Future of the Workforce

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National Institute for Occupational Safety and Health
Washington, D.C.

34th Annual Forum
Agricultural Personnel Management Association
InterContinental The Clement Hotel
Monterey, California

Future of the Workforce

- **Workplace Risks**
  - Persisting
  - Emerging
  - Employer Duties by Government
- **Employment**
  - Flexible /Precarious
  - Part-time & Independent
  - Virtual
- **Workforce**
  - Demographics
  - Health Status
  - Technology

Federal Government & Worker Health

Occupational Safety and Health Standards-Setting & Enforcement

Research and Authoritative Recommendations

Department of Labor (DOL)

Department of Health and Human Services (HHS)

MSHA

OSHA

Centers for Disease Control and Prevention (CDC)

National Institute for Occupational Safety and Health

Overview

- Economic Health
- Workforce
  - Demographics
  - Farmworker Health
  - Immigration Reform
- Issues in American Agriculture

What Makes Countries Rich?

- Long run economic growth determines our standard of living

- Long run economic growth hinges on a country's productive potential.

  - Greg Ip, *The Little Book of Economics: How the Economy Works in the Real World* (2013)

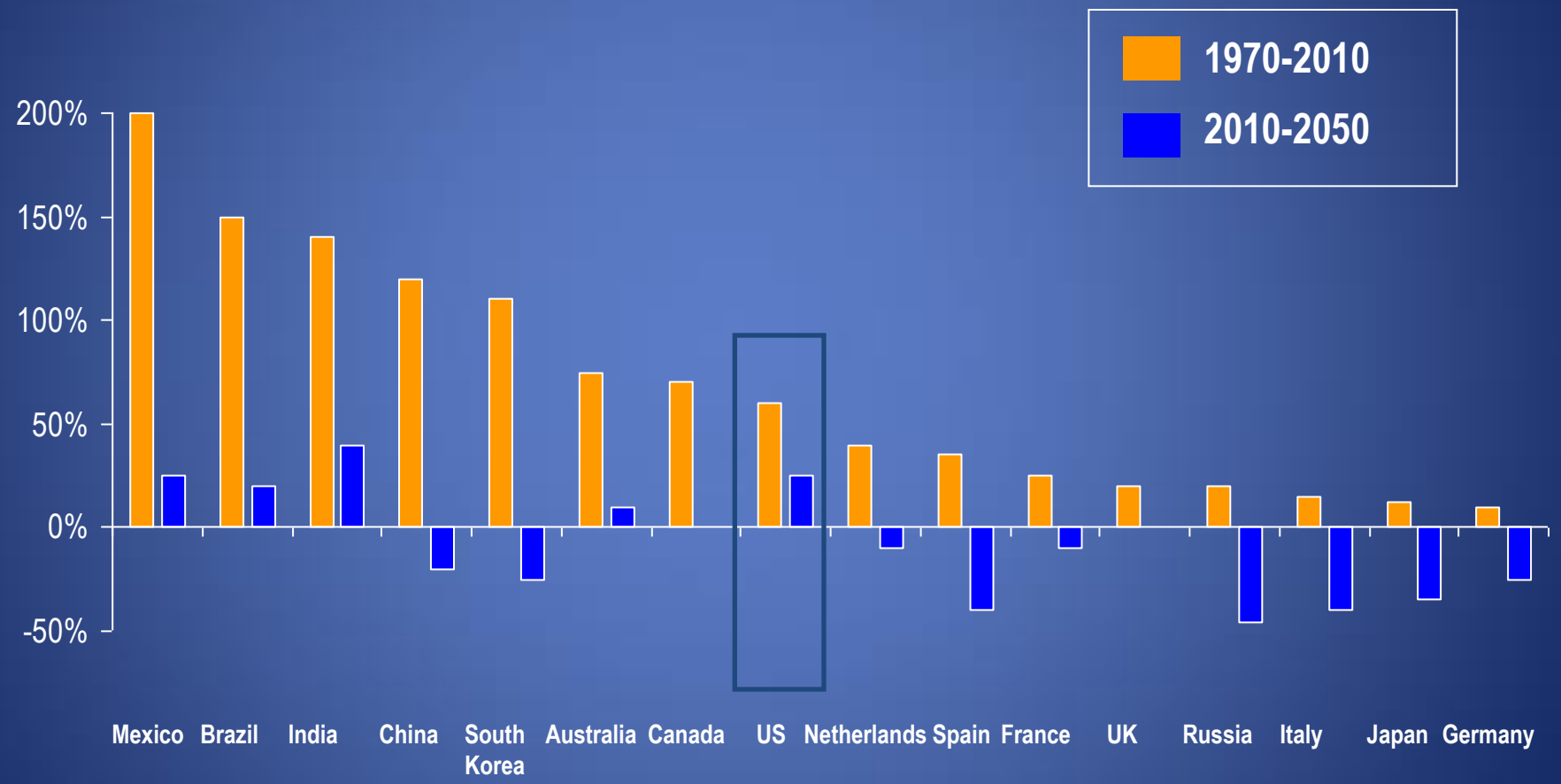
Productive Potential

- **Ideas**
  - "Economic growth springs from better recipes, not just from more cooking." (Paul Romer, Stanford University)
- **Capital**
  - You can raise productivity by equipping workers with more capital—investing in more land, buildings or equipment.
- **Workforce**
  - Long term economic growth depends on workforce population and the output/worker (productivity)

Workforce Demographics

- **Population:** 318,000,000
  - Net gain of 1 person each 17 seconds (births, deaths, immigration)
  - http://www.census.gov/popclock/
- **Working Age Population:** 142,284,000
  - 6.7% -- U3 —Total unemployed as percent of civilian workforce (December 2013)
  - 13.0% -- U6 —Total unemployed = total employed part time for economic reasons + all persons *marginally* attached to the labor force (17.2% Gallup)
  - 5% on SSDI
- **U.S. Population Replacement**
  - **In-country births**
    - Current fertility rate: 1.89 children/woman
    - Replacement fertility rate: 2.1 children/woman
  - **From out-of-country**
    - **Immigration**

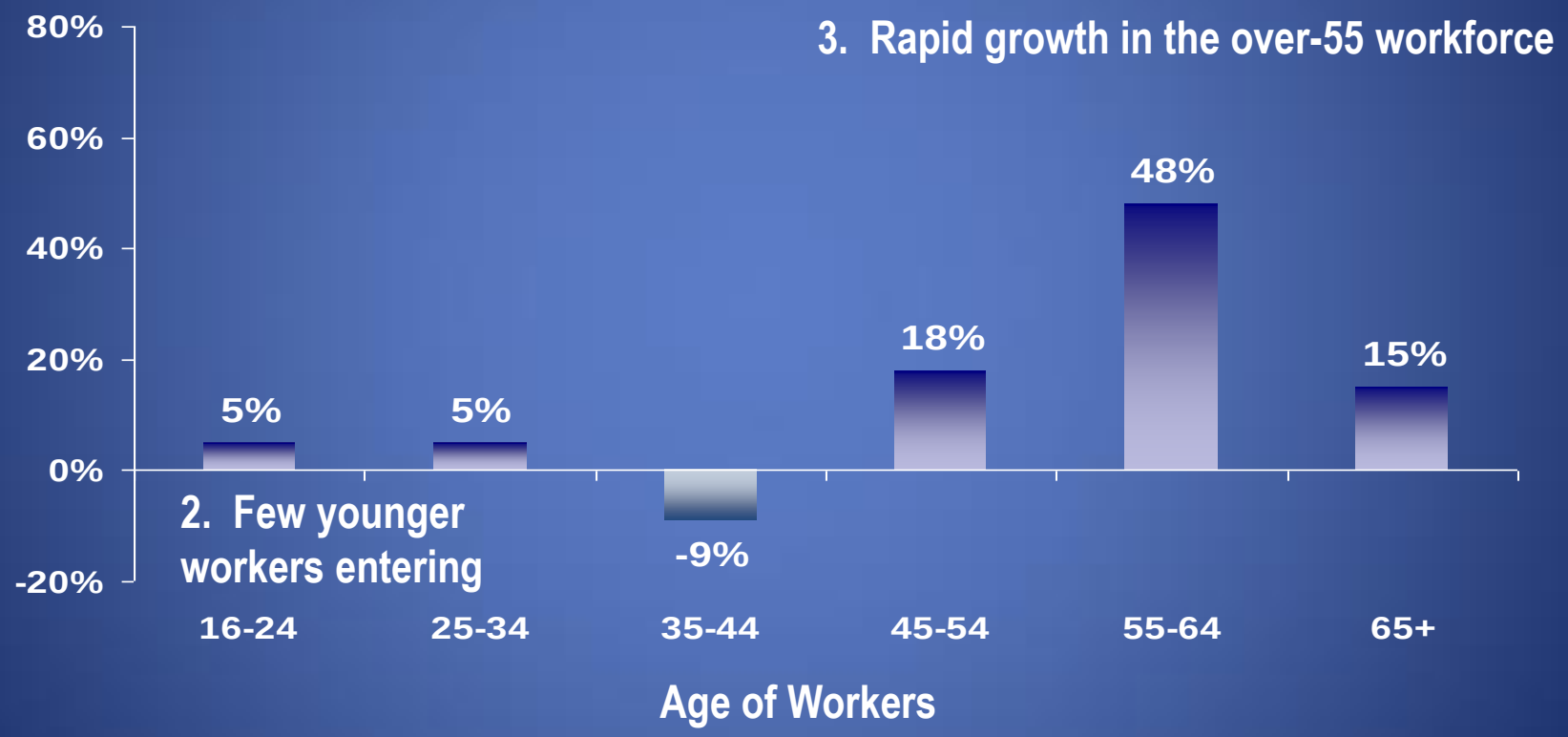
Growth in the Working-Age Population



Source: Deloitte Research/UN Population Division (http://esa.un.org/unpp/) It's 2008: Do You Know Where Your Talent Is? Why Acquisition and Retention Strategies Don't Work, p.6

