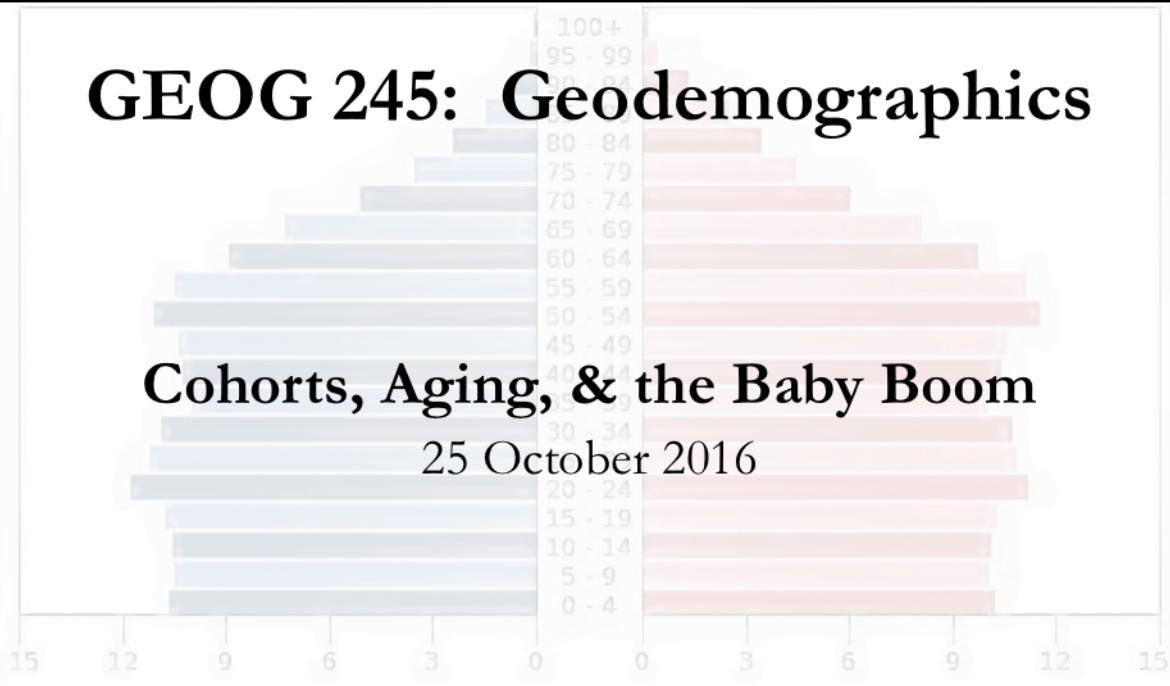


# GEOG 245: Geodemographics

Cohorts, Aging, & the Baby Boom

25 October 2016



## Announcements

- Reminder: Midterm is one week from today. The review sheet is online and I will update it after class to include today's material. I will update it again on Thursday to include Thursday's material.

The midterm review sheet also contains a few sample questions of each of the three types of questions you will see on the exam (multiple choice, matching, and short answer). The exam will consist of 30 multiple choice questions (2 points each), 10 matching questions (2 points each), and four short answer questions (5 points each). I expect the exam to take the average person about an hour to complete, but you will have the entire class time (except for the first 5 minutes or so in which I will open it up to last minute questions).

Most of the exam material will come from the lectures. If something is important enough to appear on the exam, you will most likely have seen it in lecture, so I would highly recommend reviewing either your notes from lecture, the slides with notes that I have posted on canvas before each lecture, and/or the lecture recordings.

Everyone has their own unique style of studying, so do what works best for you, but my recommendation if you are looking for suggestions on how to study (and some of you said you were in the feedback sheets), would be to go through notes from each lecture and think about A. what are the most important things discussed in this lecture? (there will be about 3 multiple choice questions per lecture), B. what vocabulary/terms lend themselves to matching style questions? and C. what are the big picture ideas? (and do I truly understand them?).

My goal in writing the exam is to write it in such a way that if you came to class/listened to the lecture recordings you will do OK and if you understand everything that was said in lecture you will do well. It is not a rote memorization test and I am not trying to trick you, but I do expect you to understand what we have talked about.

## Plan for Today

- Responding to Feedback
- Cohorts and Cohort Analyses
- The Geodemographics of Aging
- The Baby Boom

## Response to Feedback

There were a lot of things you didn't agree on...

...but a lot of you agreed I go too fast!

I got a lot of conflicting suggestions (more discussion vs. less discussion, more links between geodemographics and social justice issues/current events vs. less on social justice issues, etc.), but a lot of you were in agreement that I go too fast through the slides. I am sorry about that and will try to slow it down, but if I am still moving too fast, please feel free to let me know in the moment!

