

(This Report is released early to assist Members in preparing for the discussion Item. If you have not reviewed the free YouTube video, “Genetic Roulette” - The gamble of our Lives”] (Please do so prior to the meeting or you will not have a clue in a brief 5-minute presentation) .

[Disclosure: As usual Sunshine Law must be adhered to with no discussion of these Reports whatsoever, with any manners in any manner until the SAB Meeting tomorrow starting at 2:30 pm.]

In the nearly 20 years of intensifying exposure, scientists have been documenting the health consequences of Roundup and glyphosate in our food, in the water we drink, in the air we breathe and where our children and pets play. They've found that people who are sick have higher levels of glyphosate in their bodies than healthy people. [57]

Genetically Modified Organisms [Free on YouTube, “Genetic Roulette - The gamble of our Lives”]

- ***Logarithmic increase in chronic illnesses in last 20 years.***
- ***88% US corn and 94% of Soy and Wheat is Genetically Modified.***
- ***Take genes of one species and force into other species.***
- ***They've taken genes of spiders and put into goats in the hopes they can milk the goat to get spider web protein to make bulletproof vests.***

- ***They've taken cow genes and put them into pigs so that the pigs have cowhides.***
- ***Monsanto PCB's, Agent Orange and DDT were safe, they lied.***
- ***Bt is bacterial toxin in soil. It is taken from soil and genetically introduced into agricultural products like corn or cotton by spraying. This allows the plant to do the killing of insects. Every single cell within that plant is producing a toxic protein. Bt is designed to break open the stomach of the insect and kill them. Doctors are saying that this may be responsible for the increase in gastrointestinal sicknesses that they're seeing in their practices. "Permeable" or "Leaky Gut". 164 - [0.5 minutes].***

The following health problems are attributed to exposure to Roundup and/or glyphosate:

ADHD: In farming communities, there's a strong correlation between Roundup exposure and attention deficit disorder (ADHD), likely due to glyphosate's capacity to disrupt thyroid hormone functions.

Alzheimer's disease: In the lab, Roundup causes the same type of oxidative stress and neural cell death observed in Alzheimer's disease. And it affects CaMKII, an enzyme whose dysregulation has also been linked to the disease.

Anencephaly (birth defect): An investigation into neural tube defects among babies born to women living within 1,000 meters of pesticide applications showed an association for glyphosate with anencephaly, the absence of a major portion of the brain, skull and scalp that forms during embryonic development.

Birth defects: Roundup and glyphosate can disrupt the Vitamin A (retinoic acid) signaling pathway, which is crucial for normal fetal development. The babies of women living within one kilometer of fields sprayed with glyphosate were more than twice as likely to have birth

defects according to a study from Paraguay. Congenital defects quadrupled in the decade after Roundup Ready crops arrived in Chaco, a province in Argentina where glyphosate is used roughly eight to ten times more per acre than in the U.S. A study of one farming family in the U.S. documented elevated levels of glyphosate and birth defects in the children, including an imperforate anus, growth hormone deficiency, hypospadias (an abnormally placed urinary hole), a heart defect and a micro penis.

Brain cancer: In a study of children with brain cancer compared with healthy children, researchers found that if either parent had been exposed to Roundup during the two years before the child's birth, the chances of the child developing brain cancer doubled.

Breast cancer: Glyphosate induces human breast cancer cells growth via estrogen receptors. The only long-term animal study of glyphosate exposure produced rats with mammary tumors and shortened life-spans.

Cancer: House-to-house surveys of 65,000 people in farming communities in Argentina where Roundup is used, known there as the fumigated towns, found cancer rates two to four times higher than the national average, with increases in breast, prostate and lung cancers. In a comparison of two villages, in the one where Roundup was sprayed, 31 percent of residents had a family member with cancer, while only 3 percent of residents in a ranching village without spraying had one. The high cancer rates among people exposed to Roundup likely stem from glyphosate's known capacity to induce DNA damage, which has been demonstrated in numerous lab tests.

Chronic kidney disease: Increases in the use of glyphosate may explain the recent surge in kidney failure among agricultural workers in Central America, Sri Lanka and India. Scientists have concluded, "Although glyphosate alone does not cause an epidemic of chronic kidney disease, it seems to have acquired the ability to destroy the renal tissues of thousands of farmers when it forms complexes with [hard water] and nephrotoxic metals."

Colitis: The toxicity of glyphosate to beneficial bacteria that suppress clostridia, along with clostridia's high resistance to glyphosate, could be a significant predisposing factor in the overgrowth of clostridia. Overgrowth of clostridia, specifically *C. difficile*, is a well-established causal factor in colitis.

Depression: Glyphosate disrupts chemical processes that impact the production of serotonin, an important neurotransmitter that regulates mood, appetite and sleep. Serotonin impairment has been linked to depression.

Diabetes: Low levels of testosterone are a risk factor for Type 2 diabetes. Rats fed environmentally relevant doses of Roundup over a period of 30 days spanning the onset of puberty had reduced testosterone production sufficient to alter testicular cell morphology and to delay the onset of puberty.

Heart disease: Glyphosate can disrupt the body's enzymes, causing lysosomal dysfunction, a major factor in cardiovascular disease and heart failure.

Hypothyroidism: House-to-house surveys of 65,000 people in farming communities in Argentina where Roundup is used, known there as the fumigated towns, found higher rates of hypothyroidism.

Inflammatory Bowel Disease (“Leaky Gut Syndrome”): Glyphosate can induce severe tryptophan deficiency, which can lead to an extreme inflammatory bowel disease that severely impairs the ability to absorb nutrients through the gut, due to inflammation, bleeding and diarrhea.

Lou Gehrig's Disease (ALS): Sulfate deficiency in the brain has been associated with Amyotrophic Lateral Sclerosis (ALS). Glyphosate disrupts sulfate transport from the gut to the liver, and may lead over time to severe sulfate deficiency throughout all the tissues, including the brain.

Multiple Sclerosis (MS): An increased incidence of inflammatory bowel disease (IBS) has been found in association with MS. Glyphosate may be a causal factor. The hypothesis is that glyphosate-induced IBS causes gut bacteria to leak into the vasculature, triggering an immune reaction and consequently an autoimmune disorder resulting in destruction of the myelin sheath.

