

ACTIVE TRANSPORTATION ON FORT RILEY ARMY INSTALLATION: A FIELD
EXPERIENCE REPORT

by

JOSEPH SCOTT LIGHTNER

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College of Human Ecology

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Approved by:

Major Professor
Katie M. Heinrich

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Table of Contents

List of Figures	5
Chapter 1 - Introduction	6
Public Health Rotations.....	6
Field Experience Project.....	6
Purpose.....	7
Chapter 2 - Public Health Rotations.....	8
Overview of the Department of Public Health	8
Program Activities	9
Public Health Nursing	10
Environmental Health	10
Army Hearing	11
Industrial Hygiene.....	11
Occupational Health.....	12
Veterinary Services	12
Public Health Relevance.....	13
Overall Experience.....	15
Chapter 3 - Field Experience Project.....	17
Review of the Literature	18
The Built Environment	20
Projects Specifics.....	22
A Social Ecologic Approach	23
Logic Model.....	24
Methods.....	26
Setting and Design.....	26
Measures	28
Results	28
Physical Environment	28
Policy Environment	34

Social Environment	35
Political Environment	36
Discussion	37
Review of Findings	37
Recommendations	38
Engineering	38
Education	39
Encouragement	39
Enforcement	40
Evaluation	40
Policy	40
Project 1: Increase visibility of crossing at Trooper Drive and Hitchings Post Road	41
Project 2: Increase visibility of crossing at Huebner Road between Seitz Drive and Carpenter Place	41
Project 3: Install crosswalk at Cavalry Mount Road and Paddock Road	42
Project 4: Install wayfinding to the community garden	42
Project 5: Install trailhead and wayfinding signs on all trails	43
Strengths and Limitations	44
Conclusion	44
Acknowledgements	45
References	46

List of Figures

Figure 1. Force Structure	8
Figure 2. Social Ecological Model.....	23
Figure 3. Logic Model	24
Figure 4. Location of Fort Riley in Kansas.....	31
Figure 5. Areas of Fort Riley.....	32
Figure 6. Elevation of Fort Riley.....	33
Figure 7. Sample figure from Army Installation Design Guide.....	35
Figure 8. Crosswalk signs at Trooper Drive.....	41
Figure 9. Crossing at Trooper Drive.....	41
Figure 10. Crossing at Huebner Road.....	41
Figure 11. Crossing at Cavalry Mount Road and Paddock Road.....	42
Figure 12. Suggested wayfinding signs for the community garden.....	42
Figure 13. Trail on Camp Forsythe.....	43

Chapter 1 - Introduction

At any United States Army Installation, the Army Public Health Command is responsible for all aspects of public health. This can include control of infectious disease by vaccination or vector management, assessing the environment for possible toxins, or mitigation of unintentional injury. Because of the broad spectrum of public health, the numerous activities of the Army Public Health Command are too many to detail but directly affect all soldiers, families and civilians on any Army installation.

Public Health Rotations

This first section of this report will focus specifically on the Department of Public Health at Fort Riley Army Installation in Kansas. Within the Department of Public Health are subgroups. Public Health Nursing, Environmental Health, Army Hearing, Industrial Hygiene, and Occupational Health work together to mitigate and solve large-scale public health issues. Additionally, Veterinary Services, while external to the Department of Public Health, works with the other groups to control food-borne illness and zoonotic diseases. I conducted rotations within each group and have reported on my overall experience.

Field Experience Project

One core focus area of the Army Public Health Command is the built environment. The built environment encompasses all human-made aspects of our surroundings to include how and where buildings are constructed, where roadways are located, and if space is available for parks, among others. This includes how the environment is designed for walking and biking. The second part of this report will focus

on the physical, policy, social and political environments that can affect how the built environment is constructed for walking and biking.

Purpose

This report was focused on my field experience at the Department of Public Health at Fort Riley Army Installation. The purpose of this report was two-fold. First, I have outlined and described my experiences with various groups within the Department of Public Health. Second, I aimed to evaluate policies and programs focused on promoting environmental change for walking and biking and gave direction to the Army Corp of Engineers on best practices for walking and biking for transportation. The objectives were to identify key agencies responsible for bike and pedestrian infrastructure, understand how those agencies could work together to improve the built environment for walking and biking and develop intervention strategies to improve walking and biking on Fort Riley.

Chapter 2 - Public Health Rotations

Overview of the Department of Public Health

The Department of Public Health at Fort Riley Army Installation is comprised of several groups: Public Health Nursing, Environmental Health, Army Hearing, Industrial Hygiene, and Occupational Health. These groups work synergistically to create an environment where health is protected and improved. Figure 1 outlines the structure of the program. The Department of Public Health is a section of the Medical Command and not a part of the Public Health Service, a section under Public Health Command. However, Veterinary Services are a section under the Public Health Service.

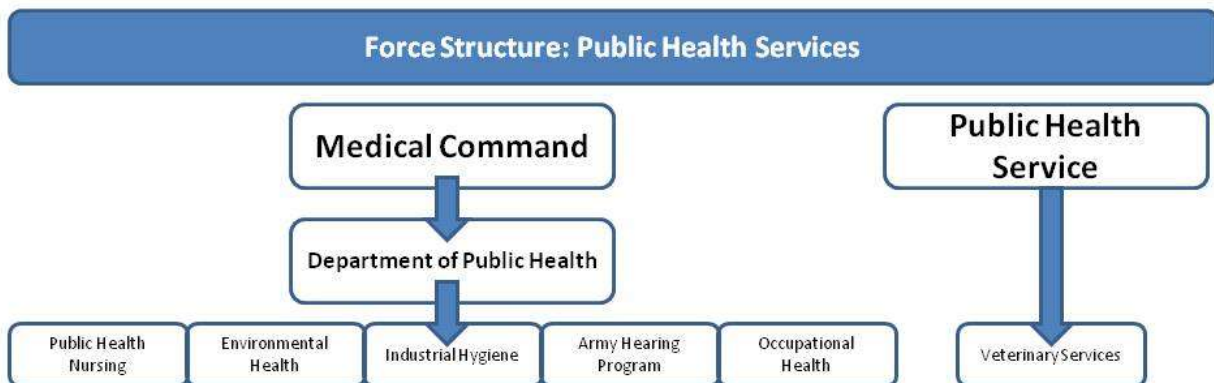


Figure 1. Force Structure

Public Health Nursing is responsible for behavior modification for sexual transmitted diseases, other infectious diseases and tobacco. Additionally, Public Health Nursing is responsible for investigating disease outbreaks and reporting specific disease to local, state and national authorities, inspecting child development centers for safety, and interacting with other community health organizations. Environmental Health is responsible for food service sanitation and inspections, water quality and surveillance,

disease vector surveillance, hospital waste management and child development center sanitation and inspections. The Army Hearing Program is responsible for clinical, occupational and preventive services associated with hearing. The hearing program directly tests a patient's hearing level, assesses environments where noise can reach levels that damage hearing, and implements strategies to mitigate these conditions. Industrial Hygiene is responsible for preventing exposure to various industrial toxins and ensuring that proper ventilation is present in work settings. Industrial Hygiene works closely with the Army Hearing Program to mitigate noise in industrial settings. Lastly, Occupational Health is responsible for all aspects of the work environment for civilian employees. This includes conducting pre-employment physicals to develop a health baseline in case someone is injured or exposed to an environmental toxin, giving vaccinations and cardiovascular tests, if applicable, and assess and mitigate unintentional injury accidents. Additionally, the Department of Public Health works closely with Veterinary Services to inspect food for safety and to prevent zoonotic disease.

