Infrastructure and Policies Supporting Physical Activity Habits: A Comparison Between the United States and Europe

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Infrastructure and Policies Supporting Physical Activity Habits: A Comparison Between the United States and Europe

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Abstract

Most adults in the United States are not getting enough physical activity, and this is causing high rates of adverse health conditions such as diabetes and cardiovascular disease in the population. The rising costs of cardiovascular disease are a national problem that must be tackled from multiple perspectives. This literature review explores policies and infrastructure implemented in European countries with better health outcomes and higher physical activity levels in the population compared to the United States. The infrastructure in places such as Germany and Denmark is constructed to encourage physical activity in the form of active transportation such as walking or biking, while most cities in the United States are heavily car dependent. Although changing the infrastructure and car culture of the United States is not simple, many of the policies which are implemented in European cities to encourage physical activity can be successfully used in the United States. Initiatives such as building bike lanes, renovating parks, implementing zoning laws to keep cities more walkable, fixing the public transportation system, and establishing legal protections for community gardens were considered in this literature review. It was found that along with physical infrastructure improvements and policy changes, it is also important to advertise physical activity as being safe and enjoyable to change longstanding cultural attitudes surrounding physical activity in the United States.
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INTRODUCTION

Rationale for the Literature Review

Much of the adult population of the United States is unhealthy and does not get adequate physical activity. Adequate physical activity refers to at least 150 minutes of moderate-intensity aerobic activity or 75 minutes of vigorous-intensity aerobic activity per week, as well as muscle-strengthening activities at least 2 times a week, according to federal guidelines and recommendations put out by the American Heart Association (Virani et al., 2020). The majority of the adult population of the United States does not meet this target. In fact, less than 25% of American adults older than 20 report participating in adequate aerobic and muscle-strengthening activities during leisure time (Virani et al., 2020). Physical activity is extremely important for maintaining overall health and preventing disease. It increases cardiorespiratory fitness, which lowers risk of death from cardiovascular disease specifically, and it also reduces all-cause mortality overall (Virani et al., 2020). Physical activity is also associated with decreased prevalence of many adverse health conditions such as insulin resistance, dementia, and cardiovascular disease (Virani et al., 2020). The lack of adequate physical activity in the United States is a pressing public health issue that needs to be addressed immediately.

The inadequate level of physical activity among the adult population of the United States contributes to the high rates of adverse health conditions as well as high healthcare expenditures. According to the National Health and Nutrition Examination Survey (NHANES) in the United States in 2016, 48% of American adults older than 20 had some form of cardiovascular disease (CVD), which includes coronary heart disease, heart failure, stroke, and hypertension (Virani et al., 2020). In addition, 39.6% of American adults were overweight in 2016 when classified by body mass index (BMI) (Virani et al., 2020). High BMI, such as in classifications of overweight
and obesity, is linked with increased risk for CVD, type 2 diabetes, dementia, and many other health issues (Virani et al., 2020). High BMI is also associated with shorter lifespans overall and more time spent living with disease (Virani et al., 2020). The 2016 NHANES also estimated that 37.6% of the adult population of the United States has prediabetes, another health condition that can be associated with inadequate physical activity (Virani et al., 2020). The rates of all these adverse health conditions are incredibly high in the United States, and they can all be linked with the low levels of physical activity in the adult population. In addition, these health conditions are expensive. Costs for hospitalizations, medications, and outpatient visits associated with these issues make up a significant portion of all healthcare expenditures (Virani et al., 2020).

Lack of physical activity is a modifiable factor that can be improved to reduce rates of CVD, prediabetes, and other related health conditions in the United States, and subsequently lower healthcare costs as well. In many European countries, rates of physical activity are higher than they are in the United States, and rates of adverse health conditions are lower than in the United States For example, according to statistics published by the World Health Organization Regional Office for Europe, in Denmark 72% of adults aged 16-64 have adequate levels of physical activity (2018). In Sweden, 67% of adults aged 18-64, and in the U.K, in England, 67% of adults aged 19-64 get adequate physical activity per week (WHO Regional Office for Europe, 2018). The level of reported physical activity is in general higher than it is in the United States, which has a great impact on life expectancy and health. It is not a coincidence that in Denmark, Sweden, and England, as well as many other countries in Europe, the probability of dying from any form of CVD, cancer, diabetes, or chronic respiratory disease between the ages 30 and 70 is far lower than it is in the United States (World Health Organization, 2018).
When comparing the United States directly to the U.K., the United States has higher rates of circulatory disease deaths and endocrine disorder deaths, which include diabetes and CVD (Pritchard et al., 2021). The high number of these disease-related deaths contributes to the all-cause mortality rate for the nation. Age-adjusted all-cause mortality is higher in the United States than in 20 comparable Western countries such as Denmark, Sweden, Norway, France, and the U.K. (Pritchard et al., 2021). All-cause mortality can be reduced by increasing physical activity levels in the population (Virani et al., 2020). Studies show that increasing physical activity also results in declines in fatal and non-fatal hospitalizations for cardiovascular events (Virani et al., 2020). The United States must increase levels of physical activity in the adult population in order to reduce the prevalence of adverse health conditions and to improve mortality rates. Doing so will also reduce the enormous costs associated with related health conditions.

Several countries in Europe have improved population health by encouraging physical activity, and the statistics published by the WHO show that these ventures have been successful. The purpose of this literature review is to examine how policies, infrastructure, and culture attitudes play a role in the higher levels of physical activity in European populations compared to the United States. In addition, this literature review will examine how these strategies may be implemented successfully in the United States to improve population health and bring down healthcare costs.

