Southeastern Actuaries Conference
November 20, 2014

Mortality Improvement
A Different Approach

Al Klein, FSA, MAAA
Agenda

- Traditional approaches to mortality improvement
- A different approach to estimating mortality improvement
  - Look back at reasons for past improvements and determine whether or not they will continue into the future
  - What is happening today (and in the future) that will impact future mortality
    - The bad
    - The good
- Conclusion and summary
- Questions
Traditional Mortality Improvement
Techniques for projecting future mortality

- Cairns-Blake-Dowd
- Currie Age-Period Cohort
- Delphi study
- Environmental scanning
- GLM (Generalized linear models)
- Gompertz
- Heat map
- Heligman-Pollard
- Hunt-Blake
- Lee-Carter
- Lorenz Curve and Gini Index
- Makeham
- Perks/Kannisto
- Poisson log-bilinear
- P-Spline
- Renshaw-Haberman
- Weibull
Sources of mortality data

- Centers for Disease Control and Prevention
  - US life tables
  - www.cdc.gov/nchs/products/life_tables

- Social Security
  - US population life tables and projections
  - www.socialsecurity.gov/OACT/STATS/index.html

- Society of Actuaries Table Manager
  - Life and population data from 40 countries
  - www.soa.org

- World Health Organization
  - Civil registration systems from 130 countries
  - www.who.int/en/

- Continuous Mortality Investigations Library
  - UK life, annuity, pension, income protection, critical illness
  - www.actuaries.org.uk/mortality

- Human Mortality Database
  - Population data from 37 countries
  - www.mortality.org

- Human Life-Table Database
  - Population life tables from 67 countries
  - www.lifetable.de
Problems with extrapolation techniques

- Generally assumes past improvements will continue into future
- Generally ignores future changes
A Different Approach to Determining Mortality Improvement

- Look at the drivers of past improvement
  - Will they continue into the future?
- Determine the drivers of current and future improvement?
  - How will they impact mortality?
Drivers of Past Mortality improvement

- Some of the drivers of past improvement include:
  - Decreases in infant mortality rates
  - Decreases in motor vehicle deaths
  - Reduction in smoking prevalence

- Question: Will these continue into the future?
Decrease in infant mortality rates

Infant Mortality Rates for Texas and the U.S., 1960-2008

Note: Infant deaths (under one year old) per 1,000 live births by residence

Source: National Center for Health Statistics.
Thoughts on Infant Mortality Rates

- Trend appears to be stabilizing
- According to a recent CDC report*, in 2010, the infant mortality rate was 6.1 infant deaths per 1,000
  - This is the 4th highest rate among 29 of the world’s most developed countries
  - It is more than double that of Finland and Japan (2.3) and Portugal and Sweden (2.5)
  - So, there may be continued room for improvement
- Top 10 causes of infant mortality same in 2012 as 2011**
  - Birth defects, low birth weight, sudden infant death syndrome, maternal complications, bacterial infection, breathing problems, circulation problems, newborn bleeding
- Has biggest impact on mortality improvement
  - If more infants live, they may each add about 80 years to life expectancy
- Conclusion – Possible continued future improvement

* Source: Chicago Tribune, September 25, 2014
** HealthDay, October 8, 2014
Decrease in motor vehicle deaths

Figure 1. Motor vehicle traffic, poisoning, and drug poisoning death rates: United States, 1980–2008

NOTE: In 1999, the *International Classification of Diseases, Tenth Revision (ICD–10)* replaced the previous revision of the ICD (ICD–9). This resulted in approximately 5% fewer deaths being classified as motor-vehicle traffic-related deaths and 2% more deaths being classified as poisoning-related deaths. Therefore, death rates for 1998 and earlier are not directly comparable with those computed after 1998. Access data table for Figure 1 at http://www.cdc.gov/nchs/data/databriefs/db81_tables.pdf#1.

Thoughts on Changes Related to Motor Vehicles

- **Positives**
  - New safety features:
    - Air bags
    - Lane departure warnings / Blind spot indicator
    - Reverse backup sensors / Automatic braking
  - Increased awareness not to drink and drive
  - Increase in seatbelt use
  - In some states, requirement for more time behind the wheel (and practice) for new drivers before they are allowed their driver’s license

- **Negatives**
  - Texting while driving
  - Increase in speed limits

- **Conclusion** – If new driver training and crackdowns on texting while driving continue, positives outweigh negatives and we will see continued improvement, at least for the near term
Decrease in prevalence of smoking

Trends in Current Cigarette Smoking by High School Students* and Adults** — United States, 1965-2011

- Students
- Adults**

*Percentage of high school students who smoked cigarettes on 1 or more of the 30 days preceding the survey (Youth Risk Behavior Survey, 1991-2011).
**Percentage of adults who are current cigarette smokers (National Health Interview Survey, 1965-2011).
Thoughts on Reduction in Smoking

- Rates look like they could continue to decline

- However:
  - Anecdotally, it seems to me like more people are smoking now in cities and on college campuses
  - Teenagers still think they are invincible and can stop smoking anytime they want
  - Bad economy and stress can lead to more smokers

- Impact of e-cigarettes is still unknown

- Conclusion – Difficult to predict, but probably won’t see same improvements as in past
A Different Approach to Mortality improvement

- How will current and future events impact future mortality?
- My goal is point out issues you may not be aware of, but quantification is beyond the scope of this presentation
- To quantify, you should consider the following questions:
  - Will everyone benefit from the advance or only a segment of the population?
  - For those who could benefit, will they learn about it?
  - If they learn about it, will they implement it? This will depend on:
    - Affordability
    - Possible risks/side-effects associated with using the advancement
  - For those that implement it, how long will it take for the improvements to become effective?
Mortality improvement

- The bad …
Topics

- Geographical differences
- Foods
- Chemicals and hormones
- Obesity
- Drugs
- Natural and other disasters
Widening geographical differences

Longevity by County
From 1983 to 1999, life expectancy declined significantly in 11 counties for men, and 180 counties for women. Counties with significant declines were consistent with regional trends in smoking, high blood pressure and obesity.

Change in life expectancy relative to the national average
- Significant decline
- No change
- Significant increase

Source: PLoS

THE NEW YORK TIMES
Increasing mortality

- US Women – 2012
  - “A new study offers more compelling evidence that life expectancy for some U.S. women is actually falling, a disturbing trend that experts can’t explain. The latest research found that women age 75 and younger are dying at higher rates than previous years in nearly half of the nation’s counties—many of them rural and in the South and West. Curiously, for men, life expectancy has held steady or improved in nearly all counties... The phenomenon of some women losing ground appears to have begun in the late 1980s, though studies have begun to spotlight it only in the last few years... The study, released Monday by the journal *Health Affairs*, found declining life expectancy for women in about 43 percent of the nation’s counties... found that nationwide, the rate of women dying younger than would be expected fell from 324 to 318 deaths per 100,000. But in 1,344 counties, the average premature death rate rose, from 317 to about 333 per 100,000. Death rates rose for men in only about 100 counties.”

- *Fox News / Associated Press*, March 5, 2013
Geographical differences in US White Males – 2007

Percentage of Americans living below poverty level

2012: 15 percent

2000: 11.3 percent

TRIBUNE NEWSPAPERS
England and Wales

Premature death rates for deaths under age 75

London Tube Map

Life expectancy at birth and child poverty. Map by James Cheshire, University College London, June 2012.

