**http://milk.procon.org/view.answers.php?questionID=000806**

**Is Raw Milk More Healthful Than Pasteurized Milk?**

|  |  |
| --- | --- |
| **General Reference (not clearly pro or con)** | |
| Epicurious.com, a website about food consumption, stated in the entry for milk in its "Food Dictionary" (accessed Aug. 15, 2011):  *"Raw milk, usually only commercially available in health-food stores, has not been pasteurized. Advocates say it's better nutritionally because vitamins and natural enzymes have not been destroyed by heat. The dairies that are certified to sell raw milk have rigid hygiene standards and their herds are inspected regularly. But the milk is still not [pasteurized](http://milk.procon.org/viewresource.asp?resourceID=664" \l "pasteurization" \t "_self) and therefore carries some potential risk of disease."*  Aug. 15, 2011 - [Epicurious.com [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=002981)](http://milk.procon.org/view.source.php?sourceID=002981" \t "_blank) | |
| [**Editor's Note**: As of Jan. 2013, the sale of raw milk in stores is legal in 12 states. 17 states only permit raw milk sales on farms; 4 states only allow raw milk acquisition through "cow-share" agreements; and in 17 other states all sales of raw milk are prohibited. | |
| **Is Raw Milk More Healthful Than Pasteurized Milk?** | |
| **PRO (yes)** | **CON (no)** |
| Linda Melos, ND, primary care naturopathic physician, stated the following in her article "The Health Benefits of Raw Milk," available at www.lindamelosnd.com (accessed Aug. 15, 2011):  "[P]asteurized milk actually interferes with calcium metabolism... Before heating [pasteurization], milk is a living food rich in colloidal minerals and enzymes necessary for the absorption and utilization of the sugars, fats, proteins and minerals in milk. Raw cream and butter has 'X Factor' that prevents joint stiffness.  Eight to ten thousand years ago, raw and fermented milk products began to replace animal bones as a major source of minerals in many cultures. These raw dairy products were known to increase strength, fertility and general health. Present-day cultures whose diets are high in cultured raw dairy products tend to be extremely healthy, long-lived people. (The culturing of raw milk breaks down the lactose, and predigests the milk proteins.) Raw milk that is still warm from the animal has traditionally been used through the centuries for various wasting diseases...  Pasteurizing milk kills off all bacteria, including the health-giving lactobacilli. This allows milk to putrefy with bad bacteria over time, rather than sour or ferment from good lactobacilli. Pasteurization also destroys vitamins, especially C, B6 and B12, and denatures fragile milk proteins. It destroys 20% of the iodine, and makes insoluble the major part of the calcium content."  Aug. 15, 2011 - [Linda Melos, ND [http://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=011017)](http://milk.procon.org/view.source.php?sourceID=011017" \t "_blank)  The Weston A. Price Foundation's Campaign for Real Milk explains in the article "What Is Real Milk?," available on its website (accessed Aug. 15, 2011):  "Pasteurization destroys enzymes, diminishes vitamin content, denatures fragile milk proteins, destroys vitamins C, B12 and B6, kills beneficial bacteria, promotes pathogens and is associated with allergies, increased tooth decay, colic in infants, growth problems in children, osteoporosis, arthritis, heart disease and cancer...  Pasteurization was instituted in the 1920s to combat TB [tuberculosis], infant diarrhea, undulant fever and other diseases caused by poor animal nutrition and dirty production methods. But times have changed and modern stainless steel tanks, milking machines, refrigerated trucks and inspection methods make pasteurization absolutely unnecessary for public protection."  Aug. 15, 2011 - [Weston A. Price Foundation [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=003203)](http://milk.procon.org/view.source.php?sourceID=003203" \t "_blank)  Theodore Beals, MD, former pathologist at the Veterans Administration Medical Center in Ann Arbor, MI, in the case of *Organic Pastures v. State of California*, provided the following testimony on Apr. 25, 2008, in support of raw cow's milk and against CA legislation (AB 1735) which regulated coliform levels in raw milk:  "Beneficial bacteria provide benefits in a number of ways…[o]ne of the ways that they provide benefit is by producing specific substances which kill other [harmful] bacteria. Another way that they are beneficial to people is that they inhibit the growth of other [harmful] bacteria indirectly rather than just simply killing them. Additionally, they have been shown -- beneficial bacteria have been shown to block the entrance of [harmful] bacteria into the body, therefore preventing the illness…  Prebiotic is a substance which when introduced to beneficial bacteria stimulates their growth or stimulates their beneficial activity. A probiotic is defined technically as bacteria, beneficial bacteria, which when added to a product or as a supplement provides those beneficial bacteria to the person that's drinking the milk. My personal take on this is it's obvious from the definitions that fresh market - raw market milk is in fact a prebiotic. It does stimulate beneficial organisms. And although not technically meeting the definition of a probiotic because it's not added, these beneficial bacteria that are present are natively present in [raw] milk.”  Apr. 25, 2008 - [Theodore Beals, MD [http://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=006974)](http://milk.procon.org/view.source.php?sourceID=006974" \t "_blank)  The Organic Consumers Association stated the following in its May 7, 2010 press release "Cow on Boston Common 5-10-2010 for Raw Milk Drink-In," available at www.organicconsumers.org:  "Over three million Americans now prefer organic raw milk and raw milk dairy products over pasteurized milk because of its superior nutrition and disease fighting qualities and because it comes from small, local producers who pasture their dairy cows, rather than keeping them confined all day and all year in dairy feedlots on huge, disease-ridden factory farms."  May 7, 2010 - [Organic Consumers Association [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=011018)](http://milk.procon.org/view.source.php?sourceID=011018" \t "_blank)  Joseph Mercola, DO, an osteopathic physician, stated in his Apr. 24, 2004 article "The Real Reasons Why Raw Milk Is Becoming More Popular," published on his website:  "Raw milk is a highly health-promoting food... While it is certainly possible to become sick from drinking contaminated raw milk, it is also possible to become sick from almost any food source. But it seems that raw milk has been unfairly singled out as a risk, when only a very small risk exists...  Raw milk is an outstanding source of nutrients including beneficial bacteria such as lactobacillus acidophilus, vitamins and enzymes, and it is, in my estimation, the finest source of calcium available...  People who have been allergic to pasteurized milk for many years can typically tolerate and even thrive on raw milk. Raw milk is truly one of the most profoundly healthy foods you can consume, and you'll feel the difference once you start to drink it."  Apr. 24, 2004 - [Joseph Mercola, DO [http://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=003200)](http://milk.procon.org/view.source.php?sourceID=003200" \t "_blank)  Raw-milk-facts.com, a website with information about raw milk, reports in the article "The Health Benefits of Raw Milk," available on the website (accessed Aug. 15, 2011):  "Clean raw milk from pastured cows is a complete and properly balanced food... About 80% of the proteins in milk are caseins - reasonably heat stable but easy to digest. The remaining 20% or so fall into the class of whey proteins, many of which have important physiological effects (bioactivity). Also easy to digest, but very heat sensitive, these include key enzymes (specialized proteins) and enzyme inhibitors, immunoglobulins (antibodies), metal-binding proteins, vitamin binding proteins and several growth factors... Studies have shown significant loss of these important disease fighters when milk is heated to normal processing temperatures...  Lactose, or milk sugar, is the primary carbohydrate in cow's milk. Made from one molecule each of the simple sugars glucose and galactose, it's known as a disaccharide. People with lactose intolerance for one reason or another (age, genetics, etc.), no longer make the enzyme lactase and so can't digest milk sugar. This leads to some unsavory symptoms, which, needless to say, the victims find rather unpleasant at best. Raw milk, with its lactose-digesting Lactobacilli bacteria intact, may allow people who traditionally have avoided milk to give it another try."  Aug. 15, 2011 - [Raw-milk-facts.com [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=003117)](http://milk.procon.org/view.source.php?sourceID=003117" \t "_blank)  Adam Helfer, certified nutrition and lifestyle coach, stated the following in his Aug. 6, 2011 article "Rawesome Foods Raided: A Sad Day for America," available at communities.washingtontimes.com:  "Raw Grassfed milk and products (which have been produced and consumed safely for thousands of years) have been shown to help combat allergies, gastro intestinal disorders, build the immune system and have helped children with Autism and Asperger syndrome. These positive benefits are not found in pasteurized milk, which in fact can cause many of the symptoms listed. This makes raw milk a very popular and crucial part in a mothers' dietary planning for their children and family."  Aug. 6, 2011 - [Adam Helfer [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=011016)](http://milk.procon.org/view.source.php?sourceID=011016" \t "_blank) | The US Food and Drug Administration (FDA) stated the following in a July 16, 2011 press release, "Foodborne Outbreak Associated with Raw Milk from Tucker Adkins Dairy of York SC," available at www.fda.gov:  "The FDA recommends that consumers only drink pasteurized milk. Raw milk is unpasteurized milk from hoofed mammals, such as cows, sheep, or goats. Raw milk may contain a wide variety of harmful bacteria – including Salmonella, E. coli O157:H7, Listeria, Campylobacter and Brucella - that may cause illness and possibly death...  Symptoms of illness caused by various bacteria commonly found in raw milk may include vomiting, diarrhea, abdominal pain, fever, headache and body ache. Most healthy individuals recover quickly from illness caused by raw milk. However, some people may have more severe illness, and the harmful bacteria in raw milk can be especially dangerous for pregnant women, the elderly, infants, young children and people with weakened immune systems...  Since 1987, the FDA has required all milk packaged for human consumption to be pasteurized before being delivered for introduction into interstate commerce. Pasteurization, a process that heats milk to a specific temperature for a set period of time, kills bacteria responsible for diseases, such as listeriosis, salmonellosis, campylobacteriosis, typhoid fever, tuberculosis, diphtheria and brucellosis...  Proponents of drinking raw milk often claim that raw milk is more nutritious than pasteurized milk and that raw milk is inherently antimicrobial, thus making pasteurization unnecessary. There is no meaningful nutritional difference between pasteurized and raw milk, and raw milk does not contain compounds that will kill harmful bacteria.”  July 16, 2011 - [US Food and Drug Administration (FDA) [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=003099)](http://milk.procon.org/view.source.php?sourceID=003099" \t "_blank)  The Los Angeles County District Attorney's Office stated the following in its Aug. 3, 2011 press release, "Three Arrested on Charges of Illegally Producing, Selling Unpasteurized Milk," available at da.co.la.ca.us:  "Pasteurization kills or slows the growth of pathogens and microbes and it must be accomplished according to state standards under sanitary conditions. The process involves the heating of milk to a high temperature for a specific time and then cooling it immediately. The manufacture and sale of unpasteurized [raw] milk products poses a risk of pathogenic contamination. Those pathogens include salmonella, listeria, e-coli, staphylococcus aureus and tuberculosis."  Aug. 3, 2011 - [Los Angeles County District Attorney's Office [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=011015)](http://milk.procon.org/view.source.php?sourceID=011015" \t "_blank)  The Centers for Disease Control stated in their June 13, 2008 article "Escherichia Coli 0157:H7 Infections in Children Associated with Raw Milk and Raw Colostrum from Cows,” published in the *Morbidity and Mortality Weekly Report*, that:  "Those states that permit the sale and consumption of raw milk report more outbreaks of foodborne disease attributed to raw milk than those states that have stricter regulations. During 1973-1992, raw milk was implicated in 46 reported outbreaks. Nearly 90% of these outbreaks (40 out of 46) occurred in states that allow the sale of raw milk…  Because illnesses associated with raw milk continue to occur, additional efforts are needed to educate consumers and dairy farmers about illnesses associated with raw milk and raw colostrum. To reduce the risk for E. coli O157 and other infections, consumers should not drink raw milk or raw milk products.”  [**Editor's Note**:  In March, 2012, the US Centers for Disease Control and Prevention (CDC) released a report titled "[Nonpasteurized Dairy Products, Disease Outbreaks, and State Laws - United States, 1993-1996](http://milk.procon.org/sourcefiles/2012-cdc-raw-milk-study.pdf" \t "_blank)" (268KB) http://milk.procon.org/files/milk%20images/pdf-logo.gif, which concluded:  "Public health officials at all levels should continue to develop innovative methods to educate consumers and caregivers about the dangers associated with nonpasteurized dairy products.  State officials should consider further restricting or prohibiting the sale or distribution of nonpasteurized dairy products within their states. Federal and state regulators should continue to enforce existing regulations to prevent distribution of nonpasteurized dairy products to consumers. Consumption of nonpasteurized dairy products cannot be considered safe under any circumstances."]  June 13, 2008 - [United States Centers for Disease Control and Prevention (CDC) [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=003208)](http://milk.procon.org/view.source.php?sourceID=003208" \t "_blank)  John F. Sheehan, JD, Director of Plant and Dairy Food Safety at the US Food and Drug Administration's Center for Food Safety and Applied Nutrition, stated the following in his Mar. 15, 2007 testimony before the Health and Government Operations Committee of the Maryland House of Delegates, available at www.fda.gov:  "Raw milk is inherently dangerous and may contain a whole host of pathogens...  Claims that raw milk has miraculous disease-curing properties are not supported by the scientific literature...  Permitting raw milk sales, or the operation of so-called 'cow-share' schemes to occur within any given jurisdiction, will not result in the maintenance or further strengthening of our food safety systems. On the contrary, permitting such sales and schemes will inevitably result in an increased incidence of foodborne illness...  Raw milk is inherently dangerous and should not be consumed. Raw milk continues to be a source of foodborne illness and even a cause of death within the United States. Despite the claims of raw milk advocates, raw milk is not a magical elixir possessing miraculous curative properties. Pasteurization destroys pathogens and most other vegetative microbes which might be expected and have been shown to be present in milk. Pasteurization does not appreciably alter the nutritive value of milk."  Mar. 15, 2007 - [John F. Sheehan, JD [http://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=011014)](http://milk.procon.org/view.source.php?sourceID=011014" \t "_blank)  Ruth Kava, PhD, RD, stated in her Aug. 7, 2006 article "'Healthful' Raw Milk: A Dangerous Myth Is Back," published on the American Council on Science and Health website:  "It's ironic that a food process instituted back in the 1920s and 30s to prevent real, milk-borne disease, is now being demonized as a cause of nutrient depletion (which it is not). Indeed, some raw milk advocates blame pasteurized milk for everything from infant colic to osteoporosis, heart disease, and cancer (have they been talking to the anti-aspartame lobby?). None of this is true...  While raw milk may taste somewhat sweeter than the pasteurized variety, this hardly makes up for the fact that it is considerably more likely to carry disease-causing microorganisms. Indeed, as we have noted in the past, there have been well-documented outbreaks of E. coli O157:H7 infection in children, an infection that can result in permanent kidney damage, if not death.  We can only hope that the public health community exerts itself to counter the spread of the raw milk myth."  Aug. 7, 2006 - [Ruth Kava, PhD, RD [http://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gifhttp://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=003209)](http://milk.procon.org/view.source.php?sourceID=003209" \t "_blank)  The Washington Dairy Products Commission explained in its article "What Is Milk?," published on its website, (accessed Sep. 25, 2008):  "'Raw milk' is milk that has not been pasteurized. Although some people claim that 'raw' milk possesses positive nutritional and health-promoting attributes, these claims have not been scientifically substantiated. USDA, FDA, Centers for Disease Control [and Prevention] and many other scientific authorities recommend against consumption of 'raw' milk. 'Raw' milk can contain a variety of microorganisms that can be harmful and even fatal to people - including bacteria campylobacter, Escherichia, listeria, salmonella, yersinia and brucella. Pasteurization, however, destroys any harmful microorganisms and renders milk safe for everyone to consume."   [**Editor's Note:** On Aug. 15, 2011 ProCon.org checked for updated information on raw milk from this source. The original article quoted above on Sep. 25, 2008 no longer appears on their website, nor does any information about raw milk that we could find.]  Sep. 25, 2008 - [Washington Dairy Products Commission [http://milk.procon.org/images/gstar.gif](http://milk.procon.org/view.source.php?sourceID=002982)](http://milk.procon.org/view.source.php?sourceID=002982" \t "_blank) |

<http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/>

# Pasteurized vs. Raw Milk: Which One Is Healthier for You & Your Family?

*Published on September 28, 2009, Last Updated on June 12, 2013*

Since the early 1930′s our government has been “protecting” us from the “dangers” of whole, raw milk. How do they do this? By actually killing the whole, raw milk by pasteurizing it! Interestingly, pasteurization also increases the shelf life of milk, making it much easier to mass-market, maximizing profits for the dairy industry.

