

Nutrition Perspectives

University of California at Davis, Department of Nutrition, Cooperative Extension, and Center for Health and Nutrition Research

Science on Salt Is Polarized, Study Finds

An analysis of scientific reports and comments on the health effects of a salty diet reveals a polarization between those supportive of the hypothesis that population-wide reduction of salt intake is associated with better health and those that were not (1). In all, 54 percent were supportive of the hypothesis; 33 percent, not supportive; and 13 percent inconclusive.

The article in the *International Journal of Epidemiology* is co-authored by Ludovic Trinquart, Columbia University Epidemiology Merit Fellow at the Mailman School of Public Health; David Johns, a doctoral student in Sociomedical Sciences at the Mailman School of Public Health and an affiliate of the Data & Society Research Institute; and Sandro Galea, dean of the Boston University School of Public Health and adjunct professor of Epidemiology at the

Mailman School.

The researchers systematically reviewed 269 academic reports published between 1979 and 2014, including primary studies, meta-analyses, clinical guidelines, consensus statements, comments, letters, and narrative reviews. Each was classified according to whether it supported or refuted the link between reduced sodium intake and lower rates of heart disease, stroke, and death. More than half of the reports were published since 2011—suggesting an increasing level of interest in the question, even if there was no emerging consensus.

A citation analysis found papers on either side of the hypothesis were more likely to cite reports that drew a similar conclusion than to cite reports



Reducing sodium intake has long been recommended to reduce risk of cardiovascular disease.

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drawing a different conclusion. Dominating the literature were a small number of influential papers that presented strong evidence for and against.

“There are two almost distinct bodies of scholarship—one supporting and one opposing the claim that salt reduction in populations will improve clinical outcomes,” says Johns. “Each is driven by a few prolific authors who tend to cite other researchers who share their point of view, with little apparent collaboration between the two ‘sides.’”

“We pay quite a bit of attention to financial bias in our work,” says Galea. “We seldom pay attention, however, to how long-held beliefs bias the questions we ask and the results we publish, even as new data become available.”

An analysis of systematic reviews revealed very little consistency in the selection of primary studies. If a primary study was selected by a review, the chance that another review would select the same study was less than a third. The finding points to uncertainty and disagreement about what should

count as evidence, the authors argue. Moreover, choices about which studies to cite as primary evidence directly influenced the conclusions of systematic reviews.

Even while the scientific debate over salt continues, public health officials, from the local to the global level, have enacted policies to lower consumption. World Health Organization guidelines recommend limiting salt intake. In December 2015, New York City became the first U.S. city to require chain restaurants to label foods high in sodium.

“Decision-makers often must choose a course of action in the face of conflicting, uncertain evidence,” says Trinquart. “Both the misuse of uncertainty and the exaggeration of certainty can shape the outcomes of public health decision-making processes.”

The authors say the citation analysis method used in the study represents a new way of understanding the relationships between academic research papers and authors. In the future, the same method could be applied to other topics, including controversial issues such as e-cigarettes as well as topics on which there is greater agreement.



“There are two almost distinct bodies of scholarship – one supporting and one opposing the claim that salt reduction in populations will improve clinical outcomes.”

Reference:

1. Trinquart L, Johns DM, Galea S. Why do we think we know what we know? A metaknowledge analysis of the salt controversy. *Int J Epidemiol*. 2016 Feb 17. pii: dyv184. [Epub ahead of print]

Source: Columbia University Mailman School of Public Health News; Feb. 18, 2016. <https://www.mailman.columbia.edu/public-health-now/news/science-salt-polarized-study-finds>

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Don't Use Body Mass Index to Determine Whether People are Healthy, UCLA-led Study Says

Over the past few years, body mass index, a ratio of a person's height and weight, has effectively become a proxy for whether a person is considered healthy. Many U.S. companies use their employees' BMIs as a factor in determining workers' health care costs. And people with higher BMIs could soon have to pay higher health insurance premiums, if a rule proposed in April by the Equal Employment Opportunity Commission is adopted.

But a new study led by UCLA psychologists has found that using BMI to gauge health incorrectly labels more than 54 million Americans as "unhealthy," even though they are not (1). The researchers' findings are published in the *International Journal of Obesity*.

"Many people see obesity as a death sentence," said A. Janet Tomiyama, an assistant professor of psychology in the UCLA College and the study's lead author. "But the data show there are tens of millions of people who are overweight and obese and are perfectly healthy."

The scientists analyzed the link between BMI — which is calculated by dividing a person's weight in kilograms by the square of the person's height in meters — and several health markers, including blood pressure and glucose, cholesterol and triglyceride levels, using data from the most recent National Health and Nutrition Examination Survey.