Program Activities

As described previously, one main objective of this practicum was to conduct rotations with public health practitioners. The following is a list of activities that were accomplished during my rotations.

Public Health Nursing

- Conducted three on-site daycare inspections to include record reviews, classroom walk-throughs, and reviews of special needs and documentation.
- Developed a product summarizing how the requirement of one essential public health service was or was not being met, identified any gaps in precluding the accreditation effort and developed a plan to meet those needs. This was briefed to the Army Public Health Nursing team during a weekly staff meeting.
- Understood disease surveillance and prevention by conducting three Disease Reporting System internet (DRSi) reports, conducting one State of Kansas EpiTrak report and investigating one case of communicable disease.
- Counseled patients on prevention of sexually transmitted diseases.
- Wrote one article for publication in a newspaper targeting one of the leading causes of disease in the community.
- Attended one meeting with community partners, specifically a Geary County Health Department Board meeting.

Environmental Health

- Conducted three food service sanitation inspections.
- Understood water quality surveillance by collecting and transporting water samples to the laboratory.
- Processed and analyzed water samples for choline levels, presence of organic waste and microbial levels.
- Understood vector surveillance by collecting biological vectors for disease transmission and transported them to the laboratory.

- Understood hospital waste procedures and conducted inspections for biological waste and “sharps” containers.
- Conducted child development center inspections for sanitation and safe food handling.

Army Hearing

- Understood relevant regulation to include: 29 CFR 1910.95, Department of Defense Instruction 6055.12, Department of the Army Pamphlet 40-501, Fort Riley Hearing Program Policy, and Medical Readiness Program Inspection Plan.
- Understood the aspects of the hearing program to include: noise abatement, administrative controls, audiometric monitoring, hearing protectors, training programs, record keeping, enforcement of regulations and program evaluation.
- Understood how the Department of Public Health tracked hearing readiness, how the program attempted to conserve hearing of soldiers, and what clinical services were available for those who needed monitoring and treatment for hearing issues.

Industrial Hygiene

- Understood the field of industrial hygiene to include: ventilation, occupational noise exposure, process safety management, dipping and coating operations, respiratory protection standards, confined space standards, air contaminants, asbestos, access to employee and medical records, lead, hexavalent chromium, bloodborne pathogens, and hazard communication standards.
- Conducted a basic ventilation assessment.
- Conducted a basic noise assessment.

- Conducted air sampling to include calibration volatile compounds, metal, and arsenic.
- Understood ionizing radiation and non-ionizing radiation
- Conducted a basic ergonomic assessment and provided solutions for problems
- Conducted a basic indoor air quality investigation to test for mold, bacteria, carbon dioxide, temperature and humidity

Occupational Health

- Reviewed the occupational health programs to include: medical surveillance examinations and screenings, reproductive hazards, blood borne pathogens, hearing conservation and readiness, vision conservation and readiness, injury prevention and control, work related immunizations, worksite evaluations, personal protective equipment, employee health and wellness, and occupational illness and injury prevention and mitigation
- Reviewed occupational health operations to include: hearing tests, spirometry tests, vision screenings, immunizations, physicals, deployment and redeployment physicals, tuberculosis screenings and pregnancy surveillance.

Veterinary Services

- Understood food sanitation and inspections.
- Conducted an inspection on food products on receipt and in storage.
- Determined if storage conditions are within regulations.
- Evaluated packaging, packing and marking requirements.
- Identified unsanitary conditions in food storage facilities.
- Identified zoonotic diseases.

- Evaluated animals for potential zoonotic diseases.
- Understood the role of veterinary services in bite cases.
- Conducted an inspection on Child Development Center animals.

Public Health Relevance

Throughout my field experience, I was exposed to multiple facets of public health. Epidemiology, healthcare administration, environmental health and social and behavioral sciences were all covered in detail. For example, in public health nursing, I tracked infectious disease and utilized my knowledge and skills learned from epidemiology. In industrial hygiene, I surveyed ventilation systems for possible issues in removing environmental toxins in the workplace and applying those skills I learned in environmental toxicology. For my physical activity-related project, I used my extensive knowledge in social and behavioral sciences to understand the political and social environments for walking and biking.

All functions of public health were addressed in this field experience. The functions of public health are assessment, policy development and assurance. I assessed the health of soldiers and civilians on Fort Riley by investigating infectious disease outbreaks, soldiers' knowledge of sexually transmitted diseases, exposure to toxins at workplaces, et cetera. With that information, I developed a critique of one of the 10 essential services of public health (as detailed below) and reported it to the director of public health nursing. Finally, high-ranking staff members were briefed on the status of several aspects of health including obesity, infectious disease, chronic disease and active living.

Because of the large scale of my rotations and project, I was exposed to all 10 essential services of public health (Centers for Disease Control and Prevention [CDC], 2010).

- Monitor health status to identify and solve community health problems,
- Diagnose and investigate health problems and health hazards in the community,
- Inform, educate, and empower people about health issues,
- Mobilize community partnerships and action to identify and solve health problems,
- Develop policies and plans that support individual and community health efforts,
- Enforce laws and regulations that protect health and ensure safety,
- Link people and needed personal health services and assure the provision of healthcare when otherwise unavailable,
- Assure a competent public and personal healthcare workforce,
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services, and
- Research for new insights and innovative solutions to health problems.

I monitored several health conditions (sexually transmitted infections, exposure to environmental toxins, etc) during my practicum experience. I investigated the spread of infectious disease outbreaks, educated people who were exposed to a certain disease and connected them with the appropriate healthcare professionals. I developed partnerships with outside agencies to encourage promotion of walking and biking. Finally, I researched the social, political, and environmental aspects of walking and biking and provided insight and innovative strategies to promote active living.

Overall Experience

My experience at the Department of Public Health at Fort Riley went beyond my expectations. The staff members were highly qualified and excited about their respective fields making it easy to learn. The leadership was willing to answer any question that I had and directed me to the resources that I needed. I was able to sit in on meetings, meet high ranking staff members and was consistently asked my opinion on public health issues that impacted large groups. Overall, I learned more about the many aspects of public health in my field experience than I was exposed to in my public health coursework.

I was able to follow the staff to learn about all aspects of public health. While I was familiar with infectious disease and environmental correlates of health, I was less familiar with injury management and the clinical aspects of public health. Lastly, I was able to sit in on pre-employment physicals and vaccinations, and learned the complete physiology of mosquitoes and ticks, something I had never considered.

The most enjoyable part of the entire experience was counseling people on safe sex behaviors. In the field of physical activity, we are taught to think critically about multiple behaviors at once. For us, it makes sense that dietary habits and stress patterns would impact physical activity and vice versa. However, when discussing sexual health, not many people think about multiple behaviors that impact condom use. When counseling patients, I was able to use my background in biology to talk about the disease itself and use my background in public health physical activity to talk about how drinking, drug use or other negative health behaviors impacted the lack of condom use among this population. Additionally, I was able to give recommendations to patients who, in the past, did not understand the benefits of practicing safe sex.

I was interested to learn more of the administrative side of public health, as well. It is worth noting that, while administration is not a designated group within the department at Fort Riley, I learned a lot from Col. Benne, Director of the Department of Public Health; May. Lindsey, Director of Public Health Nursing, and Ms. Bourland, Administrative Assistant. These three people were instrumental in connecting me with outside resources that I needed and gave me insight on how to develop programs from an administrative viewpoint.

