Too Fat, Frail, and Out-of-Breath to Fight

Colorado children need regular PE and real walking and biking options to maintain healthy weights and build strong bones and lungs.

Sprains and broken bones outpaced combat injuries in Iraq and Afghanistan.
WHO WE ARE


Mission: Readiness is the nonprofit, nonpartisan national security organization of more than 500 retired generals, admirals and other senior retired military leaders who work to ensure continued American security and prosperity into the 21st century by calling for smart investments in the upcoming generation of American children. It operates under the umbrella of the nonprofit Council for a Strong America.

For a full listing of our membership, please see our website at www.missionreadiness.org

ACKNOWLEDGMENTS

“A WALKING AND BIKING TO SCHOOL CELEBRATION” COVER PHOTO CREDIT: U.S. ARMY PHOTO BY BILL BENTGSON

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Report authored by Bill Christeson, Kara Clifford, Amy Dawson Taggart, and Jamie Lockhart.

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Report design by Mariana Galloway.
Our nation’s military has often played a role in solving problems affecting our greater society. When malnutrition kept many young men from serving during WWII, General Lewis Hershey pushed successfully for the creation of the national school lunch program as a major force for children’s health. When the Soviet Union sparked national security concerns by successfully launching Sputnik as the first satellite to circle the earth, military leaders helped inspire improvements in the teaching of mathematics in U.S. schools. Responding to military leaders’ concerns about the need to move troops and supplies during an emergency, President Eisenhower—a former Army general—championed the development of the Interstate Highway System. And today, in response to an obesity crisis that disqualifies millions of young adults for military service, retired military leaders once again are leading the charge to ensure that schools are able to serve more nutritious meals to our nation’s students.

Today there are new challenges that affect the health of our nation’s children and the success of our military:

- Nearly one in three young Americans is too overweight to serve, one of the leading reasons why 70 percent of Colorado’s young adults cannot serve in the military;

- Nearly 14 percent of young Coloradans currently have asthma, which disqualifies them from serving in the military without a waiver. Obesity and lack of exercise can contribute to asthma and other respiratory problems;

- More than 60 percent of non-deployed active duty service members experience a sprain, stress fracture, or other musculoskeletal injury each year due in part to years of low calcium intake, lack of long-term exercise habits and/or excess weight. The military is spending billions treating these injuries among active duty personnel and veterans.

While these challenges have been driven by a variety of factors, there are two key ways to improve both health and military readiness for generations to come.

First, community planners and builders can prioritize the creation of new transportation systems that prioritize sidewalks, trails, separate bike lanes and other longer-term built environment changes to substantially increase walking or biking to and from school and work. While Colorado is doing better than other states, currently only 20 percent of Colorado adolescents walk or bike to school. These efforts will reinforce regular physical activity as a simple and rewarding way to lead a healthy life, while improving air quality and lung functioning in the process.

Second, schools can help ensure that children get at least one hour of physical activity every day—the amount recommended by experts—which will help young people maintain a healthy weight while building strong muscles, lungs and bones. Unfortunately, in an average week, more than half of Colorado teens receive no physical education (PE) and only half get the recommended hour of daily physical activity during the day.

Finally, we must stay the course on serving healthier
school meals. Children consume up to half of their daily calories at school, and healthier meals will not only help prevent weight gain, but also provide the right nutrients that can enhance physical activity and contribute to bone and muscle growth. According to the U.S. Department of Agriculture, 100 percent of Colorado’s schools are successfully serving meals that meet updated nutrition standards. 

The good news is that Colorado has started making important changes to encourage physical activity. Boulder, Denver and Colorado Springs are all ranked among the top 50 cities for biking nationwide, and Denver is making additional strides by protecting bike lanes from traffic and building a new biking and pedestrian bridge for commuters. Recent evidence from elsewhere shows success is possible. Childhood obesity rates have declined by more than 30 percent among students in Wisconsin’s Chetek-Weyerhaeuser school district following a number of changes to help students become healthier, including expanding opportunities for physical activity throughout the school day. In the most polluted parts of Los Angeles, the number of teens with under-developed lungs has been cut in half following efforts to reduce air pollution. In Portland, Oregon and across Northern Europe, ongoing commitments to “active transportation” efforts have led to many thousands more children and adults walking or biking to and from school and work each day.

