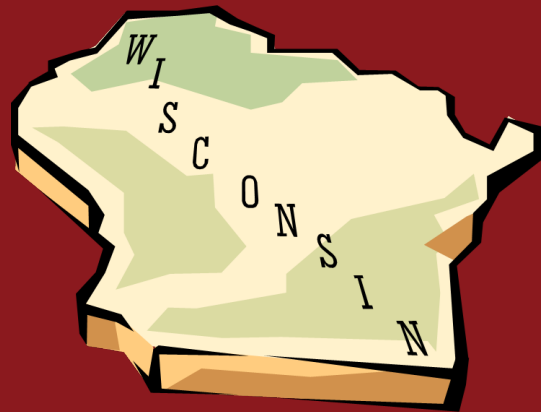
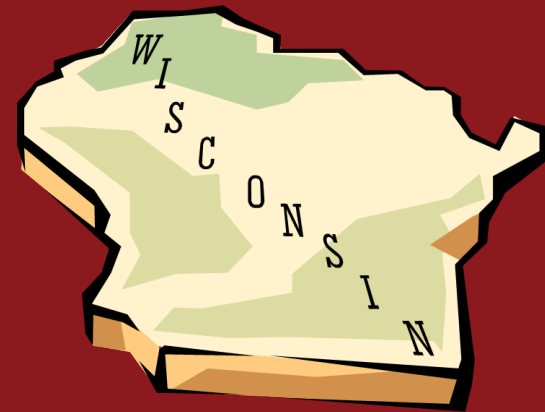


# Population Projections and Practicalities



David Egan-Robertson  
Demographer  
Applied Population Laboratory  
Demographic Techniques I  
December 2018





# About the Applied Population Lab

- **Clearinghouse for Demographic Data and Products**
  - Census State Data Center & UWEx roles
- **Applied Work**
  - Mapping
  - Regional Profiles
- **Facilitation of data and informational resources**
  - Training
  - Data “translation:” partnership with WisContext
- **Local area estimates and projections**
  - School District Enrollment Projection Program
- **Our websites**
  - Main home page: [www.apl.wisc.edu](http://www.apl.wisc.edu)
  - Data access page: [www.getfacts.wisc.edu](http://www.getfacts.wisc.edu)



# Applied Demography

**Slate**

## Documenting the Undocumented

How do you count unauthorized immigrants?

By Brian Palmer | Posted Wednesday, Jan. 23, 2013



Activists rally for immigration reform in front of the White House. Photo by Mark Wilson/Getty Images

**The New York Times**

## Life Spans Shrink for Least-Educated Whites in the U.S.

By SABRINA TAVERNISE  
Published: September 20, 2012

For generations of America, life spans have been longer than their parents'. But this enduring trend has reversed for whites, an increasingly troubling sign that the health of the nation has fallen by four years since 1980.



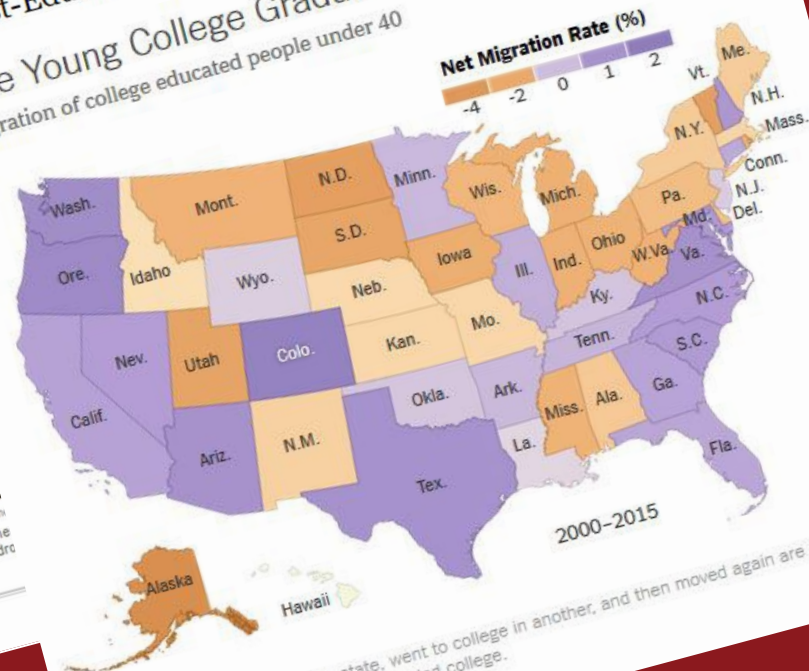
Enlarge This Image

John Gress for The New York Times

S. Jay Olshansky, the lead researcher in a study that showed a life span drop based on education.

## Where Young College Graduates Tend to Move

Net migration of college educated people under 40



# Population Projections and Policy

## THE WISCONSIN TAXPAYER

Vol. 82, Number 3 | March 2014

### The Impending Storm

Changing Demographics and Wisconsin's Economy

## A Perfect Storm

Declining enrollment, increasing student poverty and rising operational costs are putting pressures on rural schools | Sarah Kemp

In Wisconsin, aging population and declining births have meant a decrease in rural school district enrollment.

In addition to declining enrollment, poverty increased during the recession of the late 2000s, especially among children. This increase is evident by the increasing number of students qualifying for free or reduced-price lunch.

Meanwhile, fixed costs like transportation and food services have increased. Many rural school districts responded by cutting variable costs including instruction and

support staff and by delaying facility improvements.

Faced with these challenges, rural school districts have been placed in a perilous situation. As a researcher at the University of Wisconsin-Madison's Applied Population Laboratory, I have been exploring these trends including enrollment decline, increasing costs and rising poverty, and their effects on rural schools.

**Enrollment, Costs, and Poverty**  
Of the trends mentioned above, rural schools have been hit especially hard.

The study analyzed data from the Department of Public Instruction (DPI) for the 2008-09 and the 2013-14 school years and focused on three data sources of fundamental concern: change in enrollment, change in costs per pupil, and change in free and reduced-price lunch eligibility.

Over this five-year period, total statewide student enrollment declined by 8.43 percent. However, enrollment change has affected rural, town, urban and suburban districts differently. Enrollment increased for 65 percent of urban districts,

Faced with multiple challenges, rural school districts have been placed in a perilous situation.





# The Future is... Qualitative?



# The Future is... Qualitative

BROOKINGS

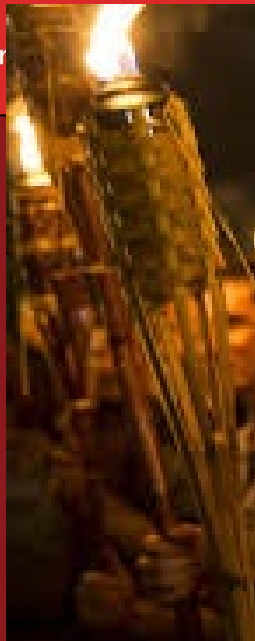


THE AVENUE

## The US will become 'minority white' in 2045, Census projects

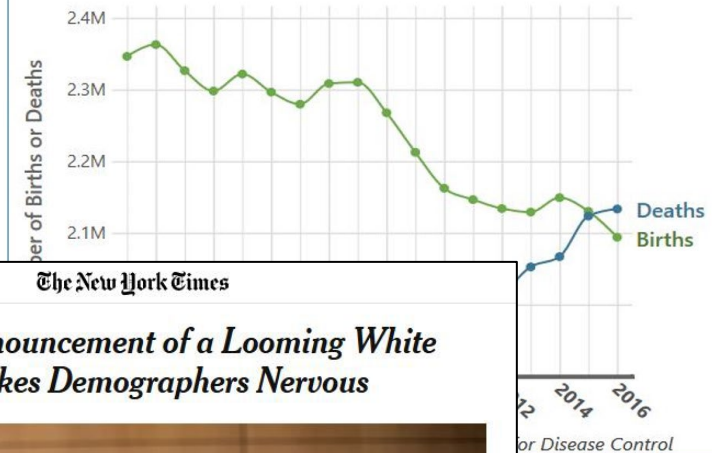
Youthful minorities are the engine of growth

William H. Frey · Wednesday, March 14, 2018



## White Deaths Exceed Births in a Majority of U.S. States

Figure 1: Number of Births and Deaths Among Whites in the United States, 1999 to 2016



The New York Times

## Why the Announcement of a Looming White Minority Makes Demographers Nervous



"People went crazy," said Dowell Myers, a demographer at the University of Southern California, of the 2008 projection that non-Hispanic whites would drop below half the population by 2042.





# Population Projections: Past Experience, Future Patterns

**More Science, Less Art**

**More Art, Less Science**



# Population Projections: Assumptions at Each Step

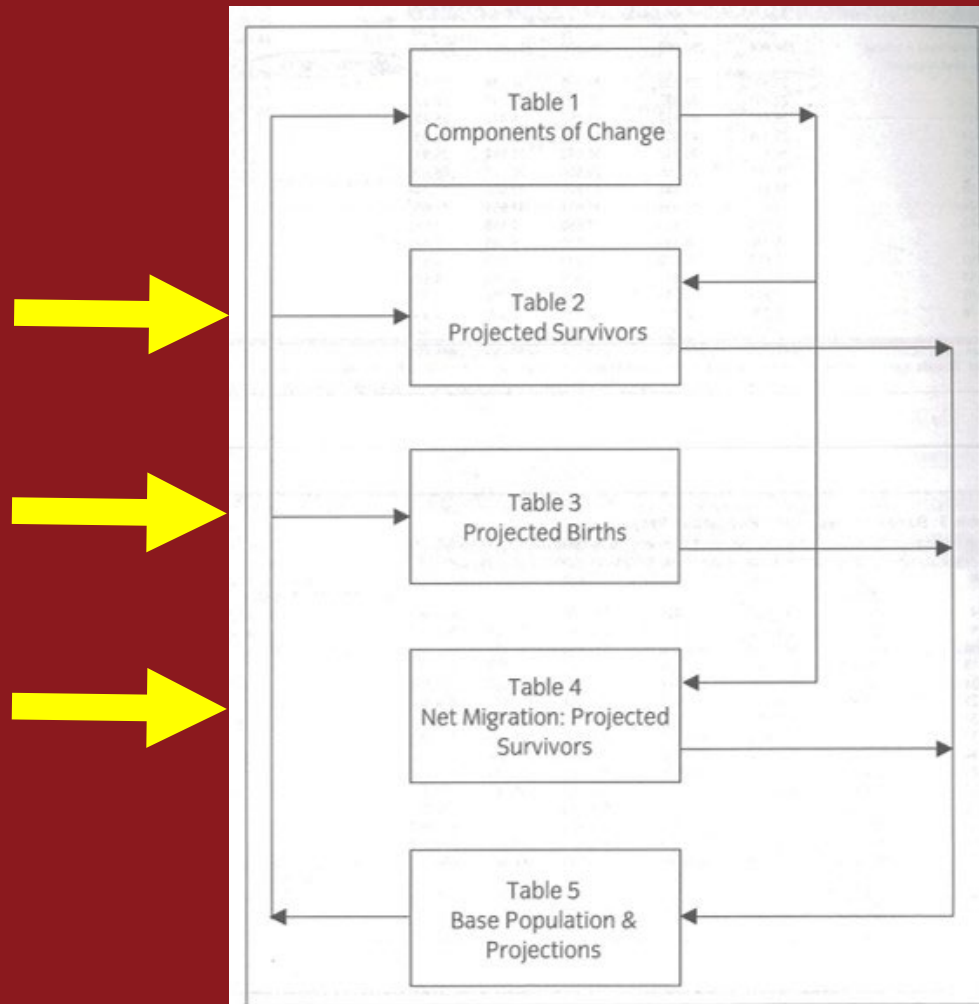


Figure 12.2 Flow chart for cohort component projections.