If I could improve anything about the project, I would hope to decrease the red tape. Because Fort Riley is an Army installation, force protection and anti-terrorism efforts were paramount. Because this document will be publically available, my ability to use GIS data was limited. Additionally, photographs were not available due to anti-terrorism initiatives. It seems that science and anti-terrorism do not go hand-in-hand.

Chapter 3 - Field Experience Project

Obesity is a major public health concern in the United States and other developed countries. In the past 50 years, the prevalence and incidence of obesity of adults has steadily climbed, resulting in a three-fold increase (USDHHS, 2010; USDHHS, 2012). In 1960, the National Health and Nutrition Examination Survey (NHANES) estimated that 12.8% of the adult American population was obese (USDHHS, 1960). In 2010, the prevalence of obesity among the same group increased to 35.7% (USDHHS, 2012). In 1996, the United States Surgeon General released a report stating the health concerns associated with obesity and the need for innovative interventions addressing the problem (USDHHS, 1996).

Obesity increases the risk for all-cause mortality, morbidity, hypertension, dyslipidemia, diabetes mellitus, chronic heart disease, congestive heart failure, stroke, gallstones, osteoarthritis, sleep apnea, some cancers (colon, breast, endometrial, and gallbladder), fertility complications, binge eating disorder, negative perceptions of body image, depression, and discrimination based on weight status (Stamler, Stamler, Riedlinger, Algera & Roberts, 1978; Lew & Garfinkel, 1979; Hubert, Feinleib, McNamara & Castelli, 1983; Rexrode, Hennekens, Willett, Colditz, Stampfer, Rich-Edwards, et al., 1997; Khare, Everhart, Maurer & Hill, 1995; Hart & Spector, 1993; Shepard, 1992; Giovannucci, 1995; Willett, Browne, Bain, Lipnick, Stampfer, Rosner, et al., 1985; Hartz, Barboriak, Wong, Katayaa & Rimm, 1979). Any person with a BMI over 30 is considered obese and at a higher risk for comorbidities. Additionally, risk increases with BMI, such that as BMI increases over 30 the risk of comorbidities increases. A goal of

Healthy People 2020 is to reduce the percentage of obese Americans to 30.6% (USDHHS, 2012).

One way to combat rising levels of physical inactivity and obesity is to change the environment so that people can access places to be physically active. Since the mid 1990's, building places where people can be physically active has been recommended by leading public health researchers (Schmid, Pratt, & Howze, 1995; King, 1994). A goal of Healthy People 2020 is to build environmental supports where people can engage in physical activity (USDHHS, 2012). Additionally, the Taskforce for Community Preventive Services recommends environmental changes to facilitate physical activity on a community scale (Kahn, et al., 2002).

Review of the Literature

The current rates of physical inactivity and obesity have caused detrimental health outcomes for the entire U.S. population. Less than half of all Americans are active enough to meet recommendations and more people are overweight or obese than normal weight (Troiano, Berrigan, Dodd, Masse, Tilert & McDowell, 2008). Actively commuting to work and school has the ability to increase physical activity habits. By facilitating bicycling, residents of Fort Riley, Kansas are likely to engage in more physical activity, leading to healthier lifestyles, experiencing a greater quality of life and enjoying the benefits of a more vibrant local economy.

It is estimated that up to 300,000 premature deaths occur every year in the United States due to physical inactivity (Powell & Blair, 1994). Several decades of experimental and epidemiological research have firmly established the health benefits of physical activity (USDHHS, 1996). Regular engagement in physical activity reduces

all-cause mortality, morbidity, cardiovascular disease, hypertension, diabetes mellitus, chronic heart disease, congestive heart failure, stroke, depression, anxiety and some cancers (USDHHS, 1996).

Because of the overwhelming evidence to suggest the positive effects of physical activity, the United States Department of Health and Human Services suggests that all adult Americans should engage in moderate intensity aerobic physical activity (e.g. brisk walking) for at least 150 minutes per week or vigorous intensity aerobic physical activity (e.g. running) for at least 75 minutes per week, or a combination of the two (USDHHS, 2008). Additionally, all adults should incorporate muscle strengthening exercises (e.g. lifting weights, pushups, sit ups, yoga) at least twice a week. Physical activity can be broken into 10-minute segments throughout the day. Additional health benefits are seen with more physical activity. For greater health benefits, adults should engage in 300 minutes of moderate-intensity aerobic activity or 150 minutes of vigorous activity per week, or a combination of the two with muscle-strengthening activity at least twice a week (USDHHS, 2008).

Despite the benefits of physical activity, most of the population does not engage in enough to receive the benefits. The Behavioral Risk Factor Surveillance System suggests that in 2009, 49.4% of adults met current physical activity recommendations (BRFSS, 2009). In 1996, before the Surgeon General report on physical activity was released, only 21.0% of adults met the recommendation (which was 30 minutes five days per week). However, objectively measured physical activity by accelerometer suggests that in 2006, less than 5% of people met physical activity guidelines (Troiano,

Berrigan, Dodd, Masse, Tilert & McDowell, 2008). Increasing physical activity is one of the 10 leading health indicators of Healthy People 2020 (USDHHS, 2012).

The Built Environment

The past 100 years have been a dynamic time for public health in the United States. With the introduction of the industrialized age, the automobile and consumerism, overall lifespan has increased to approximately 80 years (U.S. Census Bureau, 2010a). However, physical activity has slowly been engineered out of the American lifestyle creating a population that lives longer with more chronic disease. The way municipalities design cities has created barriers to physical activity that once were not there. Whereas walking and biking were popular forms of transportation in the early 20th century, now Americans make more than 90% of all trips by car (U.S. Census Bureau, 2010a). Paradigm shifts have created a society where physical activity is unnecessary and often difficult to engage in.

The built environment encompasses all aspects of the physical environment planned for and constructed by humans (Roof & Oleru, 2008). It includes, but is not limited to the following: design of communities, land use, structures (buildings and bridges), transportation and utility infrastructure, energy networks, and parks and trails. Perceptions of the built environment for physical activity can be influenced by city design, safety, presence of sidewalks, friendliness, open space, traffic patterns, scenery, weather, et cetera (Humpel, Owen & Leslie, 2002). Additionally, the built environment can influence how people move across geographic space, what housing options are available and how people access places to be physically active (Ewing & Cervero, 2007; Bhat & Guo, 2006; Gordon-Larsen, Nelson, Page, & Popkin, 2006). By

changing the built environment to create places to be physically active, current research suggests that communities are likely to have less incidence of chronic disease, to include obesity (Ewing, Schmid, Killingsworth, Zlot, & Raudenbush, 2003; Papas, Alberg, Ewing, Helzlsouer, O'Donnell, & Frank, 2007).

The Community Guide to Preventive Services recommends community-wide campaigns to increase physical activity, including built environment changes (Guide to Community Preventive Services, 2004). Community- and street-scale urban design and land use policies, increasing access to places to be physically active, and social support interventions in community settings, and are all recommended as strategies to increase physical activity. Multicomponent interventions that focus on worksite settings are recommended to decrease obesity (Guide to Community Preventive Services, 2004).