The study found that close to half of Americans who are considered "overweight" by virtue of their BMIs (47.4 percent, or 34.4 million people) are healthy, as are 19.8 million who are considered "obese."

Given their health readings other than BMI, the people in both of those groups would be unlikely to incur higher medical expenses, and it would be unfair to charge them more for health care premiums, Tomiyama said.

Among the other findings:

- More than 30 percent of those with BMIs in the "normal" range — about 20.7 million people — are actually unhealthy based on their other health data.
- More than 2 million people who are considered "very obese" by virtue of having a BMI of 35 or higher are actually healthy. That's about 15 percent of Americans who are classified as very obese.

Tomiyama, who directs UCLA's Dieting, Stress and Health laboratory, also called DiSH, found in previous research that there was no clear connection between weight loss and health improvements related to hypertension, diabetes, and cholesterol and blood glucose levels.

She said she was surprised at the magnitude of the numbers in the latest study.

"There are healthy people who could be penalized based on a faulty health measure, while the unhealthy people of normal weight will fly under the radar and won't get charged more for their health insurance," she said. "Employers, policy makers and insurance companies should focus on actual health markers."

Jeffrey Hunger, a co-author of the paper and a doctoral candidate at UC Santa Barbara, said the research shows that BMI is a deeply flawed measure of health. "This should be the final nail in the coffin



A new study has reported that more than 54 million Americans are incorrectly classified as unhealthy when BMI is used alone.

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for BMI," he said.

Hunger recommends that people focus on eating a healthy diet and exercising regularly, rather than obsessing about their weight, and strongly opposes stigmatizing people who are overweight.

Reference:

1. Tomiyama AJ, Hunger JM, Nguyen-Cuu J, and Wells C. Misclassification of cardiometabolic health when using body mass index categories in NHANES 2005-2012. *Int J Obes (Lond)*. 2016 Feb 4. doi: 10.1038/ijo.2016.17. [Epub ahead of print]

Source: Stuart Wolpert. UCLA Newsroom; Feb. 3, 2016; <http://newsroom.ucla.edu/releases/dont-use-body-mass-index-to-determine-whether-people-are-healthy-ucla-led-study-says>

The proposed EEOC rule would allow employers to charge higher insurance rates to people whose BMI is 25 or higher. A BMI between 18.5 and 24.99 is considered normal, but the study emphasizes that normal BMI should not be the primary goal for maintaining good health.

Gradual Drop in Adolescent Metabolic Syndrome Severity Linked to U.S. Dietary Changes

A study in the March 2016 issue of *Pediatrics* shows that among adolescents with metabolic syndrome, a cluster of risk factors that boost the odds of developing heart disease and type 2 diabetes, the severity of the condition slowly declined in the U.S. during the past 15 years (1). The drop coincided with a trend toward healthier diets among teens during the same timeframe, according to the study, "Trends in Metabolic Syndrome Severity and Lifestyle Factors among Adolescents."

Researchers looked at 5,117 participants between the ages of 12 and 19 in the National Health and Nutrition Examination Survey from 1999 to 2012. They found that while the percentage of those with metabolic syndrome--having at least three risk factors that included excessive belly fat, high

blood pressure, elevated fasting blood-sugar or triglyceride levels and low levels of "good" cholesterol or high-density lipoprotein (HDL)--held constant, the syndrome's severity decreased during this time frame.



The decrease in metabolic syndrome in adolescents might be due to increased consumption of unsaturated fat and protein.

The decline took place despite a significant rise in participants' body mass index, an indicator of obesity, which the study's authors suggest was offset by noted decreases in triglyceride levels and increases in HDL. The adolescents' physical activity levels remained the same during the time period, but their overall calorie intake decreased. Possibly mirroring the Mediterranean diet's rising influence on adult eating habits, the authors said, the adolescents consumed a decreasing proportion calories from carbohydrates and an increasing amount from unsaturated fat and protein.

Reference:

1. Lee AM, Gurka MJ, and DeBoer MD. Trends in Metabolic Syndrome Severity and Lifestyle Factors Among Adolescents. *Pediatrics*. 2016 Mar;137(3):1-9. doi: 10.1542/peds.2015-3177. Epub 2016 Feb 9.

Source: AAP Press Room; Feb. 9, 2016; <https://www.aap.org/en-us/about-the-aap/aap-press-room/pages/Gradual-Drop-in-Adolescent-Metabolic-Syndrome-Severity-Linked-to-U-S--Dietary-Changes.aspx>

School Breakfasts Contribute to Healthy Weight, Study Finds

Middle school students who eat breakfast at school — even if they have already had breakfast at home — are less likely to be overweight or obese than students who skip breakfast, says a new study by the Community Alliance for Research and Engagement (CARE) at the Yale School of Public Health and the Rudd Center for Food Policy & Obesity at the University of Connecticut (1).