With all of this in mind, the retired admirals and generals of Mission: Readiness are leading the way to making PE a key part of every student’s day and supporting Safe Routes to School projects in Colorado and across the country. Collectively, these efforts will put more students on track for a healthy future and help those who choose that path the opportunity to serve their country in the military. When military leaders have called for important changes, Americans have listened and acted. It is time for Colorado to answer the call.

“Colorado cities are at the forefront of active transportation efforts nationwide. For example, Boulder, Denver and Colorado Springs are all ranked among the top 50 cities for biking in the country.”
Colorado, We Have a Problem

Impacts on the Military

A growing number of military recruits and service members are not only too overweight, but also too frail to fight. Many others have respiratory problems that prevent them from serving. While some physical deficiencies can be addressed once individuals enter the military, long-term military readiness is at risk unless a large-scale change in physical activity and nutrition takes place in America.

Unhealthy weights

Nearly one in three young Americans is now too heavy to serve in the armed forces, a main reason why 70 percent of Colorado young adults cannot serve.1 At the same time, physical inactivity is a problem even among those whose weight does not disqualify them from serving; according to one study, one out of every seven male Army recruits reported that they had not exercised or played any sports in a typical week prior to joining.2

Among active duty forces, obesity has risen by 61 percent since 2002. The military pays more than $1.5 billion in annual obesity-related health care spending and costs to replace unfit personnel.

Respiratory problems

Asthma is a smaller but growing problem for recruiters, rendering approximately 14 percent of young Coloradans ineligible for military service.3 In addition, approximately 600 newly enlisted recruits are discharged each year because of asthma and approximately four percent of soldiers currently have asthma.4

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<th>Unhealthy Weights</th>
<th>Weak Lungs</th>
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<td>1 in 3 young Americans is too overweight to serve in the military.</td>
<td>1 in 10 young Americans has asthma, disqualifying them from serving without a waiver.</td>
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</table>

**Weak Bones**

6 in 10 service members experience a sprain, stress fracture or similar injury each year.

**Lung Function Capacity**

Maximal forced expiratory volume in 1 second. 

<table>
<thead>
<tr>
<th>Lung Function Capacity</th>
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<td>80% vs. 100%</td>
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**NEW CHALLENGES ARE PUTTING OUR NATIONAL SECURITY AT-RISK**

**WE NEED TO REVERSE THESE AND OTHER DANGEROUS TRENDS**

- In less than 2 generations, a quarter as many children walk or bike to school and childhood obesity tripled.
- Most children aren’t getting the exercise or nutrients needed to build strong bones.
- Respiratory problems are rising among children. Reducing air pollution in parts of LA helped halve the number of teens with lungs functioning under 80% of expected capacity.*

*Maximal forced expiratory volume in 1 second.
While allergens, air pollution and smoking are known to increase the risk of asthma and other respiratory problems, research shows that obesity and a lack of physical fitness are also risk factors. For example, one Journal of the American Medical Association study examining a military population found that being overweight or obese was a major risk factor for asthma.

**Broken bones and sprains**

The military is also facing an unprecedented problem with sprains, stress fractures and other orthopedic problems (also known as musculoskeletal injuries). Those injuries are now recognized as “the biggest medical threat to readiness” among service members. Musculoskeletal injuries increase during wartime as a result of heavier packs and greater stressors, but research shows that poor nutrition, lack of exercise and obesity are contributing factors as well.

More than 60 percent of non-deployed active duty service members experience a musculoskeletal injury each year for an annual total of more than 740,000 musculoskeletal injuries. These injuries are the leading reason why 30 percent of the Army’s reserve population is non-deployable. They are also the leading health-related reason for discharge from service. Discharges for these injuries have increased five-fold among males and nine-fold among females over the last three decades.