Germany

Life expectancy by federal state, 2004-2006

India

Age 0-60 life expectancy by state, 2000-2004

Region 1 provinces have lowest fertility and mortality and Region 5 have highest

Source: Differential Mortality in Iran, http://www.pophealthmetrics.com/content/5/1/7
Japan

Unadjusted and age-adjusted all-cause mortality across 47 prefectures, 2005

Source: Geographic Inequalities in All-Cause Mortality in Japan: Compositional or Contextual?, http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0039876
Netherlands

Age-standardized all-cause mortality rates by region, 2004-2008

Russia

Death Rates in Russia per 1,000 Population in 2012

Death Rates in Russia, 2012 (Per 1,000 Population)

2012

All Regions: 13.3

2012, Federal State Statistics service of Russia
Ukraine

Life expectancy in Ukraine in 2012

Source: http://upload.wikimedia.org/wikipedia/commons/7/77/UkrLifeExpectancy.PNG
Caveat / Warning

- I am an actuary, not a doctor or nutritionist
- I do a lot of research and discover things many doctors don’t know about or refuse to accept due to conflicts with traditional training
- Before following any of the “advice” I am about to provide, consult your own medical/other professional
- Some of the topics may be controversial and you may not believe them at first – I encourage you to do your own research
- Except for a few new topics I wanted to share with you now, I have multiple sources for everything I will be showing you
Omega-3 Fatty Acids

“Before the days of modern industry, your meat and fish had abundant supplies of Omega-3s. But these days, even some salmon has little to none of this essential oil. That’s bad news, because your body can’t make Omega-3 on its own. And without it, your risk of disease skyrockets… As is often true in nature, balance is essential. Your body needs both Omega-3s and Omega-6s, but in the right ratios. For most of the time humans have been on Earth, we ate foods that had Omega-6s and Omega-3s in the ratio of about 2:1. Over the last 75 years, Omega-6s in your diet have soared. Now the ratio is about 20:1… The main sources of Omega-6s are vegetable oils, processed foods and grain-fed beef. Here’s where the health ‘gurus’ of the 1980s made a big mistake: They mistook the heart disease culprit to be red meat because grain-fed, commercial cattle have very high, 20:1 Omega-6s to Omega-3s. But they never bothered to explain why native cultures – who ate meat from grass-fed cattle – never had a single case of heart disease.”

The Cholesterol Fraud and Other Dirty Little Secrets Modern Medicine Doesn’t Want You to Know About, Al Sears, MD, 2014
Foods that are bad for you that you may not know about

- Red meat from cattle fed grain, antibiotics, and hormones
- Processed foods
- Fried foods
- White rice
- White and wheat bread
- Pasta
- Soda
- Refined and fake sugars (e.g., High Fructose Corn Syrup)
Do we have control over what we eat?

“Experts in the food industry have found additional, sneakier ways to increase what they call the ‘craveability’ of food products. They’ve learned how to combine ingredients, including chemical enhancers (such as artificial sweeteners, hickory smoke flavor and cheese flavorings) to create a complex series of flavors and textures that magnify the sensory appeal. As soon as that fleeting taste and oral stimulation fade, you reach for more. Can’t a person use willpower to resist such foods? Not necessarily. What’s really happening is that their brain circuitry has been ‘hijacked’.”

*Bottom Line Health*, November 2009
Ad for “New Sizzling Flavors”
Packaged foods and flavoring

“The strawberry flavor found in many diet-food snacks and desserts is made up of 50 different chemicals. So your mind is tricked into believing you’re eating the flavor of fresh-picked strawberries. It’s kind of like mind control – your whole taste function is ‘hypnotized’. The science that goes into flavor-making is quite advanced. And it’s a closely guarded secret. An elite group of chemists creates these mind tricks. Companies call them “flavorists” and they pay them a lot of money. After all, it’s their art that really drives sales. If something doesn’t taste good, people won’t buy it — plain and simple.

Why do companies have to add ‘flavors’? It’s because the act of processing the food strips the flavor right out of it. Imagine what it takes to prepare a prepackaged ‘low fat’ roast beef dinner – First, a factory processes the beef to remove the fat. While they’re at it, they add chemicals to make sure it doesn’t spoil. Then they add more chemicals – in the form of food coloring – to make it look more appealing. Next, they sterilize the food and cook it to excess to ensure there’s no risk of bacterial contamination. Then it’s tossed through handling and packaging machinery and sent to another machine where it’s ultimately frozen. With the extreme heat, machine-handling and extended exposure to air, more vital nutrients are lost with each passing second… But a factory-prepared dinner – before added colors and flavors – would taste (and smell) bland, lifeless, and sterile. It definitely wouldn’t make your mouth water. That’s where the flavorist comes to the rescue. You see, he’s created a delicious new ‘roast beef’ flavor. And it’s very convincing. If you were to close your eyes and smell their carefully crafted clear liquid potion, you’d swear someone had been cooking a perfectly seasoned pot roast all day in a crock-pot… But it’s all a dangerous trick. These foods are chemical weapons in a box, plain and simple.”

• Dr. Sears’ Confidential Cures, Vol. III Issue IV, April 2014
# Effect of Certain Food Ingredients

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Used In</th>
<th>Caution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue 1</td>
<td>Beverages, candy, baked goods.</td>
<td>Suggestions of a small cancer risk.</td>
</tr>
<tr>
<td>Blue 2</td>
<td>Pet food, beverages, candy.</td>
<td>The largest study suggested, but did not prove, that this dye caused</td>
</tr>
<tr>
<td></td>
<td></td>
<td>brain tumors in male mice.</td>
</tr>
<tr>
<td>Green 3</td>
<td>Candy, beverages.</td>
<td>A 1981 industry-sponsored study gave hints of bladder cancer.</td>
</tr>
<tr>
<td>Red 3</td>
<td>Cherries in fruit cocktail, candy, baked goods.</td>
<td>The evidence that this dye caused thyroid tumors in rats is “convincing,”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>according to a 1983 review committee report requested by FDA.</td>
</tr>
<tr>
<td>Yellow 6</td>
<td>Beverages, sausage, baked goods, candy, gelatin.</td>
<td>Animal tests indicate causes tumors of the adrenal gland and kidney.</td>
</tr>
<tr>
<td>Sodium Nitrite</td>
<td>Bacon, ham, frankfurters, luncheon meats, smoked fish, corned beef.</td>
<td>Small amounts of several carcinogens contaminate Yellow 6.</td>
</tr>
<tr>
<td>Potassium Bromate</td>
<td>White flour, bread and rolls.</td>
<td>Studies link consumption of cured meat and nitrites with various types</td>
</tr>
<tr>
<td>Saccharin</td>
<td>Diet, no-sugar-added products, soft drinks, sweetener packets.</td>
<td>Causes cancer in animals. Banned virtually worldwide except in Japan</td>
</tr>
<tr>
<td>Aspartame</td>
<td>“Diet” foods, including soft drinks, drink mixes, gelatin desserts, low-</td>
<td>Animal studies link to cancer of the bladder, uterus, ovaries, skin,</td>
</tr>
<tr>
<td></td>
<td>calorie frozen desserts, packets.</td>
<td>blood vessels, and other organs. Increases the potency of other cancer-</td>
</tr>
<tr>
<td>Acesulfame-K</td>
<td>Baked goods, chewing gum, gelatin desserts, diet soda.</td>
<td>causing chemicals.</td>
</tr>
<tr>
<td>Butylated Hydroxyanisole (BHA)</td>
<td>Cereals, chewing gum, potato chips, vegetable oil.</td>
<td>Brain tumors in rats; lymphomas and leukemias mammary (breast) cancer.</td>
</tr>
<tr>
<td>Propyl Gallate</td>
<td>Vegetable oil, meat products, potato sticks, chicken soup base, chewing</td>
<td>Two rat studies suggest that the additive might cause cancer. In addition,</td>
</tr>
<tr>
<td></td>
<td>gum.</td>
<td>large doses of acetoacetamide, a breakdown product, have been shown to</td>
</tr>
<tr>
<td>Olestra (Olean)</td>
<td>Lay’s Light Chips, Pringles Light chips.</td>
<td>affect the thyroid in rats, rabbits, and dogs.</td>
</tr>
</tbody>
</table>

Source: Center for Science in the Public Interest

Continued on the next page...
Genetically Modified Food

- Genetically modified corn

Genetically Modified Food (cont’d)

- GMO Crops:
  - Canola, Corn, Cotton, Edamame (soy), Hawaiian papaya, Soy, Sugar beets, Yellow summer squash

- Can end up in all kinds of packaged foods:
  - Various food additives including flavoring agents, nutritional supplementation, thickeners, and pH regulators
  - Alcohol, Baking extracts and powder, Bread, Brown sugar, Can soups, Candy, Cereal, Chewing gum, Chips, Chocolate, Cookies, Cooking oil, Crackers, Enriched flour and pasta, Fried food, Frozen yogurt, Fruit juices, Hamburgers and hot dogs, Ice cream, Infant formula, Ketchup, Margarine, Mayonnaise, Meat substitutes, Peanut butter, Pickles, Powdered sugar, Protein powder, Salad dressing, Soda, Soy sauce, Tomato sauce, Vanilla, Veggie burgers, Yogurt