Non-Hodgkin lymphoma: A systematic review and a series of meta-analyses of nearly three decades worth of epidemiologic research on the relationship between non-Hodgkin lymphoma (NHL) and occupational exposure to agricultural pesticides found that B cell lymphoma was positively associated with glyphosate.

Parkinson's disease: The brain-damaging effects of herbicides have been recognized as the main environmental factor associated with neurodegenerative disorders, including Parkinson's disease. The onset of Parkinson's following exposure to glyphosate has been well documented and lab studies show that glyphosate induces the cell death characteristic of the disease.

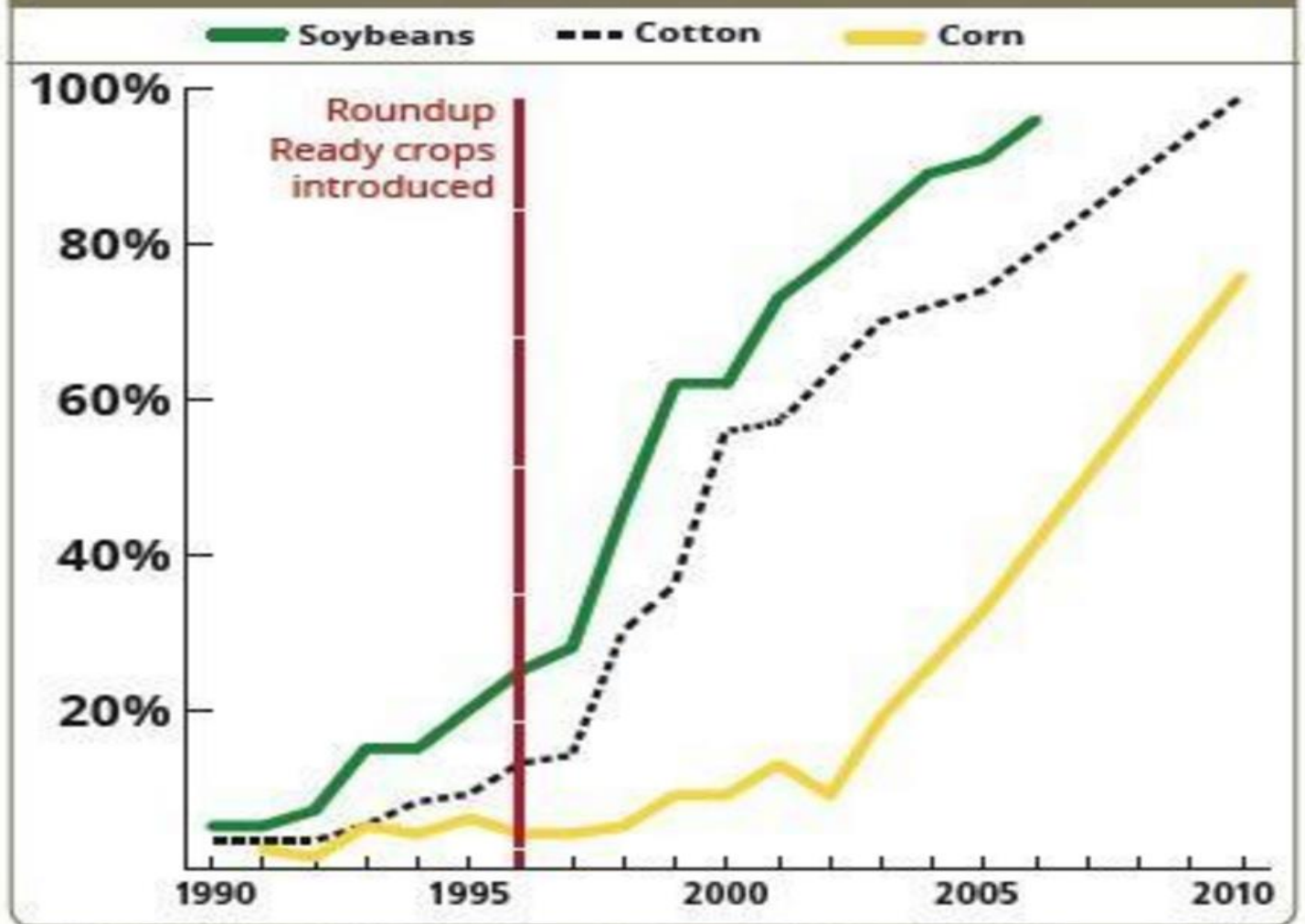
Pregnancy problems (infertility, miscarriages, stillbirths): Glyphosate is toxic to human placental cells, which, scientists say, explains the pregnancy problems of agricultural workers exposed to the herbicide.

Obesity: An experiment involving the transfer of a strain of endotoxin-producing bacteria from the gut of an obese human to the guts of mice caused the mice to become obese. Since glyphosate induces a shift in gut bacteria towards endotoxin-producers, glyphosate exposure may contribute to obesity in this way.

Reproductive problems: Studies of laboratory animals have found that male rats exposed to high levels of glyphosate, either during prenatal or pubertal development, suffer from reproductive problems, including delayed puberty, decreased sperm production, and decreased testosterone production.

Respiratory illnesses: House-to-house surveys of 65,000 people in farming communities in Argentina where Roundup is used, known there as the fumigated towns, found higher rates of chronic respiratory illnesses. [9.4 Minutes]

Figure 2. Percentage of U.S. Acres Sprayed With Glyphosate



SOURCE: USDA-NASS Quickstats: Survey, Environmental, Corn, Cotton, Soybean, Application, Percent Area Planted (Average) (Glyphosate).

