

Dr. Patrick Stover
Director, Institute for Advancing Health Through Agriculture
The Texas A&M University System

House Committee on Agriculture
“Innovation, Employment, Integrity, and Health: Opportunities for Modernization in Title IV”

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Congressional Testimony

Introduction

Chairman Thompson, Ranking Member Scott, and members of the committee, thank you for the opportunity to testify before you today and elaborate on the crucial intersection of agriculture, food, nutrition, and human health. My name is Dr. Patrick Stover, and I serve as Director of the Institute for Advancing Health Through Agriculture in The Texas A&M University System. I oversee a unique research institute that conducts research and rigorous scientific evidence synthesis seeking to better align Agriculture, Food and Nutrition as the solution to the skyrocketing rates of diet-related chronic diseases that are driving unsustainable health care costs and making both young and adult Americans sick. Medical costs associated with diet-related diabetes alone are more than \$180 billion annually, more than the budgets of most federal agencies.

I previously served as Vice Chancellor and Dean of Texas A&M AgriLife, where I oversaw the agricultural and life sciences academic and research programs across the Texas A&M System, one of the largest, top ranked and most comprehensive agriculture programs in the country, encompassing 5,000 people and a \$400 million budget. Texas A&M research programs span the entire agriculture value chain, from food production and farm inputs all the way to consumer behavior and human nutrition. Prior to that role, I served as director of the Division of Nutritional Sciences at Cornell University, one of the largest and top ranked academic nutrition programs in the United States. In this position, I worked with the World Health Organization (WHO) to establish a successful summer training program to train experts in evidence-based nutrition policy. Additionally, I have consulted for the Centers for Disease Control and Prevention, WHO, and the U.S. Food and Drug Administration on a variety of nutritional topics such as food fortification, nutrition policy and related research gaps. I have been an expert member, organizer and/or a report reviewer for several National Academies of Sciences, Engineering and Medicine (NASEM) initiatives including but not limited to: “Guiding Principles for Developing Dietary Reference Intakes Based on Chronic Disease”¹; “A Framework

¹ <https://www.nap.edu/catalog/24828/guiding-principles-for-developing-dietary-reference-intakes-based-on-chronic-disease>

for Assessing the Effects of the Food System”²; “Redesigning the Process for Establishing the Dietary Guidelines for Americans”³; and “Examining Special Nutritional Requirements in Disease States: Proceedings of a Workshop”⁴. I am an elected member of the National Academy of Sciences (NAS) and currently serve in a leadership position as NAS Agriculture Section Chair.

My research program specializes in deciphering the connections among human genetics, dietary folic acid, and birth defect prevention, notably spina bifida. I was part of a global team who advanced the fortification of folic acid into the food supply, which has been one of the greatest public health successes in using food as medicine, based on rigorous clinical trial data, and saving health care costs. Spina bifida, a debilitating birth defect, is now rare thanks to changes in food policy. My research in this area led to the Presidential Early Career Award for Scientists and Engineers awarded by President Bill Clinton, the highest honor bestowed by the U.S. government on outstanding scientists and engineers beginning their independent careers. I have served two terms on the NASEM Food and Nutrition Board, which oversees the academies’ nutrition portfolio including the establishment of the Dietary Reference Intakes. I am a Fellow of the American Association for the Advancement of Science (AAAS) and former president of the American Society for Nutrition (ASN). As ASN President, I led a major initiative to understand and address public trust in nutrition science. Last month, I was selected by the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) as the 2023 W.O. Atwater Lecturer, which recognizes “scientists who have made unique contributions toward improving the diet and nutrition of people around the world.”

Today, I want to provide my perspective on the state of agriculture, the food system, and its connection to hunger, nutrition, and human health. I will give some context and urgency related to the enormous challenges and barriers we face, but more importantly, emphasize the opportunities to reimagine the role of food and agriculture as the solution in transforming our lives, the economy, and our health. Finally, I will update you on efforts we are leading to position agriculture and our nation’s food supply as the solution to the diet-related chronic disease epidemic.