- GMO is also fed to animals so it can be in:
  - Cheese, Eggs, Farmed fish, Meat (beef, chicken, pork), Milk

Exposure to Chemicals

- **Enlist Duo – Weed killer**
  
  “The EPA is all ready to approve a new, highly toxic weed killer for use on food crops. It’s one containing both glyphosate (Monsanto’s Roundup) and 2,4-D – half of what made up Agent Orange. It’s a chemical assault the likes of which we’ve never been exposed to before. And the icy on the toxic cake, it’s coming with two new GM crops. Despite over 200,000 comments to the EPA docket, over 100,000 other public comments and objections from scores of medical and health professionals, the ... EPA refuses to budge... once you know the facts, there is a way to steer clear of this new poison... it’s made by Dow Chemical. It was developed because Roundup use has backfired. GM crops are created so that they don’t die when sprayed with Roundup – like weeds do. But nature always finds a way. And weeds ‘learned’ how to survive. So now we have Superweeds to deal with, ones that aren’t killed when doused with Roundup. To kill these Superweeds they needed to build a bigger gun... Remember, these aren’t just any weed-killing chemicals. Studies on rats fed GM corn sprayed with Roundup suffered serious health effects. Things like severe organ damage and deadly tumors. And then there’s the second half of Enlist Duo, the Agent Orange chemical 2,4-D. We know how it earned its reputation – by poisoning tons of our Vietnam vets. But now it’s ready to poison more of us, including our children and grandchildren. Studies have connected 2,4-D to diseases like Parkinson’s hypothyroidism, cancers and lowered immune function... Now corn and soy will be the first two crops that Enlist Duo will be approved for. And they’ll be brand new GM crops too! They had to be specially ‘designed’ in Dow’s laboratory to withstand both these deadly chemicals... you don’t have to give up foods that contains these ingredients. One way is to buy organic products, which, by law cannot contain any GMOs. Another way to be sure you haven’t ‘enlisted’ without your permission in this experiment by Dow, is to only buy foods that contain corn or soy that has a label saying ‘Non GMO Project Certified.’ And most sweet corn, the kind you buy to eat on the cob (or frozen), is still safe from being genetically modified.”

*HSI eAlert, August 21, 2014*
Pesticides and Parkinson’s Disease

“Researchers have identified a mechanism by which exposure to pesticides might increase the risk for Parkinson’s disease (PD). Their new study shows that pesticides that inhibit aldehyde dehydrogenase (ALDH) activity can raise PD risk by up to 6-fold and that having a particular genetic predisposition also raises that risk. ‘What’s new about this report is that we have identified several pesticides currently being used that were previously unknown to inhibit ALDH activity, and we also identified variations in the ALDH gene, which helps determine sensitivity to these pesticides’ said lead author Jeff M. Bronstein, MD, PhD, professor, neurology, and director, Movement Disorders, David Geffen School of Medicine, University of California at Los Angeles. The authors stress the importance of protection for those who must be exposed to pesticides but also argue for removing toxic pesticides from the market. They also suggest possible therapeutic approaches to modulate ALDH enzyme activity that might reduce PD occurrence. The study was published in the February 4 issue of *Neurology*... *Medscape Medical News* also invited Emanuele Cereda, MD, PhD, Fondazione IRCCS Policlinico San Matteo, Pavia, Italy, who has extensively studied pesticide exposure in PD, to comment on the study. Dr. Cereda said it can be considered a ‘milestone’ in explaining the relationship between pesticide exposure and the risk for PD... In a recent unpublished study, Dr. Cereda and his colleagues assessed the effect of exposure to pesticides in the presence of a low- or high-risk genotype. ‘Interestingly, when pooling data from all studies focusing on a gene-environment interaction, regardless of the gene involved, we found a 1.5-fold and a 3-fold increase in risk in subjects carrying a low-risk and a high-risk genotype, respectively.’

• *How Pesticides May Boost Parkinson’s Risk*, Medscape, February 6, 2014
Air Pollution

- According to World Health Organization, air pollution is now the world’s largest environmental health risk – about 7 million people died in 2012 due to air pollution exposure

- “According to the Environmental Protection Agency, indoor air can be as much as FIVE TIMES more polluted than outdoor air. For example, when researchers tested lung function and urine samples in more than 160 subjects over the age of 60 who were living at home, they linked impaired lung function with high urine levels of two volatile organic compounds (VOC): toluene and xylene. VOCs are chemicals emitted as gasses. And many household products emit VOCs. Toluene is a very common VOC used in fingernail polish, adhesives, paints, paint thinners, lacquers, and rubber. Xylene is a toxic petroleum byproduct that’s used in many air fresheners… Xylene has also been associated with headaches and increased risk of cognitive impairment.”
  - **HSI eAlert**, February 14, 2014

- “[Air fresheners are] actually a mix of volatile organic compounds, cancer-causing chemicals, and toxins that can irritate your nose, eyes and lungs, cause allergic reactions and possibly even produce birth defects! Even the head of the American Lung Association advises against using these products if someone in your home has respiratory problems.”
  - **HSI eAlert**, February 17, 2014
Suntan Lotion, Vitamin D, and Cancer

- Vitamin D and Cancer
  - “After years of warning against the dangers of sun exposure, at least one mainstream researcher has finally ‘seen the light’. He’s Angus Dalgleish, M.D., a medical oncologist and professor at St. George’s University of London. For most of his life he’s always avoided sunlight, covering up whenever he was outside and using plenty of sunblock. As a ‘fair-haired Scot’ (his own description), he always feared that too much sun might result in melanoma – the deadly form of skin cancer.

But his thinking began to change about 15 years ago. As part of a research team that tested vitamin D to treat breast cancer, he found that D could speed up the death of tumor cells and target tumors in many other ways. But what really shocked Dr. Dalgleish was when he started testing his cancer patients’ D levels. He expected 30 percent would be deficient. But his discovery that the percentage was closer to 90 ‘changed everything’ for him. Writing in a recent edition of the Daily Mail, he says he now believes that avoiding sun exposure increases rather than reduces skin cancer risk.”

- HSI eAlert, May 19, 2014
Suntan Lotion, Vitamin D, and Cancer (cont’d)

- Suntan lotion and Cancer
  
  “Why in the world would sunscreen manufacturers need to have a huge lobby working in Washington, making big donations to congressman, PAC’s, and non-profit organizations? My research suggests it’s so that they can keep their bogus claims of product safety in front of you, and scare you into slathering on more of their product… When you wear sunscreen, you inhibit your body’s ability to produce vitamin D – a process that’s triggered by sunlight on your skin. Low vitamin D levels are associated with nearly every age-related disease you can think of… heart disease… cancer… arthritis… dementia and Alzheimer’s… You’ve been told over and over again that you need to avoid sun exposure and wear sunscreen whenever you go outside on a sunny day. You’ve been promised that doing so will help protect you from skin cancer. The facts are very revealing: (1) Studies show that zinc oxide – a common ingredient in sunscreens – becomes unstable when exposed to light and may damage skin cells leading to an increased risk of skin cancer. (2) Despite a steady rise in the use of sunscreen, skin cancer rates have gone up over the past thirty years. Sun avoidance has become so ingrained that nearly two thirds of Americans aren’t getting enough vitamin D! To boost your vitamin D levels, you need sun exposure. Two or three times a week, spend 15 minutes if you’re fair-skinned, or up to an hour if you have a darker complexion, in full sun without sunscreen.”

- Independent Living, August 2013
Suntan Lotion, Vitamin D, and Cancer (cont’d)

Bring it all together – Suntan lotion

“Sunburn, wrinkles, and skin cancer. All are reasons we slather ourselves with sunscreen. And they are all wrong, wrong, and wrong. The Environmental Working Group has just released its annual report on sunscreens. And what it has to say is alarming. The group found that two-thirds of products it looked at either don’t work or have dangerous ingredients. And some of them can actually cause skin cancer! For one thing, the SPF – or “sun protection factor” – can often be misleading… Then there are those with toxic chemical ingredients. Oxybenzone, for instance, can cause hormonal problems, and retinyl palmitate can interact with the sun and fast-track skin tumors and lesions. And the group warns you to absolutely stay away from products that combine bug repellents with sunscreens.