**Statement of Problem**

Inadequate physical activity contributes to a large portion of health care expenditures in the United States. 11.1% of all health care expenditures can be associated with inadequate aerobic activity (Virani et al., 2020). Health care costs for hospitalizations, prescription medications, and outpatient visits are higher for individuals who don’t have sufficient physical
activity and thus have higher cardiovascular disease risk (Virani et al., 2020). The annual direct and indirect cost of CVD in the United States in 2015 was estimated to be $351.3 billion (Virani et al., 2020). This estimate includes direct costs such as the cost of medical services and medications, as well as indirect costs such as money lost in productivity due to CVD and premature mortality. By 2035, it is projected that the indirect and direct medical costs for CVD will exceed 1 trillion dollars annually (Virani et al., 2020). CVD incidence in the United States must be reduced to control these rising costs, which can be done through increasing the level of physical activity in the population. Considering that overall, the rates of adverse health conditions linked with physical inactivity are so high in the United States, more resources should be allocated toward strategies to improve the levels of physical activity in the adult population.

The paradox is that the United States already spends a larger proportion of its gross domestic product (GDP) on health care than any other country in the world, yet Americans have poor health outcomes when compared to citizens of economically similar countries in Europe (Bradley et al., 2017). Comparatively, Americans have lower life expectancy overall, and higher rates of obesity, diabetes, and CVD during their lifespan (Bradley et al., 2017). CVD accounts for the biggest proportion of United States healthcare expenditures compared to other diagnoses, such as cancer (Virani et al., 2020). However, CVD isn’t the only adverse health condition that is present in the American population. The United States has higher age-adjusted all-cause mortality rates overall when compared to other western countries in Europe, indicating that the health care system is not efficient for the large amount of money spent (Pritchard et al., 2021). However, data shows that interventions to encourage physical activity can offset health care costs. For example, for every $1 invested into creating walking paths or bike lanes, almost $3 dollars are saved in medical costs (Virani et al., 2020). If more money was directed to be spent
on such physical activity interventions, not only would the health of the population improve, but total spending on health care as a nation may decrease.

There are strategies that select European countries are successfully using to encourage physical activity, active transportation, and to improve population health. Cities and states in the United States could look to these economically comparable countries as an example on how to modify spending, infrastructure, policy, and cultural attitudes as related to physical activity and population health. Unfortunately, not every European solution for increasing physical activity or improving population health is feasible or easily implementable in the United States, due to existing infrastructure, cost, or perceptions and beliefs about the government's role in health. For example, although the addition of bike lanes would seem like a neutral or positive infrastructural initiative, in a few United States cities there has been unexpectedly strong backlash against them. Bike lane projects have been met with strong emotional responses and have become increasingly politicized, in some cases leading to shutdowns of the projects or removal of lanes (Wild et al., 2018). There are real and perceived social issues that come with any type of change to the community and built environment, so efforts must be taken prior to such starting such projects to ensure that they are taken positively by community members (Wild et al., 2018). This literature review will seek to analyze such examples of European physical activity initiatives and understand how to better implement them in the American context.

Purpose

The purpose of this literature review is to analyze what cultural factors, infrastructure, and policies to promote physical activity are present in European countries that are economically comparable to the United States. This review will analyze different types of strategies such as bike lane projects, community gardens, and other government initiatives, and discuss what type
of effects they have had on the health outcomes of the population and if they are successful. This literature review will also discuss how these policies or initiatives may be better implemented in the United States, where cultural factors and existing infrastructure affect the feasibility of public health initiatives such as those present in European countries. Finally, there will be a discussion of what initiatives to improve physical activity levels in the adult population are most likely to be successful in the United States, and how to change cultural attitudes in the community to better accept these initiatives.

**Summary**

The adult population of the United States has low levels of physical activity, resulting in high levels of adverse health outcomes such as CVD, obesity, and prediabetes in the population. CVD and other adverse health outcomes related to inadequate physical activity cost billions of dollars every year, and the costs are projected to increase. The United States already spends more than any other country on health care expenditures, so these rising costs must be controlled. Some European countries have implemented policies in order to increase levels of physical activity in their populations, resulting in better population health, improved all-cause mortality rates, and lowered health care expenditure costs. These initiatives include bike lane projects, development of cities to make them more walkable, community gardens, and more. Some of these initiatives may be successfully implemented in the United States, but existing attitudes, culture, and infrastructure surrounding physical activity and government policies must be examined. This literature review will examine the culture of physical activity and existing physical activity initiatives in Europe, their benefits to the population, and the possibility of implementing these types of measures to increase adult levels of physical activity in the United States.
REVIEW OF THE LITERATURE

Introduction

There are various forms of physical activity that could be used to meet the minimum recommended guidelines set forth by the American Heart Association. In this literature review, the forms of physical activity discussed will include methods to build physical activity into daily life and leisure time, such as active commuting using biking, walking, or public transportation, recreational use of park space, and participating in community garden ventures. Structured athletic activity such as attending exercise classes or weightlifting in a gym are not considered in this review. Policies and infrastructure in European countries economically and culturally comparable to the United States, such as France, Denmark, and the Netherlands, will be analyzed to determine what specific measures have been successful and if they can be implemented in the United States to increase the amount of daily physical activity in the population.

Active Commuting

In this literature review, active commuting refers to physically active methods of reaching a specific destination such as work or school on a regular basis, and can include modalities such as biking, walking or taking public transit. Active transportation is a broader definition which refers to the same methods of transportation, but can also include one-time trips or destinations, rather than trips taken on a regular basis. Active commute can be a functional way to incorporate regular physical activity into an otherwise sedentary lifestyle (Dinu et al., 2019). The health benefits of regular physical activity, such as lowered incidence of cardiovascular disease, have been recorded in various studies looking at active commuters (Dinu et al., 2019). A meta-analysis of 23 scientific studies calculated an overall 9% reduction in
cardiovascular disease risk just by participating in active commuting (Dinu et al., 2019). Active commuters also have “lower incidence of coronary events, stroke, and heart failure” and a significantly lowered all-cause mortality rate (Dinu et al., 2019). Thus, promoting active commute to work, or active transportation in general, is one strategy that can effectively be used to reduce cardiovascular disease burden and all-cause mortality rates in the United States. Other health benefits of physically active transportation include lower incidence of overweight, obesity, and hypertension, significantly lowered cancer mortality, and a 30% reduction in diabetes risk (Dinu et al., 2019). If transportation habits in the United States could be modified to include more physically active alternatives, these benefits could potentially be gained by the American people.