Autism: *Glyphosate has a number of known biological effects that align with the known pathologies associated with autism. One of these parallels is the gut dysbiosis observed in autistic children and the toxicity of glyphosate to beneficial bacteria that suppress pathogenic bacteria, along with pathogenic bacteria's high resistance to glyphosate. In addition, glyphosate's capacity to promote aluminum accumulation in the brain may make it the principal cause of autism in the U.S.*

Number of children (6-21yrs) with autism served by IDEA

plotted against glyphosate use on corn & soy ($R = 0.9893$, $p \leq 3.629e-07$)

Sources: USDA:NASS; USDE:IDEA

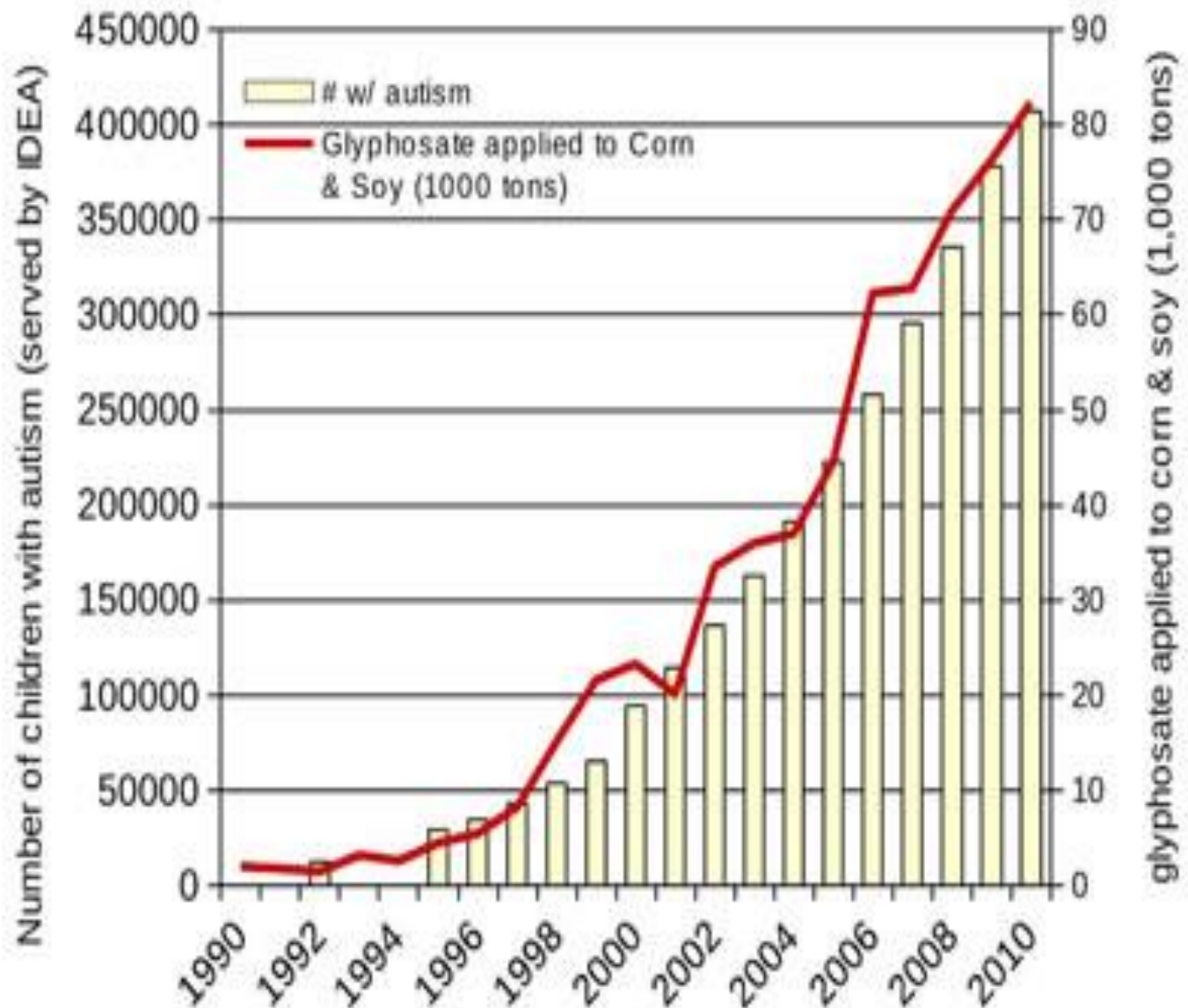
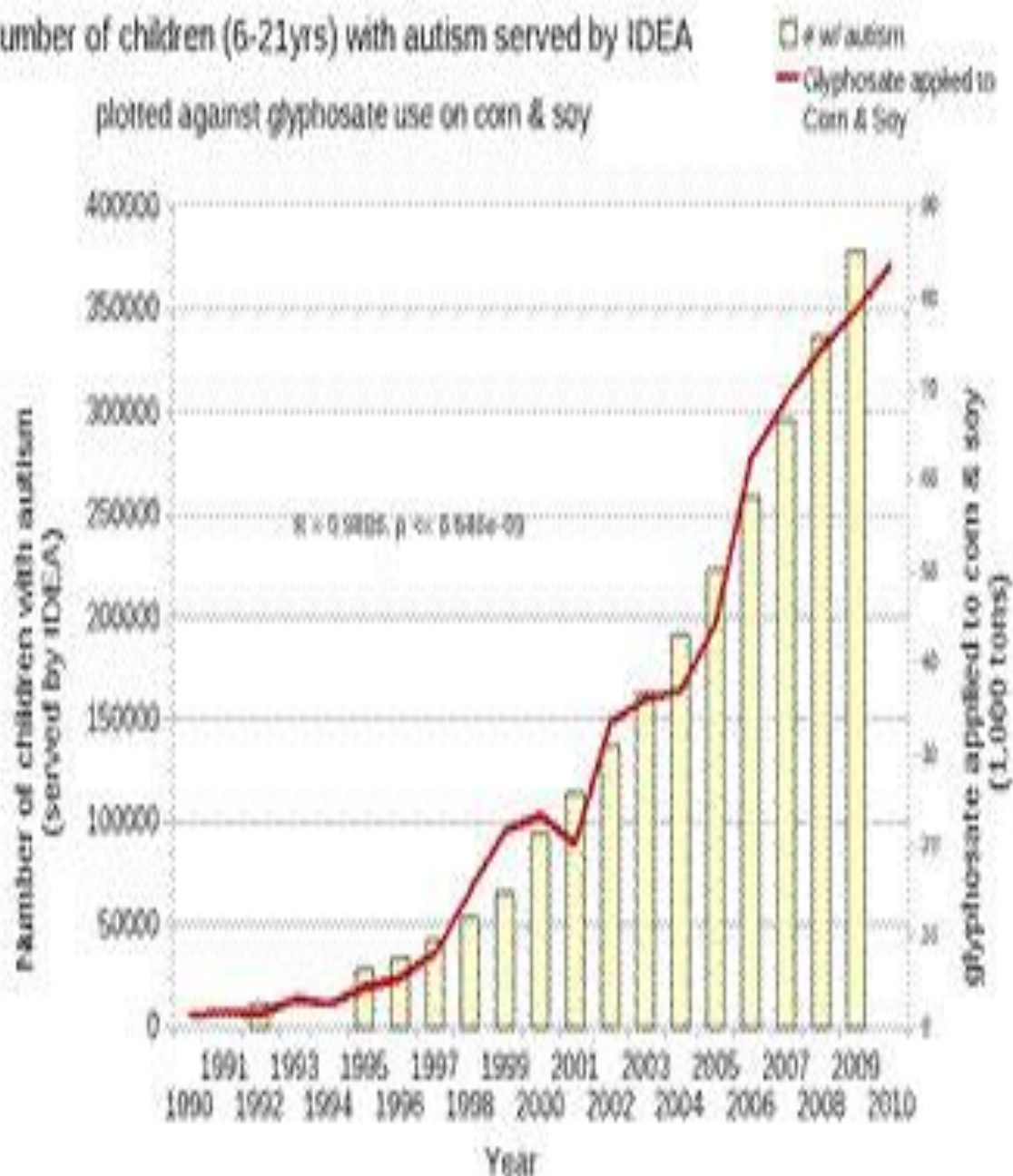