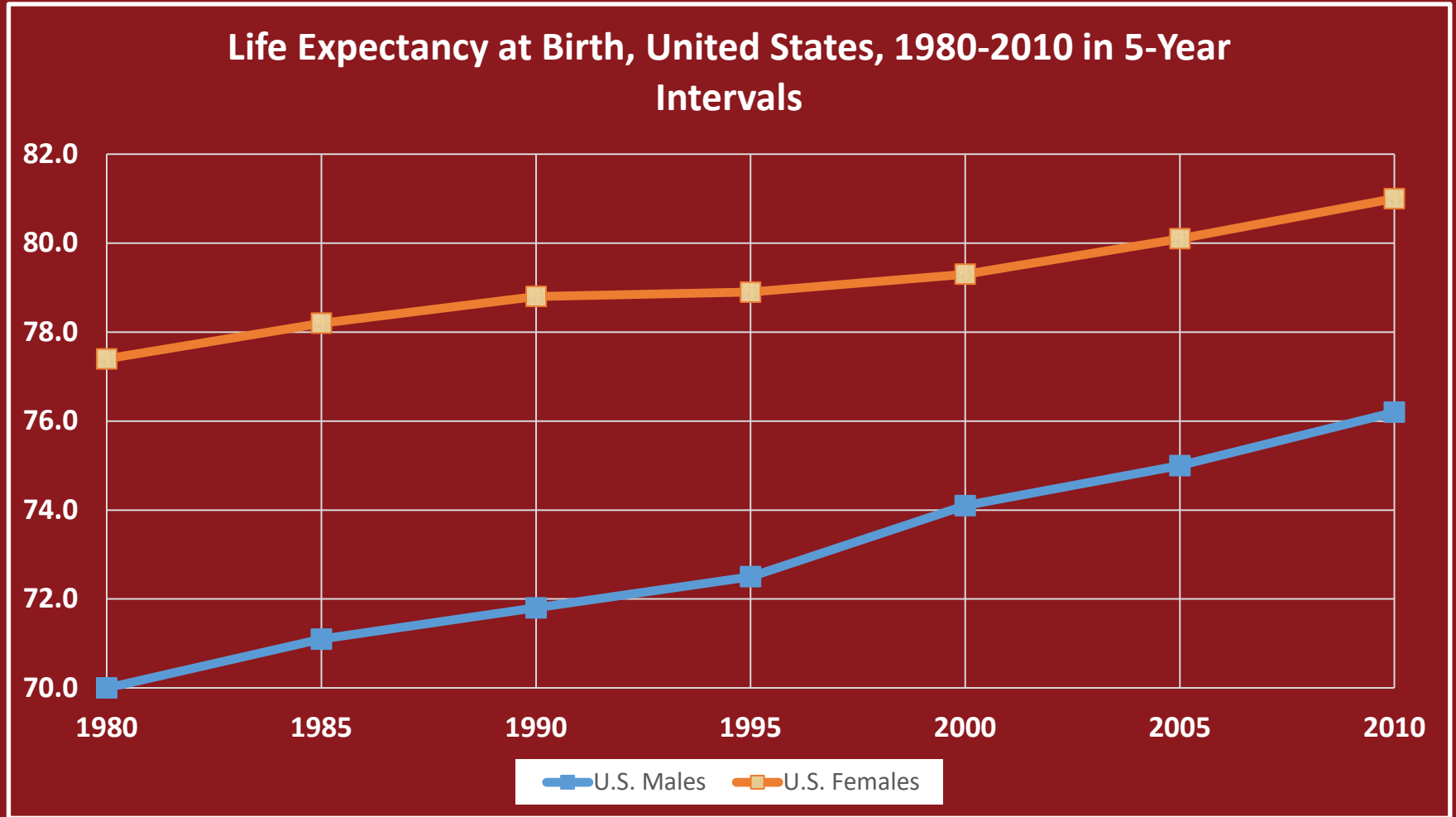






# Population Projections: Survival Rates

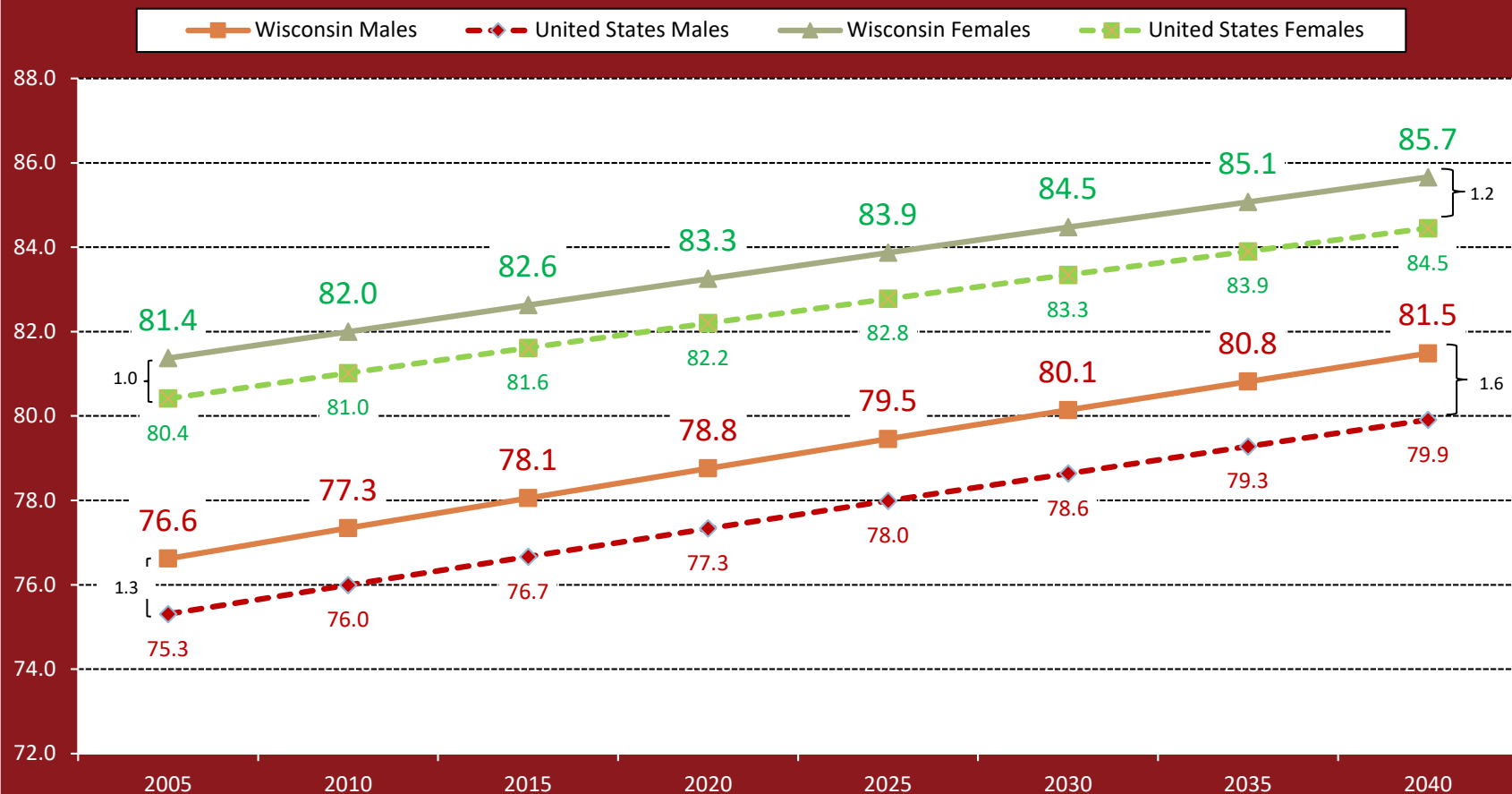
## Past: Life Expectancy (U.S.)



# Vintage 2013 Projections: Survival Rates

## Life Expectancy (Wisconsin and U.S.)

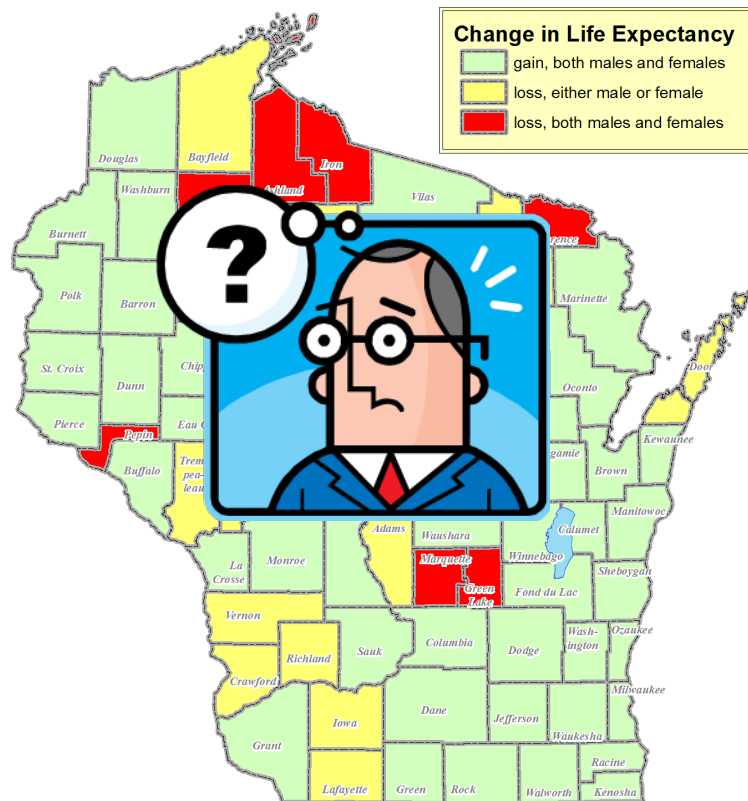
Wisconsin's Projected Life Expectancies at Birth, 2005-2040, Males and Females, Compared to U.S. Projected Life Expectancies



# Vintage 2013 Projections: Survival Rates

## The Past: Life Expectancy Change (County Level)

Change in Life Expectancy, 1995 to 2005, Wisconsin Counties



The New York Times

Life Spans Shrink for Least-Educated Whites in the U.S.

By SABRINA TAVERNISE

The Washington Post

Health & Science

A group of middle-aged whites in the U.S. is dying at a startling rate

By Lenny Bernstein and Joel Achenbach November 2

A large segment of white middle-aged Americans has suffered a startling rise in its death rate since 1999, according to new statistics published Monday that shows a sharp reversal in decades of progress toward longer lives.

The New York Times

Suicide, at 50-Year Peak, Pushes Down US Life Expectancy

By The Associated Press

Nov. 29, 2018



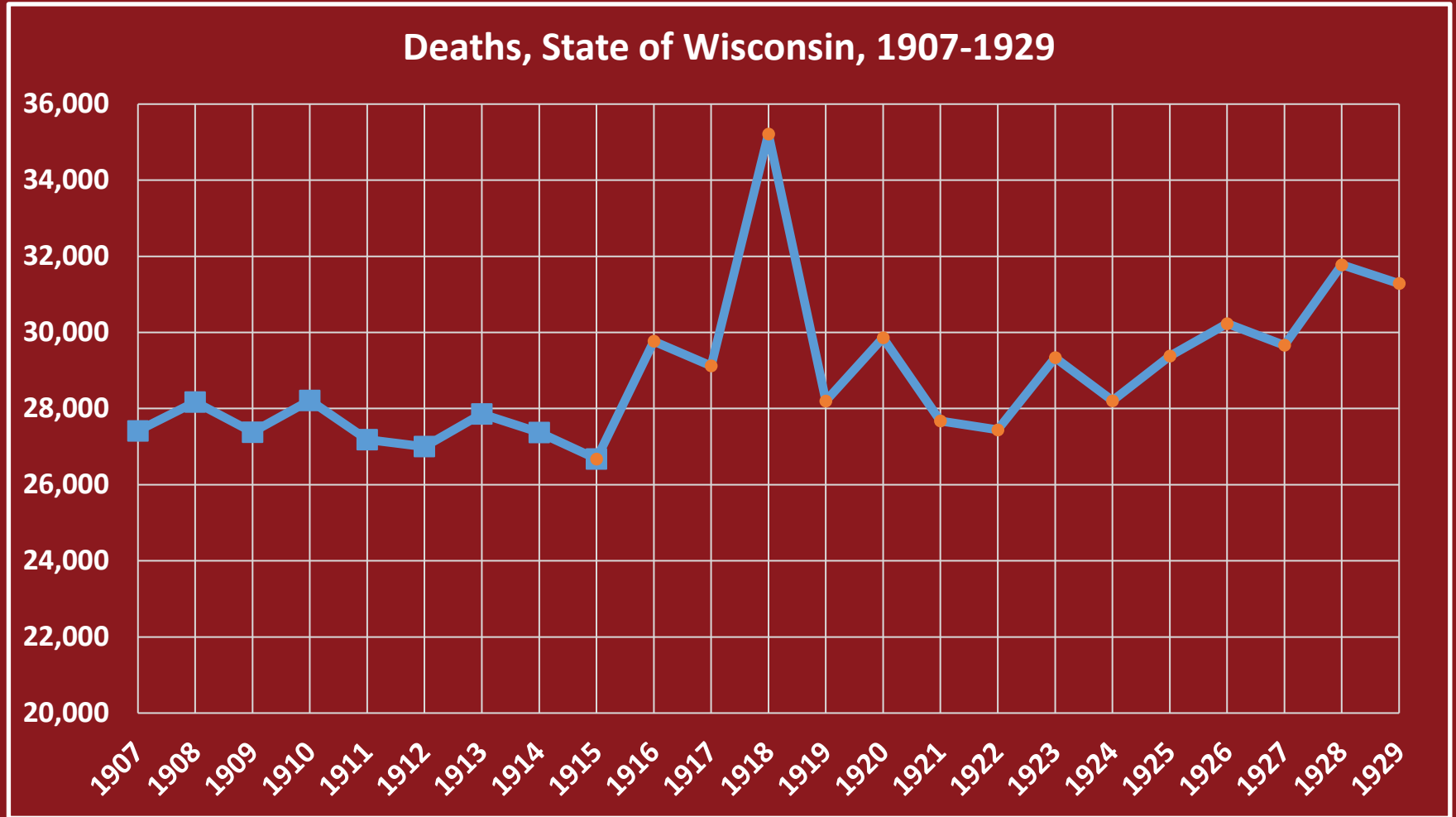
NEW YORK — Suicides and drug overdoses pushed up U.S. deaths last year, and drove a continuing decline in how long Americans are expected to live.

Overall, there were more than 2.8 million U.S. deaths in 2017, or nearly 70,000 more than the previous year, the Centers for Disease Control and Prevention said Thursday. It was the most deaths in a single year since the government began counting more than a century ago.