Unfortunately, people in United States are less likely to utilize active commute compared to people other high-income countries (Stroope, 2021). Only 5% of Americans reported biking, walking, or using public transit to get to work, compared to 32% of people in England and 48.4% of people in the Netherlands (Stroope, 2021). If the utilization of physically active methods of transportation increased in the United States, the health status of the adult population could improve and current costs for health care could be reduced. However, switching from inactive to active transportation requires more than just individual motivation, it requires a complementary environment and infrastructure. Sidewalks, protected bike routes, parks, and easy access to public transit increase the number of active commuters (Stroope, 2021). The built environment is a factor in encouraging citizens to switch from inactive to active transportation, meaning that policy makers need to focus on incorporating active transportation infrastructure into urban environments if they want to improve public health (Dinu et al., 2019).
Examples of policies that could increase levels of active transportation include construction of sidewalks, bike lanes, and zoning codes to make areas more walkable by consolidating cities instead of having housing, shopping, and work spaced far apart (Stroope, 2021). Unfortunately, state level departments of transportation in the United States are generally unsupportive of active transportation, and until that changes it is unlikely that the number of Americans walking, biking, or taking public transit will increase (Stroope, 2021). In comparison, many European countries have successfully adopted some of these policies to improve population health. The following sections of the literature review will detail specific active transportation initiatives and how best to implement them in the United States.

**Biking**

Bicycles have been in use by the general population since the 1890s and are a clean, sustainable, healthy, and relatively fast mode of transportation (Oosterhuis, 2016). Bicycling, or biking as it is more commonly known in the United States, is one form of active transportation, which generally benefits communities by reducing pollution, traffic, and noise (Stroope, 2021). Biking also has benefits relating to health, longevity, well-being, and participation in the community, compared to commuting by car (Stroope, 2021). However, biking as a form of transportation is not common in the United States in comparison to certain European countries.

In the Netherlands and Denmark, 27% and 20% respectively of all traffic is on bicycle, whereas in the United States less than 3% of all traffic movement is on bicycle (Oosterhuis, 2016). It has not always been the case that the United States utilizes bicycles less than these European countries. In 1900, bicycles were extremely popular in both the United States and Europe but by 1930 the use of bicycles in the United States had declined and American cycling levels were much lower than in Europe (Oosterhuis, 2016). Much of the current variation in
bicycle use can be traced back historically to the social cultures of different countries in Europe versus the United States in the late 19\textsuperscript{th} and early 20\textsuperscript{th} centuries, and how bicycles were seen by the population during this time period (Oosterhuis, 2016).

In the United States, automobiles became a mass product as early as the 1920s due to Ford, lowering the popularity of cycling earlier historically compared to countries in Europe (Oosterhuis, 2016). Driving a car became part of the American identity, while biking was seen as out-of-fashion or for poor people who couldn’t afford cars (Oosterhuis, 2016). Policymakers and urban planners considered bicycling to be “inferior, outdated, slow, and unsafe,” and favored infrastructure for motorized vehicles (Oosterhuis, 2016). Bicycling advocates in the United States were scared that they would be banned from the road and fought for the right to share the roads meant for motor vehicles, opposing the creation of separate biking infrastructure (Oosterhuis, 2016). The few bike paths that did exist tended to be poorly constructed, narrow, and indirect or not continuous (Oosterhuis, 2016). In general, it can be said that as policymakers, traffic engineers, and urban planners catered to the growing number of cars and people who preferred to drive, cyclists became marginalized and proper infrastructure for bicycles was never constructed (Oosterhuis, 2016). Due to this, biking cannot be widely utilized as a form of active transportation in the United States.

Meanwhile, in the 1920s in the Netherlands and Denmark, bicycling was promoted as being patriotic, democratic, and egalitarian (Oosterhuis, 2016). Bicycles became a national symbol and there was less of a class divide associated with bicycling (Oosterhuis, 2016). Cycling associations pushed for the creation of cycling paths and the utilitarian use of bicycles for transportation, while car use was heavily taxed (Oosterhuis, 2016). This led to a strong bicycling culture that did not die out as easily with the growth of the automobile industry. Now, in the
Netherlands and Denmark, cycling is a part of the daily routine for much of the population and a source of national pride (Oosterhuis, 2016). Cyclists have a large amount of protection from traffic, and it is not considered unsafe to cycle as a primary form of transportation (Oosterhuis, 2016). The bicycling infrastructure is much more developed in these countries than in the United States, and the cultural view of bicycles as a primary form of transportation is also more favorable.

In countries such as the Netherlands and Denmark, policies relating to cycling have broad support as people tend to agree about the benefits of bicycling (Oosterhuis, 2016). Traffic engineers and civil servants keep the substantial number of cyclists in mind when constructing infrastructure and traffic facilities, and there are many bike paths for utilitarian and recreational use (Oosterhuis, 2016). In comparison, in the United States policies relating to biking infrastructure are often contested or lack support (Oosterhuis, 2016). There remain some negative connotations associated with bicycling, such as that it is only a childhood activity, unsafe, uncomfortable, for poor people, or on the other extreme, a lifestyle choice only for the exclusive, rich, and sporty as part of a political commentary (Oosterhuis, 2016). Car culture is much more dominant in the United States, and the existing infrastructure reflects that, with policy change being difficult because of the long-standing cultural habits and attitudes surrounding bikes and cars (Oosterhuis, 2016). The United States has considerable obstacles to face when it comes to creating a more favorable environment for bicycling to grow as a form of transportation.