Chronic Diseases Manifest at the Interface Between the Consumer and the Food Environment They Experience

As we are all aware, the food we eat is in large part responsible for billions in healthcare costs attributable to diet-related diseases. The burden of chronic disease and associated costs are disproportionate in minority, rural, and other underserved, low resource populations⁵, while the associated health care costs are shared by everyone – we all have a stake in finding solutions. The overall obesity prevalence among U.S. adults is 42.4%, driven by a disproportionate

² <https://www.nap.edu/catalog/18846/a-framework-for-assessing-effects-of-the-food-system>

³ <https://www.nap.edu/catalog/24883/redesigning-the-process-for-establishing-the-dietary-guidelines-for-americans>

⁴ <https://www.nap.edu/read/25164/chapter/1>

⁵ RAND Health Care. Landscape of Area-Level Deprivation Measures and Other Approaches to Account for Social Risk and Social Determinants of Health in Health Care Payments. September 2022.

prevalence in African American (49.6%), Hispanic (44.8%), and Native American (48.1%) adults.⁶ Food insecurity follows a similar pattern.⁷ There are two primary and interacting drivers that underpin diet-related chronic disease: 1) the food environment that consumers experience and 2) individual consumer choices and health behaviors. The rising and unprecedented health care costs directly due to diets can only be addressed through a focused national effort that advances the spectrum of research, policy and practice that better aligns the food environment and individual consumer choices with human health outcomes. Both the food environment and consumer behavior need to be addressed together through sound policy grounded in high quality scientific evidence, which is largely lacking at this time.

The Food Environment That Consumers Experience

The agricultural system and food environment we all experience today has its origins in the post WWII era, where there was a consensus that food was a human right, and that hunger was unacceptable in the United States and globally. A food system and economic model was developed to ensure that hunger (lack of calories), and hidden hunger (lack of essential nutrients) would be rare and not due to insufficient food production to prevent nutritional deficiencies. Technology was brought to bear to achieve this goal. In 1970, Norman Borlaug won a Nobel Peace Prize for developing disease-resistant wheat plants, which sparked the Green Revolution. Borlaug leveraged science and technology to increase agricultural efficiency, generating more food production from the land. His legacy is the race to feed the world and eliminate hunger. A long-time Distinguished Professor of International Agriculture at Texas A&M University, his scientific and humanitarian achievements are legendary.

These efforts led to the creation of a national food system that is abundant, affordable, nutrient fortified and high in caloric density, as hunger results from a deficit in calories. While this system has proved successful in achieving its intended mission, one of the biggest challenges we face today is the unintended consequence of obesity and other chronic health conditions. Diet-related chronic diseases cost the U.S. economy well over \$1 trillion annually and affect 50% of adults. In Texas alone, obesity costs businesses \$11 billion per year, and that is expected to reach \$30 billion by 2030. We need to build upon Borlaug's legacy in a revolutionary new way, expanding our mission from simply using food to eliminate hunger and undernutrition to also using food to become healthier. This necessarily involves innovating throughout the food supply chain and not merely focusing on what some deem to be "healthy foods."

⁶ National Center for Health Statistics. Summary Health Statistics: National Health Interview Survey, 2018. (https://ftp.cdc.gov/pub/Health_Statistics/NCHS/NHIS/SHS/2018_SHS_Table_A-15.pdf).

⁷ Coleman-Jensen A, Rabbitt M, Gregory C, Anita Singh A. Household Food Security in the United States in 2021, ERR-309. U.S. Department of Agriculture, Economic Research Service; September 2022; Jernigan VBB, Huyser KR, Valdes J, Simonds VW. Food insecurity among American Indians and Alaska Natives: a national profile using the Current Population Survey-Food Security Supplement. *Journal of Hunger and Environmental Nutrition* 2017;12(1):1-10. (In eng). DOI: 10.1080/19320248.2016.1227750.