# Population Projections: Survival Rates

## Disruptive Events



# Population Projections: Assumptions at Each Step

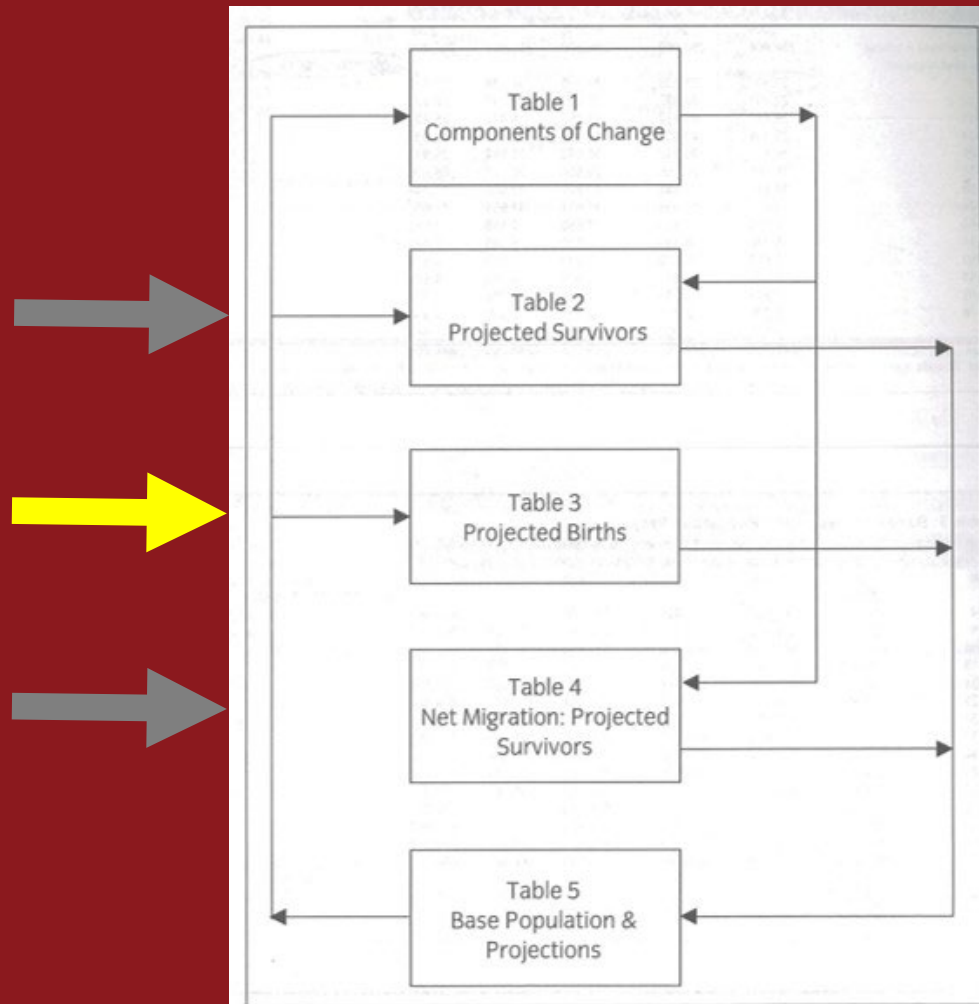


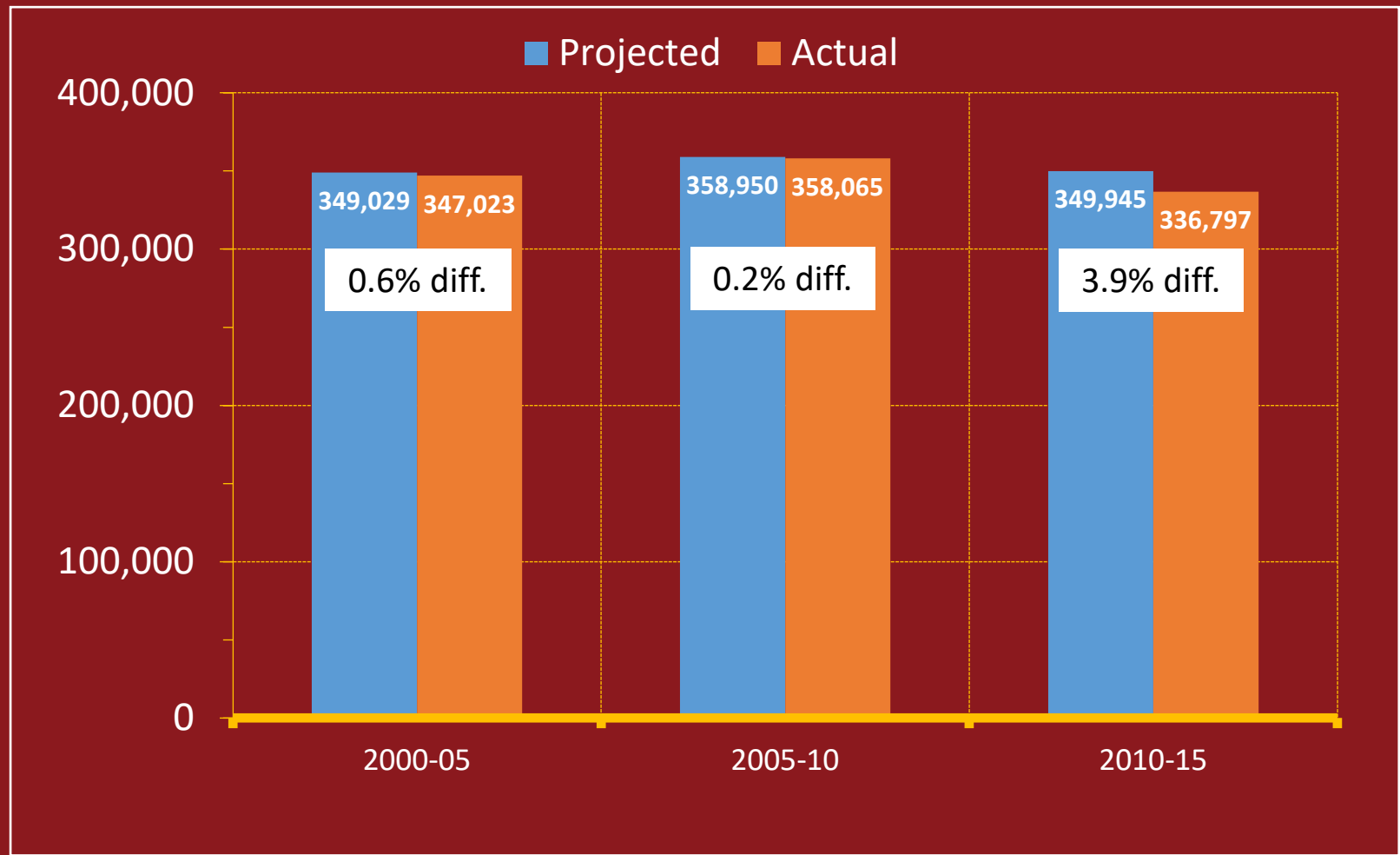
Figure 12.2 Flow chart for cohort component projections.





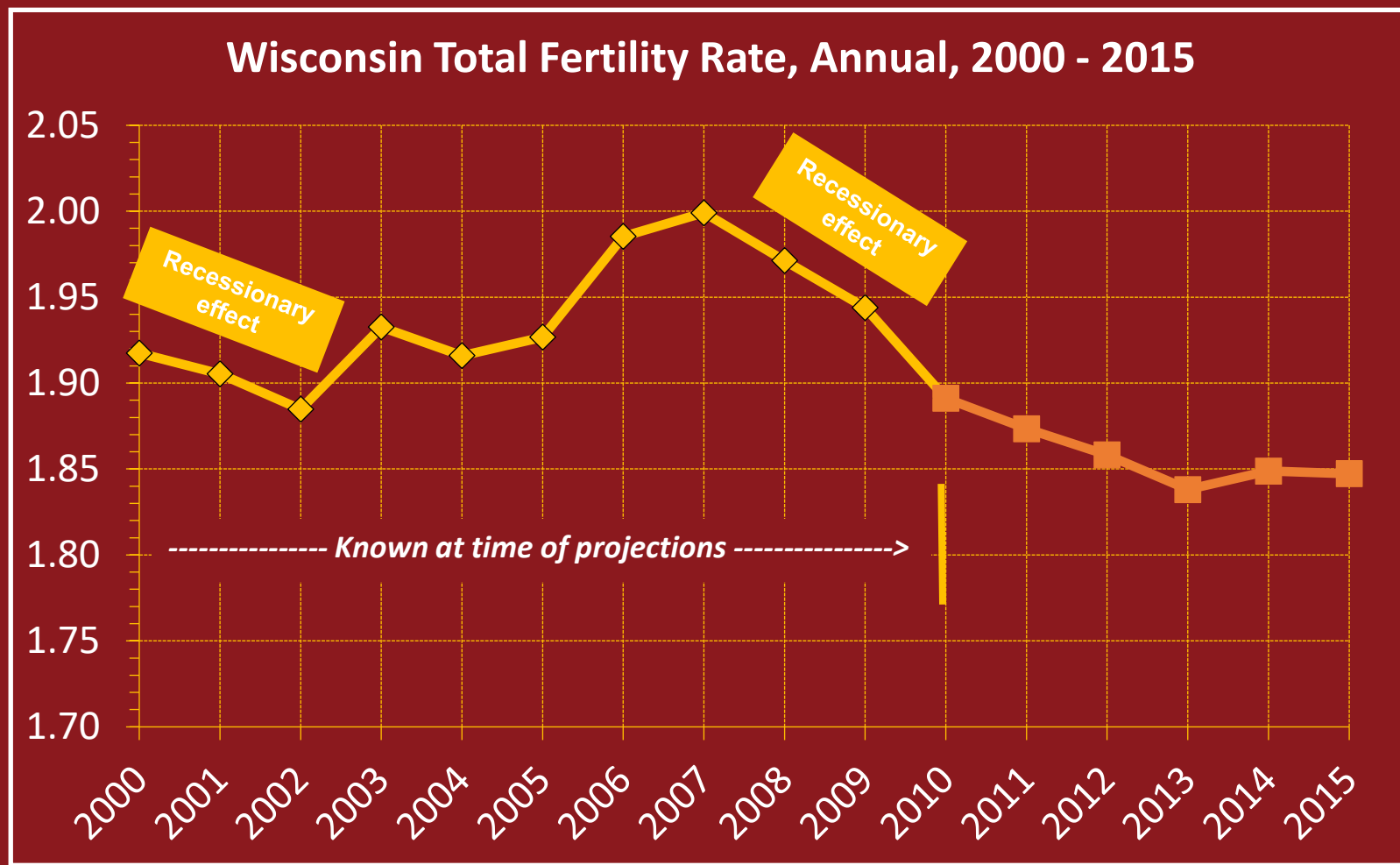
# Births in Wisconsin, Projected vs. Actual

Births in 5-Year Periods, 2000-05, 2005-10, 2010-15



# Vintage 2013 Projections: Fertility

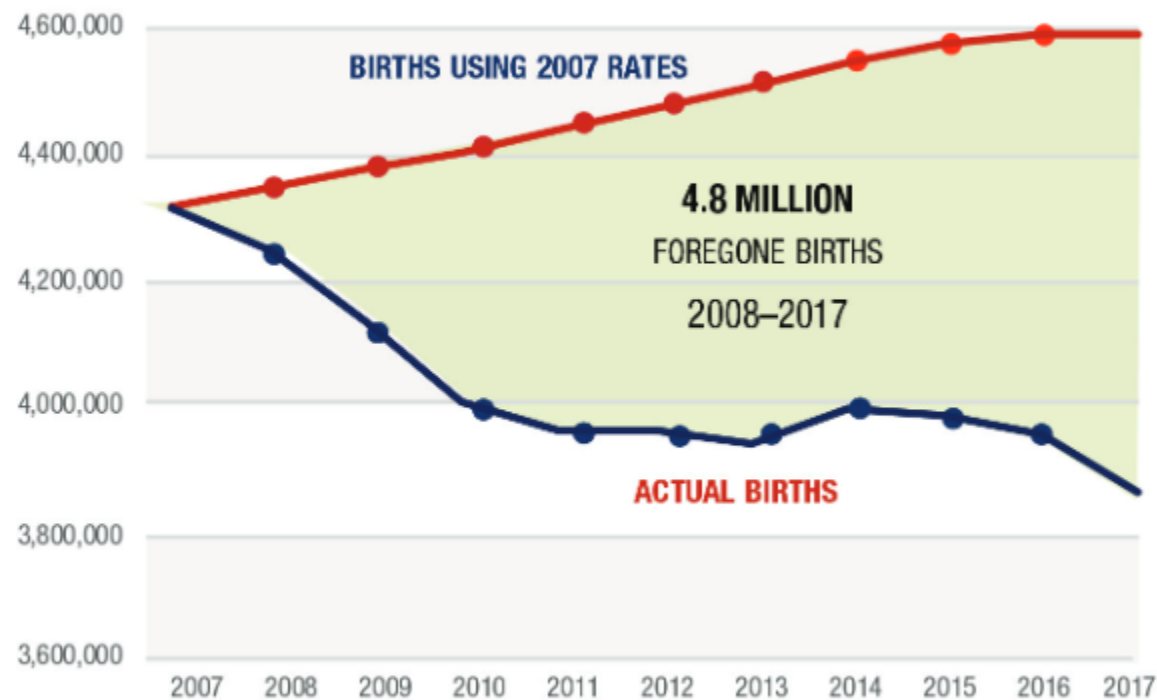
## The Past: Fertility Rates (Wisconsin)