Figure 23. Correlation between children with autism and glyphosate applications.

Glyphosate and Autism*

Number of children (6-21yrs) with autism served by IDEA
plotted against glyphosate use on corn & soy



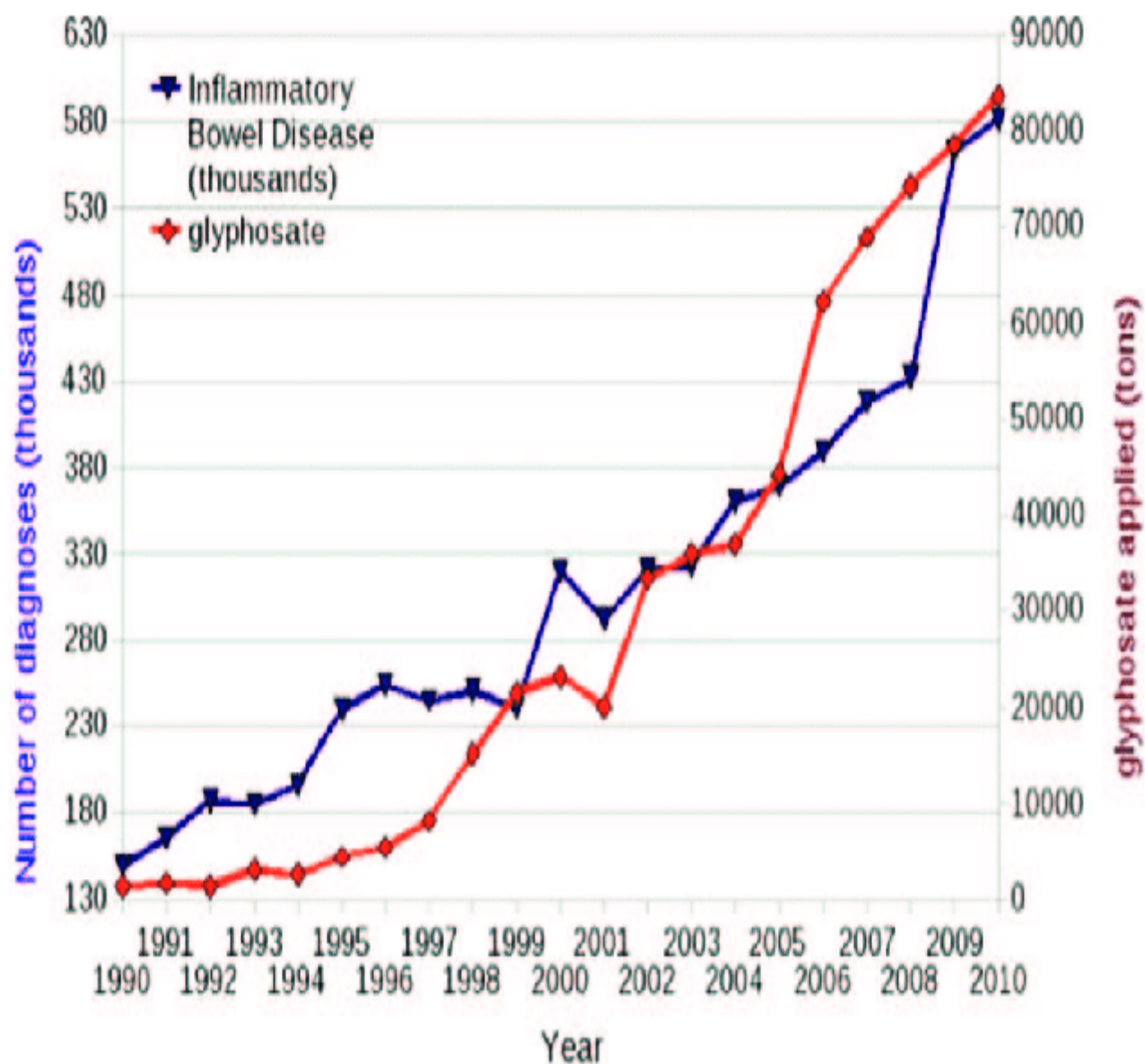
* <http://www.examiner.com/article/>

data-show-correlations-between-increase-neurological-diseases-and-gmos

Hospital discharge diagnoses (any) of
Inflammatory Bowel Disease (Crohn's and Ulcerative Colitis)

