FUSION at Harvard University The Science and Business of Aging Tuesday, February 5, 2019 | Boston, MA



MEETING RECAP

- The world's aging population presents a host of health and economic challenges.
- Several innovative approaches show significant promise in achieving healthier aging.
- Important approaches include geroscience, cell and gene therapies, digital technologies, and more holistic care.
- While the medical, scientific, and economic challenges related to aging are immense, many scientific and business leaders are engaged and are focused on practical, scalable, innovative solutions. Some solutions already exist, and others aren't far off.





THE BLAVATNIK BIOMEDICAL ACCELERATOR AND THE BLAVATNIK FELLOWSHIP IN LIFE SCIENCE ENTREPRENEURSHIP

Established by a gift from the Blavatnik Family Foundation, headed by Len Blavatnik, MBA '89, the Blavatnik Biomedical Accelerator guides Harvard innovations towards translational impact by providing strategic, monetary, and advisory support for well-defined research projects. The Blavatnik Fellowship in Life Science Entrepreneurship **Program at Harvard Business** School (HBS) offers HBS alumni the opportunity to create new ventures around promising life science technologies while developing their leadership talents.



Isaac T. Kohlberg, Senior Associate Provost and Chief Technology Development Officer, Harvard University, Len Blavatnik, Founder and Chairman, Access Industries, and Lawrence S. Bacow, President of Harvard University



\$20 Million

To date, the Blavatnik Biomedical Accelerator has provided \$20 million in direct support to 109 Harvard research projects.

Completed projects have resulted in numerous corporate partnerships, licensing agreements, and startups, generating more than **\$40 million** in new research funding and more than **\$30 million** in commercialization revenue.

\$500 million

Startups launched around Blavatnik Biomedical Accelerator technologies have collectively raised more than \$500 million in equity funding.



25 Fellows

The Fellowship has admitted a select group of 25 Fellows across 5 years, with a 6th cohort that started in June 2019.

21 life science companies have been started as a result of the work of a Blavatnik Fellow.

\$250M+ in financing has been raised into these startup ventures through venture funding, grants, awards, and angel investors.





The Science and Business of Aging

FUSION is the annual Harvard University symposium that builds on philanthropist Len Blavatnik's vision of hastening the pace of scientific progress by bringing together scientific innovators and business leaders to form partnerships that produce real-world impact. The symposium is jointly hosted by the Blavatnik Biomedical Accelerator (a program of Harvard University's Office of Technology Development) and the Blavatnik Fellowship in Life Science Entrepreneurship at Harvard Business School (HBS).

Each year FUSION integrates perspectives from experts in science and business to explore the promise of an emerging field. FUSION shows what is possible when leading scientific thinkers come together with entrepreneurs and business leaders to focus on critically important topics such as aging (2019), combating antibiotic resistance (2017), and regenerative medicine (2016).

It is to address challenges like aging that makes FUSION, and the collaboration across academia and industry it inspires, so important. Historically, there has been a development gap in that promising scientific breakthroughs have not always made the leap from the academic laboratory to the marketplace.

"Most of the important things that are brought to the world are through some combination of a scientific or technical discovery that then gets combined with a business model." NITIN NOHRIA, DEAN, HARVARD BUSINESS SCHOOL



Nitin Nohria, Dean, Harvard Business School



George Daley, Dean, Harvard Medical School, Michelle Williams, Dean, Harvard T.H. Chan School of Public Health Lawrence Bacow, President, Harvard University, and Nitin Nohria, Dean of Faculty, George F. Baker Professor of Administration, Harvard Business School

Held on February 5, 2019, the third FUSION symposium focused on the science and business of aging. All people share a goal of growing old while remaining healthy and productive, without experiencing chronic disease, reduced mobility, or decreased independence. The challenges of aging, which confront individuals and our entire society, have the potential to bankrupt our nation.

Leaders from across Harvard also shared their insights on this timely, important topic. Speakers included Harvard University President Lawrence Bacow; Senior Associate Provost and Chief Technology Development Officer Isaac Kohlberg; deans of the schools of medicine (George Daley), business (Nitin Nohria), and public health (Michelle Williams); the faculty chair of the Blavatnik Fellowship in Life Science Entrepreneurship at HBS (Peter Barrett); and event emcee, director of the Health Care Initiative at HBS, Cara Sterling.