# Fertility Decline in the U.S.

## Will the Fertility Rate Recover?

ACTUAL BIRTHS COMPARED TO BIRTHS USING 2007 BIRTH RATES, 2007 TO 2017



**Analysis:** K.M. Johnson, Carsey School, University of New Hampshire

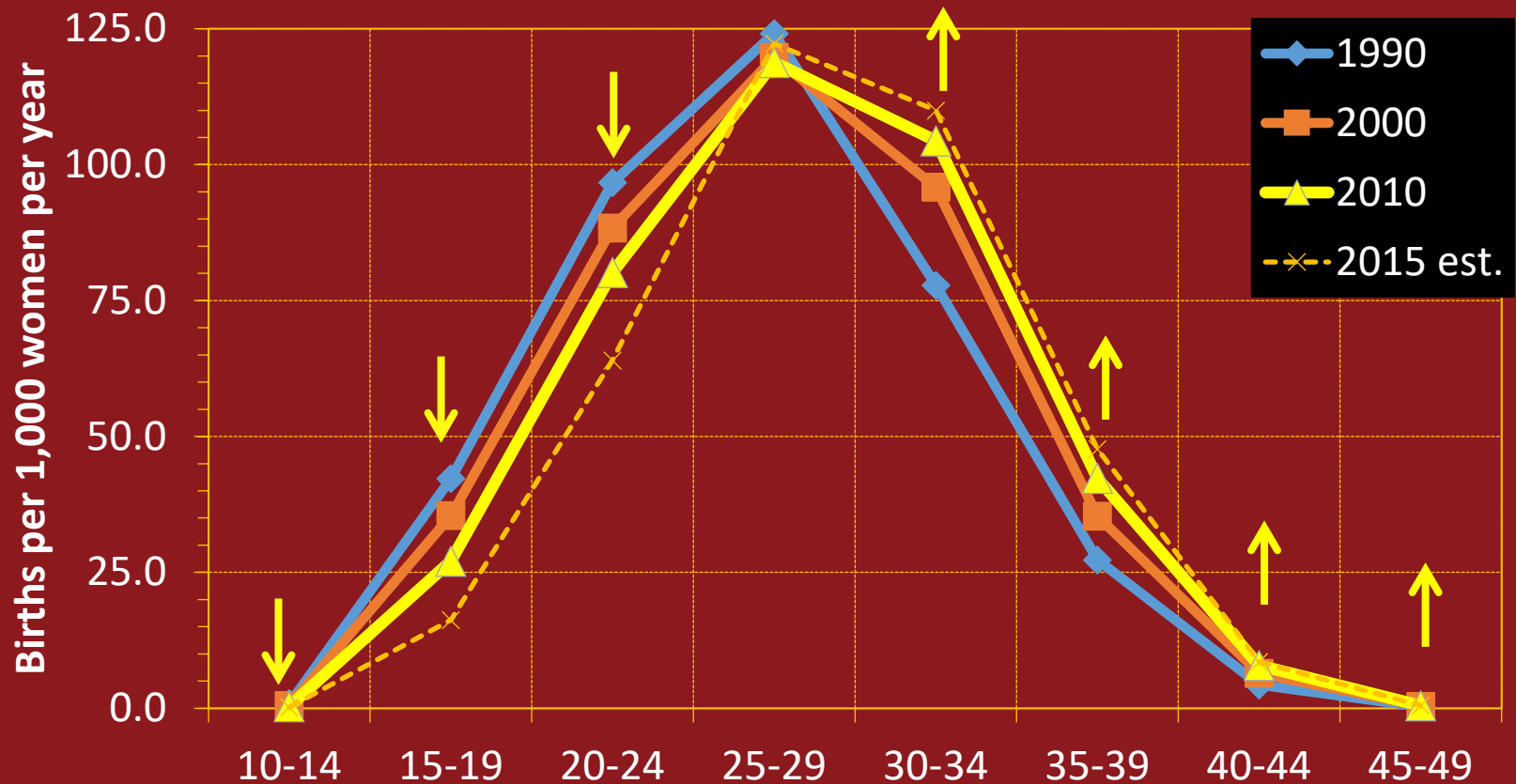
**Data:** National Center for Health Statistics and U.S. Census Bureau



# Vintage 2013 Projections: Fertility

## The Past: Rates (Wisconsin)

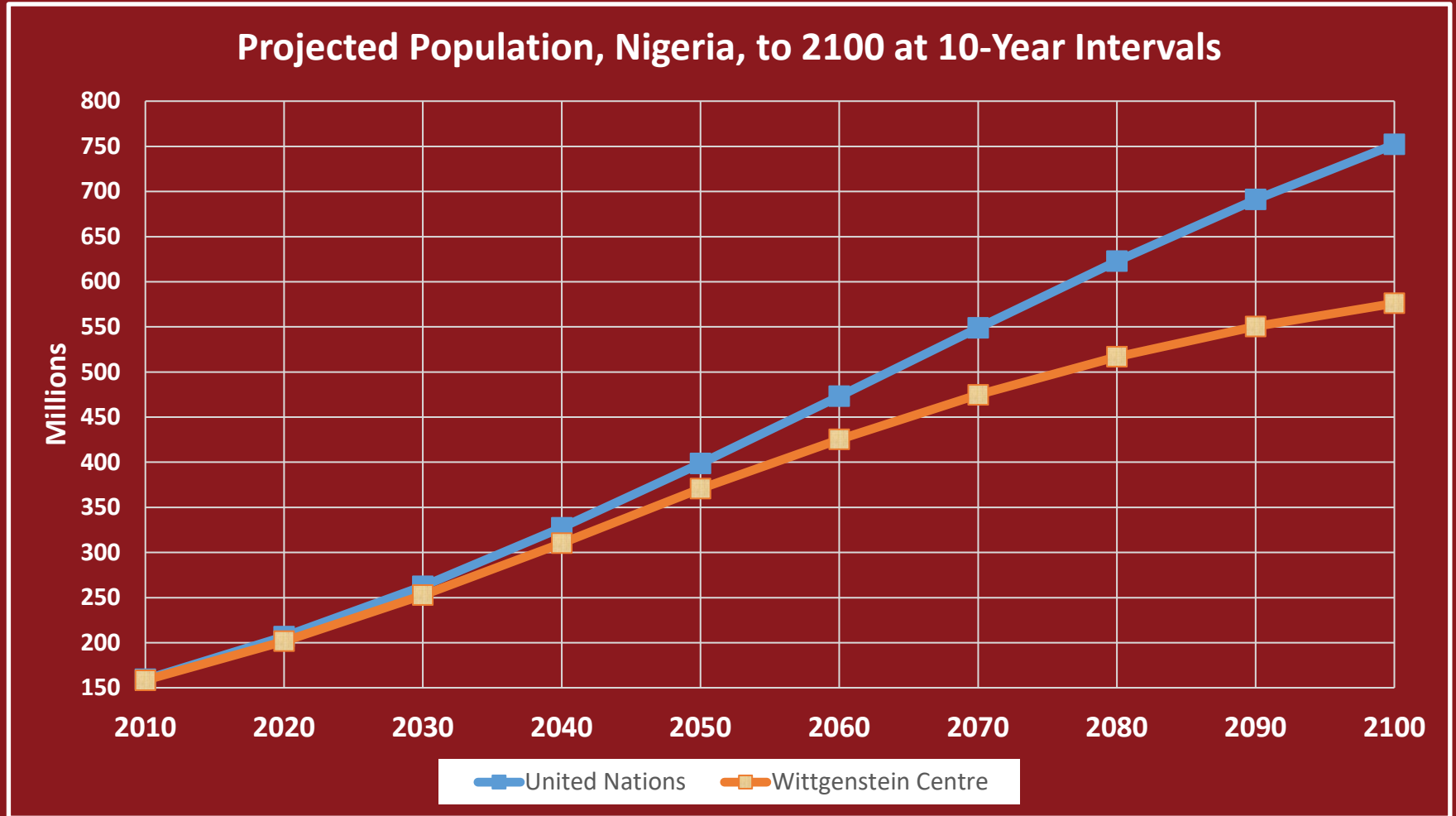
Wisconsin Age-Specific Fertility Rates, Censal Years, 1990 -2010 & 2015 Estimated





# Population Projections: Nigeria

## Different Fertility Assumptions = Big Differences

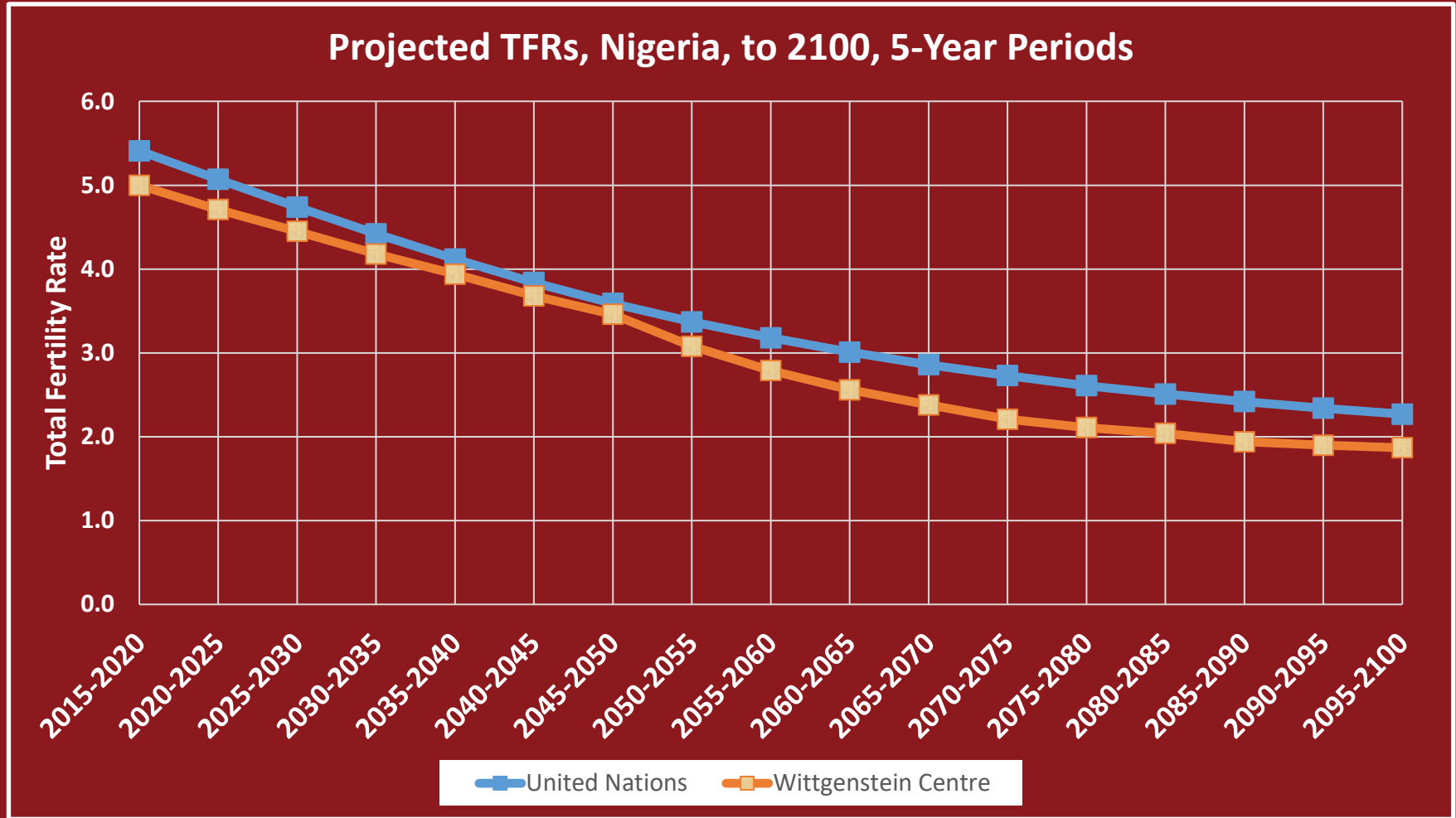






# Population Projections: Nigeria

## Different Fertility Assumptions = Big Differences



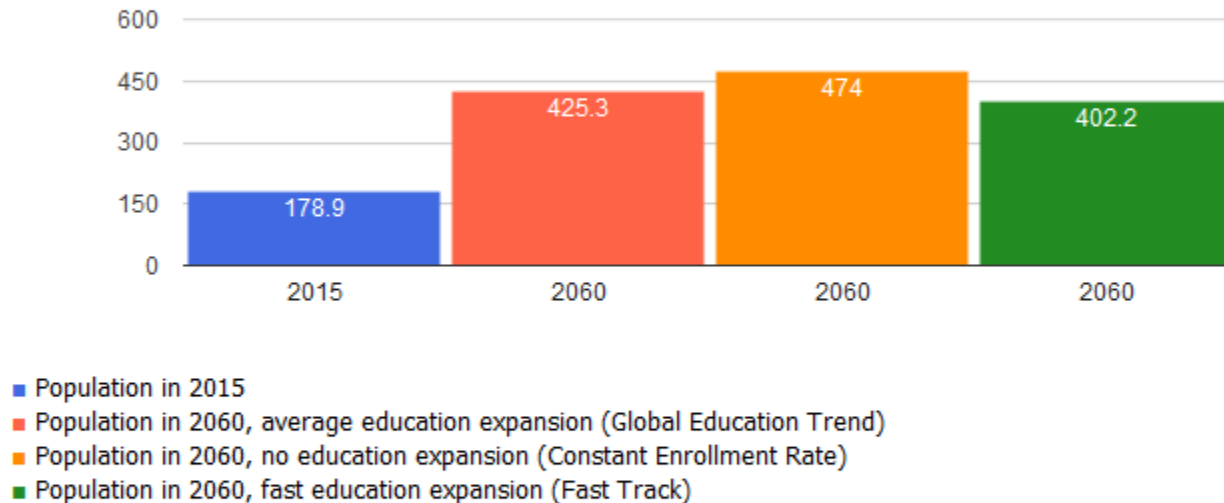


# Population Projections: Nigeria

## Different Fertility Assumptions = Big Differences

### Nigeria

Population (millions)



[More Information](#)

**Note:** Three scenarios of possible future development are presented here (1) the Global Education Trend (GET) or the middle-of-the-road scenario is based on historical educational trends and implies sustained effort in increasing education attainment; (2) the Constant Enrollment Rates (CER) scenario illustrates stagnation of progress, with constant school enrollment rates; (3) the Fast Track (FT) scenario assumes that all countries follow the path of the most rapid historical education expansion that was experienced in South Korea.