However, that doesn’t mean that it is impossible to change the status quo. Until the 1970s, cycling patterns in Germany were declining similarly to the United States due to social class divides and the rise of the automobile industry (Oosterhuis, 2016). Since then, however,
due in part to improved cycling policies, German cycling levels have risen considerably (Oosterhuis, 2016). For example, the “National Cycling Plan 2020, joining forces to evolve cycling” is a strategic transport policy document from the German federal government which builds upon a plan enacted in 2002 (WHO Regional Office for Europe, 2018). The document outlines objectives such as promoting cycling in rural areas, increasing the use of electric bicycles, and making cycling more attractive and safer (WHO Regional Office for Europe, 2018). If adopted in the United States, this type of initiative can increase the proportion of people who feel comfortable using bicycles instead of cars to commute, and therefore increase the baseline level of physical activity in the United States population while decreasing levels of adverse health conditions related to sedentary lifestyles.

Other European countries have also put in place similar biking initiatives. For example, in 2014 France launched the “Active Plan for Active Mobility” to increase physical activity through active transport (WHO Regional Office for Europe, 2018). It includes 19 different measures which aim to develop public transit, make shared public spaces and modes of active transport safer, boost the economic benefits of cycling, take active transport into account when designing urban environments and housing, develop bicycling tourism and leisure routes, and promote the benefits of walking and cycling (WHO Regional Office for Europe, 2018). Sweden also has a national cycling strategy called “Cykelstrategin” which aims “to encourage long-term, sustainable public transport, walking, and cycling by increasing safe cycling, which will promote public health while reducing the environmental impact of transport and traffic congestion,” (WHO Regional Office for Europe, 2018). Austria, Hungary, Ireland, Portugal, and the U.K. have national cycling initiatives as well, which range from media campaigns about cycling to incentives for businesses who rent bicycles to employees at a free or subsidized cost (WHO
Regional Office for Europe, 2018). The governments in these countries aim to promote bicycling because they wisely view it as a positive investment for the health of their citizens and environment.

What needs to change for bicycling to become more popular? Many of these European bicycling promotion strategies mention changing communities to make biking “safe” (WHO Regional Office for Europe, 2018). Presumably, this would include changing traffic patterns and updating cycling infrastructure, such as constructing cycle-specific lanes to protect cyclists from motor vehicle traffic. Although there exists no such federal program or initiative for bike lane infrastructure in the United States, many individual cities, such as San Francisco, have begun to encourage active transportation and construct bike lanes (Wild et al., 2018). Although the addition of bike lanes would seem like a neutral or positive infrastructural initiatives, in a few United States cities there has been unexpectedly strong backlash against them (Wild et al., 2018). Bike lane projects have been met with strong emotional responses and have become increasingly politicized, in some cases leading to shutdowns of the projects or removal of lanes (Wild et al., 2018). People in the United States don’t seem to gleefully embrace bicycling culture the way their counterparts in Europe have done, which can contribute to the low levels of regular physical activity and related health outcomes in the population.

This doesn’t mean that any bike lane infrastructure project in the United States is doomed to fail because of the anti-bicycle history and the current attitudes about biking. It is possible to follow the example of these European initiatives and improve not only the active commuting rates but also improve all the population health metrics that come alongside that. These infrastructure projects must be undertaken mindfully with the residents of the community in mind. There are real and perceived social issues that come with any type of change to the
community and built environment, and disruption of the existing streetscape may be viewed as a loss for some, instead of an opportunity (Wild et al., 2018). If the culture of biking and the policies that promote bicycle infrastructure are to be changed, the issue of creating bike lanes cannot be looked at in an apolitical, neutral way, as city planners often try to do (Wild et al., 2018). Those opposed to bike lanes have a variety of reasons and backgrounds, including retailers who fear losing street parking space, anti-gentrification activists, and cyclists with concerns about safety (Wild et al., 2018). Each of these groups may be persuaded but only with proper communication and marketing strategies, such as talking to populations affected beforehand and raising awareness about the expected positive outcomes of the projects.

The most effective solutions to assuage fears about bike lane projects seem to be communication with the community before planned construction, and positive promotion efforts at the community level (Wild et al., 2018). For example, retailers tend to be opposed to bike lanes due to fear of economic consequences from losing street parking space (Wild et al., 2018). There have been studies done that show that the economic effect of constructing bike lanes leans positive, as being a bicycle-friendly business can attract higher income customers and spur commercial activity in the area (Wild et al., 2018). There was one bike lane project in Sydney, Australia, in which some retailers initially stated concerns about the loss of car parking, but once they saw the effect on business was anything but negative, they actually pressed for more bike space later on (Wild et al. 2018). Retailers tend to benefit from the increased foot traffic and bike traffic, although they may not be aware of this. Pitching bike lanes as a positive thing for the whole neighborhood, instead of just a project for sporty cyclists, by showing these economic figures could help garner support from businesses (Wild et al., 2018). Generating positive buzz
and excitement about the construction of bike lanes may be a strategy to offset any negative feelings about such projects.

There are also certain populations which may be more opposed to bike lanes initially, which can be planned for. Conservative voters are more likely to oppose the construction of new cycling infrastructure (Wild et al., 2018). This may be because conservatives see cars as an essential part of American life, in line with values of privacy, suburban lifestyles, private ownership, and privilege (Wild et al., 2018). Planning to construct bike lanes which connect urban and suburban environments, lower dependence on private motor vehicles, and can be used by the anyone as a free resource, may be seen as an overreach of the government into the lives of private citizens and an unnecessary use of public funds (Wild et al., 2018). Debates in cities such as New York and Vancouver have relieved these concerns by having bike lane promotion events where kids, parents, and schools rode bikes together and garnered positive media coverage, promoting the message that having safe alternatives for transportation is good for regular people in the community and is in line with “family-values” (Wild et al., 2018). This type of communication about the positives of biking could reduce opposition and change the negative stereotypes and culture surrounding bike lanes and utilitarian bicycling in the United States.

