research Center at Portland State University has projected health status indicators to 2020 for Oregon Parks and Recreation Department as a part of this SCORP planning effort. According to the Population Research Center report, high-priority counties in Oregon include those having less than 50% of the adult population meeting the CDC recommendations (in 2010) and those with a negative trend over time with less then 50% in 2020. High-priority counties identified in the Population Research Center analysis include Morrow, Umatilla, Tillamook, Baker, Wallowa, Crook, Douglas, Hood River, Josephine, Harney and Columbia. These counties could greatly benefit from the health benefits associated with increased recreational trail use. As a result, priority points should be awarded for close-to-home trail acquisition and development project applications within these 11 Oregon counties in the OPRD-administered grant programs.

Additional Recommendations

Although not key statewide or local recommendations, the following recommendations were also identified in the planning process as ways that local, state, and federal recreation providers can tribute to an overall increase in the numbers of Oregonians that meet CDC physical activity requirements.

1. Adopt the AARP/NRPA 10-week Senior Walking Program for use across Oregon. The intent is to help participants find safe places to walk, and provide tools and support to help them take personal

responsibility for their health and to stick with their exercise plans. Additional information about this program is available at the following web site: http://www.nrpa.org/content/default.aspx?documentId=5331.

2. Work with local park and recreation departments to establish mall walking programs within their communities to encourage winter walking.
3. Adopt the NRPA "Step up to Health" Program for use across Oregon. The program is an online, in-service training for staff and citizen leaders. It offers field-tested curriculum to increase awareness and knowledge about the health impacts of physical inactivity and poor diet. It also focuses on proven strategies and best practices to combat sedentary lifestyles. Additional information about this program is available at the following web site: http://www.nrpa.org/content/default.aspx?documentId=4491.
4. Encourage employers to provide flextime to allow for physical activity before or during the workday. Park and recreation providers should work with employers to set up programs to use local park and recreation facilities and programs.
5. Develop a pilot project to examine whether adding lighting to high-daytime use urban recreational trails would significantly increase trail use during evening and early morning hours and among women.
6. Work with park and recreation departments to establish bike refurbishing programs modeled after the Corvallis Parks and Recreation Departments program. The following is a brief description of the program (next page).
7. Develop a model marketing plan for a "Passport to Winter Fun" designed to show Oregonians what to do outdoors during winter months. Potential slogan: "*There is no bad weather, only bad clothing!*" The concept is based on a program developed by the Upper Valley Trails Alliance in Norwich, Vermont. Additional information about this program is available at the following web site: http://www.uvtrails.org/passport.htm.
8. Adopt the Ohio model for a Healthy Community Award for Park and Recreation Agencies. The Healthy Ohio Park and Recreation Community Award is a self-assessment tool that enables agencies to review their programs and policies as they relate to the health and fitness of the entire community. Agencies are measured against others within their selected park district whether rural, suburban or urban. Those earning the most points based on this assessment are awarded a gold, silver or bronze award. Additional information about this program is available at the following web site: http://healthyohioprogram.org/. This award is part of Governor Ted Strickland's comprehensive health care reform initiative.

CORVALLIS YOUTH VOLUNTEERS HELP OTHERS GET ON THE ROAD

by Deb Curtis, Recreation Program Coordinator

Corvallis Parks and Recreation Department's bike refurbishing program connects youth with the community by teaching bike repair skills, while modeling recycling practices. For the past seven years, youth, ages eleven to sixteen, who participated in the Department's Youth Volunteer Corps (YVC), spent time learning about bike maintenance, reuse and recycling, while refurbishing donated bikes. The finished bikes were then given to community members in need through the assistance of various non-profit organizations. In addition to learning a new life skill, youth gained knowledge about the vital role played by area organizations helping people in difficult times.

YVC youth work side by side with bike mechanics from Oregon State University's Outdoor Recreation Center and local bike shops to rebuild and repair donated bikes. The bikes are donated by community members and through the organizations who later receive the refurbished bikes. The mechanics evaluate the bikes for potential repair, and if beyond repair, parts are collected to use in the program. After all useable parts have been stripped the bike is recycled at a local metal recycling facility, keeping it out of the waste stream. Local bike shops donate parts or provide them at discounted prices. In addition, staff members have written successful grants to Consumers Power, the Kiwanis and the Blazers Community Builders Youth Corps program to help pay for parts and training for the youth.

One hundred-thirty-five refurbished bikes have been donated to local non-profits, such as Jackson Street Youth Shelter, Children's Farm Home (a residential treatment facility for youth), and Community Outreach's family and adult shelters.

In December 2006, Corvallis Parks and Recreation expanded the program to include a "Bikes for Tykes" component. Youth repaired, cleaned, and painted seventeen children's bikes and one scooter that were given to low-income youth through a local non-profit as holiday gifts.

For more information regarding this program, or the Youth Volunteer Program, call Deb Curtis at Corvallis Parks and Recreation at 766 - 6918 or email debra.curtis@ci.corvallis.or.us.