# Population Projections: Assumptions at Each Step

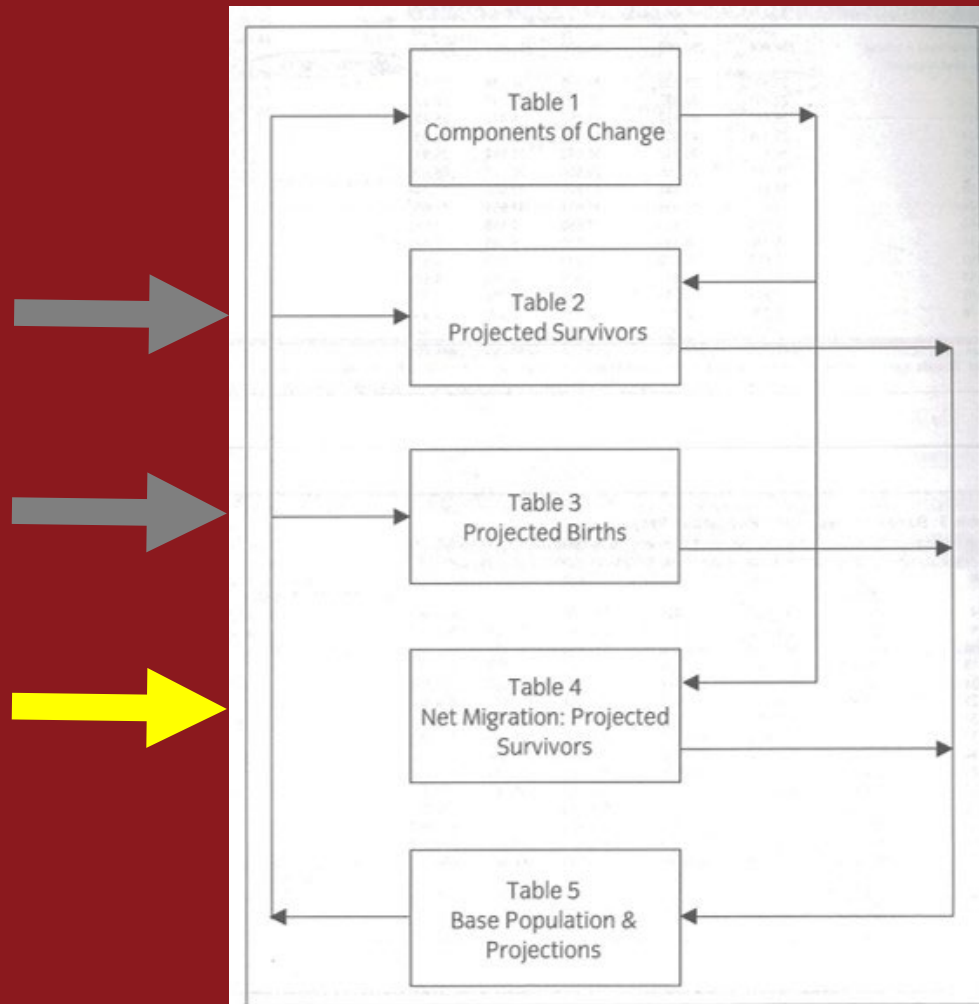


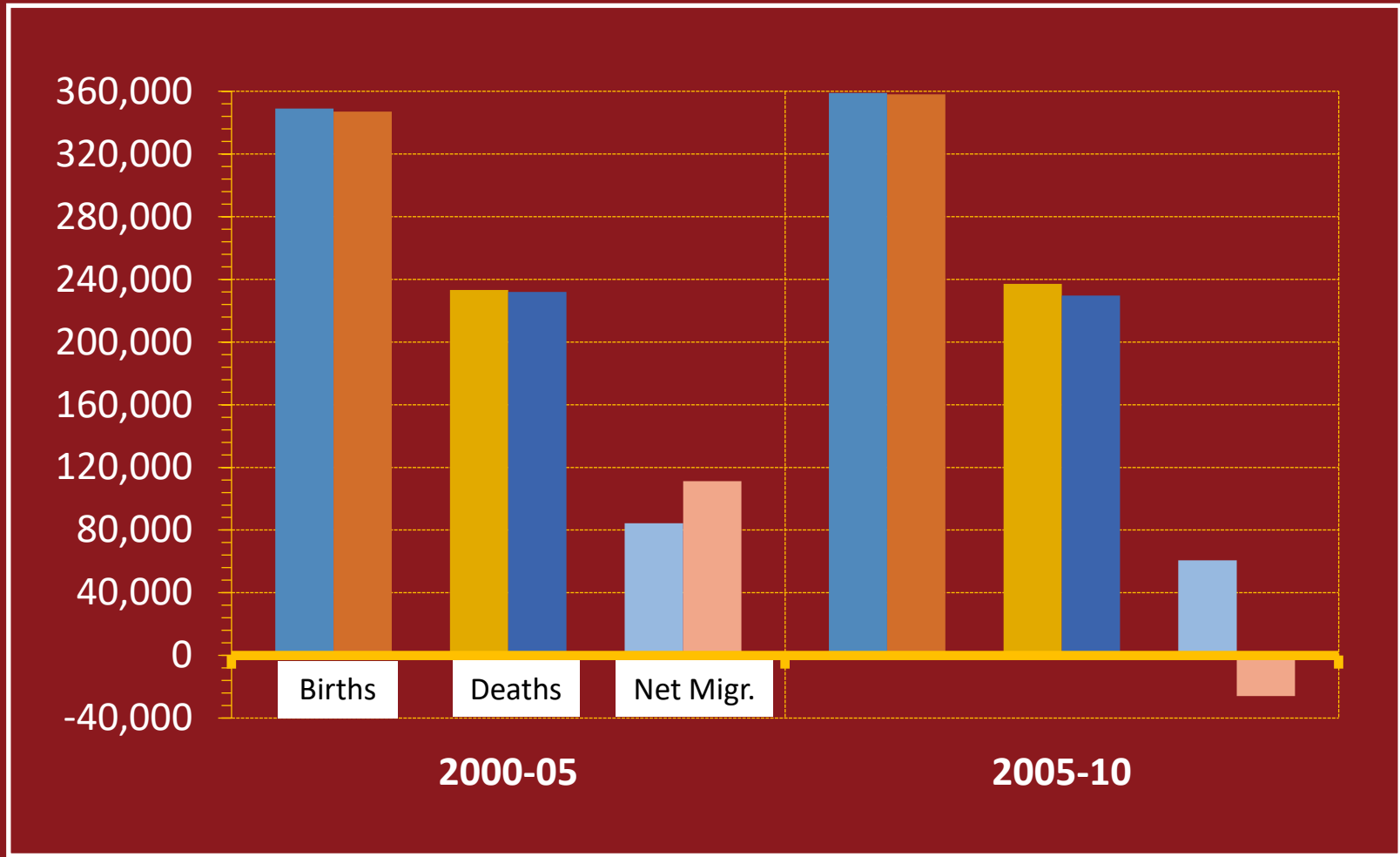
Figure 12.2 Flow chart for cohort component projections.





# Wisconsin Components of Change, Projected vs. Actual

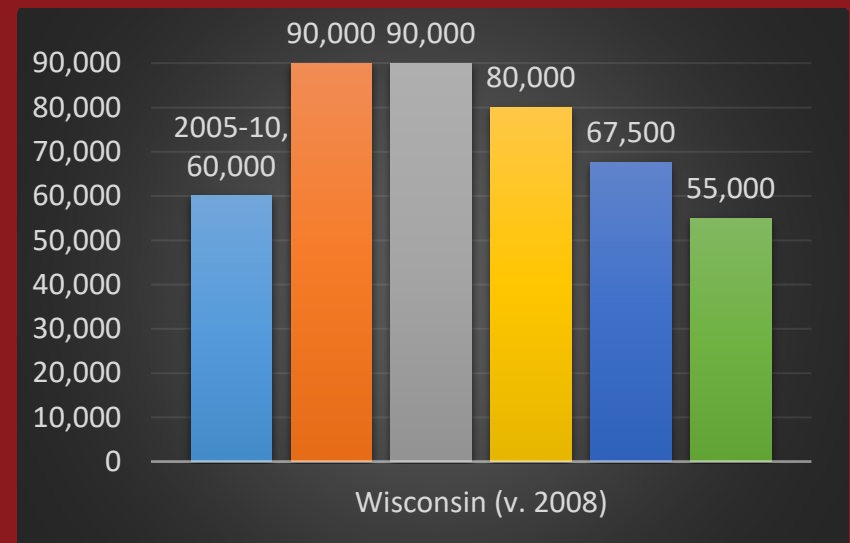
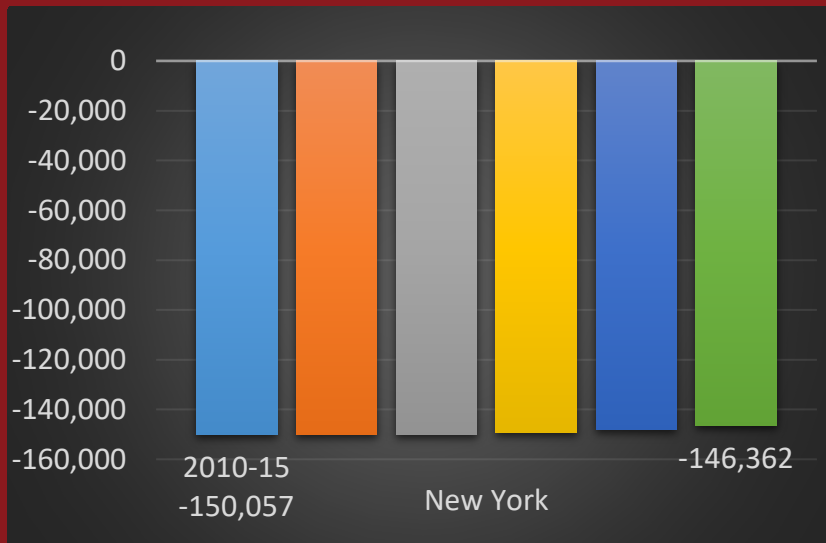
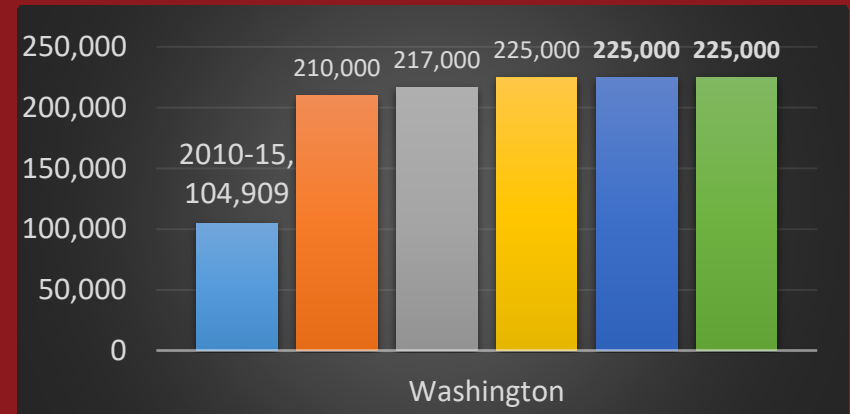
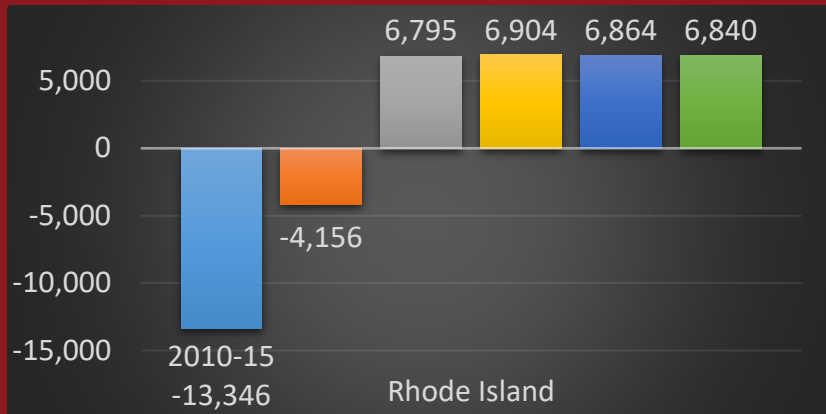
## 5-Year Periods, 2000-05 & 2005-10