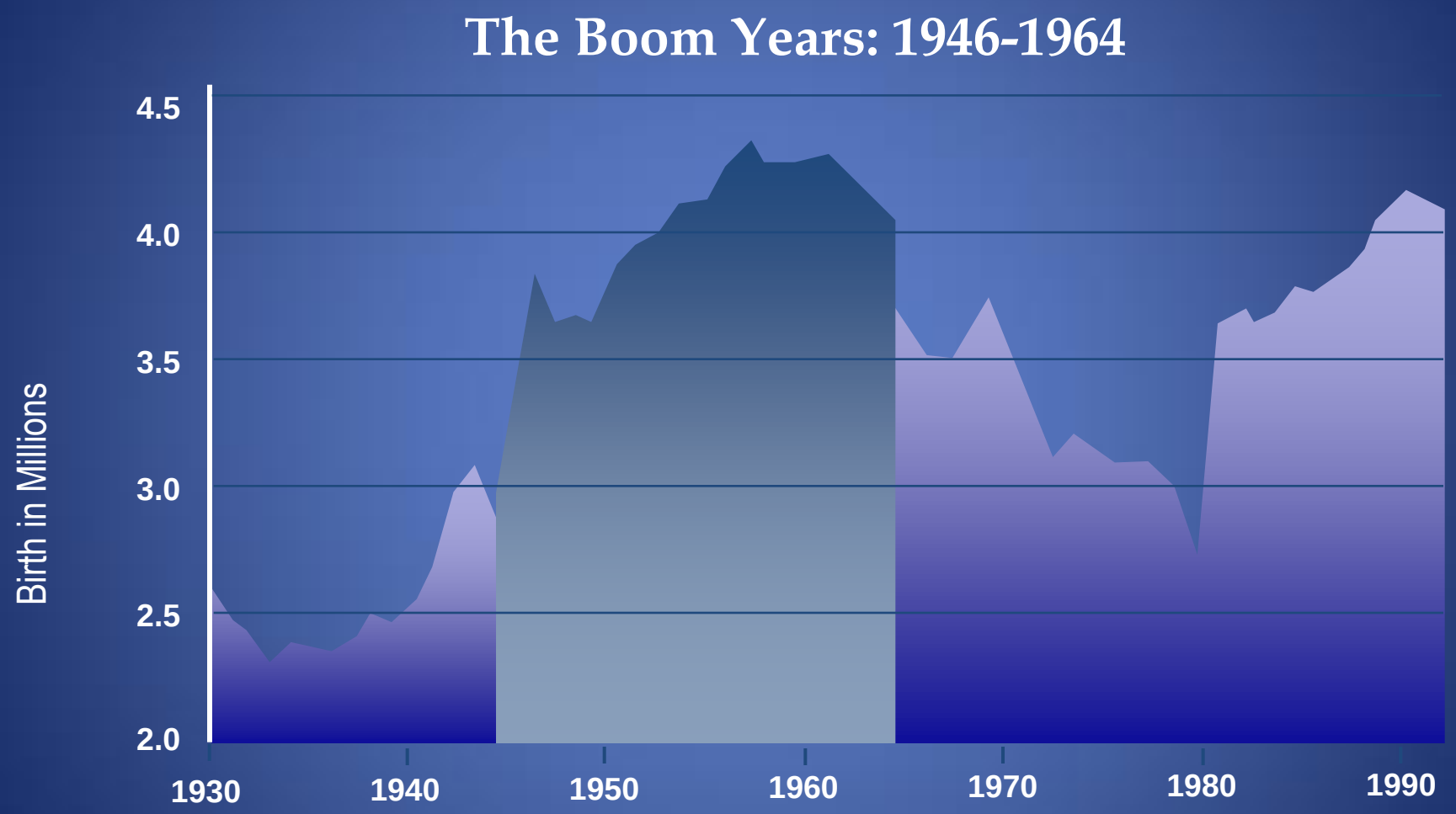
Different Patterns of Growth by Age

Percent Growth in U.S. Population by Age: 2000-2010



Source: U.S. Census Bureau. 2000

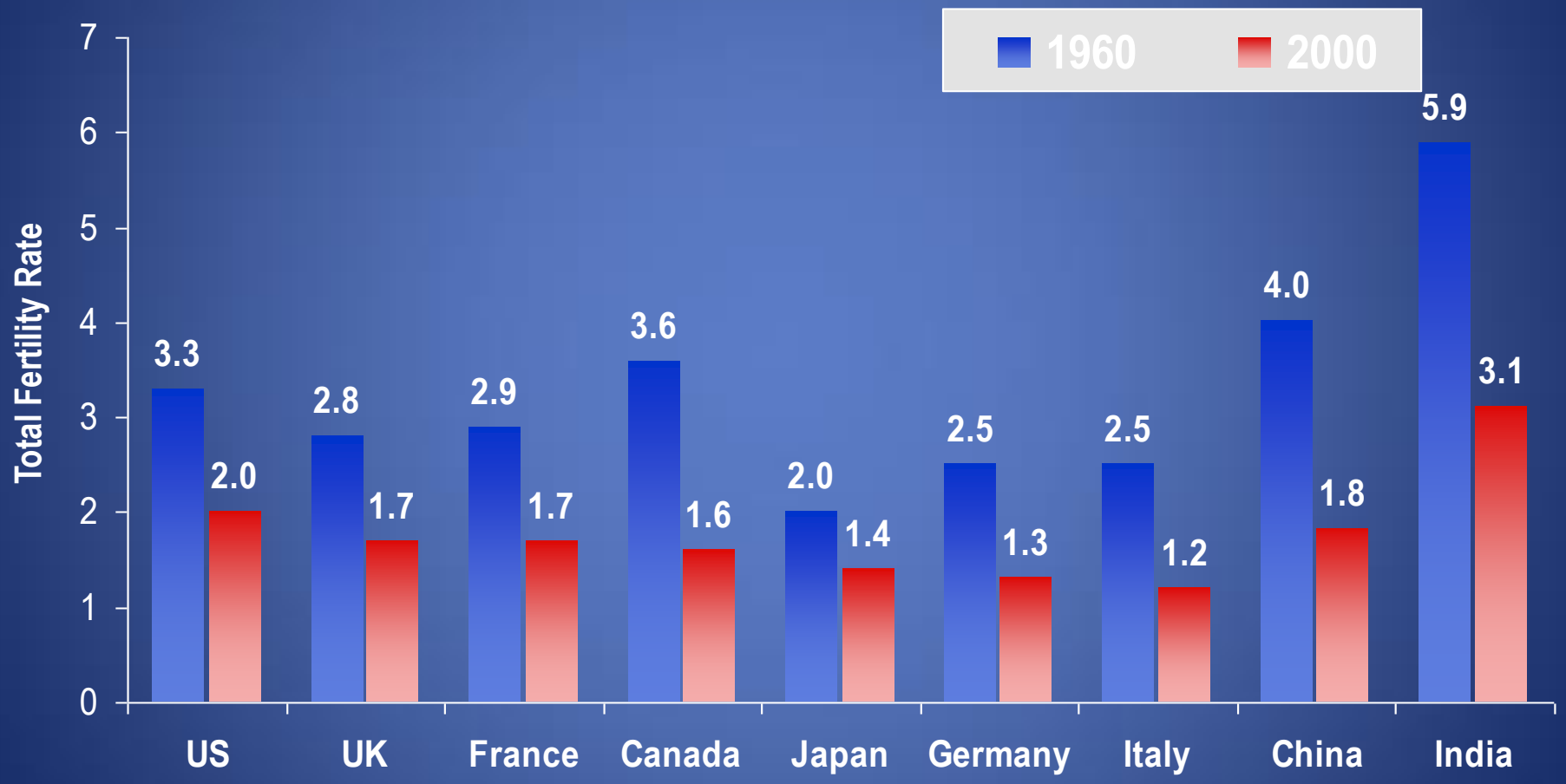
Why?



Source: U.S. Census Bureau International Data Base

Drop in Birth Rates

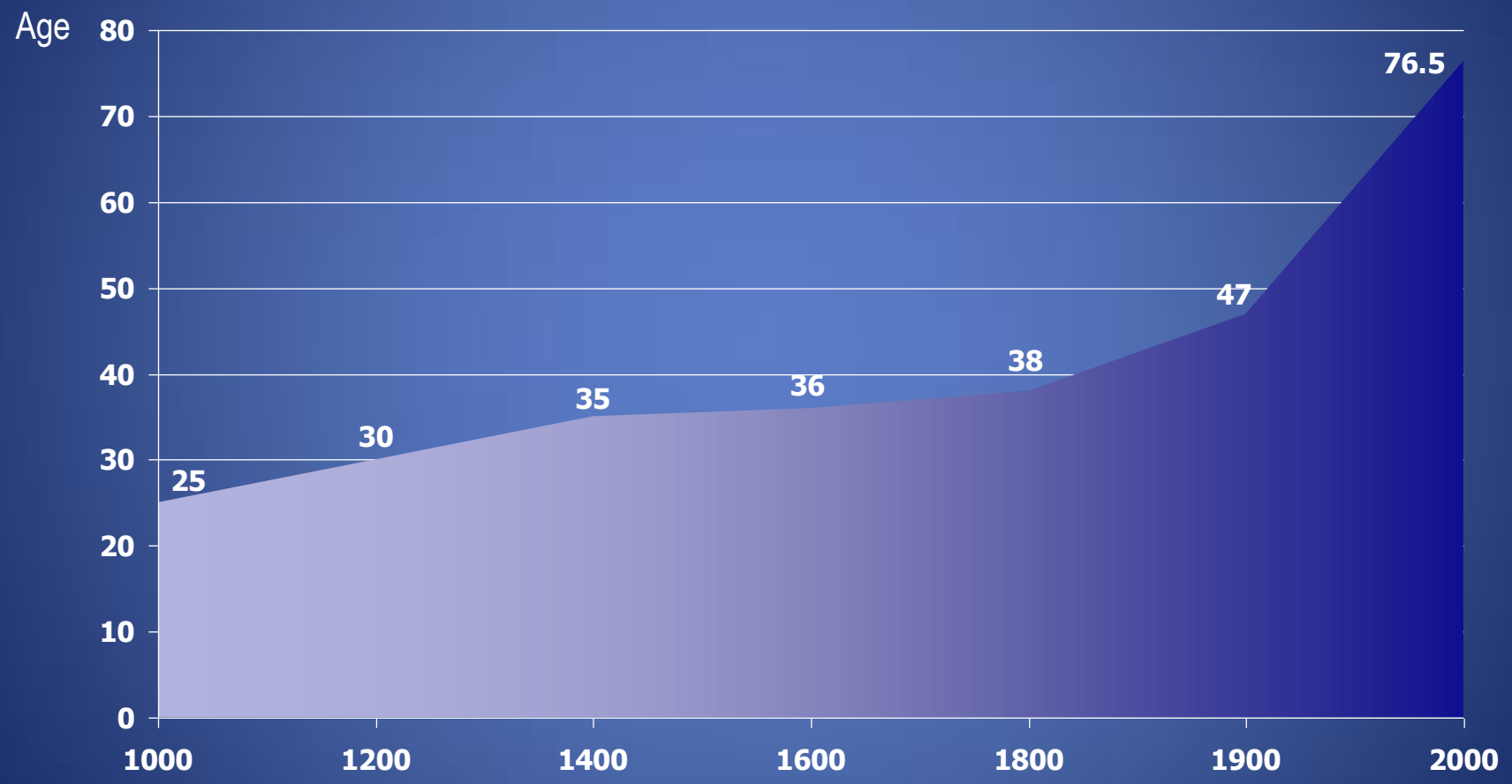
Total Fertility Rate: 1960 and 2000



Source: Age Wave

Increase Life Expectancy

Life Expectancy at Birth: 1000 - 2000



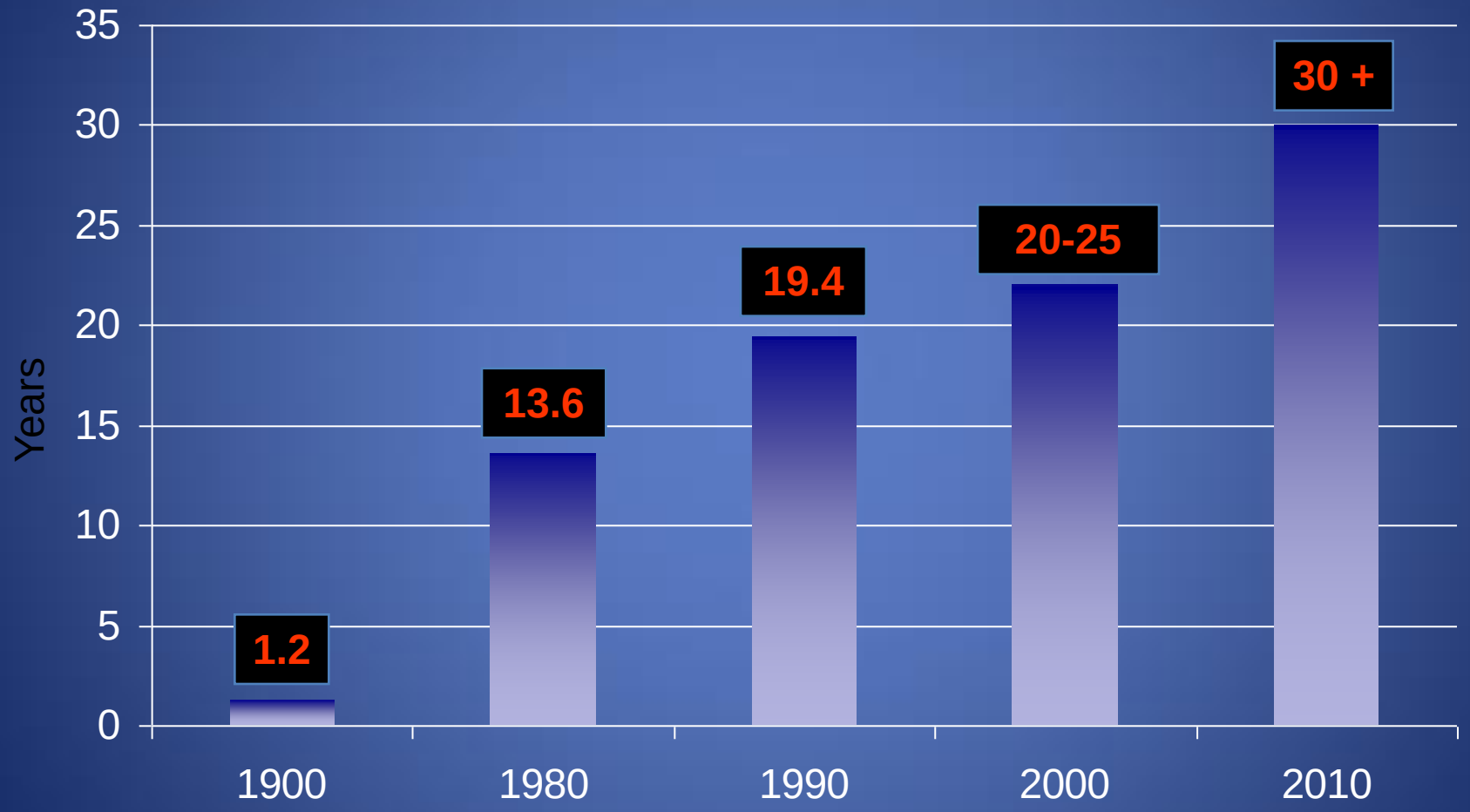
Source: U.S. Census Bureau, 2000

Expectations of Life at Birth: 2010-2020

Projections	Total	Male	Female
2010	76.3	76.7	80.8
2015	76.9	76.4	81.4
2020	79.5	77.1	81.9

– Source: U.S. Census Bureau http://www.census.gov/compendia/statab/2012/tables/12s0104.pdf

More Years Spent in "Retirement"



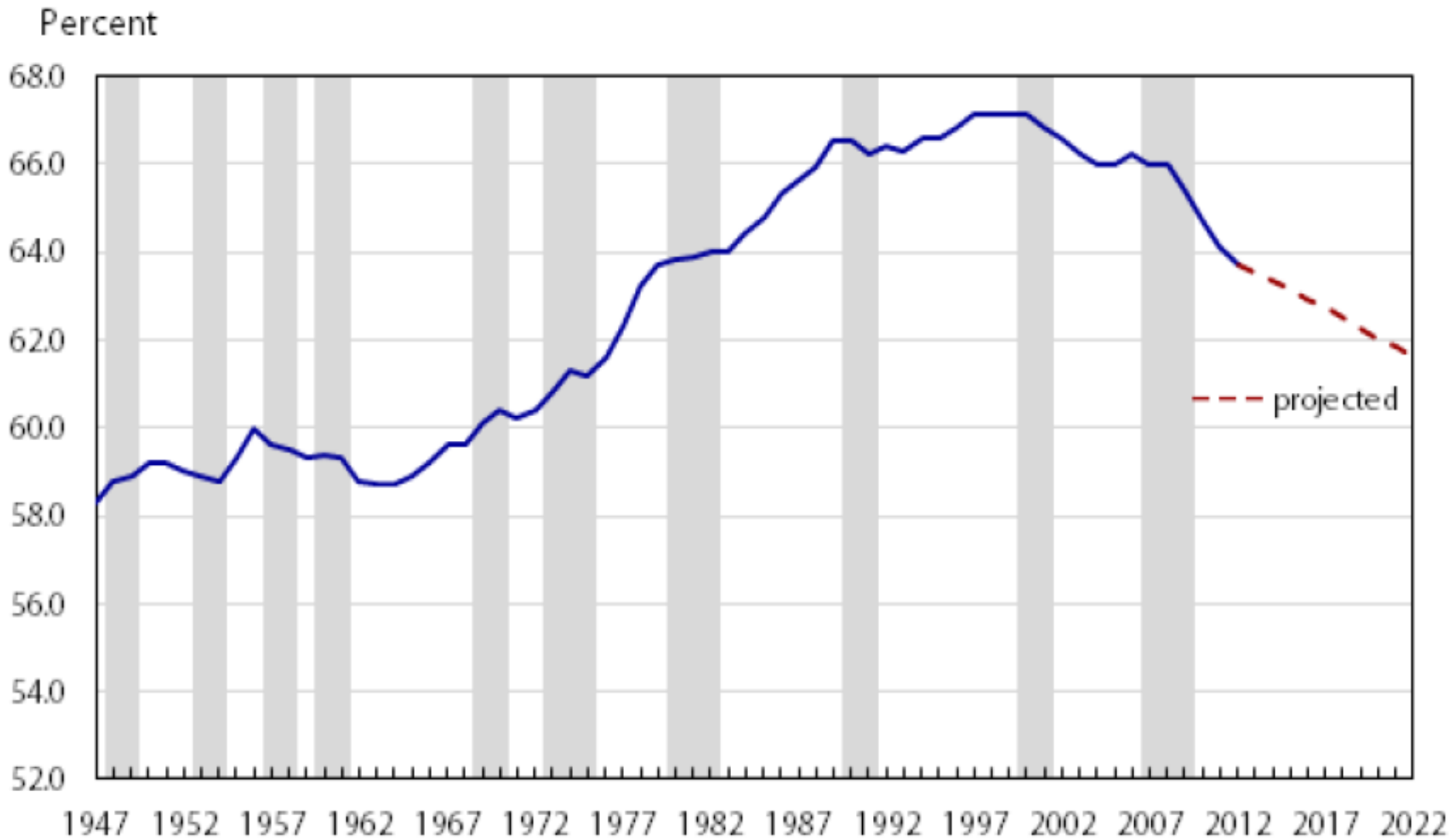
Source: Age Wave, based on U.S. data, and The Concours Group