But don’t think that means you have to stay indoors all summer. There are ways to enjoy the benefits of sunshine. First, get a short amount of unprotected sun exposure to boost your vitamin D levels – but not for too long. Then cover up with a hat, long sleeves and long pants or a skirt. Of course, there are times when you can’t help but expose your skin for longer periods. In those cases, you should use a sunscreen recommended by the EWG that will protect you without risky chemicals.”

• *HSI eAlert*, June 5, 2014
Exposure to Chemicals (cont’d)

- **Fluoride**
  - “On July 29, 2013, the Supreme Court of Israel passed new regulations requiring Israel to stop adding fluoride chemicals into public water supplies in one year. A 1974 regulation had mandated fluoridation throughout Israel. But in April 2013, after reviewing more recent science, Israel’s Minister of Health revised the regulation, removing the mandate… Fluoride exposure linked to lower IQs in children. In July 2012, researchers from the Harvard School of Public Health, Published a review of fluoride’s effects on the brains of children … the Harvard review reported that 26 of 27 studies they examined showed a relationship between lower IQ and fluoride intake.

In 2006, the National Research Council of the National Academies of Science released a 450-page report on their findings about fluoride and toxicity. It warned of possible damage to the brain and other health effects from exposure to fluoride, even at the low levels purportedly contained in the drinking water in the U.S. The committee that compiled the report stated, ‘On the basis of information largely derived from historical, chemical, and molecular studies, it is apparent that fluorides have the ability to interfere with the functions of the brain and the body by direct and indirect means.’ And since 1999, the Environmental Protection Agency’s Union of Scientists has opposed the use of fluoride due to its neurotoxic effects demonstrated in studies.”

- *Nutrition and Healing*, February 2014
Exposure to chemicals (cont’d)

- **Triclosan - Antibacterial**
  - “Triclosan is widely used to prevent bacterial contamination. It’s the active ingredient not only in hand sanitizer but in widely used antibacterial soaps. It shows up in toys, clothes, kitchenware, deodorants, toothpastes, mouthwashes, cleaning supplies and many other products. In short, it’s everywhere. Some of the possible health problems linked to triclosan include heart problems, hormone imbalances, and even early puberty in children. But the biggest worry is a possible link between triclosan and the development of drug-resistant bacteria. Once again, our overuse of a compound that can kill bacteria is slowly rendering the compound useless, leaving us less equipped to fight superbbugs over the long run.”

  - *Heath Edge*, April 21, 2013
Exposure to chemicals (cont’d)

- Bringing it all together – Impact on thyroid
  - “If you’ve been feeling tired, fat, worn out, and sluggish lately, I have good news for you – You can stop blaming yourself… You may not feel like you’re under attack, but the truth is that your body is constantly barraged by low levels of disruptive chemicals, many of which head straight toward a very powerful, yet vulnerable gland, your thyroid. That’s even worse than it sounds, because your thyroid is your body’s master gland, … the one that controls your energy, your metabolism, your mood, and your weight… Because the signs creep up slowly, it’s easy to mistake them for usual signs of aging… The chemicals to blame are everywhere, from your doctor’s office to the grocery store – even your very own home. These extremely common chemicals are known as endocrine-disruptors, meaning they sabotage your endocrine system, which includes your thyroid, your adrenal glands, and many crucial hormones. These health ‘hackers’ include everyday chemicals like:
    - Fluoride, added to drinking water, toothpaste, and mouthwash
    - Triclosan, the key ingredient in so many antibacterial products
    - PFCs (perfluorinated compounds), which make your clothes, carpets, and curtains stain resistant
    - Phthalates, found in many personal care products like soap and shampoo, sometimes listed on the label only as ‘fragrance’

You can see why it’s so hard to avoid the problem – it’s practically impossible. In fact, it’s a truly pervasive public health threat.”

– Heath Sciences Institute, Vol. 18, No. 10, June 2014
Exposure to chemicals and hormones

- Early puberty
  - “Today in the U.S., about 16% of girls enter puberty by the age of 7 and 30% by the age of 8. A recent study determined that the number of girls entering puberty (defined by breast development) at these early ages has increased markedly between 1997 and 2010. The average age at menarche [the first occurrence of menstruation] in Western countries began declining during the early part of the 20th century due to increased consumption of animal products and increasing calorie intake … [the] age at menarche in Ireland has declined from 13.52 in 1986 to 12.53 in 2006. In Italy, a recent study showed that girls’ age at menarche was on average 3 months earlier than their mothers’ … Why is this happening? The neurological and hormonal systems that regulate pubertal timing are complex, but research has identified a number of environmental factors that may be contributing to the decline in age at puberty:
    - Increasing rates of childhood overweight and obesity – Several studies have found associations between higher childhood BMI and earlier puberty in girls.
    - Increased animal protein intake – Higher total protein, animal protein, and meat intake in children age 3-7 have been associated with earlier menarche in multiple studies.
    - Other dietary factors – Higher dairy … [and] soft drink consumption [are] associated with early menarche. Children with lower nutrient diets … tend to enter puberty earlier.
    - Exposure to endocrine-disrupting chemicals (EDCs) – EDCs are hormonally active synthetic chemicals that either mimic, inhibit, or alter the action of natural hormones. These chemicals are … considered by scientists to be a significant public health concern. Although EDCs are thought to pose a threat to adults as well, children’s bodies are more sensitive to exposure to exogenous hormones… in a vast array of products we come into contact with every day, including organochlorine pesticides, plastics, fuels, and other industry chemicals. The substances of most concern are BPA and phthalates. BPA is one of the highest volume chemicals produced in the world. It is used in the manufacture of polycarbonate plastics, such as rigid cups, water bottles and food storage containers; BPA is also found in the linings of cans and dental washings… Phthalates are chemicals used to make PVC plastics more flexible and are found in … toys, food packaging, hoses, raincoats, shower curtains, vinyl flooring, wall coverings, lubricants, adhesives, detergents, nail polish, hair spray, and shampoo.

The most significant and alarming consequence of early maturation is an increased risk for breast cancer in adulthood… [Also,] seven, eight and nine year old girls are not emotionally or psychologically equipped to handle puberty.”

Obesity

“Childhood obesity rates have nearly tripled in the previous 30 years and researchers are asking the important question of how this epidemic will impact the future health of these obese children and public health in general. A University of Colorado Cancer Center article recently published in the journal Gerontology shows that even in cases in which obese children later lose weight, the health effects of childhood obesity may be long-lasting and profound. ‘There were two things going on here. First, the earlier you are exposed to obesity, the earlier we may see the onset of complications including type II diabetes, cardiovascular disease, metabolic syndrome and cancer… But then it looks like independent of this increased-exposure effect, kid’s maturing bodies may be especially vulnerable to the detrimental health effects of obesity…’ says Kristen Nadeau, MD, investigator at the CU Cancer Center, associate professor of Pediatric Endocrinology at the CU School of Medicine, and the paper’s senior author… Childhood obesity may itself be enough to cause outcomes including metabolic syndrome, cardiovascular disease, type 2 diabetes and its associated cardiovascular, retinal and renal complications, nonalcoholic fatty liver disease, obstructive sleep apnea, polycystic ovarian syndrome, infertility, asthma, orthopedic complications, psychiatric disease and increased rates of cancer, among others. ‘However, our ability to make conclusions is complicated by a lack of data,’ Nadeau says. ‘Because the epidemic of childhood obesity is still relatively new, we simply don’t have the longitudinal data to know how childhood obesity affects late-life health. The people who were children in, say, 1980 near the start of this rise in obesity rates are only reaching their 40s.’ ”

• Study Highlights Long-Term Effects of Childhood Obesity on Late-Life Health by Garth Sundem, University of Colorado Cancer Center, February 12, 2014
Drugs for Children