Real milk comes from real goats or cows that are allowed to graze in toxin free pastures. Besides tasting great, raw organic milk is a precious, life-giving food. But extreme temperatures used to pasteurize (“cook”) the milk can actually render it life-depleting.

Pasteurization destroys almost all of the nutritive value of [cow’s milk](http://www.globalhealingcenter.com/natural-health/dangers-of-cows-milk/). The milk everybody drinks today is far from a whole food, and in my research is not fit for human consumption.

Pasteurization also destroys beneficial bacteria found in raw milk [[1](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#1)]. It kills the natural enzymes and destroys the chemical make-up of calcium in raw milk. Calcium is vital to the growth and health of children. Pasteurization has been implicated in everything from allergies to heart disease to cancer. Truly, the resulting product after pasteurization is not raw and living, but rather “killed and dead.”

**Raw Milk: Why the Fuss?**

The fuss about raw milk has to do with pathogens – organisms that can cause diseases such as Salmonella. But whether or not raw milk carries pathogens depends totally on the way the milk is produced, how the animals are fed, and the care that’s taken to keep the milk clean during production.

Today’s pasteurized milk comes from cows crammed in cages loaded with synthetic hormones and antibiotics. Homogenizing purposely destroys raw milk’s natural butterfat in an effort to separate and hide the cream from the consumer. European studies show that this is dangerous and may cause heart disease [[2](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#2)]. Of course our FDA disputes this. Homogenized milk is quite unnatural!

Back in the 20′s Americans could buy raw, clean, grass-fed milk and cheese – and at that time milk-borne diseases were rare. Can you believe that suppliers of organic, raw milk today are required to display the words “Not fit for human consumption”? It’s true!

I firmly believe that true [health starts in the colon](http://healthbeginsinthecolon.com/). Raw milk contains the milk sugar “lactose” in its purest form, and lactose aids in digestion and elimination. And organic, raw milk is the only food that has it in a usable form! I personally am not a animal milk drinker, but if I was I would only consume [raw goat milk](http://www.globalhealingcenter.com/natural-health/goat-milk-benefits/).

**The Nutritional Benefits of Raw Milk**

Here’s just a sampling of the nutritional benefits of raw, organic milk

* Organic, raw milk is a complete food, loaded with minerals, protein and vitamins. Raw milk contains an amazing selection of minerals ranging from calcium and phosphorus to trace elements. Pasteurization destroys them and they must be re-supplied.
* Raw milk has 20 of the standard amino acids. [[3](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#3)]
* Up to 80% of the proteins in raw milk are easy to digest — some are complex antibodies. [[4](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#4)]
* Raw milk is abundant in calcium — legendary for its benefits for teeth, bones etc. [[5](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#5)]
* It is also loaded with enzymes that have an array of health benefiting functions. [[6](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#6)]
* Raw milk is alive with beneficial bacteria that aid digestion and protect against disease-carrying organisms. [[7](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#7)]

**A Historical Look at Raw Milk**

Humans have drank raw milk, long before the pasteurization process began. Here’s a look at the history of raw milk and how it was used for many generations before ours. [[8](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#8)]

* The earliest possible records show that man valued milk intensely, including milk from goats, camels, horses, even reindeer! And most certainly it was of the unpasteurized, raw organic variety. Herdsmen in Asia coveted milk even before the Bible praised the “land of milk and honey.”
* Most people don’t know that raw organic milk from grass-fed animals was actually used as a medicine in the 1920′s. The Mayo Foundation used a diet of raw milk as a remedy for heart failure, diabetes, kidney disease, chronic fatigue and obesity. [[9](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#9)]
* From the time of Hippocrates until just after World War II, this miracle food nourished and healed millions. Today, in Germany, successful raw milk therapy is provided in many hospitals. [[10](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#10)]
* Studies show that raw milk is very effective in preventing scurvy and protecting against flu, diphtheria and pneumonia. Raw milk prevents tooth decay, even in children who eat a lot of sugar. [[11](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#11)]
* And it’s amazing to think that, almost always, the folks known most for their great health and long life, like the Bulgarians and Russians, are heavy consumers of raw milk and milk products, not to mention that they eat hardly any meat!

### How to Find Raw Milk

There’s a huge demand today for organic raw milk and milk products. That’s because people are becoming more aware of the life-giving benefits of raw milk. But dairy farmers who have been supplying raw organic milk to consumers are increasingly at odds with local and state government, who are oblivious to the adverse effects of pasteurization.

In California, Governor Schwarzenegger signed legislation requiring pasteurization of all raw milk in California. California will go from being one of the most raw-milk friendly states to one of the most restrictive. And that’s a pity. [[12](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#12)]

Fortunately, an abundance of small organic farms across the country are willing to continue to stick their necks out and sell raw organic milk, and raw organic milk products like cheese, butter and yogurt – in spite of the risk from the long arm of the FDA. To find your own local source of raw organic milk check out The Weston A. Price Foundation, as well as RealMilk.com.

Or you can share part “ownership” of a healthy organically fed cow or goats. You just split the cost with other folks and the milk becomes yours, and thereby legal to drink! Believe it or not some people are forced to skirt the law by claiming its for their pets! In the meantime, it’s best to follow the advice of one of the pioneers of the natural health movements in America, Dr. Paavo Airola:

“If you cannot get a high-quality milk, raw and unpasteurized, guaranteed to be from organically raised animals and 100% free from chemical additives, drugs, detergents, and insecticide and herbicide residues, then you will be better off to omit milk and milk products from your diet.” [[13](http://www.globalhealingcenter.com/natural-health/raw-milk-vs-pasteurized-milk/#13)]

As a vegan alternative, try drinking organic nut and seed milks. My favorite is [Hemp Milk](http://www.globalhealingcenter.com/natural-health/benefits-of-hemp-milk/).

- Dr. Edward F. Group III, DC, ND, DACBN, DCBCN, DABFM

<http://www.thenewamerican.com/usnews/health-care/item/13030-health-officials-push-flu-shots-but-some-question-their-safety>

Friday, 28 September 2012 16:27

Health Officials Push Flu Shots, but Some Question Their Safety

Written by  [Raven Clabough](http://www.thenewamerican.com/usnews/health-care/itemlist/user/59-ravenclabough)

Health officials are [encouraging](http://www.usatoday.com/news/nation/story/2012/09/27/health-officials-push-for-more-people-to-get-flu-shot/57848096/1" \t "_blank)Americans to get vaccinated for the flu, as there are a significant number of doses of flu shot vaccine available this year. Thus far, 85 million of the 135 million flu vaccine doses for this year have been distributed, according to the Centers for Disease Control and Prevention. But some critics assert that it is more dangerous for Americans to acquire the flu shot than the flu.

Those at the Department of Health and Human Services assert that the flu is dangerous and “unpredictable” and assert that those who do not receive the flu vaccines are at risk.

"Influenza is predictably unpredictable," said Howard Koh, assistant secretary for health at the Department of Health and Human Services. "In 2009-2010, we had a pandemic with thousands hospitalized and many deaths," Koh said. "Last year, we set a record for the lowest number of hospitalizations and the shortest influenza season."

But according to Natural Society, the flu vaccines are equally “unpredictable” and dangerous. What’s more, Natural Society contends that the vaccines are ineffective.

Natural Society [reports](http://naturalsociety.com/a-flu-vaccine-timeline-the-recent-history-revolving-around-vaccine-dangers/" \t "_blank)that in 2009, “a staggering 50 percent of doctors refused the H1N1 flu vaccine due to the strong connection with adverse health connection with adverse health concerns.” Sadly, many of those doctors were still recommending those shots to their patients.

By 2010, government chiefs had confirmed a link between the H1N1 vaccine and a nerve disease known as [Guillain-Barre Syndrome](http://en.wikipedia.org/wiki/Guillain%E2%80%93Barr%C3%A9_syndrome" \t "_blank). But as noted by Natural Society, “This information didn’t stop health officials from pushing the vaccine onto the population in 2010 and 2011.”

And the link between flu vaccines and Guillain-Barre Syndrome has been made since the 1970s.

“The vaccines used to combat an expected swine influenza pandemic in 1976 were shown to be associated with GBS and were withdrawn from use,” [Prof. Elizabeth Miller, head of the HPA’s immunization department](http://www.foxnews.com/story/0,2933,539880,00.html" \t "_blank), wrote in the letter sent last month to neurologists

And assertions that the benefits of the flu vaccine outweigh the risks fall flat when one observes research by The Lancet which revealed that the flu vaccination is virtually ineffective.

Natural Society writes:

The study involved a control group of 13,095 adults who were not vaccinated. The group were watched to see if they caught the influenza virus, but 97 percent of them did not. Only 2.7 percent, or 357 people, of the non-vaccinated group ended up catching the virus. Another group of adults whom were vaccinated with a trivalent inactivated influenza vaccine ended up with 1.2 percent of them not catching the flu. The difference between the two outcomes is 1.5 people out of 100 which shows that the flu vaccine only prevents the flu in 1.5 out of every 100 adults injected with the flu vaccine.

In addition to the issues associated with the flu vaccination, a number of skeptics note the dangers of vaccinations in general.

Natural Society writes:

Vaccines are often filled with harmful chemicals which lead to many of the health conditions listed above. Many of these chemicals are inflammatory chemicals added to strengthen the vaccine. One main “ingredient” in vaccines which has been in the controversial spot light for quite some time is thimerosal. Thermerosal is a preservative used for injections coming from a multi-dose vial to prevent bacterial contamination. The problem is that thimerosal contains quite a bit of mercury which is concerning to many health professionals.

Still, the CDC is recommending flu vaccines for anyone over aged 6 months.

"Even mild seasons can lead to suffering and death," said Koh, who was vaccinated at the news conference. "People cannot become complacent this season. When it comes to the flu, we cannot look to the past to predict what will happen this season."

Pregnant women are being encouraged to receive the flu vaccine as well.

*USA Today* touts the “benefits” of receiving a flu vaccine while pregnant.

“By getting a flu shot during pregnancy, women develop antibodies that go through the placenta to their fetuses, protecting babies after birth for their first six months of life, before they are old enough to get their own shots,” writes USA Today.

However, a study by the U.S. National Library of Medicine National Institutes of Health indicates that pregnant women show significant increase in the C-reactive protein (CRP) and other indications of inflammation following the vaccinations:

Trivalent influenza virus vaccination elicits a measurable inflammatory response among pregnant women ... There was considerable variability in magnitude of response; coefficients of variation for change at two days post-vaccination ranged from 122 percent to 728 percent, with the greatest variability in IL-6 responses at this timepoint.

… As adverse perinatal health outcomes including preeclampsia and preterm birth have an inflammatory component, a tendency toward greater inflammatory responding to immune triggers may predict risk of adverse outcomes, providing insight into biological mechanisms underlying risk… further research is needed to confirm that the mild inflammatory response elicited by vaccination is benign in pregnancy.

Additionally, Dr. Joseph Mercola of Mercola.com [emphasizes](http://articles.mercola.com/sites/articles/archive/2011/10/31/flu-vaccination-epa-safety-limit-for-mercury.aspx" \t "_blank)that pregnant women should be particularly fearful about the presence of thimerosal that is found in the vaccines.

“If you are pregnant or have an infant and want to get a flu shot, be aware that you may have to specifically insist on getting the thimerosal-free single vial version as many health practitioners and pharmacists are still clueless about the health risks associated with thimersoal,” he writes.

Australia, Finland, and Sweden have all either banned flu vaccines altogether, or have opened investigations into their dangers.

In 2010, Australia suspended vaccinations for children under the age of five after noticing a 200 percent increase in unusual fevers and convulsions. Even worse, Australia’s health agency, the CSL had reportedly omitted that information from legally required product information sheets given to doctors.

In Finland, 79 children between the ages of 4 and 19 developed narcolepsy after having received the Pandemrix vaccine. Amongst those cases, 76 also suffered from bouts of cataplexy, suffering hallucinations or paralyzing physical collapses.

In response, the Finnish government and major health insurance companies offered to pay for the lifetime medical care of all those children who were diagnosed with narcolepsy after receiving the vaccine that caused it.

Dr. Mercola asserts that examples like these should compel Americans to at least reconsider the pros and cons of vaccinations.

“Unfortunately, vaccine makers are completely shielded from liability for any harm caused by a pandemic vaccine, which is what the H1N1 flu vaccine was, so the fact that this vaccine turned out to be so harmful is a red flag for everyone to carefully weigh potential benefits and risks, and not trust blindly when health officials and doctors give standard assurances of vaccine safety and effectiveness,” he writes.

**http://www.huffingtonpost.com/david-katz-md/flu-shot\_b\_2257520.html?view=print&comm\_ref=false**

**Flu Me Once** Posted: 12/07/2012 11:37 am

The CDC has [noted](http://bostonglobe.com/news/nation/2012/12/04/cdc-says-flu-season-starts-early-could-bad/YqXLCLamIKX0jGXfL97dyK/story.html" \t "_hplink) an early and nasty start to the flu season. Perhaps their own website has caught it, because as I'm writing this, the whole thing is down. Assuming it recovers, I will insert relevant links per routine. Otherwise, I wish it well, and leave you to find your way there on your own.

It's a bit soon to say, but the virus and the outbreak pattern at this point [seem to resemble](http://hollysprings.patch.com/articles/cdc-get-your-flu-shot-ee44743a" \t "_hplink)those of the 2003-2004 flu season, in which nearly 50,000 Americans died. At least [two children](http://www.cbsnews.com/8301-204_162-57556861/cdc-warns-flu-season-off-to-earliest-start-in-decade/" \t "_hplink) have already died of flu complications this fall.