Workforce Changes: 1970-2014

- During the 1970s and early 1980s, the labor force grew vigorously as women's labor force participation rates surged and the baby-boom generation entered the labor market.

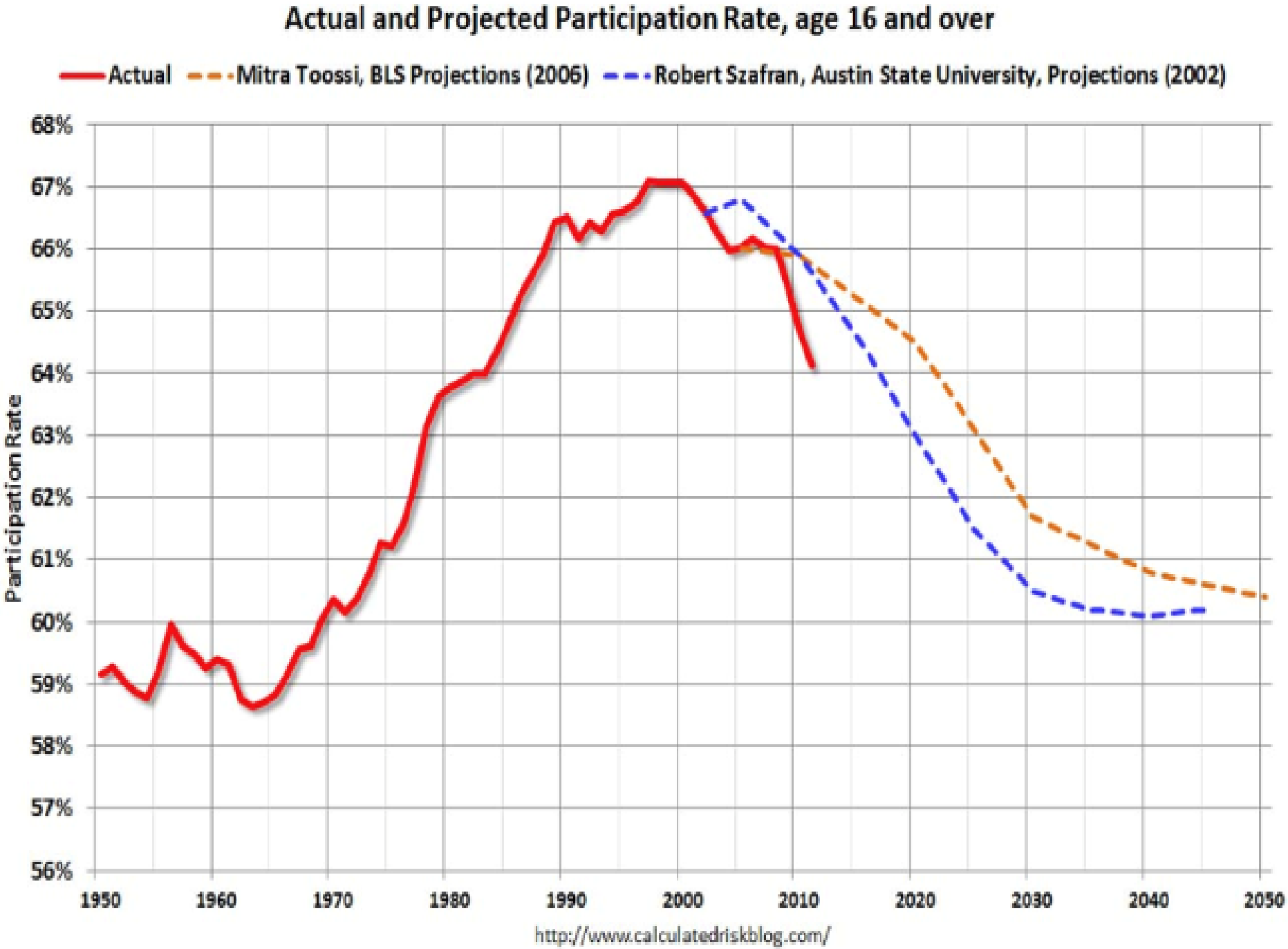
- Dynamic demographic, economic, and social forces that once spurred the level, growth, and composition of the labor force have changed and are now damping labor force growth.
  - Workforce participation rate of women peaked in 1999 & has been on a declining trend.
  - Baby boomers are retiring in large numbers and exiting the workforce.
  - December 2013 labor participation rate = 62.8% (declined by 0.8% in 2013)
- In the first 13 years of the 21st century, the growth of the population has slowed and labor force participation rates generally have declined.

Figure 1. Labor force participation rate, 1947–2012 and projected 2022



Note: Shaded regions represent recessions as designated by the National Bureau of Economic Research. Turning points are quarterly.

Source: U.S. Bureau of Labor Statistics.

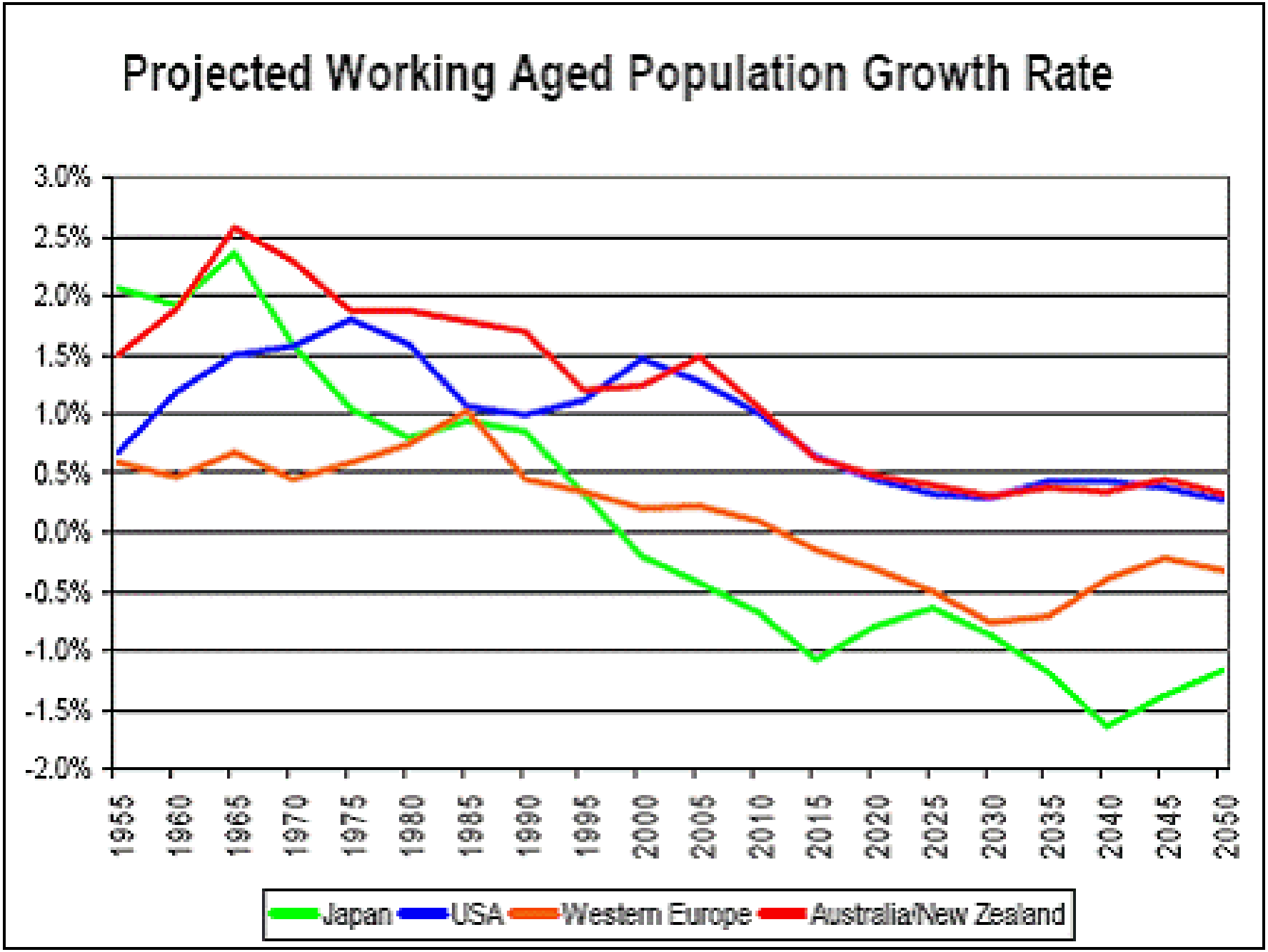

Actual and Projected Participation Rate, age 16 and over
Actual
Mitra Toossi, BLS Projections (2006)
Robert Szafran, Austin State University, Projections (2002)
Participation Rate
68%
67%
66%
65%
64%
63%
62%
61%
60%
59%
58%
57%
56%
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
http://www.calculatedriskblog.com/

Workforce Projections to 2022

- U.S. labor force is:
  - Projected to reach 163.5 million in 2022
  - Anticipated to grow by 8.5 million, an annual growth rate of 0.5 percent, over the 2012–2022 period.

- The growth in the labor force during 2012–2022 is projected to be smaller than in the previous 10-year period, 2002–2012, when the labor force grew by 10.1 million, a 0.7-percent annual growth rate.

  - Toossi M. Labor force projections to 2022. *Monthly Labor Review*, December 2013


Projected Working Aged Population Growth Rate
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
-0.5%
-1.0%
-1.5%
-2.0%
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050
Japan
USA
Western Europe
Australia/New Zealand

Remember These Demographic Facts

- In 1940, the life expectancy of a 65-year-old was almost 14 years; today it is more than 20 years.
- By 2033, the number of older Americans will increase from 45.1 million today to 77.4 million.
- There are currently 2.8 workers for each Social Security beneficiary. By 2033, there will be 2.1 workers for each beneficiary.
  - http://www.ssa.gov/pressoffice/factsheets/basicfact-alt.pdf

