

Tufts

NUTRITION

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FRIEDMAN SCHOOL OF NUTRITION SCIENCE AND POLICY
AND THE JEAN MAYER USDA HUMAN NUTRITION
RESEARCH CENTER ON AGING
WINTER 2013 VOL. 14 NO. 1



CLIMATE AND CRISIS

Are we ready for the disasters of tomorrow?

PLUS: DIETING AT WORK ■ FAT THAT BURNS CALORIES ■ TV AND OBESITY

Q: Is Dieting or Exercise Better for Losing Weight?

For this installment of “Ask Tufts Nutrition,” *Lainey Younkin, N13, a registered dietitian and second-year student in the Nutrition Communication program, serves as our expert.*

A ■ Are you diligently exercising but seeing no results around your midsection? It’s not just you. ■ Two new studies may explain why many people who begin exercise programs often lose little to no weight in the long run.

In the first study, published in the online science journal PLoS One, researchers compared the daily energy expenditures of Westerners and the Hadza, a population of hunter-gatherers living in northern Tanzania. Many believe modern Westerners burn fewer calories than in the past because their lives have become more sedentary. The Hadza, who are generally very lean, hunt and forage for food without modern tools such as vehicles or guns. Men walk about seven miles each day, while women walk about half that.

What was surprising was that although the Hadza seem to be more active, the researchers found little difference in calories burned between the Hadza and their Western counterparts.

The second study, published in *Obesity Reviews*, analyzed the effect of exercise interventions on body

composition. The researchers found that—contrary to popular belief—when people exercise but keep their energy intake constant, their resting metabolic rate (i.e., metabolism) actually goes down. Exercisers who ate more calories than they usually do did burn more fat than predicted, but some overcompensated and negated the effects of their hard work.

These studies suggest two things: exercise programs may not lead to as much calorie burn as you would think, and many people start eating more when they exercise, and they may eat too much.

Bottom line, if you start exercising to lose weight, you won’t succeed with the mentality, “I can eat anything because I’ll burn it off later.” You will have better results if you choose a healthy diet of whole grains, fruits and vegetables, lean proteins and healthy fats while exercising. Although these two studies show that diet may be more important than exercise for weight loss, don’t discount the other benefits of exercise, including decreased stress and anxiety, improved mood and reduced risk of cardiovascular disease, diabetes and some cancers.

Send your questions for future installments of “Ask Tufts Nutrition” to Julie Flaherty, Tufts University Office of Publications, 80 George St., Medford, MA 02155 or email julie.flaherty@tufts.edu.



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CENTURY RIDE



Friedman School Professor Miriam Nelson and Tufts faculty members John Rush of the Cummings School of Veterinary Medicine and Jeffrey Hopwood of the School of Engineering arrive at the veterinary school's Grafton, Mass., campus on a 105-mile bike tour of Tufts' three campuses. David R. Harris, the university's new provost, organized the Century Ride to meet faculty, 28 of whom pedaled all or part of the course.

TALK TO US

Tufts Nutrition welcomes letters with concerns, suggestions and story ideas from all its readers. Address your correspondence, which may be edited for space, to Julie Flaherty, Editor, *Tufts Nutrition*, Tufts University Office of Publications, 80 George St., Medford, MA 02155. You can also fax us at 617.627.3549 or email julie.flaherty@tufts.edu.

Online, but Not Out of Touch



ONE OF THE MOST TALKED ABOUT CHANGES IN higher education these days is online learning. Many universities and colleges are exploring the use of massive open online courses (MOOCs) to provide education to large numbers of students around the world. While MOOCs are free and accessible to anyone with an Internet connection, the downside is

that they typically do not offer academic credit, and students can miss out on meaningful interactions with faculty.

The Friedman School is taking a more personalized approach to online learning. Our regularly scheduled webinars, online certificate programs and innovative blended-learning degree program all offer the chance to interact with esteemed members of the Tufts community. These online programs are winning the praises of our students, alumni, instructors and friends.

Participants in the webinars, for example, have the opportunity to guide the content of the discussion, ask questions and experience firsthand the type of teaching and scholarship offered by the Friedman School and the Jean Mayer USDA Human Nutrition Research Center on Aging. (To view our previous webinars, visit nutrition.tufts.edu/event/recorded.)

To meet the continuing education needs of working professionals, we launched three online graduate certificate programs in *Nutrition Science and Communications for Public Relations Professionals*, *Delivery Science in International Nutrition* and *Applied Positive Deviance*. Based on the great success of these programs, we will offer a fourth certificate program in *Evidence-based Humanitarian Assistance* starting next September. Each certificate program, which is made up of three courses, is taught by renowned Tufts faculty. The certificate students, who live around the world, are collaborating with each other and receiving superior career-advancing instruction on a schedule that fits their needs. This fall we were fortunate to enlist the talents of one of our best online educators, Assistant Professor Diane McKay, who became the academic director of the certificate programs. (For more information, go to nutrition.tufts.edu/academics/certificate-programs.)

Our newest entry in the online learning arena is the Master of Nutrition Science and Policy (MNSP) blended-learning degree program. This program combines intensive residencies on Tufts' Boston campus with a sophisticated online environment. This format gives students who are unable to attend class full time in Boston the opportunity to earn a Friedman School graduate degree with minimal interruption to career or family obligations. For

approximately one week a semester, students in the MNSP program will come to Boston where they will have the chance to interact with Friedman faculty, meet fellow students, participate in essential hands-on learning and become totally immersed in the experience of attending Tufts University. Graduates will emerge with an understanding of nutrition policy and science, the skills needed to analyze and communicate nutrition-based research and the ability to solve nutrition and lifestyle-related challenges. This program is ideal for professionals seeking career advancement or continuing education, those working in community-based or international nutrition programs, people relatively new to the field of nutrition and those looking to further their understanding of nutrition so they can have a positive impact on their communities. (To find out more, go to nutrition.tufts.edu/academics/mnsp.)

We believe that the Friedman School approach to online learning provides an outstanding educational experience. It allows our graduates to take leadership roles in their chosen professions, and ultimately will make for a strong, global community of Friedman School alumni.

ROBIN KANAREK, PH.D.
INTERIM DEAN, FRIEDMAN SCHOOL OF
NUTRITION SCIENCE AND POLICY



Celebrate the Ban

In a victory for public health, trans fats have left New York City

A

BAN ON TRANS FATS HAS MADE RESTAURANT FOODS IN NEW YORK City that much healthier, and diners didn't need to lift a finger or put down a fork.

A recent study to evaluate the impact of the regulations, which took effect in 2007, found that when restaurants replaced the partially hydrogenated fats in their recipes with healthier oils and spreads, the trans fat content of foods decreased to almost zero while the saturated fat content increased just slightly. Restaurants didn't have to spend more, either. In an editorial published in the *Annals of Internal Medicine*, Gershoff Professor Alice

H. Lichtenstein, D.Sc., writes that consumers reaped the heart-healthy benefits of the change without having to summon their willpower or study up on nutrition.

"Having a default option takes some of the stress of making healthy choices from the consumer, and this strategy could succeed where other population-wide initiatives, such as dietary guidelines or recommendations, have fallen short," says Lichtenstein, director of the Cardiovascular Nutrition Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts.

Historically, attempts to modify food production for the public good have meant adding in nutrients, such as iodizing salt and adding vitamins A and D to milk. "We have entered a new era where the focus is on limiting rather than maximizing intake," Lichtenstein writes.

She credits much of the success of the regulation to its implementation: The city set up a hotline to answer technical questions from chefs; offered "trans fat 101" courses in English, Spanish and Chinese to educate those involved; and created a comprehensive website with guidance for preparing foods without trans fat.

The trans fat ban did what it set out to do, which is make the default option for restaurant foods a bit healthier. That doesn't mean that greasy French fries are now good for you. Taking in too many calories is still the country's major public health problem, and Lichtenstein warns that the trans fat-free label shouldn't give an undeserved "health halo" to calorie-dense foods. "Vigilance in this area is essential," she writes.

OVERHEARD

"A serving of tea is like adding a serving of fruits or vegetables to your diet."

— PROFESSOR JEFFREY BLUMBERG, PH.D., IN *THE WASHINGTON POST*, EXPLAINING THAT FLAVONOIDS, A GROUP OF POWERFUL ANTIOXIDANTS, ACCOUNT FOR ONE-THIRD THE WEIGHT OF A TEA LEAF



Fitness in a Bottle

Sports drinks such as Gatorade and Powerade are heavily promoted as beverages that are essential for replenishing carbohydrates and electrolytes lost during exercise. But are these drinks any better than water for the average weekend warrior?

Miriam Nelson, Ph.D, N85, N87, thinks not. Nelson, a professor at the Friedman School, told the “Radio Boston” program on WBUR-FM recently that “unless you’re in the Tour de France, the Boston Marathon or the Iron Man Triathlon, for the most part drink water, eat well, nourish yourself well and train appropriately.” When the host laughed at her unexpectedly direct and blunt statement, Nelson added good-naturedly, “Sorry it’s not more sparkly than that.”

The most elite endurance athletes, such as marathoners who exert themselves at high intensity for more than two hours, represent a special category, she says. They may benefit from the replenishment available in sports drinks. “But you have to realize we’re talking about less than 0.1 percent of the population,” she points out. For most, the drinks deliver little more than “an added sugar load” that doesn’t improve anyone’s health or performance in a time of widespread obesity.

BABIES OF OBESE MOTHERS AT RISK FOR IRON DEFICIENCY

A new study has found that obese women are more likely to have babies with lower levels of iron, a mineral that is crucial for nervous system development in the early stages of life.

The cause may be the low-grade, chronic inflammation that is associated with obesity. Inflammation, an abnormal immune response to extra fat in the body, raises levels of hepcidin, a hormone that helps balance iron levels. Obese people tend to make too much of it and also tend to have less iron in their blood. This study, conducted by researchers at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts and the Mother Infant Research Institute at Tufts Medical Center, found that high levels of hepcidin also appear to interfere with the transfer of iron from mother to fetus.

“When there is excess hepcidin in a cell, it binds to and inhibits the function of ferroportin, the protein that allows iron to pass through the cell membrane and into the bloodstream,” explains Professor Simin Nikbin Meydani, D.V.M., Ph.D., director of the HNRCA and its Nutritional Immunology Laboratory, who was senior author. Maria Carlota Dao, N10, a doctoral student in the lab, and Sarbattama Sen, M.D., an assistant professor at Tufts School of Medicine, were first authors of the study, published in the *Journal of Perinatology*.

The study looked at 30 pregnant women, half of them obese. The researchers checked iron and hepcidin levels of the mothers during their second trimester and measured the iron status of the newborns through their umbilical cord blood. As expected, the obese women had markers of inflammation and higher levels of hepcidin, while their newborns showed lower levels of iron than the babies of the normal-weight women.

Children born with iron deficiency are at a greater risk for delays in motor and cognitive development. But the authors stress that more research is needed before obese pregnant women consider changing their iron intake. The American Congress of Obstetricians and Gynecologists recommends pregnant women consume 27 milligrams of iron daily.





BUMP UP THE D

Vitamin D supplements of at least 800 international units (IU) daily can cut hip fracture risk by almost a third, but only if you remember to take them.

That's the finding of a study published in the *New England Journal of Medicine* that analyzed the results of 11 vitamin D trials involving a total of 31,022 adults 65 and older. When the researchers looked at how much vitamin D participants were asked to take, those assigned at least 800 IU daily had modest decreases in fractures. When they took into account how much vitamin D the participants actually consumed, the results were more striking: Those who took between 792 and 2,000 IU daily showed a 30-percent lower rate of hip fractures, and a 14-percent decrease in other, nonvertebrae fractures. They found no benefit to taking vitamin D supplements in doses below 800 IU per day.

Considering hip fracture treatment can cost more than \$25,000, "vitamin D supplementation is an efficient intervention for a devastating and costly injury that affects thousands of older adults each year," said senior author Bess Dawson-Hughes, M.D., M75, director of the Bone Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging.

The Institute of Medicine recommends 600 IU per day for adults 51 to 70 and 800 IU for adults over 70.

Yogurt May Keep Blood Pressure Low

People who eat yogurt a few times per week are less likely to develop high blood pressure than those who rarely eat it, according to Tufts research.

Huifen Wang, Ph.D., a researcher in the Nutritional Epidemiology Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging, and colleagues measured low-fat yogurt consumption and blood pressure in about 2,100 adults from the Framingham Heart Study Offspring Cohort and followed them for more than 14 years. Although none of the participants started out with high blood pressure, 913 of them developed it over the course of the study.