## Response to Feedback

What is the link between the history we have talked about in class (of race, of population) and current demographic patterns?

## Response to Feedback

What is the link between the history we have talked about in class (of race, of population) and current demographic patterns?

- History helps to explain how the current patterns were produced and often, the legacy of history is visible in the demographics of a place.

## Response to Feedback

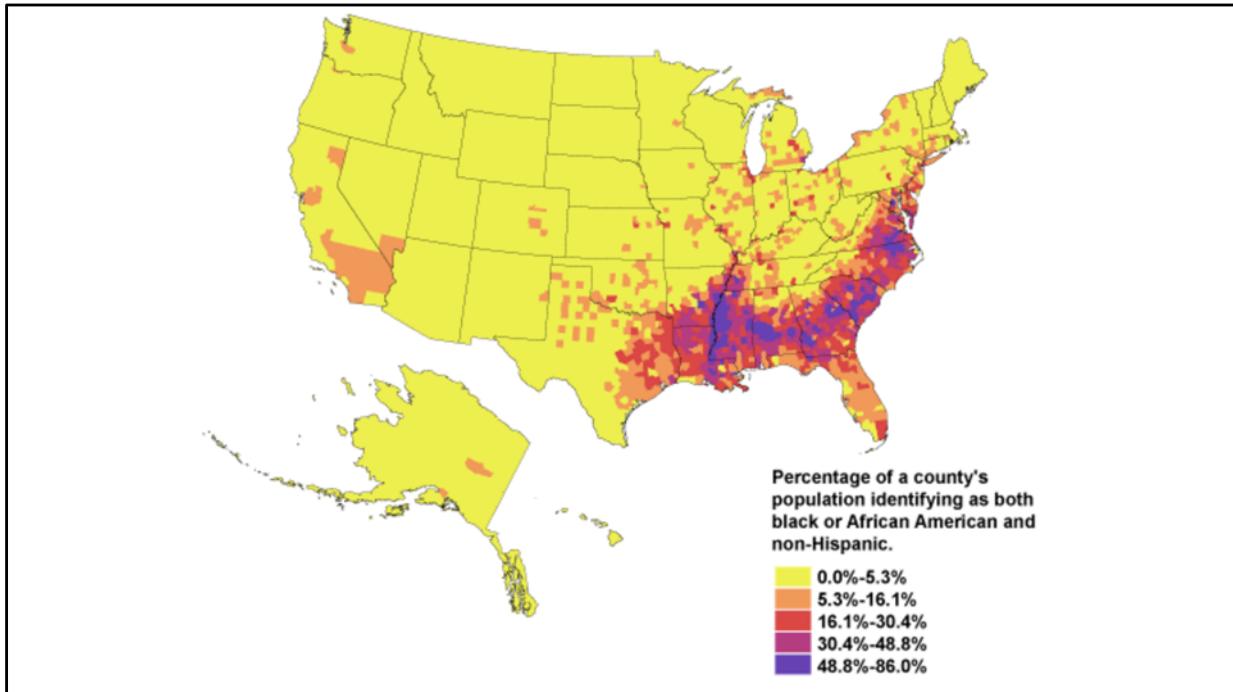
What is the link between race/white privilege/segregation and geodemographics?

Or in other words, why did we spend a week talking about ‘social justice issues’?