But, urbanization, underinvestment in agricultural research, gaps in knowledge, the shifting landscape of dietary guidance leading to a deficit in public trust all contribute to the growing disconnect between people and their knowledge of food production and the role of agriculture in human, environmental and economic health. This disconnect threatens the very system that puts food on their plate—agriculture.

Consumer Choice and Health Behaviors

The role of the consumer is equally important to achieving chronic disease reduction through food. When the purpose of food and diets is to avoid nutritional deficiencies, population-based approaches to agriculture, food and nutrition programs, policies and guidance are possible because most healthy individuals respond the same in the food-deficiency relationship. When chronic disease reduction is the expectation of the food environment, people respond differently to dietary exposures. I served as chair of an invited expert workshop to advise the National Institutes of Health on a major initiative in “Precision Nutrition”. As former NIH Director Francis Collins has stated, one-size does not fit all in the diet-chronic disease relationship. This awareness resulted in the National Institutes of Health focusing on understanding the complex role that dietary exposures play in chronic disease, and its variability among individuals, primarily through the *Nutrition for Precision Health* (NPH) initiative which is expected to facilitate actionable dietary advice to reduce chronic diseases.

Hence, as a nation we must focus on addressing both the food environment that consumers experience as well as increasing the individual consumer’s ability to support informed and positive food choices, which is fundamental to achieving chronic disease reduction through food. The ability to make healthy food choices includes a person’s knowledge, skills, and resources to make decisions about the consumption of healthy foods based on their goals, preferences, culture, and values. While advancing the precision nutrition research agenda and related technologies is key to informing Americans of the dietary practices and foods that best support their health, there are also actionable steps we can take now. For example, there is unacceptable variability in the delivery, rigor, effectiveness, and impact evaluation our nutrition education programs that support national food assistance programs, including EFNEP and SNAP-Ed. Immediate attention should be paid to understanding and maximizing the best practices that lead to positive health behaviors and disease reduction across these education programs, including common standards for effectiveness evaluation.

Building Public Trust in Nutrition

A 2019 report from the Pew Research Center, and a publication from the American Society for Nutrition, which I co-authored, indicated trust gaps between the public and nutrition research scientists. The science of nutrition is still in its infancy and today is rife with misunderstanding that leaves consumers confused. Inconclusive, emerging research on the nutrition needs of individual persons, which has led to flip-flopping dietary recommendations over time, has bred distrust in the science around the food we eat and the way that food is made. That’s why another piece to this puzzle is public trust. That is, everyone engaged in research, practice and policy must

work even harder to ensure scientific rigor is our highest priority, especially research that underpins our food intake recommendations. We can only earn that trust by not fearing where the science takes us, by being transparent about the state of knowledge and the certainty of our recommendations, and by respecting the tight linkages between cultures and their food systems.

The Texas A&M Institute for Advancing Health Through Agriculture (IHA) and the Agriculture, Food and Nutrition Evidence Center (AFNEC)

The divide between agricultural production and the contemporary expectations of agricultural systems—transitioning from hunger to human health—amounts to one of the greatest challenges facing our society. However, agriculture is positioned uniquely to be the solution—to lead the world in bridging this divide, supporting human health in a way that is both environmentally and economically sustainable. As a research accelerator, the new Texas A&M Institute for Advancing Health Through Agriculture (IHA) is the world’s first research institute to bring together precision nutrition and responsive agriculture research, linking food production to human consumption, to improve public health and lower health care costs. The IHA will also advance research to help agricultural producers and consumers harness big data, artificial intelligence and machine learning to produce food that improves public health.

The IHA includes a USDA-ARS program called “A Systems Approach to Responsive Agriculture.” We define “responsive agriculture” as approaches that increase both the quantity of food produced (to eliminate hunger) and the quality of food produced in that it supports human health in a way that is both environmentally and economically sustainable. The program will work with other land-grant universities and USDA-ARS centers to bring big data, state-of-the-art sensors and computational systems approaches to responsive agriculture and precision nutrition. IHA has a strong emphasis on minority food systems and health and respects the importance of all cultures and their connection to food. We have entered a full collaboration with The Texas A&M University System member Prairie View A&M University, an 1890 institution, which includes three post-docs for collaborative projects.