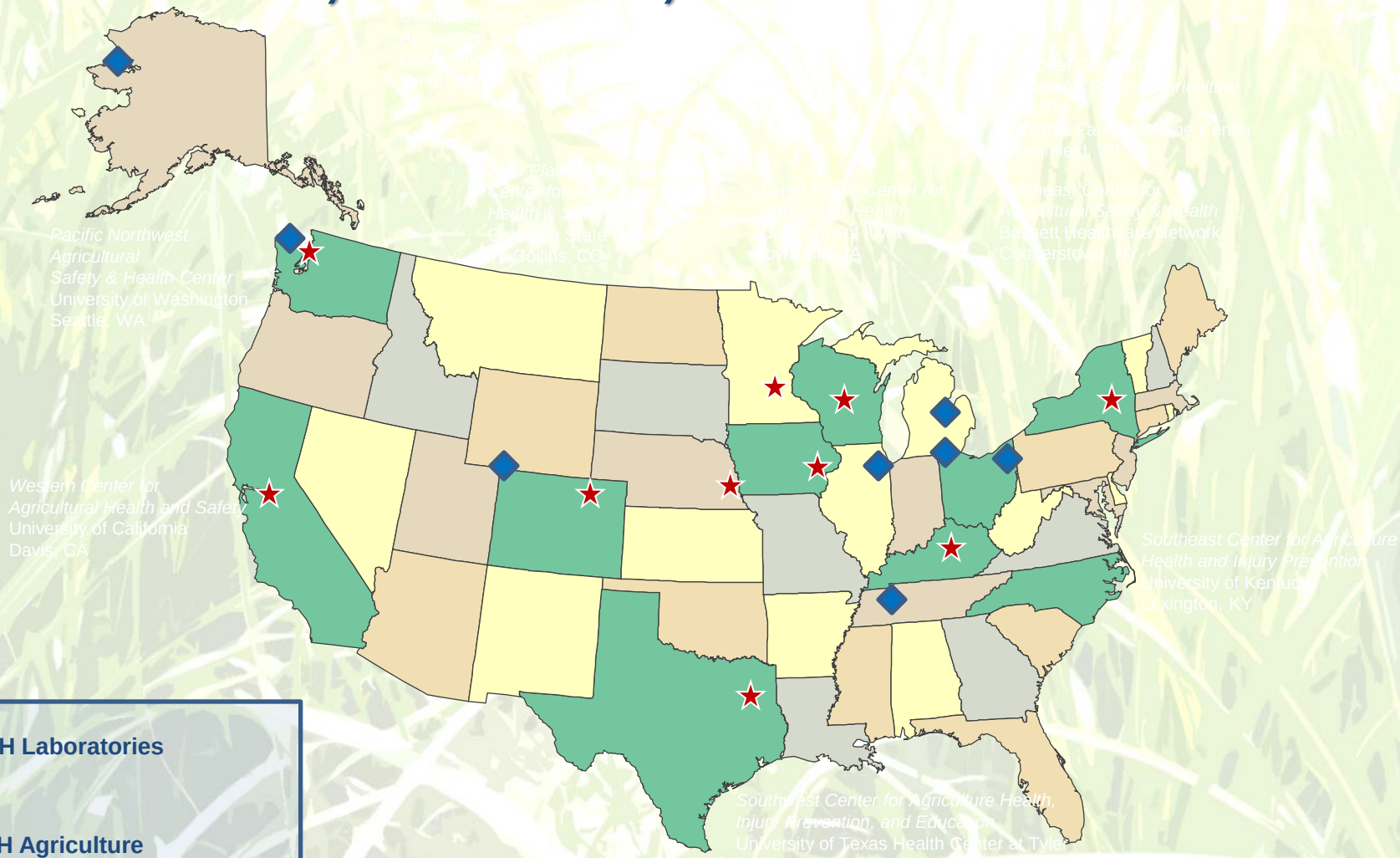
Diabesity and the Future Workforce

- 39 States with 40% of young adults considered to be overweight or obese in just last decade!
  - In Kentucky, Alabama and Mississippi, >50% young adults are overweight
- Medical Consequences:
  - High Blood Pressure
  - Elevated cholesterol
  - Increased Type 2 Diabetes (formerly called adult-onset)
  - Hepatic steatosis epidemic (fat deposits in the liver)
  - Sleep apnea (too much fat around the upper airway)
- Musculoskeletal disorders
  - What the mature and young worker share

Cost of Social Benefits

- **Social Security Retirement Benefits**
  - In 1935, average life span at birth was 62
    - So, retirement benefits started at 65!
  - Rising SS costs squeezes out discretionary spending
- **Medicare**
  - Rising costs due to aging population with chronic medical conditions
  - Rising costs squeezes out discretionary spending
- **Unfunded Liabilities**
  - Projected 75-year unfunded liabilities SSRB and Medicare now total $40 trillion

NIOSH Centers for Agricultural Disease and Injury Research, Education, and Prevention



U.S. Agricultural Workforce

- Although agricultural employment accounts for less than one percent of all jobs, such employment has an important place in the Nation's economy

- Ability of such a small workforce to provide for most of the country's food needs, plus exports, represents remarkable productivity through technology

Table 1. Employment by occupational group, 2008 and projected 2018

(Numbers in thousands)

Code	2008 National Employment Matrix code and title	Employment		Percent distribution		Change, 2008–18	
		2008	2018	2008	2018	Numeric	Percent
00–0000	Total, all occupations	150,931.7	166,205.6	100.0	100.0	15,273.9	10.1
11–1300	Management, business, and financial occupations[1]	15,746.7	17,410.9	10.4	10.5	1,664.2	10.6
15–2900	Professional and related occupations[2]	31,053.5	36,280.0	20.6	21.8	5,226.5	16.8
31–3900	Service occupations[3]	29,575.9	33,645.1	19.6	20.2	4,069.2	13.8
41–0000	Sales and related occupations	15,902.7	16,883.1	10.5	10.2	980.4	6.2
43–0000	Office and administrative support occupation	24,100.6	25,942.7	16.0	15.6	1,842.1	7.6
45–0000	Farming, fishing, and forestry occupations	1,035.4	1,026.3	.7	.6	–9.1	–.9
47–0000	Construction and extraction occupations	7,810.3	8,828.8	5.2	5.3	1,018.6	13.0
49–0000	Installation, maintenance, and repair occupations	5,798.0	6,238.2	3.8	3.8	440.2	7.6
51–0000	Production occupations	10,083.0	9,733.9	6.7	5.9	–349.2	–3.5
53–0000	Transportation and material moving occupations	9,825.5	10,216.6	6.5	6.1	391.1	4.0

[1] Major occupational groups 11–0000 through 13–0000 in the 2000 Standard *Occupational Classification* (SOC).

[2] Major occupational groups 15–0000 through 29–0000 in the 2000 *Standard Occupational Classification* (SOC).

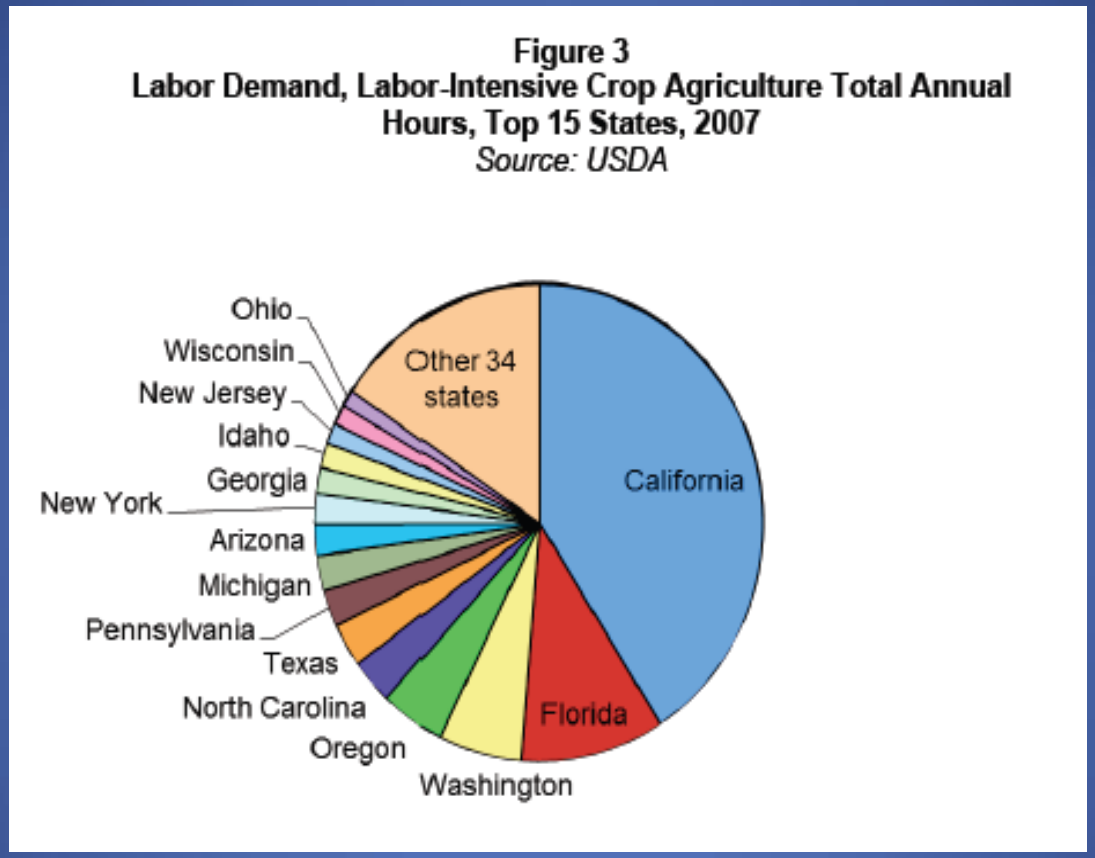
[3] Major Occupational groups 31–0000 through 39–0000 in the 2000 *Standard Occupational Classification* (SOC).

Changes in the Workforce

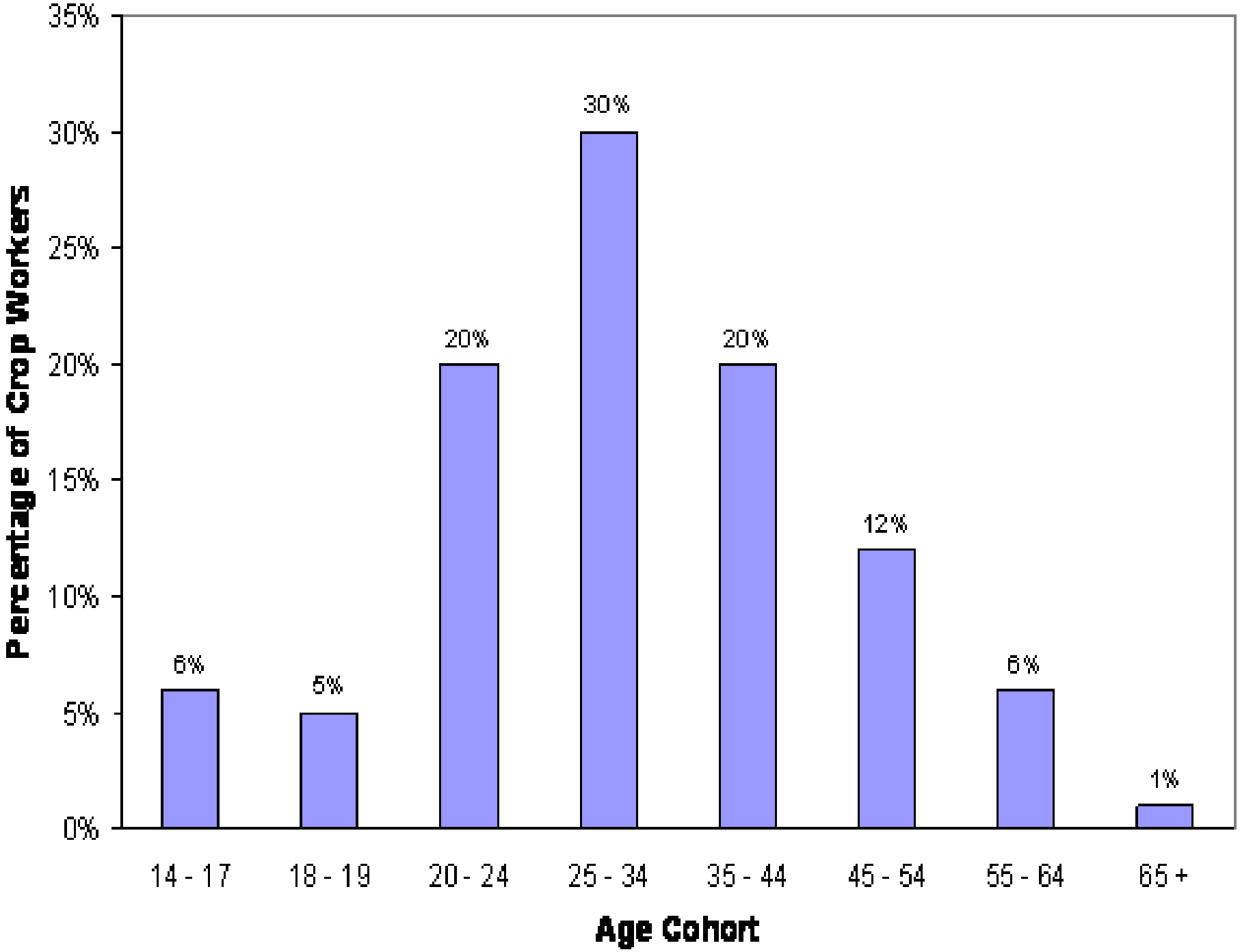
2007 Census of Agriculture (USDA)

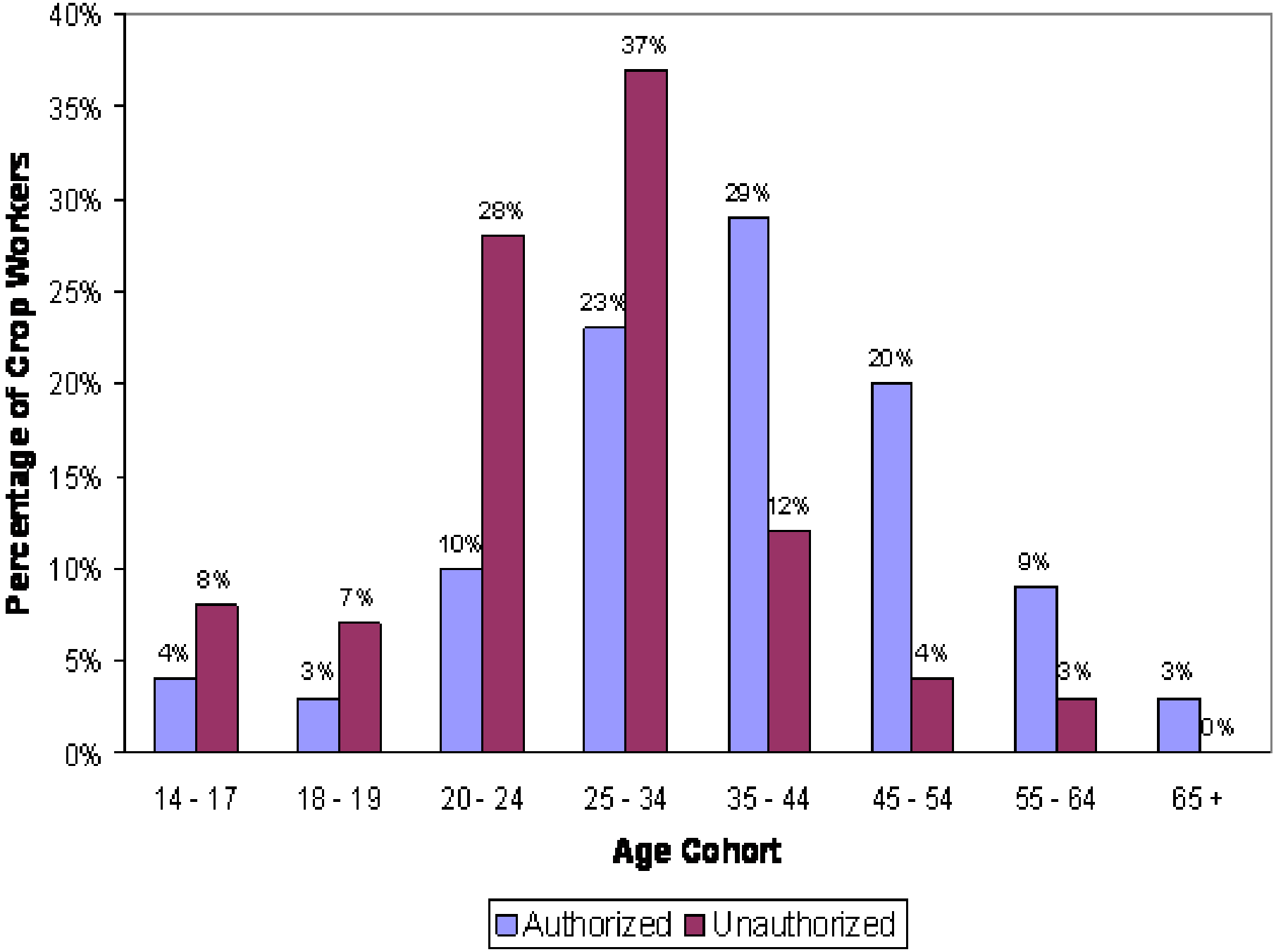
- 2,204,792 farms in U.S.
- 300,000 new farms since 2002 census
  - More diversified production, fewer acres, lower sales and younger operators
- 30% more women as principal farm operators
- Technical skill sets required
- Continuing trend toward small & very large farms and fewer mid-sized operations
- Increase in *hired* agricultural workers
  - % hired workers (vs. family members and owners) increased dramatically in recent years
    - Greater exposure to risky activities
    - Health and safety surveillance systems need to include hired workers