This is not the sort of stuff a public health physician can ignore. So, I recently noted on[LinkedIn](http://www.linkedin.com/today/post/articles/23027997" \t "_hplink) and [Twitter](https://twitter.com/DrDavidKatz" \t "_hplink) that I've been vaccinated -- as I am every year -- and recommend this year's vaccine, which appears to match the prevailing viral strain quite well, to everyone else. I promptly got comments back from naysayers, including at least one self-identified microbiologist, who noted he never got vaccinated, and had "never gotten the flu."

I believe him. But this is like that proverbial "Uncle Joe" everyone knows, who smoked three packs a day and lived to be 119. It could happen -- but I wouldn't bet the farm on it. Uncle Joe is that rare character who somehow comes away from a train crash with a minor flesh wound. The rest of us are mortal.

But there is something more fundamentally wrong with the "I've never gotten the flu, and therefore don't need to be vaccinated" stance than the *Uncle Joe fallacy*. Let's face it -- those who were ultimately beneficiaries of smallpox or polio immunization never had smallpox or polio, either. If they ever had, it would have been too late for those vaccines to do them any good.

Not all that long ago in the grand scheme -- when our parents were children -- [polio](http://en.wikipedia.org/wiki/Poliomyelitis" \t "_hplink) was the dreaded scourge of summer. Our grandparents knew that the advent of summer meant a reasonable chance that one of their children would be infected with the polio virus, and possibly come away crippled for life as a result. Immunization put an end to this, of course. But all of the beneficiaries of it -- all those children who never were crippled by the virus -- could say just what the nihilistic microbiologist said. They never got polio.

The same is true of [smallpox](http://en.wikipedia.org/wiki/Smallpox" \t "_hplink), one of the most dreaded killers in human history, and still the only infectious disease willfully eradicated. We can no longer say how many millions of lives have been saved by the smallpox vaccine. (Which was, by the way, the original "vaccine," and the reason for the name. The word "vaccine" comes from the Latin word for cow, and refers to the fact that the smallpox vaccine was derived from cowpox.) But we can say that no one saved by the vaccine ever had smallpox before they got it.

The trouble with serious illness is that one time can be one time too many.

Familiarity breeds contempt, or at least complacency, and perhaps the annual return of influenza has induced that response. Perhaps that's why we seem to be dismissive of this germ, and overlook what a serious illness it can be.

But that tendency is at our peril. The single greatest infectious disease calamity in all of human history was not plague, or typhus, or smallpox -- it was the [1918 flu pandemic](http://en.wikipedia.org/wiki/1918_flu_pandemic" \t "_hplink), which killed as many as [50 million](http://wwwnc.cdc.gov/eid/article/12/1/05-0979_article.htm" \t "_hplink). Those who don't respect the flu just aren't paying attention.

That said, I do understand the reasons for reticence about immunization in general, and flu immunization in particular.

For any vaccine to do us any good, we need to get it while feeling fine. This is quite different from, say, an operation that is much more dangerous -- but easily justified by the obviously hemorrhaging bullet hole, plugged-up gallbladder or occluded arteries. Convinced as I am of the benefits of immunization, I feel a momentary hesitation each year myself.

It can be hard to talk ourselves into rolling up our sleeves and getting jabbed with a needle when healthy, even if we are not particularly worried about a [government conspiracy](http://theintelhub.com/2010/09/01/cdc-ignores-dangers-needles-for-everyon/" \t "_hplink). With a little nudge from conspiracy theories -- up to and including allegations of flu vaccine used for purposes of [willful genocide](http://www.blogtalkradio.com/servant-of-yahushua/blog/2009/07/02/mass-genocide-via-flu-vaccine" \t "_hplink) -- however unreliable the source, doubt can become insurmountable.

There are several reasons why the potential harms of flu vaccine may loom much larger in the imagination than they actually are. First, any adverse event -- an allergic reaction, the now exceedingly rare case of Guillain-Barré syndrome, or anything else -- is amplified many orders of magnitude by repetition in the blogosphere. One case, appearing on 500,000 websites, exerts the influence of 500,000 cases.

There is also our prevailing tendency for risk distortion. Consider if flu infects one person in five, and kills one person per 10,000 infected. There is certainly a good chance you, if healthy, would not be among those who get the flu. There is a very good chance the majority of people you know would not get the flu, either. And you are very unlikely to know anyone who is killed by the flu.

But one infection per five means 60 million or so infections nationally. One death per 10,000 of these infections might be invisible in your circle of friends and family, but it would mean 6,000 deaths nationwide. This is consistent with a quite mild flu season in the U.S. A bad season is 10 times worse -- to say nothing of a truly dreadful season.

In contrast, the most dangerous flu vaccine in history -- the notorious [swine flu debacle](http://en.wikipedia.org/wiki/1976_swine_flu_outbreak" \t "_hplink) in 1976 -- was associated with 25 deaths. That's bad, of course, but it is more than two orders of magnitude less bad than even the mildest flu season.

Perhaps a more legitimate roadblock is [doubt](http://www.medicalnewstoday.com/releases/55507.php" \t "_hplink) about the effectiveness of the flu vaccine. It is certainly [far from perfect](http://www.time.com/time/health/article/0,8599,1967306,00.html" \t "_hplink), and the elderly -- who most need protection -- may need two inoculations to get it. But leaving aside some of the subtleties that complicate measuring vaccine effectiveness in real-world settings, and applying even a [low-level estimate](http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0005079" \t "_hplink) of overall vaccine effectiveness, routine flu vaccination produces a decisive overall benefit compared to just taking our chances with the flu.

We should also recognize that when it comes to contagion, not one of us is an island. While true that the elderly most need protection and benefit least from vaccination, there is another way to protect our older loved ones: Vaccinate ourselves and our children. People who can't get the flu can't transmit the flu to those most vulnerable to it and its complications.

I have recently read *[The Wild Life of Our Bodies](http://www.amazon.com/Wild-Life-Our-Bodies-Predators/dp/006180648X" \t "_hplink)*, and am currently reading *[An Epidemic of Absence](http://www.amazon.com/An-Epidemic-of-Absence-ebook/dp/B0061P2L5U" \t "_hplink)*, and these books raise an issue that warrants brief mention here. We can overshoot in our zeal to banish potential infectious agents, and the result may be other ills -- from allergies, to asthma, to serious autoimmune diseases. We clearly don't want these, any more than we want [river blindness](http://en.wikipedia.org/wiki/Onchocerciasis" \t "_hplink). The right balance is a work in progress, a fascinating area of inquiry and research -- and a topic I will certainly revisit in future columns. For now, we may simply note that there is nothing in the work thus far to suggest that bouts of influenza do us any good.

Unlike that microbiologist, I have had influenza -- several times over my 50 years. All but one bout were in the years before I got the vaccine annually. One case, the most recent, was despite the vaccine, and obviously a strain from which I was unprotected. I'm quite healthy, and recovered each time -- but it was a truly miserable experience. There were moments when I really wanted to die!

Whatever your doubts about the influenza vaccine, it is an established fact that immunization is many times -- many times -- safer than the flu itself. That does not mean flu is a plague, nor that the vaccine is perfectly safe. Nothing in medicine and little in life is perfectly safe. Harm from the flu vaccine is possible, but a highly remote risk. For what it may be worth to make this personal, I readily accept that risk every year not only for myself, but for my beloved wife and children as well. I put the arms of the people I love most on the planet where my mouth is on this topic.

So, I am unimpressed and unpersuaded by those who argue against flu vaccination because they have avoided the flu without it.

You presumably know the expression -- -- "Fool me once, shame on you, fool me twice -- shame on me."

For everyone else, the relevant point is this: Influenza unashamedly kills tens of thousands of us ever year. Being fooled by it even once could be one time too many.

[**http://www.cdc.gov/flu/about/qa/misconceptions.htm**](http://www.cdc.gov/flu/about/qa/misconceptions.htm)

**Misconceptions about Seasonal Flu and Flu Vaccines**

**Questions & Answers**

The information on this page also is available in a [video featuring CDC's Dr. Joe Bresee](http://www.cdc.gov/flu/freeresources/video/misconceptions-flu-vaccine.htm).

Misconceptions about Flu Vaccines

**Can a flu shot give you the flu?**

No, a flu shot cannot cause flu illness. Flu vaccines that are administered with a needle are currently made in two ways: the vaccine is made either with a) flu vaccine viruses that have been 'inactivated' and are therefore not infectious, or b) with no flu vaccine viruses at all (which is the case for recombinant influenza vaccine). The most common side effects from the influenza shot are soreness, redness, tenderness or swelling where the shot was given. Low-grade fever, headache and muscle aches also may occur.

In randomized, blinded studies, where some people get inactivated flu shots and others get salt-water shots, the only differences in symptoms was increased soreness in the arm and redness at the injection site among people who got the flu shot. There were no differences in terms of body aches, fever, cough, runny nose or sore throat.

**Can the nasal spray flu vaccine give you the flu?**

The nasal spray vaccine cannot give you the flu. The viruses contained in the nasal spray flu vaccine are attenuated (i.e., weakened), which means they cannot cause flu illness. These weakened viruses are also cold-adapted, meaning they are designed to only cause mild infection at the cooler temperatures found within the nose. These viruses cannot infect the lungs or other areas of the body where warmer temperatures exist. The nasal spray is well tolerated and the most commonly reported side effects are mild and include runny nose, nasal congestion and cough.

**Are any of the available flu vaccines recommended over the others?**

CDC does not have a preference for which of the available flu vaccine options people should get this season. This includes deciding between trivalent vaccine (protects against three flu viruses) or[quadrivalent](http://www.cdc.gov/flu/protect/vaccine/quadrivalent.htm) vaccine (protects against four flu viruses) or between injection (the flu shot) or nasal spray vaccine. All are acceptable options, but some vaccines are intended for specific age groups. Talk to your doctor or nurse about the best options for you and your loved ones. The important thing is to get a flu vaccine every year.

**Is it better to get the flu than the flu vaccine?**

No. Flu can be a serious disease, particularly among young children, older adults, and people with certain chronic health conditions, such as asthma, heart disease or diabetes. Any flu infection can carry a risk of serious complications, hospitalization or death, even among otherwise healthy children and adults. Therefore, getting vaccinated is a safer choice than risking illness to obtain immune protection.

**Do I really need a flu vaccine every year?**

Yes. CDC recommends a yearly flu vaccine for just about everyone 6 months and older, even when the viruses the vaccine protects against have not changed from the previous season. The reason for this is that a person's immune protection from vaccination declines over time, so an annual vaccination is needed to get the “optimal” or best protection against the flu.

**Why do some people not feel well after getting the seasonal flu vaccine?**

Some people report having mild reactions to flu vaccination. Common reactions to the flu shot and the nasal spray flu vaccine are described below.

*Reactions to the flu shot:*  
The most common reaction to the flu shot in adults has been soreness, redness or swelling at the spot where the shot was given. This usually lasts less than two days. This initial soreness is most likely the result of the body's early immune response reacting to a foreign substance entering the body. Other reactions following the flu shot are usually mild and can include a low grade fever and aches. If these reactions occur, they usually begin soon after the shot and last 1-2 days. The most common reactions people have to flu vaccine are considerably less severe than the symptoms caused by actual flu illness.

*Reactions to nasal spray flu vaccine:*  
People also may have mild reactions to the nasal spray vaccine. Some children and young adults 2-17 years of age have reported experiencing mild reactions after receiving nasal spray flu vaccine, including runny nose, nasal congestion or cough, chills, tiredness/weakness, sore throat and headache. Some adults 18-49 years of age have reported runny nose or nasal congestion, cough, chills, tiredness/weakness, sore throat and headache. These side effects are mild and short-lasting, especially when compared to symptoms of seasonal flu infection.

**What about serious reactions to flu vaccine?**

Serious allergic reactions to flu vaccines are very rare. If they do occur, it is usually within a few minutes to a few hours after the vaccination. While these reactions can be life-threatening, effective treatments are available.

**What about people who get a seasonal flu vaccine and still get sick with flu-like symptoms?**

There are several reasons why someone might get a flu-like illness, even after they have been vaccinated against flu.

1. One reason is that some people can become ill from other respiratory viruses besides flu such as rhinoviruses, which are associated with the common cold, cause symptoms similar to flu, and also spread and cause illness during the flu season. The flu vaccine only protects against influenza viruses, not other viruses.
2. Another explanation is that it is possible to be exposed to influenza viruses, which cause the flu, shortly before getting vaccinated or during the two-week period after vaccination that it takes the body to develop immune protection. This exposure may result in a person becoming ill with flu before protection from the vaccine takes effect.
3. A third reason why some people may experience flu like symptoms despite getting vaccinated is that they may have been exposed to a flu virus that is very different from the viruses the vaccine is designed to protect against. The ability of a flu vaccine to protect a person depends largely on the similarity or “match” between the viruses selected to make the vaccine and those spreading and causing illness. There are many different flu viruses that spread and cause illness among people. For more information, see [Influenza (Flu) Viruses](http://www.cdc.gov/flu/about/viruses/index.htm).
4. The final explanation for experiencing flu-like symptoms after vaccination is that unfortunately, the flu vaccine doesn't always provide adequate protection against the flu. This is more likely to occur among people that have weakened immune systems or people age 65 and older.

**Can vaccinating someone twice provide added immunity?**

In adults, studies have not demonstrated a benefit of receiving more than one dose during an influenza season, even among elderly persons with weakened immune systems. [Except for some children](http://www.cdc.gov/flu/protect/children.htm), only one dose of flu vaccine is recommended each season.

# <http://www.sfgate.com/bayarea/article/Amputees-become-athletes-with-prosthetic-advances-3618547.php#page-2>

# Amputees become athletes with prosthetic advances

##### **Stephanie M. Lee**

##### **Published 4:00 am, Friday, June 8, 2012**

[Carlos Gonzalez](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22Carlos+Gonzalez%22) swung a red boxing glove at his trainer's jaw. As he reared up for another punch, he pivoted on his right leg - a jointed, silver pole attached to a sneaker.

Seven years ago, a shooting left Gonzalez with a wound that forced surgeons to amputate his leg to mid-thigh. He became one of almost 2 million people in the United States who have limb loss because of vascular disease, trauma or cancer.

When he stood on his first prosthetic leg, he just wanted to walk again. But he soon grew frustrated by its limitations and moved to a new generation of prostheses that has placed Gonzalez, 32, among a growing number of amputees worldwide who are running marathons, bicycling and swimming, sometimes faster than competitors with fully intact limbs.

Twenty years ago, the Paralympic Games drew 3,000 disabled athletes to compete in 16 sports. This summer in London, 4,200 athletes will compete in 20 sports, including track and field, rowing, wheelchair rugby and power lifting.

At UCSF this fall, physical therapists plan to hold the first clinic of what they hope will become an annual event intended to help amputees become athletes. The workshop will teach students to sprint, kick a soccer ball, shoot hoops, play flag football and climb rocks on a wall, among other activities.