Those who ate the most yogurt (at least one six-ounce cup of low-fat yogurt every three days) had about a 31-percent lower risk of developing hypertension than people who ate yogurt less than once a month. Specifically, the high-intake group had a smaller rise in their systolic blood pressure (the top number).

Although the study is only observational, and doesn't show cause and effect, the researchers point out that yogurt is a good source of calcium, potassium and magnesium, which seem to play a role in regulating blood pressure and which most Americans need to eat more of anyway.

These preliminary results were presented at an American Heart Association conference. The study was funded by the Framingham Heart Study of the National Heart, Lung and Blood Institute of the National Institutes of Health; the U.S. Department of Agriculture; and a research grant from the Dannon Company Inc.





Persuading Moms to Breast-feed

ONE OF THE FEDERAL GOVERNMENT'S goals in tweaking the content of its food packages for the Women, Infants and Children (WIC) nutrition program was to encourage more new mothers to breast-feed. The changes, which took effect in 2009, produced mixed results, however.

For many years, WIC has provided low-income new mothers with monthly checks or vouchers to purchase healthy foods to supplement their diets and those of their infants. Mothers have also been offered

supplies of infant formula.

WIC staffers, in consultation with the moms, assign food allotments to mothers based on their nutritional needs and whether they are breastfeeding or intend to breast-feed. Under the old guidelines, food allotments for women who did not breast-feed had the highest market value, because they included a full supply of infant formula.

To make breastfeeding more attractive, WIC offered more food for moms who breast-feed fully and lowered the amount of infant formula given to women who

partially breast-feed. Vouchers for those monthly food allotments were offered for a year. WIC continued to offer a six-month allotment, with a full supply of infant formula and less food, to mothers who did not breast-feed.

An analysis published in the *American Journal of Clinical Nutrition* found that while the percentage of women taking advantage of the full breastfeeding allotment increased after the changes, the percentage given the full formula package also increased. Only the allotment for partially breastfeeding mothers had fewer takers.

Perhaps more important, the percent of new mothers who said they tried breastfeeding stayed the same, at about 65 percent.

"There had been some hope that breastfeeding initiation would increase after the policy change," said Parke E. Wilde, Ph.D., corresponding author and an associate professor at the Friedman School. "While this did not happen, the good news is there was no decrease in breastfeeding initiation, and more mothers did, at least, adopt the full breastfeeding package."

Wilde points out that some states and localities had better breastfeeding outcomes than others. Recent research out of California has found stronger increases in breastfeeding in agencies that vigorously reached out to WIC participants before they gave birth. It is during pregnancy, Wilde and his colleagues found, that three-quarters of the women decided how they wanted to feed their babies, suggesting that more outreach before delivery may be beneficial.

PILLS FOR THE WRONG POPPERS

People who take supplements containing minerals tend to eat more mineral-rich foods anyway, according to an analysis published in the *American Journal of Clinical Nutrition*.

Researchers including Johanna Dwyer, D.Sc., a scientist in the Nutritional Epidemiology Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts, a professor at Tufts School of Medicine and an adjunct professor at the Friedman School, looked at the self-reported diets and supplement use of 8,860 adults in the National Health and Nutrition Examination Survey. They found that men who took supplements were getting more magnesium, copper, potassium and selenium from their

food than men who didn't take supplements. Except for selenium, the same held true for women.

While those who took supplements were less likely to have low intakes of some minerals, a small number actually exceeded the limit of what is considered a safe. Among women 51 to 70, almost 16 percent were consuming calcium above the Tolerable Upper Intake Level (UL). Almost 20 percent of men 71 and older took in too much iron.

The results told the researchers two things: that the people taking supplements aren't necessarily those who need them the most and that while some nutrient supplements are helpful, some folks may be overdoing them.

**Big changes in global weather mean rethinking how we respond
to natural disasters—and we better think quickly**

CLIMATE AND CALAMITY



STORIES ABOUT SEVERE FLOODING in the Philippine capital of Manila were splashed across U.S. newspapers and other media last summer: people thigh-high in water, cars nearly submerged on city streets, water-borne disease a clear threat. It was yet another natural disaster with more people in crisis, and humanitarian groups were poised to act.

On the ground, though, Filipinos were ready. The floods come almost

every year. Armed with one of the highest densities of smartphone coverage in the world, metro Manila residents texted and tweeted continual updates about conditions at the street level; a Filipino-developed computer program collated the messages, tracked the rapidly changing conditions and alerted authorities about where help was needed most. The army, the Red Cross and the municipal authorities all had agreed-upon roles to play and got down to the business of cleaning up the mess.

BY TAYLOR MCNEIL ILLUSTRATION BY HOLLY LINDEM



WEATHER-RELATED CRISES—FLOODS, DROUGHTS, POWERFUL CYCLONES AND hurricanes—are likely to increase as global temperatures continue to rise, according to climate scientists' latest projections. But most governments and humanitarian organizations are not as well prepared as those in Manila. Even in Boston, in the wake of Hurricane Sandy in late October, some scientists say the city needs to do much more to gird itself for dangerous storms and rising sea levels.

If natural disasters become the new normal, being ready to adapt to those changing conditions, as the Filipinos have done, becomes more and more urgent, says Peter Walker, Ph.D., the Rosenberg Professor of Nutrition and Human Security and director of the Feinstein International Center, which is based at the Friedman School.

It won't be easy. Governments need to anticipate dangerous weather patterns and become more agile in responding when storms strike. Outside humanitarian organizations need to change the way they approach such crises—the standard tactic of parachuting in and taking charge just won't work.

Walker is the coauthor of the recent Feinstein Center report "Climate Change as a Driver of Humanitarian Crises and Response," commissioned by the Institute for Sustainable Development and International Relations in Paris, which outlines many of the challenges facing governments and NGOs and recommends more effective ways to respond. Drawing on the historical record of climate change, Walker says impending weather-related disasters will have widespread implications and therefore require more sophisticated responses.

"All the analyses show that in the future, we will have more frequent extreme weather events," says William Moomaw, Ph.D., professor of international environmental policy at the Fletcher School and a longtime member of the Intergovernmental Panel on Climate Change (IPCC). Generally, he says, "the wet places are getting wetter, and the dry places are getting drier." The IPCC, which shared the 2007 Nobel Peace Prize, noted in a report issued that year that warming of the climate system "is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level."

Climate change "is highly likely to generate the sorts of natural hazards that can prove disastrous to many communities," the Feinstein report warns, including more intense cyclones, major flooding, droughts,

food and water shortages and changes in the frequency and patterns of disease.

The effects of those fluctuating weather patterns are already being felt. The World Health Organization says that "global warming that has occurred since the 1970s caused over 140,000 excess deaths annually by the year 2004." Most of these were due to diarrheal diseases, malnutrition, malaria and dengue, which are "highly climate-sensitive and are expected to worsen as the climate changes." These impacts of climate change will hit poor people and poor countries disproportionately, according to a report from the Organization for Economic Cooperation and Development. The cyclone that hit Myanmar in 2008 and killed more than 140,000 people, and the 2010 floods in Pakistan, which put almost a third of the country underwater and left 20 million people displaced, point to increasing devastation. "A long time ago it was recognized that climate change will have property-damage effects in the developed countries, and life losses in the poor countries," says Moomaw.

GET USED TO IT

Climate change doesn't lead only to sudden, cataclysmic natural disasters. Rising temperatures, for example, mean that malaria will likely spread into now-temperate regions. The above-average summer temperatures in Russia last year, for example, led to many more fires than usual, damaging the wheat crop. Grain yields fell, and shortages hit the global grain market. The ensuing price increases led to political instability in a number of countries; many feared a repeat of the 2009 food riots that hit 61 countries.

In its 2007 report, the IPCC examined the potential effects of rising temperatures worldwide and found that for Africa, rain-fed agricultural yields could drop by up to 50

percent in just the next eight years. "Unless agriculture adapts very quickly in Africa, there will be widespread malnutrition," Walker says. That's even more likely given the increasing commodification of food, as speculators bid up prices worldwide.

Climate change, in other words, isn't just about hurricanes and other bad weather. The consequences are going to be more far-reaching than most people anticipate. The more governments and others are aware of that, Walker says, the wiser their responses will be.

Until recently, crisis was an abnormal state, and natural disasters were an exception. In the future, Walker says, calamities could become routine. That's a significant change, and one that goes against the grain of how governments and aid agencies think and work.

"Our field experience tells us that there's a difference between communities that are hit unexpectedly by one-off disasters and struggle, and communities that have grown used to a pattern of disasters," says Walker. "If you know that on average, every third year you're going to get whacked by a flood, you adapt." Such was the case in Manila.

But some communities face an escalating pattern of disasters, and no matter how hard they try, they can't keep up. The Horn of Africa, for instance, is now experiencing a recurring pattern of droughts and subsequent crop failures. Somalia and Ethiopia have seen ongoing humanitarian crises in the last several decades, with little letup in sight. "Those are the ones that worry you," says Walker, who worked for aid organizations in Africa for several decades before coming to Tufts in 2002. "And of course, climate change has the potential to push a number of countries in that direction."

The humanitarian aid system typically operates by having outsiders come in and fix immediate problems. However, that interventionist reaction to periodic crises is increasingly unrealistic. "I think the whole one-off response approach is wrong," says John Hammock, Ph.D., F68, F71, an associate professor of public policy at the Fletcher School and an adjunct professor at the Friedman School. "We have to respond—things happen, no doubt about it. But the best way to deal with them is to do it before they happen."

Hammock speaks from firsthand experience. He led Oxfam America, an international aid agency that provides development assistance to poorer countries, from 1984 to 1995. “I think that the best kind of humanitarian aid is to be prepared, to get people prepared for eventualities that are going to happen,” he says. The best way to bring about change, he adds, is a long-term commitment to help a country develop its resources.

He cites an example closer to home: the San Francisco Bay area. Californians realize that at some point, a major earthquake will happen, so communities hold regular meetings about what to do in case of emergency. “They know what their vulnerabilities are, and they are prepared to deal with them,” Hammock says.

One way to address the need for better planning is to have a steady presence on the ground, working with local governments and aid organizations. Hammock cites the case of Action Aid, which was involved in development work in Burundi before the genocide in 1993. During the war, agency workers fled the

Hammock. “We treat them as victims, and we treat them as helpless. We don’t have all the answers. People have to have their own answers. We need to build on those and not come in with our own preconceived solutions.”

AGILE ADAPTATION

Climate change isn’t the only aspect of the world that’s in flux, of course. It is one element in a mix of often unpredictable conditions. For starters, the world’s population keeps growing, and more people are living in cities than ever before. In China, for example, more people have moved from the countryside to cities in the past 30 years than at any time in history—often to coastal cities prone to storms and flooding. “The picture of famine and flood is almost always rural,” Walker says. “Humanitarian agencies have less understanding of how to work in urban areas.” And then there’s economic globalization, which affects the cost of food, with prices of basic commodities like rice and corn increasingly at the whim of market specula-

tion. government holds simulation exercises, going right down to the village level to practice for emergencies and expose the weak points in the response systems.

In Indonesia, the tsunami of 2004 hit and killed more than 130,000 people. Much of the response was international, but now disaster planning is handled by the national government. “It’s turned around,” Walker says. Change like that is impressive, but often it seems it’s more outlier than standard practice. “It’s like wrestling treacle,” Walker says. “How do you get at the things that need to change?”

The experience with the floods in Manila offers up a clue: Usually government at the local level is most responsive. While national governments in many poorer countries are often less than accountable to their citizens, local governments often respond more quickly, Walker says.

A new study published in November by researchers at the National Center for Atmospheric Research makes a dire prediction: Based on the latest data and modeling,



OUTSIDE HUMANITARIAN ORGANIZATIONS NEED TO CHANGE THE WAY THEY APPROACH NATURAL DISASTERS—THE STANDARD TACTIC OF PARACHUTING IN AND TAKING CHARGE JUST WON’T WORK.

country, but when they got back, they had a much better understanding of the local situation than other people coming in, having worked with Burundians of all backgrounds before the war.

“It’s a lot easier if you’re not flying in by night to help these people,” Hammock says. “Let’s be there to facilitate a development process of change.” Often, the best solutions are found among the people living with the crisis, not the outside experts. “It has to be the local system that is in charge and is running this,” with the aid agencies providing only support, Walker says. In theory, that’s the way it’s supposed to work—the United Nations is very clear that outsiders are guests—but the reality is different.

“We have to learn how to trust people, and listen to people who are poor,” says

tors. It all means “a much less predictable future,” Walker says.