- Drugs for children
  - “Over three-and-a-half million kids are being drugged for ADHD. And these are kids as young as 4-years-old... the CDC just announced that over 10,000 2- and 3-year-olds are being drugged – for ADHD! That should be criminal! These are little kids who have just started learning their shapes and colors being given dangerous drugs like Ritalin. And all because they’re acting like – well, little kids... what the CDC reported is just the tip of a horribly dangerous iceberg... The CED report ... got a LOT of attention. But there was another study that didn’t get much notice at all. A watchdog group called the Citizens Commission on Human Rights (CCHR) discovered some shocking facts that dwarfed what the CDC found... Almost 300,000 of these ‘kids’ are just babies – infants under a year old! ... Ritalin is only one of many dangerous drugs that toddlers and infants are being prescribed. According to numbers the CCHR uncovered, almost 250,000 babies just a year old or younger are being given anti-anxiety drugs. Over 26,000 are on antidepressants, like Prozac and Paxil, and over 1,400 are administered ADHD drugs like Ritalin.... Babies we’re told are too young to be given a taste of honey are being dosed with Prozac! It also discovered something else the CDC missed out on entirely. That’s all the other meds 2- and 3- year olds are swallowing. These preschoolers, if found, are being drugged by the hundreds of thousands on anti-anxiety meds, antidepressants and antipsychotics. The figure for tots on anti-anxiety drugs alone is almost 319,000. That’s not medical treatment – it’s child abuse! And just how do you diagnose psychiatric problems in a two-year-old? Is it because they might cry when they need a nap, throw a tantrum if they can’t have an Elmo doll or maybe just refuse to go to bed? Well, that’s just about as reliable as the way all of these ADHD diagnoses are made. Even the National Institute of Health says that ‘we do not have an independent, valid test for ADHD.’ When Ritalin was first prescribed to kids who were ‘acting out’ and not paying attention in the 1960s, we started the ball rolling in prescribing these dangerous drugs to kids. We started giving risky meds for an entirely made-up condition. And now, 50 years later we find that over a million kids up to 5 years old are being prescribed psychiatric drugs – meds that are even too risky for adults to take. The biggest tragedy in all this is that we have no idea at all what these drugs are doing to children. What horrible problems might it causes them when they grow up? That is, if they grow up.”

- *HSI eAlert*, July 22, 2014
Drugs can cause diseases

- Parkinson’s
  - “… Stelazine [a drug to treat depression] is just one of over 49 drugs that are known to produce a disease remarkably similar to Parkinson’s… Two of them, compazine and Regian, are often prescribed to treat acid, nausea and vomiting… Other drugs that can trigger the disease include Zoloft, Paxil, Wellbutrin, Prozac and Abilify. In fact any drug that can affect your mood, treat anxiety or that can be used for bipolar disorder or schizophrenia … can cause this disease.”
  - *HSI e-Alert*, September 30, 2014

- ALS (Lou Gehrig’s disease)
  - “… Statin drugs may be triggering ALS, or a condition that strongly resembles it, in some people who take them. Even Pfizer, which makes Lipitor, noticed a ‘signal’ in a number of cases of ALS in people taking the drug.
  - *HSI e-Alert*, September 22, 2014
Cholesterol and Statins

“The lipid hypothesis—the consumption of saturated fat causes heart disease. This infamous hypothesis was proposed by Ancel Keys in 1953 based on statistics of consumption of saturated fat in six countries. Keys neglected to disclose that he had selected six countries out of a total of 22 whose data were available to him. His misuse of the data was exposed by Yerushalmy and Hilleboe in 1957 when they published the graph of the full data set. When the full data is used, the biological gradient disappears—as does the strength of the association. The lipid hypothesis was consequently modified so the dietary cholesterol became the villain instead of saturated fat. Many years of research followed but Ancel Keys finally admitted in 1997 that ‘There’s no connection whatsoever between cholesterol in food and cholesterol in blood. And we’ve known all along. Cholesterol in the diet doesn’t matter unless you happen to be a chicken or rabbit.’ … In fact, many people with heart disease have low levels of cholesterol. In the January 2009 edition of American Heart Journal it was reported that, of the 136,905 people admitted to 541 hospitals in the United States with heart attack whose lipid levels were recorded, nearly 75% had ‘normal’ LDL cholesterol levels, which is below 130 mg/dl… What is the use of being saved from heart disease only to die from some other cause? Even worse, higher cholesterol levels appear to be protective against cancer in the longer term and statins have significant and probably under-reported side-effects… I will continue to enjoy a full English breakfast, shorn of the guilt that this may affect the health of my heart. At my age (50+), and free of heart disease with a cholesterol level higher than the recommended level, I am quite happy not to increase the five-year probability of avoiding a heart attack from 98.2% to 98.8% by taking a statin for five years. The probability that I will avoid the nasty side effects is 100%.”

Heart of the Matter by Garth Lane, The Actuary (UK), August 2011
Statins

- Diabetes risk
  - “Statin use increases the risk of diabetes in some women by almost 80 percent! Data was analyzed from the Women’s Health Institute, a long-term survey of more than 153,000 postmenopausal women aged 50-79 years… The drugs being taken included all the big ones: simvastatin (Zocor), lovastatin (Altocor, Altoprev, Mevacor), pravastatin (Pravachol), fluvastatin (Lescol), and atorvastatin (Lipitor). Overall, the risk of diabetes associated with statin therapy was an astonishing 48 percent! The biggest jumps were seen in white (49 percent), Hispanic (57 percent), and Asian women (78 percent). Those numbers are shocking. But here’s an even bigger stunner: The study found that women with the lowest body mass index had a higher risk of diabetes compared with obese women… It is not understood exactly how statin drugs cause diabetes. Based on the research, they may alter glucose metabolism of the liver or muscles… previous studies have also shown that statin use also increases the risk of diabetes in men… the mainstream media hyped up the 2008 Jupiter trial involving statin drugs, praising the ability of the statin drug known as rouvastatin (Crestor) to reduce the risk for heart attack and stroke in people who had normal cholesterol and high levels of C-reactive protein. (Never mind that, in reality, only one person out of 120 actually would benefit from the drug.)”

• Health Revelations, 2012
Statins (cont’d)

- “… it stands for ‘number needed to treat.’ The number of people who have to take a drug for just one person to benefit from it. If a drug helps one person out of five it will be marketed as a ‘wonder drug.’ Which means for you, the person taking it, there’s an 80% chance it won’t do anything for you. That’s why the pharmaceutical industry doesn’t want you to know what the NNT is – and they completely ignore it when they advertise drugs to you.

Statins are a perfect example. The commercials would have you think life is glorious on a statin drug… Yet statins have an NNT of 60. Which means … 60 people would have to take a statin drug for at least five years for the probability that just one person wouldn’t have a non-fatal heart attack. And what about the other kind – fatal heart attacks? Not a single heart attack death would be prevented (Source: Hooper J. ‘Drugs: Effective for the Few, Prescribed to the Many.’ Men’s Journal. www.mensjournal.com. September 23, 2014)

Even without knowing the NNT, people are starting to figure out statins aren’t a good idea. Why? Because they don’t like side effects, and that’s something no one has to tell them about. So Big Pharma has come up with a solution. A marketing campaign to doctors to make people take their statins. You see, they think people who don’t want to take a drug to lower cholesterol are just being children who won’t do what they’re told, and that it’s silly to worry about statin side effects. So they’ve come with a new term: ‘Statin Phobia’…

But the truth is, you should still stay away from them – not only because they still have plenty of side effects, but because cholesterol is a good thing. In fact, higher cholesterol saves lives. A 10-year study in the prestigious journal Lancet proved people with higher cholesterol had a lower risk of dying from any cause. (Source: Weverling-Rijnsburger AW, Blauw GJ, Lagaay AM, Knook DL, Meinders AE, Westendorp RG. ‘Total cholesterol and risk of mortality in the oldest old.’ Lancet 1997;350(9085): 1119-23)

And just a short list of statin drug side effects should make you hide from a doctor who tries to give you one. They include muscle pain, memory loss, and even liver failure. Statins are also linked to Parkinson’s disease and Lou Gehrig’s disease. And … an increased risk of developing type 2 diabetes. The side effects get so bad that one study found 62% of statin users can’t stand it and stop taking their medication.”
## Cholesterol

- **Mortality at various cholesterol levels**

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<th>Deaths Sum</th>
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<th>Deaths/2001 VBT A/E</th>
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- **The Similarities Between Life Table Analysis and Multivariate Cox Models by Doug Ingle, *On the Risk*, March 2013**
Drugs

- Acetaminophen (Tylenol)
  - “You might be surprised to know that the leading cause of acute liver failure in the United States is not alcohol abuse nor viral hepatitis. The number one reason Americans suffer acute liver failure is a drug the FDA has allowed to be sold for decades after its lethal toxicities were known. Acetaminophen’s deadly effects extend beyond the liver. Regular users of acetaminophen [Tylenol] may double their risk of kidney cancer.”