KEY THEMES

The world's aging population presents multiple challenges to health care and economics.

Richard Hodes, MD, director of the National Institute on Aging at the National Institutes of Health, painted a picture of future challenges. It is estimated, he said, that the number of people in the world over age 65 will increase from 617 million today to 1.6 billion in 2050.

This trend is due in part to far longer life expectancies. In 1840, the female life expectancy in the record-holding country was 45. In 1920, it had increased to 65. And another 80 years later, in 2000, it was 85. This trend has continued over the past 20 years.

Speakers at FUSION described the goal for successful aging as avoiding disease and disability while maintaining high cognitive and physical function, along with engagement in life. Or, as Nir Barzilai, MD, of Albert Einstein College of Medicine stated, the goal is to achieve a longer healthy lifespan.

But achieving this healthy lifespan faces multiple challenges. Among the insights and observations shared by speakers during FUSION were the following:

- Many seniors struggle to navigate the complex, fragmented health care system.
- Seniors often live in isolation and experience loneliness and depression.
- The risk for many diseases, including heart disease, cancer, and diabetes, increases with age. And, these diseases tend to be treated individually instead of treated holistically as part of aging.
- The total costs of these age-related diseases are enormous and are growing rapidly; they threaten to bankrupt countries including the United States.
- Despite billions of dollars of investment, most attempts to develop drugs to combat Alzheimer's and dementia have failed.

These challenges place a tremendous burden on society and require innovations on numerous fronts to achieve the goal of a longer, healthier lifespan. "Global population aging is one of the greatest public health challenges of our time."

MICHELLE WILLIAMS, DEAN, HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH

 Several innovative approaches show significant promise in achieving healthier aging.

After decades of focusing on treatments and cures for specific diseases, many scientists are looking more holistically at the topic of aging. Specific approaches include:

- The emergence of geroscience. As Dr. Hodes said, "By understanding the basic biology of aging, we can address the processes of aging." The intent is to target the biological mechanisms of not just one or two diseases, but of multiple diseases for which aging is an important risk factor. This has led to "geroscience," which is the convergence of the biology of disease and the biology of aging. Scientists are better understanding aging at the cellular level and are developing pathways to treatment.
- Developing cell and gene therapies. Per George Church, professor of genetics at the Blavatnik Institute at Harvard Medical School, the low cost of genome sequencing and the capabilities of gene editing will make it possible to prevent diseases, reverse diseases, and restore lost capabilities. Amazing innovations and interventions are being advanced in Harvard's laboratories along multiple pathways that are critical for longevity and aging reversal. In the near future it will be possible to turn this knowledge into therapies.
- Thinking differently about existing therapies. To date, drugs have been developed for specific indications for specific diseases. With new knowledge of the biology of aging, it may be possible to repurpose existing treatments, such as Metformin, which is typically used for type 2 diabetes, to increase overall health and life span by having a positive effect on multiple age-related diseases.
- Using digital technologies to identify diseases early and encourage behavior change. To date, treatments for Alzheimer's have failed because when patients first experience symptoms, they have often had the disease for 20 to 25 years. By that time, it is too late for treatments to reverse the damage to the brain.





Neurotrack CEO Elli Kaplan described her company's efforts to test patients who have not yet had symptoms to determine if they are at risk. Based on test results, she said, it may be appropriate to encourage behavior modification, such as changes in diet, and to monitor progress. Such an approach may provide optimism for identifying and engaging at-risk patients, reducing the risk for Alzheimer's, and preventing memory loss.

Providing more holistic care for seniors. In addition to developing new treatments and using new technologies, entrepreneurs such as Sachin Jain, president and CEO of CareMore Health, are focused on changing how care is delivered. He described the need for a social movement with changes in public policy, implementation of human-centered design, and new business models. His company is working to assist seniors by anticipating their most basic needs and taking steps to address feelings of loneliness and isolation. Jain said that CareMore Health has redesigned waiting rooms to function as community space, has partnered with Lyft to provide transportation, and has the same clinicians care for a patient at all sites of care, building personal relationships. These innovations are about building new social constructs and making a meaningful difference in people's lives as they age.



SESSION SUMMARIES

Reimagining the Business of Aging

Sachin Jain, President and CEO, CareMore Health

The business of aging has been extremely successful from a financial point of view. Examples include the retirement home industry, anti-aging cosmetics, pharmaceuticals, and financial planning.

