Connecting Dots

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By:
Charles Benbrook, PhD
Chief Scientist
The Organic Center

Americans spend more on food than over 95 percent of humanity. Per capita expenditures on food in America are low because we are a rich nation, not because our food is inexpensive.

Americans spend more on health care than citizens in any other nation, yet public health is slipping by all sorts of measures. Today, nearly two-thirds of Americans are overweight or obese, and by 2010 scientists project that three-quarters of us will cross over the line. The prevalence of diabetes will nearly double from levels a decade before, with the most rapid increase among children and teenagers. Why are health problems with their roots in food choices and diet among the most serious public health problems in America today?

People are beginning to connect the dots. New research on diet-health connections is emerging daily and points to three important conclusions –

- Americans are overfed by, on average, a few hundred calories a day.

It takes about 3,500 extra calories to put on a pound of weight gain. If a person consumes, on average, 200 extra calories per day for a year, they are likely to end up 20 pounds heavier.

- We consume far too much added saturated fat, salt, and sugar.

A couple of extra sodas or sugared drinks per day are the difference between a teenager that maintains a healthy weight and one who becomes obese by their early 20s.

- Americans are undernourished.

On a daily basis, we lack adequate intakes of fiber and three to five essential nutrients, and consume less than half the fruits and vegetables needed to promote healthy development and graceful aging. Many of us lack adequate

intakes of heart-healthy fats like CLAs and omega-3, the kind present at elevated levels in Organic Valley milk, especially this time of year.

Science is beginning to look more deeply at all the things in our diet that can affect health, for better or worse, from vitamins and minerals, to antioxidants, chemical contaminants like pesticides, and mycotoxins and bacteria. A new consensus is emerging around two very important points.

1. The timing of exposures to chemicals, viruses, and bacteria, or imbalances in nutrient intake, plays a major role in the consequences of such exposures and imbalances.

Pregnant women, the child (or children) they are carrying, and infants and children are by far the most vulnerable. The developing baby is exposed to everything mom is exposed to, but lacks an adult woman's ability to detoxify toxic chemicals and repair the damage they cause at the cellular level. Their rapid growth is orchestrated by dozens of regulatory proteins that must be manufactured by the body at just the right time, in just the right amount. Anything that blocks their production, their action, or mimics them can steer a baby's development off course, with lifelong consequences.

After getting through our early years, the wear and tear of life catches up on us all, and as we age, we reach another vulnerable period when new diet-health connections become important. New science is highlighting the critical roles of antioxidants in preventing or slowing the neurological diseases of aging. In an ironic generational role reversal, the day is coming when kids will start telling their grandparents to eat their spinach.

2. The balance across all nutrients consumed in a day, and the form in which nutrients are ingested, can make a big difference in their availability to people, and in their value to, and impact on the body.

Scientists usually try to isolate and simplify problems to make it easier to design and carry out experiments that will prove or disprove a given theory or hypothesis. In the nutrition sciences, the typical reductionist approach in study design has often taking out of the equation the form of the nutrients in food, the balance of nutrients consumed in a day, chemical exposures, and interactions among all these factors. Recently, science has shown that these factors and interactions are often critical in understanding diet-health connections and outcomes. New types of studies are underway that take at least some of these factors into account.

Fortunately, and despite a lack of definitive science, many people over the years have sensed that farming-food quality and diet-health connections are important and started to look for ways to tip the odds toward good health. Their search for better tasting, more nutritious and safer food created the demand that

has financed over the years the steady growth in organic production, the emergence of a new industry, and companies like Organic Valley.

More science is coming, with deeper insights into the connections between how we produce and process food, what we choose to eat, and impacts on our health. The future is bright for those involved with organic food and farming, because knowledge both empowers and motivates, and there is no more powerful force than mothers and dads, grandparents, family members, and friends trying to keep each other, and their kids, healthy.