Because of that, governments have to be quicker to adapt—which is no easy task. Most are built on the assumption of slow, steady, incremental change, which is just the opposite of what they may soon be facing. “Agile adaptation is what’s going to get you through this,” Walker says. The question, he says, is “how you get these elephants to dance?”

Adaptation is possible, though. Consider Mozambique, in southeastern Africa. “Ten years ago it was a wreck, with massive floods, and most of the response was international,” Walker says. Today the Mozambique authorities do a yearly contingency plan for what-ifs. It is done in collaboration with international agencies, but led by Mozambique. The

they suspect temperatures could increase by 8 degrees Fahrenheit by the century’s end, the high end of previous projections. If so, sea levels would rise dramatically, coastlines would be swamped, and weather patterns would be even more extreme. John Holdren, the senior science adviser to President Obama, has said that we have three choices in dealing with climate change: mitigation, adaptation and suffering. Unless governments learn the hard lessons like those in Manila, there will indeed be more suffering.

As the Feinstein report notes, “Business as usual cannot be expected to work in such unusual times.” **TN**

Taylor McNeil, the senior news editor in Tufts’ Office of Publications, can be reached at taylor.mcneil@tufts.edu.

THE ANTI-

Fat

INSIDE TUFTS MEDICAL CENTER IN DOWNTOWN BOSTON, ANDREW GREENBERG, M.D., leads me through a long hallway covered in research posters. About halfway down, he stops and points to a photo of fat samples collected from mice in his lab. The first sample looks more or less the way you'd expect—a lump of the yellow-white tissue similar to the kind that plumps our bellies and thighs, and wraps itself around our internal organs. The other sample looks very different. It's a creamy coffee color. This, Greenberg proclaims, is what's called "brown fat." Ironically, it is this obscure type of fat that may become a powerful tool in the fight against obesity, thanks to a unique characteristic: Instead of storing calories from food, it burns them up.

Greenberg is director of the Obesity and Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging, where he studies brown fat formation and metabolism. He says that the cell's ability to burn calories is due in part to its structure. Under the microscope, white fat cells look like bundles of swollen grapes filled with molecules of fatty acids. Brown fat cells, on the other hand, are much more compact, and hold only a small number of those molecules. The cells are also chock-full of mitochondria, tiny structures that act as engines for the cell, taking in fuel and creating energy.

**A LESSER-KNOWN
ADIPOSE TISSUE THAT
BURNS CALORIES INTRIGUES
OBESITY RESEARCHERS**

BY DAVID LEVIN ILLUSTRATION BY BETSY HAYES





Unlike white fat, however, brown fat cells can throw those engines into neutral. Thanks to a protein called UCP-1, they can switch off their energy production and use fatty acids to generate heat instead. “That’s one of the major reasons brown fat exists,” says Greenberg, who is also an associate professor at the Friedman School. “It’s engineered to release heat and keep us warm.”

Because of this special quality, brown fat is common in babies and hibernating animals, which need to maintain body heat to survive long, bitter winters. But the tissue’s warming properties also make it attractive to drug companies and obesity researchers.

Like a furnace in a cold Boston winter, brown fat burns through a tremendous amount of fuel to create warmth. As it works its way through its own small store of fatty acids, it also starts taking fat out of the bloodstream—fat that’s released by bloated white fat cells elsewhere in the body.

“What may be happening is that brown fat is burning what it’s got, but it’s also funneling white fat from other parts of the body to be burned up,” says Aaron Cypess, M.D., Ph.D., a researcher and staff physician at the Joslin Diabetes Center in Boston.

If researchers can find a drug that activates brown fat, Cypess says, it might be an effective treatment for obesity. “You’ve got a [substance] that’s basically designed to burn off calories,” he says. “The question is, can we use it to burn off enough calories to have clinical significance?”

A BROWN RENAISSANCE

Scientists have tried to answer that question many times. During the 1970s and early ’80s, labs around the country—including many at major drug companies—began testing compounds that seemed to activate brown fat in lab animals.

“It turned out that these compounds, known as beta-3 agonists, worked on mice, but on humans, they didn’t work so well, because there were some different [biological] characteristics,” says Greenberg, the Atkins Professor in Metabolism and Nutrition.

One major difference, he notes, is that adult humans have significantly less brown fat than babies or lab rats. As we age, we slowly lose our stores of the tissue, which form mainly along the spine and upper back at birth.

Robin Kanarek, Ph.D., the interim dean of the Friedman School and John Wade Professor in the School of Arts and Sciences, was one of many researchers who studied the effects of brown fat in the early 1980s. She says that interest in the tissue began to wane by the end of that decade, because many researchers assumed that there wasn’t enough active brown fat left in adults for it to have a meaningful effect. “At the time, we just didn’t have the techniques and technology to effectively monitor and identify brown fat in the body,” she says. “A lot of the science has changed because of the tools we have today.”

New imaging technologies such as PET-CT scans, which measure the activity of cells in the body, have led to a renaissance in brown fat research, Kanarek says. Normally, these scans are used to find cancerous tumors, but they can also consistently spot small deposits of brown fat in adults that are revving away, converting glucose and fatty acids into heat. In 2009, three independent teams of researchers (among them a group led by Cypess) used PET-CT scans to identify tiny stores of the tissue in adult humans.

These discoveries rekindled the hope that brown fat could be used to control obesity. But despite the newfound excitement about its existence in adults, Cypess says he and other researchers still faced one lingering issue: “Adults only have, at most, 100 to 300 grams of brown fat in the body. Due to the small amount, it’s not clear if it’s going to have that much effect based on its energy expenditure alone,” he says.

When the brown fat stores we’re born with begin to shrink, there’s no way to bring them back, but Cypess says there may be a sort of biological loophole. Some white fat cells can take on the properties of brown fat—they shrink in size, produce more mitochondria, and most important, generate heat.

“If you can make white fat—which we have much more of in the body—act like brown fat, now you’re getting into something that could have a major effect on energy balance in the body,” says Cypess. “You’re taking a tissue that was not doing much and making it far more active. And that’s a very exciting possibility.”

By creating more of these brown-fatlike cells in the body, he says, it may be possible to use them to burn off extra fatty acids in the blood. That extra boost could help treat

obesity and, by extension, such obesity-related disorders as hypertension, cardiovascular disease and Type 2 diabetes.

TURNING ON THE FURNACE

Figuring out exactly *how* to trigger the formation of brown-fatlike cells has been an ongoing challenge for scientists. Bruce Spiegelman, Ph.D., a professor at Harvard Medical School, thinks he may have found an answer. In 2011, his lab discovered a hormone called irisin, which is released by muscles during exercise. He says it may be the key to the formation of brown-fatlike cells in the body.

“[By injecting irisin] in mice, we’ve shown a two- or three-fold elevation in brownlike fat, which improved the metabolic status of those animals,” Spiegelman says. “Would that be enough to cause weight loss in obese humans? We’re not sure. But in mice it looks promising.”

Spiegelman has formed a small biotech firm dedicated to bringing irisin to clinical trials, but he’s a long way from testing the hormone in humans. First, he’ll have to find a stable version of the protein that will work in the human body and then address any concerns about its safety.

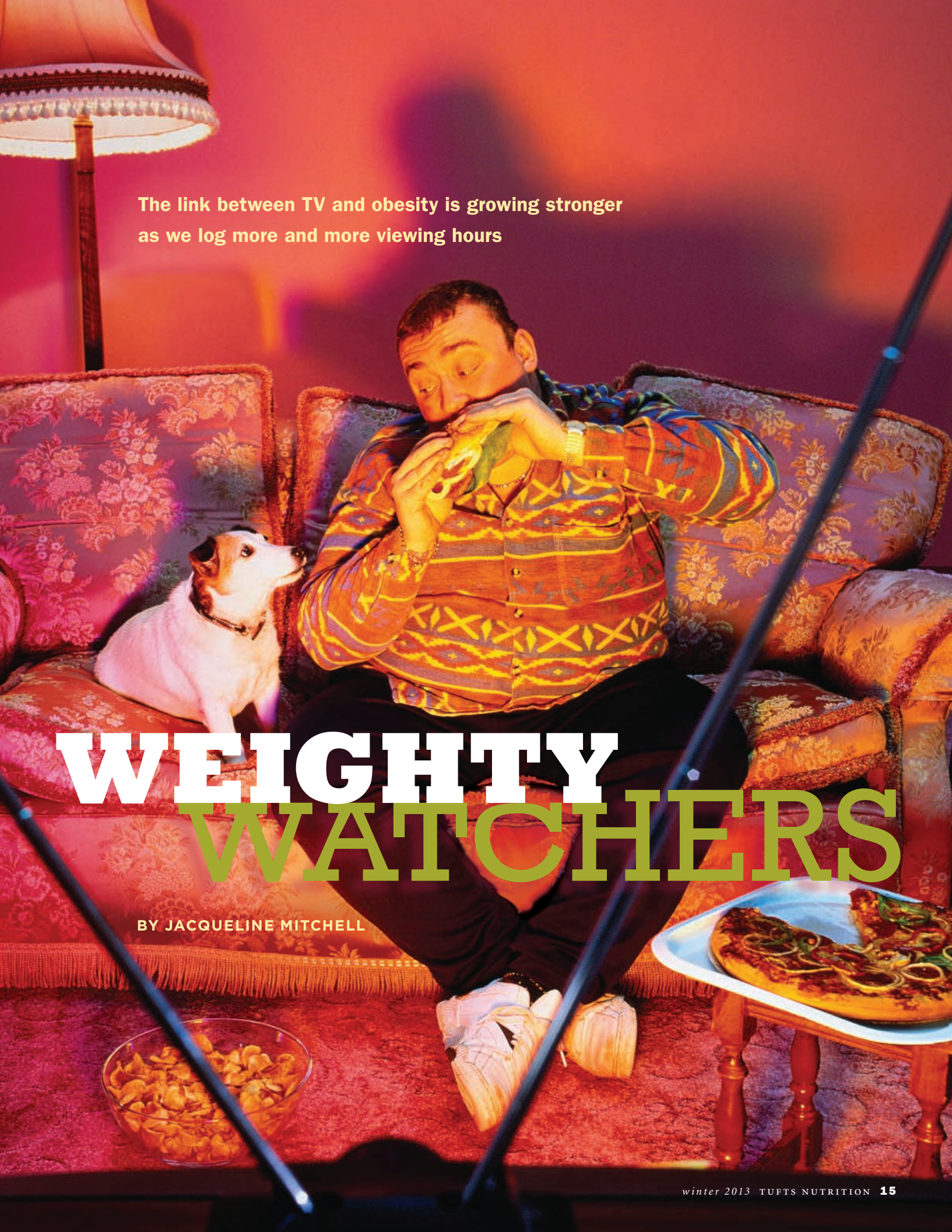
When it comes to brown fat research, says Cypess, “there are some billion-dollar questions sitting on us right now. One, can brown fat really have a clinical effect on obesity, and two, is it safe if you turn it on?”

Greenberg agrees with that assessment. “The field is really nascent,” he says. “We have to be careful to work in a safe manner. You don’t want the therapy to be worse than the disease.”

At the moment, says Greenberg, researchers still aren’t sure how much brown fat humans might need in their bodies to see a positive effect, or if there’s a downside to having too much brown fat.

So until a treatment based on brown fat is tested clinically, Greenberg thinks we shouldn’t ignore age-old strategies in the war against our expanding girth. Nutrition researchers “still believe in a healthy diet and exercise,” he says. “They’ve been shown to be very effective against a lot of the complications from obesity.” **TN**

David Levin is an independent science journalist in Boston.

A man with a large belly is sitting on a patterned couch, eating a burger. A small dog is sitting next to him, looking up at him. A bowl of snacks is on the floor, and a pizza is on a tray on a table next to him. The background is a warm, orange-red color.

The link between TV and obesity is growing stronger
as we log more and more viewing hours

WEIGHTY WATCHERS

BY JACQUELINE MITCHELL



AMERICANS SPEND

an average of more than 150 hours a month in front of the television—that's six days—and never mind other sedentary hours we spend with computers or mobile devices. As our screen time has exploded, so has the national waistline. Two-thirds of adults are overweight, and childhood obesity has more than doubled in the last 20 years.

One reason obesity may be on the rise is that people who watch a lot of television may eat more, particularly pizza, soda and other fast foods, according to a recent Tufts study that evaluated 30 years of research linking TV viewing with weight gain. The paper, written by four students and their adviser, Robin Kanarek, Ph.D., interim dean of the Friedman School, was published online in the June 4 edition of *Physiology and Behavior*.