But from a human perspective, the business of aging hasn't delivered the kinds of solutions that society needs. For seniors, the health care system is disjointed; care is not cohesive or connected, and the health care industry is failing miserably at delivering on what patients and families need in the last years of life. Most entrepreneurs who have developed products or services targeting seniors don't truly understand seniors' needs and most offerings miss the mark.

Many aspiring innovators create health care services involving digital technologies that may be appropriate for millennials. But such offerings often fail to take into account the modest real-world lives of most American seniors which include experiencing chronic diseases, depression, loneliness, and isolation. As a result, many intended innovations don't turn out to be used or useful.

What is needed is a social movement that combines public policy, human-centered design, and rethinking business models to close the gap between the financial and human aspects of aging.

"How can we build an ecosystem that actually incorporates real human values into the business and science of aging?" sachin Jain, PRESIDENT AND CEO, CAREMORE HEALTH

CareMore Health, which Sachin Jain leads as president and CEO, is attempting to bring about this social movement by adopting principles and practices that in some ways defy the conventional wisdom within health care. CareMore Health is a Medicare-focused health care organization that cares for about 90,000 patients in 10 states. The company employs about 1,000 clinicians and operates 50 clinics.







Sachin Jain, President and CEO, CareMore Health

According to Jain, three of CareMore Health's key design principles are:

- The business of aging should anticipate and deliver on people's needs. Conventional wisdom is that empowered consumers should be given information and expected to make their own care decisions. But this is unrealistic for many ill or incapacitated seniors. Instead, CareMore Health aims to anticipate and deliver on patients' needs, including, for example, transportation and meals. CareMore Health has the same clinician interact with a patient throughout all care settings, providing comfortable relationships and continuity of care. Also, CareMore Health has redesigned its waiting rooms to function as community spaces and has appointed a Chief Togetherness Officer to focus on connecting lonely seniors.
- 2. Aging people shouldn't have to shop for care they need. When a senior is diagnosed with an illness, it isn't realistic to expect the individual to navigate the health care system, get to the right providers, and schedule the right tests and appointments. The system should proactively direct patients to the right providers. CareMore Health aims to do this for patients 100% of the time.
- 3. The aging should not have to pay out of pocket for things they need. This differs from how most health plans are designed, with various copays. In an effort to eliminate barriers, CareMore Health doesn't have copays for primary care, insulin, or to use exercise facilities in CareMore Health's clinics. CareMore Health has also partnered with Lyft on a ride-sharing program.

The fundamental idea, Jain said, is not just to focus on value, but to implement solutions for seniors based on *values*. Solutions don't need to be fancy or sophisticated; they need to solve basic problems that make a difference in seniors' lives.

Progress in Aging Research: Advances and Plans from the NIA

Richard Hodes, MD, Director of the National Institute on Aging at the National Institutes of Health

Demographically, the world is aging. Since 1950, the percentage of the global population over age 65 has increased significantly while the portion of the population under age 5 has declined dramatically. There will soon be more senior citizens than young children in the world. The increase in the percentage of the population over age 65 is attributable in part to unprecedented increases in life expectancy.





With an aging population and growing health care expenditures, an understanding of the biology of age-related diseases is increasingly urgent. As shown below, it is known that the prevalence of many diseases is a function of age.

Disease Prevalence as a Function of Age



Source: St. Sauver et al. - BMJ Open 2015;5:e006413



The convergence of the biology of disease and the biology of aging is "geroscience." Focus on geroscience is leading to interventions and approaches with the potential to address risk factors for multiple diseases.

One important area of geroscience is cell senescence, which is the ability of cells to replicate for a period of time and then stop in a predictable way, showing the phenomenon of aging at the cellular level. Research to eliminate senescent cells has shown positive results in animals and is quickly moving into clinical trials in humans.

"By understanding the basic biology of aging, we can address the processes of aging and, in doing so, affect the risk factors for not just one or two but for multiple diseases for which aging is an important risk factor."

RICHARD HODES, DIRECTOR, NATIONAL INSTITUTE ON AGING



Unfortunately, efforts to date to target Alzheimer's have met with multiple failures. One reason is that interventions occur too late. When treatment begins after initial symptoms, too much irreversible damage has already occurred in the brain. To begin treating early it is necessary to identify who is at risk using genetic markers and biomarkers.