**Model athletes**

Organizers hope to compel patients to model themselves after people like Gonzalez, a patient at UCSF's [Orthopaedic Institute](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22Orthopaedic+Institute%22) in Mission Bay. Day in and day out, the Visitacion Valley resident hammers away in boxing gloves and practices jujitsu, a martial art that emphasizes hand-to-hand combat. Gonzalez dreams of becoming a Paralympian, but for now he'll compete in national cage fighting and martial arts competitions.

"If you put your mind to it and train properly and have the right staff and the right people in your corner, it's pretty much 'Just go for it,' " said Gonzalez, who styles his black hair in a faux-hawk and has tattoos on his neck. "I think I can have a good time and motivate people and inspire. The most important thing is to inspire."

On an evening in February 2005, Gonzalez, a phone to his ear, unknowingly walked into a turf war between drug dealers on his way to his mother's house in the city's Sunnydale neighborhood.

One gunshot rang out, then two. The third bullet hit Gonzalez in the stomach. A subsequent infection in his right leg forced doctors to amputate 6 inches above his knee.

"I was pretty eager to accept it early on," he said, "but it was hard."

**Technological marvel**

After 10 months on crutches, Gonzalez took his first steps on a prosthetic leg provided by his insurance. Generally, the patient's remaining limb transfers kinetic forces to the device. Inside Gonzalez's mechanical knee, a liquid hydraulic system diminished the speed at which he flexed, bent and extended his knee as he walked.

He quickly grew frustrated because his new limb didn't do much more than help him get around. "I walk fast, and the leg was just kind of draggy," he said.

In 2010, Gonzalez acquired his current prosthesis, a marvel of advanced medical technology. The knee contains a computer chip that automatically adjusts to the weight, distance and speed he puts into each step.

The change has given him the energy to rediscover boxing, a childhood passion, and pick up jujitsu. Moving will never feel natural again, but he's falling back into the swing of things.

"You're thinking about where you have to plant your feet so you don't trip," he said.

Gonzalez, who worked in a warehouse before the injury, is now living off disability insurance and training this year for a cage fight and a tournament in grappling, a form of self-defense. First, he must get permission to use his prosthetic leg.

Until now, professional nondisabled and disabled athletes have mostly competed in separate events. But increasingly, those walls are crumbling, said [Matthew Garibaldi](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22Matthew+Garibaldi%22), director of UCSF's [Orthotics and Prosthetics Center](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22Orthotics+and+Prosthetics+Center%22). He points to [Oscar Pistorius](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22Oscar+Pistorius%22), the double-amputee sprinter from South Africa who is on the cusp of qualifying for this year's Olympics.

"There hasn't ever been crossover just because the events are different, the techniques are different," Garibaldi said. "But now, certainly, the technology has leveled the playing field (and) the training techniques as well."

Over the past 15 years, modern prosthetic components - electronic technologies, plus materials such as advanced plastics and carbon-fiber composites - have put athletics within reach for people who have lost a limb. "It's mimicking natural body mechanics in a far greater degree of accuracy than they ever have been," Garibaldi said.

**Running triathlons**

When [Geoff Turner](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22Geoff+Turner%22) runs, one leg ends in a shoe. The other ends in a J-shaped, carbon-fiber blade.

In 1990, Turner, then living in Australia, was riding a motorcycle when he collided with a car. His damaged right leg had to be amputated above the knee.

With prosthetics, Turner has run triathlons and marathons in Chicago, Helsinki and San Francisco, which he now calls home. The 47-year-old risk manager is preparing to do the local Escape From Alcatraz relay race this weekend, a triathlon in New York City in July and a marathon there in November.

When he is seriously training, Turner runs and bikes up to 80 miles a week. "There aren't a lot of above-knees amputees who realize they can run. A lot of people think they can't run," he said. "That's just not true."

There's another reason amputees avoid the arena: It can be prohibitively expensive. A running blade like Turner's can cost as much as $10,000, and each prosthetic limb has to be customized for the wearer. Insurance companies generally don't cover limbs specifically for athletics, so athletes often turn to sponsorships from outside organizations.

"For me, there's no way I would be able to keep on top of the knees I destroy," said Turner, who relies on a sponsorship from Össur Prosthetics for his equipment.

[Mira El-Katcha](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22Mira+El-Katcha%22), an occupational therapist at [California Pacific Medical Center](http://www.sfgate.com/?controllerName=search&action=search&channel=bayarea&search=1&inlineLink=1&query=%22California+Pacific+Medical+Center%22)'s Davies campus in San Francisco, said she encourages patients to take up athletics to feel independent again.

"Always at the beginning, the adjustment is hard - just losing a limb and accepting the fact of needing a prosthesis and how their life is going to be," she said. Later, "when they're participating in a sport - and it doesn't have to be in a Paralympic manner, just on a team or playing a sport - they feel like they got back to their own life."

For Turner, every step on the pavement brings him closer to reclaiming his identity.

"I'm not an amputee runner," he said. "I'm a runner who happens to be an amputee."

[**http://www.scientificamerican.com/article.cfm?id=scientists-debate-oscar-pistorius-prosthetic-legs-disqualify-him-olympics**](http://www.scientificamerican.com/article.cfm?id=scientists-debate-oscar-pistorius-prosthetic-legs-disqualify-him-olympics)

[**Should Oscar Pistorius's Prosthetic Legs Disqualify Him from the Olympics?**](http://www.scientificamerican.com/article.cfm?id=scientists-debate-oscar-pistorius-prosthetic-legs-disqualify-him-olympics&print=true)

Scientists debate whether prosthetic legs give Pistorius an unfair advantage in the 400-meter race

By [Rose Eveleth](http://www.scientificamerican.com/author.cfm?id=2650)  | Tuesday, July 24, 2012 | [52](http://www.scientificamerican.com/article.cfm?id=scientists-debate-oscar-pistorius-prosthetic-legs-disqualify-him-olympics&print=true#comments)

Runners who've faced off against [Oscar Pistorius](http://en.wikipedia.org/wiki/Oscar_Pistorius) say they know when the South African is closing in on them from behind. They hear a distinctive clicking noise growing louder, like a pair of scissors slicing through the air—the sound of[Pistorius's Flex-Foot Cheetah](http://www.ossur.com/?PageID=13462) prosthetic legs.

It's those long, J-shaped, carbon-fiber lower legs—and the world-class race times that come with them—that have some people asking an unpopular question: Does Pistorius, the man who has overcome so much to be the first double amputee to run at an Olympic level, have an unfair advantage? Scientists are becoming entwined in a debate over whether Pistorius should be allowed to compete in the 2012 London Games.

Pistorius was born without fibulas, one of the two long bones in the lower leg. He was unable to walk as a baby, and at 11 months old both of his legs were amputated below the knee. But the growing child didn't let his disability slow him down. At age 12 he was playing rugby with the other boys, and in 2005, at age 18, he ran the 400-meter race in 47.34 seconds at the South African Championships, sixth best. Now 25, the man nicknamed the “Blade Runner” has qualified for the 2012 Summer Olympics in London, just three weeks before the games were to begin. But should he be allowed to compete?

The question seems preposterous. How could someone without lower legs possibly have an advantage over athletes with natural legs? The debate took a scientific turn in 2007 when a German team reported that Pistorius used 25 percent less energy than natural runners. The conclusion was tied to the unusual prosthetic made by an Icelandic company called Össur. The Flex-Foot Cheetah has become the go-to running prosthetic for Paralympic (and, potentially Olympic) athletes. "When the user is running, the prosthesis's J curve is compressed at impact, storing energy and absorbing high levels of stress that would otherwise be absorbed by a runner's ankle, knee, hip and lower back," explains Hilmar Janusson, executive vice president of research and development at Össur. The Cheetah's carbon-fiber layers then rebound off the ground in response to the runner's strides.

After the German report was released, the International Association of Athletics Federations (IAAF) banned Pistorius from competing. Pistorius hired Jeffrey Kessler, a high-powered lawyer who's represented athletes from the National Basketball Association and National Football League. It soon became clear that the IAAF's study was very poorly designed, so when Pistorius's team asked for a new study they got it. Soon scientists gathered at Rice University to figure out just what was going on with Pistorius's body.

The scientific team included [Peter Weyand](http://smu.edu/education/aboutus/weyand_peter.asp), a physiologist at Southern Methodist University who had the treadmills needed to measure the forces involved in sprinting. [Rodger Kram](http://www.colorado.edu/intphys/faculty/kram.html), at the University of Colorado at Boulder, was a track and field fan who studied biomechanics. [Hugh Herr](http://biomech.media.mit.edu/people/herr.htm), a double amputee himself, was a renowned biophysicist. The trio, and other experts, measured Pistorius's oxygen consumption, his leg movements, the forces he exerted on the ground and his endurance. They also looked at leg-repositioning time—the amount of time it takes Pistorius to swing his leg from the back to the front.

After several months the team concluded in a paper for *The Journal of Applied Physiology* that Pistorius was "physiologically similar but mechanically dissimilar" to someone running with intact legs. He uses oxygen the same way natural-legged sprinters do, but he moves his body differently.

The results of the Rice University study—physiologically similar, mechanically different—were presented to the Court of Arbitration for Sport (CAS) in Switzerland in 2008, which decided that Pistorius should be allowed to run, revoking the IAAF's decision. He missed qualifying for the 2008 Beijing Olympics by 0.7 second.

But then scientific controversy arose. Members of the team that had published the paper began to express very different ideas about what, exactly, "mechanically different" meant. One group said that Pistorius's differences leave him on a level running field with all the other athletes. The other said that Pistorius is mechanically different in a way that confers a serious competitive advantage.

Weyand, the scientist with the treadmills, believes that Pistorius's prosthetics allow him to move in a way that no non-prosthetics wearer could, giving him an advantage. Kram, the biomechanics expert, believes that the Blade Runner's blades hinder him just as much as they help.

One of the biggest points of contention is limb-repositioning time. The average elite male sprinter moves his leg from back to front in 0.37 second. The five most recent world record holders in the 100-meter dash averaged 0.34 second. Pistorius swings his leg in 0.28 second, largely because his Cheetah's are lighter than a regular human leg. Pistorius's rivals are swinging a lower leg that weighs about 5.7 kilograms, whereas his lower leg only weighs 2.4 kilograms.

Kram and his researchers countered with a paper claiming to have measured Walter Dix, a 100-meter sprinter, swinging his leg faster than Pistorius. But they used television footage of Dix rather than the standard, high-speed research video generally used to make such measurements. "The differences here are relatively small, so doing it with TV video isn't going to cut it," says Jesus Dapena, a biomechanics researcher at Indiana University Bloomington who was not involved in the Rice study. High-speed footage for Dix from that same season does exist, Weyand says, and it shows the runner clearly repositioning his limbs at around the same rate as the average Olympic sprinter.

Swing time is important because it affects some central factors that determine how fast a person can run. Repositioning his legs faster means Pistorius can keep his foot on the ground longer than everyone else. It's a bit counterintuitive, but Weyand argues that a runner's speed is largely determined by how long he can keep his feet on the ground, rather than in the air. The longer a foot remains on the ground, the more time the person has to generate force that will propel him forward. More force generally means more speed.

Kram argues, however, that because the Cheetahs are made of carbon fiber, and are lighter, they can't transmit nearly as much force to the ground as a human leg can, creating less forward propulsion. So Pistorius has to push down harder than most people to get the same amount of force against the ground. Weyand counters that Pistorius simply doesn't need to push as hard to run just as fast.

Of course, other researchers have other theories about a possible advantage. Because Pistorius's Cheetah's don't tire, his lower leg stays springy throughout the entire race. For most 400-meter runners the second half of the race is where the real battle happens. Jim Matin, a researcher at the University of Utah, says that the lower leg is what weakens and slows runners. Martin thinks that if Pistorius ran in a competitive 600-meter race, Pistorius could set the world record.

Some of the arguing may be moot. The fact that Pistorius runs differently does not necessarily indicate an advantage, because even the most elite sprinters have their own running styles, says Jill McNitt-Gray, a researcher at the University of Southern California who wasn't involved in the Rice study. One sprinter might use his hips more than the next. Another may rely more on his arm thrust. Amputees develop ways to interact with their prosthetic that makes sense for them. "Your body is going to figure out how best to use [the prosthetic]," she says.

In many ways, studying Pistorius is difficult. There's only one of him, and only one good study that uses his specific physiology. There are no other Olympic-level double amputees, and single-leg amputees run totally differently. Imagine your right leg could swing 10 percent faster than your left; your left leg simply could not keep up. A person with one prosthetic and one intact leg can only go as fast as his slowest leg—generally the biological one.

To complicate matters further, science doesn't totally understand how running works. "We really don't know exactly the mechanics of running," Dapena says. They have a working idea, he says, but it's possible that the forces Weyand and Kram are debating aren't important. "It's a good logic," he says, "but it's not necessarily down pat that way."

Weyland will not say outright whether or not Pistorius should be allowed to run in the Olympics. Perhaps, he says, the sprinter represents something more important than the dispute over his light, springy legs. "I admire the heck out of him," he adds. "He's an excellent athlete who's worked like crazy and persevered and overcome."

For Kram, whether Pistorius should run comes down to power. "Oscar derives all of his power from what he had for breakfast." Athletes should be in a different race only when motors or alternate power sources are introduced, he says. "When you're tired you can't just twist the throttle. You have to find that desire or have that physiological ability to push. That's what makes the Olympics special." It's what makes Pistorius special, too, Kram says. He's pushed his whole life.

Now Pistorius will represent South Africa in the [400-meter race and the 4 x 400-meter relay](http://espn.go.com/olympics/summer/2012/trackandfield/story/_/id/8129325/olympics-2012-south-african-double-amputee-oscar-pistorius-run-400m). And if there’s one thing everyone agrees on, it’s that the races will be intriguing to watch.

**Mad cow, bird flu, pink slime? The bigger threat is antibiotics in our meat**

23,000 people die each year in the US from overuse of antibiotics. We should regulate antibiotic use in agriculture

Remember[pink slime](http://www.huffingtonpost.com/2012/03/05/pink-slime-for-school-lun_n_1322325.html) – that Dayglo-bright mash of ground up [meat](http://www.theguardian.com/lifeandstyle/meat)scraps and cow connective tissues larded with industrial strength ammonia that was being served up in school lunch programs in the[United States](http://www.theguardian.com/world/usa) last year?

More ominously, there was [mad cow disease](http://www.emedicinehealth.com/mad_cow_disease_and_variant_creutzfeldt-jakob/article_em.htm), which has killed scores of people in Britain and elsewhere. Bird-flue outbreaks originating in poultry farms in China and Southeast Asia have also led to periodic scares. And did I mention [salmonella](http://www.cdc.gov/salmonella/outbreaks.html)?

But these food-related scourges pale in comparison with another threat, which was the subject of a [report released Monday by the US Centers for Disease Control](http://www.cdc.gov/drugresistance/threat-report-2013/): the spread of antibiotic resistant bacteria. In its first estimate of the scope of the problem, the CDC says that 23,000 people – and possibly many more than that – die in the US each year from infection by microorganisms that can no longer be controlled by our current array of [antibiotics](http://www.theguardian.com/society/antibiotics).