Cyclists concerned about safety of bike lanes and activists against gentrification also respond well to collaboration with the government in advance of construction (Wild et al., 2018). Including cycling advocates and people from marginalized neighborhoods in discussions about how best to improve the infrastructure of the area, and consulting with them as “experts” on the needs of their community is key (Wild et al., 2018) In addition, emphasizing that these lanes can benefit everyone in the community in the long run helps garner public support for bicycle infrastructure projects (Wild et al., 2018). Bike lanes are not just for the small population of
current cyclists, but for the larger population of *potential* cyclists who may start using biking as a form of transportation once they have been convinced of safety and viability by having this type of infrastructure available to them (Wild et al., 2018). This is a crucial point to promote at the community level so that more support may be garnered for policies relating to bicycling. It is important to remember that as the number of people who utilize biking as a form of active transportation grows, the number of people experiencing the health benefits grows as well.

In conclusion, bicycling is an excellent form of active transportation which provides many health benefits such as lowered cardiovascular disease risk, obesity, and diabetes risk. However, Americans utilize bicycles for transportation far less than people in countries such as Denmark. If bicycling were to be promoted in the United States, all-cause mortality rates and cardiovascular disease burden could decrease. This could be an effective strategy to reduce the currently exorbitant health care costs in the nation. However, for bicycling to become more popular among the adult population of the United States, there must be infrastructural changes to make biking safe and desirable, such as the construction of bike lanes. Individual communities attempting to undertake bicycle infrastructure projects should use the previously mentioned communication and marketing strategies to ensure that they are successful in engaging the community positively. In addition, United States policy makers should look to the countries which have put out federal level initiatives to promote safe bicycling and attempt to do the same. With these efforts, the number of people who feel safe and comfortable using biking as a form of active transportation should grow, and this could be directly reflected as an improvement to the health status of the American people.

**Walking**
Walking is another accessible way to incorporate regular physical activity into one’s lifestyle. Walking requires no equipment and is generally free. The health benefits of walking include positive effects on resting blood pressure, depression, weight loss, and cardiovascular disease risk prevention (Hanson & Jones, 2015). Promoting walking could lower incidence of cardiovascular disease and related healthcare costs in the United States. However, the built environment in the United States is currently not conducive to encouraging walking, due to the primarily automobile-centric infrastructure, as mentioned previously. As a result, Americans use walking as a form of transportation extremely infrequently compared to other high-income countries (Stroope, 2021). For example, 10.7% of all trips taken in the Netherlands are on foot, whereas in the United States less than 5% of people report walking, biking, or taking public transit to work in total (Stroope, 2021). Changing the built environment to accommodate and encourage more pedestrians could be an effective strategy towards getting Americans more physically active and reducing adverse health conditions in the population.

As with biking, promoting an increase in walking as a form of active transportation requires strategies that target multiple aspects of the community. Interventions to change the physical activity habits of a population are only effective when they target not only the individual, but also the social environment and built environment (Sallis et al., 2012). It is not effective to promote walking to individuals in the United States currently because the environment poses many barriers and lacks support. However, there has been much research into these barriers and how to overcome them, and there exist strategies that have been proven to increase walking habits in communities. For example, environmental factors that increase the prevalence of walking habits in a population include proximity to public parks and recreational areas, proximity to public bus or rail stops, and the number of destinations that can be reached by
walking (Sallis et al., 2012). In addition, pedestrian safety is a concern that cannot be ignored as it reduces the likelihood of adults and children utilizing walking as a form of active transportation (Sallis et al., 2012). If pedestrians don’t feel safe, don’t have any appealing destinations within walking distance, or don’t have routes made for them, then walking is not likely to become a primary form of transportation. In addition, those using walking as a leisure-time activity also need areas in which to do this safely. If these specific areas could be targeted, walking habits in the United States would increase and the related health benefits of physical activity would be seen in the population as well.

One of the factors that influences how people spend their leisure time is the proximity to parks and green spaces. Perceived access to parks or recreational areas was found by a United States national study to be positively associated with physical activity (Sallis et al., 2012). This includes areas such as neighborhood playgrounds, basketball or tennis courts, and soccer fields, where people can be physically active in their leisure time (Sallis et al., 2012). This also includes the presence of trails and greenways, which can be used for both active recreation and active commuting (Sallis et al., 2012). People who live within 1 kilometer of a recreation area are more likely to go on walking trips and have greater odds of participating in frequent physical activity, and people who use the trails on a weekly basis are twice as likely to meet physical activity guidelines than those who don’t (Sallis et al., 2012). Increasing the number of parks, recreational areas, and trails in the United States, and ensuring that they are dispersed so that every citizen has nearby access in their neighborhoods and cities, would be a first step in increasing the number of people who meet physical activity guidelines.

However, it is not just the mere presence of recreational areas or trails that motivates people to become more physically active. These areas also need to be well maintained and
pleasing to the eye, otherwise the likelihood of people utilizing them decreases (Sallis et al., 2012). A study done in a San Francisco community comparing usage of parks before and after renovations including new lighting and turf replacement found that there was a significant increase in adult and youth visitors to the park after the renovations (Sallis et al., 2012). Other studies done in Dallas, Texas and Los Angeles, California showed that trails which had litter, noise, and overgrown vegetation had less usage compared to trails that had good lighting, good trail conditions, and restrooms (Sallis et al., 2012). One study done in the United States cities of Savannah, Georgia and St Louis, Missouri even found a correlation between obesity and sidewalk maintenance – if the sidewalks were visibly of poor quality, lacked interesting sites, and there was a presence of garbage, then residents were more likely to be obese (Garfinkel-Castro et al., 2017). If increasing the number of trails and recreational areas is to be a viable strategy to get people walking and more physically active, then there also needs to be constant maintenance and improvement of these areas once they are installed. Having well-lit and clean trails would increase the number of people who go on walking trips recreationally, as well as the number of people who use them to commute to destinations. This will build physical activity habits into the daily lives of Americans and thereby reduce their risk for CVD and other adverse health conditions such as obesity.