Policy and environmental level factors have shown a consistent association with physical activity (Brownson, Baker, Housemann, Brennan & Bacak, 2001; Diez Roux, Evenson, McGinn, Brown, Moore, Brines, & Jacob, 2007; Wilson, Kirtland, Ainsworth & Addy, 2004; Troped, Saunders, Pate, Reininger, Ureda & Thompson, 2004; Gordon-Larsen, et al., 2006; Frank, Kerr, Chapman & Sallis, 2007; Grow, Saelens, Kerr, Durant, Norman & Sallis, 2008). As the environment is improved by building trails, sidewalk, parks, et cetera, community levels of physical activity are increased (Gordon-Larsen, et al., 2006; Wilson, et al., 2004). The ability to do activities of daily living without the use of a vehicle (i.e. going to work and buying food and other items) is termed walkable or bikeable (Leyden, 2003). A walkable area is one in which there are appropriate environmental supports for walking to perform activities of daily living. A bikeable area is

one in which there are appropriate environmental supports for biking to perform activities of daily living.

Access to places where a person can be physically active has been associated with increased levels of physical activity (Brownson, et al., 2001; Diez Roux, et al., 2007). Martin and colleagues (2013) suggest that policy can influence physical activity behavior even without an environmental change. Therefore, it is important to incorporate policy and environmental factors that facilitate physical activity.

Few correlational studies focused on how the built environment policy can affect physical activity have been conducted on a military installation. Only one longitudinal study was conducted on how military fitness was affected after small environmental change including the addition of bike paths, wayfinding, and pavement marking (Naval Health Research Center, 1990). Researchers have suggested that small changes to the environment can have significant impacts on force readiness and fitness of soldiers, as measured by physical readiness training scores. In the future, more studies should be conducted to understand the unique environments of military installations.

Projects Specifics

In 2012, the Department of the Army Public Health Command and Department of Public Health realized the importance of the link between the built environment and health. As such, the Army Public Health Command developed a policy stating that all installations should understand specifically how they can potentially impact health through environmental approaches. However, because of the newness of the built environment field, few practitioners in the Army had the knowledge and skills to be able to accurately assess the environment and provide innovative strategies for change. My

project provided the necessary support to fulfill this policy. Specifically, I assessed the built, social, political and policy environments for walking and biking and provided innovative strategies for change.

This study was conducted with the understanding that more than one factor impacts a person's engagement in physical activity. While a person's individual-level factors may play a role, external factors such as the social and physical environments are also associated with engagement in physical activity. Furthermore, external factors may be more easily changed by public health interventions than individual-level factors. The project utilized the Social Ecological Model to understand the external factors that impacted walking and bicycling behaviors.

A Social Ecologic Approach

The Social Ecological Model suggests that multiple factors influence behavior and that these factors can be grouped into intrapersonal, interpersonal, organizational, community and policy

levels (Bronfenbrenner, 1979; Sallis, Bauman, & Pratt, 1998; McLeroy, Bremner, Salmon, Rosenberg, & Giles-Corti, 1998). Figure 2 shows the different levels of the Social Ecological Model. All of these levels account for



Figure 2. Social Ecological Model

variance in participation of a behavior and should be the focus of public health interventions. Additionally, all levels are multidimensional, complex, and dynamic, changing with groups of people, societal norms, physical environments and policy initiatives (Bronfenbrenner, 1979). Interventions targeted at changing behaviors are more likely to be effective if they include components of a multi-dimensional campaign. By focusing first on the higher level intervention strategies such as policy and environmental approaches, an individual's behaviors are more easily changed through targeted individual approaches.

Logic Model

The goal of this study was to understand the physical, policy, social and political environments for walking and biking. I aimed to understand how the built environment could be changed on Fort Riley Army installation to facilitate physical activity and improve overall health. Figure 3 illustrates the logic model for this project.

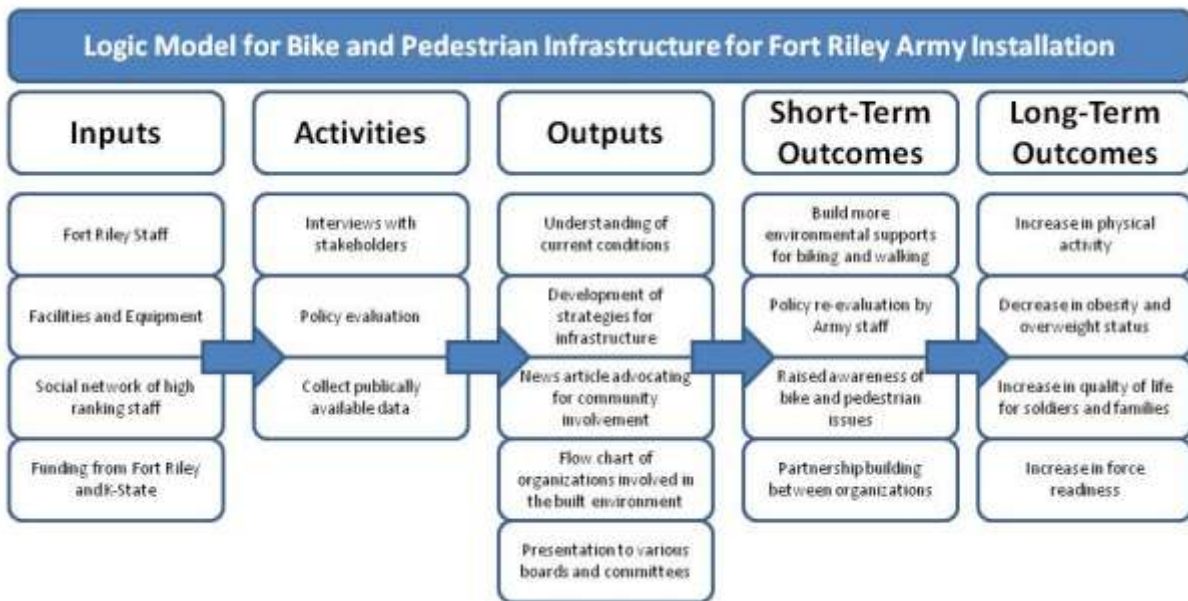


Figure 3. Logic Model

The inputs necessary to accomplish this were Fort Riley staff, facilities and equipment, the social networks of high ranking staff members and funding from Fort Riley and Kansas State University. I met with various stakeholders who gave me their expert opinions and advice regarding the various conceptual areas of walking and biking. Additionally, when meeting with stakeholders about bike and pedestrian infrastructure and policy, the social networks of high ranking staff were utilized. That is, high ranking staff used their personal and work relationships to introduce me to the Chief of Master Planner and others so that I could collect information the policy, social and political environments. This included Col. Paul Benne, MD, MPH, Mrs. Kristen Bourland and others who had long-term, close relationships with members in various organizations, such as Master Planning and Public Works. Lastly, this experience and research would not have been possible without funding from Fort Riley and Kansas State University. This funding provided equipment and time of staff necessary to collect data and interpret the results.

To answer the specific questions of this report (i.e., which organizations are important to target for bike and pedestrian infrastructure interventions and which strategies could potentially improve the environment for biking and walking), I collected publically available data on walking and biking and report the current conditions to the department. Second, I evaluated current policies and plans from Master Planning for their potential impact on biking and walking. Third, I interviewed stakeholders (e.g. Chief Master Planner, staff at the Office for Sustainability, et. cetera) for their perceptions for walking and biking and which strategies they think would be appropriate to improve the built environment for walking and biking.

Once the data were collected, I wrote a report outlining current environmental conditions for walking and biking, developed a flow chart of those organizations important for the built environment and developed strategies for improving the environment for walking and biking. I also presented this information at the Department of Public Health staff meeting, as directed by the Director of the Department of Public Health. Lastly, I wrote a news article to be published in the local installation news paper outlining my results and advocating for community involvement.