Alzheimer's Research: Pathways to Treatment







Richard Hodes, MD, Director of the National Institute on Aging at the National Institutes of Health

Increased funding for Alzheimer's is leading to identification of new genes and development of new possible treatments. There are now about 140 treatments and interventions being advanced, many through productive public-private partnerships. There is great hope that the increased funding and resources focused on geroscience and on Alzheimer's will help address many of the most serious conditions of aging.

"We are seeing a remarkable translation from basic science, in a relatively short period of time, into clinical trials."

Aging Reversal via Cell and Gene Therapies

George Church, Robert Winthrop Professor of Genetics, Blavatnik Institute at Harvard Medical School

Innovations advanced in labs at Harvard Medical School can achieve dramatic, even exponential, impact. For example, the \$3 billion genome sequence was down to \$1,000 four years ago and is now almost free. However, despite this drop in cost, few people have had their full genome sequenced. In the future, Prof. George Church said, getting everyone's genome sequenced will be important to find those few people who can benefit from gene therapy.







George Church, Robert Winthrop Professor of Genetics, Blavatnik Institute at Harvard Medical School

Church commented that there is a great deal of unfounded, wishful thinking in the field of aging. Some people believe there are products they can eat or drink, or supplements they can take, that will slow or reverse aging. Or, they can starve themselves to slow aging. But the evidence doesn't support this.

In contrast to some of the ideas in pop culture to slow or reverse aging, there are actual scientific discoveries with real evidence that can address aging. Most significant is an immediately accessible revolution in genetics. For monogenic or Mendelian diseases, there is gene therapy and the cost-effective alternative of genetic counseling. In the multifactorial environment, which encompasses common or complex diseases of aging, there are both simple and complex treatments. Prevention, reversal, and cure may be achieved with cell or gene therapies.

Gene therapy involves the addition, subtraction, or precise editing of genes. These therapies need to be thought of broadly to encompass an entire gamut of possible interventions in the diseases of aging.

In particular, data show nine or ten different pathways to enhance longevity or aging reversal. It is possible to begin targeting these pathways with therapies.

Pathways Shown to Enhance Longevity or Aging Reversal

- 1. Reduction of cells with genomic damage
- 2. Telomeres
- 3. Epigenetics
- 4. Reactivation of protein regulation
- 5. Caloric restriction
- 6. Restoring mitochondrial function
- 7. Clearance of senescent cells
- 8. Stem cell addition
- 9. Reduction of inflammation
- 10. Blood-borne rejuvenation molecules



Some of these possibilities sound like science fiction, but they are quite real. For example, with CRISPR, it is possible to make multiple edits to the genome of living cells. In 2015, the record was 62 edits to a cell, but already it is proving possible to make tens of thousands of edits to a single cell. This could be used, for example, to engineer organs for safe transplant into humans from other animals. This would help address the worldwide shortage of organs. Or, it may be possible to change the genetic code of an organism to make it resistant to viruses.

"I think there's a lot of wishful thinking in the field of aging . . . but I think very powerful medicines are right around the corner, including gene therapy."

GEORGE CHURCH, PROFESSOR OF GENETICS, BLAVATNIK INSTITUTE AT HARVARD MEDICAL SCHOOL

Disrupting Alzheimer's with Technology: Using Data to Forge a Solution

Elli Kaplan, Co-founder and CEO, Neurotrack

The statistics on Alzheimer's are alarming. There are currently more than five million Americans with Alzheimer's and related dementia, and about 50 million globally. These numbers are expected to triple in the next few decades.



Source: The World Alzheimer Report 2015, August 2015

The financial burden related to Alzheimer's is staggering. In the US the approximate lifetime costs for an individual with dementia are more than \$340,000. Total spending in the US for Alzheimer's and dementia in 2018 was \$277 billion.







Elli Kaplan, Co-founder and CEO, Neurotrack

Unfortunately, current approaches to combat this crisis have been unsuccessful. To date, almost all efforts have been focused on patients' physical health, with billions of dollars spent in search of a cure or vaccine. These efforts have almost always resulted in crushing failures. Since 1998 there have been more than 100 attempts at developing a disease-modifying drug for Alzheimer's, and 99.6% have failed. During this time other treatment options have not been considered.