Environmental Connections

The size of the Dead Zone is projected to break another record this summer. The Dead Zone I am referring to is not where the Grateful Dead used to play. It is an ecologically dead part of the Gulf of Mexico about the size of Connecticut caused by the billions of pounds of nitrogen, phosphorous, soil and pesticides from farm land that flows down through the heartland into the Mississippi River and to the Gulf each year.

Ecological devastation in coastal areas ripple outwards, across species, time, and space. The magnitude of the tragedy in the wake of the Dead Zone will grow and people will ask – "How could this come to pass?"

The question has been asked and answered -- the Dead Zone is caused by the loss of nutrients from over-fertilized cropland up through America's heartland, even all the way up to valleys like this one. Ways to start shrinking the size of the Dead Zone are well known and have been described in detail in multiple commissions, studies, and calls to action.

Organic farming significantly increases the portion of nutrients that get into crops and remain bound in organic matter in the soil. Organic farmers do not apply 50 extra pounds of nitrogen fertilizer on corn, just to be sure that a shortage of N won't reduce yields by a few bushels. They apply none of the herbicides that can wreak havoc with a wide range of aquatic organisms, from frogs to sea grass and coral.

The more acres converted to organic farming in the heartland, the fewer acres in the Dead Zone in the Gulf.

Colony Collapse Disorder (CCD) threatens the successful pollination of the fruits and vegetables Americans need to eat more of. Despite great effort by scientists, the causes of CCD remain mysterious. One of the most likely drivers is the systemic nicotinyl insecticides now used to coat virtually every conventional corn seed planted in America. We know these insecticides are taken up by the plant roots and move throughout the plant. We know that the

levels present in pollen are sometimes high enough to make bees disoriented, so that some cannot find their way back to the hive.

But CCD impacts bees all over the country, and in many areas where corn is not planted. The missing piece in the puzzle will be found, and could be the presence of very low levels of nicotinyls in high-fructose corn syrup – the most common source of energy fed to bees in the winter by large commercial beekeepers.

We know that populations of native pollinators are much healthier on organic farms, especially those that maintain some natural habitat or which are near wild lands. Organic farmers do not use the insecticides, GM crops, or other inputs that might be contributing to CCD. Several, if not all of the root causes of CCD will probably fade away as more acreage is converted to organic farming.

Cows and Milk

Conventional dairy farmers, especially in the west, are dealing with some worrisome cow health trends. I know there are hundreds of exceptionally well-managed conventional dairy farms in Wisconsin with healthy cows and deep-set commitment to resource stewardship. Thanks for the good milk and clean water, and thanks on behalf of the cows. But all is not well on the nation's dairy farms.

Compared to a few decades ago, and on average, cows are more difficult to rebred, milk for several months longer per lactation, and are sent to slaughter after just a few lactations because of health or reproductive problems.

Each decade, the average life expectancy of a Holstein cow on "modern," high-production conventional dairy decreases by several months to half a year. This trend cannot go on, because if it does, the lifespan of dairy cows on conventional farms will hit zero in a few more decades.

The roots of today's cow health problems are well-known -- high-energy rations, lack of grazing, and excessive production levels that literally take the life out of the cow. There is little mystery left in connecting these dots. Most people in the dairy sector, including scientists, seem to accept today's level of wear and tear on cows as an unavoidable cost of doing business, and hence acceptable. But for many people, it is not acceptable, and it certainly is not unavoidable.

Organic dairy farming systems are grounded in promotion of cow health. The average age of cows on most well-established organic farms is increasing, in part because there is such strong demand for organic milk. Organic cows are valuable! Many of the two, three and four year old cows sold by organic dairies to make room for younger stock move down the road, or across state lines, to another farm for a few more years of production.

Not only is organic dairy farming healthier for cows, it produces more nutritious, safer milk. An exciting European study just came out on the impacts of organic milk and meat on heart-healthy fats in human breast milk. The scientists divided 312 breastfeeding women into groups on the basis of whether, and how much, organic milk and meat they consumed. They tested CLA (conjugated linoleic acid) levels in the women's breast milk, and found that the women consuming the most organic milk and meat had almost 40 percent higher levels of rumenic acid, the most common CLA in milk.