$R = 0.9557$, $p \leq 2.455e-08$

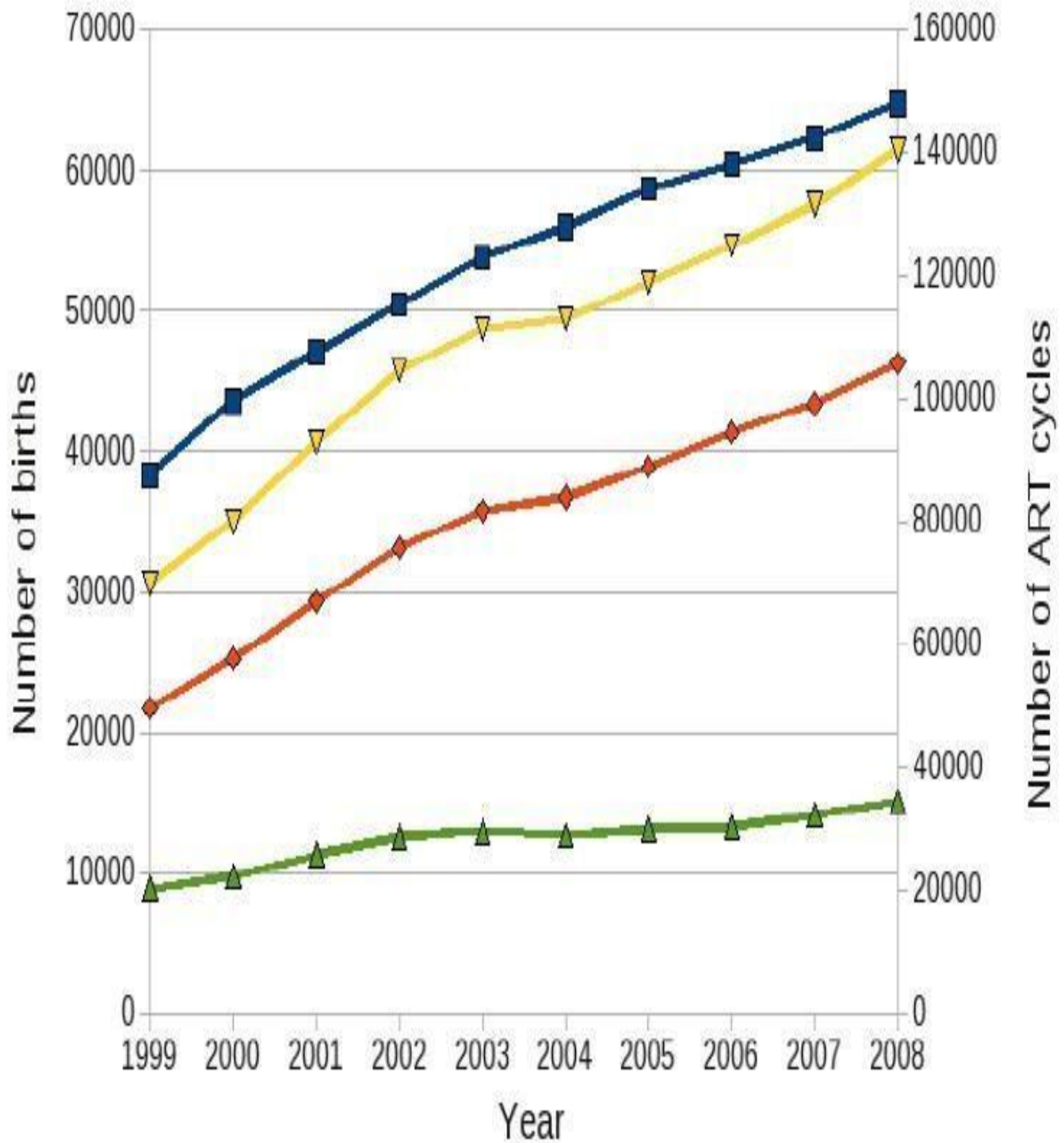
plotted against glyphosate applied to corn and soy



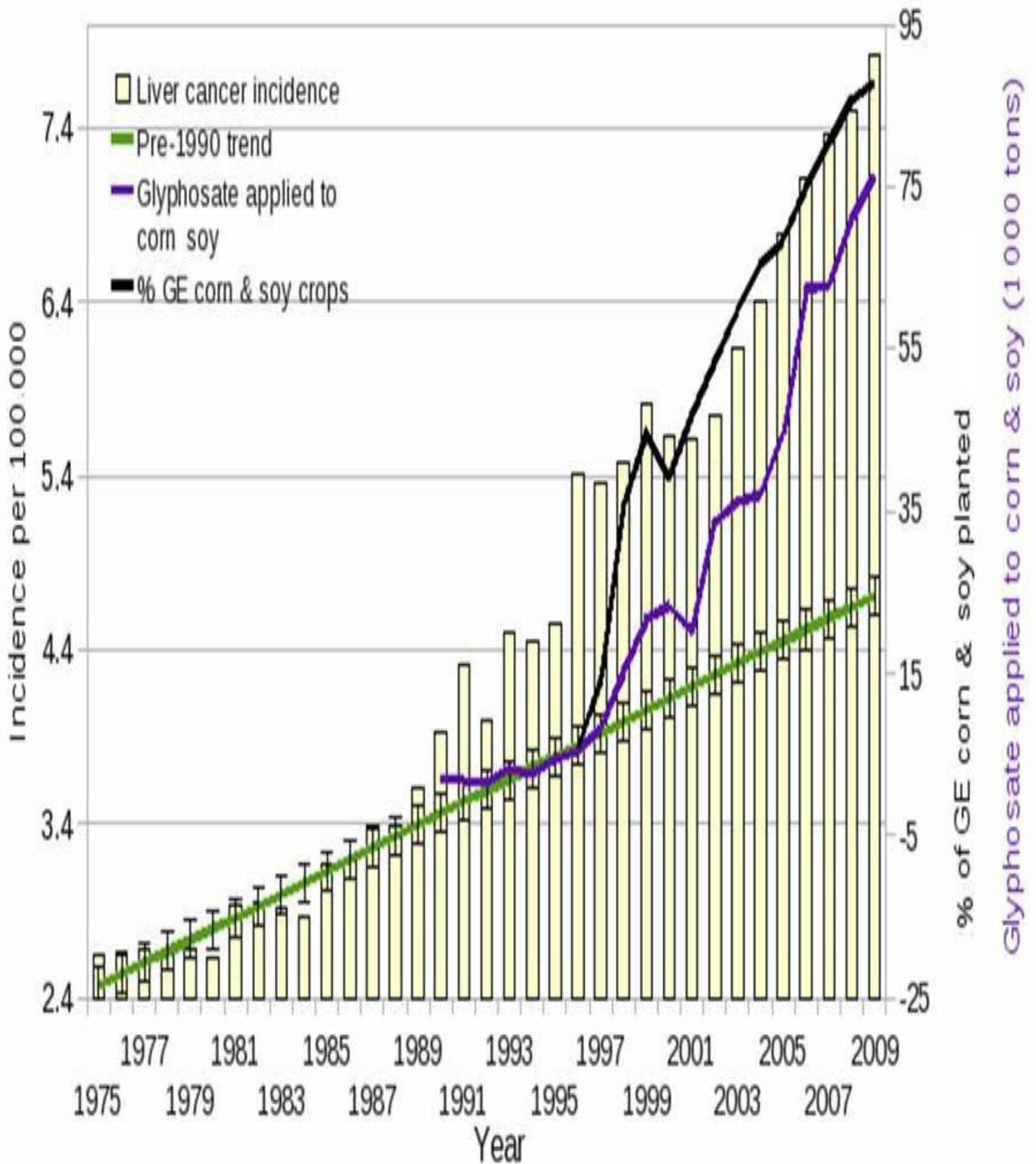
Assisted Reproductive Technology (ART)