# Population Projections: Net Migration

## “Hedge Your Bets” Method

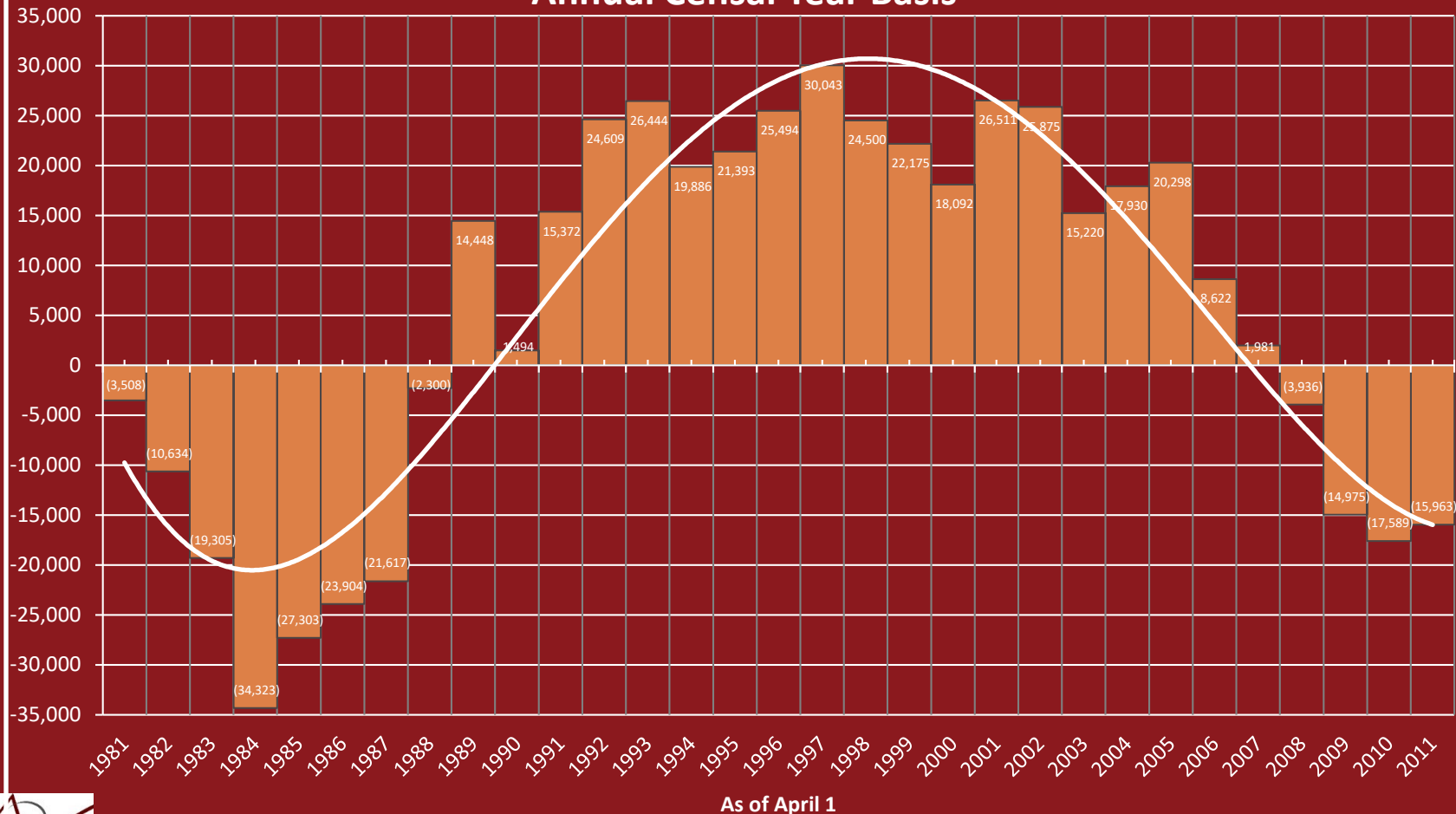




# Vintage 2013 Projections: Migration

## The Past: Net Migration by Year (Wisconsin)

Estimated Net Migration, Wisconsin, 4/1980 - 4/2011,  
Annual Censal Year Basis

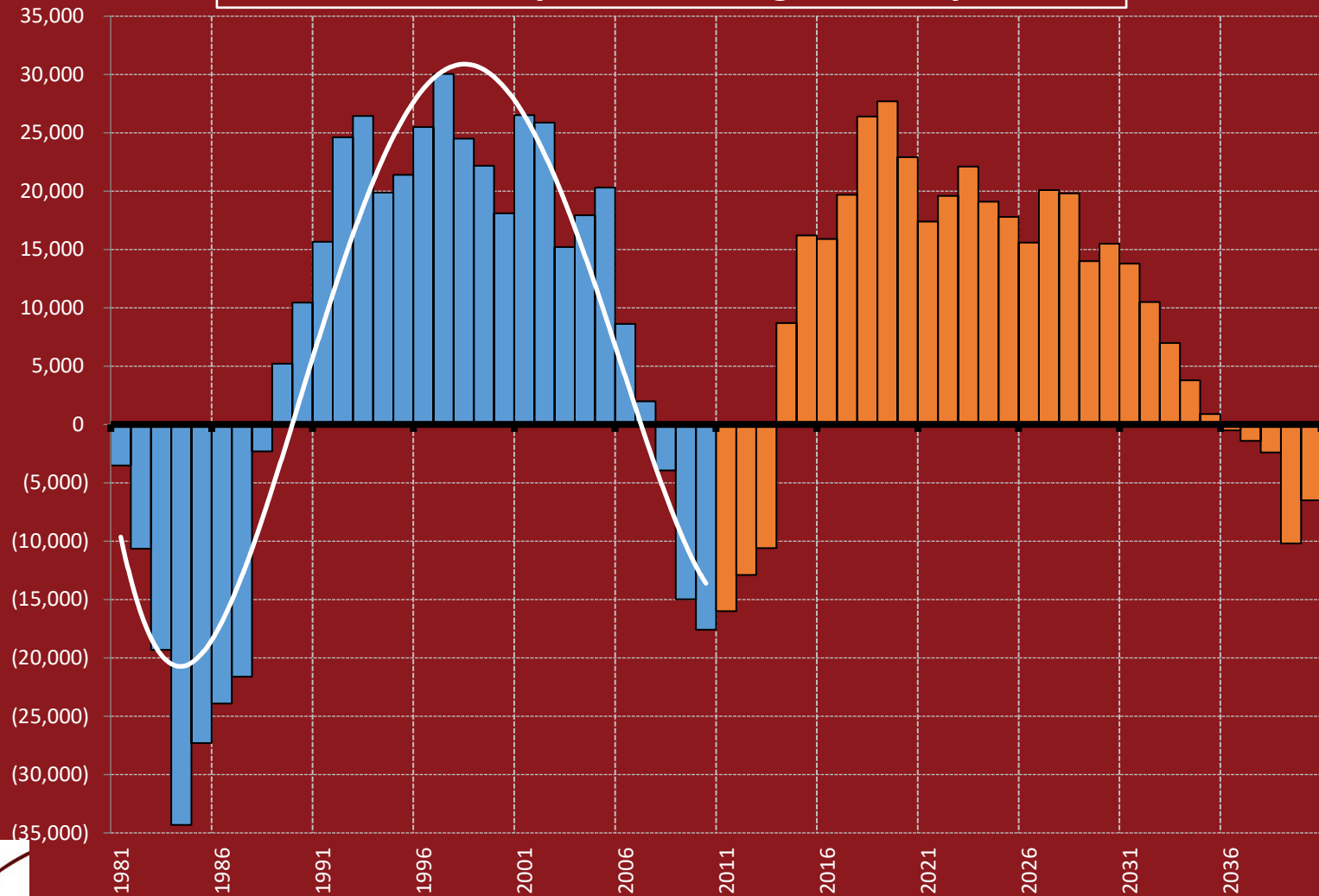




# Vintage 2013 Projections: Migration

## The Past and Future: Net Migration by Year (Wisconsin)

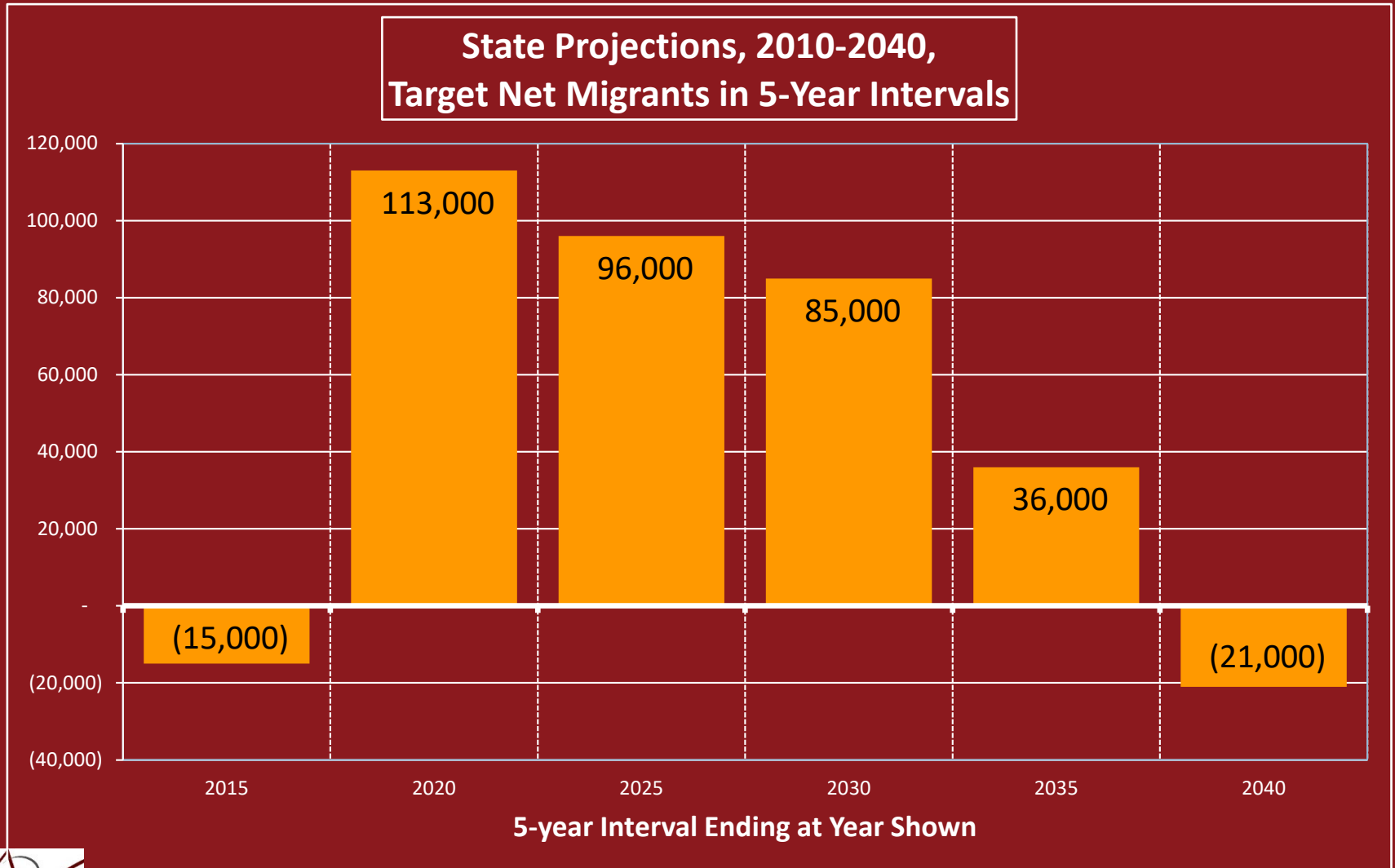
Estimated and Projected Net Migration, 1-year Basis