We've known for a long time that our chronic overuse of antibiotics is helping to create these dangerous new strains of bacteria. Public health officials worry that doctors are routinely overprescribing powerful broad-spectrum antibiotics for everything from stomach aches to common colds. The CDC report says that 50% of all the antibiotics prescribed for people are not actually necessary.

But antibiotics are not just overused in medical care; we're also feeding them indiscriminately to cows, pigs and chickens. Fully [80% of the antibiotics sold](http://www.livablefutureblog.com/2010/12/new-fda-numbers-reveal-food-animals-consume-lion's-share-of-antibiotics) in the US are administered to farm animals in their water and feed. The use of these drugs in agriculture is virtually unregulated, according to Keeve Nachman, the director of the Center for a Livable Future at Johns Hopkins University.

Nachman told me that we don't know exactly what antibiotics are being used in meat production, or how large the doses that are administered are. Even more critically, we don't know how much of these antibiotics remains in the meat that we eat. There is no requirement to routinely test for this. Eating meat, even with low doses of antibiotics, he warns, may lead to the spread of antibiotic resistant bacteria in our own guts, if the meat is mishandled or undercooked.

There is also ample evidence that the overuse of antibiotics has created resistant bacteria in the external environment. Studies have shown them in water downstream from livestock farms, as well as in the air and soil near facilities where antibiotics are used. Nachman himself published a study yesterday in the journal JAMA Internal Medicine that shows that people living near swine production sites are more likely to be infected with the superbug MRSA (Methicillin-Resistant Staphylococcus aureus).

In light of these risks, the CDC report says pointblank:

The use of antibiotics for growth is not necessary, and the practice should be phased out.

Most antibiotics currently used on farms are not for the treatment of sick animals, or even the prevention of disease, but to promote the growth and weight of livestock. Until recently scientists didn't know how antibiotics stimulated growth. However, a study published in the [journal Nature last year](http://www.nature.com/nature/journal/v488/n7413/full/nature11400.html) helped to clear up this mystery.

New York University researchers found that antibiotics have a big impact on what is called the microbiome, the teeming ecosystem of billions of diverse bacteria that live within the gut. Not only do they kill off many valuable microorganisms, but they also apparently alter the ability of some gut bacteria to metabolize carbohydrates. With the result that mice that the scientists fed antibiotics [fattened up](http://www.nature.com/nature/journal/v488/n7413/full/nature11400.html), just as as livestock do.

So if animals typically put on weight when they take antibiotics, what about humans? A study published in the Journal of Obesity found a strong correlation between exposure to[antibiotics in childhood and later obesity](http://www.sciencedaily.com/releases/2012/08/120822130837.htm). But that may not be the worst of it. Evidence is also mounting that low microbial diversity in the gut is associated with a whole range of[inflammatory illnesses](http://www.wbur.org/npr/216081342/diverse-gut-microbes-a-trim-waistline-and-health-go-together?ft=3&f=216081342) including heart disease, type 2 diabetes and cancer.

With all of these dangers deriving from our overuse of antibiotics, Keeve Nachman argues that the time has come to get serious about regulating them. He says:

The FDA has proposed a voluntary program in which the pharmaceutical companies are asked to give up their drug approvals for purposes of growth promotion and to relist them for purposes of disease prevention.

But Nachman calls this "essentially a shell game" which will change how the drugs are labelled, but not the way they are actually used in animals.

To solve the problem, he says, we'll have to ban antibiotics except in actual cases of illness. Farmers should be required to get a prescription from a veterinarian, much as you and I need a prescription from their physician before we can use the drugs.

There are already several European countries that have [banned the indiscriminate use of antibiotics](http://www.npr.org/blogs/thesalt/2012/03/23/149221287/europes-mixed-record-on-animal-antibiotics) in meat production. But so far neither Congress nor regulators in the US have been willing to stand up to the livestock lobby and protect the public's health.

http://www.theguardian.com/commentisfree/2013/sep/18/antibiotics-meat-growing-threat

Antibiotic Debate Overview

Ranchers and farmers have been feeding antibiotics to the animals we eat since they discovered decades ago that small doses of antibiotics administered daily would make most animals gain as much as 3 percent more weight than they otherwise would. In an industry where profits are measured in pennies per animal, such weight gain was revolutionary.

Although it is still unclear exactly why feeding small "sub-therapeutic" doses of antibiotics, like tetracycline, to animals makes them gain weight, there is some evidence to indicate that the antibiotics kill the flora that would normally thrive in the animals' intestines, thereby allowing the animals to utilize their food more effectively.

The meat industry doesn't publicize its use of antibiotics, so accurate information on the amount of antibiotics given to food animals is hard to come by. Stuart B. Levy, M.D., who has studied the subject for years, estimates that there are 15-17 million pounds of antibiotics used sub-therapeutically in the United States each year. Antibiotics are given to animals for therapeutic reasons, but that use isn't as controversial because few argue that sick animals should not be treated.

The biggest controversy centers around taking antibiotics that are used to treat human illnesses and administering them to food animals. There is an increasing amount of evidence suggesting that the sub-therapeutic use of antibiotics in food animals can pose a health risk to humans. If a group of animals is treated with a certain antibiotic over time, the bacteria living in those animals will become resistant to that drug. According to microbiologist [Dr. Glenn Morris](http://www.pbs.org/wgbh/pages/frontline/shows/meat/interviews/morris.html), the problem for humans is that if a person ingests the resistant bacteria via improperly cooked meat and becomes ill, he or she may not respond to antibiotic treatment.

Concern about the growing level of drug-resistant bacteria has led to the banning of sub-therapeutic use of antibiotics in meat animals in many countries in the European Union and Canada. In the United States, however, such use is still legal. The World Health Organization is concerned enough about antibiotic resistance to suggest significantly curbing the use of antibiotics in the animals we eat. In a recent report, the WHO declared its intention to "reduce the overuse and misuse of antimicrobials in food animals for the protection of human health." Specifically, the WHO recommended that prescriptions be required for *all*antibiotics used to treat sick food animals, and urged efforts to "terminate or rapidly phase out antimicrobials for growth promotion if they are used for human treatment."

Although conclusive evidence directly linking the use of drugs in food animals to an increase in drug-resistant bacteria that make people sick has not been uncovered, a number of recent studies suggesting such a link concern many scientists. "There is no evidence that antibiotic resistance is not a problem, but there is insufficient evidence as to how big a problem it is," says Dr. Margaret Mellon, with the Union of Concerned Scientists.

In one study published in the New England Journal of Medicine on February 6, 2002, researchers found links that strongly suggested that the people who developed Cipro-resistant bacteria had acquired them by eating pork that were contaminated with[salmonella](http://www.pbs.org/wgbh/pages/frontline/shows/meat/safe/foodborne.html#salmonella). The report concluded that salmonella resistant to the antibiotic flouroquine can be spread from swine to humans, and, therefore, the use of flouroquinolones in food animals should be prohibited.

Another New England Journal of Medicine study from Oct. 18, 2001, found that 20 percent of ground meat obtained in supermarkets contained salmonella. Of that 20 percent that was contaminated with salmonella, 84 percent was resistant to at least one form of antibiotic.

**CIPRO AND BAYTRIL**

Some, including the FDA, believe the overuse of Baytril, an antibiotic used to treat sick birds, led to an increase in treatment-resistant bacterial infections in humans. Baytril is used by poultry growers to protect chickens and turkeys from [E. coli infection](http://www.pbs.org/wgbh/pages/frontline/shows/meat/safe/foodborne.html#ecoli). The size of commercial chicken flocks precludes testing and treating individual birds, so when a veterinarian diagnoses one infected bird, farmers treat the whole flock by adding the drug to its drinking water. General use of Baytril, therefore, falls in the gray area between therapeutic and sub-therapeutic.

Baytril is the sister drug to Cipro, which is used to treat and prevent anthrax as well as [campylobacteriosis](http://www.pbs.org/wgbh/pages/frontline/shows/meat/safe/foodborne.html#campylobacter) and [salmonellosis](http://www.pbs.org/wgbh/pages/frontline/shows/meat/safe/foodborne.html#salmonella) in people. The Food and Drug Administration, doctors, and consumer groups have all urged that Baytril be removed from the market on the grounds that its use in animals may eventually compromise the power of Cipro and similar antibiotics to fight disease in humans. Cipro and Baytril belong to a class of drugs known as fluoroquinolone, among the most powerful antibiotics currently available.

Baytril first came up for approval for use in chickens six years ago. Physicians have used fluoroquinolones to treat food-borne illness since 1986, but fluoroquinolone-resistant bacteria were rare until 1995, when the FDA approved the use of these drugs in drinking water for poultry. The FDA's rough estimate, using 1999 data, is that use of fluoroquinolones in chickens resulted in over 11,000 people that year contracting a strain of the campylobacter illness that was resistant to fluoroquinolones, contributing to unnecessarily severe disease.

When the FDA proposed pulling Baytril use in chickens a year ago due to sharp increases in resistance to fluoroquinolones in campylobacter bacteria, one of the two manufacturers voluntarily withdrew its product. The other, Bayer, did not.

Bayer officials continue to offer the human drug Cipro at reduced rates to the American public, saying that they are not convinced that the use of fluoroquinolones in animals can be blamed for increased resistance in people. Until more proof is found of the specific danger to humans, they will not withdraw their product from the chicken market.

**THE MEAT INDUSTRY'S ARGUMENT**

For its part, the meat-production industry contends that there is not enough conclusive evidence to support measures like the FDA's proposed ban against flouroquinolones. Although none deny that the spread of antibacterial resistance is a real problem, proponents of sub-therapeutic antibiotic use in animals point out that the problem stems from overuse of all antibiotics, including therapeutic and preventative use in both animals and humans. Agricultural use may contribute to the problem, but it is impossible to determine to what extent.

In its recent report, the World Health Organization blamed the worldwide upswing in resistance to antibiotics on a combination of factors that included "overuse in many parts of the world, particularly for minor infections," and "misuse due to lack of access to appropriate treatment." The factors involved in the problem are clearly not limited to antibiotic use in animal feed.

"When someone's sick and goes to the doctor, they still expect to get a prescription," said National Chicken Council spokesman Richard Lobb. He said that people should look to themselves for the causes of antibiotic resistance, referring to the American practice of prescribing antibiotics for even the most minor of illnesses.

Increased use in hospitals may also contribute to the resistance problem. "Today, especially in intensive care wards, the amount of antibiotics in the environment can become high enough that people in the vicinity of patients receiving antibiotics are exposed continuously to low levels of antibiotics," microbiologist Abigail Salvers of University of Illinois told *Scientific American*. This low level of exposure, she contends, is one reason why highly resistant bacteria are developing in hospitals. She says that a similar phenomenon may be taking place in agriculture.

According to Alexander S. Matthews, president and CEO of the Animal Health Institute (AHI), removal of antibiotics from animals' feed and water "would lead to increased animal disease, a reduction in food safety and gain little, if anything, in the effort to control resistance." He suggests developing "prudent use principles."

Lowering or halting sub-therapeutic antibiotic use in animal production could have serious economic effects on the meat and poultry industry. According to a report released in May 2001 by USDA's Economic Research Service, discontinuing the use of antimicrobial drugs in hog production would initially decrease feed efficiency, raise food costs, reduce production and raise prices to consumers. According to the same report, U.S. hog producers saved about $63 million in feed costs in 1999 due to their use of low levels of sub-therapeutic drugs; they would have suffered an estimated loss of $45.5 million in 1999 if the drug use was banned.

Even within the industry, however, there is a growing movement to reduce at least the sub-therapeutic use of antibiotics in animals raised for food. Tyson Foods, Perdue Farms and Foster Farms, which collectively produce a third of the chicken Americans eat, recently declared their intention to greatly reduce the amount of antibiotics fed to healthy chicken. There is still no way for consumers to know whether one of these companies' chickens has been treated with antibiotics, although some corporate consumers, McDonald's, Wendy's and Popeye's among them, are refusing to buy chicken that has been treated with fluoroquinolones. Increased public pressure may cause the companies who grow animals for food to collectively decide that putting extra weight on feed animals isn't worth the possibility that they are putting consumers' health at risk.

http://www.pbs.org/wgbh/pages/frontline/shows/meat/safe/overview.html

###### [KNOW…The Vaccine Controversy](http://www.know-vaccines.org/?page_id=456) http://www.know-vaccines.org/?page\_id=456