Short-term outcomes of this project included the potential for building more environmental supports for walking and biking, re-evaluating policy by Army staff, raised awareness of bike and pedestrian issues among staff, and potential partnerships between organizations. Long-term outcomes should include increased physical activity of the population that live and work on Fort Riley, decreased overweight and obese status, increased quality of life and improved force readiness.

Methods

Setting and Design

This evaluation was conducted at Fort Riley Army Installation. In 2013, Fort Riley was the home of over 5000 military personnel and families, some of whom chose to live outside of the installation. Additionally, approximately 2000 contracted civilian personnel worked on the installation but lived in the neighboring counties. According to the 2010 census, there were 7,761 people living on Fort Riley. At the time, Fort Riley was predominately white (35.4%) with few African Americans (15.3%), Hispanics (12.3%) and Asian (2.3%) (Census, 2010a). The population was relatively young with 43.7% between the ages of 20 and 29 years, 24.1% under 10 years, 14.6% between the years

of 30 and 39, and 13.7% between the ages of 10 and 19 (Census, 2010a). The median household income was well below the state average at \$34,350 (the state average was \$50,594). Of the population living on Fort Riley, 24.1% lived below the poverty line.

The current rates of walking and biking to work on Fort Riley were high. According to the 2010 Census mode-share to work, an estimation of transportation to and from work, residents on Fort Riley walked 10.6% and biked 1.3% of all trips (Census, 2010b). However, 33.0% of all trips to and from work were made by car. Interestingly, a full 47.5% of residents said they worked from home and thus, did not travel for work. The average time spent commuting to work was only 11.1 minutes.

Obesity was also a problem in the military setting. According to Department of Public Health, Public Health Nursing, a subsample of active duty personnel on Fort Riley indicated that obesity was a problem even with military personnel. An internal report of active duty weight status collected at physical readiness training showed that 46.36% and 12.83% of military members were overweight or obese, respectively (C, Lindsey, personal communication, February 11, 2013). Only 39.23% of military members were of normal weight.

Fort Riley was part of both Riley and Geary Counties in Kansas. Figure 4 shows where Fort Riley was located in the state of Kansas. The installation occupied 5.04 square miles (Census, 2010a). The installation was divided into five outposts as shown in Figure 5. It had varying topography which made it difficult to bike or walk to destinations. Figure 6 shows the topographical characteristics of the installation.

Measures

The physical environment was analyzed for basic infrastructure and layout. Geographic Information Science (GIS) data were collected from publically available resources and used to describe the current conditions and provide visual representations of the area.

Policies that were identified by the Chief Master Planner as guiding documents for planning and encouragement of biking and walking were downloaded from publically available resources. Policies were analyzed for statements related to encouraging or inhibiting biking and walking for transportation and recreation.

Qualitative interviews were conducted with high ranking personnel solely to gather information about the social and political environments for Fort Riley Army Installation. The interviewer asked probing questions about the structure of planning on post, which documents guided the development of infrastructure, if they thought people would walk or bike given the appropriate geographical supports, and what challenges they saw were the hardest to overcome when encouraging people to walk and bike for transportation. No questions were asked of each participant's current behaviors.

Results

Physical Environment

Fort Riley was divided into six separate and distinct areas: Custer Hill, Camp Whiteside, Camp Forsythe, Camp Funston, Old Post and Marshall Air Field. These six areas are outlined in Figure 5. Each area had different levels of infrastructure that facilitated walking and biking to different degrees. However, there was little to no infrastructure for walking and biking between these separate areas. Roads with high

traffic volumes and heavy vehicle traffic were the only safe way to get from one area to the other.

The physical environment for walking and biking was highly varied on Fort Riley. Some areas were designed with walkability in mind and other areas were not walkable due to lack of infrastructure, high traffic volumes, speeds or heavy vehicles. While biking was allowed on Fort Riley, there were no on-street facilities that encouraged biking for transportation. Furthermore, most roadways had high traffic speeds, no or narrow shoulders, and were traveled by large trucks or military vehicles. All of this discouraged walking and biking for transportation.

Custer Hill was where most single soldiers lived and worked. It was the most walkable area of Fort Riley and was clearly designed with walking in mind. It facilitated walking and biking behaviors with immense spans of sidewalk, trails and buildings that were constructed near housing. There were few infrastructure supports that allowed access across major roadways providing a ways for soldiers to walk to work. However, there were trails that traversed around the golf course that could be used for recreational physical activity.

Camp Whiteside was where the hospital and air crew housing was located. It had two trails and one track usable for recreational physical activity. The hospital area was walkable with an extensive sidewalk network and very low traffic speeds and volumes. However, the air crew housing, while walkable within the complex, was not connected to any destinations other than the dining facility where soldiers were likely to walk to.

Camp Forsythe was one of the major housing areas on Fort Riley. It was also where the Commissary (grocery store) and Post Exchange (mall) were located. This

area was disjointed and sporadically connected. There were large amounts of sidewalks but they did not connect to any destinations. The Commissary, Post Exchange and day care facility were located across a four-lane, high traffic volume and high-speed street from a major housing complex, yet there was no safe and convenient way to get from one side to the other.

Camp Funston was one of the older areas of Fort Riley where grid-pattern street design was still apparent. Grid-pattern streets allow for the shortest travel between areas due to the high level of intersection density. In this area, there were few sidewalks and large parking lots that encouraged people to drive to their destination rather than walk.

Old Post, as the name implies was the oldest part of Fort Riley. Its historical significance allowed for it to remain relatively untouched in the last 100 years. It was connected with sidewalks and low speed roads that allowed but did not encourage pedestrian traffic. It had one large trail that could be used for recreation physical activity.

Lastly, Marshall Air Field was located across the river from the rest of the installation. The only way to get from one side of the river to the other was a bridge that was not safe for pedestrian traffic. It also had a trail that could be used for recreational or transportation physical activity as it connected one side of the airfield to the other.

These six camps were not connected by infrastructure that would allow for walking or biking between them. They were separated by distances that would make it difficult to travel by foot or bike. Furthermore, the elevation changes were large and made it difficult to climb steep hills and to cross rough terrain. Figure 6 shows the elevation. The only realistic way of travel from one area to the other was by vehicle.