The link between watching TV and unhealthy eating is not surprising. Consider one fact: The food industry spends \$1 billion annually on advertising that targets children and teenagers, according to the Tufts analysis. The authors point to a 2010 study conducted by public health researchers at Armstrong Atlantic State University in Savannah, Ga. It calculated that if children chowed down on the foods promoted by the advertising aimed at them, they would be consuming 25 times the sugar and 20 times the fat—but less than half the fruits and vegetables—current dietary guidelines recommend.

The research by Kanarek and the students—Rebecca Boulos, N13; Emily Vikre, N08, N13; Sophie Oppenheimer, N11, MPH11; and Hannah Chang, A10—also indicated that television can shape societal views about overweight and obese people. They found evidence that excess weight is heavily stigmatized on television, often used as shorthand to indicate a character is evil, unattractive,

incompetent, not to be taken seriously or simply greedy. At the same time, fat people are underrepresented. Only 14 percent of female characters on TV are overweight, compared with more than a third of American women.

Kanarek, a psychologist who studies nutrition and behavior, and Boulos, a USDA doctoral fellow in obesity at the John Hancock Research Center on Physical Activity, Nutrition and Obesity Prevention at the Friedman School, talked with us about how our TV habits might be affecting our health.

How does TV make us fat? Couldn't the same be said for any sedentary activity, such as reading or sitting at work all day?

Rebecca Boulos: The perception is that if you're watching TV, you're not exercising, and it really isn't that simple. TV plays a role not just in energy expenditure, but also in energy intake. Many people eat particularly high-calorie foods while they're watching TV. They are also more prone to eating the foods they see advertised on TV, and those are energy-dense ones. So it's not just that they're watching an hour of TV instead of taking an hourlong walk or bike ride. Ultimately, that choice to watch TV is a triple whammy: You're moving less, you're eating more and your perceptions of what is normal are being altered.

Robin Kanarek: We were interested in things like product placement and how often people on TV are seen eating. It's not in the paper we just published, but I did a very rough calculation by watching a few situation comedies, *The Middle*, *Friends* and *How I Met Your Mother*. The characters on *Friends* spend a large amount of time either in the coffee shop or in an apartment, and they are frequently eating. On *How I Met Your Mother*, they're in a bar, and they're often eating hamburgers, cheeseburgers and French fries. In one episode of *The Middle*, I counted 18 occasions when characters were eating, with the food of choice being pizza, popcorn or sweetened cereal. I don't like to say those foods are unhealthy, but the characters were never eating anything most people would call healthy food.

What about reality shows? Do they portray weight issues more realistically than children's shows and situation comedies?

Kanarek: A paper that came out after ours looked at the effects of the weight-loss shows, like *The Biggest Loser*. Weight-loss shows seem like such a great idea, but it's not realistic for most individuals to have a personal trainer come regularly to their homes, or to live on a

**“That choice to watch TV is a triple whammy:
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—REBECCA BOULOS, N13

weight-loss farm for several months. I think it’s interesting because very few people have looked at whether weight-loss programs ultimately increase or decrease peoples’ desire to diet. What happens, for instance, if an individual goes on a diet but doesn’t experience the same kind of miraculous weight loss as shown on television?

Boulos: The news media can also influence society’s understanding of the obesity epidemic. It typically oversimplifies the complexity of the situation by emphasizing the role of the individual, rather than environmental and social causes. This can lead people to blame individuals rather than look at more systemic problems and social patterns, such as our cultural approach to time management, the role of advertising and marketing and the kinds of food we serve in schools.

One thing we hadn’t thought much about until we started working on this was the role of cooking shows and how they influence viewers’ perceptions of food preparation. There’s a term we came across called “food porn.” Effectively, people watch others prepare food and imagine eating it, but don’t actually intend to prepare or eat the foods themselves. This can set unrealistic expectations about what it means to cook at home, which can deter people from preparing a meal instead of ordering takeout. This idea has been covered more in popular media, but has been less explored in more rigorous, large-scale research studies.

It doesn’t seem like most people are willing to curb their TV watching. How can we break the link between viewing habits and obesity?

Kanarek: We have to be realistic. We are never going to go back to the ’50s, when the mother was at home all day, and kids came home from school and played outside. People just have to be educated. I don’t think people realize how much TV they watch. In some households, the TV is on almost all the time, and many children start watching TV when they’re less than a year old. People don’t even have to be in the home anymore. With iPads, people can watch TV or a movie anywhere they want.



Speaking of iPads, has there been any research on how viewing content on mobile devices may affect obesity?

Boulos: I really think it can go both directions. People might be watching TV or movies on their tablets instead of playing or exercising. But mobile devices can also serve as motivation. People can upload runs and bike rides with other users on sites such as *mapmyrun.com* and *mapmyride.com*. They can share their activities on Facebook and get social support that way, too. They can also download apps for their smartphones that let them enter which foods they’ve eaten and which physical activities they’ve done. There is a little research that supports text messages as a way to encourage weight loss. So there is variability in the ways in which people use their mobile devices, and potential for both positive and negative influences on obesity. This is another area in which we could use more research. **TN**

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Partners for a Healthier Community, a nonprofit in Springfield, Mass., brought 10 of the city's preschools and day cares together to form a co-op that buys produce from a local farm.





As an outgrowth of the farm-to-preschool program, a bus brings fresh fruits and vegetables to several child-care centers once a week, so parents can pick up something healthy for dinner.



little locavores

From day-care lunch tables to K-12 cafeterias, farm-to-school programs are taking root

BY JULIE FLAHERTY PHOTOGRAPHS BY STEVEN VOTE

a FEW YEARS AGO, THE SQUARE ONE CHILD-care centers in Springfield, Mass., made some adjustments to their menus. The changes brought arguments from the kids, although not the kind you might expect. Food Service Director Sara Teece recalls some of the 3-, 4- and 5-year-olds insisted that the pears they were gobbling up were *not* pears. They had eaten pears, they said—pale, squishy chunks swimming in juice—not these things that looked like they may have come off a tree.

“They had never seen a fresh pear before,” Teece says.

Today, the kids have plenty of fresh encounters, with pears, apples, strawberries and other produce, thanks to Jessica Collins, N01, and Frank Martinez

Nocito, N03, who brought 10 of the city’s preschools and day cares together to form a co-op that buys produce from a local farm in Hadley, Mass. Now the kitchens serve up steamed green beans that have never met a freezer, homemade soups with diced fresh vegetables and locally grown sweet potatoes sprinkled with cinnamon and a little sugar.

For Collins, director of special initiatives for the nonprofit Partners for a Healthier Community, buying fruits and vegetables from local farmers is about equity for the children. Springfield is not a wealthy community. Some of the kids who go to preschool here are homeless. Some of their parents are in prison. On Monday morning, many come to school hungry.

"These are beautiful, smart kids, and many of them have complicated lives due to poverty," Collins says. "We're saying these kids deserve what everyone else has," including access to fresh, healthy food.

Farm-to-school programs like this one are taking root everywhere, from urban preschools to rural high schools. Over the last 15 years, schools across the country have gone from timidly buying a few local apples in the fall to arranging standing orders worth tens of thousands of dollars with farmers nearby. Support at the state, local and federal level has spurred school districts to develop new supply chains, with an emphasis on fresh instead of canned and local instead of shipped. Sometimes that means breaking with the way things have been done for decades.

Why all the fuss about local? The theory behind farm-to-school programs is that children who are served fresher, more appealing produce—fruits and vegetables that actually look good enough to eat—will grow up to be healthy eaters, perhaps putting a dent in the obesity epidemic. At the same time, schools that buy local can become a steady source of income for small- and medium-scale farmers, who often struggle to make a profit in an industry dominated by huge farms. Some, like Collins, see it as a tool for social and health equity.

SALAD-BAR BEGINNINGS

The first attempt to team up farms with schools may have been in 1996, when a father in the Santa Monica-Malibu Unified School District of California got together with the schools' food service director to create a salad bar that featured local produce. Not surprisingly, California, with its long growing season, became the first state to embrace farm-to-school initiatives. Programs in other states emerged, many with support from foundations and the U.S. Department of Agriculture.

The movement got a boost in 2010, when the federal Healthy, Hunger-Free Kids Act allocated \$40 million over eight years to bolster school districts' farm-to-school efforts. By the end of 2011, 33 states had policies supporting farm-to-school initiatives, and 10 states had hired staffers to work on farm-to-school issues.

That's not to say that bringing locally grown foods into schools hasn't been a rocky row to hoe. Food service directors have had many concerns: cost, quality, reliable supply, food safety, seasonality and the hassle of working within federal and state procurement regulations. Many school districts weren't set up to pay individual farmers for small orders of produce.

That's where Colleen Matts, N06, comes in. Matts, the farm-to-institution specialist with the Michigan State University (MSU) Center for Regional Food Systems since 2007, is a matchmaker, introducing farmers to buyers and smoothing the way to long-lasting business relationships. But it takes patience. When food service directors in rural Manistee County, Michigan, started looking into local produce back in 2008, only one farmer responded to their request for bids. "It was hard to pull them out of being discouraged about that," Matts says. She tried to cajole some of the farmers herself; she recalls one strawberry grower who said he was just too old for new endeavors such as working with a school.

"They often stick to what they know," Matts says. "They worry about getting involved with schools because they assume there is a lot of paperwork that goes along with it." Michigan has tried its best, by keeping the request for bids down to a relatively unthreatening three pages. And they've been helped by legislation. The Healthy, Hunger-Free Kids Act allows schools to give local providers preference when they bid for school food contracts, and a change to Michigan law now allows schools to buy up to \$100,000 of local produce without going through a formal bidding process.

Today, some schools in Manistee County buy local apples, asparagus, blueberries, corn, cherries, green beans, lettuce, pears, plums, potatoes, summer squash, winter squash, tomatoes, watermelon and strawberries. (Even the strawberry farmer eventually decided working with schools was too good an opportunity to pass up.)

MSU surveys found that between 2004 and 2009, the number of Michigan food service directors who were buying local produce had more than tripled, from 11 percent to 41 percent. And with that, the conversation around farm to school has matured,

Matts says. Five years ago, schools may have been looking to buy whole produce such as apples and pears—the low-hanging fruit, so to speak. Now they are seeking foods that have been lightly processed, such as peeled and sliced squash or ready-to-eat baby carrots. That is pushing farmers and food producers to rethink the way they process and package their products. When the Grand Rapids Public Schools contacted a local dairy and asked about supplying milk directly to the schools, the dairy went so far as to put in new equipment so it could bottle half-pint containers for the cafeterias.

Other foods, such as meat, remain a challenge. "We don't have enough USDA meat-processing facilities to easily process and move meat locally," Matts explains.

Still, farmers have had such success selling to schools that they are starting to look at other institutions. Matts knows of one Michigan farmer who changed his crops to meet the needs of a correctional facility: He grew small potatoes with thin skins that could be mashed without peeling (prison kitchen equipment is highly restricted), and cultivated ears of corn that were just the right size for splitting into two servings. Matts expects to be doing more work with hospitals, as well as colleges and universities.

WORKING RELATIONSHIPS

Farm-to-school programs in and of themselves may not drastically change the way we eat, but Michelle Markesteyn Ratcliffe, Ph.D., N08, farm-to-school program manager for the Oregon Department of Agriculture, already sees the movement leading to bigger things. Oregon, she points out, is working to step down the sodium its metropolitan-area bakers use, a trend that began when the Portland Public Schools decreased the salt in the bread products they served. "We're literally changing how food is being produced, kids are educated and communities work together," Ratcliffe says.

Perhaps more important, because farm-to-school it is one of the rare food issues that people seem to agree on ("Who can argue with feeding kids healthy, local foods?" she asks), it has helped communities and nutrition advocates forge relationships with food producers, packagers and distributors. Those connections could be important



name, says she can plot a school district's enthusiasm on the normal bell-shaped curve. "There are early adopters, people doing this regardless of any type of challenge." For example, the Portland, Ore., schools, a highly motivated group with extensive community engagement, were making 32 percent of their food purchases locally, even before they had any federal or state support.

"Then I have some schools that will just never do it" of their own volition, she says. But even that small percentage will go along "accidentally" as the system around them changes.

For those schools that do commit to farm

on the Shape Up Somerville project and is a consultant to the Children in Balance Initiative, two Friedman School-led programs that take a multipronged approach to preventing childhood obesity, knows that serving good food in school cafeterias is only part of the solution.

"It's got to go along with parent education, professional development for staff and providing equipment and infrastructure," she says.