Besides parks and trails, having a variety of other destinations reachable by walking is an important part of the equation as well. The term destination refers to places frequently accessed in daily life for shopping, work, and education (Sallis et al., 2012). Areas which have high population density tend to have destinations closer together and walkable distances from each other (Sallis et al., 2012). Conversely, low density is a characteristic of a phenomenon known as urban sprawl, where destinations and people are spread further from each other, greater than
distances that could be comfortably walked (Garfinkel-Castro et al., 2017). Urban sprawl has been linked to negative health outcomes. There is evidence to suggest that adults who live in sprawling environments have higher BMI and are more likely to be obese than those who live in compact, walkable areas, even when controlling for other factors such as age and diet (Garfinkel-Castro et al., 2017). This may be because those who live in sprawling environments, which have low-walkability, use walking as a form of transportation less than those who live in neighborhoods with high-walkability (Sallis et al., 2012). This correlation between the built environment and physical activity habits is consistently proven by research. In fact, one international study stated that those who live in activity-supportive environments are twice as likely to meet physical activity guidelines than those in the least supportive neighborhoods (Sallis et al, 2012). Clearly, the walkability factor of a community, or how close residential areas are to jobs, schools, and commercial areas, is an extremely important environmental factor in influencing the physical activity habits of a population. Unfortunately, cities in the United States today are increasingly built with single-use zoning, which keeps homes separate from commercial areas and shapes neighborhoods into unwalkable environments, requiring a car for transportation from home to work to shopping, and reducing opportunities for active transport (Garfinkel-Castro et al., 2017). This is a major infrastructural issue that needs to be addressed when discussing how to promote active transportation methods such as walking to the general population.

There exists a stereotype or general knowledge that cities in Europe are built to combat urban sprawl and generally have higher density of destinations located within biking or walking distances of each other. Places such as Amsterdam or Paris have developed a reputation for being bikeable or walkable cities and tourists romanticize the idea of walking around aimlessly to get
lost among the monuments and cafes as a form of exploration. Although this perception is most likely true, it is difficult to directly compare walking infrastructure in European countries with that of the United States, because there are limited studies or statistics about this topic available. This may be because Europe did not have the automobile-centric infrastructure that the United States developed early in the 1920s, as discussed earlier in the bicycling section of this literature review. Historically, the citizens were already utilizing active transportation regularly and this was a part of the culture as cities continued to grow. Because many of these countries already have better reported health outcomes to the United States, and don’t need to convince the citizens to abandon cars and take up walking or bicycling, it could be that studies tracking sidewalk usage or surveying city blocks are not viewed as necessary and thus not funded or undertaken. Urban sprawl and walking infrastructure in Europe is an area that could use further research.

Although completely destroying current infrastructure and rebuilding entire United States cities is clearly not an option, there are some methods that can be used to incentivize walkable cities as they are developed going forward. First, there needs to be zoning reform that allows neighborhoods to fit better into the urban environment, rather than as isolated residential blocks out of the way from commercial destinations (Garfinkel-Castro et al., 2017). This would require switching from single-use zoning to mixed-use zoning, from an urban planning and policy perspective, and involves processes such as approving building permits where they were previously not allowed (Garfinkel-Castro et al., 2017). These type of policy changes would ideally encourage more compact development (Garfinkel-Castro et al., 2017). Second, bonuses and fee waivers could be given to developers who carry out these mixed-use development projects, incentivizing them to build these walkable communities which have shopping, schools, jobs, and residential space all within close distance of each other (Garfinkel-Castro et al., 2017).
These strategies would ensure that any new development would not contribute to urban sprawl and would create environments with opportunities for active transportation. Any new development should also be done with planning for pedestrian safety and public transit stations, as will be discussed further below.

At present, one of the other barriers which prevents people from walking to destinations or utilizing recreational spaces more frequently are concerns for safety (Sallis et al., 2012). Just as with biking, traffic safety for pedestrians must be addressed in order to encourage people to walk more frequently as a mode of transportation. In 2011, the American Heart Association released recommendations on how to modify built environments and policies to promote physical activity, prevent obesity, and reduce CVD risk (Sallis et al., 2012). Their recommendation to improve traffic safety for pedestrians was to “implement zoning/building ordinances that encourage pedestrian-friendly streets and roadways with appropriate crosswalks, sidewalks, traffic lights, etc. and slower speed limits in walking/biking areas” (Sallis et al., 2012). These are physical changes that can be made to the infrastructure in cities and neighborhoods to make walking safer for pedestrians. As for safety in parks and recreational areas, the presence of which improve leisure time physical activity levels in a community, the Institute of Medicine proposed adopting “community policing strategies that improve safety and security for park use, especially in higher crime neighborhoods (Sallis et al., 2012). Promoting policing, adequate lighting, presence of crosswalks and sidewalks, and reduced traffic speeds are all viable solutions on how to soothe safety concerns, which currently prevent people from using walking as a mode of active transportation.

Finally, an alternative method to encourage walking and physical activity which doesn't involve active commute to school or work is to sponsor the formation of outdoor walking groups.
Outdoor walking groups take short, social walks outdoors, typically lasting less than one hour and led by trained lay people (Hanson & Jones, 2015). These walking groups create a group dynamic which encourages high levels of adherence to regular physical activity, perhaps due to companionship and a shared positive attitude towards the activity (Hanson & Jones, 2015). The social aspect is a positive force in getting people to stick to the physical activity habit and reap its health benefits. In fact, some studies found that the positive effects of group walking were greater than the positive effects of walking alone, both physiologically and psychologically (Hanson & Jones, 2015). Participants in walking groups reported greater reductions in blood pressure, BMI, depression, and total cholesterol levels than those who walked alone with pedometer (Hanson & Jones, 2015). A systematic review of studies involving walking groups concluded that they could potentially even reduce the number of premature deaths and disabling strokes in a population (Hanson & Jones, 2015). It is up to local leaders and individuals to take the initiative and form these social groups in their neighborhoods, and in doing so they can improve the health outcomes of their entire community. To encourage this, city governments could offer incentives for creating such groups, as well as training for group leaders on topics such as motivational speaking, nutrition, and injury prevention.