There are more than two million medical encounters among service members for musculoskeletal injuries every year — greater than for any other condition. There were 72 percent more medical evacuations from Afghanistan and Iraq to Germany for stress fractures, serious sprains and other musculoskeletal injuries among those deployed than for combat wounds. The military pays at least $5 billion a year in medical care costs and for the salaries of service members who are on limited duty or non-deployable because of injuries — the majority musculoskeletal. U.S. Department of Veterans Affairs (VA) payments to individuals partially or fully disabled by musculoskeletal injuries also topped $5 billion per year even before the Afghanistan and Iraq wars. Since 2000, the average disability payment to veterans has increased by 60 percent.

**Declining activity and weaker bones among children**

It is well-known that America is facing an obesity epidemic. A growing body of research is shedding light on one of the primary contributors to the epidemic: physical inactivity.

In less than two generations, physical activity time among adults in the U.S. has declined 32 percent and is on track to drop 46 percent by 2030. Three-quarters of children receive less than an hour of physical activity daily. The proportion of children who walk or bike to school dropped dramatically over the past four decades: from 48 percent in 1969 to 13 percent in 2009. Meanwhile, children’s diets are increasingly made up of more empty calories and fewer nutrients. For instance, in 1977, children received 13 percent of their daily calories from milk and eight percent from sugary drinks. In 2001, by contrast, children received 17 percent of their daily calories from sugary drinks and only eight percent from milk.

As a result of these trends, compared to recent generations, children at age 10 are not only 12 pounds heavier, but many also have weaker bones. More than one-quarter of adult bone mass is formed between the ages of nine and 15, and research on child development shows that if children miss this key window for bone growth, they can have problems the rest of their lives. Yet an increasing number of children are not getting the adequate physical activity, calcium and vitamin D...
that healthy musculoskeletal development requires:

- Between the ages of nine and 15, the time that children spend engaged in moderate and vigorous physical activity drops by 75 percent. By tenth grade, 70 percent of American students are not getting the recommended hour of moderate to vigorous exercise daily.  

- Eighty-five percent of adolescent girls and 77 percent of adolescent boys ages nine to 13 are not getting an adequate amount of calcium, and nearly half of girls and boys ages nine to 13 are not getting the vitamin D needed to build strong bones.

As a result of these deficiencies, there is evidence that many children have weaker bones than previous generations. A long-term study in Rochester, Minnesota, published in the *Journal of the American Medical Association*, found that forearm fractures increased by 32 percent among boys and 56 percent among girls from 1970 to 2000, likely in part because of rising obesity rates and less-developed skeletal systems. It is also possible that many children are suffering from weaker muscles and tendons due to lack of exercise; the CDC began collecting data on children’s muscle strength in 2012, and research examining longitudinal trends should become available in future years.

**Respiratory problems often develop in childhood**

In just over three decades, the proportion of the U.S. population with asthma has tripled—from around three percent in 1980 to nine percent in 2013. Asthma prevalence is slightly higher among young adults: 14 percent of 18- to 24-year-olds in Colorado and 10 percent nationwide have asthma. Meanwhile, CDC data show that the proportion of Americans ages 12 to 15 with adequate levels of cardiorespiratory fitness dropped by 20 percent between 2000 and 2012.

There is no single cause of asthma or other respiratory problems, but physical inactivity and pollution contribute to these issues. Lung development is nearly complete by the age of 18 and, therefore, “children with lung deficits are likely to have diminished lung function for the rest of their lives.” Research shows that children exposed to nitrogen dioxide and fine particulate matter — both prevalent in traffic pollution — experience an increase in daily symptoms of troubled breathing as well as a substantial decrease in lung function and growth. Another study found that children with elongated exposure to these pollutants throughout the first eight years of life have an increased risk of developing asthma. Denver and Colorado Springs have higher average particulate air pollution than many other cities nationwide. There is promising evidence that reducing air pollution can strengthen children’s lungs. According to a recent study, neighborhoods in Los Angeles that experienced meaningful decreases in air pollution over 13 years also saw the percent of children with smaller lungs and lower lung functioning cut in half over the same time period. Specifically, teens with lung function below 80 percent of expected lung function capacity—a cutoff used to indicate concern—fell from eight percent to four percent. The average daily density of fine particulate matter in micrograms per cubic meter (PM2.5). Less than 12.4 PM2.5 is considered good by U.S. standards.