The authors attributed this increase in CLA in human breast milk to higher CLA levels in organic milk and meat products. Science has already proven that the higher level of CLAs in organic milk and meat products is a function of animal diets. The greater the reliance on pasture in organic dairy farming, the bigger the boost in CLA levels.

This study provides solid support for a simple truth -- What's good for the cow is also good for the people drinking the cow's milk.

Science is a powerful force, for good and sometimes evil. It drove the technological changes that created today's food system. Recently, science has begun looking under forbidden rocks. A new generation of scientists are conducting rigorous, world class research in the hope of connecting dots between how food is grown, how we process it, and how food and dietary choices impact us and the health of the planet.

Lets review a couple of recent examples. Concern among the public over the use of growth promoting hormones in beef production has lingered for years. The Europeans banned growth-promoting hormones in 1988, triggering an on-again, off-again trade war with the United States. But in the U.S., to this day, nearly 100% of the conventional beef cattle that spend the last couple of months of life in a feedlot are given growth-promoting hormones.

But old-school safety issues have not gone away, and some new ones are emerging. A team of scientists from the U.S. and Denmark decided to take a fresh look at beef hormone safety, and did so in a novel way. They probed data compiled through the "Study for Future Families," a five state, multicenter study of pregnancy outcomes carried out between 1999 and 2005. They focused on the impact of a mother's beef consumption on her adult son's reproductive capabilities.

They found that sons borne to mothers who were frequent consumers of conventional beef (more than seven servings per week) were three times more likely to meet the World Health Organization's criteria for impaired fertility than sons borne to moms who ate beef less regularly (less than seven times a week).

Another example. Scientists at U.C. Davis have been carrying out for over a decade a long-term farming systems trial comparing organic and conventional tomato production. They have studied and compared yields, nutrient content, production inputs and costs, impacts on soil quality, and specific combinations of production practices. The most recent publication to appear from this long-term trial came out in the June 23, 2007 issue of the *Journal of Agricultural and Food Chemistry*, a high-impact publication of the American Chemical Society.

The team reported a near doubling in health-promoting flavonoids in tomatoes in the organic system, compared to conventionally grown tomatoes in the same trial. They also reported another, unexpected finding – the gap between the flavonoid levels in the organic versus conventional tomatoes increased steadily over time. The longer the fields were managed organically, the greater the nutrition premium in the tomatoes harvested off the land. And even more mysterious – the increase in flavonoid nutrient density in the organic tomatoes continued despite cutting back significantly on the rate of compost applied to the organic plots.

Being scientists, they wondered why. They pushed the envelope and explored why organic tomatoes were more nutritious and concluded that changes in nitrogen levels and cycling within the higher quality soils in the organic plots was the most plausible explanation. This study is receiving well-deserved attention. By linking soil quality and reduced rates of nitrogen to more nutrient dense food, this study adds a powerful new dimension to one of the founding principles of organic farming –

Feed the soil to feed the plant, and to better feed people.

Scientists have a lot of work to do to connect all the dots linking farming to food quality, to animal and human health. More and more researchers are using organic food and farming as a "model system" that represents an alternative to today's industrial food system. They are peeling back layers of the onion, connecting more dots, sometimes in unexpected ways.

Two things are bound to happen. First, we will learn more about how to change agriculture and food, and dietary choices to better promote human health. Second, organic farmers and food companies will be offering consumers a wider choice of more nutritious, tastier and safer food.

The growth and prosperity of the organic industry in the years ahead will be driven by how fast this information emerges, how effectively it is communicated to consumers, and by the integrity and quality of organic food options in the marketplace. The Organic Center, my employer, is dedicated to achieving these goals and I know everyone here is as well.