The findings, published in the journal *Pediatric Obesity*, bring new evidence to the ongoing debate over policy efforts to increase daily school breakfast consumption. Previous research has shown that eating breakfast is associated with improved academic performance, better health, and healthy body weight for students. But there have been concerns that a second breakfast at school following breakfast at home could increase the risk of unhealthy weight gain.

“Our study does not support those concerns,” said Jeannette Ickovics, the paper’s senior author, director of CARE, and a professor at Yale School of Public Health. “Providing a healthy breakfast to students at school helps alleviate food insecurity and is associated with students maintaining a healthy weight.”

The study involved 584 middle school students from 12 schools in an urban school district where breakfast and lunch are provided to all

students at no cost. Researchers tracked the students’ breakfast-eating locations and patterns, and their weight over a two-year period from 5th grade in 2011-2012 to 7th grade in 2013-2014.

Specifically, the study found that:

- Students who skipped or ate breakfast inconsistently were more than twice as likely to be overweight or obese compared with students who ate double breakfasts.
- The weight changes from 5th to 7th grade for the students who ate double breakfasts was no different than the weight changes measured for all of the other students.

“When it comes to the relationship between school breakfast and body weight, our study suggests that two breakfasts are better than none,” said Marlene Schwartz, a study author and director of the Rudd Center.

The study holds implications for advocates and policy makers working to reverse the nation’s childhood obesity problem. Approximately one-third of American children between the ages of 6 and 11 are overweight or obese, with higher rates among black and Hispanic children than white children. School breakfast promotion initiatives have begun, but evidence is needed to ensure these efforts do not lead to the consumption of excess calories among children at risk for obesity.



“Middle school students who eat breakfast at school – even if they have already had breakfast at home – are less likely to be overweight or obese than students who skip breakfast, says a new study.”

Photo by USDA, <https://flic.kr/p/quB5ar>

Reference:

1. Wang S, Schwartz MB, Shebl FM, et al. School breakfast and body mass index: a longitudinal observational study of middle school students. *Pediatr Obes*. 2016. doi: 10.1111/ijpo.12127. [Epub ahead of print]

Source: Michael Greenwood. Yale News; Mar. 17, 2016; <http://news.yale.edu/2016/03/17/school-breakfasts-contribute-healthy-weight-study-finds>

Adolescents Living In Households with Food Insecurity Two Times More Likely To Have Poor Mental Health

More than twice as many adolescents living in households with food insecurity have poorer parent-reported mental health than peers, according to a study published by researchers at the Children's Hospital at Montefiore (CHAM), in the journal *Academic Pediatrics* (1).

Investigators at CHAM analyzed data from a nationally representative sample – the 2007 wave of the Early Childhood Longitudinal Study-Kindergarten – which included 8,600 students aged 12 – 16 years-old. Caregivers of the adolescents responded by phone to a series of questions that assessed the household's food situation (The U.S. Household Food Security Scale) and questions that are typically used as a screening tool to identify likely cases of mental health disorders (the Strengths and Difficulties Questionnaire).

Adolescents who experienced household food insecurity – a limited or uncertain availability of nutritional food - were twice as likely, according to their caregivers, to have emotional problems, conduct problems (a range of destructive behaviors that could include bullying, stealing, destroying other people's property, truancy and initiating physical fights), have hyperactivity and struggle with peer relationships.

"Food insecurity is not a risk factor for mental health that pediatricians typically address, but given our findings it is a topic we should consider discussing during our interactions with families," said Ruth E. K. Stein, M.D., co-author, attending physician, CHAM and professor of Pediatrics, Albert Einstein

College of Medicine. "We recommend keeping food insecurity in mind so we can better connect patients with the resources required to improve their home lives and overall health."

The researchers suggest exploring public health interventions aimed at reducing household food insecurity, for example government-assisted supplemental nutrition programs, and assessing their implications for adolescent mental health.

"Our study adds to the growing understanding of the adverse health risks experienced by children and adolescents living with food insecurity," said co-author Elizabeth Poole-Di Salvo, M.D., M.P.H., assistant attending pediatrician, New York-Presbyterian Hospital and assistant professor of Pediatrics at Weill Cornell Medical College. "As more than 15 million children in the U.S. under the age of 18 years-old live in households with food insecurity, this is a public health issue of utmost importance."