Below, I highlight 3 example research and convening initiatives that the IHA is undertaking to make agriculture and food the solution to human health:

1) Task Force on Developing a National Roadmap for Responsive Agriculture Solutions

Over the course of the next 18 months, the IHA is collaborating with the Chicago Council on Global Affairs’ Center on Global Food and Agriculture (the Council) by convening committees to set priorities for supporting human health through food and agriculture. These priorities will focus on the concept of *responsive agriculture*, which is an agriculture-system and food environment that consumers experience that supports human health through nutrition while ensuring the system is environmentally and economically sustainable for future generations. The three domains of responsive agriculture are: chronic disease reduction, agricultural ecosystems and agriculture-food value chain, and nutrition equity. To catalyze a system of responsive agriculture, the IHA, with project management support from the Council, has convened a Task

Force on Developing a National Roadmap for Responsive Agriculture Solutions and three committees. The task force will oversee the work of the committees and provide an initial framework to help guide the work of the committees. The composition of the committees includes leading experts in human health, agriculture, food, and economics with knowledge of biological and/or social/behavioral research, scientific evidence, policy, applied health and agricultural technologies as well as food and agriculture related industry representatives. This is an inclusive initiative that involves stakeholders throughout the entire food and agriculture value chain – everyone must have a seat at the table and be engaged in conversations to address these grand challenges at the nexus of agriculture, food systems, nutrition, and health.

Achieving human health through food will require greater precision in dietary guidance as “one size does not fit all” in the diet-disease relationship. Hence it is essential that we maintain a highly diversified agriculture production system to meet the different dietary needs of our diverse population. Agriculture is vital to these efforts. We cannot solve these problems without working collaboratively with production agriculture.

2) Agriculture, Food and Nutrition Scientific Evidence Center

To have confidence that our investments and interventions in the food system and human nutrition, whether a new policy action or recommendation, achieves the intended outcome, we must have confidence in the quality of the scientific evidence that serves as the foundation. There are major efforts underway to improve the rigor and reproducibility of agriculture and nutrition research. Furthermore, over the past two decades, nutrition has been moving from an approach of convening a group of experts to advise on policies and practices, to a two-tiered “evidence-informed” approach that considers and evaluates the totality of the scientific literature and data by agnostic methodologists or data experts, followed by the convening of experts. These advances are focused on removing the many biases we all have based on individual preferences and values around food choice when evaluating scientific data, but there is still much work to be done as discussed in more detail below.

The Texas A&M Agriculture, Food and Nutrition Scientific Evidence Center located in downtown Fort Worth is conducting state-of-the-art scientific evidence synthesis studies to address pressing public issues where agriculture, food and health intersect. This one-of-a-kind evidence center is a place where policymakers can ask questions related to connections among food, agriculture, the environment and the economy, and research specialists will gather and combine existing data on any topic pertaining to diet and health or economic and environmental policy by performing rigorous systematic reviews. And then, they will interpret the data for a non-science audience. The center is an objective source of comprehensive scientific information for decision-makers, akin to evidence centers in the medical science domain.

3) Maternal Diet and Child Health

Studies of the Dutch Famine of World War II revealed that maternal diet during pregnancy has strong and persistent effects on offspring health that persist through the lifespan, including risk

for cardiovascular disease, diabetes, and obesity. In Texas, health and nutrition for mothers and their children is in a state of crisis, which ultimately negatively impacts all Americans. The 2021 March of Dimes Report Card, which provides a comprehensive overview of the health of moms and babies across the U.S. and grades states' performance on mother and infant health, gave Texas a "D" grade. We believe it doesn't have to be this way. Texas has one of the nation's highest rates of poor birth outcomes (preterm birth rate of 10.8% statewide, 14.6% for African American Women in Texas), and 1 in 9 babies are born too soon in Texas. The maternal mortality rate in Texas is 34.5 deaths per 100,000 births, which is higher than the U.S. rate at 17.4 deaths per 100,000 births (highest among developed nations) and higher than Cuba, Mexico, and Uzbekistan. Texas ranks highest among the U.S. states and territories in childhood obesity with 20.3% of children ages 10-17 considered obese.