  - *Life Extension*, July 2010
Drugs (cont’d)

- **Pain pills**
  - “**America is in pain** – and being killed by its painkillers. It starts with OxyCotin, Percocet, and Vicodin – prescription narcotics that can make days bearable if you are recovering from surgery or suffering from cancer. But they can be as addictive as heroin and are rife with deadly side effects. Use of those and other opioids has skyrocketed in recent years. Prescriptions have climbed 300 percent in the past decade, and Vicodin and other drugs containing the narcotic hydrocodone are now the most commonly prescribed medications in the U.S. With that increased use have come increased deaths: 46 people per day, or almost 17,000 people per year, die from overdoses of the drugs. That’s up more than 400 percent from 1999. And for every death, more than 30 people are admitted to the emergency room because of opioid complications… An estimated 90 percent of people suffering long-term pain wind up being prescribed an opioid despite little evidence the drugs help much or are safe when used long-term. ‘But we do know that the higher the dose and the longer you take it, the greater your risk,’ says Gary Franklin, M.D., research professor of environmental and occupational health sciences at the University of Washington in Seattle… Opioids such as hydromorphone (Exalgo), oxycodone (OxyContin and generic), morphine (Avinza, MS Contin, and generic), and the newly approved Zohydro ER stay in the body longer and are usually stronger than short-acting forms.”

  - *Deadly Pain Pills*, Consumer Reports, September 2014
Drugs (cont’d)

- Chantix – Smoking cessation drug
  
  “A few years after Chantix, the popular smoking cessation drug, hit the market, a team led by the Institute for Safe Medication Practices took a close look at adverse-event reports for it… The list of side effects reads like a Stephen King plot outline: hallucinations, suicidal thoughts, panic attacks, depression, and paranoia. With a dramatic list like that, these other side effects don’t really pop out quite as vividly: anger, and aggressive or violent behavior. When the ISMP team did some digging, they came up with dozens of wild reports that involved acts or thoughts of aggression or violence. What’s most disturbing is that almost none of these people had ever displayed extreme moods or behaviors like this before… might wonder if irritability from nicotine withdrawal could spill over into very aggressive behavior. But nearly all the adverse events took place soon after medication started – and BEFORE most of the subjects had actually stopped smoking. Later, the same ISMP team … examined 1,500 reports of homicides, physical assaults, physical abuse, and other acts of violence, along with murderous thoughts. About 80 percent of the reports were linked to antidepressants, sedatives, hypnotics, and ADHD drugs… of the 31 drugs involved [Chantix] topped the list. But if Pfizer has anything to do with it, those warnings on the Chantix package and web site might get downplayed by a lot. Or who knows, maybe even go away entirely! That’s because it’s getting ready to present data that … apparently only looked at psychiatric problems in Chantix users that landed them in the hospital!... the FAA has banned commercial pilots from using it. Truck drivers are also told not to take it.”

• *HSI eAlert*, May 13, 2014
Drugs (cont’d)

- **Diabetes – Injectable Insulin**
  
  “One in every three. That’s the shocking rate of diabetics who are at grave risk. And they don’t even know it. But it’s not diabetes that increases their risk. Ironically, it’s their medication. And it’s potentially deadly. Injectable insulin has extended countless lives of type 1 diabetics. But a new study shows that it can produce the exact opposite result for type 2 patients. Researchers looked at long-term medical records of more than 84,000 type 2 diabetics. Compared to using metformin, (1) Insulin use increased risk of a major cardiac event, cancer, or early death by 80% and (2) Insulin use nearly doubled heart attack risk, and more than doubled neuropathy risk. Patients who took metformin and insulin together were still at greater risk of major cardiac event, cancer, or early death. But the risk was lower than when taking just insulin alone. In type 1 diabetes, patients can’t produce their own insulin. In type 2 they can. So for these patients, an insulin injection is like a battering ram. Insulin is pumped up to such excess that it forces sugar into the cells.”

- *HSI eAlert, October 17, 2013*
Drugs (cont’d)

- ACE Inhibitors – Blood pressure drugs
  - “When you are taking an ACE inhibitor, even for years, things can suddenly turn deadly. And it can all happen with lightening speed. It’s vitally important that you know what to watch for and what to do. Because if this happens to you, ‘minutes matter’. Dr. James Roberts calls the sudden, life-threatening side effect people can get from these drugs an ‘unrecognized epidemic.’ He’s the director of emergency medicine at two hospitals in Philadelphia. And in his hospitals alone they are seeing several cases a week. He’s talking about something called ‘angioedema.’ Put simply, that means a sudden swelling in the face and neck. It’s more than just uncomfortable or annoying. Because if your tongue and throat start to swell too, you can die. And there are no medications that will reverse this swelling. It just has to go down on its own. In a worst case scenario ER doctors must insert a tube in a patient’s nose or mouth. Sometimes they even need to cut an incision in the throat to prevent suffocation. And Dr. Roberts says that he’s seen a number of patients die ‘because you just can’t get the tube in.’ Dr. Roberts is desperately trying to alert others about this danger. He recently had a letter published in a professional journal warning colleagues. And, he wants the FDA to put a ‘black box’ warning on these meds … Over 12 years ago, a Boston University ER doctor, James Feldman, sent a formal petition into the FDA saying the same thing… But he was turned down… Dr. Feldman says that the black box warning is absolutely needed to raise awareness – not just for patients, but also for other doctors who may not realize the danger.”

- HSI eAlert, August 6, 2014
Blood thinning drug – Pradaxa

- “It was one of the most irresponsible and dangerous things the FDA has ever done. It was bad enough that it approved this horribly dangerous drug in the first place. But to do it without having an antidote in place practically accounts to murder. Before the very first Pradaxa pill was ever swallowed, an antidote to stop the uncontrollable bleeding it can cause should have been available. But it wasn’t. And there have been thousands of serious bleeding events and more than 1,000 deaths because of that… When Pradaxa was first approved by the FDA in 2010 the agency called it a lifesaver. But ask any ER doctor who can only stand by helplessly while waiting to see if his patient hemorrhages to death… Experts have been pleading with the FDA to pull Pradaxa off the market. But the agency did … a complete 180. This spring, the agency quietly gave the okay for close to a million more of us to take Pradaxa. That’s because it’s now being prescribed for blood clots in the legs and lungs. That approval will no doubt open the floodgates to even more tragedies. And Pradaxa will be prescribed for those new conditions at the same dangerous dose as those who have A-fib. A dose that experts have been asking the FDA to lower since 2010… Thomas Moore, senior scientist at the Institute for Safe Medication Practices, put it this way: ‘There was an opportunity to make it safer. Instead it appears that commercial instincts to sell more drugs won out.’ … They also asked the FDA to reconsider that large dose and to improve its monitoring of high-risk patients. They also asked the FDA to do what regulators have done in Canada, Australia, New Zealand, Japan and Europe – make a lower dose available to doctors. But the FDA refused to budge and lower the dose. And now Boehringer [Ingelheim, the German company that makes this blood thinner] is finally getting around to work on an antidote, after almost 5 years and millions of Pradaxa prescriptions.”

- *HSI eAlert, July 21, 2014*
Medical Errors

- Now the third leading cause of death
  - “Heart disease and cancer are the first and second leading causes of death in the United States, according to the latest statistics. Care to guess what comes in a close third? That would be errors made by healthcare providers, which account for about a half million deaths a year, says a top expert… Medical author Joe Graedon, who’s also a pharmacy professor, calls such errors ‘the equivalent of three jumbo jets crashing every day of the year and killing everyone on board.’ In fact, Graedon and his wife Terry, who co-host a public radio program called *The People’s Pharmacy*, have just come out with a new book on the subject. It’s called *Top Screwups Doctors Make – and How to Avoid Them*… As he points out ‘No one is counting the bodies. There is no outrage, no plan to change a system that allows too many to die unnecessarily. The medical profession seems largely immune to the consequences of its errors.’ And the most common one, he says, is a wrong diagnosis. It’s most often the result of doctors not wanting to take time to consider alternative explanations for symptoms. Patient overload and an unwillingness to seek help from other doctors are also contributing factors.”