Adolescents who experienced household food insecurity were twice as likely to have emotional problems, hyperactivity, difficulty with peer relationships, and conduct problems, such as bullying, stealing, destroying other people's property, truancy and initiating physical fights.

Reference:

1. Poole-Di Salvo E, Silver EJ, and Stein RE. Household Food Insecurity and Mental Health Problems Among Adolescents: What Do Parents Report? *Acad Pediatr*. 2016 Jan-Feb;16(1):90-6. doi: 10.1016/j.acap.2015.08.005. Epub 2015 Sep 26.

Source: Montefiore News Releases; Feb. 16, 2016; <http://www.montefiore.org/body.cfm?id=1738&action=detail&ref=1286>

Tests Show No Specific Gastrointestinal Abnormalities in Children with Autism

Children with autism have no unique pattern of abnormal results on endoscopy or other tests for gastrointestinal (GI) disorders, compared to non-autistic children with GI symptoms, reports a study in the *Journal of Pediatric Gastroenterology and Nutrition* (1).

The study finds no evidence of cellular intestinal inflammation, lactase deficiency, or "leaky gut" specific to autistic children with GI symptoms, according to the new research, led by Timothy Buie, MD, Rafail Kushak, PhD, and Harland Winter, MD, of MassGeneral Hospital for Children, Boston. The results raise questions about previous scientific and non-scientific reports linking GI abnormalities to autism and autistic behaviors.

The researchers analyzed the results of diagnostic tests in 61 children with autism being evaluated for GI symptoms, such as abdominal pain or constipation. The findings were compared with those in 50 non-autistic, or "neurotypical," children undergoing similar tests. All tests were performed as part of routine clinical care—not solely for the purposes of the study.

The study focused on certain abnormalities with previously suggested links to autism. These include intestinal inflammation; deficiency of the digestive enzyme lactase, associated with lactose intolerance; and increased intestinal permeability, sometimes called "leaky gut."

Intestinal biopsy samples showed mild levels of microscopic inflammation in some of the children with autism, as well as in some of the non-autistic children. Markers of intestinal inflammation, lactase deficiency, and intestinal permeability were all similar between the children with and without autism.

Children with autism have behaviors that affect social interaction and both verbal and nonverbal communication. Common problems such as acid reflux or constipation may lead to atypical symptoms in children with autism—for example, aggressive or self-injuring behavior. "Consequently, gastrointestinal problems that might easily be recognized in a neurotypical child may go undiagnosed in a child with autism," the researchers write.

These unusual symptoms have led to the suggestion that autism behaviors might be linked to underlying GI disorders—or even that GI abnormalities contribute to the development of autism. Some parents and clinicians have observed improvements in autism-related behaviors and GI symptoms with special diets and other "non-evidence based interventions."

But the new study questions the reported links between autism and GI abnormalities, showing no significant differences in intestinal inflammation, lactase deficiency, or intestinal permeability in autistic



"The new study questions the reported links between autism and GI abnormalities, showing no significant differences in intestinal inflammation, lactase deficiency, or intestinal permeability in autistic versus non-autistic children with GI symptoms"

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Children with autism have behaviors that affect social interaction and both verbal and nonverbal communication. Common GI problems may lead to atypical symptoms.

versus non-autistic children with GI symptoms. "The results of this study suggest that common gastrointestinal problems occur in children with autism and should be evaluated," according to the authors. They add, "There is no evidence to support that gastrointestinal disorders cause autism."

The researchers emphasize that the findings of endoscopy and other diagnostic tests in autistic children with GI symptoms are similar to those in nonautistic children with similar GI symptoms. However, they note, "Identifying children with ASD who have concomitant medical conditions such as inflammatory bowel disease, malabsorption, or lactose intolerance may be challenging because their symptoms are atypical."

Reference:

1. Kushak R, Buie TM, Murray KF, et al. Evaluation of Intestinal Function in Children with Autism and Gastrointestinal Symptoms. *J Pediatr Gastroenterol Nutr.* 2016 Feb 20. [Epub ahead of print]

Source: Wolters Kluwer News; Feb. 25, 2016. <http://wolterskluwer.com/company/newsroom/news/2016/02/tests-show-no-specific-gastrointestinal-abnormalities-in-children-with-autism.html>

Vitamin D Deficiency During Pregnancy May Increase Risk of MS in Children

Children of mothers with vitamin D deficiency during early pregnancy appeared to be at greater risk for multiple sclerosis (MS) in adulthood, according to an article published by *JAMA Neurology* (1).

While elevated levels of vitamin D have been associated with a decreased risk of MS in adulthood, some previous research also has suggested that vitamin D exposure in utero may be a risk factor for MS in later life.