To address these challenges of maternal and child health, and high rates of chronic disease, the IHA is launching a major study to understand the role and contribution of maternal diet during pregnancy to chronic disease. There are three popular and distinct food traditions in Texas: African American, Hispanic and European. Our food preferences are one of the many things that make our state one of the most culturally diverse. The United States is a melting pot of people with various ethnicities and heritages, and the current menu landscape at all types of restaurants and food-service operations certainly reflects that. Food is not just a part of culture; it can define culture. However, it is important to note that food traditions such as those we have in Texas and in many parts of the country provide different nutritional benefits, as well as challenges to consumers. We must work within the cultural contexts of these food traditions to improve maternal and child health, starting at pregnancy. We must use certain science to work within these cultural contexts to improve lives through food systems and avoid the temptation to simply "tell people what to eat."

The IHA is deploying mobile health units to perform this community-based scientific research that seeks to understand the connection between food systems and maternal health (i.e., precision nutrition) and improve health habits in urban and underserved communities, populations that are not normally accessible to university-based research. These "labs on wheels" will house tools like body composition scanners, biometric recorders and blood pressure monitors and may partner with local farmers markets to deliver healthy food to residents. Equipped with information about healthy living, the mobile health units will also generate research data by surveying citizens about their current food habits. For many Texans, they will be the IHA's first touchpoint to connect food and health in underserved communities.

Conclusion

While historic efforts to eliminate hunger and food insecurity were important and well-intentioned, hunger cannot be considered in the absence of agriculture and health. We need to develop a systems approach to connecting agriculture, food, environment, economic and human health.

The costs of the current situation are hard to overstate. Diet-related chronic diseases place a huge financial burden on individuals, the health care system, and the American economy as a whole—as well as a heavy toll on life expectancy and quality of life. Our society needs help improving health outcomes and re-establishing trust in the science of nutrition and all of agriculture. Again, in achieving this goal, we must ensure our practices across the entire food and agriculture value chain are environmentally and economically sustainable for future generations.

Fortunately, there are solutions on the horizon. Achieving those improvements requires that the bridge between producers and consumers be rebuilt and no longer fragmented. It also requires that policies and practices must be informed by the best available science, and that nutrition and food needs must be based on people's specific biology and physiology, cultural preferences, transparency regarding scientific certainty and current health needs as they change over a lifetime. And, finally, it requires us to bolster citizen education to bring consumers along with the evolving field to earn their trust, ultimately allowing them to make the best decisions for themselves—benefitting the whole population in the aggregate.

It is also critical to restore trust across the entire food value chain, from producers to consumers. To meet these critical expectations of the food system, all actors and players in the food system must have a seat at the table to ensure collaboration and cooperation, while keeping rigorous and transparent science and the goals of eliminating hunger while advancing human, environmental and economic health, as paramount.

The White House recently proposed an \$8 billion federal and private partnership to implement program and policy initiatives referred to as “Food is Medicine” (FIM), to reduce the prevalence of chronic diseases. At this time, reducing hunger and chronic disease through food policies and programs that are evidence-based and therefore achievable will require first filling fundamental knowledge gaps through a nutrition research agenda that builds a deeper understanding of the diet-disease relationship. In the case of folic acid fortification for birth defect prevention, there was a strong evidence base to ensure the likelihood of success. For other FIM initiatives, our policies, programs and practices cannot get ahead of the science if they are to be successful.

Thank you for the opportunity to testify. I look forward to your questions.