Annual Farm Labor Demand By State



- California's share of national fruit and vegetable production was 46% n 1996—by 2008, share had increased to 57%


35%
30%
25%
20%
15%
10%
5%
0%
Percentage of Crop Workers
6%
5%
20%
30%
20%
12%
6%
1%
14 - 17
18 - 19
20 - 24
25 - 34
35 - 44
45 - 54
55 - 64
65 +
Age Cohort


40%
35%
30%
25%
20%
15%
10%
5%
0%
Percentage of Crop Workers
4%
8%
3%
7%
10%
28%
23%
37%
29%
12%
20%
4%
9%
3%
3%
0%
14 - 17
18 - 19
20 - 24
25 - 34
35 - 44
45 - 54
55 - 64
65 +
Age Cohort
Authorized
Unauthorized

Fatalities, Injuries & Illnesses: 2009-2012

Data series	2009	2010	2011	2012
Fatalities				
Number of fatalities	580	624	570	(P) 478
Rate of injury and illness cases per 100 full-time workers				
Total recordable cases	5.3	4.8	5.5	5.5
Cases involving days away from work, job restriction, or transfer	2.9	2.7	3.2	3.3
Cases involving days away from work	1.6	1.7	1.8	2.0
Cases involving days of job transfer or restriction	1.2	1.1	1.4	1.3

Footnotes
(P) Preliminary

Blank cells indicate no data reported or data that do not meet publication criteria.

Decreasing Number of Fatalities

- Decreased 16% to 478 in 2012 from 570 in 2011.
  - This follows a 9 percent drop in agriculture fatalities in 2011.
  - Fatal injuries in the crop production, animal production, forestry and logging, and fishing sectors were all lower in 2012.
- Despite the declines in this sector over the last two years, agriculture recorded the highest fatal injury *rate* of any industry sector at 21.2 fatal injuries per 100,000 FTE workers in 2012.
  - http://www.bls.gov/news.release/cfoi.nr0.htm

Hierarchy of Causes

- Transportation Incidents
- Contact with objects and equipment
- Exposure to harmful substances
- Falls, slips and trips
- Violence
- Fires and explosions

California AFF Fatalities: 2003-2010

http://data.bls.gov/pdq/querytool.jsp?survey=fi

All Sectors

Year	Annual
2003	412
2004	411
2005	421
2006	471
2007	407
2008	402
2009	342
2010	282

Agriculture

Year	Annual
2003	32
2004	51
2005	49
2006	63
2007	38
2008	69
2009	29
2010	38

2011 40

Health of Hired Farmworker Workforce

- Reliable information about the personal health of U.S. farmworkers is sparse
  - Rates of obesity, hypertension, and high cholesterol levels are high, and most have no health insurance
    - Villarejo, The Kresge Foundation (2012)
- Safety and health risks
  - Transportation
  - Machinery
  - Heat
  - Musculoskeletal disorders
  - Pesticides

New Equipment Safety Issues

- Advances in tools, equipment and machinery occurring quickly without adequate characterization of safety risks

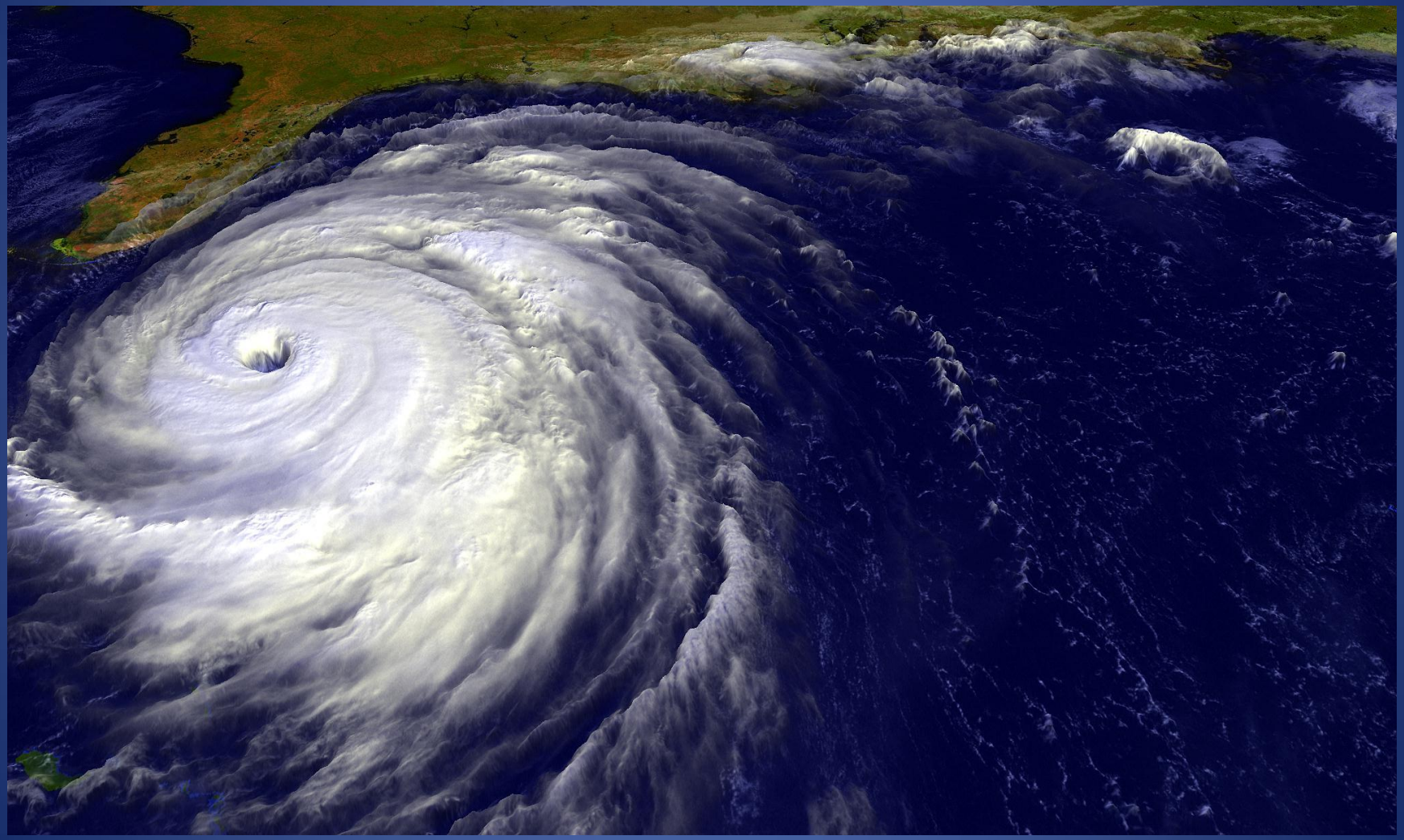
- Equipment
  - High pressure hydraulic systems
  - Power take-off (PTO) entanglement
- ***New*** Vehicles for Farm Work
  - Cowboys now riding ATVs instead of horses
  - Vehicles with automatic steering
  - Autopilot & computer-operated equipment
  - Remote-controlled tractors

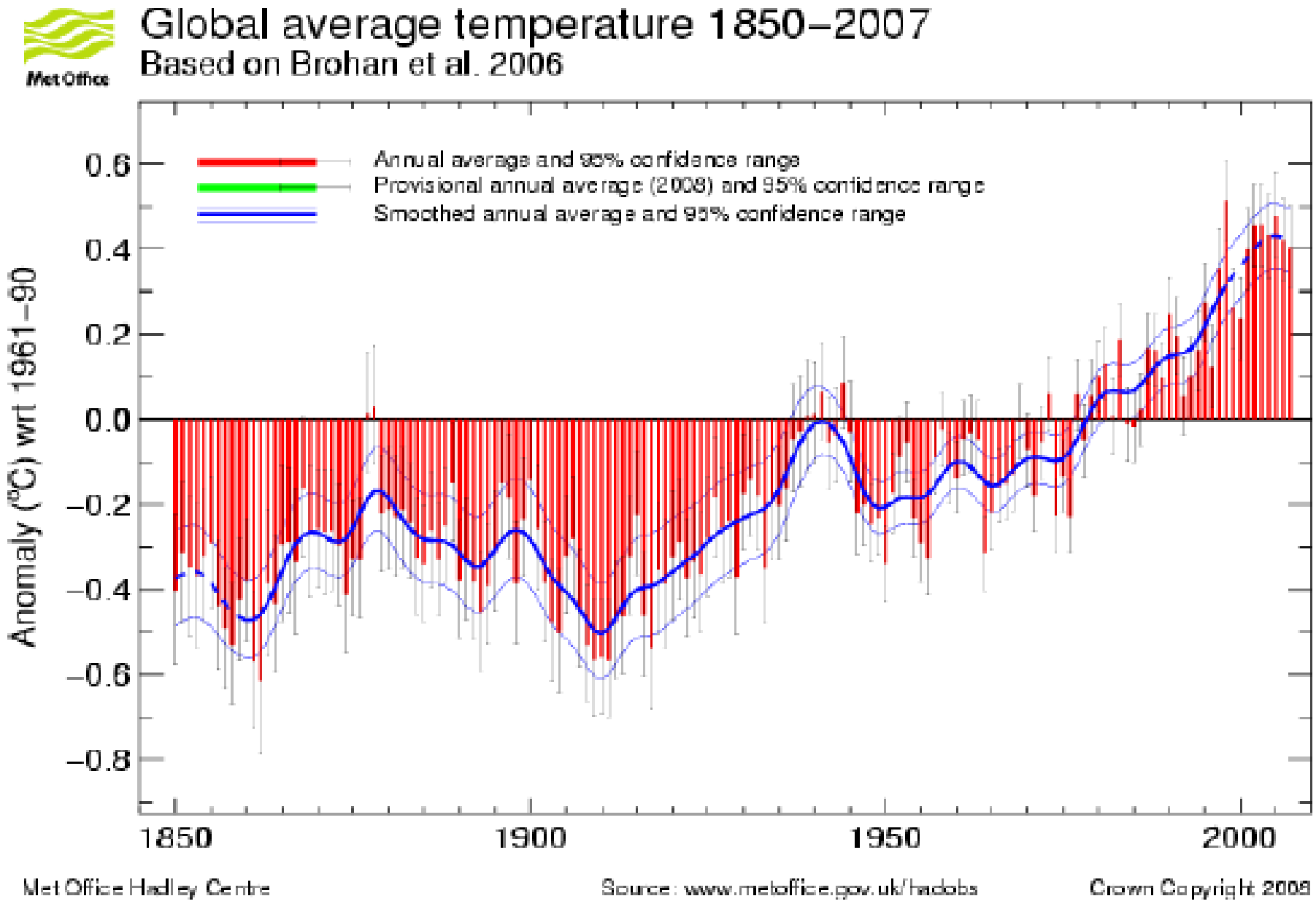
Road Transportation Injuries

- Daily & seasonal mobility of hired farm workers—tied to crop work availability—results in increased exposure to MVAs
- Numerous studies show increased risk of head injuries & injury-related death in Latino farm workers
  - Seatbelt nonuse, alcohol, speeding
  - Driving while drowsy and distracted

- **NIOSH Center for Motor Vehicle Safety**
  - http://www.cdc.gov/niosh/topics/motorvehicle/NCMVS.html

Climate Change





IPCC4th AR Global T increase 1.4°F

Agriculture Effects on Climate

- Agriculture has been shown to produce significant effects
  - Production and release of greenhouse gases
- Agriculture alters the Earth's land cover, which can change its ability to absorb or reflect heat and light
  - Land use change such as deforestation and desertification. together with use of fossil fuels, are the major anthropogenic sources of $C0_2$
- Agriculture itself is the major contributor
  - To increasing methane and nitrous oxide concentrations in earth's atmosphere
- Assessment of the effects of global climate changes on agriculture might help to properly anticipate and adapt farming to maximize agricultural production

Climate Change and Farmworkers

- UN forecasts an increase in global temps 1.1 - 6.4^{o} Celsius
- Impact on agricultural populations difficult to predict
- Impact on worker safety and health unknown
  - Heat stress in southern states year around
  - Disease vectors may flourish in areas previously inhospitable
  - Safety gear in hot and humid environments
  - Increased exposure:
    - Mold
    - Fungi
    - Insects
    - Ultraviolet radiation

California employers are required to take these four steps to prevent heat illness

1. Training

Train all employees and supervisors about heat illness prevention.