|  |
| --- |
| Most people are unaware that there is a controversy about vaccination. They are unaware that there is another point of view about the benefits of vaccination. They are unaware of the risks associated with this medical procedure. Where risk of injury or death is acknowledged, it is believed to be rare and inconsequential compared to the perceived benefits to individuals and society.  With growing evidence that vaccinations may actually be causing chronic health problems and the attendant realization that the right to informed consent is being denied, a growing number of parents and concerned individuals are demanding that questions about safety and appropriateness be addressed.  **What are the perceived issues?**  On the one hand, there is a vaccination policy whose goal is 100% compliance and whose proponents believe that vaccination is modern medicine’s greatest achievement. Today every child born is expected to be “inoculated” with some 30 vaccines by the age of 18 months and by the age of five years old, have up to 38 shots.  On the other hand, there are concerned parents and professionals who believe there are some flaws with both the theory and the application of our vaccine policy, who claim that vaccines are dangerous, and who may not want to comply with the above stated goal.  In the middle of this schism, a growing number of people are getting wind that a debate about vaccines is brewing. Many of these people would prefer NOT to know there are issues about vaccination, because the questions and issues that are being raised threaten the belief system that our conventional health care system is predicated upon.  While it may seem like The Vaccine Controversy is news, the issues surrounding this debate have actually been contested for decades. Whereas the proponents of mass vaccination might have you think there is a conspiracy of quacks and unfit parents trying to thwart medical progress, the truth of the matter is that the mounting evidence of malfeasance is undeniable as the conspiracy of silence about this conflict is brought to light.  At issue, of course, is whether vaccines are safe. As the incidence of autoimmune diseases in our children rise to epidemic levels, concerned people see a credible correlation to vaccine history and want the independently researched scientific data that verifies both safety and efficacy of these medical products and procedures. Vaccine proponents, while they admit there are some risks, keep assuring us that vaccines are safe and vaccination saves lives. Those who question, they say, forget or are unaware of how devastating diseases were before the advent of vaccines.  Given that vaccines were conceived and are produced within the paradigm of Modern Medicine’s scientific method, our faith in the policy of mass vaccination is nothing less than steadfast and confident. With killer epidemics of infectious disease a thing of the past, WHY NOT credit mass vaccination? Indeed, this assertion is taken at face value even in the Informed Consent Movement, even though statistics show that better nutrition and improved hygiene are as much contributing factors to the eradication of killer epidemics as mass vaccination is purported to be.  The fact is, **the stellar role that mass vaccination is believed to play in public health DOES NOT preclude a possible secondary role in ALSO being a cause of chronic, debilitating and, in many ways, painful immunologic and neurological disorders**. Proponents of mandatory vaccination say absolutely not. Parents of chronically ill children, a growing number of medical professionals, and other reasonable people are beginning to wonder. Hence, the Vaccine Controversy . . .  Many people would prefer not to go down this road. It was easier when you only had to deal with the fear of getting an infectious disease. Vaccination put that fear out of your mind. With Informed Consent, and knowing that the risks of vaccination are actually higher and more diverse than you previously thought, it seems we now have two fears to contend with. What to do?  To begin with, what is needed is proper perspective. There are several serious issues in this debate that MUST BE RESOLVED, vaccine safety being one, however  The FUNDAMENTAL ISSUE in The Vaccine Controversy is not about vaccine safety!  The fundamental issue in The Vaccine Controversy has to do with the government’s power to deny individual rights. Simply stated, because vaccines are mandated by law individuals are not free to make choices about vaccination for themselves or their family members.  **Because vaccines are mandated, The Vaccine Controversy is about the**[**Right to Informed Consent**](http://www.know-vaccines.org/informedconsent.html).  Vaccination is a medical procedure that carries an inherent risk of injury or death. Vaccination is the only medical procedure & medical product that is forced upon us by law.  Because there are risks of injury or death with vaccines, parents deserve to be given truthful and unbiased information about both the diseases and the vaccines.  [Informed Consent](http://www.know-vaccines.org/informedconsent.html) means having the right to choose or decline a medical procedure that carries a risk for serious injury, disability or death.  **Because vaccines are mandated, The Vaccine Controversy is about the**[**Right to Choose**](http://www.know-vaccines.org/statutes3.html)**.**  Individuals have the right to choose the type of preventive health care they want to use, including choosing whether to use one, ten or no vaccines. See the [Patient’s Bill of Rights](http://www.know-vaccines.org/statutes3.html) for more information.  **What is the justification for mandated mass vaccination?**  A common belief that the majority of people have shared since the advent of vaccines is that vaccination improves public health and that [mass vaccination protects everyone’s health](http://www.know-vaccines.org/interview.html#10). The presumed logic is that [high vaccination rates are necessary](http://www.know-vaccines.org/interview.html#10) in order to prevent the return of terrible diseases. In order to protect the public, the public must be vaccinated.  It is not clear whether vaccination became mandatory because the public cannot be trusted to always fulfill their obligations to society, so laws were created to enforce compliance, or whether because vaccination is a medical procedure that carries risk of injury or death, it must be mandated. If the rationale that mass vaccination protects everyone’s health was true, rational people would likely be willing to take the risk of injury or death from vaccination, and people everywhere would suppose that forcing this medical procedure upon entire populations is noble, even though not ethical. In fact, this is what we have believed and why we have been so willing to sanction this violation of civil rights.  **However, the variables have changed, and so, too, the outcome. We now have a new, more insidious epidemic occurring, the consequences of which are not yet fully understood or realized**. The rising epidemic of autoimmune diseases and neurological dysfunction in our children begs, now more than ever, the question **“is vaccination somehow to blame; is vaccination a contributing factor?”** Yet, even as the credible empirical and scientific data coming in suggests that it could be, our regulatory agencies and the pharmaceutical companies that profit from vaccination continue to assure us that injecting a plethora of diseases and toxic chemicals into the bodies of our young children does not adversely affect their immune systems and “not to worry.” In fact, they implore us to ignore what we see, what we read and hear about, and they remind us of our obligation to society. Because, you see,  **The rationale for mandated mass vaccination is based on the notion that the risk of injury or death from vaccine is relative to the risk of injury or death without vaccine.**  In other words, the perceived benefit of saving millions of lives from the scourge of epidemics by mass vaccination outweighs the purportedly rare incidence of death by vaccine. Thus, “the end justifies the means.”  This, as we learn from studying history, is a dangerous precedent for government intrusion and leads to unbridled, unchecked and unlawful power. Yet the majority of people think that mandating this risky medical procedure is appropriate. Why? Because “vaccination is about the public health”, meaning that individual choice is no longer relevant.  **If it were true that vaccination protects the public health and improves immunity, one might be willing to play the vaccine game of roulette in order to gain such a benefit.** However, the science simply does not support this hypothesis any longer. The truth is that the justification for compulsory injection of toxic chemicals and foreign proteins is based on a flawed but pervasive belief that vaccination safely stimulates an immune response — **yet the most advanced science in immunity proves that the human immune system cannot be tricked, suppressed, or controlled into accepting or tolerating any foreign DNA or proteins – whether by infection, injection or transplantation – without immunologic consequences.** Vaccine technology is based on a two hundred year old theory and advanced science simply does not support this hypothesis any longer.  With an epidemic of autoimmune diseases literally crippling our next generation of adults, there is no question that vaccination is about public health. Perhaps it is time to expand our myopic view that high vaccination rates and low incidence of infectious disease alone constitutes public health. The fact is, our beliefs about vaccination are founded on precepts that are no longer valid — the variables have changed, and so too the outcome. |

**Vaccinations: Pros & Cons   
by Rebecca Dirks, ND**

http://www.ncoh.net/services/education/askdrp.php?aid=52  
**General Vaccination Information**

School immunization laws: All states have exemptions for medical contraindications, 47 states have exemptions for religious beliefs against vaccination & 15 states have exemptions for philosophical reasons to oppose vaccination.

Washington State has both exemptions available.  
Schools will send the child home for days if there is an outbreak (for the child's protection)

Taking exemption from vaccination requires time & responsibility of the parents. Educating your child on proper behavior to minimize disease is very important.

Doctors are required to provide vaccine information statements before administering the vaccine.

Breast-feeding does protect the child from diseases through the mother’s immunity but it does not protect against Pertussis.

Vaccination timing: Typically, the 1st shot in a series provides full immunity to 70% of the population. The 2nd shot in the series brings it up to 80% & the 3rd to 90% of the population.

A blood test can be done to show immunity to a disease after vaccination or after contracting the disease (antibodies will present in the bloodstream).

Immunizations provide long-term immunity, not lifetime immunity.

Most of the vaccines given now do not contain live virus.

Vaccines can cause allergic reactions/ sensitivities to certain foods like eggs & gelatin as well as certain medications (antibiotics).

Severe allergies to eggs, gelatin or antibiotics can result in severe deadly reactions to a vaccine containing these substances.

Consider the risks of contracting the disease in your decision to immunize your child. High risks include overseas travel, frequent plane or bus travel, urban day care or school, & poor sanitary conditions.

**Vaccination Internet Hype:**

American health authorities are considering a complete change of policy in the face of strong evidence that all cases of polio are caused by the polio vaccine. Change has occurred with the polio vaccine due to cases of vaccine-associated paralytic polio. It is no longer an oral vaccine of live virus but an injectable vaccine of inactivated virus.

The Lancet reported that West German authorities had listed 27 neurological reactions to the mumps vaccine, including meningitis, febrile convulsions & epilepsy. These are risks of the vaccine but don’t let this statement fool you, we don’t know the time frame or the total amount of vaccinations given to result in this number.  
Dr. R. Mendelsohn said, “There now exists a growing theoretical concern which links immunization to the huge increase, in recent decades, of auto-immune diseases. No scientific research has proved or disproved this theory.

Keep in mind other factors in our environment that have changed in the past 20-30 years (air quality, pesticides, increased medication use, modified foods, etc.).

Mercury is a common preservative used in vaccines & is causing neurologic deficits in infants worldwide. Mercury does cause neurologic impairment in long-term low doses & also in short-term high doses as found in vaccines. It is a concern to the FDA & the EPA &, since 1999, has been removed from most all vaccines. If you want to be cautious, ask your doctor to check the label for Thimerosal.

**Vaccination pro’s & con’s**

Hepatitis A:  
Pro’s:

1. In high risk populations it can prevent the disease (other countries, communities with prolonged outbreaks).
2. The disease is contagious to family members if careful hygiene is not followed.
3. Death can occur from the disease (very rare).

Con’s:

1. The disease is self limiting & gives you life-long immunity
2. Mild symptoms occur with the vaccination in as little as 1 out of 6 people
3. Severe allergic reactions & death can occur (very rare)

Hepatitis B:   
Pro’s:

1. 9% of Hepatitis B occurs in adolescents (14-19yo)
2. 45% of Hepatitis B occurs in ages 20-29

Con’s:

1. JAMA article 2001 states that there is no scientific evidence to justify HBV before the age risk factors become relevant. Risk/benefit analysis show HBV vaccination among children carries one of the largest unjustified risks & substantial financial costs.
2. HBV immunization associated with 53 deaths & 828 serious injuries
3. Rate of child under 10 getting HBV infection is 191/38million
4. There are mild symptoms associated with the vaccine & severe reactions are rare

MMR (Measles, Mumps, Rubella):  
Pro’s:

1. Those not vaccinated are 35 times more likely to contract measles.
2. Symptoms can become severe.
3. If planning on getting pregnant – to protect against possible contraction of Rubella

Con’s:

1. In a population mixed with vaccinated children & unvaccinated children, those vaccinated had a
2. 5 - 30% chance of contracting measles depending on the number of unvaccinated children in the population. (JAMA 1999;282:47-53)
3. Mumps-like virus has been showing up in immunized children
4. Side effects to the vaccination are very similar to the disease itself
5. This vaccine has a higher likelihood of moderate to severe reactions
6. Seizures, 1 out of 3000
7. Joint pain or stiffness 1 out of 4
8. Low platelet count leading to bleeding disorder 1 out of 30,000

Chicken Pox:  
Pro’s:

1. Symptoms can rarely progress to severe skin infection
2. 12,000 people are hospitalized each year & 100 deaths (that is approx. 1 in 250,000 people hospitalized & 1 in 3million die).

Con’s:

1. Contracting the chicken pox gives lifetime immunity
2. The vaccine immunity lasts about 20yrs. so a booster is required
3. Mild symptoms from vaccination are similar to the disease & can be contagious
4. Seizures occur with vaccination in 1 out of 1000 people

Polio Virus:  
Pro’s:

1. The disease is still common in developing countries

Con’s:

1. No cases of wild polio have been reported in the U.S. for over 20yrs.

DTP – (Diptheria, Tetanus, Pertussis):  
Pro’s:

1. DTaP is a safer version of the older vaccine DTP.
2. Tetanus is a severe disease that is often fatal
3. In 1999, 400 reported cases of Pertussis; 5 cases were hospitalized in 1998

Con’s:

1. Pertussis is a disease of younger children only. Anyone over 7 has no need for DTaP. (Td is offered)
2. A booster is required every 10-12 years for Tetanus
3. Diptheria is eradicated here in the U.S. but can be found in developing countries
4. Side effects are more common with the DTaP vaccine. Mild problems occur in 1 out of 4 kids.
5. Seizures & high fever occur in 1 child out of 14,000 & 1 out of 16,000
6. Non-stop crying for 3hrs or more occurs in 1 out of 1000 kids
7. Severe problems like long-term seizures, coma, brain damage are rare
8. Any child with moderate to severe reactions should not get another dose of DTaP

Haemophilus Influenza (Hib):  
Pro’s:

1. Hib is the leading cause of bacterial meningitis among children under 5yrs.
2. Before Hib vaccine, 1 out of 1500 children got Hib each year & nearly 1 out of 30,000 died
3. There were 9 cases of Hib Epiglottitis at Children’s hospital last year

Con’s:

1. Children over 5 years old don’t need the vaccine
2. Fever is common with this vaccine; 1 out of 20 kids

Pneumococcal Vaccine:  
Pro’s:

1. Conjugate vaccine is available for children under 2 years.
2. The vaccine help prevent diseases that are becoming resistant to antibiotics

Con’s:

1. If you commonly get ear infections, or respiratory infections you don’t need the vaccine

<http://www.nytimes.com/ref/health/healthguide/esn-vaccinations-ess.html>

Public health experts generally agree that after clean water and flush toilets, the most important health advances in history have been[vaccinations](http://health.nytimes.com/health/guides/specialtopic/immunizations-general-overview/overview.html?inline=nyt-classifier).

**By the Numbers**

Shots against [measles](http://health.nytimes.com/health/guides/disease/measles/overview.html?inline=nyt-classifier), [diphtheria](http://health.nytimes.com/health/guides/disease/diphtheria/overview.html?inline=nyt-classifier),[whooping cough](http://health.nytimes.com/health/guides/disease/pertussis/overview.html?inline=nyt-classifier), [tetanus](http://health.nytimes.com/health/guides/disease/tetanus/overview.html?inline=nyt-classifier), [polio](http://health.nytimes.com/health/guides/disease/poliomyelitis/overview.html?inline=nyt-classifier),[mumps](http://health.nytimes.com/health/guides/disease/mumps/overview.html?inline=nyt-classifier), [rubella](http://health.nytimes.com/health/guides/disease/rubella/overview.html?inline=nyt-classifier), [chicken pox](http://health.nytimes.com/health/guides/disease/chickenpox/overview.html?inline=nyt-classifier), [flu](http://health.nytimes.com/health/guides/disease/the-flu/overview.html?inline=nyt-classifier),[hepatitis](http://health.nytimes.com/health/guides/disease/hepatitis/overview.html?inline=nyt-classifier) and some causes of childhood [meningitis](http://health.nytimes.com/health/guides/disease/meningitis/overview.html?inline=nyt-classifier), [pneumonia](http://health.nytimes.com/health/guides/disease/pneumonia/overview.html?inline=nyt-classifier) and[diarrhea](http://health.nytimes.com/health/guides/symptoms/diarrhea/overview.html?inline=nyt-classifier) have saved more lives than all the “miracle drugs” of the latter half of the 20th century — [antibiotics](http://topics.nytimes.com/top/news/health/diseasesconditionsandhealthtopics/antibiotics/index.html?inline=nyt-classifier) like penicillin, antivirals like drugs to fight[AIDS](http://health.nytimes.com/health/guides/disease/aids/overview.html?inline=nyt-classifier) and flu, and so on. In addition, vaccination is one of the leading reasons that many families in the West now feel comfortable having only two or three children: they can be reasonably certain that the children will survive childhood.

According to a large historical study by the [Centers for Disease Control and Prevention](http://topics.nytimes.com/top/reference/timestopics/organizations/c/centers_for_disease_control_and_prevention/index.html?inline=nyt-org) released in November 2007, death rates for 13 diseases that can be prevented by childhood vaccinations were at all-time lows in the United States. The study looked at hospital and death records going back to 1900 and estimated death rates before various vaccines were invented. In nine of the diseases, rates of hospitalization or death had declined more than 90 percent. For three — [smallpox](http://health.nytimes.com/health/guides/disease/smallpox/overview.html?inline=nyt-classifier), diphtheria and polio — death rates had dropped by 100 percent.

In the 1930s, the United States had about 30,000 diphtheria cases a year, and 3,000 of those succumbed to the disease as gray membranes formed in their airways and eventually choked them to death. Diphtheria is now virtually unknown in the West, but in the chaos following the breakup of the former Soviet Union, vaccinations broke down, and the Red Cross estimated there were 100,000 cases and 5,000 deaths from the disease.

Smallpox vaccine is no longer given to children because the disease has been eliminated from the world, except for stocks frozen in laboratories in the United States and Russia. The smallpox vaccine also carried some risks.