When Collins surveyed the Springfield parents about what would help them serve more fruits and vegetables at home, they said they couldn't commit to farm shares,

Over the last 15 years, schools across the country have gone from timidly buying a few local apples in the fall to arranging standing orders worth tens of thousands of dollars with farmers nearby.

down the road, when we need to figure out how to feed a world population of 9 billion, which we are set to reach in 2050. "It's one of those systemic levers," Ratcliffe says. "If we can have solid, working, trusting relationships up and down the supply chain, then we've succeeded."

There's still a lot to do, however. Bringing locally produced and processed food into cafeterias is one thing; it's another to change how kids think about food.

"Many kids have about eight minutes to eat lunch," Ratcliffe points out. "The fact that the cafeteria is not considered a learning environment is problematic, because we *are* teaching them something." Creating kids who are literate in agriculture, food and the environment—by planting school gardens or making nutrition part of the curriculum—should be a goal for every school, she says, and something she expects will be taken up for the next iteration of the Elementary and Secondary Education Act, first passed in 1965 as part of the War on Poverty. She also says there should be more research into best practices and the impact that farm to school is having on fruit and vegetable consumption.

Ratcliffe, who has been part of the farm-to-school movement since before it had a

to school, Ratcliffe says it typically takes three years to work out the kinks and establish a reliable, local supply chain.

It took about that long for the Springfield, Mass., program to find its stride. Buying local has saved the 10 child-care centers, which feed more than 2,000 children, about 32 percent in produce costs, while generating about \$30,000 in sales for local farms and the local distributor they use.

The transition hasn't been effortless, however. When Collins visits the pantry of one child-care center she works with, she is disappointed to see industrial-sized cans of fruit cocktail on the shelves. She explains that if the distributor forgets to send the schools the sheet with that week's local produce offerings, a food service worker is likely to order the canned and frozen produce. It doesn't take much to slip back into old ways.

"You think they are in," she says, "but one thing changes, and they are back to the vendor relationship that they had for 20 years prior."

Yet Collins is undaunted. "We know that these kids are eating [the fresh produce] and that they will go home and tell their parents about it. So we're committed to figuring it out."

Collins, who served as a project manager

and farmer's markets were too hard to get to. So she arranged with a local farm to create a mobile farmer's market. A bus brings fresh fruits and vegetables to the child-care centers once a week, usually toward the end of the day, so parents can pick up their children and something for dinner at the same time. She is also leading an effort to bring a full-line grocery store into the neighborhood of the King Street Square One child-care center, which lacks one.

Farm-to-preschool programs aren't necessarily that attractive to farmers, because little kids have little bellies, and the produce orders aren't as large as they would be for a high school. "Yet we know we have to start in preschool," Collins says. "When you try to change things through the K-12 system, a lot of what you get is the kids won't eat it."

Preschool, she says, is the right age for kids to discover they like zucchini. When these kids get to kindergarten, she wants them "banging on the cafeteria table," demanding fresh fruits and vegetables. "They are an adorable, tricky population," she says, "but once you've got them, you've got them." **TN**

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WORK IT OFF

What's the right formula for a successful weight-loss program on the job?

BY DEBORAH HALBER ILLUSTRATION BY JULIETTE BORDA

MICHAEL WAS ATHLETIC AS A KID. AS AN ADULT, HE BIKED, skied and hiked. “I was very skinny all my life until I got married,” he says. “And then I just...exploded,” packing an extra 60 pounds onto his 5-foot-9-inch frame. He tried cutting out soft drinks, drinking a lot of water, eating more fruits and vegetables. But, he says, “whatever I did didn’t make much difference.” So when he spotted a notice at his company seeking subjects for a Tufts research study on weight loss, the 55-year-old software project leader was intrigued.

In the months before the notice appeared, Susan B. Roberts, Ph.D., director of the Energy Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts, had been wrestling with a puzzle: Why had attempts to help people lose weight in the workplace failed so miserably?

The solution, if she could find it, potentially would have high stakes: The Centers for Disease Control and Prevention had labeled more than a third of U.S. adults obese and predicted 42 percent would be obese by 2030, contributing to premature death, disease and skyrocketing health-care costs.

In 2008, the *American Journal of Health Promotion* published a review of worksite-based weight-loss program studies. It identified more than 1,000 conducted between 1995 and 2006, advocating everything from substituting meal-replacement beverages for two meals a day to setting personalized goals to maintaining activity

logs. Focusing on 11 of the most relevant studies, authors Michael Benedict and David Arterburn concluded that while worksite-based weight-loss programs had resulted in “modest, short improvements,” long-term results were inconclusive. Worse, some programs failed to help workers achieve the 5- to 10-percent reduction in body mass needed to improve their health—even to prevent them from gaining weight. The review did find that interventions that included face-to-face contact more than once a month appeared to be more successful.

With this in mind, Roberts arranged for four Boston-area companies—including Michael’s firm, which happens to aggregate health and lifestyle data for the insurance industry—to invite employees to join a new science-based weight-loss program. Michael and more than 30 of his coworkers signed on to spend six months reinventing their relationships with food, with the help of Roberts and a research team from her laboratory.

THE OFFICE MINEFIELD

For the health-conscious eater, a day at the average workplace can serve up a minefield of temptations: candy on the receptionist’s desk, doughnuts and home-made brownies in the communal lunchroom, pizza and chips or restaurant meals served at lunch meetings.

Yet workplaces should be, “in theory, amazing places to transform Americans’ health,” Roberts says. Most employed adults spend half their waking

hours at work. As public health specialists wrote in the *American Journal of Health Promotion*, “worksites provide rich opportunities for educational, behavioral, environmental and economic strategies to improve nutrition and physical activity behaviors.” In addition, employee social networks—the proverbial gathering around the water cooler—could make for a built-in coworker support system. “If you can create a culture of health at the worksite,” Roberts says, you’ve reached a captive audience with a targeted message. Yet apparently, no one had hit upon an intervention that leveraged all these things.

Growing up in England, “I was the fattest kid in my school,” says Roberts, who once worked as a French bistro chef and gained 55 pounds in her 30s after a difficult pregnancy. “I’ve seen it and been there.” Now slender, Roberts has managed to keep the weight off for almost two decades without, she says, giving up the “wonderful pleasures of food, comfort food and all the rest.”

Roberts has more than an inspiring story to offer. In creating her workplace pilot program, she drew heavily on the tenets of her 2008 book *The Instinct Diet* (later rereleased as *The “I” Diet*). The book was the culmination of her 17 years of research into dieting, cravings, metabolism and the brain’s role in food preferences. The psychological component of our daily food choices played a large part in the pilot study that Roberts, Assistant Professor Sai Krupa Das, Ph.D., N02, Taylor Salinardi, Ph.D., N12, and graduate student Payal Batra conducted at four Boston-area companies between October 2010 and October 2011. Roberts’ research team avoided the death-by-PowerPoint approach of some workplace interventions and instead led intensive, weekly group sessions in which participants shared their frustrations, challenges, emotional struggles and successes with food.

At Michael’s company, 20 percent of the workforce filed into the conference room for the first session, reinforcing Roberts’ suspicion that people are not as apathetic about their waistlines as the growing obesity statistics indicate. “Fifty percent of Americans try to lose weight every year,” says Roberts, a professor at the Friedman School and an adjunct professor of psychiatry at Tufts School of Medicine. “People care a huge amount, but they can’t do it.”

BOSSING AROUND CRAVINGS

Roberts’ approach recognizes that for much of human evolution, famine, not feast, was the norm. Our ancestors never anticipated the triple-bacon cheeseburger or deep-fried Twinkies, but Roberts maintains there are ways to avoid the intrinsic allure of calorie-dense foods. Staying full with high-fiber, low-calorie items, such as legumes, the right kind of cereals and veggies, is key, she says, because nobody can ignore the Twinkies when they’re hungry. The team provided the study participants with recipes, menus and easy-to-follow strategies to stay full during life on the run. There were also practical strategies—having lunch before a noon meeting at which pizza will be served, for instance, and taking an alternate route to the mailroom to avoid that candy bowl.

Roberts relies on the techniques herself. Within easy reach of her desk in her office on the 13th floor of the HNRCA in Boston are an apple, a small container of milk and a liter bottle of water.

From behind a cabinet, she produces a box of high-fiber cereal. “We always have some fiber handy,” Batra says, laughing.

In all, 133 people at the four companies participated in two consecutive six-month studies. “People who were participating were seeing results, and that affected others,” says Kevin, a vice president of human resources. “Word was spreading like wildfire. People were changing their grocery-shopping habits, their restaurant-eating habits. It was changing the way people were viewing food.” Reports started trickling in about improved blood glucose levels and lower blood pressure.

“People were seeing a direct impact,” Kevin says. “We were getting healthier.” Leslie, a corporate communications and wellness coordinator, said she lost 30 pounds and is now at her lowest weight since college. She no longer takes blood pressure and cholesterol medication; she’s no longer at risk for diabetes. Michael lost 40 pounds in part by ditching a regular Friday pizza night for homemade soups. Kevin, who is 6-foot-2, went from 250 to 210 pounds. He stopped buying fast-food muffins on his way to work, eats yogurt and fiber cereal for breakfast and brings his own lunch instead of eating out or in the company cafeteria. He keeps more fruits and vegetables, and less ice cream, in his refrigerator at home.

Most of the participants had signed on “not as the first step, but the tenth,” Roberts says. “Everyone who came to us had already dieted multiple ways: They’d tried something in a magazine, had a sister who knew something that worked, bought supplements at the drugstore.

“Anybody who is clinically obese has been on at least 10 to 15 diets and has a reservoir of failure behind them,” she says. “They don’t really believe they can do it. A good program has to deal with all of the issues” people bring to the table. It’s key, Roberts says, to “instill a sense of hope. I absolutely believe it is possible for anyone” to lose weight.

Some dieters learned that in addition to their waistlines, their brains changed. Using brain scans, the researchers found that participants’ brains responded differently to images of high-calorie and low-calorie foods before and after the program—“evidence that dietary and behavioral intervention for weight loss can lead to changes in activation in regions of the brain associated with food reward,” says Salinardi, whose doctoral dissertation examined the effectiveness of this workplace diet and its influence on the brain.

When the pilot study ended last year, some participants wept. “They weren’t ready for us to leave,” Robert says. “When I see a future, it’s not [dietitians] zipping in for six months and saying goodbye. I see this as a permanent feature of the workplace: If someone gains five pounds, they go back in and catch it quickly. Many people can be very successful, and some of those just need the accountability and support of a long-term program.”

Roberts and Das are now seeking funding to expand the study to 16 worksites and include a variety of workplaces in the mix. Among their questions going forward: Could these programs one day pay for themselves with savings in a company’s annual health-care expenses? Considering that obesity is estimated to cost U.S. companies \$13 billion per year, Roberts believes the answer is yes. **TN**



Programmed for Weight Gain

Infants born to overweight or underweight mothers are at higher risk for obesity later in life by **Jacqueline Mitchell**

IN THE WINTER OF 1944-45, TOWARD THE END OF WORLD WAR II, a German blockade of food and fuel plunged Nazi-occupied Holland into famine. For eight months, over what came to be known as the Hunger Winter, 4.5 million Dutch citizens subsisted on meager diets, as little as 600 calories a day, or less than a third of the average requirements for adults. More than 20,000 starved to death.

Nineteen years later, 300,000 boys born to women during the Hunger Winter entered the Dutch Army, providing startling data that linked the recruits' exposure to the famine while in their mothers' wombs with their tendency to be overweight as adults. The recruits whose mothers endured the famine during the first two trimesters of pregnancy were far more likely to become obese later in life than their peers whose mothers had enough to eat.

The Hunger Winter provided some of the earliest evidence for the now well-accepted Barker Hypothesis, the theory that the maternal environment has profound long-term consequences for infants. In industrialized nations,

such as the United States, too many calories—not too few—pose the greater health risk. Two-thirds of American women are overweight or obese. Scientists are just starting to investigate how the historically unprecedented numbers of overweight mothers may be affecting their children's chances of growing up to be obese adults. Just as too little food during fetal development is linked to increased risk for obesity as an adult, so is maternal obesity.

A recent Tufts study reviews current research about the relationship between a mother's diet and the child's weight later in life. The paper, published online in *Physiology and Behavior*, was written by Sarbattama Sen, M.D., a neonatologist and investigator in the Mother Infant Research Institute at Tufts Medical Center, and Susan Roberts, Ph.D., a professor of nutrition and of psychiatry and director of the Energy Metabolism Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging, and their students, Ariel Carpenter, A10; Jessica Hochstadt, A08, N11; Juli Huddleston, N10; Vladimir Kustanovich, N10; and Ashley Reynolds, N11.