Location of Fort Riley in Kansas

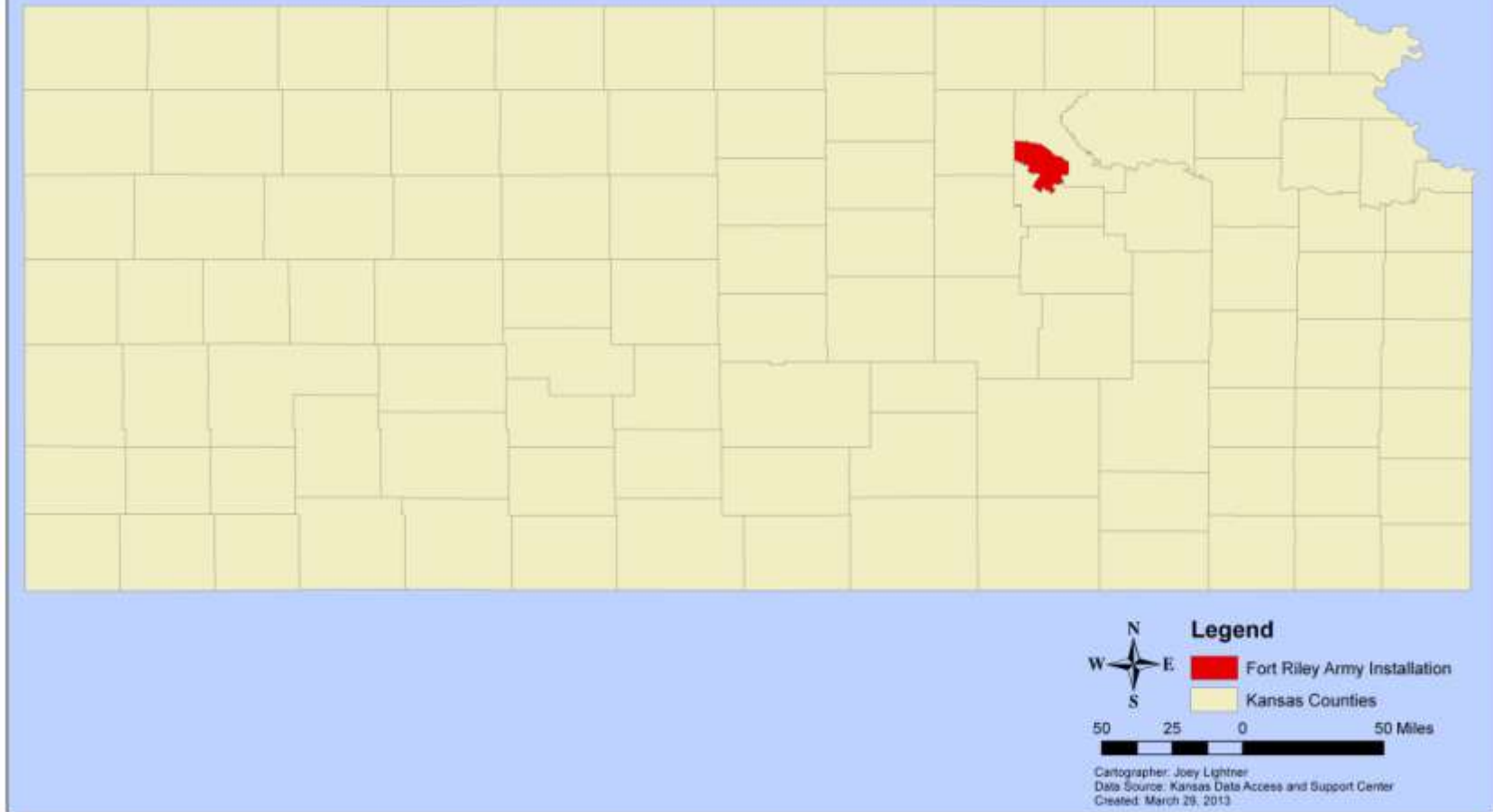


Figure 4. Location of Fort Riley in Kansas.

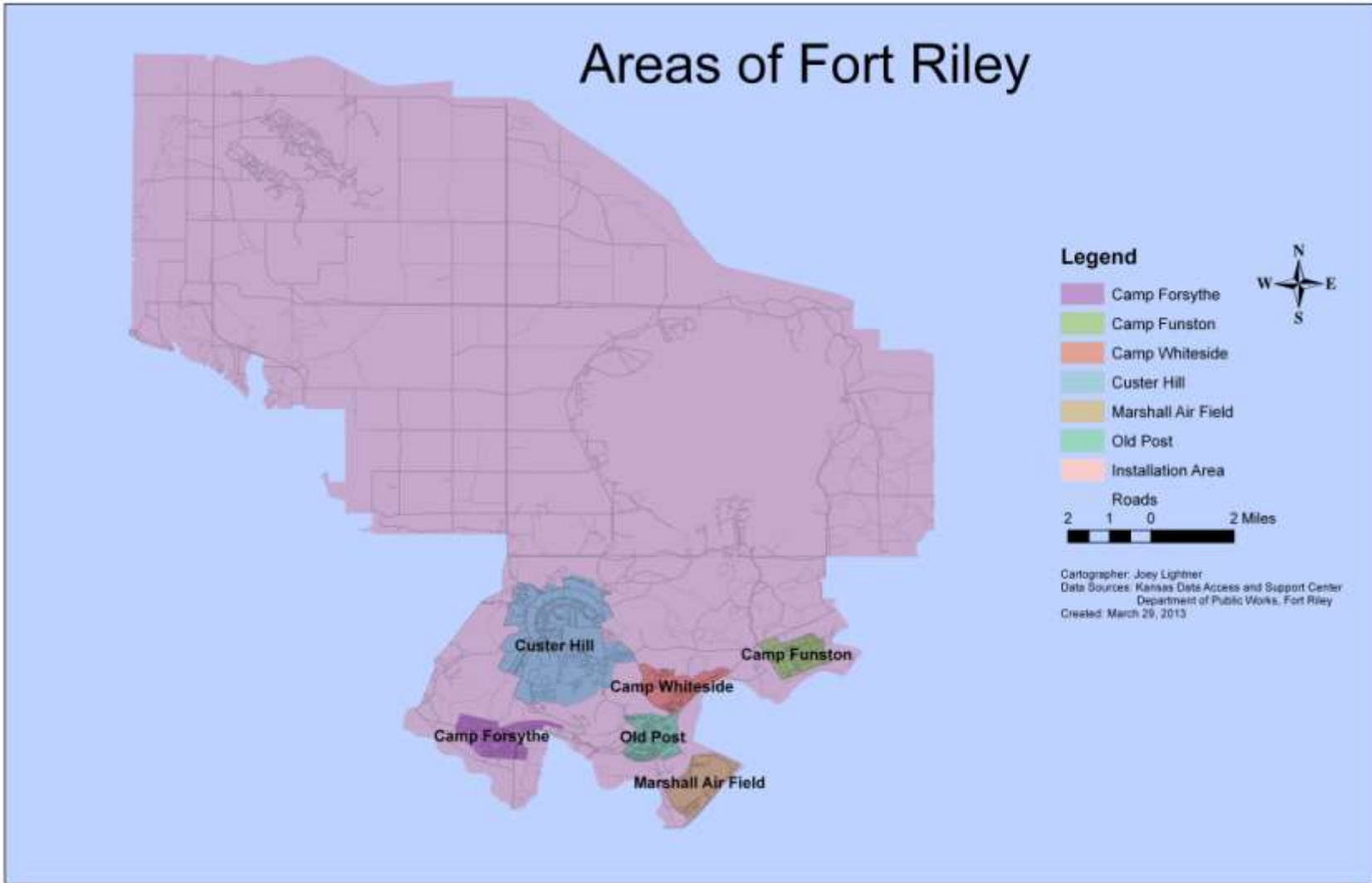


Figure 5. Areas of Fort Riley.