2. Water

Provide enough fresh water so that each employee can drink at least 1 quart per hour, *and encourage them to do so.*

3. Shade

Provide access to shade and encourage employees to take a cool-down rest in the shade for at least 5 minutes. *They should not wait until they feel sick to cool down.*

4. Planning

Develop and implement written procedures for complying with the Cal/OSHA Heat Illness Prevention Standard.

Cal/OSHA Enforcement Stats

Cal/OSHA Heat Illness Enforcement Activities

CY 05 - 13 (YTD)

Statewide

CY05	CY06	CY07	CY08	CY09	CY10	CY11	CY12	CY13***	
39	234	1018	2586	3574	3183	3301	3854	3737	Inspections conducted coded S 18 Heat
9	158	490	899	935	788	836	1099	947	Inspections w/ 3395 violations (some 2013 cases still open)
2	136	614	1121	1163	957	908	1363	1503	Violations of 3395 cited during specified year *(breakdown below)
$7,085	$535,140	$822,990	$1,775,071	$1,041,527	$578,995	$570,320	$893,708	$1,202,995	Assessed initial penalties during specified year (to date)
14	96	284	1145	2562	2482	2272	2055	1745	Heat outreach activities (enforcement and consultation**)

* The number of 3395 (heat) violations cited is generally higher than the number of inspections w/ 3395 violations as multiple subsections of 3395 may be cited in one individual inspection (case). See below for breakdown of each 3395 subsection.

** Cal/OSHA Consultation heat illness outreach activities for CY 2008 - 2013 includes workshops, seminars, training related to on-sites, etc. Cal/OSHA will continue to conduct heat outreach activities throughout 2013.

*** Information is only reflective of partial data within the IMIS database to date. This is NOT a complete year for 2013. Cal/OSHA will continue to conduct inspections throughout 2013.

Integration of Human and Animal Health

- Zoonotic disease outbreaks are increasing in humans
- Use in animals of antibiotics that could be harmful to humans
  - Use of Micotil—bovine antibiotic used to prevent shipping fever in cattle—can cause death in humans when injected
- Neurocysticercosis
  - Brain infection cause by larval stage of pork *tapeworm—Taenia solium*
  - Eradicated in US in early 1990s
  - Indirect evidence of increasing incidence
    - Migration of hired labor from Mexico & Latin America
  - Many *neurocysticercosis* patients may harbor adult tapeworm in the intestines and could infect other humans and pigs
  - Complexity of disease goes beyond neurological to occupational and socio-ccultural

Increased Cancer Burden Among Pesticide Applicators and Others Due to Pesticide Exposure

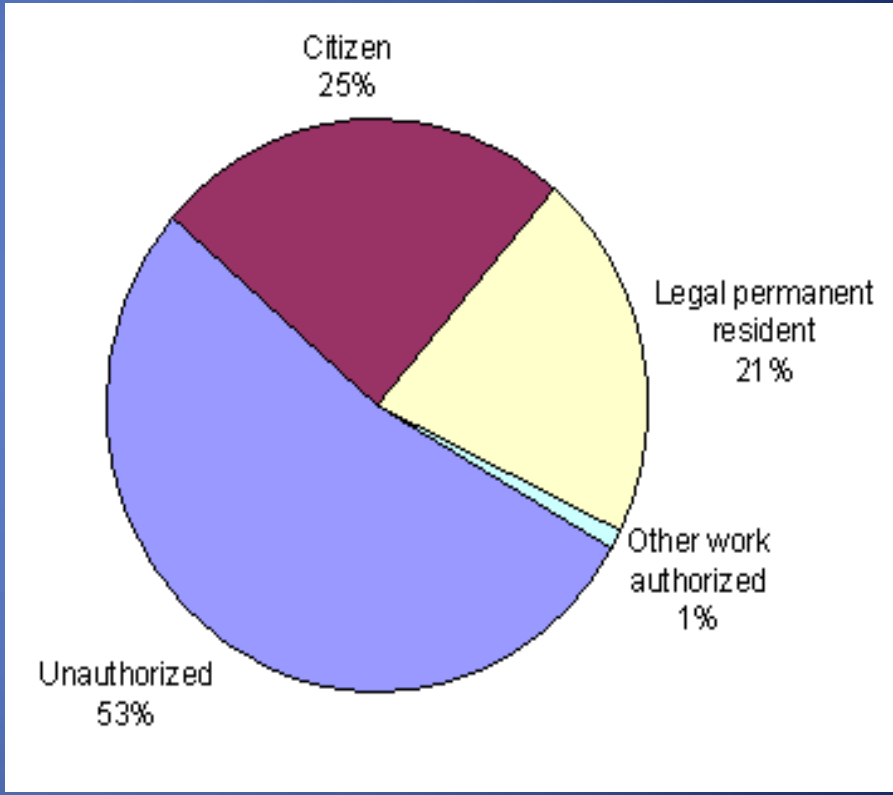
Michael C. R. Alavanja, DrPH[1]; Matthew K. Ross, PhD[2]; Matthew R. Bonner, PhD, MPH[3]

- "A growing number of well-designed epidemiological and molecular studies provide substantial evidence that the pesticides used in agricultural, commercial, and home and garden applications are associated with excess cancer risk."

- Alavanja et al. *CA: A Cancer Journal for Clinicians* 2013;63(2):120-142

Employment Eligibility

- In 2002, 50% to 60% of the hired crop labor force lacked work authorization.
- 25 percent of the crop workers were U.S. citizens
- 21 percent were legal permanent residents
- One percent were employment-eligible some other basis



Immigration Reform

- Border Security, Economic Opportunity, and Immigration Modernization Act (S. 744)
  - S. 744 would change laws governing the types & numbers of foreign-born persons granted lawful permanent resident status
  - Passed Senate on 27 June 2013 (68-32) and sent to House of Representatives
  - Second session of 113th Congress convened 7 January 2014
- December 2013
  - Boehner hires Rebecca Talent, Director of Immigration Policy at the Bipartisan Policy Center

S.744 and Stakeholder Values

- Build a legal, more stable workforce in agriculture
- Develop economically viable guest worker program that allows employers to hire legal foreign workers and protects foreign and U.S. farmworkers
- Ensure quality of life, good working conditions, and opportunities for food and agriculture workers
- Provide more opportunities for farmworkers to develop skills and advance their careers within the food and agriculture sector.

  – **AGree** 3 June 2013 http://www.foodandagpolicy.org/

Issues In American Agriculture

- Precision Agriculture
- Robotics
- Food Harvesting & Production
- Food Safety & Security
- Industrialization
- GMOs
- Sharing the Fields

Precision Agriculture

- Farming management concept based on observing, measuring and responding to inter- and intra-field variability in crops
- Smart Agriculture
  - Collects real-time data on weather, soil and air-quality, need for nutrient-enrichment of land,
  - Uses global navigation satellite systems, robotics, sensory and other data acquisition technologies
  - Reduces amount of nutrient and crop inputs while boosting yields
  - Makes possible sustainable agriculture
- Latest in a history of technological advances in agriculture which increases workforce productivity

Horicultural Robotics

- In horticulture:
  - Robots can spray, trim, prune, grade and move stock.

- Robots may also start:
  - Planting tulips and replanting seedlings
  - Harvesting pumpkins and watermelons (using their sensors to determine which ones are ripe)
  - Trimming and packaging mushrooms
  - Packaging potted plants

Agricultural Robotics

- "Tasks like fruit picking, with robots operating in a complex natural setting, are far more challenging and will require better sensors and more intelligence. But robots, like all workers, have to start somewhere."

  - "Robots in the Shrubbery," *The Economist*, Sept 7, 2012 http://www.economist.com/blogs/babbage/2012/09/agricultural-technology

Agricultural Robotics

A lettuce thinner created by an agricultural tech startup uses cameras and sensors to thin lettuce rows. Salinas, Calif., has hired a venture capital fund to help it attract other high-tech agricultural companies to the area.

Robotics and the Agricultural Worker

- Robotics and computer-based mechanization increases competencies needed from agricultural workforce

- Replacement of low-skilled hand labor by mechanization will have major socio-political effects

Blurring Boundaries for Food Harvesting and Food Processing

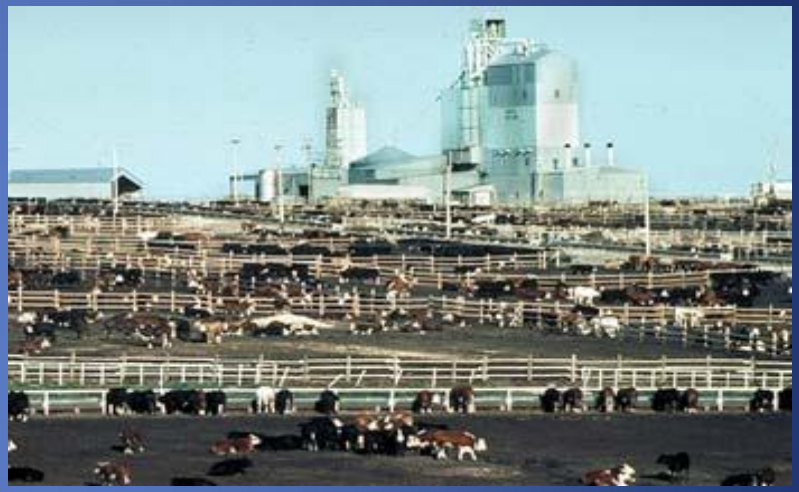
- Economic pressures to add value to products
  - Control undesirable chemical changes in the product
  - Minimize physical damage
  - Obtain better control of pathogens through sanitation procedures
- Increases in amount of food processing performed at harvest site
- As processing becomes more closely integrated with traditional harvesting, workers may be exposed to new hazards for which they are not trained, nor have the competencies for.
  - Post-harvest processing entails cooling, cleaning, sorting and packing
  - Exposure to chemicals used as pesticides or a sanitizers
  - Increase risk of musculoskeletal injuries, e.g., twisting to core lettuce

Food Safety and Food Security

- Hazardous food agents can cause illness among people directly involved in food production
- List of hazardous biological agents is long
  - Bacterial, viral, parasites, multi-drug resistant bacteria, antibiotic and pesticide residues
- Genetic modified foods (GMFs) can contain allergens not found in conventional foods
- Risk of intentional food contamination
  - *Agroterrorism*
  - Lack of oversight of food quality control
- Studies that integrate harvesting, processing, packing and transport are need to understand the risks of acute and chronic illness in the new agriculture workforce

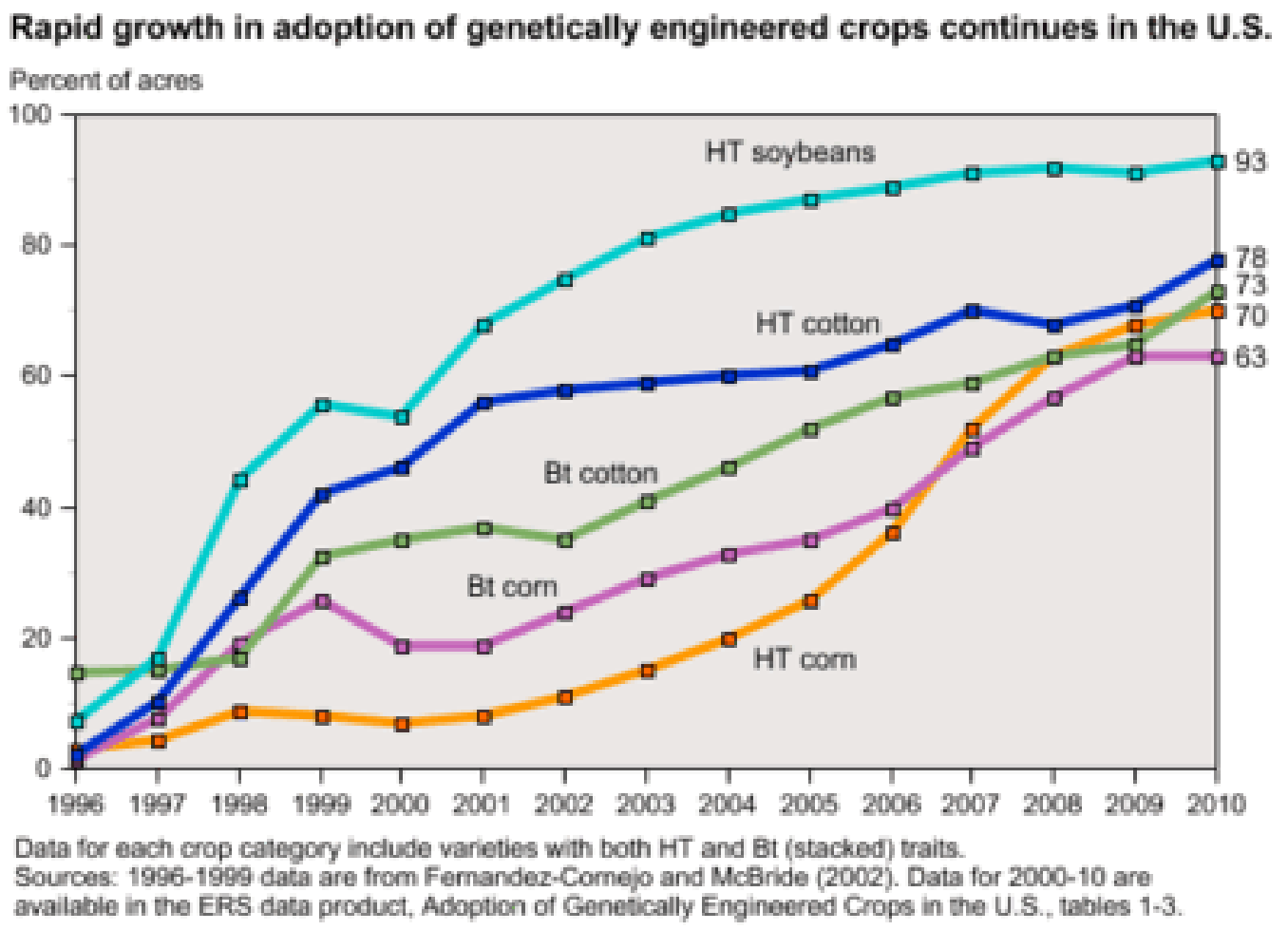
Industrialization of Agriculture

- Concentrated animal feed operations
  - Subject to intense environmental scrutiny (NRC, 2003)
  - Worker health effects not well studied