Maternal nutrition may play an important role in the obesity epidemic, notes Sen, who is also an assistant professor of pediatrics at the School of Medicine. She discussed her research with us.

What are the long-term consequences of a mother's diet on her infant?

Infants born to mothers on both ends of the spectrum—mothers who are undernourished or overnourished—end up having similar predispositions to obesity later in life. Researchers are investigating the biological mechanisms by which maternal malnutrition may be linked with metabolic changes in the offspring. We are not accustomed to thinking about obesity as “malnutrition,” but it really is. New data from our lab and from others points to striking differences in dietary

See **WEIGHT**, page 26

WEIGHT, continued from page 25

composition and levels of micro-nutrients between obese and lean individuals.

Historically, there have been a lot more mothers who have been undernourished than overnourished, so there is a lot more known about how that leads to obesity. There's not as much data about obese mothers and how this might propagate obesity to the next generation.

How do scientists think that happens?

I don't think there is a unifying hypothesis. The most likely mechanism is through changes in the genes involved in laying down fat in the infant's body. Babies born to obese mothers aren't just bigger; they have more fat and less muscle than babies born to women of average weight.

Research in animals has found that maternal obesity disrupts the development of regions in the brain that regulate appetite and influences the brain's reward system. This implies that children of obese mothers may be predisposed to craving foods higher in calories or find it harder to feel satiated.

Some research implicates inflammation—the harmful, chronic, low-grade immune response associated with obesity—but exactly how that alters fetal metabolism still isn't known.

What has your research shown?

I did some work looking at rats fed traditional Western diets high in fat, sugar and calories. Their litters were very different from those of the control groups. Pups born to mothers fed a Western diet had higher body fat and evidence of metabolic dysfunction as early as the first two weeks of life. We found that pups born to mothers fed this Western diet but supplemented with an antioxidant had lower levels of body fat and improved metabolic status, similar to those pups whose mothers were fed a control diet. That was my first exposure to this area of study, and I've developed a passion for finding ways to improve outcomes for obese mothers and their

infants. Before we are even born, aspects of our long-term health and well-being are programmed. I want to know how we can intervene to improve both maternal and fetal health.

How might you do that?

We're looking at three types of interventions. We can help women adhere better to the new weight guidelines that recommend that women who are obese or overweight before pregnancy gain less weight during pregnancy; they often end up gaining more weight than their leaner counterparts. We're also looking at how we can alter nutritional supplementation in these women and if that affects outcome. The third thing is to identify infants who are at risk of becoming obese based on family history. There's been a lot of data that growing very quickly early in life is linked with later development of obesity.

Is it possible today's obesity epidemic has its roots in maternal nutrition?

In 1997, most of the country had a BMI of less than 25. In 2005, 66 percent of adults were overweight and obese. I think you can't attribute such a huge change over such a small period of time to intergenerational issues. The genesis of the obesity crisis has been a source of much debate, but undoubtedly it was in large part due to very rapid social changes that occurred in the 1970s, '80s and '90s—changes in agriculture, changes in eating habits, changes in society. People perform less physical activity in their daily lives now, and they also eat more processed foods.

But now we're seeing that we have a critical mass of people who are obese, and those effects are being felt in very different ways than we anticipated. One of those ways is that we have, for the first time, a large proportion of women of reproductive age who are obese, and we're now seeing the effects on their children. We can't say the genesis of the epidemic was intergenerational—it undoubtedly has many causes—but now we are seeing the effects of this epidemic on the next generation.



SMART MOVES

Clever innovations slip exercise into the school year

At most elementary schools, physical activity is limited to a brief run around the playground after lunch and a gym class once or twice a week. Yet at the Red Hawk Elementary School in Erie, Colo., students get 40 minutes of hearty physical activity every day, not even counting recess and regular PE classes. That's because every morning and afternoon, classes take a 20-minute break for movement. It may be the "Red Hawk Walk," a power-stroll along designated routes through the building, or an in-class dance break. Students may go to the gym with PE staff to learn an exercise routine, which can be repeated in the classroom with student leaders taking charge. And each Friday for "All-School Movement," all 460 students, faculty and staff head outside to participate in a coordinated fitness routine set to popular music.

Red Hawk's dedication to making physical activity part of the school culture was one reason it was named one of two winners of ChildObesity180's nationwide innovation contest. ChildObesity180 (childobesity180.org) works in collaboration with Tufts University to reverse the trend of childhood obesity using an integrated, evidence-based approach. The competition was part of the Active Schools Acceleration Project, an initiative that seeks to increase quality



BOKS is a before-school physical activity program featuring games and drills that get kids' hearts pumping.

physical activity in schools. More than 513 entrants representing all 50 states participated in the competition, which ran from February to June, and identified and rewarded the most creative, impactful and scalable school-based programs and technologies to promote children's physical activity. In all, nine school programs received grants of \$25,000 to \$100,000 to further advance health and wellness programming. Two technologies—an activity-tracking wristband for kids and curriculum-based podcasts kids listen to while they walk—also received grants of \$50,000 to fund school-based pilot programs. A consortium of the nation's leading health plans provided funding for the competition.

"These innovators show how teachers, parents and technology developers are creatively increasing physical activity in schools," says Christina Economos, Ph.D., an associate professor at the Friedman School and vice chair and director of ChildObesity180. "They are leading the way toward a real shift in the nation's approach to physical activity."

As many as six winners will work with ChildObesity180 to make their programs available to schools across the country, with the goal of getting 1,000 schools ready to deploy their own versions by the start of the 2013 school year.

The Doctors Are In

Physicians get a briefing on important nutrition research

ALAN MEYERS, M.D., A PEDIATRICIAN AT BOSTON MEDICAL CENTER, EXPECTS no miracles when he talks with obese children about their weight. He doesn't bombard them with instructions about diet and exercise. Instead, he focuses on one small adjustment at a time, usually starting with cutting down on soda and juice. He'll even write his request—"Don't drink sugar"—on a special prescription pad, so that parents take his orders seriously.

If a child who normally drinks five cups of juice a day can stop that, Meyers said, "you've really got something positive to build from."

Meyers shared several techniques for treating obese children when he spoke at a conference on Nutrition and Exercise in the Management of Outpatients, held at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRC) in October. The conference was geared toward medical students, residents, fellows and primary-care physicians, with the goal of getting them up to speed on the most relevant nutrition science and how they can use it in their practices.

Joel Mason, M.D., a professor of medicine and nutrition at Tufts and director of the HNRC's Vitamins and Carcinogenesis Laboratory, said the idea for the conference grew from his longstanding frustration with the lag in conveying important nutrition advances out of the lab and into the hands of doctors.

"It takes an extraordinarily long time for that to trickle down to the grassroots level to those health professionals who are seeing patients on a week-in and week-out basis," said Mason, who chaired the two-day event. "I want to remove that road block."

Mason and conference cochair Edward Saltzman, M.D., an associate professor of medicine and nutrition at Tufts and chief of the Division of Clinical Nutrition at Tufts Medical Center, brought together 15 experts from inside and outside Tufts to answer questions that come up in doctors' offices every day. Should you pump patients full of vitamin D? Are probiotics worth recommending?

Anastassios Pittas, M.D., an associate professor of medicine and nutrition at Tufts, explained that research—including his own—has shown promising but unproven evidence that vitamin D supplements decrease the risk of Type 2 diabetes. But he does not recommend prescribing megadoses of D to patients.

"Is higher better? I would say not so fast," Pittas said. "I'm an endocrinologist, and endocrinology is all about balance." He pointed to a study where people who were given huge, biyearly doses of vitamin D had more fractures than a placebo group.

Probiotics are another category of supplement that shows potential, but not all bacterial concoctions are created equal. Mason told the physicians that so far, only a few specific strains of bacteria have been proven useful and then only in preventing or treating specific illnesses, such as *Lactobacillus rhamnosus* GG and *S. boulardii* in preventing the diarrhea that often comes with taking antibiotics.

Mason's takeaway message: "Don't fall prey to the idea that it doesn't matter whether you take this organism or that organism."

Some of these issues may seem more appropriate for a dietitian to handle, and sometimes they are. "In many instances, optimal care is achieved by having a doctor and dietitian work together, since the two possess complementary skill sets," Mason says. But primary-care physicians, out of necessity, often serve as the first line of defense, particularly when it comes to childhood obesity. While Meyers works in a team that includes dietitians and mental health providers, programs like his, called the Nutrition and Fitness for Life Program, can only see a small fraction of the kids who would benefit. "The primary-care physician has to take this on," he said.



Relaunching the War on Hunger

In a speech at Tufts, U.S. Rep. James McGovern says government needs to do more to improve the nutrition and health of all Americans
by Jacqueline Mitchell

ENDING HUNGER AND IMPROVING nutrition for all Americans must become national priorities if the United States wants to control health-care costs and reduce the federal deficit, U.S. Rep. James McGovern, D-Mass., told an audience of about 200 people on October 24 at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA).

McGovern, who chairs the House Hunger Caucus, has long been a champion of nutrition policy aimed at eliminating domestic hunger. “When they say, ‘We can’t afford to spend any more money combating hunger,’ I respond, ‘We can’t afford not to, because hunger results in a lot of costs.’”

Hunger and poor nutrition incur direct health-care costs, he said, because they contribute to chronic conditions such as obesity, diabetes and cardiovascular disease. Obesity alone costs the United States an estimated \$147 billion each year in medical

expenditures and lost productivity, according to research cited by the Centers for Disease Control and Prevention.

But hunger also takes a more subtle economic toll, said McGovern. An empty stomach makes it hard to pay attention at school or at work. Pointing to the Breakfast to Bell school meal program in Worcester, Mass., McGovern said, “Kids have a meal, and guess what? They get better test results, and teachers report better behavior. Want better education results? Nutrition is part of that discussion.”

“I’ve been pushing this for four years,” McGovern said, referring to his yet-unfulfilled request that President Obama convene a conference to develop a plan to eliminate hunger and improve nutrition for all Americans.

In 1969, President Nixon appointed then Tufts President Jean Mayer, an internationally known nutritionist for whom the HNRCA is named, to chair the

first such White House conference, which helped establish the food stamp program. (During his 16-year tenure at Tufts, Mayer founded the only graduate school of nutrition in the country and launched a campaign that secured a congressional appropriation to build the HNRCA on the Boston campus in 1982.)

“Hunger is a reality not just halfway around the world, but halfway down the block,” said McGovern. A 2011 study conducted by the USDA Economic Research Service described about 18 million American households as “food insecure” because they experienced some difficulty obtaining enough to eat at some point during the year.

More than a third of these households, almost seven million, experienced food insecurity for an average of seven months out of the year. Despite these numbers, which have risen sharply since 2008, some members of Congress are proposing to cut the federal food-assistance program by \$16 billion over the next 10 years.

McGovern, who sits on the House Committee on Agriculture, argued against the proposed cuts, and said he was dismayed by some of his colleagues’ attitudes toward the food stamp program, now called the Supplemental Nutrition Assistance Program (SNAP), which falls under the auspices of the Farm Bill.

“It was stunning, the ignorance and the contempt some people had for this program,” he said. “The Government Accountability Office says SNAP is one of the most efficiently run programs in the federal government. We need to push back, so when somebody says something that’s wrong, ignorant, we need to correct the record.”

That’s where nutrition researchers like those at Tufts come in, he said. “You are the leaders in the world. The research that comes out of here is the basis for a lot of the progress we have made up to this point and will be the basis for how we move forward.”

“Combating hunger is still not part of our public policy in a way that I think is meaningful,” McGovern said. “In the richest country on the planet, nobody ought to go hungry.”

Tufts: The Next 10 Years

President Monaco launches strategic planning initiative by Taylor McNeil

TUFTS HAS LAUNCHED A STRATEGIC planning initiative that will identify priorities and create a road map for where the university aspires to be in 10 years.

"This is an opportunity for us, as a community, to envision a trajectory for Tufts—where it needs to be, and should be, in a decade's time," said President Anthony P. Monaco, who has asked Provost David R. Harris to lead the initiative.

"The process of creating a strategic plan allows you to learn more about yourself as an institution," said Monaco. "We will engage with the community—faculty, students, staff, alumni, trustees, advisers and friends—to come up with a direction we believe is important and meaningful for Tufts. More broadly, strategic planning is an opportunity for us to think about Tufts' mission, its role in the world and our values and priorities."

Monaco and Harris sat down with *Tufts Nutrition* to talk about the role of strategic planning in advancing Tufts.