# Vintage 2013 Projections: Migration

## The Future: Net Migration by 5 Years (Wisconsin)

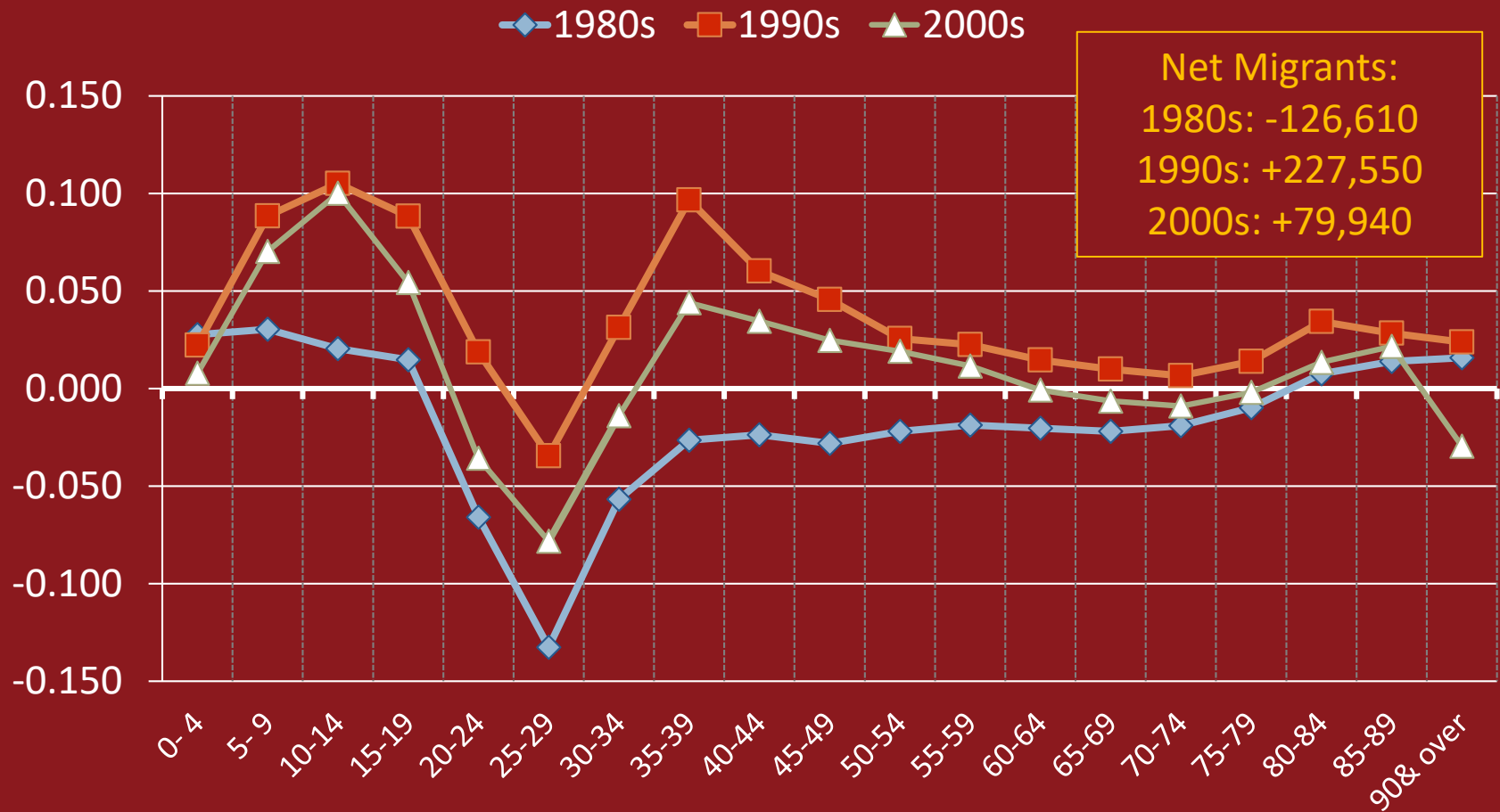




# Vintage 2013 Projections: Migration

## The Past: Net Migration by Age (Wisconsin)

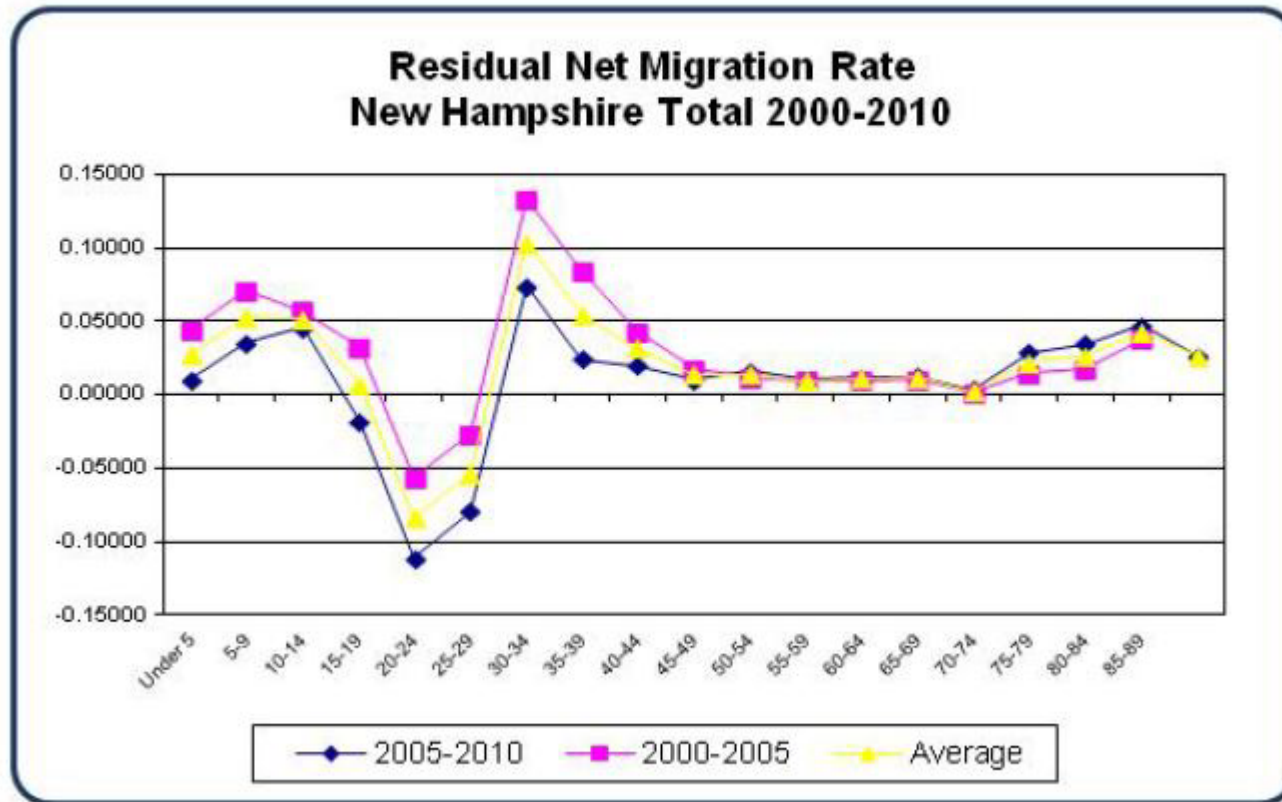
### Net Migration Rates by 5-year Age Groups



# Population Projections: Net Migration Signatures

## Net Migration by Age (New Hampshire)

Figure 2





# Population Projections and Policy

THE WISCONSIN  
**TAXPAYER**

Vol. 82, Number 3 | March 2014

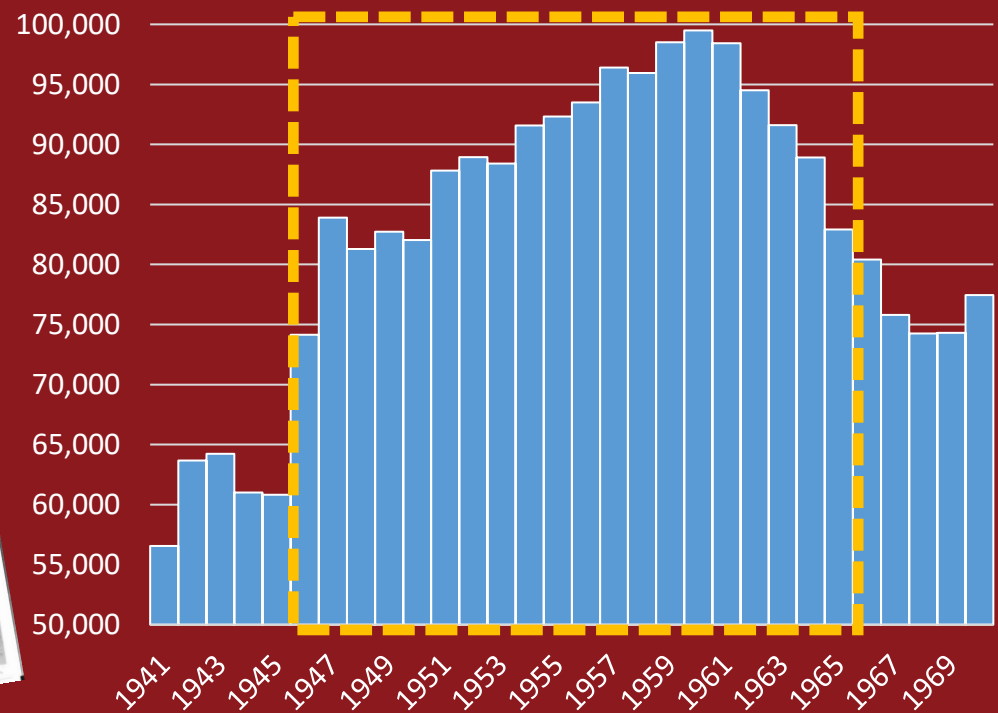
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Changing Democ