#ART cycles, # live births, # infants born, # multiple births

- # ART cycles
- ◆ live-births
- ▽ infants born
- ▲ Multiple births



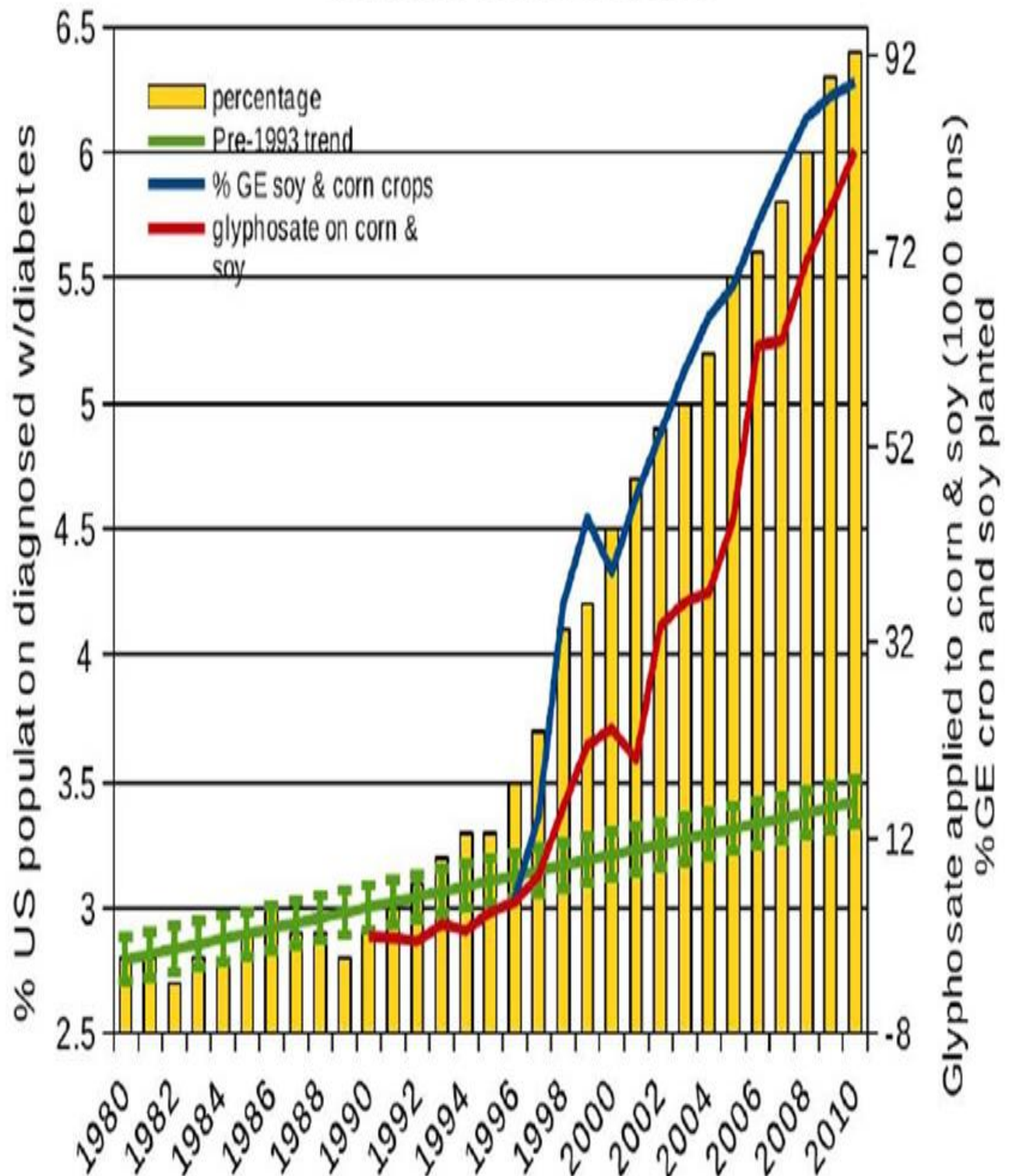
Liver disease: Very low doses of Roundup can disrupt human liver cell function, according to a 2009 study published in *Toxicology*.