Kassandra L. Munger, Sc.D., of the Harvard T.H. Chan School of Public Health, Boston, and coauthors examined whether serum 25-hydroxyvitamin D (25[OH]D) levels in early pregnancy were associated with the risk of MS in children.

The authors identified 193 individuals (163 of them female) with a diagnosis of MS whose mothers were part of the Finnish Maternity Cohort and matched 176 case patients with 326 control participants for comparison.



Previous research has suggested that vitamin D exposure in utero may be a risk factor for MS in later life.

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The risk of MS as an adult was 90 percent higher in children of mothers who were vitamin D deficient.

The majority of maternal blood samples (70 percent) to measure 25(OH)D levels had been collected during the first trimester and the average maternal vitamin D levels were in the insufficient vitamin D range.

The risk of MS as an adult was 90 percent higher in children of mothers who were vitamin-D deficient (25(OH)D levels less than 12.02 ng/mL) compared with the children of mothers who were not vitamin D deficient, according to the results.

The authors note that two prior studies examining the association between 25(OH)D levels in pregnancy/early life did not find an association with future MS risk in children. In the current study, the authors note a few limitations, including that maternal 25(OH)D levels during pregnancy are not a direct measure of the 25(OH)D levels to which the developing fetus is exposed.

The study concludes that “while our results suggest that vitamin D deficiency during pregnancy increases MS risk in the offspring, our study does not provide any information as to whether there is a dose-response effect with increasing levels of 25(OH)D sufficiency. Similar studies in populations with a wider distribution of 25(OH)D are needed.”

Reference:

1. Munger KL, Åivo J, Hongell K, et al. Vitamin D Status During Pregnancy and Risk of Multiple Sclerosis in Offspring of Women in the Finnish Maternity Cohort. *JAMA Neurol.* 2016 Mar 7. doi: 10.1001/jamaneurol.2015.4800. [Epub ahead of print]

Source: JAMA News Releases; Mar. 7, 2016; <http://media.jamanetwork.com/news-item/vitamin-d-deficiency-during-pregnancy-may-increase-risk-of-ms-in-children/>

Study Supports Fish Consumption During Pregnancy

A new study supports the theory that the detrimental effects of low-level exposure to mercury may be outweighed by the beneficial effects of fish consumption (1).

The study finds little evidence of harm in infants whose mothers had low fish consumption and low mercury exposure. In fact, infants of mothers with higher mercury exposure during pregnancy and who consumed more fish had better attention and needed less special handling during a newborn exam. This likely was due to the beneficial nutritional effects of fish consumption, according to the researchers.

“The better neurobehavioral performance observed in infants



Omega-3 fatty acids found in fish have been reported to benefit attention, memory, and other areas of development.

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with higher mercury biomarkers should not be interpreted as a beneficial effect of mercury exposure, which is clearly neurotoxic,” says Kim Yolton, PhD, a researcher at Cincinnati Children’s Hospital Medical Center and senior author of the study. “It likely reflects the benefits of polyunsaturated fatty acid intake that also comes from fish and has been shown to benefit attention, memory, and other areas of development in children. In our study, mercury exposure was very low, primarily due to consumption of fish low in mercury, so the detrimental effects might have been outweighed by the beneficial effects of fish nutrition.”

The study is published in *Neurotoxicology and Teratology* (1).

The researchers assessed the neurobehavior of 344 5-week-old infants using a standard neurobehavioral scale. Gestational mercury exposure was measured in maternal blood and infant umbilical cord blood. The researchers collected fish consumption information from the mothers and estimated polyunsaturated fatty acid intake based on the type and amount of fish consumed.

Reference:

1. Xu Y, Khoury JC, Sucharew H, et al. Low-level gestational exposure to mercury and maternal fish consumption: Associations with neurobehavior in early infancy. *Neurotoxicol Teratol*. 2016 Mar-Apr;54:61-7. doi: 10.1016/j.ntt.2016.02.002. Epub 2016 Feb 12
2. U.S. Food and Drug Administration and U.S. Environmental Protection Agency. Fish: What Pregnant Women and Parents Should Know. Jun. 2014. Available at <http://www.fda.gov/Food/FoodbomellnessContaminants/Metals/ucm393070.htm>

Source: Cincinnati Children’s Hospital Newsroom; Feb. 23, 2016; <http://www.cincinnatichildrens.org/news/release/2016/fish-consumption-pregnancy/>

Eighty-four percent of mothers reported eating fish during pregnancy but only about two ounces per week on average. Those infants with higher prenatal mercury exposure showed asymmetric, or unequal reflexes. But when fish consumption was taken into account, those whose

mothers consumed more fish had better attention and needed less special handling.