Public Transit

Another form of active transportation is using public transit. People who use public transit tend to be more physically active and less likely to be overweight or obese than those who do not use public transit, perhaps due to the regular use of active transportation to reach the station (Sallis et al., 2012). 29% of adults who use public transit report more than 30 minutes of physical activity each day simply walking to and from the public transit station (Sallis et al., 2012). Walking or biking to a public transit station is a wonderful way to build regular physical
activity into one’s day and could be a feasible solution to the nation’s obesity problem and high rates of cardiovascular diseases. If one lives near a public transit station, they are more likely to utilize it, and studies show that proximity to public bus or rail stops is associated with an increase of active transportation habits (Sallis et al., 2012). However, most cities in the United States do not have a reliable and effective public transit system, especially when compared to major European cities and even neighboring Toronto (English, 2018). This hinders people from using public transit and reaping the physical activity benefits associated with regularly getting to the station.

There are a few specific issues that can be considered in the existing public transit system that are barriers for people wanting to use it as a primary form of transportation. The first issue is the frequency of buses and trains. Munich, a German city that has a population comparable to Denver or St. Louis, has a system of commuter trains that come every 20 minutes all day, connected to a subway system in the downtown areas where trains come every 2 minutes, all day (English, 2018; Munich Transport and Tariff Association, 2022). These train routes have many stops across the city and are also serviced by feeder buses (Munich Transport and Tariff Association, 2022). This makes it feasible for someone in the suburbs to decide on a Sunday evening that they want to watch a movie in the cinema across town and use public transit to do it. They could walk to a nearby bus station, quickly be picked up by the bus and taken to a train station, journey across the city on the train, and get off at a station within walkable distance to their destination. In contrast, this would never be an option in the United States, where buses run infrequently, often only operating during workday hours, and someone in the suburbs may be left at a station waiting an hour or more if they do want to use public transit to get into the city (English, 2018). This lack of frequency and reliability hinders people from considering public
transit as a viable option for their transportation needs in the United States (English, 2018). Most people are dependent on cars as the primary mode of transportation and do not walk to or from public transit stations as a part of their daily schedule, thus staying sedentary and missing out on the potential boost of physical activity.

Public transportation fares can also be an economic concern for many who rely on the service. In the United States, rider may have to pay a double fare or transfer penalty if they switch from bus to rail, or switch between routes, or leave city limits (English, 2018). The systems of transit and the price of fare to ride are not merged the way they are in European cities. Taking the Chicago railway system as an example of this phenomenon; there are Amtrak trains that go from Chicago to cities a further distance away, Metra trains which go from the downtown Chicago area to surrounding suburbs, and the Chicago Transit Authority “L” train which has stops within the city. All three of these trains have different fare systems, so that riders must purchase separate tickets at different price points if they would like to utilize railways as their primary method of transport. Even within the CTA system inside the city, which utilizes the same transit passes between modes of transportation at least, bus fare is a different price than “L” train fare, and only 2 transfers are allowed within 2 hours or riders will be charged again (CTA, 2021). Now comparing this to Paris, France, where one large agency called the RATP controls the transit for the entire region, and every mode from commuter rail to suburban bus is part of the same fare structure (Autonomous Parisian Transportation Administration, 2022). Riders in Paris are not penalized for journeying from the suburbs into the city using public transit, because they are not charged double fare when transferring from bus to rail under the RATP model (English, 2018). The same is true in Germany, where a traffic union coordinates fares and schedules between different transit agencies (English 2018). The fare system for public transit in
American cities must be updated to match these streamlined European structures, so that riders will find public transit to be an appealing and economical way to get around.

Although developing or updating public transit infrastructure is a complex topic, these are two simple changes that can be made to the already existing infrastructure that would entice Americans to utilize public transit more. One is to increase the frequency of the bus and train schedules at existing stops, and the other is to consolidate the fare systems in those cities in the United States that already have the beginnings of a solid public transit system. These changes could encourage more Americans to utilize the public transit system and view it as an economical and reliable way to travel, resulting in an increase in regular physical activity in the population due to the short walks associated with reaching the transit stations, rather than sitting in a car and driving to every location. Although in the short term these changes may cost significant amounts of money to implement for local transit authorities, even short walks could improve the CVD risk of the population if done daily, thus reducing the healthcare expenditures of the government down the line.

**Community Gardens**

While walking and other forms of active transportation can be great for increasing physical activity, there are other ways regular physical activity can be built into one’s daily life that don't involve getting to and from destinations. Gardening is one such example and can involve a range of low-intensity to high-intensity physical activities such as digging soil, filling pots, and sowing seeds (Dewi et al., 2017). Personal and community gardens offer people the opportunity to engage in regular physical activity, especially in the spring and summer months, where research suggests the daily management of gardens and growing and picking of vegetables can potentially lead to metabolic and cardiovascular health benefits (Gregis et al., 2021). In fact,
gardening can improve several health outcomes at once because it is so variable. Rather than focusing on a singular health behavior, such as diet, physical activity, or stress reduction, the act of gardening can influence all domains at once, as it involves exercise, closeness to nature, and cultivating healthy foods simultaneously (Heilmayr & Friedman, 2020). So how can gardens be utilized and developed to encourage more people in the United States to be consistently active? Personal gardens may be harder to govern, as they rely on individual constraints such as location, space, and monetary resources. However, community gardens show promise as places for such public health interventions to succeed.