But, despite these failures, a great deal has been learned about Alzheimer's, with a growing body of evidence suggesting that interventions related to early detection, cognitive status, lifestyle, and behavior may be effective. Early detection is critical because by the time an individual shows symptoms of Alzheimer's they may have had the disease for more than 20 years.

Neurotrack, founded by Elli Kaplan, takes a more holistic, comprehensive approach to dealing with Alzheimer's than just relying on pharmaceutical treatments. The company uses innovative digital technologies, such as wearable technologies and digital phenotyping, to establish a person's baseline and then monitor movements, moods, and behaviors over time. Monitoring includes collecting massive amounts of voice and social media data and using tools to assess and measure cognition. It also involves monitoring progression. Monitoring of changes versus the baseline helps identify at-risk patients years before they develop detectable symptoms.

These technologies can be used on a phone or an iPad, providing the ability to monitor large numbers of patients across the globe at low cost. Neurotrack is now monitoring about 100,000 individuals in 165 countries, and the company hopes to use this data for prevention and to develop new therapies.

Today, Neurotrack pairs monitoring with its Memory Health Program, which is a phone-based app that involves personal coaching. This program aims to help at-risk patients prevent memory loss by making scientifically based lifestyle changes related to diet, exercise, sleep, and stress management, and by staying cognitively engaged. "We know that lifestyle and behavior have a massive role to play in health outcomes. There is a large and growing body of evidence that some form of multi-lifestyle intervention can be extremely effective [in improving cognition]."

How to Die Young at a Very Old Age

Nir Barzilai, Professor of Medicine and of Genetics, Albert Einstein College of Medicine; Director of the Institute for Aging Research; Director of the Paul F. Glenn Center for the Biology of Human Aging Research; Director of the NIH Nathan Shock Centers of Excellence in the Basic Biology of Aging

The major risk for age-related diseases is . . . aging. Prevalence of heart disease, cancer, stroke, diabetes, and many other diseases all increase with age.



The Milbank Quarterly, Vol. 80, No. 1, 2002 from 1997 U.S. Vital Statistics

Two insights about aging:

- Yes, genetics plays a role in the diseases people get. But while genes can affect the first disease a person gets, other diseases follow rapidly not because of genetics, but because of aging.
- Chronological age and biological age are not the same. People's biological age may be younger or older than their chronological age.







Nir Barzilai, Professor of Medicine and of Genetics, Albert Einstein College of Medicine; Director of the Institute for Aging Research

Nir Barzilai put forth a goal of increasing the "health span." The idea is to improve overall health, which can have a side effect of improving longevity. Research shows that it appears possible to improve health span through certain treatments. In one study of centenarians, among those receiving some treatments, about 30% didn't have a disease at age 100, compared to a control group where only about 10% didn't have a disease.

What excites Dr. Barzilai most about this research is not that people will live longer, but that people might die without becoming sick or only become sick for a short period. Living healthier will have a significant economic impact for society, which Barzilai terms "the longevity dividend."

However, to date, the health care community has focused on treating specific individual diseases, like diabetes, instead of simultaneously treating all age-related diseases. And, drugs are approved by the FDA with indications focused on specific disease areas. If a drug lacks a specific indication, a payer won't pay for it. If drugs aren't paid for, pharmaceutical companies won't develop other drugs.

But we can't make progress by just eliminating one age-related disease, because we will still get other diseases. We have to target aging itself, since aging is related to so many diseases.

Barzilai talked about the TAME (Targeting Aging with Metformin) trial, which is a study of Metformin's ability to increase the health span and improve all age-related diseases. Metformin is a safe, inexpensive, generic drug that has been around for more than 60 years. Previous studies have shown that Metformin delays diabetes, delays cardiovascular diseases, decreases cancer, and delays cognitive decline. The TAME trial, being conducted with the agreement of the FDA, is disease agnostic. It has the potential to change regulation, change how the health care industry thinks about aging, and change drug development. The intent is to show that Metformin delays multiple comorbidities related to aging and can therefore be prescribed with a general indication of "aging."

Beyond TAME, better drugs and combinations are needed to combat aging. Fortunately, developing new therapeutics that target aging holistically has the potential to become a big business, and several pharma companies and biotechs are pursuing this opportunity.