In 2014, the FDA and EPA updated their advice to consumers to encourage women to eat more fish (eight to 12 ounces per week) than had previously been recommended and to select fish with the lowest mercury levels (2). These include salmon, shrimp, pollock, light canned tuna, tilapia, catfish, and cod. They also suggested avoiding

fish with the highest mercury levels, including tilefish, shark, swordfish, and mackerel.

“The important thing for women to remember is that fish offers excellent nutritional qualities that can benefit a developing baby or young child,” says Dr. Yolton. “Moms just need to be thoughtful about which fish they eat or provide to their child.”



“In 2014, the FDA and EPA updated their advice to consumers to encourage women to eat more fish (eight to 12 ounces per week) than had previously been recommended and to select fish with the lowest mercury levels.”

Global Shift in Farmed Fish Feed May Impact Nutritional Benefits Ascribed to Consuming Seafood

The fish-farming industry is increasing its use of plant-based ingredients in its feed and moving away from traditional feed made from fish, which could impact some of the health benefits of eating certain types of seafood, suggests a new analysis from the Johns Hopkins Center for a Livable Future (CLF) at the Johns Hopkins Bloomberg School of Public Health (1).

The findings are published in the journal *Environment International*.

Half of the seafood consumed by Americans is farmed. Fish farming, also known as aquaculture, is the fastest-growing food animal sector, outpacing the beef and poultry industries. While wild fish find their own food – which includes smaller fish for carnivorous species — intensively farmed fish are fed a manufactured aquaculture feed. Until recently, this manufactured feed was typically composed of high levels of fishmeal and fish oil derived from wild fish — but it has become unsustainable to catch more wild fish to feed growing numbers of farmed fish, so the industry has shifted the makeup of the feed. For example, twice as much soybean meal was used in commercial aquaculture feed in 2008 as compared to fishmeal, and the use of crop-based ingredients is projected to increase 124 percent between 2008 and 2020.

“Farmed fish get their health-promoting omega-3 fatty acids, EPA and DHA, from their feed, and specifically from fish oil,” says study leader Jillian Fry, PhD, director of CLF’s Public Health and Sustainable Aquaculture Project and a faculty member at the Bloomberg School. “Our review found that increasing plant-based ingredients can

change the fatty acid content in farmed fish, which can affect human nutrition.”



The farmed-fish industry is increasingly using plant-based ingredients in fish feed, which may impact the fatty acid content of farmed fish.

The new study details the industry shift to crop-based feed ingredients, such as soy, corn, and wheat, to replace wild fish as a key ingredient in manufactured feed. The researchers — in collaboration with colleagues from the University of Minnesota’s Institute on the Environment and McGill University — reviewed aquaculture and public health literature, and

conducted a new analysis to estimate the environmental footprint for the top five crops used in commercial aquaculture feed.

The shift has been hailed by some as a positive change in light of the increasingly depleted oceans and the rapidly expanding aquaculture industry. But the shift may have some unintended consequences as well.

Using vegetable oils instead of fish oil changes the fatty acid content of fish and nutritional value for human consumption, the researchers say. Considering Americans are encouraged to consume seafood high in omega-3 fatty acids, which promote improved cardiovascular health and neurodevelopment, this has large implications for dietary recommendations and the aquaculture industry. More research is needed, they say, to better understand the impact of this shift in feed on the health benefits of consuming farmed fish.

While fish-based ingredients are seen as

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acutely limited, so are the resources such as land, water and fertilizer used to produce feed crops. Aquaculture's environmental footprint likely now includes increased nutrient and pesticide runoff from the industrial crop production needed to supply fish food. This runoff is a key driver of water pollution globally, and can negatively impact public health. Depending on where and how feed crops are produced, plant-based fish feed could be indirectly linked to negative health outcomes for agricultural workers and nearby communities due to exposure to air, water or soil contaminated by nutrients and/or pesticides.

Fry says that these new findings may raise more questions than they answer.

"The nutritional content of farmed fish should be monitored," Fry says. "The aquaculture industry should assess the environmental footprint and public health impacts of their crop-based feed ingredients and seek those produced using sustainable methods."

Reference:

1. Fry JP, Love DC, MacDonald GK, et al. Environmental health impacts of feeding crops to farmed fish. *Environ Int.* 2016 Mar 10;91:201-214. doi: 10.1016/j.envint.2016.02.022. [Epub ahead of print]

Source: Johns Hopkins Bloomberg School of Public Health News Releases; Mar. 11, 2016; <http://www.jhsph.edu/news/news-releases/2016/global-shift-in-farmed-fish-feed-may--impact-nutritional-benefits-ascribed-to-consuming-seafood.html>



The change in feed may also shift the environmental impact of farmed fish production.