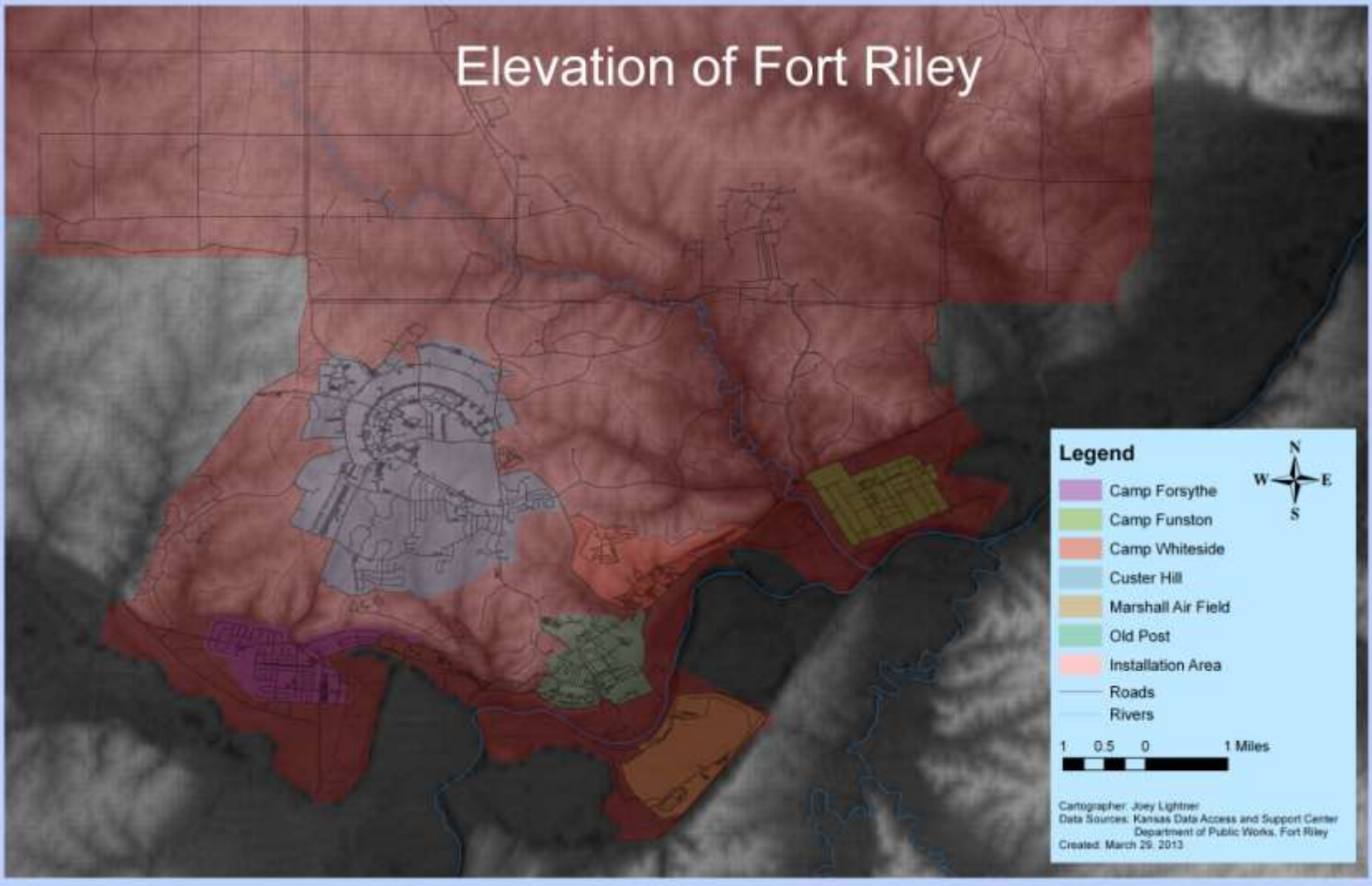


Figure 6. Elevation of Fort Riley.

Policy Environment

The highest policy document for planning in the Army was the Unified Facilities Criteria Installation Master Planning or UFC 2-100-01 (U.S. Army Corp of Engineers, 2012). This document suggested integrating bicycle and pedestrian infrastructure to facilitate physical activity for transportation. The document stated,

“Planners will ensure (through programming projects as appropriate) that uses within each district as well as the districts themselves are thoroughly connected by roads, sidewalks, and bikeways sized to support mission requirements” (p. 7).

UFC 2-100-01 suggested the creation of a master plan for sidewalks and bikeways. By creating a master plan for bike and pedestrian infrastructure, planners could more easily integrate bike and pedestrian projects into current projects as they were built. A master plan for bike and pedestrian infrastructure will allow planners to request additional funds during the construction of a large projects of high importance instead of requesting funds for separate bike and pedestrian projects that might be of lower priority.

At the installation level, the Army Installation Design Guide: Fort Riley was the guiding document for all planning (Army Garrison, 2006). It acted as a high-level vision document for planners outlining the planning process, goals and objectives for the installation and design standards for all elements of construction to include buildings, landscapes, roadways, and force protection.

The Army Installation Design Guide: Fort Riley suggested construction of bicycle and pedestrian infrastructure to facilitate active transportation. It acknowledged that biking and walking were realistic and convenient ways to transport people to and from

destinations. It also identified the sustainability of biking and walking and how that was central to the Army's mission of reducing the impact on the environment.

Within the Circulation chapter of the Army Installation Design Guide: Fort Riley were sections devoted to construction of bicycle and pedestrian infrastructure. The goal for both sections was to

encourage active

transportation as a viable

transportation method. The

plan went into detail about how

the infrastructure should be

design such that it best

encouraged active

transportation. Figure 6 is one

of the many suggested designs for bicycle and pedestrian infrastructure.

It is important to note that the planning process was reviewed by all Senior Mission Commanders and the Garrison Commander. A representative from Medical Command at Fort Riley was on this committee who oversaw this process and approved all plans. Ideally, this person was an expert in built environmental correlates of public health to include infectious disease, toxicology, nutrition and physical activity.



Figure 7. Sample figure from Army Installation Design Guide.

Social Environment

The social norm associated with transportation on Fort Riley was that everyone drove to all destinations. In interviews with stakeholders, I discovered that people would drive across parking lots to get to another building and park as close as possible to a

building even if that meant parking in a ditch or on a roadway. For those who did not have a car, they rode with others and almost refused to walk or bike. Often the soldiers on Custer Hill lived within walking distance but still drove around the block to park next to their building. In the past, parking was reported as a problem both because people would park in non-parking areas and because of the congestion associated with the increasing number of cars on the installation.

During my three months at Fort Riley, I did not see anyone walk or bike between the areas of the installation (e.g. Custer Hill to Camp Forsythe). In Camp Whiteside, walking to adjacent buildings was common and encouraged because there was only one large parking lot that was located on the periphery. However, driving to another area of the installation was the social norm. In my opinion, people on the installation did what was easiest. If walking was easier than getting in a vehicle, they were likely to use that mode of transportation. However, if driving was easiest, they were likely to drive.

Political Environment

The political environment on Fort Riley was essentially like any other municipality or state government. The Base Commander acted like a mayor or governor to direct planning and construction of all projects. This person was appointed for two years and then another person was appointed to his position and often had differing goals for the installation. Since infrastructure for walking and biking was seen as a quality of life issue instead of a public health issue, it was often made to be a lower priority, if one at all. This left the civilian staff with the responsibility of educating all new Base Commanders on the importance of active transportation and requesting that infrastructure be built to facilitate this behavior.

Discussion

The purpose of this report was two-fold. First, I outlined and described my experiences with various groups within the Department of Public Health at Fort Riley Army Installation. Second, I aimed to evaluate policies and programs focused on promoting environmental change for walking and biking and gave direction to the Army Corp of Engineers on best practices for walking and biking for transportation. The objectives of this report were to identify key agencies responsible for bike and pedestrian infrastructure, understand how these agencies could work together to improve the built environment for walking and biking and develop intervention strategies to improve walking and biking on Fort Riley.