- Safety and health challenges:
  - Safety interventions for workers working around large number of animals
  - Concentrated operations employ large number of workers and present management and oversight challenges that far exceed conventional farming operations

Genetically-Engineered Crops



Genetically-Engineered Foods

- Foods produced using genetic engineering (GE foods, or GMOs)
  - First appeared on the market in 1990s
- Critics have objected to GM foods on several grounds:
  - Food safety issues
  - Ecological harm
  - Economic concerns raised by the fact that GMOs are subject to intellectual property law
- Increased cultivation of GMOs
  - 80-fold from 4.2 to 331 million acres (55% in US) from 1996 to 2009
- And then there is Europe…
  - Convenient way to "whip up people against industrial agriculture"?
    - Freedman, Are engineered foods evil? *Scientific American*, Sept 2013

U.S. Public Acceptance of GMOs

Agriculture scientists support approving genetically altered apple but meet resistance

By Michael Doyle, Published: January 6

An apple genetically engineered not to turn brown is putting the Agriculture Department and the apple industry on the spot.

The department appears inclined to approve the so-called Arctic apple, designed by a small Canadian company. First, though, officials must confront some enduring public distaste for genetically modified foods.

GMO Labelling

- California GMO Labelling Initiative (Prop. 37)
  - Failed—53% opposed
- Washington State Initiative (I-522)
  - Failed—55% opposed
- Natural vs. Engineered?
  - November 2013, Grocery Manufacturer's Association submitted a petition to FDA asking to define the term "natural" to include foods produced using genetic engineering
  - December 2013, Center for Food Safety Tells FDA: "Natural" Label Should Not Include GE Foods

Really, How Risky Are GM Foods?

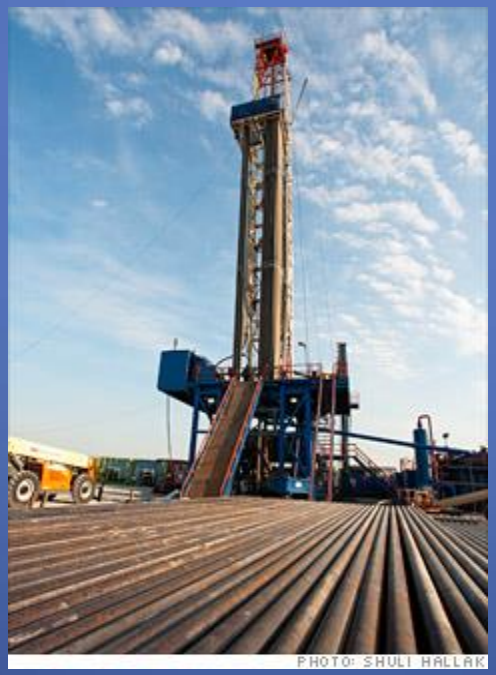
- The nutritional quality of soybeans (*Glycine max*) is compromised by a relative deficiency of methionine in the protein fraction of the seeds.
- Genetic engineering to the rescue:
  - To improve the nutritional quality, methionine-rich 2S albumin from the Brazil nut (*Bertholletia excelsa*) has been introduced into transgenic soybeans.
  - Radioallergosorbent testing, immunoblotting, and skin-prick testing showed that individuals allergic to Brazil nuts were also allergic to the new GM soybean.
  - "An allergen from a food known to be allergenic can be transferred into another food by genetic engineering."
    - » N Engl J Med 1996; 334:688-692

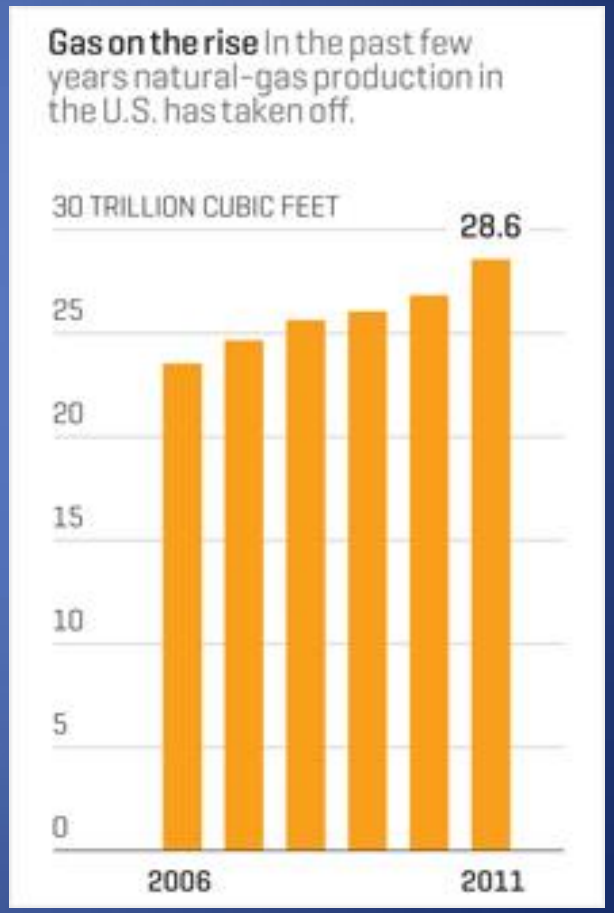
Corn Modified for Ethanol Production

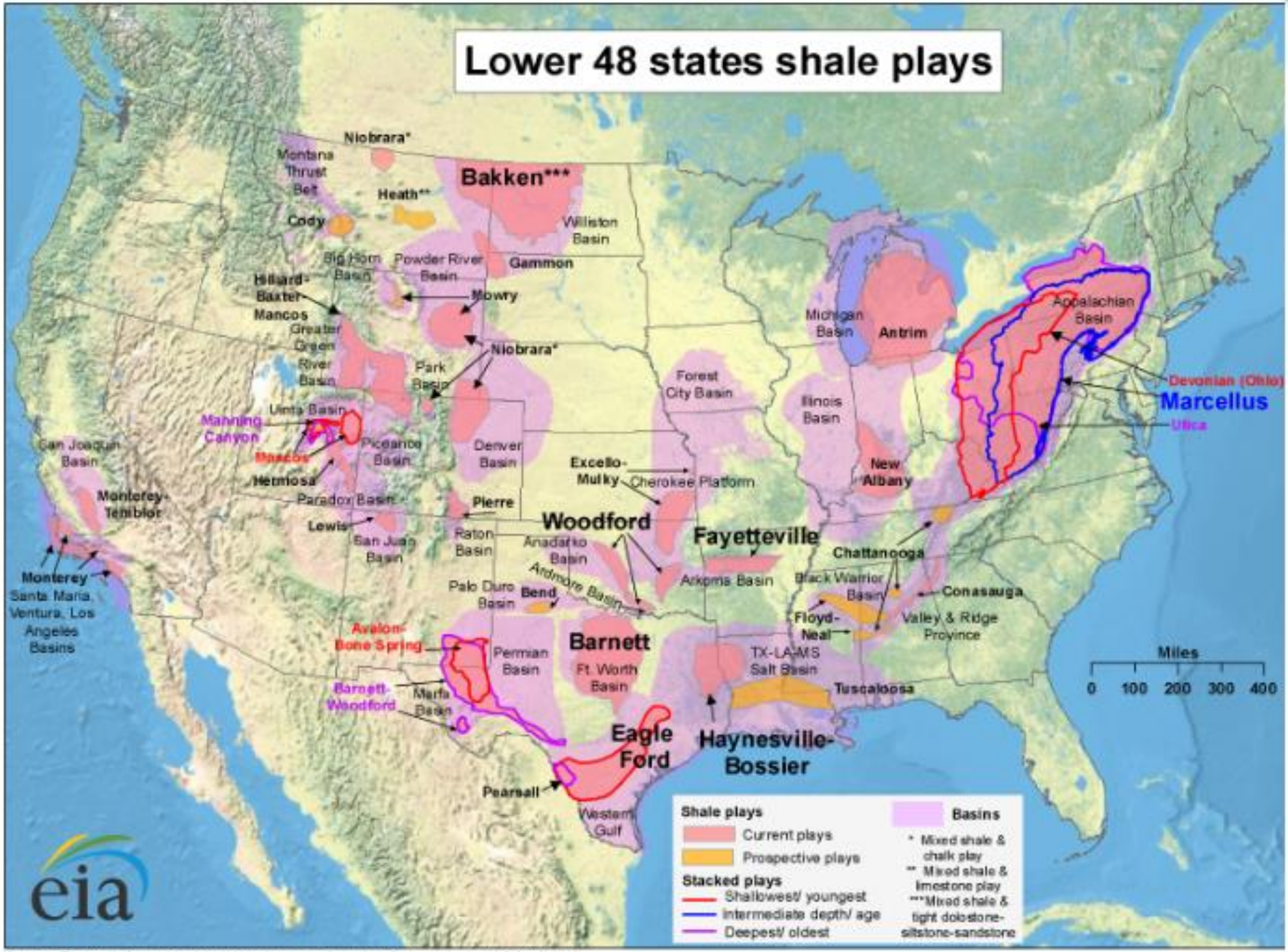
- USDA Approves Syngenta's Enogen Corn -- February 11, 2011
  - Syngenta announced it has received full deregulation for its corn amylase trait from the U.S. Department of Agriculture (USDA).
- Enogen contains a microbial gene that causes it to produce alpha amylase that breaks down corn starch into sugar—first step to making ethanol—making ethanol manufacture more efficient
  - Enogen is one of the first crops genetically engineered to contain a trait that influences use of the plant after harvest and one of the first engineered *solely* for industrial purposes.
  - Virtually all past biotech crops have had traits like insect resistance, aimed at helping farmers more than manufacturers or consumers.
- Food processors and environmental groups worried about cross-pollination or inadvertent mixing
  - FDA said corn is safe to eat
  - Center for Food Safety not happy

The New Energy Workforce

- America's Energy Hotspots
  - Deep Sea Oil
  - Tight Oil

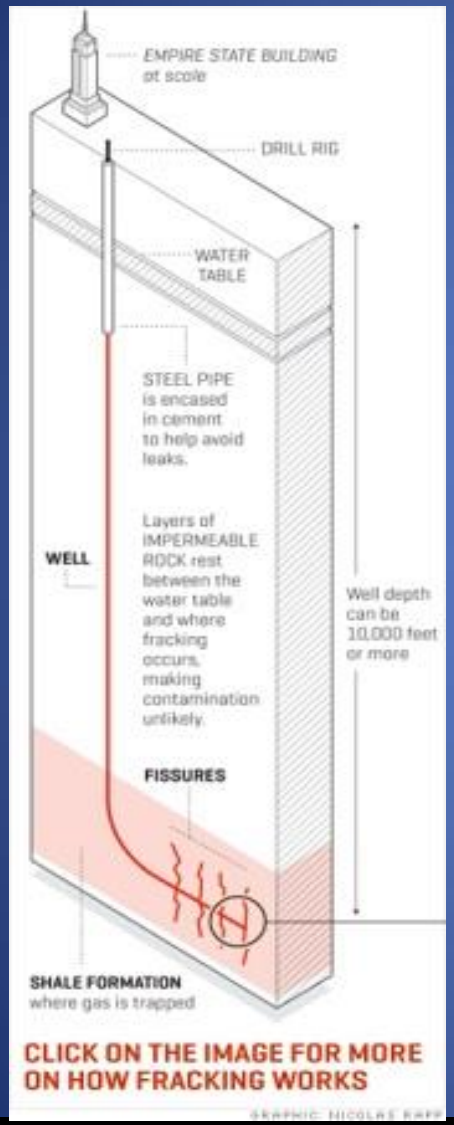




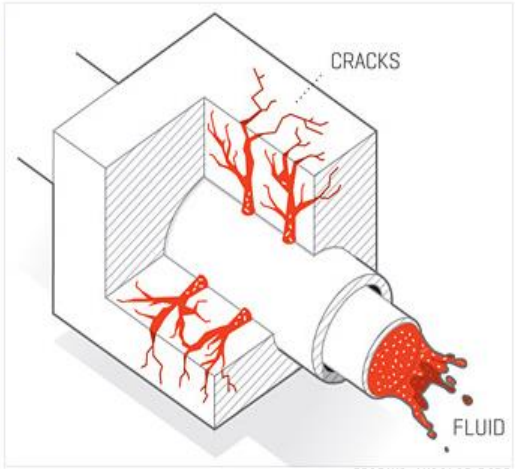


Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

Hydraulic Fracturing Process

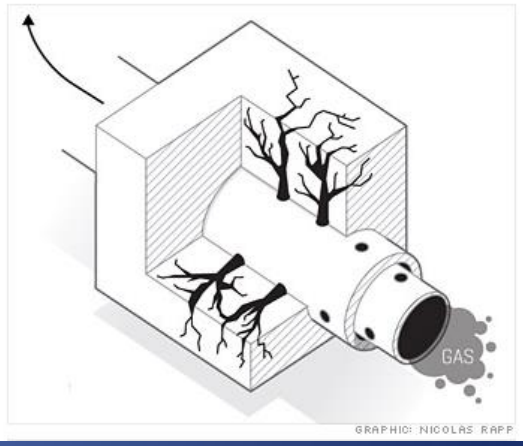


3. A mix of water and chemicals is injected at high pressure to fracture the shale. Sand is included to keep the cracks open.