- *HSI eAlert*, September 9, 2014
Ebola

- Lessons learned?
Bioterror Lab Mishaps

“More than 1,100 laboratory incidents involving bacteria, viruses and toxins that pose significant or bioterror risks to people and agriculture were reported to federal regulators during 2008 through 2012… More than half of these incidents were serious enough that lab workers received medical evaluations or treatment, according to the reports. In five incidents, investigations confirmed that lab workers had been infected or sickened; all recovered. In two other incidents, animals were inadvertently infected with contagious diseases that would have posed significant threats to livestock industries if they had spread. One case involved the infection of two animals with hog cholera, a dangerous virus eradicated from the USA in 1978. In another incident, a cow in a disease-free herd next to a research facility studying brucellosis became infected because of practices that violated federal regulations… The names of the labs that had mishaps or made mistakes, as well as most information about all of the incidents, must be kept secret because of federal bioterrorism laws, according to the U.S. Department of Agriculture… The issue of lab safety and security has come under increased scrutiny by Congress in recent weeks after a series of high-profile lab blunders at prestigious government labs involving anthrax, bird flu and smallpox virus.”

“Hundreds of bioterror lab mishaps”, USA Today, August 18, 2014
Natural disaster

- Volcano under Yellowstone
  - “A super volcano is the most destructive force on this planet... Not all super volcanoes have been found, but one of the largest is in Yellowstone Park, USA. Scientists searching for the caldera in the park could not see it because it was so huge - only when satellite images were taken did the scale of the caldera become apparent - the whole park, 85 km by 45 km, is one massive reservoir of magma... When will it next erupt? Scientist have discovered that the ground in Yellowstone is 74 cm higher than in was in 1923 —indicating a massive swelling underneath the park... The volcano erupts with a near-clockwork cycle of every 600,000 years. The last eruption was more than 640,000 years ago – we are overdue ... What would be the effect of an eruption? Immediately before the eruption, there would be large earthquakes in the Yellowstone region. The ground would swell further with most of Yellowstone being uplifted. One earthquake would finally break the layer of rock that holds the magma in—and all the pressure ... would be unleashed in a cataclysmic event. Magma would be flung ... into the atmosphere. Within a thousand kilometers, virtually all life would be killed by falling ash, lava flows and the sheer explosive force of the eruption. Volcanic ash would coat places as far away as Iowa and the Gulf of Mexico... lava would ... coat the whole of the USA with a layer 5 inches thick... It would be the loudest noise heard by man for 75,000 years, the time of the last super volcano eruption. Within minutes of the eruption tens of thousands would be dead. The long-term effects would be even more devastating... ash ... could block out light from the sun, making global temperatures plummet. This is called a nuclear winter... the world’s plant life would be killed by the ash and drop in temperature. Also, virtually the entire of the grain harvest of the Great Plains would disappear in hours ... Similar effects around the world would cause massive food shortages. If the temperatures plummet by the 21 degrees they did after the Sumatra eruption the Yellowstone super volcano eruption could truly be an extinction level event.”

- http://rense.com/general31/overdue.htm
Natural disaster (cont’d)

- Volcano under Yellowstone – Example 2
  “It is also known that one end of Yellowstone Lake is 100 feet higher than it used to be and flooding the land at the other end and killing the trees. Trees in various parts of the park are dying because their roots are cooking from the heat under the ground. Water is now boiling along the trails. If there is an eruption, we would need at least a year’s worth of supplies because no food could be grown, farm lands would be useless, temperatures would drop by as much as 15 degrees. Within 3 months, the entire world would be covered by clouds. Millions of people would die—most within the surrounding 100 miles. 600 miles from the caldera is not safe at all. FEMA could not handle this big an event. The U.S. economy would come to a halt. Grocery stores would empty out, airlines, trains, buses, and roads would stop.”

Fukushima Radiation

“… Fukushima has been in continual nuclear crisis since March 2011… To this day the disaster is not contained, and the situation is even more grim than at first! Japan has recently declared the leak of massive radioactive water from Fukushima a ‘worldwide state of emergency.’ Every day 300 tons of radioactive water seeps into the Pacific Ocean. Retaining walls have failed, massive radiation is seeping into ground water, and the real and living danger of a ‘China Syndrome’ even looms. The Japanese government and TEPCO have stated that the outcome of this event is grim. If the core fails and the rods meltdown into the earth, when they hit ground water, an explosion of nuclear radiated steam will blast into our atmosphere and contaminate the entire Northern Hemisphere! As of July 2013, Fukushima is 80-100x more expansive and more intense, letting out 100x more of the radiation than Chernobyl. The US government has raised the radiation limits in our foods more than 400% to not cause a panic! Reports are indicating that fish coming from the West Coast and Hawaii should not be consumed. An 80% increase in still births has been recorded along the British Columbia coastline in Canada. The current US administration ordered the shutdown of all West Coast sensor towers for radiation starting on April 2011 (why?). They have not been in operation since, except for a few periods of time, and all data received from them is not open to the public. ‘Do not eat anything out of the Pacific Ocean at this time. – Dr. Simon Atkins, PhD, DSc… Radiation is a silent killer. The US Department of Energy has testified that there is no level of radiation that is so low that it is safe, and without health risks… various harmful levels of radiation can already be found in our food, water, milk and even naturally in the earth to some degree…”

Mortality improvement

- And now the good news …
Topics

- Foods
- How to live longer
- New research
Food

- Foods that are good for you that you may not know about
  - Eggs
  - Butter
  - Saturated fat
  - Cherries
  - Cinnamon
  - Curcumin
  - Nuts
  - Olive and macadamia nut oils
  - Red meat – grass-fed
  - Sauerkraut
  - Wine
  - Chocolate
Foods that can help protect against cancer

- Cayenne pepper
- Coffee
- Eggplant
- Fermented foods
- Fruits (citrus)
- Grapes
- Guava
- Pomegranate
- Tea (green, white, oolong)
- Tomato
- Turmeric
- Vegetables (cruciferous)
Foods that can help protect against heart disease

- Meat from pasture-raised animals
- Organic eggs
- Wild-caught salmon, sardines and herring
- Flaxseeds and flaxseed oil
- Walnuts, Brazil nuts, Almonds
- Hemp seeds
- Pumpkin seeds

“The Cholesterol Fraud and Other Dirty Little Secrets Modern Medicine Doesn’t Want You to Know About” by Al Sears, MD, 2014
Foods that are telomere friendly
(from *The Immortality Edge*)

- Almonds
- Apples
- Avocados
- Beans
- Beets
- Blueberries
- Broccoli
- Cabbage
- Eggs
- Garlic
- Grapefruit
- Kale
- Meat
- Olive Oil
- Oranges
- Sea vegetables
- Sweet potatoes
- Tea
- Tomatos
- Wild salmon
Eating right

- Study of over 120,000 people for 20 years
- Some gained weight and some lost weight
- Foods most responsible:
  - Potato chips: 1.69 pound gain
  - Potatoes: 1.28 pound gain
  - Sugar-sweetened beverages: 1.00 pound gain
  - Vegetables: 0.22 pound loss
  - Whole grains: 0.37 pound loss
  - Fruits: 0.49 pound loss
  - Nuts: 0.57 pound loss
  - Yogurt: 0.82 pound loss

- Source: Alternatives, September 2011
Sweden changes dietary guidelines

- Swedish Council on Health Technology Assessment analyzed 16,000 studies and concluded diets high in fat and protein and low in carbohydrates benefit health and the waistline.

- In 2013, Sweden became the first western nation to make these recommendations.

- Findings
  - Butter, olive oil, heavy cream, and bacon are not harmful.
  - Fat is the best thing for those who want to lose weight.
  - There are no connections between a high fat intake and cardiovascular disease.
  - Saturated fats like butter and bacon are better than carbohydrates like bread and barley.
  - Choose protein over potatoes and pasta because they contain glucose, which converts to sugar, making the hormone insulin skyrocket.
  - A low carb diet can boost weight loss by cutting cravings.
  - Eating fat means you will feel satiated and stay so longer.

Don’t want to eat right – There is still help!