"Aging has a biology that can be targeted. There are strategies with translational potential using tools already in clinical use." NIR BARZILAI, PROFESSOR OF MEDICINE AND GENETICS, ALBERT EINSTEIN COLLEGE OF MEDICINE

CONCLUSION

By 2050, the number of people over age 65 will increase from 617 million today to 1.6 billion, making aging one of the most important issues facing the world.

As the population ages and life expectancy continues to increase, so too will the number of people with heart disease, cancer, diabetes, and other age-related diseases, especially Alzheimer's and dementia. The costs of caring for this aging population are immense and the existing health care system is not set up to effectively and efficiently care for this aging population.

But along with these profound challenges, the aging population presents tremendous opportunities. There are opportunities for improving the current health care system and the care provided to today's aging population, as Sachin Jain is doing through CareMore.

There are also innovative near-term and longer-term opportunities where science can radically transform aging. Per Richard Hodes, geroscience is a new field that reflects the convergence of biology and disease and the biology of aging. George Church explained how innovations that sound like science fiction, such





as gene editing to cure diseases and reverse aging, are possible today. Elli Kaplan described using digital technologies and data to identify patients at risk for Alzheimer's much earlier, monitor them, and provide holistic treatment to prevent and delay this disease. And, Nir Barzilai highlighted the opportunity to find treatments for all age-related diseases instead of just treating one individual disease. These opportunities combine scientific discovery, new approaches, new and existing technologies, and new ways of delivering care.

FUSION illustrated the enormous scope of the medical, scientific, and economic challenges presented by aging, but also offered hope because many of the world's best scientific and business minds, including leaders from across multiple parts of Harvard, are focused on innovative, scalable solutions. Some of those solutions are already here and others aren't far away.

RECAPS OF PREVIOUS FUSION SYMPOSIA

FUSION 2016: The Science and Business of Regenerative Medicine

The first FUSION Symposium focused on regenerative medicine.

Harvard Business School professor Vicki Sato termed regenerative medicine the bleeding edge, and multiple leading clinicians and scientists shared examples of regenerative medicine's potential to save lives and reduce human suffering. Thanks to ongoing innovations, regenerative medicine has the potential to fight blindness, heart failure, blood diseases, amyotrophic lateral sclerosis, and musculoskeletal injuries. Regenerative medicine will transform the way transplants are conducted and will make it possible to rebuild heart tissue.

When Larry Summers, Charles W. Eliot University Professor and President Emeritus of Harvard University, delivered Harvard's commencement address a decade earlier, he spoke of the amazing possibilities of stem cell science and regenerative medicine. But speaking at FUSION, he said that he may have underestimated the scientific potential. Dr. Mark Fishman predicted that regenerative medicine will prove to be the third big wave of transformative medicine, following infection control in the last century and today's promising work to fight cancer. Regenerative medicine is the next frontier. Business leaders shared scientists' enthusiasm. They expressed an obligation and a responsibility to bring these innovations to the marketplace, but acknowledged commercialization challenges. Considerable effort is needed to drive down costs and scale up production so regenerative solutions can be put into practice at an affordable price.

FUSION 2017: The Science and Business of Combating Antibiotic Resistance

The second FUSION Symposium brought together scientists and business leaders to examine the challenges associated with antibiotic resistance. Dr. Anthony Fauci, director of the National Institute of Allergy and Infectious Diseases, warned of a "post-antibiotic age" and expressed concern that deaths from antibiotic-resistant bugs could rise more than tenfold by 2050 if appropriate steps aren't taken.

Participants discussed the major causes of antibiotic resistance as well as feasible solutions. Factors affecting resistance include overprescribing of antibiotics, not completing a prescribed course of antibiotics, and widespread use of antibiotics in livestock. At the same time, fewer new antibiotics have been developed, largely due to poor economic incentives for drug companies.

Among the scientific solutions discussed were exploring new uses for effective drugs; searching for drugs that boost the immune system rather than attacking an infection; and using bacteria-killing viruses. Marketplace solutions mentioned included developing rapid diagnostics so physicians will know more quickly what is causing an ailment and will only prescribe antibiotics when necessary. Also, campaigns need to be continued to educate the public that some ailments can't be helped by antibiotics (such as acute bronchitis, where 71 percent of adults get antibiotics even though it isn't caused by bacteria), along with continuing efforts to convince food companies to eliminate antibiotics in production, as Perdue Farms has done in its chickens.