Since the 1990s, vaccines have become somewhat controversial, even in the United States. As diseases have disappeared, generations have grown up without ever seeing the sickness and death they caused. At the same time, new parents are often upset as their babies receive between 20 and 30 injections before age 2 and suffer the pain and mild [fever](http://health.nytimes.com/health/guides/symptoms/fever/overview.html?inline=nyt-classifier) that can accompany them as routine side effects.

In addition, rumors continue to spread that some vaccines, or a mercury antifungal vaccine preservative called thimerosal that was added to vaccines, cause [autism](http://health.nytimes.com/health/guides/disease/autism/overview.html?inline=nyt-classifier). Numerous studies have shown no link between autism and either vaccines or the preservative. An active anti-vaccine lobby, however, keeps the issue alive. The lobby is a broad tent. A few members question even whether bacteria and viruses cause disease; most seek more research into safety and greater rights to refuse vaccination.

State and city health departments, recognizing that the risk of epidemics soars when children gather daily in school, generally require parents to prove that children have been immunized before they enroll. There are some exceptions. All states allow medical exemptions for children who are immunocompromised or allergic to vaccine components. Most allow religious objections. A few allow “personal or philosophical” ones; how hard it is to get one varies by state.

Health insurers pay for most vaccines, and public clinics offer them free to the uninsured, the cost paid by the federal government under the Vaccines for Children Program of 1994. Before that time, incomplete vaccination was most common among the poor. Now it is more common for children from wealthy or middle-class families to lack some or all shots, presumably because their parents objected.

More vaccines are being developed all the time. Some are aimed at teenagers because they thwart diseases spread by sex or common in student dorms and military barracks. These include vaccines for human papillomaviruses, which cause [cervical cancer](http://health.nytimes.com/health/guides/disease/cervical-cancer/overview.html?inline=nyt-classifier); herpes; and meningococcal infections, the cause of sometimes deadly meningitis. Others, like those against flu, [shingles](http://health.nytimes.com/health/guides/disease/herpes-zoster/overview.html?inline=nyt-classifier) and some bacterial toxins, are particularly aimed at older people, who have weaker immune systems and are more likely to be in [hospitals](http://topics.nytimes.com/top/news/health/diseasesconditionsandhealthtopics/hospitals/index.html?inline=nyt-classifier) or [nursing homes](http://topics.nytimes.com/top/news/health/diseasesconditionsandhealthtopics/nursing_homes/index.html?inline=nyt-classifier).

Newer vaccines tend to be much more expensive than older ones, which were developed before the era of clinical trials costing hundreds of millions of dollars and before medical liability lawsuits were so common. But the cost of not vaccinating at all, as history has taught, can be very high.

*Publish date: 3/28/08*

Five Reasons the Zombie Apocalypse Will Never Come to Pass

Aside from the fact that no actual virus/infection exists that would turn living people into soulless, plodding flesh-hungry beasts, there are five reasons the zombie apocalypse will never come to pass.

» By [**Justin Brown**](http://www.primermagazine.com/author/justin-brown)

Just after watching the pilot episode of *The Walking Dead*, I decided that while I could still watch (and enjoy) any and all zombie films and television shows… I could no longer truly abide them. There’s too many questions logged in my head from years of viewing this particular genre and here, at the end of 2010, I now feel a responsibility to myself and the world to completely unravel any semblance of the well-accepted cultural delusion that zombies could actually take over the world, if they existed in the form presented in popular modern media.

Aside from the fact that no actual virus/infection exists that would turn living people into soulless, plodding flesh-hungry beasts, I believe there are five reasons the zombie apocalypse will never come to pass.

(For the purposes of this dissertation, I am choosing to disregard any zombie tale in which zombies are created by some indefinable Biblical prophecy wherein all dead people rise from the grave and any person who dies after a certain point becomes a zombie whether or not they’ve been “infected” in any way. Because… come on, that’s just *ridiculous*.)

**5. Weather**

You know how you have separate clothes for winter and summer? That’s because getting extremely hot or cold is bad for the human body (you may have gleaned this, over the years). Extended exposure to harsh summer sun and/or the frigid temperatures that normally accompany snow and ice will absolutely kill fully nourished and healthy humans. So how would people with open wounds, no shelter, and rapidly decaying flesh and bone respond to being out in the sun for hours or days or weeks at a time?

With an intermittent diet consisting only of human/animal flesh, their bodies would quickly become dried out and malnourished, and they would soon turn to sticky puddles of death on a hot stretch of highway. And if any zombies were caught in a frigid climate, their likelihood of survival would be even further reduced. Frostbite on the limited remaining blood and fluid in their bodies would quickly eliminate motor function, reducing them to mildly cool heaps of flesh itching to be plowed into snowdrifts.

**4. They’re already dead**

Humans may be relatively fragile but at least we can fix ourselves, more often than not. Human beings can get stabbed, shot, hit by cars, dropped from great heights, drowned, and poisoned and STILL SURVIVE (though to be honest, I don’t know if anyone’s sustained all of those in quick succession). We have science, medicine, and — above all – *functioning immune systems*. Zombies would have none of these. In addition to the aforementioned problems that zombies would encounter via the elements, they have no way to solve any other physical problem that may pop up. Oh, a zombie stepped off a curb at an awkward angle and broke his/her ankle? Have fun on the asphalt. A stray dog attacks them? Done.

Anything that happens to a zombie is final. Their life support is largely already unplugged. They cannot patch themselves up or seek help at a zombie hospital and their body can’t do anything on its own. The hard work in killing them is done. There’s no right or wrong way to go about ending a zombie’s tenure. It’s one move based purely on physics: impale the brain and walk away.

**3. Disease control**

Remember when everyone freaked out about [**SARS**](http://en.wikipedia.org/wiki/Severe_acute_respiratory_syndrome)? How about the big [**Bird Flu**](http://en.wikipedia.org/wiki/Global_spread_of_H5N1) scare, at the beginning of this century? And then the big [**Swine Flu**](http://en.wikipedia.org/wiki/2009_flu_pandemic) business last year — remember that? The total combined deaths of those three recent outbreaks worldwide was under 20,000 people (and an overwhelming majority of those were [**from swine flu**](http://www.who.int/csr/don/2010_08_06/en/index.html), which is odd considering that that form of influenza is [**not usually very deadly**](http://www.prrjournal.com/article/S1526-0542(09)00046-3/abstract)). Even with a decade and three different battlefronts, the result was far from global eradication of our species. Further, do you know how many SARS/Bird Flu/Swine Flu deaths happened in the United States? About 3,400, and those were ALL Swine Flu related (and nearly half of them were in Florida, Texas, New York, and California… meaning quarantine would’ve been relatively easy to implement).

Now you may be saying: “*well, the death toll in those three instances was small because SARS and the flu are treatable and thus, not 100% lethal. So, the number of people who were infected with SARS/the flu is a lot higher than the number of people died by them. But with the zombie infection, once you’re infected, survival is not possible.*” And you’d be right. If the zombie virus spread like the Swine Flu, over 600,000 people would be zombies. Or would they? No, they wouldn’t.

See, there is one HUGE difference between something like swine flu and the zombie virus beyond existing suitable medical treatment: transmission. The reason that influenza (in all its forms) has hung around so long and killed so many (thousands of people per year in the U.S. alone) is because it is very contagious. Whether it’s through direct contact with fluids, aerosol germs, or touching a contaminated surface, if you believe someone around you has the flu, you basically need to avoid everyone and everything. Once the flu’s in the area, it’s very difficult to remain flu-free.

But one unchanging part in nearly all of the zombie mythos is thus: you can only become a zombie if you are bitten by a zombie. So to avoid becoming infected with the zombie virus… all you need to do is **not get bitten**. How hard could that be? Well, for real-world comparison, how many times have you contracted rabies? Exactly. On average, less than 3 people die of rabies in the U.S. annually. The lack of rabies-related death can be attributed to effective vaccinations but also because, at this point, people know not to get within biting distance of wild animals. So, if you knew a zombie virus was out there, would you get within biting distance of any person you didn’t know to be zombie-free (to say nothing of getting within biting distance of any person who looked like a zombie)? Wouldn’t you wear long sleeves and pants and denim and leather all the time just to ensure no zombie could even accidentally pierce your skin? **Seriously, one aspect rarely dramatized in zombie stories is that — based on how difficult it is to contract the zombie virus — becoming a zombie would be embarrassing more than anything, as it is a clear message that you’re just a total idiot.**

Anyway, my point is this: we don’t live in 14th-century Europe. Zombification isn’t [**the Black Death**](http://en.wikipedia.org/wiki/Black_death). And even if the zombie virus was transmitted by rats or fleas like Black Death… again, it’s not the 14th century anymore. When a disease (of any kind) threatens us in the year 2010, we immediately hear about it. A video of zombies would be on TwitVid within an hour of being filmed. We learn about it. We can handle it. We close borders and set up mobile clinics. We may not solve it *immediately* but you know those two places, the Center for Disease Control and Prevention and the World Health Organization? They’re more than a couple of offices with fluorescent lights and file cabinets. They figure out how diseases work. And even if it took a month or a year or even ten years to figure out how to treat the infected, these national/global groups would have no qualms about running PSAs every 19 seconds proclaiming “hey, just a reminder: don’t let dead people bite you!”.

**2. They’re mindless**

Whether you believe [**they can run or not**](http://www.slashfilm.com/quote-george-romero-says-zombies-cant-run/), one inescapable truth about zombies since their introduction to pop culture has been that they are conclusively no longer human. They can’t speak. They can’t avoid danger. They can’t use tools. They can’t hide and wait until your back is turned. They can’t organize and design an effective plan of attack. They can’t conserve their energy. They can’t defend themselves. Translation? Make sure there are none hiding in your house and then just shut your doors and windows. That’s literally all you ever need to do.

Zombies could pile up against the sort of door used as the main entry in a home or building but it probably wouldn’t do much good as those doors are designed to keep people out. Zombies have no muscular strength or logic to organize “1… 2… 3… push!” so it would be long, sustained light pressure on your front door. I think by the time that loosely assembled plan came together for the zombies (if it ever did), you would’ve had more than enough opportunity to slip out the back door and drive anywhere else in the country.

Put it this way: how many able-minded criminals have broken into your residence when the doors were locked? Take it back another step: how many ANIMALS have outsmarted you enough to enter your house? And zombies are conclusively dumber and less capable than both of those groups. Our whole world is already full of objects erected to keep things apart — anybody who didn’t have brainpower or muscular ability enough to use a sledgehammer or turn a door knob would have endless amounts of trouble breaching these barriers. And that’s *before* you factor in people nailing two-by-fours across every entrance, piling up sandbags along the sidewalk, and buying tank spikes from the Army surplus store (I already have a line of credit there, just in case).

If you’re going to take over the world, you need to at least be as smart as my dog. Zombies don’t make that cut.

**1. The military.**

I would argue that no genre has disrespected the military quite like zombie cinema. At least when aliens or monsters or robots devastate armed forces in movies, it is usually hilariously explained within the context of the story (aliens have technology, monsters are bulletproof and very large, robots take over our computers and become omnipresent). But when zombies supposedly overrun the world, we’re rarely given an explanation as to how these zombies could possibly trump a force with greater numbers, strategy, technology, and firepower. Zombie fiction (in film and literature alike) tells us that these military forces were simply defeated and that’s about it. We’ll see the occasional abandoned tank and helicopter, with bloody fatigued bodies nearby but we’re never really offered any reasonable logic as to how this could have happened. That’s because it wouldn’t happen. It’s dumb.

[*Even worse, most zombie media will usually add another insult to the military by depicting at least one or two sequences wherein our protagonist ragtag band of survivors (or even a single survivor) -- traditionally armed only with melee weapons -- successfully wipe out a dozen or so zombies while rarely enduring any casualties on their side. How does this make any sense? A bunch of untrained civilians can hold this menace at bay but no military can? Pssh. Anyway, back to my point.*]

Using America’s military for comparison, do you realize that even when facing multiple well-armed foreign militaries overseas nearly non-stop over the last 90 years, the entire American military has never even come close to being totally annihilated (also relevant: America won nearly all of those wars). And those were multiple-year struggles against organized groups with rifles and jets and tanks — not a bunch of uncoordinated, slow-moving morons in wide open spaces.

On top of that, one of the biggest issues in winning a war is finding and subsequently neutralizing the opponent. This would never ever be a problem with zombies because zombies would be the only opponent in the history of living things to:

**a.** repeatedly try to get very close to their greatest predator

**b.** have absolutely no defense against their greatest predator

**c.** not flee their greatest predator even as their greatest predator is obliterating all other zombies

**d.** not be able to increase their numbers without step A

So if this unlikely outbreak somehow started, as long as every healthy human being stayed indoors, all the military would need to do is drive down the street and capture/kill those stumbling around, looking for flesh. It would be easier than Duck Hunt.

In conclusion, the zombie-induced end of the world as depicted in films, television shows, and comic books would never happen. Could zombies wreak some havoc in a small, isolated town full of the dumbest people on Earth? Sure. But once anyone with a functioning brain heard about it, the clean-up would take like 9 hours.

<http://www.primermagazine.com/2010/field-manual/five-reasons-the-zombie-apocalypse-will-never-come-to-pass>

FYI: Could Scientists Really Create a Zombie Apocalypse Virus?

By Ryan Bradley Posted 02.24.2011 at 9:22

Maybe, but it's not going to be easy. In West African and Haitian vodou, zombies are humans without a soul, their bodies nothing more than shells controlled by powerful sorcerers. In the 1968 film *Night of the Living Dead,* an army of shambling, slow-witted, cannibalistic corpses reanimated by radiation attack a group of rural Pennsylvanians. We are looking for something a little in between Haiti and Hollywood: an infectious agent that will render its victims half-dead but still-living shells of their former selves.

An effective agent would target, and shut down, specific parts of the brain, says Steven C. Schlozman, an assistant professor of psychiatry at Harvard University and author of *The Zombie Autopsies,* a series of fictional excerpts from the notebooks of "the last scientist sent to the United Nations Sanctuary for the study of ANSD," a zombie plague. Schlozman explained to PopSci that although the walking dead have some of their motor skills intact—walking, of course, but also the ripping and tearing necessary to devour human flesh—the frontal lobe, which is responsible for morality, planning, and inhibiting impulsive actions (like taking a bite out of someone), is nonexistent. The cerebellum, which controls coordination, is probably still there but not fully functional. This makes sense, since zombies in movies are usually easy to outrun or club with a baseball bat.

The most likely culprit for this partially deteriorated brain situation, according to Schlozman, is as simple as a protein. Specifically, a proteinaceous infectious particle, a prion. Not quite a virus, and not even a living thing, prions are nearly impossible to destroy, and there's no known cure for the diseases they cause.

The first famous prion epidemic was discovered in the early 1950s in Papua New Guinea, when members of the Fore tribe were found to be afflicted with a strange tremble. Occasionally a diseased Fore would burst into uncontrollable laughter. The tribe called the sickness "kuru," and by the early '60s doctors had traced its source back to the tribe's cannibalistic funeral practices, including brain-eating.