- **Eat sauerkraut with your hotdog**
  - May stop nitrates from converting to carcinogens

- **Eat grapes after a high-fat meal**
  - Prevents some of the negative effects of triglycerides from meal

- **Drink red wine with steak**
  - Can cut down body’s absorption of toxins that lead to heart disease

- **Eat rosemary after pizza (or any high-carb food)**
  - Reduces harmful chemicals that increase risk of cancer and heart disease by 60%

- **Have vinegar after a high-carb meal**
  - Can prevent spikes in blood sugar

- **Eat dark chocolate after salty foods**
  - Can lower blood pressure in as little as two hours

Source: *Healthy Style*, July/August 2010
How to live longer

- *The Immortality Edge* by Michael Fossel, Greta Blackburn, Dave Woynarowski

- Goal is to improve length of telomeres, four things are recommended:
  - Supplements
    - Many are recommended, including omega-3 fish oil
  - Exercise
    - Aerobic and anaerobic exercise, stretching, and short bursts of heavy exercise
  - Stress reduction
    - Meditation
  - Diet
    - Paleolithic diet
How to live longer (cont’d)

- *The Blue Zones* by Dan Buettner
  - Move naturally – Be active without having to think about it
  - Hara hachi bu
  - Avoid meat and processed foods
  - Drink red wine
  - Have a purpose
  - Take time to relieve stress
  - Participate in a spiritual community
  - Make family a priority
  - Surround yourself with those who share the same values
How to live longer (cont’d)

- **Ovodda, Sardinia**

  “... you’ve heard about the Japanese island of Okinawa and how people there live long and disease-free lives. But on the island of Sardinia, off the west coast of Italy, in a little town of Ovodda, their good health is putting the Okinawans to shame. Ovodda’s percentage of 100-year-olds is six times that of Okinawa. And where Okinawa’s 100-year-olds are mostly women, men live just as long as women on Sardinia. They socialize often, and always include the elders, who are respected for their storytelling and humor.

  What’s their secret?

  - ... they drink a very dark Sardinian wine with their meals. It’s made from cannonau grapes that have up to four times the antioxidant power of other wines.
  - They also eat all fresh, local foods. But mostly they eat pork, lamb, oily fish and shellfish prepared simply with olive oil, lemon and garlic. What do these have in common? They are all filled with healthy saturated and omega-3 fats.
  - ... [they] drink sheep’s milk called pecorino, a raw milk rich in ... healthy fats.
  - For dessert they eat cheese and fruit. One of the local cheeses is allowed to get a little rotten... these healthy bacteria [are] good for your gut... they make treats filled with even more fat. They make them with a fatty pecorino cheese and call them Seadas... It’s made with almost 100 grams of pork fat, butter, honey, lemon and eggs.
  - ... [they] also have a tradition of walking... It’s a social tradition to go for a walk with the entire family.”

- *Doctor’s House Call by Al Sears, MD, April 16, 2014*
How to live longer (cont’d)

- Cake for prof turning 100? Just no trans fat
  - “Just days away from his 100th birthday, University of Illinois adjunct professor Fred Kummerow continues to wage war on trans fats – personally from his kitchen table and professionally through a proliferation of research papers he is still writing and getting published… He has spent his career as a biochemist pioneering research into the causes of heart disease and trying to convince the world – and especially the Food and Drug Administration for more than five decades – that trans fats are responsible for heart failure. Not eggs. Not cholesterol in the plasma. Kummerow … drinks three glasses of whole milk every day and begins every morning with an egg cooked in butter (never margarine), whole grains, fruit and almonds or walnuts. It’s that diet, and up to an hour of exercise every day that has taken him this far, he says. ‘And,’ he adds, ‘the fact that I want to keep solving a problem.’

For the good of mankind, the problem he wants to solve is heart disease. For him right now, another problem is funding to keep the small lab that he dedicated in 1963, the Burnsides Research Laboratory on campus in Urbana, up and running. And then there is the pressing need for money for a lipid research center at U. of I. that would ensure his work will carry on long after him. That, he says, is his birthday wish.”

- Chicago Tribune, September 29, 2014
Research

- Reprogrammed cells
  - “In a powerful demonstration of reprogrammed cells’ potential to treat human disease and injury, scientists at the University of Wisconsin at Madison turned a rhesus monkey’s skin cells into early brain cells, then implanted them successfully in the monkey’s brain. The experiment, published Thursday in the journal *Cell Reports*, worked so well that the reprogrammed cells grafted onto the brain appeared indistinguishable from the cells already there… possibility that doctors might someday replace the neurons lost to Parkinson’s or the cells damaged in spinal cord injuries… they mark an important moment in the discussion of what has been called personalized medicine—the idea that a patient’s own cells can be used to treat a broad spectrum of ailments.”

*Chicago Tribune*, March 18, 2013
Other research

- **Calorie restriction – Work by Luigi Fontana**
  - Testing in mice and human not same
  - IGF-1 gene impacted by calorie restriction
  - Exercise is limited
  - Immune functions and bone density improve
  - Metabolic improvements?

- **Longevity enzyme – Work by David Sinclair**
  - Resveratrol appears to activate protein that promotes health and longevity
  - Sirtuins, particularly SIRT1

- **Massive database – Work by J. Craig Venter**
  - Plan is to amass electronically medical, genomic, metabolic data
  - Start with analysis of 40,000 individuals per year, move to 100,000
Other research (cont’d)

- Ongoing genetic research
  - Discovery of genes associated with longevity, health conditions, drug resistance
- Early cancer detection: ONCOblot
- Rebuilding organs with your own cells
- Artificial chromosomes
- Erasing memory
Wearable Technology

- Some of these are here today. Some will be in the future.
  - Wrist band that tracks fitness (steps, fuel, versus friends, light beams)
  - Do an x-ray, eye and ear exam, ultrasound through your phone
  - App for depression, mood tracking, and stress
  - App for measuring obstructive sleep apnea by putting your finger in a sensor and wearing it overnight
  - Infrared eye scanner to detect Alzheimer’s
  - Voice detection to diagnose Parkinson’s
  - Contact lens that measures glucose levels through tears
  - Band-aid that records every heartbeat for two weeks
  - Put a chip in your bloodstream to warn of a heart attack in the next few days to a couple of weeks
  - Fabric that doesn’t need washing, can change shapes and colors, reacts to the environment, is conductive, could be part of the digital environment
Final tips

- Do:
  - Laugh
  - Give blood
  - Drink whole milk rather than skim milk

- Don’t:
  - Eat gluten-free products
  - Avoid fats
  - Take an aspirin a day
Conclusion and summary

- Mortality / life expectancy within the population will continue to diverge
- There will emerge (at least) two distinct groups of people:
  - Those that know how to take care of themselves – will experience mortality improvement maybe even greater than today
  - Those that don’t – will experience mortality deterioration

Summary on how to take care of yourself (**PLEASE**):
- **P** – Purpose: Have a *Purpose* in life
  - If you don’t know where you are going, you will never get there!
- **L** – Love: *Love* your family and friends - All you need is love!
- **E** – Eat: Be aware of what you Eat
  - An apple a day keeps the doctor away!
- **A** – Active: Be *Active* - Use it or lose it!
- **S** – Screenings: Get periodic health *Screenings* - Better safe than sorry!
- **E** – Enjoy: Avoid stress, laugh, and *Enjoy* life! - Don’t worry, be happy!

- Live long, healthy and prosperous lives - **PLEASE!**
QUESTIONS? PLEASE!
Bio – Al Klein, FSA, MAAA

- Al is a consulting actuary with Milliman’s Bannockburn / Chicago office. He joined the firm in 2009.
- Al’s primary responsibilities include performing industry experience studies and helping clients with life and annuity product development and reinsurance-related issues. His expertise includes mortality- and underwriting-related issues, including older age, simplified issue, and preferred.
- Prior to joining Milliman, Al most recently worked for a large stock life insurance company where he was responsible for experience studies across all lines of business. He has also worked for other life insurance companies, a reinsurer, and consultant, where he has been responsible for strategic planning, product development, and traditional reinsurance aspects of the business.
- Al is a frequent speaker at industry meetings and is currently involved with a number of industry activities, including:
  - SOA representative for and vice-Chair of the Mortality Working Group (MWG) of the International Actuarial Association
  - MWG Underwriting Around the World – Chair
  - SOA Longevity Advisory Group
  - SOA Mortality and Underwriting Survey Committee
  - Joint American Academy of Actuaries (AAA) / Society of Actuaries (SOA) Preferred Mortality Oversight Group
  - Joint AAA / SOA Underwriting Criteria Team
  - 2014 SOA Valuation Basic Table (VBT) Development Team
  - SOA Longevity Game Development Team
  - Longer Life Foundation Advisory Board
- Al received a Bachelor of Science degree in Actuarial Science and Finance from the University of Illinois, Urbana.
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  - MWG Underwriting Around the World Sub-group Chair – Studying underwriting practices throughout the world
  - SOA Longevity Advisory Group
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