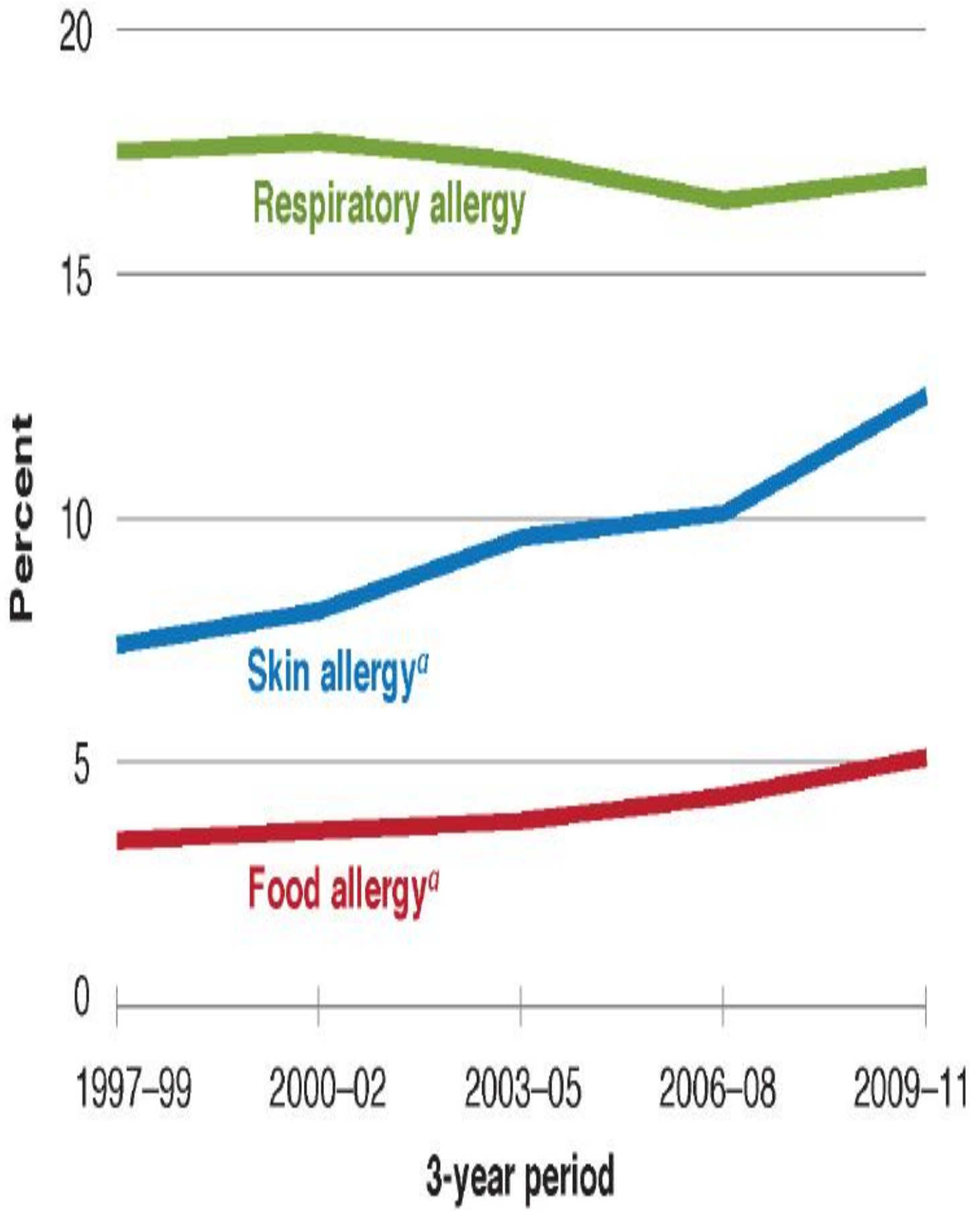


Prevalence of Diabetes in US (age adjusted)

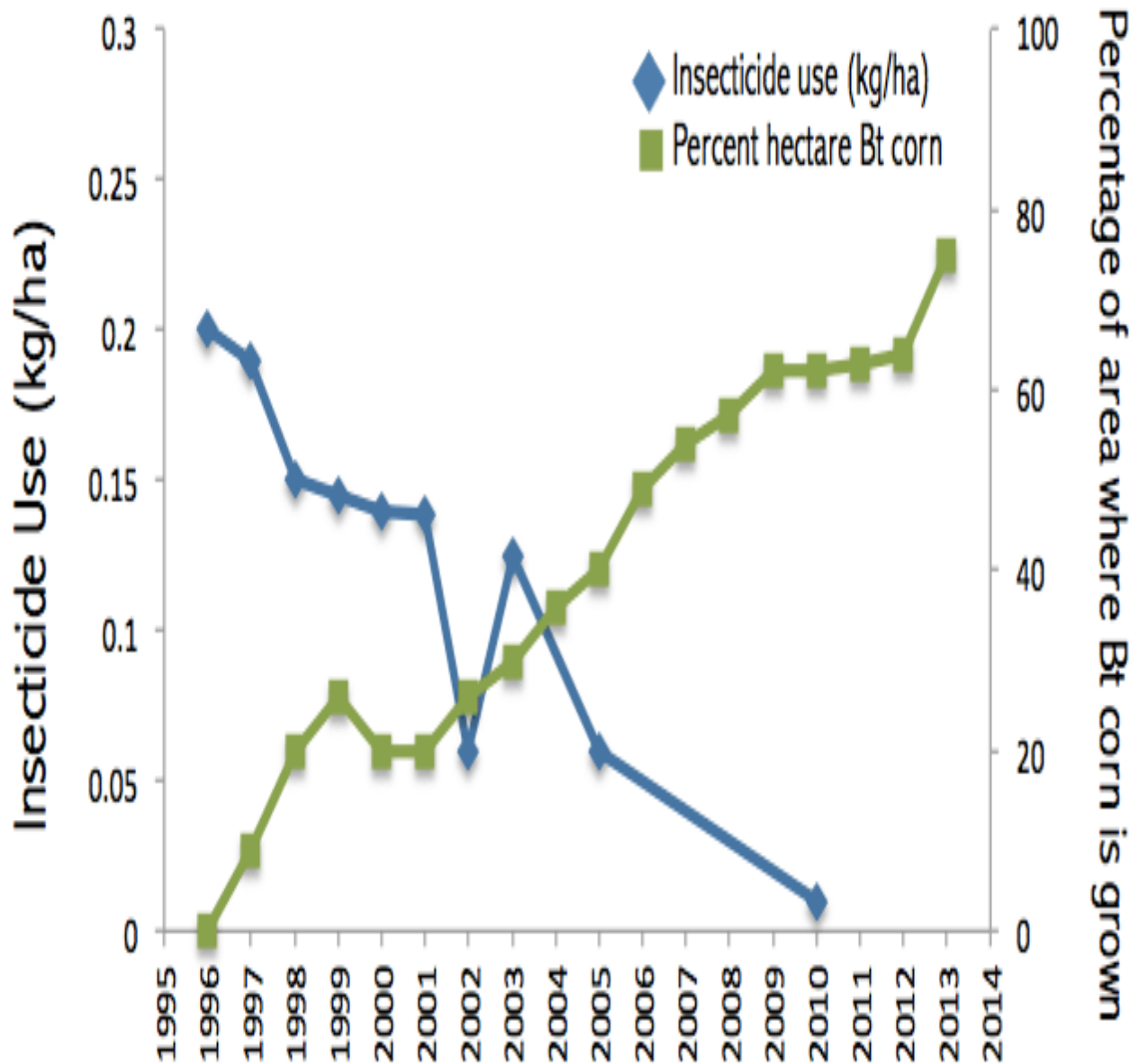
plotted against glyphosate applied to corn & soy ($R = 0.971$, $p \leq 9.24e-09$)
along with %GE corn & soy grown in US ($R=0.9826$, $p \leq 5.169e-07$)