Adherence to Nutrition Recommendations and Use of Supplements Essential For Vegans

Vegans adhere to nutrition recommendations in varying degrees, according to a new Finnish study (1). Some vegans who participated in the study followed a balanced diet, while others had dietary deficiencies. Typical deficiencies were an unbalanced use of protein sources, a low intake of berries, fruits and nuts, as well as failure to use nutrient fortified food products. The majority, however, used vitamin B12 and D supplements and calcium-fortified drinks as recommended. The findings were published in *PLOS ONE*.

The serum vitamin D concentrations were below the reference values in 24 percent of the vegan group. They also had lower concentrations of beta-carotene, selenium, iodine and essential fatty acids than the control group following a non-vegetarian diet.

According to the researchers, the findings highlight the need of vegans to get nutrition guidance and to use the recommended

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Use of supplements is necessary for vegans to avoid nutrient deficiencies.

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nutrient supplements. Moreover, closer attention should be paid to the intake of vitamin D and iodine among vegans.

Vegetarian and vegan diets are increasingly common in western societies. However, in order to ensure the intake of all the necessary nutrients, vegetarian and vegan diets need to be composed in a well-rounded manner. Research into the nutritional status of vegans nevertheless remains scarce.

The study analysed the nutritional status of young adults who had been following a vegan diet for an average period of eight years. The study involved six male vegans and 16 female vegans, and the matched control group comprised eight men and 11 women who followed a non-vegetarian diet. The researchers were especially interested in the intake and concentrations of nutrients that are limited or lacking in vegetarian foods, for example vitamin B12, vitamin D, selenium, iodine and essential fatty acids. The food intake of the study participants was analysed from three-day food records, and their nutritional status was measured from blood and urine samples.

The diet of the vegan group was exclusively limited to plant-based foods, and their intake of legumes, tofu and soy flour was higher than the control group's, but no other significant differences were observed. Nutrient supplements were used by 91 percent of the vegan group and 78 percent of the control group. Vitamin B12 supplementation was

used by 91 percent of the vegan group, vitamin D supplementation by 77 percent, and the majority also used calcium-fortified drinks.

The vitamin B12 concentrations of the vegan group were within the reference values, as were the values of the control group. The serum vitamin D concentrations were below the reference values in 24 percent of the vegan group and in 6 percent of the control group. Vegans also had lower concentrations of beta-carotene, selenium, iodine and the essential EPA and DHA fatty acids. All in all, however, vegans had higher polyunsaturated fatty acid concentrations and lower saturated fatty acid concentrations than the control group. In addition, the concentrations of soy polyphenols were high in vegans.



A vegan diet includes no animal products of any kind, including dairy, eggs, and honey.

The median concentration of iodine in urine was below the recommended levels in both groups. Earlier research shows that the intake of iodine has decreased in Finland over the past years. Iodine is present in milk and iodine-fortified salt, the use of which have declined.

According to nutrition recommendations, a vegan diet should involve a balanced, daily intake of whole grain products, legumes, seeds and nuts as sources of protein, as well as vegetables, fruits, berries and unsaturated fats. In addition, vegans should consume calcium-fortified drinks and use vitamin B12, vitamin D and iodine supplements to complement their diet.

Reference:

1. Elorinne AL, Alfthan G, Erlund I, et al. Food and Nutrient Intake and Nutritional Status of Finnish Vegans and Non-Vegetarians. PLoS One. 2016 Feb 3;11(2):e0148235. doi: 10.1371/journal.pone.0148235.

Source: University of Eastern Finland News and Events; Mar. 22, 2016; <http://www.uef.fi/-/vegaanin-on-noudatettava-ravitsemussuosituksia-ja-taydennettava-ruokavaliotaan>

Older Adults at Risk for Adverse Interactions Due to Use of Multiple Medications and Supplements

More older adults used multiple medications and dietary supplements, and taking them together put more people at increased risk for a major drug interaction, according to a study published by *JAMA Internal Medicine* (1).

Most older adults in the United States use prescription and over-the-counter medications and dietary supplements. There is increased risk among older adults for adverse drug events and polypharmacy.

Dima M. Qato, Pharm. D., M.P.H., Ph.D., of the University of Illinois at Chicago, and coauthors analyzed nationally representative data to examine changes in medication use, which included concurrent use of prescription and over-the-counter medications and dietary supplements, to gauge potential for major drug interactions.