A community garden is defined as a green space where individuals can come together for group cultivation of fruits, vegetables, and/or other plants (Gregis et al., 2021; Heilmayr & Friedman, 2020). Generally, there is shared responsibility for the upkeep of these gardens, and they are located in places central to the community, such as schools, parks, or even unused corners in urban settings. Community gardens exist all over the world, from major cities such as New York and Prague, to rural areas, suburbs, and indigenous lands. These gardens can provide many health and well-being benefits for the gardeners, including increases in physical activity, more fruit and vegetable intake, a greater sense of community and social support, stress management, reduced BMI, and lowered incidence of obesity and diabetes (Gregis et al., 2021). In addition to these direct benefits of garden labor, such as fresh produce and exercise, there is also evidence to suggest that attributes such as persistence, planning, accountability, and cooperation with others are reinforced during community gardening (Heilmayr & Friedman, 2020). These are attributes that could be beneficial in individuals who are attempting to develop a healthier lifestyle and reduce their CVD risk. Community gardening specifically, as opposed to gardening individually in private areas, may also strengthen the local social fabric, and it is
conceivable that this may encourage adherence to the regular activity, similarly to how social walking groups increase physical activity adherence compared to walking alone with a pedometer (Hanson & Jones, 2015; Heilmayr & Friedman, 2020). For these reasons, community gardens are sparking interest as places to invest in as public health initiatives.

Although community gardens are being noticed as launching points to improve the health of the local community, they are not valued in the United States to the degree they are in some European countries. It is difficult to compare the exact numbers of community gardens or gardeners in the United States to European countries, as there exists no database which tracks these values closely. However, comparisons can still be made looking at policy and how protected these gardens are in different locations. One of the biggest concerns with community gardens in the United States is their permanence, as oftentimes the gardeners themselves don’t own the land they are using (Glennie, 2020). These gardens become contested spaces when the landowner, usually the local government, seeks to develop the land and considers the existing garden to be only a temporary use of the land which should be destroyed for more profitable projects (Glennie, 2020). Unfortunately, in the United States there are no federal policies protecting community gardens, and results vary from city to city.

One city in the United States that has been able to protect their gardens is Seattle. In Seattle, community gardens are known as “P-Patch gardens” and have an unusual amount of security due to advocacy from individuals, neighborhood associations, and nonprofit organizations in the 1990s (Glennie, 2020). As real estate costs were rising and there was increasing pressure to develop all plots of land in the city, advocates fought back at every proposal to destroy any of the P-Patch sites (Glennie, 2020). They eventually secured a legally backed ordinance from the Seattle City Council stating that any land used for parks purposes,
including the gardens, could not be developed unless there was first a hearing on the public benefits of the new use for the land, and a plot of equal or better quality and size was supplied for the original purpose in the same neighborhood (Glennie, 2020). This was known as the Protect Our Parks Initiative and effectively protects the existing gardens because developing the land would be a very long and expensive public process for the city to go forward with (Glennie, 2020). However, Seattle is an anomaly, and most cities do not have any such laws protecting community gardens. New York City is a prime example of this unfortunate reality. Although there are many community gardens, they are constantly contested to make room for new developments, and advocates must fight to preserve the gardens every single time because legal protection is limited (Petrovic et al., 2019). This is not always successful and although local and national nonprofit organizations and coalitions have managed to preserve hundreds of garden plots, many have also been lost (Petrovic et al., 2019). This is discouraging from a public health perspective, as all the positive health benefits associated with participation in community gardens are lost alongside them.

Policy reform is surely needed to better protect existing community garden plots, regardless of location. There is a better way to implement protection for community gardens. Gardeners in every city across the United States shouldn’t have to go through the process of struggles and protests to secure those protections one by one. This change can be implemented on a bigger level, such as creating state or even federal level protections for community gardens. Considering that the cardiovascular disease burden weighs so heavily on the nation, it is not an overreach for the federal government to take a more active role in promoting these simple and effective public health initiatives. For example, in Denmark gardeners can apply to the Ministry of the Environment to gain a “permanent” status for their plot (Damin & Palmer, 2003). There
are some requirements that the committee considers in determining whether a plot can be made permanent or not, including size, location within city limits, and if it is in a residential area (Damin & Palmer, 2003). Once a lot is permanent, it is a protected green space and cannot be commercially developed, regardless of if the land is privately owned or municipality owned (Damin & Palmer, 2003). This encourages long-term projects and participation in the gardens, as their position is no longer precarious and there is an assurance that they will not be destroyed. Another example of federal protection for community gardens is in Poland, which tellingly has one of the highest numbers of garden plots per 10,000 people among all the countries in Europe (Rusanov, 2019). Gardeners in Poland can receive a long-term plot for rent free of charge, and although the land is technically owned by the state, a union of gardeners manages it (Rusanov, 2019). It is written in the legislation that it is every person’s right to have a free, protected space to grow whatever they want, and this has resulted in immense popularity of gardening as a hobby (Rusanov, 2019). Policies like this encourage the average citizen to go outside and participate in a community gardening venture, get daily physical exercise and grow their own produce, resulting in numerous health benefits for the population. Such protections for community gardens should be adopted in the United States as well, so that people in places like New York City aren’t fighting against the government to keep their gardens. Instead, they should be receiving the support to maintain their gardens, and their healthy habits, in the long term.

Conclusion

Cardiovascular disease is a widespread and costly problem in the United States which needs to be addressed. One modifiable risk factor for CVD is physical activity. Currently, people in the United States have lower levels of physical activity and higher levels of negative health outcomes than many comparable European countries. There are many strategies used in
European countries which increase regular physical activity in the population. These strategies could conceivably be successful in the United States as well if implemented and supported. These include more investment in bike lane infrastructure, building cities to be denser and more walkable, maintaining sidewalks and parks, reforming public transportation, and creating legal protections for community gardens. Although the infrastructure of the United States is currently not supportive to these ventures, changes in policy could make it more feasible for average citizens to incorporate physical activity into their daily lives, reducing the risk for negative health outcomes and lowering healthcare costs. To be successful, any strategy utilized will have to attack the issue from multiple angles, such as giving funding for new infrastructure, implementing new policies at state and federal levels, and even influencing cultural outlooks toward physical activity through positive promotional campaigns and marketing. However, the suggested changes could have an immense impact on the health of the population and would be well worth the effort in the long run.
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