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Three Solutions to Strengthen the Next Generation

1 Build physical activity back into communities

Research shows that simply walking or biking to and from school can supply children with 16 additional minutes of moderate or vigorous physical activity per day, just over one-quarter of the daily amount recommended by experts. In Colorado, nearly half of adolescents report that they could walk, bike or take another mode of active transportation to school, but only 20 percent of adolescents actually do.

Within the past decade, Safe Routes to School and walking school bus programs in Colorado have helped approximately 700 schools increase the number of children who walk and bike to and from school by improving sidewalks, bicycle paths, intersections, traffic signals and other infrastructure, as well as by enlisting parents to participate. Five of those schools are in Longmont, where participation in the Safe Routes to School program has not only meant safer routes but also events such as “Walk or Wheel Thursdays” and information sessions for parents and students. Since the program began, there has been a 63 percent decline in the number of children driven to school at Eagle Crest elementary school and three new bike racks are consistently full, even in January. At Columbine elementary, the number of cars in a typical drop-off line went from more than 100 to less than 15.

Many Denver schools are also participating in the Safe Routes to School program. For example, in Denver, the number of cars in a typical drop-off line went from more than 100 to less than 15.

A new bicycle and pedestrian bridge over I-25 for Denver commuters is scheduled to open in late summer 2015.
Fifty-six percent of adolescents in Colorado report receiving no PE in an average week, which helps to explain why only half of high school students in the state get the recommended hour of daily physical activity. In Denver, less than seven percent of adults actively commute to work by walking or biking. But in an average week, about 30 percent of Germans, including all age classes and rural as well as urban residents, rely on their bicycle as a means of transportation.

Colorado cities are at the forefront of active transportation efforts nationwide; for example, Boulder, Denver and Colorado Springs are all ranked among the top 50 cities for biking in the country. In Denver, improvements include the recently completed 15th Street Bikeway—the first of three planned protected bike lanes that are separated from automobile traffic with barriers. The city is also piloting a new bike parking system that replaces a single parking spot with a rack that holds up to 12 bikes. Meanwhile, a new bicycle and pedestrian bridge over I-25 for commuters is scheduled to open in late summer 2015.

Collectively, these changes will help to increase the number of children and adults walking and biking in Denver, where less than seven percent of adults actively commute to work.

Build physical activity into the school day

Routes to School program. In one elementary school, the number of students walking or biking to and from school has increased by 33 percent since the launch. Parents and local law enforcement have addressed safety concerns, and workshops with story boards, games, songs and practice bike courses have encouraged children to participate.

Physical education (PE) is an important source of physical activity for children. Yet PE is now absent from many schools and limited in others. Fifty-six percent of adolescents in Colorado report receiving no PE in an average week, which helps to explain why only half of high school students in the state get the recommended hour of daily physical activity. While PE attendance in northeast Colorado is higher than the state average, “attendance drops to 25 percent in the northwest Colorado counties of Moffat, Rio Blanco, Routt and Jackson.”

Increasing physical activity during the school day can improve students’ health, fitness and even their academic performance. Studies have found that PE curricula that emphasize total participation and health and nutrition education, such as the SPARK and CATCH programs, can substantially increase children’s physical fitness and endurance. Other rigorous studies have found that increasing physical activity during the school day can improve bone growth in prepubescent children.

