

Dawn of agriculture took toll on health

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When populations around the globe started turning to agriculture around 10,000 years ago, regardless of their locations and type of crops, a similar trend occurred: The height and health of the people declined.

"This broad and consistent pattern holds up when you look at standardized studies of whole skeletons in populations," says Amanda Mummert, an Emory University graduate student in anthropology.

Mummert led the first comprehensive, global review of the literature regarding stature and health during the [agriculture](#) transition, to be published by the journal *Economics and Human Biology*.

"Many people have this image of the rise of agriculture and the dawn of modern civilization, and they just assume that a more stable [food source](#) makes you healthier," Mummert says. "But early agriculturalists experienced [nutritional deficiencies](#) and had a harder time adapting to stress, probably because they became dependent on particular [food crops](#), rather than having a more significantly diverse diet."

She adds that growth in population density spurred by agriculture settlements led to an increase in [infectious diseases](#), likely exacerbated by problems of sanitation and the proximity to domesticated animals and other novel disease vectors.

Eventually, the trend toward shorter stature reversed, and average heights for most populations began increasing. The trend is especially notable in the developed world during the past 75 years, following the

industrialization of food systems.

"Culturally, we're agricultural chauvinists. We tend to think that producing food is always beneficial, but the picture is much more complex than that," says Emory [anthropologist](#) George Armelagos, co-author of the review. "Humans paid a heavy biological cost for agriculture, especially when it came to the variety of nutrients. Even now, about 60 percent of our calories come from corn, rice and wheat."

In 1984, Armelagos and M. N. Cohen wrote a groundbreaking book, "Paleopathology at the Origins of Agriculture," which drew from more than 20 studies to describe an increase in declining health and nutritional diseases as societies shifted from foraging to agriculture.

The book was controversial at the time, but the link between the agricultural transition and declining health soon became widely accepted in what was then the emerging field of bioarcheology.

The current review was undertaken to compare data from more recent studies involving different world regions, crops and cultures. The studies included populations from areas of China, Southeast Asia, North and South America and Europe. All of the papers used standardized methods for assessing health at the individual level and examined how stressors were exhibited within the entire skeleton, rather than a concentration on a particular skeletal element or condition.

"Unless you're considering a complete [skeleton](#), you're not getting a full picture of health," Mummert says. "You could have an individual with perfect teeth, for example, but serious markers of infection elsewhere. You could see pitting on the skull, likely related to anemia or nutritional stress, but no marks at all on the long bones."

Adult height, dental cavities and abscesses, bone density and healed

fractures are some of the markers used to try to paint a more complete picture of an individual's health.

"Bones are constantly remodeling themselves," Mummert says. "Skeletons don't necessarily tell you what people died of, but they can almost always give you a glimpse into their ability to adapt and survive."

While the review further supports the link between early agricultural practices and declining stature and health, it's important to keep re-evaluating the data as more studies are completed, Mummert says.

One confounding factor is that agriculture was not adopted in an identical fashion and time span across the globe. In some ancient societies, such as those of the North American coasts, crops may have merely supplemented a seafood diet. "In these cases, a more sedentary lifestyle, and not necessarily agriculture, could have perpetuated decreased stature," Mummert says.

The way the human body adapted to changes we made in the environment 10,000 years ago could help us understand how our bodies are adapting now, she says.

Some economists and other scientists are using the rapid physiological increases in human stature during the 20th century as a key indicator of better [health](#).

"I think it's important to consider what exactly 'good health' means," Mummert says. "The modernization and commercialization of food may be helping us by providing more calories, but those calories may not be good for us. You need calories to grow bones long, but you need rich nutrients to grow bones strong."

Provided by Emory University

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