The study group included 2,351 participants in 2005-2006 and 2,206 in 2010-2011 who were between the ages of 62 and 85. In-home interviews and direct medication inspection were performed.

The authors report:

- Concurrent use of at least five prescription medications increased from 30.6 percent to 35.8 percent over the study period.
- Concurrent use of five or more medications

or supplements of any type increased from 53.4 percent to 67.1 percent.

- Use of over-the-counter medications declined from 44.4 percent to 37.9 percent.
 - Dietary supplement use increased from 51.8 percent to 63.7 percent. Multivitamin or mineral supplements and calcium were the most commonly used supplements during the study period.
 - About 15.1 percent of older adults in 2010-2011 were at risk for a major drug interaction compared with an estimated 8.4 percent in 2005-2006. For example, preventive cardiovascular medications and supplements were increasingly used together in interacting drug regimens.



Most older adults use multiple medications and supplements, putting them at risk for adverse drug events.

The authors note study limitations. For example, their study data were not designed to evaluate the broad range of factors that can influence adverse drug events, such as liver and kidney function, type of interaction, dosage, timing of concurrent use and disease severity

“These findings suggest that the unsafe use of multiple medications among older adults is a growing public health problem. Therefore, health care professionals should carefully consider the adverse effects of commonly used prescription and nonprescription medication combinations when treating older adults and counsel patients about these risks,” the authors conclude.

Reference:

1. Qato DM, Wilder J, Schumm LP, et al. Changes in Prescription and Over-the-Counter Medication and Dietary Supplement Use Among Older Adults in the United States, 2005 vs 2011. *JAMA Intern Med.* 2016 Apr 1;176(4):473-82. doi: 10.1001/jamainternmed.2015.8581.

Source: JAMA News Releases, Mar. 21, 2016; <http://media.jamanetwork.com/news-item/articles-focus-on-otc-medications-dietary-supplements-complementaryalternative-medicine/>

Use of Complementary and Alternative Medicine Often Not Disclosed to Primary Care Physicians

Many patients do not disclose to primary care physicians their use of complementary and alternative medicine (CAM), according to an article published by *JAMA Internal Medicine* (1).

Primary care physicians often don't initiate conversations with patients about their use of CAM and patients have had concerns about discussing CAM with their physicians for fear of disapproval. These communication barriers may prevent CAM from being integrated into patient treatment and self-care routines.

Judy Juo, M.A., and Pamela Jo Johnson, M.P.H., Ph.D., of the University of Minnesota, Minneapolis, analyzed survey data for 7,493 adults. Of the adults, 3,094 (42.3 percent) did not disclose their most used form of CAM, according to the results reported in the research letter.



“When adults did not disclose CAM to their physicians, it was most often due to physicians not asking about it or patients believing their physicians didn’t need to know about their CAM use.”

Nondisclosure was most common among adults who did yoga, tai chi or qi gong and among those who practiced meditation or mindfulness. Adults who used herbs or supplements and who had acupuncture disclosed the most, results show.

When adults did not disclose CAM to their physicians, it was most often due to physicians not asking about it or patients believing their physicians didn't need to know about their CAM use, according to the results.

“Contrary to earlier findings, our results attribute most nondisclosure to physicians not asking about CAM use or to concerns about physician knowledge regarding CAM rather than to physician discouragement or negativity about the use of CAM. Consequently, physicians should consider more actively inquiring about patients' use of CAM, especially for modalities likely to be medically relevant,” the authors conclude.

Reference:

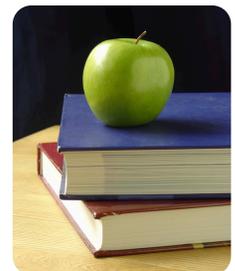
1. Jou J, and Johnson PJ. Nondisclosure of Complementary and Alternative Medicine Use to Primary Care Physicians: Findings From the 2012 National Health Interview Survey. *JAMA Intern Med.* 2016 Apr 1;176(4):545-6. doi: 10.1001/jamainternmed.2015.8593.

Source: JAMA News Releases, Mar. 21, 2016; <http://media.jamanetwork.com/news-item/articles-focus-on-otc-medications-dietary-supplements-complementaryalternative-medicine/>

Resource: CDC Parents for Healthy Schools

Parents have a powerful role in supporting children's health and learning. Engaged parents help guide their children successfully through school, advocate for their children, and can help shape a healthy school environment. CDC has developed a set of resources called Parents for Healthy Schools to help schools and school groups engage parents to create healthy school environments. Learn more at:

<http://www.cdc.gov/healthyschools/parentengagement/parentsforhealthyschools.htm>



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