Prions gained notoriety in the 1990s as the infectious agents that brought us bovine spongiform encephalopathy, also known as mad cow disease. When a misshapen prion enters our system, as in mad cow, our mind develops holes like a sponge. Brain scans from those infected by prion-based diseases have been compared in appearance to a shotgun blast to the head.

Now, if we're thinking like evil geniuses set on global destruction, the trick is going to be attaching a prion to a virus, because prion diseases are fairly easy to contain within a population. To make things truly apocalyptic, we need a virus that spreads quickly and will carry the prions to the frontal lobe and cerebellum. Targeting the infection to these areas is going to be difficult, but it's essential for creating the shambling, dim-witted creature we expect.

Jay Fishman, director of transplant infectious diseases at Massachusetts General Hospital in Boston, proposes using a virus that causes encephalitis, an inflammation of the brain's casing. Herpes would work, and so would West Nile, but attaching a prion to a virus is, Fishman adds, "a fairly unlikely" scenario. And then, after infection, we need to stop the prion takeover so that our zombies don't go completely comatose, their minds rendered entirely useless. Schlozman suggests adding sodium bicarbonate to induce metabolic alkalosis, which raises the body's pH and makes it difficult for proteins like prions to proliferate. With alkalosis, he says, "you'd have seizures, twitching, and just look awful like a zombie."

http://www.popsci.com/science/article/2011-02/fyi-could-scientists-really-create-zombie-apocalypse-virus

**Dead Likely? The Science Behind The Zombie Apocalypse**

**Maddy and Gavin team up to discuss the possible agents behind a zombie uprising. A common feature in many sci-fi movies, games and books, is the zombie a scientific possibility?**

The zombie apocalypse will happen. At least that is what we are led to believe. It may be bioterrorism or an evil pharmaceutical company’s twisted experiment gone wrong. Either way, the media has led us to believe that this deadly scenario is not just a possibility but a probability. From the many computer games to the masses of films, this topic has been covered from every angle, but what is the science behind the stories?

**ZOMBIES WITH A SCIENTIFIC BASIS**

* **Dead Island** – Mutated prion
* **Dead Rising** – Genetically modified bees
* **Resident Evil** – Virus
* **28 Days Later** – RAGE virus
* **Left 4 Dead** – Rabies virus

The likelihood of reanimated corpses rising to fulfil their bloodlust is minimal but there may be some feasibility in stories involving infections. This has been explored in many movies and videogames including the 28 Days Later franchise, Left 4 Dead, Dead Island and Resident Evil. These plots are still far-fetched but at least have their roots grounded in science. So, how likely is a zombie apocalypse and how may it come about? It’s definitely worth exploring — after all, it might just happen.

**ZOMBIE ANTS**

Though it may scare some to know, zombies already exist. Carpenter ants in Thailand have recently been discovered to be plagued by zombification caused by a parasitic fungus which infects the ants and manipulates their behavior in order to increase its own transmission. The fungus, a species of Ophiocordyceps, is absorbed in its mycelium form (the vegetative phase) and thrives on the organs of the ant, releasing unidentified chemical signals which penetrate the central nervous system and allow the fungus full control over behaviour.

The infected ant displays unusual activity, often found astray from the group, wandering on nearby vegetation. When the fungus has found the perfect spot where conditions are ideal for optimal transmission, it induces a ‘death grip’ response in the ant, which bites down on the stem of a plant, locking its body in place. As the fungus finally starts to feed on its brain, the ant dies. A fungal growth called an ascocarp erupts from its head and releases spores, potentially infecting new victims.

So far the fungus has not made the leap to human transmission and no other known fungus exists that could. However there is always the possibility that on some undiscovered island, a Cordyceps fungus exists with the ability to jump the species barrier. Let’s hope not.

**TOXOPLASMA GONDII**

Parasites, like the cordyceps above, always have a way of manipulating their host in order to ensure their own continuation. Toxoplasma gondii, a small protozoan parasite, is no different and is frighteningly common, affecting one third of the world’s population. Although primarily a cat parasite, T. gondii has intermediate hosts such as humans, livestock and rodents. However to reproduce, the parasite must be in the definitive host, so it manipulates the behaviour of its intermediate hosts to make this happen.

Rodents are timid creatures, normally averse to cats, their natural predators. Laboratory tests have shown that mice infected at early post-natal timepoints display increased activity and become ‘bolder’ – more readily exploring new territory and preferring to stay in more open, exposed areas of the testing chamber. Furthermore, mice have an amazing sense of smell and normally avoid areas marked by cat urine. Infection with T. gondii can not only cause mice to lose this life-saving instinct but also to become attracted to the smell of cat urine. The mechanism behind the alteration of behaviour is unknown but it makes these mice far more vulnerable to attack from cats, a method the parasite employs in order to breed. The parasite has even been shown to alter the personality of humans but unfortunately not in such a way as to create the flesh eating zombies that we know and love [[**2**](http://the-gist.org/2012/05/dead-likely-the-science-behind-the-zombie-apocalypse/#ref_2)].

**PRION DISEASES**

As infectious agents go, prions are indeed a novelty. Not a parasite, virus or bacterium, prions are misfolded proteins. These proteins can be transmitted from one person to another through ingestion of, wait for it … BRAAAIIINS. This major prion protein, or Prp, exists in two isoforms: the normal physiological isoform, PrPc and the misfolded form PrPsc, named after the prion disease scrapie found in sheep. Once the misfolded PrP protein has been ingested, it corrupts all PrPc production, leading to a build up of the scrapie form which is protease-resistant and cannot be removed by the body. Plaques begin to form in the brain, much like Alzheimer’s disease and a similar irreversible neurodegeneration occurs. Clinically, these patients undergo behavioural changes, with symptoms including depression, hallucinations and increased aggression. Muscular abnormalities are also common. Some form of prion outbreak is plausible as history has already shown us, with a UK epidemic of bovine spongiform encephalopathy (BSE, human form termed new variant Creutzfeldt-Jakob disease) beginning in 1987 and killing nearly 200 people over the next 2 decades.

**RABIES AND RABIES RELATED VIRUSES**

By far the most used virus in any storyline is rabies. This can be attributed to the virus’s ability to transmit between multiple species, how it changes the behaviour of those infected and the fact that there is no definitive cure. The combination of these qualities provides the perfect zombie story, although minor tweaking may be required to produce one of apocalyptic proportion. Both rabies and rabies related viruses fall under the genus Lyssavirus and are very closely related, although the latter affects insectivores more than other mammals. The fact that rabies has remained prominent for thousands of years is partially due to its ability to cross between species. Humans often contract the disease via bites from infected animals as the virus is found in high titres in saliva. Once infected the virus may replicate in muscle cells before invading the peripheral nervous system. It does so by binding to acetylcholine receptors, which is similar to the binding mechanism of many snake toxins. Once in the peripheral nervous system the virus moves towards the central nervous system where it disseminates into other cells. Victims initially present with flu like symptoms followed by huge behavioural changes, in particular disorientation. This is followed by extreme aggression and intense hydrophobia with an inability to swallow.

Rabies is almost always fatal and treatment is normally preventative. Following a bite by a possibly infected animal, the wound can be cleaned and treated with several doses of rabies vaccine. This must be carried out within 24 hours however or all is lost … almost. There have been a few cases where people have successfully survived rabies through the implementation of a treatment dubbed the Milwaukee Protocol. A drug-induced coma is used to protect the brain as the immune system mounts its response to destroy the virus. Several people have survived rabies through this treatment but its requirements wouldn’t be easy to implement if bitten by a zombie.

In terms of a zombie apocalypse rabies is an excellent candidate for an infectious agent. The localisation of the virus in saliva coupled with the intense aggression experienced by the infected gives rise to the idea of humans running rampant in the streets biting one another. It should be noted that there have been no recorded cases of humans transmitting rabies to one another via bites, however the possibility still remains. The incubation of the virus also differs widely between individuals with some people not experiencing symptoms until at least 2 years after initial infection. However with a few minor modifications, let us say through genetic modification by an evil corporation, this virus would be excellent for bringing down civilisation.

So, what are the chances of all this happening? Well, as expected, they are very slim but the science does exist to make it possible. Who knows, whatever the mechanism, one day this may all occur and the science fiction may become a lot less fictional. Until then, you can prepare yourself using this knowledge and hopefully the scientists of the world can prevent the unthinkable happening — but if you’re anything like these two authors you should make your zombie plan now before the zombies start chasing you through George Square and World War Z really does come to Glasgow.

<http://the-gist.org/2012/05/dead-likely-the-science-behind-the-zombie-apocalypse/>

(Glasgow Insight Into Science and Technology)

[ED GRABIANOWSKI](http://zeppelined.kinja.com/)

[6/06/12 7:00am](http://io9.com/5916048/how-a-zombie-outbreak-could-happen-in-real-life)

169,714g[198**L**](http://io9.com/5916048/how-a-zombie-outbreak-could-happen-in-real-life#replies)

[**How a Zombie Outbreak Could Happen in Real Life**](http://io9.com/5916048/how-a-zombie-outbreak-could-happen-in-real-life)

Could zombies actually exist? What would it take for human corpses to rise up and hunt the living? We often think zombies are scientifically impossible — but actually, they're just very implausible. Here's one way *The Walking Dead* could happen in real life.

To start our zombie thought experiment, we need to make some basic assumptions. First, we're ignoring all supernatural zombie origins. We're also going to set aside space radiation, mysterious comets, or Russian satellites. Our focus will be narrowed to biological origins –- a zombie contagion. Of course, there are many different zombie scenarios in books and film, and no one theory is going to cover all of them perfectly.

The first aspect of human zombification we need to tackle is basic zombie physiology. In virtually every zombie scenario, zombies are able to function despite increasing levels of physical deterioration due to injury or decomposition. There has to be some mechanism for transmitting neural impulses from the brain to various body parts, and for providing energy to muscles so they can keep operating.

The most common science fictional explanation for zombie outbreaks is a virus — but viruses and bacterial infections are not known for building large new physical structures within the body. So let's count viruses out. Instead, the need for a mechanism to activate deteriorating body parts actually provides the cornerstone of what is, in my opinion, the strongest theory: fungal infection.

SEXPANDWe know that fungi can infect humans. We also know that fungal networks exist in most of the world's forests. These mycorrhizal networks have a symbiotic relationship with trees and other plants in the forest, exchanging nutrients for mutual benefit. These networks can be quite large, and there are studies that demonstrate the potential for chemical signals to be transmitted from one plant to another via the mycorrhizal network. That, in turn, means that fungal filaments could perform both vascular and neural functions within a corpse.

This leads us to the following scenario: microscopic spores are inhaled, ingested, or transmitted via zombie bite. The spores are eventually dispersed throughout the body via the bloodstream. Then they lie dormant. When the host dies, chemical signals (or, more accurately, the absence of chemical signals) within the body that occur upon death trigger the spores to activate, and begin growing. The ensuing fungal network carries nutrients to muscles in the absence of respiration or normal metabolism.

Part of the fungal network grows within the brain, where it interfaces with the medulla and cerebellum, as well as parts of the brain involving vision, hearing and possibly scent. Chemicals released by the fungi activate basic responses within these brain areas. The fungi/brain interface is able to convert the electrochemical signals of neurons into chemical signals that can be transmitted along the fungal network that extends through much of the body. This signal method is slow and imperfect, which results in the uncoordinated movements of zombies. And this reliance on the host's brain accounts for the "headshot" phenomenon, in which grievous wounds to the brain or spine seem to render zombies fully inert.

SEXPThis leaves the problem of zombie metabolism. Where do the zombies get the nutrients needed to perform physical activity, plus the necessary nutrients to fuel the life-cycle of the fungi? This is most easily explained by the zombies' constant, endless drive to devour meat. The fungal network would still need some way to metabolize meat, and zombies seem to be able to function even in the absence of a human digestive system.

It is possible that this particular fungi has evolved a means to extract energy and nutrients from meat in a similar manner to carnivorous plants. The ingestion of meat may actually be vestigial, an unintended result of the drive to bite. In this case, the fungi may draw energy from the decomposition of the host's own organic material, which effectively puts a shelf-life on zombies (in addition to the deterioration of body structures beyond the point where the fungal network can compensate).

Accounts of dismembered parts moving purposefully may be apocryphal.

Now we have established a working theory for fungal zombies. How could such a disease arise? The goal of any biological organism is to live long enough to reproduce, but many pathogens are self-limited by their own lethality. The host dies before it has a chance to spread the pathogen inadvertently. This gives us two pathways for development of the zombie fungus. First, a fungal species existed that used the digestive tracts of mammals to travel. In other words, animals ingested the fungus, including spores. The spores were later defecated out in a new location. Some mutations occurred that caused the spores to gestate while still within the host. However, in most cases, the host's immune system would destroy the fungus. Further mutations could lead to spores that only trigger once the host has died, avoiding this problem.

Another possibility is a fungal infection that was highly aggressive and caused rapid death within the host. That strain was not able to successfully reproduce as often as a mutated strain that delayed activation until post-mortem.

Of course, it's one thing for a fungus to activate after the host dies, and quite another for the dead host to stand up and start attacking things. There are many evolutionary steps in between, which is why a zoonotic origin seems likely.

The precursor fungus could have been ingested by pigs, which are omnivorous. Captive pig populations, subject to overcrowding, would have been perfect places for the fungus to spread and mutate. In some poorly managed pig farms, dead pigs may have gone unnoticed, allowing post-mortem development of the fungus. Dead pigs were likely partially eaten by their living counterparts, allowing the fungal strains with post-mortem mutations to spread back into the population. The method of transfer from the pig population to the human population seems fairly obvious.

The evolution of fully mobile dead pigs probably started with a simple bite reflex that could transmit spores to nearby pigs. A bite combined with a muscular spasm, a sort of lunge, would work even better. After many generations, this developed into full post-mortem mobility. Thus, a dead host went from a drawback to an advantage, becoming a mobile platform for spore distribution. In fact, the zombie hunger drive may have originated as a spore distribution method –- only later was the ability to metabolize meat acquired. We can extrapolate this development to assume the further refinement of the fungal neural system, allowing for zombies which are far more coordinated and can run at nearly full speed.

While this type of behavior modification may seem unlikely, there is precedent for it within the animal world. Several species of parasitic wasps are able to reprogram the behavioral patterns of their hosts (bees, ants and even caterpillars), creating complex new behaviors beneficial to the wasp and detrimental to the host. While the hosts in these cases aren't dead, this does demonstrate that complex chemical overrides can evolve in nature.

Hopefully scientists can develop an effective zombie fungicide in time.

**References:**

Brahic, Catherine. "Zombie caterpillars controlled by voodoo wasps." [New Scientist, June 4, 2008.](http://www.newscientist.com/article/dn14053-zombie-caterpillars-controlled-by-voodoo-wasps.html" \t "_blank)

Yuan Yuan Song, et al. "Interplant Communication of Tomato Plants through Underground Common Mycorrhizal Networks." [PLoSONE, June 7, 2010.](http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0013324" \t "_blank)

http://io9.com/5916048/how-a-zombie-outbreak-could-happen-in-real-life