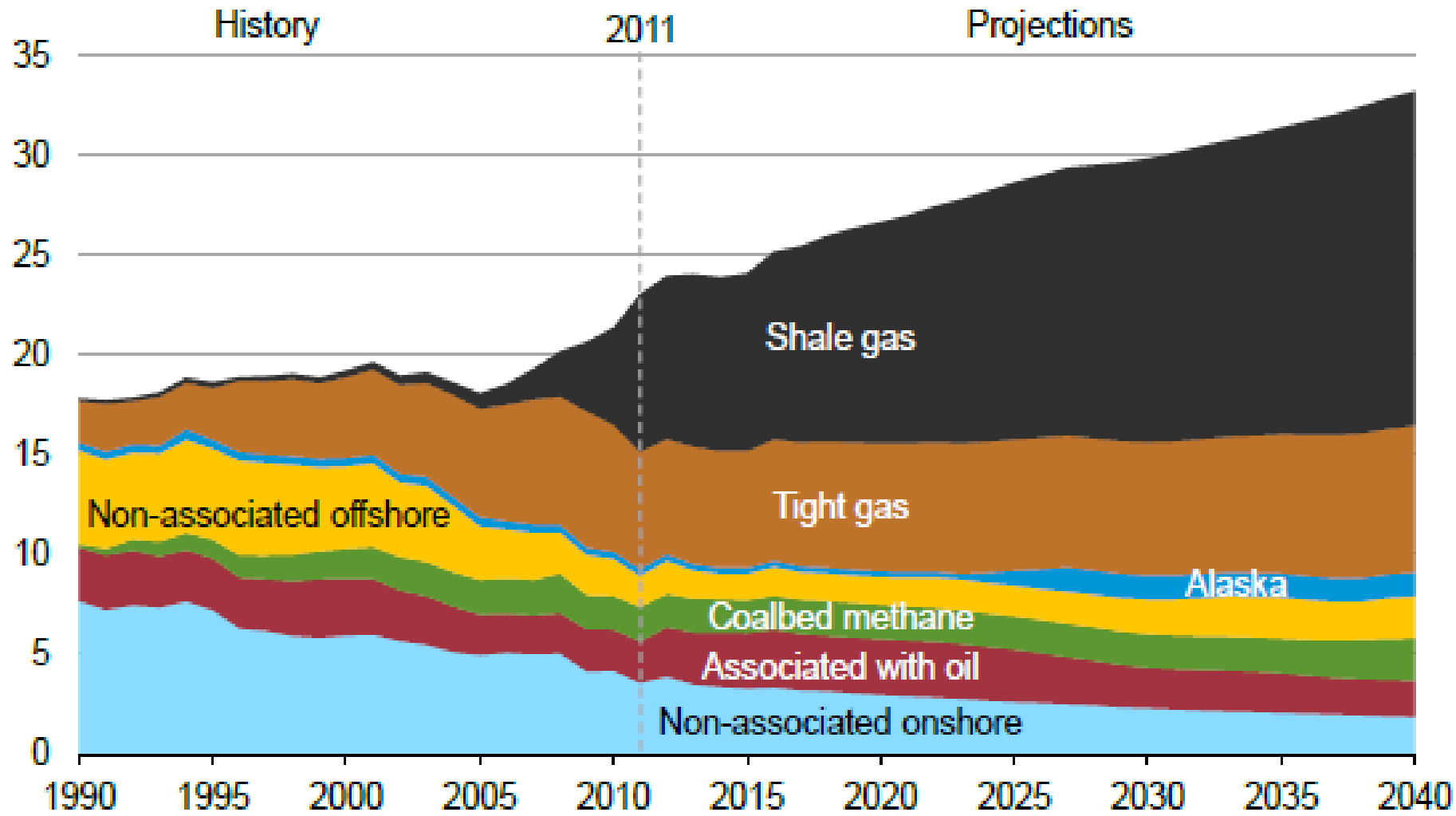
4. Part of the water and sand mix flows back to the surface. The natural gas then flows up through the well.

NEXT



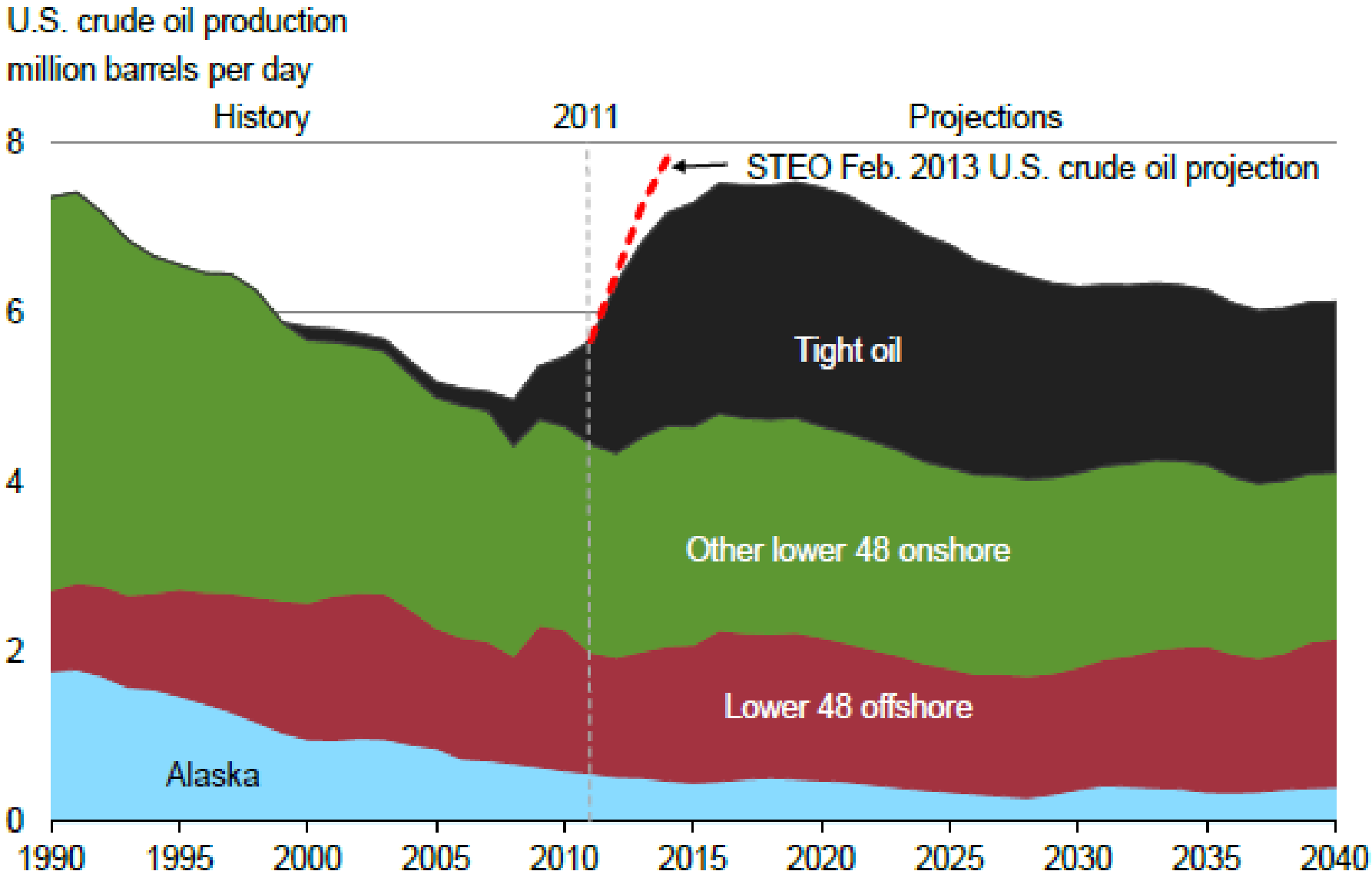
Shale gas leads growth in total gas production through 2040

U.S. dry natural gas production
trillion cubic feet



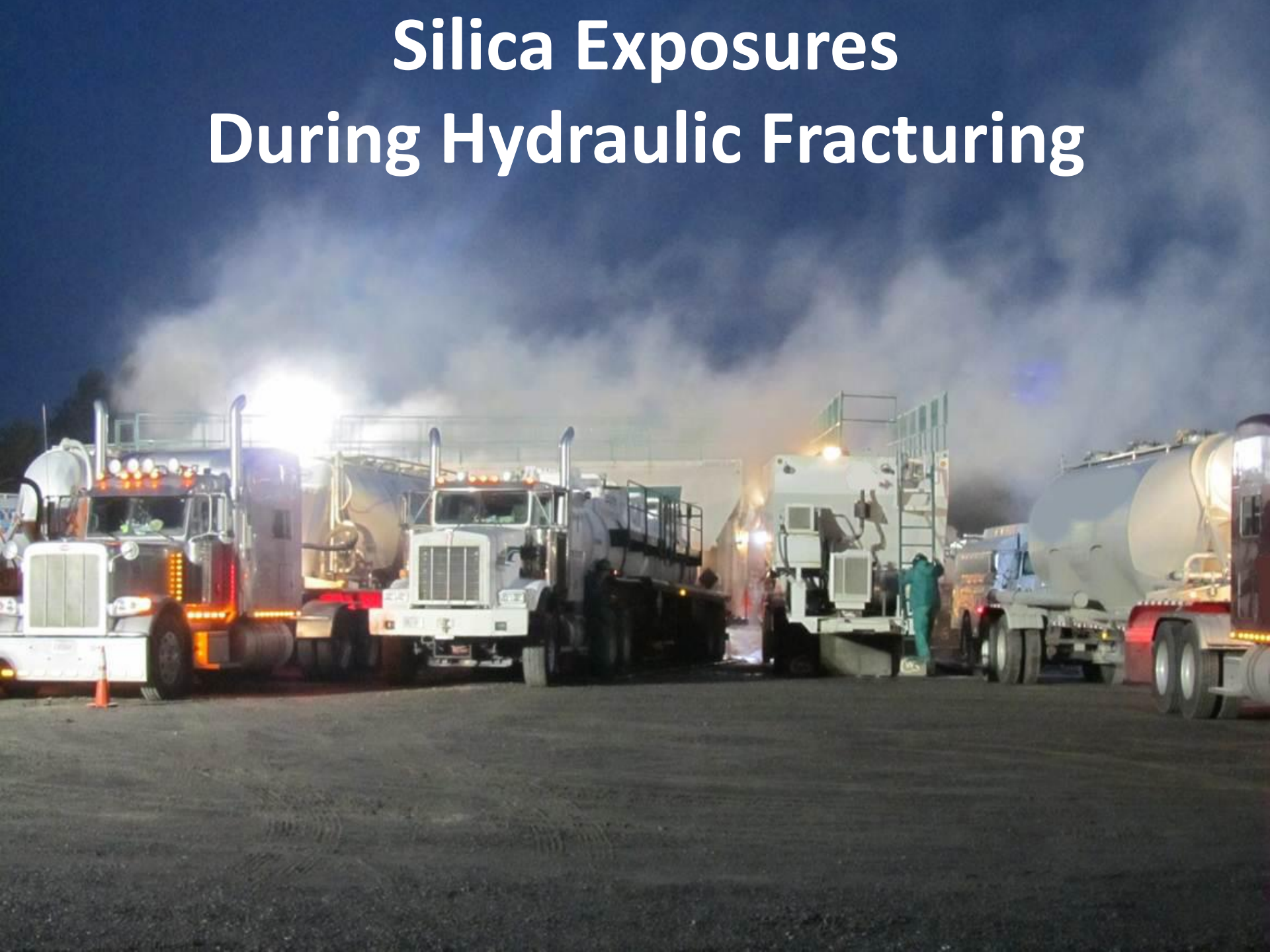
Source: EIA, Annual Energy Outlook 2013 Early Release

U.S. tight oil production leads a growth in domestic production of 2.6 million barrels per day between 2008 and 2019



Source: EIA, Annual Energy Outlook 2013 Early Release and Short-Term Energy Outlook, February 2013

Silica Exposures During Hydraulic Fracturing



OSHA/NIOSH Hazard Alert

http://www.osha.gov/dts/hazardalerts/hydraulic_frac_hazard_alert.html

OSHA•NIOSH

HAZARD ALERT

Worker Exposure to Silica during Hydraulic Fracturing

The National Institute for Occupational Safety and Health (NIOSH) identified exposure to airborne silica as a health hazard to workers conducting some hydraulic fracturing operations during recent field studies.

Sharing the Fields

- Monterey Shale is now being targeted for fracking.
  - The shale is a 1,750-square-mile area that may contain as much as 15 billion barrels of crude oil.
  - It also happens to rest below a sizable portion of California farmland.
- Increasing concerns
  - Groundwater pollution
  - Silica/Chemicals
  - Waste water backflow
- SB-4 (9/20/2013)

SB-4—Some Provisions

- Fracking permit moratorium when a required independent scientific study is completed;
- Regional groundwater monitoring in the vicinity of oil and gas fields;
  - The State Water Resources Control Board (SWRCB) to develop model criteria with outside input;
  - The SWRCB to perform the monitoring in high priority areas
  - Groundwater monitoring be added to the well stimulation treatment permit requirement;
- The state to complete a statewide environmental impact report (EIR);
- The ingredient list of trade secret chemical additives be disclosed; and
- The advance neighbor notification requirement be shifted to a third party from the well owner, and that tenants be notified.

Thank You for Your Attention!

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