sources: USDA:NASS; CDC



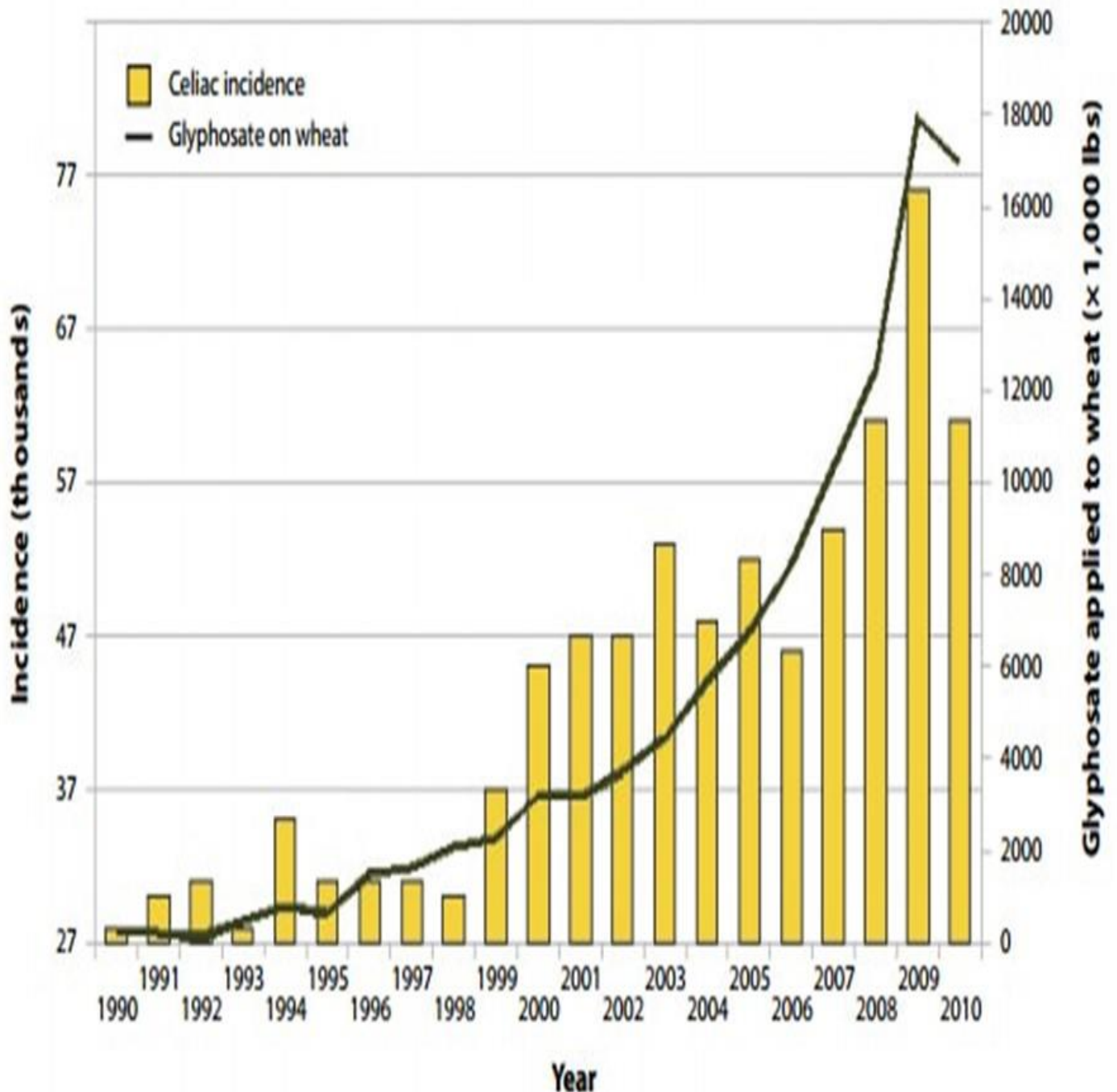


Bt corn uptake and insecticide use in U.S. corn fields



Adapted from Malakof D. and Stokstad E. Pesticide Planet. Science Magazine. 16 August 2013.

Celiac disease and gluten intolerance: Fish exposed to glyphosate develop digestive problems that are reminiscent of celiac disease. There are parallels between the characteristics of celiac disease and the known effects of glyphosate. These include imbalances in gut bacteria, impairment in enzymes involved with detoxifying environmental toxins, mineral deficiencies and amino acid depletion.



Thyroid Cancer Incidence Rate

- Incidence (adjusted)
- Glyphosate applied to Corn & Soy
- % GE soy & corn crops

plotted against amount of glyphosate applied to U.S. corn & soy crops along with the percentage of genetically engineered corn & soy crops
 Pearson correlation coefficients for glyphosate & both male and female incidence
 $R = 0.9876, p <= 7.851e-09$