Review of Findings

The physical environment for walking and biking for transportation at Fort Riley does not have adequate infrastructure to support these behaviors. Although the installation does have an extensive sidewalk network, it is often disconnected. Current research suggests that connected sidewalks are important for walking and biking (Wilson, et al., 2004). Destinations are surrounded by parking lots instead of sidewalks and green space. Additionally, no on-street bike facilities are available anywhere on the installation. On-street bike facilities encourage the behavior of bicycling for transportation (Parker, Gustat, & Rice, 2011). Of the trails that exist, all of them encourage recreational physical activity and do not connect destinations, a construct that has been shown to increase transportation physical activity (Brownson, et al, 2001).

The policies that are needed to build infrastructure that facilitates active transportation are in place and should be followed. Both the UFC 2-100-01 and the

Installation Design Guide: Fort Riley suggests construction of infrastructure for biking and walking. Additionally, the Installation Design Guide: Fort Riley outlines the planning process on the Fort Riley and currently has a representative from Medical Command on the committee that approves all infrastructure.

The social and political environments at Fort Riley are constantly changing with the transient population and leadership. This can encourage driving over walking or biking to destinations. Biking and walking for transportation are against the social norm. In order to change this, educational and encouragement campaigns are needed. Additionally, Base Commanders should be educated on the benefits of active transportation for soldiers, families, civilians and benefits to the Army as a whole.

Recommendations

There are many ways to encourage active transportation at Fort Riley. Commonly, bike and pedestrian experts categorize aspects of the active transportation into engineering, education, encouragement, enforcement, evaluation and planning. With the formative research data collected, the following section will give specific recommendations for each of these categories.

Engineering

- Construct and connect trails such that they can be used for both transportation and recreational physical activity.
- Develop on-street bike facilities within each area of the installation, but more importantly between the areas of the installation. Ensure these facilities meet the National Association of City Transportation Officials: Urban Bikeway Design Guide.

- Construct bike parking at destinations.
- Connect sidewalks such that a person can walk to and from destination without having to walk on grass.
- Install wayfinding signs for bikes and pedestrians.
- Accommodate bikes and pedestrians at intersections by constructing high visibility crosswalks, over/underpasses, and other treatments, where appropriate.

Education

- Install Share-the-Road signs where bikers are likely to travel.
- Begin a community outreach project to educate soldiers, families, and civilians on the benefits of walking and biking.
- Use lighted signs at installation entrances to remind and encourage active transportation while on Fort Riley.
- Conduct training for planners and construction personnel (both military and civilian) on appropriate facilities for biking and walking.
- Require training for all people who drive heavy vehicles (semi-trucks, delivery vehicles, any vehicle over 10,000 pounds, etc) on Fort Riley.

Encouragement

- Promote, host and sponsor a variety of biking and walking activities to include: running and biking road races, mountain bike races, bike or walk to school days, bike or walk to work days, active commuter challenges, etc.
- Encourage community involvement in the planning process for transportation.
- Develop a series of bicycle rides around post. These can be scenic, historic or challenging.

- Encourage Morale, Welfare and Readiness to open a bike shop at one of the gyms and employ a part-time bike mechanic.

Enforcement

- Offer training to police officers regarding bike and pedestrian issues.
- Encourage the Base Commander to develop a policy that bikes and pedestrians have right-of-way while crossing all roads on the installation.
- Encourage the Base Commander to develop a policy that requires a three feet clearance when passing a bicyclist.
- Reduce the speed limits in areas where bike and pedestrian traffic is likely high.

Evaluation

- Conduct regular counts of bike and pedestrian traffic at designated points on the installation.
- Review crash statistics and suggest environmental mitigation.
- Implement a trip reduction program to curb driving behavior.
- Conduct an economic impact study on walking and biking at the installation level.

Policy

- Disseminate the Army Installation Design Guide: Fort Riley and UFC 2-100-01 to Base Commander and other high ranking staff.

To understand how the environment can be easily changed to facilitate active transportation, we suggest starting with easy ways to incorporate ideas from other successful project. Often, large-scale projects are unnecessary or unrealistic. Because of that, five easy projects are suggested below. These are low-cost projects that can be

accomplished with minimal oversight and could lead to greater levels of active transportation due to environmental influence.

Project 1: Increase visibility of crossing at Trooper Drive and Hitchings Post Road

The crossing at Trooper Drive and Hitchings Post Road needs increased visibility to facilitate active transportation from the housing district to the PX, Commissary and Child Development Center.

Install flashing beacons or “sidewalk ahead” signs and repaint crosswalk stripes. The material cost for this project (to include non-lighted signs and paint) is estimated at \$400. Additionally, the lighted crosswalk signs need to be installed correctly. Currently, the southbound crosswalk sign is blocking the view of the eastbound crosswalk sign.



Figure 9. Crossing at Trooper Drive.



Figure 8. Crosswalk signs at Trooper Drive.

Project 2: Increase visibility of crossing at Huebner Road between Seitz Drive and Carpenter Place



Figure 10. Crossing at Huebner Road.

The crossing of Huebner Road between Seitz Drive and Carpenter Place needs to be repainted and signed so that drivers are aware of pedestrian activity. After the mill and overlay project, contractors did not repaint the crossing. Additionally, because of the speed limit, drivers need adequate time to stop for pedestrian. The material cost for this project (to include non-lighted signs and paint) is estimated at \$400.



Figure 11. Crossing at Cavalry Mount Road and Paddock Road.

Project 3: Install crosswalk at Cavalry Mount Road and Paddock Road

A crossing needs to be installed at Cavalry Mount Road and Paddock Road. The community garden is located to the south of this intersection and appropriate pedestrian amenities should be installed to allow access to that location. The

material cost for this project (to include paint) is estimated at \$100.

Project 4: Install wayfinding to the community garden

Wayfinding should be installed to point residents to the community garden. A minimum of four wayfinding signs should be installed along Trooper Drive, Hitchings Post Road and Cavalry Mount Road. They should be similar to what is shown in Figure 12. The material cost for this project is estimated at \$150/sign.



Figure 12. Suggested wayfinding signs for the community garden.



**Figure 13. Trail on
Camp Forsythe.**

Project 5: Install trailhead and wayfinding signs on all trails

It is important to provide residents with the locations of trailheads and wayfinding once people are on trails. Install trailhead signs where appropriate, or at all access points to the trail. Additionally, provide signs directing trail users where local attractions are near the trail. The estimated material cost for this project is \$500.

Strengths and Limitations

There are numerous strengths of this project. This is the first time bike and pedestrian issues have been reviewed by an external entity that assessed the issue from a public health perspective. Not only was the environment described at most social ecologic levels but, recommendations were also given to facilitate change. Additionally, GIS was used to describe and evaluate the physical environment without significant burden to the researcher.

However, because of time and resource constraints no new GIS data were collected. The staff members that were interviewed provided information to the researcher but not all staff members were interviewed. Additionally, no one from the Base Commander's office was interviewed. The recommendations are subjective and from the viewpoint of the researcher. A different researcher could suggest additional or different aspects to change than the recommendations given in this report.

Conclusion

Currently, the physical, social and political environments are not conducive to walking or biking for transportation on Fort Riley. However, policies exist that facilitate changing the environment to encourage transportation physical activity. By describing the current conditions on Fort Riley and providing recommendations, the Department of Public Health can begin programs that change the physical environment to support active transportation.

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I would like to thank all of the staff at Fort Riley, as well as my colleagues from Kansas State University. The staff members were excited to show and teach me the many aspects of their positions. They also went above and beyond their responsibilities and introduced me to other staff members who would teach me something different. If I had any questions, the staff was there to help. They were completely supportive of my obligations outside of the field experience and were ready to provide additional assistance whenever I needed. In the future, I hope our working relationships can continue as I research innovative strategies to combat obesity and chronic disease.

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