The connection between physical activity and brain functioning helps to explain this boost in test scores. Research shows that physical activity increases neural
Student obesity rates in the Chetek-Weyer-haeuser School District in Wisconsin are declining faster than almost any other location nationwide. In just four years, from 2009 to 2013, the percent of students who were overweight or obese dropped from 43 percent to 30 percent. The lower obesity rates have coincided with dramatic improvements in physical activity and meals served in district schools. For example, the district purchased exercise equipment such as a climbing wall, skates, snowshoes, kayaks, cross-country skis, mountain bikes, treadmills and elliptical and weight lifting machines. They also updated school meals standards to include more fruits and vegetables, whole grains and low-fat milk and enhanced health and nutrition education during classes.

activity and affects areas of the brain that are associated with learning in children. For example, one randomized study of an afterschool program that provided children with 70 minutes of physical activity per day for nine months found significant improvements in working memory (important for learning, reasoning and comprehension) among participants compared to children in the control group.

**Do not retreat on healthier school meals**

As a result of updated national nutrition standards for school meals that went into effect in 2012, 100 percent of schools in Colorado are now successfully serving healthier meals that have more fruits, vegetables, whole grains and lean proteins. Schools struggling to meet the updated standards have received support from the U.S. Department of Agriculture (USDA), which has awarded more than $185 million in grants to fund new school kitchen equipment nationwide since 2009, including nearly $700,000 in Colorado over the past two years, and continues to provide training to school nutrition professionals to help schools serve healthy meals for students. The Department also announced the nationwide expansion of its Team Up for School Nutrition Success program, which allows the schools still working to meet the standards to pair up and learn best practices from schools that are already successfully serving healthier meals. USDA has also provided appropriate flexibility on issues such as transitioning to whole grain products.

Even though Colorado is doing better than many states, it is important to keep making progress on healthier meals.
meals because children consume up to half of their daily calories at school, and healthier meals will not only help prevent weight gain, but also provide the right nutrients that can enhance physical activity and healthier bone and muscle growth.²⁶

Conclusion

Throughout America’s history, when military leaders have said it is time for a major change, the country has stepped forward to take action. Too many children are overweight and have weak bones or underdeveloped lungs. Prioritizing changes in schools and communities that promote physical education and activity are the right steps for Colorado’s future. National security is at stake. It is time to act.
## Appendix

### Colorado Data by County on Physical Activity and Obesity

<table>
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<tr>
<th>County</th>
<th>Adult obesity rate (%)</th>
<th>Adults who report getting no physical activity (%)</th>
<th>Population without adequate access to locations for physical activity (%)</th>
<th>Adult obesity rate (%)</th>
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**Source:** County Health Rankings & Roadmaps, Robert Wood Johnson Foundation
Endnotes


7 Young, S. Y., Gunzenhauser, J. D., Malone, K. E., & McTiernan, A. (2001). Body mass index and asthma in the military population of the northwestern United States. JAMA — the Journal of the American Medical Association, formerly Archives of Internal Medicine, 161(13), 1605-1611.


20 The average weight of a 10-year-old boy increased by 10 pounds between 1970 and 2002 and rose 14 pounds among girls. Among older children, the average weight of a 15-year-old boy increased by 17 pounds between 1970


27 10% of Americans ages 18-24 currently have asthma, according to: Centers for Disease Control and Prevention (n.d.) “Table C3: Adult Self-Reported Current Asthma Prevalence Rate (Percent) and Prevalence (Number) by Age and State or Territory, BBFS 2013.” Behavioral Risk Factor Surveillance System. National Center for Environmental Health. Retrieved from http://www.cdc.gov/asthma/bbfs/2013/tableC3.htm


47 Is a School-Based Physical Activity Intervention Effective for Increasing Tibial Bone Strength in Boys and Girls? This 16-month randomized, controlled school-based study compared change in tibial bone strength between 281 boys and girls participating in a daily program of physical activity (Action Schools! BC) and 129 same-sex controls. The simple, pragmatic intervention increased distal tibia bone strength in prepubertal boys; it had no effect in early pubertal boys or pre or early pubertal girls; A School-Based Exercise Intervention Elicits Substantial Bone Health Benefits: A 2-Year Randomized Controlled Trial in Girls (Pediatrics) Three brief sessions of high-impact exercise per week implemented over 2 consecutive years within the elementary school curriculum elicited a substantial bone mineral accrual advantage in pubertal girls.