# Population Projections and Policy: Whither goest the Boomers?



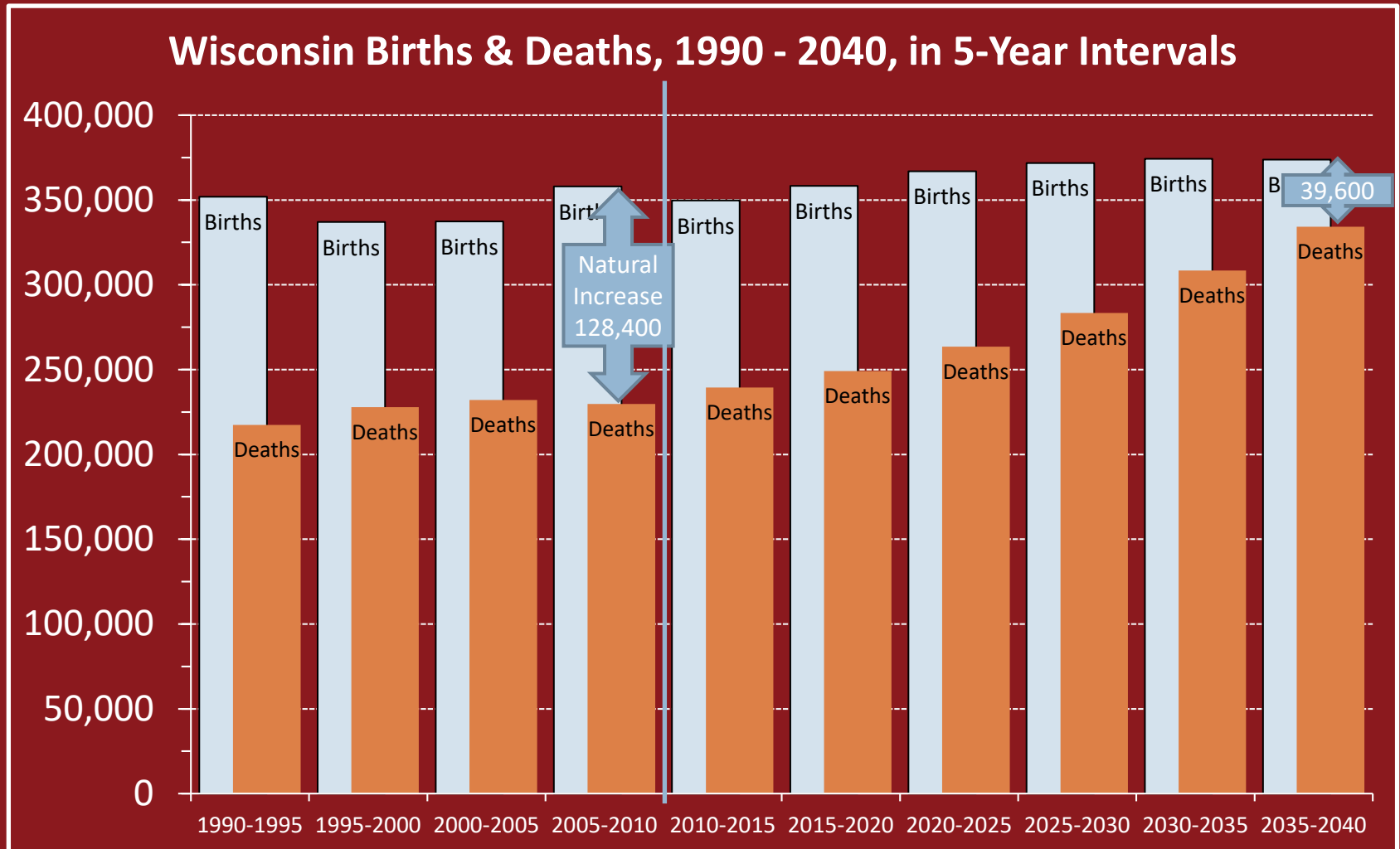
Births in Wisconsin, 1941-1970





# Elements of the “Impending Storm”

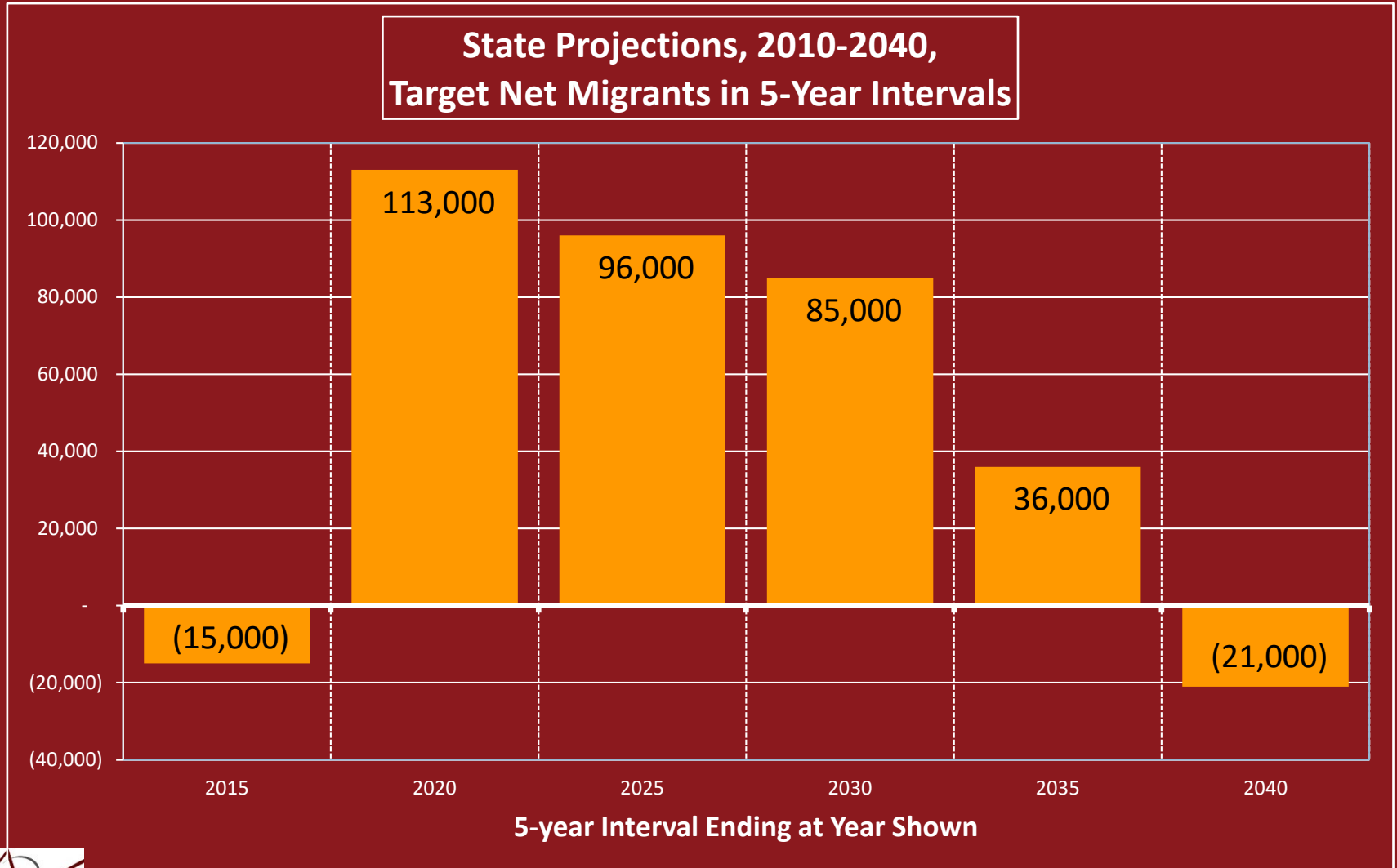
## The Future: Natural Increase (Wisconsin)





# Elements of the “Impending Storm”

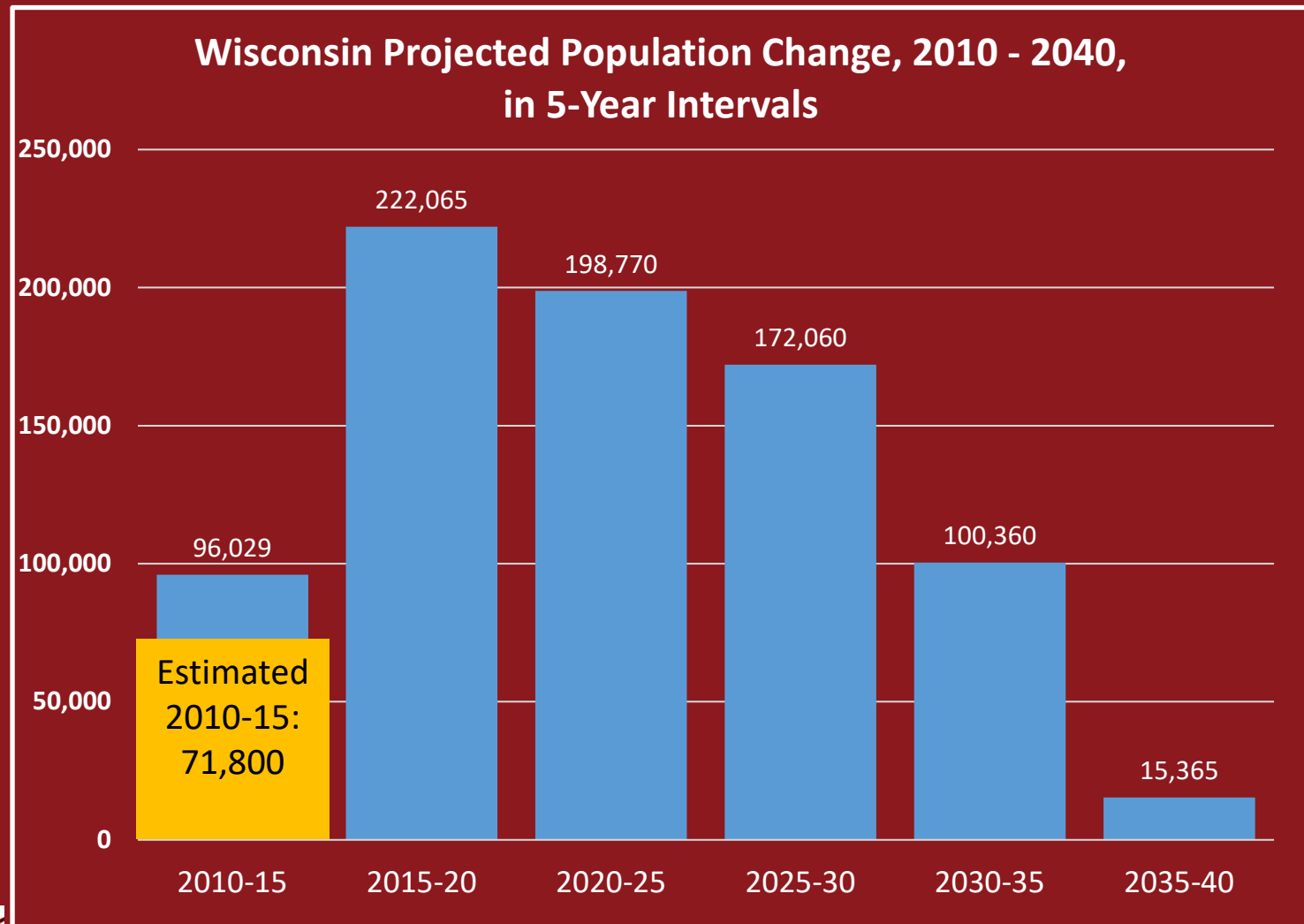
## The Future: Net Migration by 5 Years (Wisconsin)





# Elements of the “Impending Storm”

## The Future: Population Change (Wisconsin)

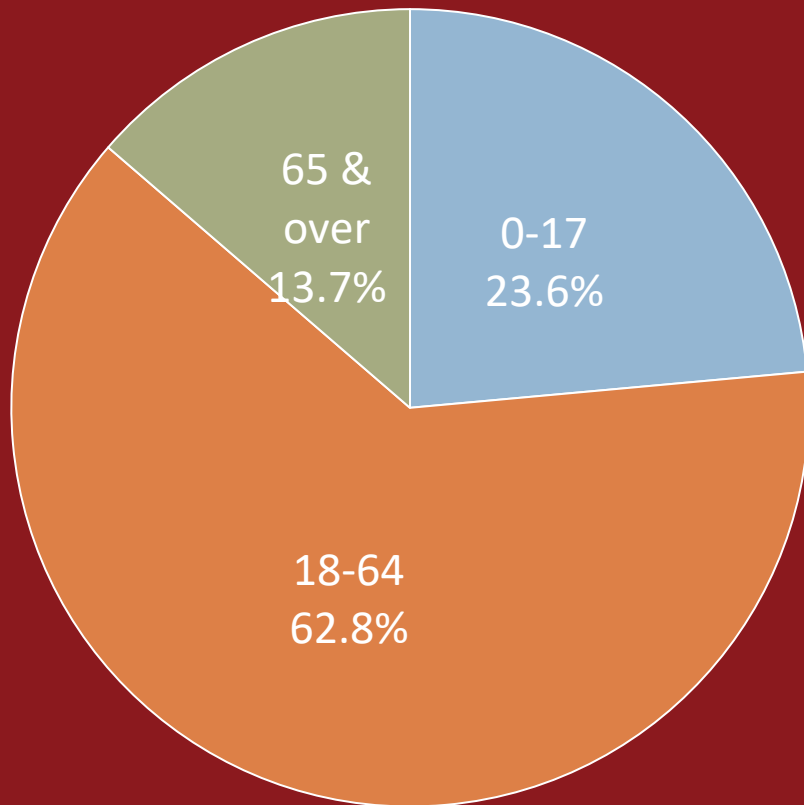




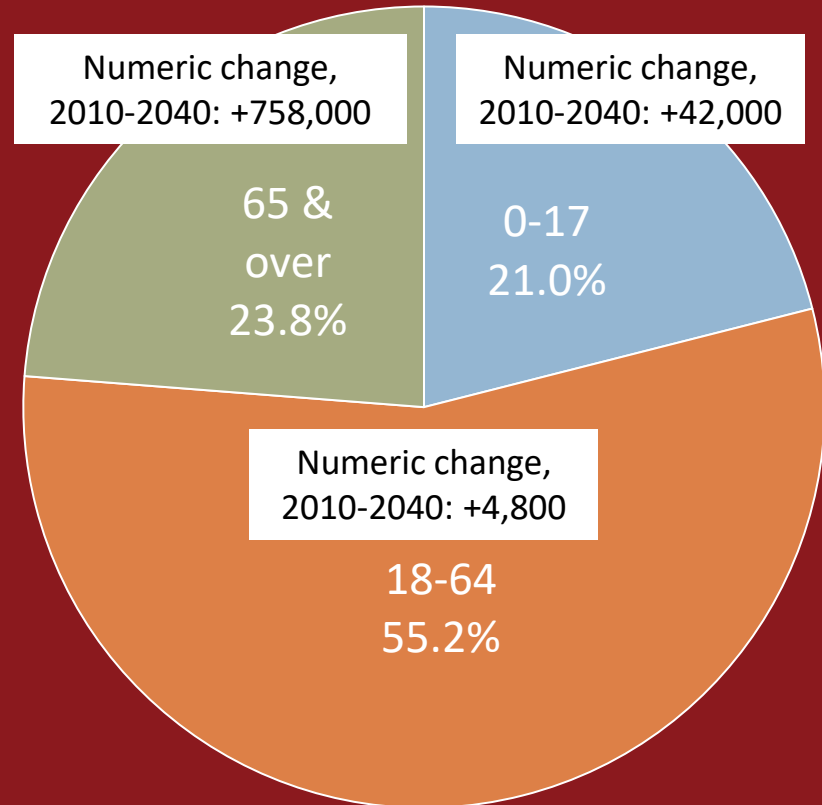
# Elements of the “Impending Storm”

## The Future: Population Change (Wisconsin) by Age

2010

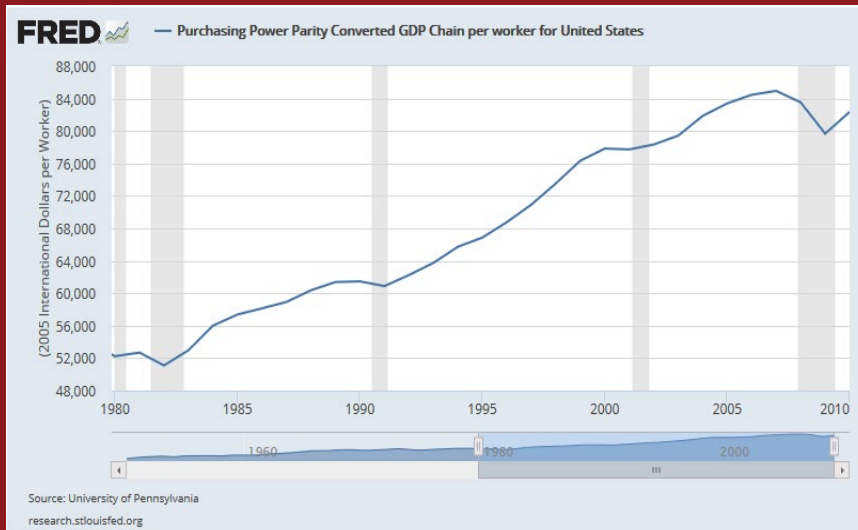


2040





# The “Impending Storm” (maybe not)



## Happy cow, happy life: Robots relieve dairy farmers of a round-the-clock task



Richard Mertens

Kayla Coehoorn hoses down the floor in the room where two robots milk the farm's 120 cows on demand. Ms. Coehoorn manages the family herd in Angelica, Wis.

## Seniors Welcome New, Battery-Powered Friends

### Retiring

By CONSTANCE GUSTKE JAN. 20, 2017



Herbert Yarbrough and Maxine Duncan with their robot in their retirement community in Walnut Creek, Calif. Ryan Young for The New York Times



*"Any requests?"*