What is the purpose of strategic planning?

Provost Harris: This process will explore what the Tufts community sees as our core opportunities, our core challenges and the barriers to our success. A strategic plan will enable us to make decisions that are aligned with shared goals instead of what any one of us might think is an appropriate direction for Tufts.

President Monaco: If the planning process indicates that it's important for Tufts to increase its impact on society, for example, then it will be up to the leadership and faculty at each of our schools to consider how they can contribute to that objective.

Why is it important to do this now?

Harris: We have a relatively new administration, and it is important for the president and me to hear from the community about the opportunities and challenges that face us and for the community to hear

from us about how we will synthesize their input and develop aspirational goals for Tufts University.

Why have you named the initiative "Tufts: The Next 10 Years"?

Harris: It reflects the idea that we are always looking 10 years out, and regularly asking whether we are on the path to achieving our goals. Strategic planning is not something we do once and then move on. This will be an ongoing activity.

What other areas will the strategic plan address?

Monaco: Many strategic plans focus on core values, and so will ours. The plan will contain sections on teaching and learning, research and scholarship and Tufts' impact on society. We will look at our civic engagement mission and our role in economic development through applications of our research. Then there are what I call challenging areas for the future, things like online learning, entrepreneurship and innovation, interdisciplinary and other modes of research and the student experience. We need to think about the direction we are going to take as an institution to make us stronger in these areas.

How was the groundwork laid for this?

Monaco: During my first year, I spent a lot of time listening and meeting faculty, alumni, students and staff to understand their perspectives on Tufts. Out of that came issues I thought were essential to laying the groundwork. One was diversity—recruiting and retaining students, faculty and staff of diverse backgrounds and creating an environment of inclusion. Another was being good stewards of the environment. And finally was thinking

how Tufts can have a larger impact in the world, in particular how collaborative research, teaching and learning across all our schools can help solve some of society's greatest challenges.

How long will this take?

Harris: On the one hand, we want the plan done as quickly as possible, because the absence of a plan means that we are making decisions without the benefit of a shared



Tufts President
Anthony Monaco and
Provost David Harris

vision. On the other hand, we want to proceed slowly enough so that everyone has an opportunity to be heard. That said, we're aiming to complete the plan by the fall of 2013. But this is a living document. Once a year we will revisit the plan, systematically asking what is working, what isn't, what new challenges have arisen and how we can more effectively pursue our goals.

How can the Tufts community get involved and stay informed?

Monaco: Once the plan gets to a certain draft level, we will put it online so all can tell us what they think. We will also be engaging with our trustees and alumni and listening to their perspectives. We want everyone to have a say.

Learn more at strategicplan.tufts.edu.



Lenape, a black-and-white belted Galloway cow, and her bull calf, Marley, at the trough with Gabrielle, a Pinewoods heifer, and her bull calf, Yukon

known as SVF Foundation, race against the clock to conserve 40 of the rarest breeds of cattle, sheep and goats in North America.

The U.N. Food and Agriculture Organization reports the planet is losing one breed of livestock every month. Now halfway into its 20-year conservation campaign, SVF has collected more than 60,000 samples of genetic material from 21 of its target breeds.

So why should you care about saving a handful of odd-looking goats or heat-loving Pinewoods cows or the multihorned sheep named for Jacob in the Old Testament?

For starters, SVF's "seed bank" of frozen material protects the world's food supply by maintaining its diversity. Preserving an array of livestock breeds that can thrive in hot, humid climates or more arid regions of the world means people have access to food, no matter where they live. Beyond the dinner table, though, this cache of frozen germplasm could one day be instrumental in developing treatments for human diseases, such as Tay-Sachs and some neuromuscular disorders.

Barnyard critters don't typically figure into our mental picture of endangered species, what with a handful of super-producing breeds meeting nearly all our food needs.

Consider the dairy industry. Although Guernsey cows produce creamier products than those made with milk from Holstein cows, they can't touch the ubiquitous black-and-white breed for sheer volume of milk production. A top-producing Holstein churns out 25,000 pounds of milk each year—several thousand more pounds than any other major dairy breed. Today, nine of every 10 U.S. dairies milk Holsteins.

However, this bigger-is-better approach comes with significant risks, warns George Saperstein, D.V.M., an expert in preserving endangered livestock and the Amelia Peabody Professor of Agricultural Sciences at Tufts' Cummings School of Veterinary Medicine. "Genetic diversity in livestock is as important as it is in plants," says Saperstein, a scientific adviser to SVF.

Escape from Farmageddon

One breed of livestock vanishes from the planet every month. Why that's not a good thing for any of us by Genevieve Rajewski

THE 15 SHAGGY ARAPAWA GOATS from Alan and Joan Caldwell's farm in Rehoboth, Mass., are in a fight for their breed's life. Whalers and British colonists first brought these goats' ancestors to Arapawa Island, off the coast of New Zealand, where the hardy breed lived in isolation, largely unchanged for more than 200 years.

Then, about 30 years ago, the New Zealand Forest Service decided the goats had overstayed their welcome—trampling and grazing through large swaths of the native forest—and so began to cull them from the island. Today, only a few hundred Arapawa goats remain in the world, scattered in small herds throughout the United States, New Zealand and the United Kingdom.

If the Arapawa breed disappears, so too goes our last link to the original hardy "Old English" goat that the Pilgrims ferried to

the New World aboard the Mayflower for milk and meat. To make sure the Arapawa don't vanish from the planet, the Caldwells dispatched their entire herd of rare goats to a most unlikely destination: a place called Swiss Village Farm in tony Newport, R.I.

Built in the early 20th century as a "gentleman's folly" hobby farm, the property looks just like what its name implies: an extravagant recreation of a Swiss village. Inside the quaint buildings are high-tech surgical suites and laboratories, where Tufts University veterinarians will harvest sperm and embryos from the Arapawa goats and then bathe the genetic material in liquid nitrogen to cryogenically preserve it. Should the Arapawa become extinct, this precious DNA could be thawed and used to reawaken the breed.

The procedure has been repeated many times over the past decade as Tufts and the Swiss Village Farm Foundation, also

In plant agriculture, the scariest tale about a monoculture is the Irish Potato Famine. Between 1845 and 1849, more than one million people starved to death when Ireland's genetically identical "lumpers" potatoes rotted in the fields, destroyed by a new fungus to which they had no natural resistance.

In the case of food animals, the balance between genetic diversity and high-volume production may already be coming undone.

Artificial insemination, which was perfected in cattle in the late 1940s, now accounts for 85 percent of Holstein births. One Holstein bull can sire as many as 50,000 daughters—and half the genes in America's 8.6 million Holstein cows come from fewer than 20 prize bulls, according to a *New York Times* report. This kind of intensive inbreeding promotes undesirable traits, and Holstein breeders recently have had to contend with a raft of new health issues in their herds.

Meanwhile, the growing "global reliance on Holsteins, which need lots of water and [expensive] grain to make milk, is risky in a world where desertification is spreading and economies are not growing," says Jennifer Kendall of the American Livestock Breeds Conservancy.

"Developing countries want our Holsteins because we've taken that cow to the next level of increased efficiency," agrees Saperstein. "However, many countries that import Holsteins to tropical climates watch them die, because they'll never do as well in heat and humidity as their indigenous breeds."

NOAH'S PARK

Dorrance Hill Hamilton, a Philadelphia philanthropist who spent her girlhood summers in Newport, was flying home from Europe in 1998 when she read a newspaper article about the mass slaughter of cattle following the outbreak of mad cow disease. Hamilton had recently purchased Swiss Village—once the opulent country home of railroad baron Arthur Curtiss James and his prize herd of Guernsey cattle—to preserve the rolling, green farmland that she remembered from her childhood. "I read that when rare livestock was slaughtered, it might be hard to bring them back," recalls

Hamilton. "I thought maybe I could help by raising some of those breeds."

She was encouraged to approach Tufts, where she met Saperstein and talked about her vision for her 45-acre farm. He told her that she had only enough land for a small herd of one breed. Then he asked: "But have you thought about cryopreservation?"

In 2002, she established the nonprofit SVF Foundation and signed a contract with Tufts to begin the breed-preservation work. The goal of the Tufts/SVF collaboration is to collect and cryopreserve at least 200 embryos and 3,000 samples of semen for each of the rare North American livestock breeds on SVF's conservation priority list—a modern-day Noah's ark, if you will.

BACK TO THE FUTURE

To date, nearly 700 head of livestock have passed through the program. The animals spend anywhere from nine months to two years roaming SVF's pastures, under the watchful gaze of the farm's three guard llamas, as they go through a breeding cycle and germplasm collection.



Pablo, an Arapawa buck

At Swiss Village, common livestock have birthed nine endangered animals: Arapawa and Tennessee fainting goat kids; American milking Devon, Dutch belted and Canadienne calves; and Cotswold, Gulf Coast, Santa Cruz and Tunis lambs.

SVF's mascot, Chip, a Tennessee fainting goat born to a common Nubian doe in 2005.

Though SVF is determined to save the

rarest North American ruminants, regardless of whether there is an overt imperative for any particular breed, Saperstein notes that many breeds have special traits because they evolved in geographic isolation—and that has applications for human and veterinary medicine. He says some breeds "have unique genetic characteristics that may not seem particularly desirable, but those faulty genes might make the animal a good model for developing new treatments for human diseases."

The genetic mutation that causes the fatal neurodegenerative disorder Tay-Sachs in children, for example, also exists in Jacob sheep. Research done at New York University School of Medicine not only has helped keep this defect from accelerating the disappearance of the rare sheep breed, but has led to the first animal model for studying gene therapies for Tay-Sachs, which typically kills children before their fifth birthday.

And Saperstein notes that Tennessee fainting goats—which fall over when startled because of a genetic disorder that triggers all their skeletal muscles to contract—could someday help people with congenital myotonia, a neuromuscular disorder.

Saperstein says that while these are great, tangible reasons for preserving endangered livestock, it's just as important to save them for reasons we've yet to imagine. If not, he says, it would be like a society in which all the libraries have been obliterated.

"What if we only kept what was written every year and threw the rest of our books away? Well, that's what happens when we discard breeds cultivated over centuries to focus only on the animals currently deemed utilitarian," he says. "Once these animals are gone, they're gone. And then we'll never be able to visit that genetic library to select a breed that's right for that world we're living in, whether we want animals with resistance to a certain disease or those better suited to meeting a consumer demand for grass-fed beef."

A version of this article first appeared in the Spring 2012 issue of Tufts Veterinary Medicine magazine. Genevieve Rajewski, editor of that publication, can be reached at genevieve.rajewski@tufts.edu.



In Her Footsteps

A loyal donor's generosity helps others along the path

WHEN SHE STARTED HER STUDIES AT THE FRIEDMAN SCHOOL in 1983, Haewook Han, N86, N00, had lots of exploring to do. The vast American expanse was a world apart from her native South Korea—and not just when it came to the culture and way of life. Taking her first class in clinical nutrition at Tufts, she saw that nutrition science itself was full of frontiers she had never encountered in the biochemistry laboratory.

"That changed my career," says Han.

Suddenly a new approach to nutrition was at her fingertips, one that involved working closely with patients to develop nutritional-care plans. It was the foundation for a career that bridges the gap between laboratory science and people's needs. Understanding both arenas, Han says, is indispensable for practicing nutrition. "Nutrition is more about how patients eat, how they live—about understanding their situation—than it is just a textbook following of their diets," she says. "It's the contact with people that I really like."

Following the completion of her master's degree and an internship in Atlanta, she returned to the school for a Ph.D., focusing on the connection between nutrition and kidney disease. Han now works as a renal nutrition specialist in Boston, counseling patients with chronic kidney disease who suffer from such complications as obesity, diabetes and kidney stones. She guides them through better nutrition practices that will improve their quality of life.

Until recently, she also held a research and teaching position at Tufts University School of Medicine, and while she since has moved into more

purely clinical work, her alma mater remains close to her heart. Each year since she earned her doctorate, Han has made a leadership-level gift to the Friedman School, making her a member of the school's new Loyalty Society, which recognizes two or more consecutive years of giving. Her motivation is her gratitude for the opportunities and direction her degree provided her.

PAYING IT FORWARD

Thanks to donors like Han, students such as Brittany Lorigue, N13, are following in her footsteps. A student in the combined master of science/dietetic internship program at the Friedman School and Frances Stern Nutrition Center, Lorigue knew early on that nutrition was the field for her, thanks in part to a career placement test. "Most of the students who took the exam had about 25 career suggestions on the final list," she says. "I had three." Dietitian was number one. "I was 16, and I never looked back."

Her decision was also influenced by the death two years earlier of her grandmother, who had cancer and medical issues resulting from obesity. "It just blew my mind that something that's supposed to be under our control, like our weight, could come back and be fatal."

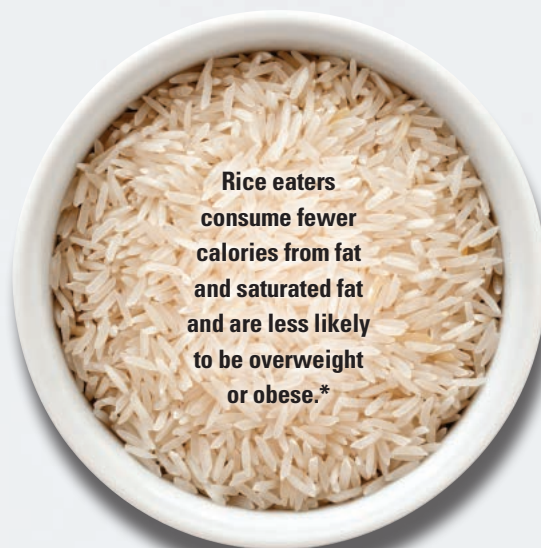
Through her graduate work at Tufts, Lorigue aspires to improve the lives of children. "I hope to work with the pediatric population in healthy eating and physical activity programming to prevent childhood obesity and all these chronic diseases that we're seeing in children who are simply too young for that."

Coming to Tufts was her dream. But Lorigue wouldn't be able to pursue her calling at the Friedman School without financial aid. As she says, "I just can't say thank you enough. The people who donate have really made all the difference in my life. Someday I hope to give back just as much as I've been given."

TO LEARN MORE ABOUT THE LOYALTY SOCIETY, INCLUDING ITS IMPACT ON THE SCHOOL, PLEASE CONTACT SEAN DEVENDORF, DIRECTOR OF ANNUAL GIVING AND ASSOCIATE DIRECTOR OF DEVELOPMENT, AT 617.636.2949 OR SEAN.DEVENDORF@TUFTS.EDU OR VISIT ALUMNI.NUTRITION.TUFTS.EDU.



pH levels in soft drinks approach 2.5 (7 is neutral) and can erode tooth enamel. Avoid acidic drinks, use a straw, and drink milk and water to restore pH levels in your mouth.*



Rice eaters consume fewer calories from fat and saturated fat and are less likely to be overweight or obese.*

Like what you've learned?

Support the research that helps you enjoy a healthy life. Make your gift to the Friedman School and contribute to nutrition research on aging at Tufts University. nutrition.tufts.edu/givenow2



Older adults, unless exposed to bright, year-round sunlight, require supplementation to meet their vitamin D needs.*

Tufts
UNIVERSITY

Gerald J. and Dorothy R.
Friedman School of
Nutrition Science and Policy

Nourishing minds. Nourishing humanity.

*This information has appeared in *Tufts Nutrition* magazine and *TuftsNow* and represents the research of the Friedman School and nutrition research on aging at Tufts University.

NEW TO ALUMNI RELATIONS



This summer, the Friedman School welcomed Brigid Durant as the associate director of alumni relations. Brigid has been a member of the Tufts University Advancement Division since 2007, most recently as assistant director of regional programs for alumni of the university's undergraduate schools. At the Friedman School, Durant is leading programs related to the school's Alumni Association and will be working closely with volunteers to continue to grow the active and engaged alumni community.

She joins Cindy Briggs Tobin, senior director of development and alumni relations; Sean Devendorf, who was promoted to director of annual giving and associate director of development; Eileen Ahearn, stewardship and events coordinator; and staff assistant Joanne McDonough in the school's Office of Development and Alumni Relations.

director. As a key member of the center's leadership, she will refine administrative procedures, lead center communications, monitor and report program progress, coordinate outreach activities and contribute to training and research.

N05 After working at the Beijing Food Safety Administration for seven years, **Fan Fan Han** is now deputy director of the Risk Communication Division. Her division also serves as the news and public education office for the China National Center for Food Safety Risk Assessment.

N06 **Kerri Hawkins** was the featured expert in a *Tufts Now* column titled "How can I break bad eating habits?" Read her advice at now.tufts.edu/articles/how-can-i-break-bad-eating-habits.

N08 **Allison Parker** is now a senior account supervisor at FoodMinds,

N96 **Christina Economos** was featured in the HBO documentary film *Weight of the Nation*, and working with **Jeanne Goldberg, G59, N86, J92P**, and **Jennifer Sackeck, N01**, led the film's "take action" and "learn more" website features.

Lisa Freeman, J86, V91, just established the nation's first obesity clinic for pets at the Cummings School of Veterinary Medicine at Tufts, where she is a professor of clinical sciences.

N97 **Diane McKay, G89, N00; Jody Biergiel, N06; Jessica McGovern, N12; and Larkin Kimmerer, N12, MPH12**, were featured in the alumni spotlight section of *The Friedman Sprout*, the student newspaper of the Friedman School. Read their interviews at friedmansprout.com/category/alumni-spotlight.

N98 **Jennifer Otten** accepted a faculty

position at the University of Washington (Seattle) School of Public Health beginning in January 2013.

N00 The American Heart Association featured **Rachel Doucette** in its "Go Red for Women" campaign to raise awareness of heart disease and stroke among women.

Dan Hoffman, associate professor and chair of the Department of Nutritional Sciences at Rutgers University, was a guest speaker for the Friedman Seminar Series. His talk was titled "The Double Burden of Global Malnutrition." View this and other seminars from the weekly series at nutrition.tufts.edu/event/friedmanseminar.

N01 Associate Professor **Jennifer Sackeck** gave a presentation on "Fitness in America: Science and Policy" during the Friedman Seminar Series this fall. View this and other

seminars from the weekly series at nutrition.tufts.edu/event/friedmanseminar.

N02 **Ann McDermott** joined the Johns Hopkins Global Center on Childhood Obesity on September 1 as the center's assistant

Keep in Touch with the Friedman School

VISIT US ON THE WEB Stop by our web pages for information on upcoming events, ways to get involved and profiles of Friedman School alumni.

Are you on Facebook or LinkedIn?

If you are an alum, faculty member or student, join the Friedman School Alumni Association group pages on www.facebook.com and www.linkedin.com. And be sure to "like" the Friedman School page on Facebook.

Alumni ALUMNI.NUTRITION.TUFTS.EDU
Friends NUTRITION.TUFTS.EDU/FRIENDS

a food and nutrition company in Chicago.

Michelle Markestyn Ratcliffe, farm-to-school program manager for the Oregon Department of Agriculture, wrote two articles that appeared in a special issue of the journal *Childhood Obesity* on school food, published in August. You can learn more about her work in this issue of the magazine; turn to page 16.

N10 In September, **Jalal Elhayek** and **Jessica Lattif** cofounded Fair Share CSF, a community-supported fisheries project based in San Francisco. They are engaged and plan to be married in early 2013.

Caroline Gottesman Kaufman's blog, *sweetfoodie.com*, won awards for Nutrition Expert Blog of the Year and Top Blog of the Year from the Around the Plate website.

Dawn Undurraga was one of the lead developers for the Environmental Working Group's guide, *Good Food on a Tight Budget*. The guide, which includes tips for healthy eating, quick lists of best foods,

tasty recipes and easy tools for tracking food prices and planning your weekly menu, is available at www.ewg.org/goodfood.

Caitlin Westfall married Josh Howe on September 2, 2012.

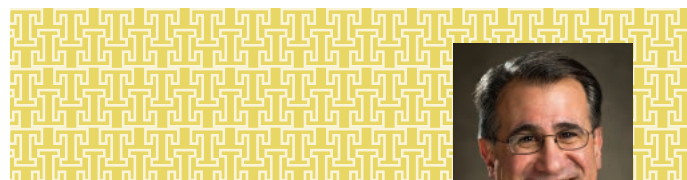
N11 In June, **Jesse Appelman** started a new job as a supply chain analyst for the humane and sustainable agriculture campaign at the World Society for the Protection of Animals.

Jessica Larson has a new job, manager for strategic communications at the Academy of Nutrition and Dietetics in Washington, D.C.

Julie MacCartee and Adam Rutenberg were married on October 27, 2012.

N12 **Lauren Adler** married Brandin Dear on August 5, 2012.

Nicholas Strutt is working in Ghana as a researcher for the International Nutrition Foundation, managing research projects related to complementary food supplementation.



Tufts Alumni

Together, we begin...

During a time of transition and expanding horizons for the university, Tufts Alumni is pleased to invite you to meet with Tufts President Anthony P. Monaco to hear about his plan for developing a road map for where Tufts aspires to be in the next 10 years.

During the first year of his tenure, Tufts Alumni hosted 15 receptions to introduce the university's 13th president to alumni and friends around the world. This year, President Monaco will be visiting a number of European cities as well as cities in Arizona, Colorado, Connecticut, Maine, New Jersey, Pennsylvania and Rhode Island.

All members of the Tufts community are invited to attend any of these special events to meet President Monaco and hear his thoughts on Tufts today and his vision for the future.

As the president's itinerary is developed, you can find event dates and locations at tuftsalumni.org/president.

SAVE THE DATE!

10TH FRIEDMAN SCHOOL ALUMNI REUNION
APRIL 19-22, 2013

Join your classmates and friends for a weekend of fun, education and celebration in Boston. Attend the Gershoff Symposium, participate in the career panel, reconnect at the Friedman School reception being held in conjunction with the Experimental Biology Conference and join us for a special awards ceremony and dinner at the John Joseph Moakley U.S. Courthouse to celebrate the school's 10th reunion. For more information, visit <http://bit.ly/2013friedmanreunion>.



Farm to College

Only the most resourceful chef is unintimidated by 760 pounds of rutabagas. As director of sustainable food systems for Sterling College, a small liberal arts school in Vermont, Anne Obelnicki, N08, faces down such challenges daily. One of her many jobs is to feed students, faculty and staff using whatever the school's farm has produced, be it an abundance of rutabagas or an embarrassment of kale. All their sustenance can't come from the farm, of course, but she manages to purchase half of it in-state.

"Most people will say local food is too expensive; we can't feed everyone," she says. "I don't think that's true." To keep meals and the school budget balanced, Obelnicki, a graduate of the Culinary Institute of America, packs the menu to be nutritionally dense. As many as eight different salads show up at each meal. Beans, legumes and brown rice provide much of the protein, which means that when she does buy meat—always pasture-raised, and therefore costly—she can buy less of it.

She wastes nothing. Last year's bumper crop of cucumbers turned into 125 gallons of pickles. The lambs they raise become roasted lamb leg for family weekend and lamb shanks for the vegetable soup and lamb tongues that are braised, chopped and grilled for "tongue tacos." As for how she'll use the rutabagas? She says calmly, "That's what I'm going to have to come up with."



Anne Obelnicki, N08

“Taking a multi-pronged approach to nutrition, fitness, and wellness is part of who we are. It’s what draws us to the Friedman School and why we want to give back.”



For **TESSA, N83**, and **GLENN COOPER, M78**, proper nutrition isn’t just a guideline to healthy eating; it is central to their lives. In fact, Tessa’s dedication to improving food quality helped bring them together. The couple met on an archeological dig where Tessa provided balanced meals to a hungry crew, including Glenn.

The Coopers have co-authored two books on fitness and nutrition: *The Two-Day Diet* and *Taking Charge of Cholesterol*. Tessa is currently designing a diet and exercise weight-loss program that she hopes will inspire her next book.

A graduate of the school’s second class, Tessa remains heavily involved with the Friedman School, and her enthusiasm has rubbed off on Glenn. Tessa and Glenn proudly serve as volunteer leaders on the school’s Friends Council. And, impressed with the pioneering work by faculty and staff at the John Hancock Research Center on Physical Activity, Nutrition, and Obesity Prevention, the Coopers created a gift in their estate plans to support its mission. As a result, they have been recognized as members of the Charles Tufts Society, the university’s legacy society.



To learn more about including a gift to Tufts in your plans, please contact Tufts’ Gift Planning Office
888.748.8387
giftplanning@tufts.edu
www.tufts.edu/giftplanning



www.facebook.com/CharlesTuftsSociety



LITTLE LOCAVORES

Farm-to-school programs are no longer a fad. In the last 15 years, they have taken root in school districts across the country, from rural preschools to urban high schools. Getting food service directors and farmers to buy into the idea hasn't always been easy, however. For more on the story, turn to page 18.