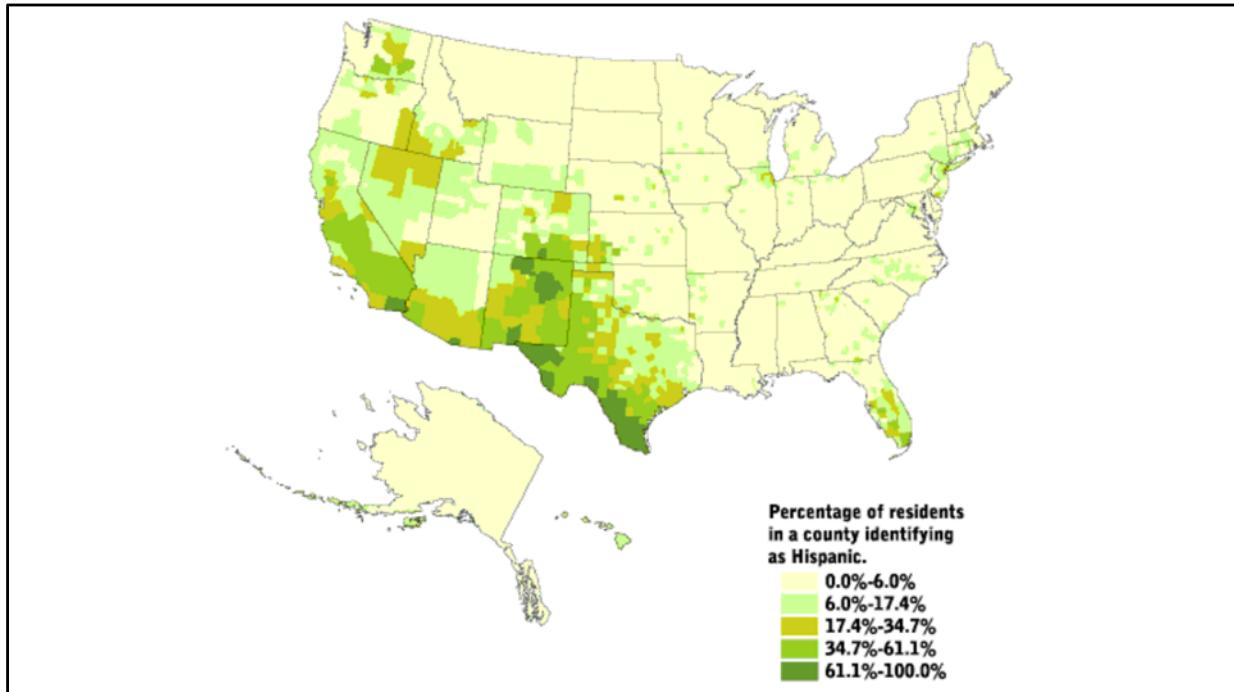
## Response to Feedback

What is the link between race/white privilege/segregation and geodemographics?

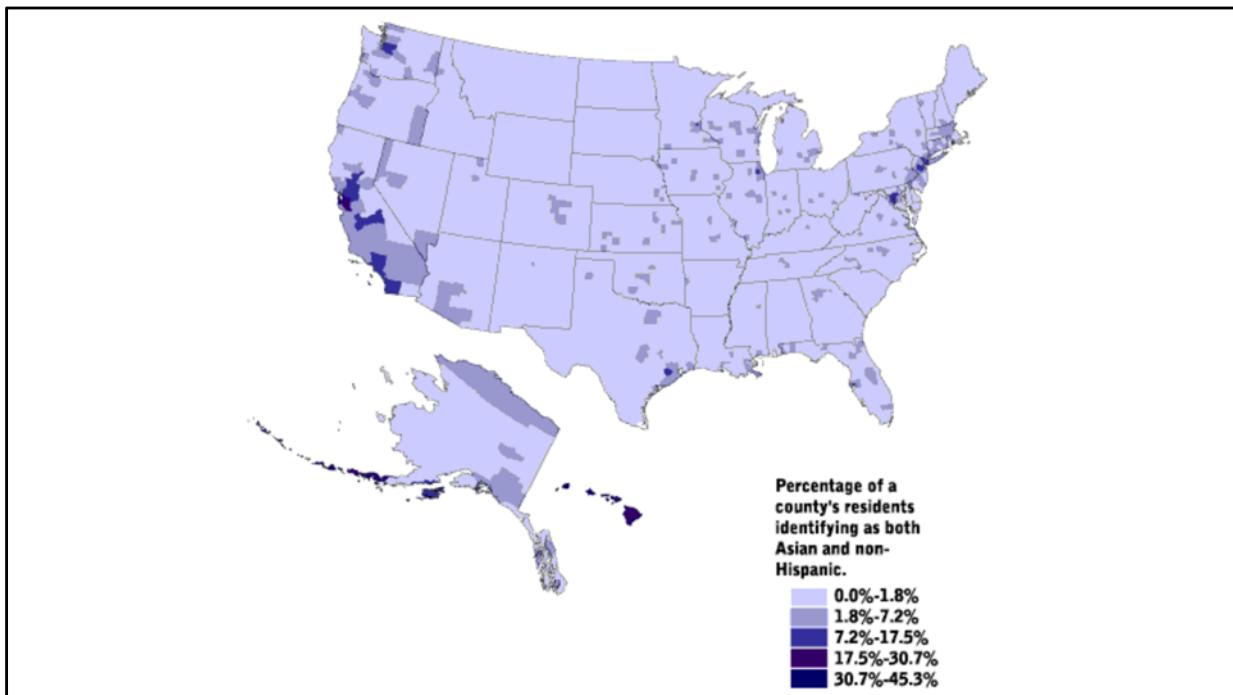
- Again, the geodemography of the US is very dependent on the history of race relations in the country. This history continues to produce a visibly segregated US today.

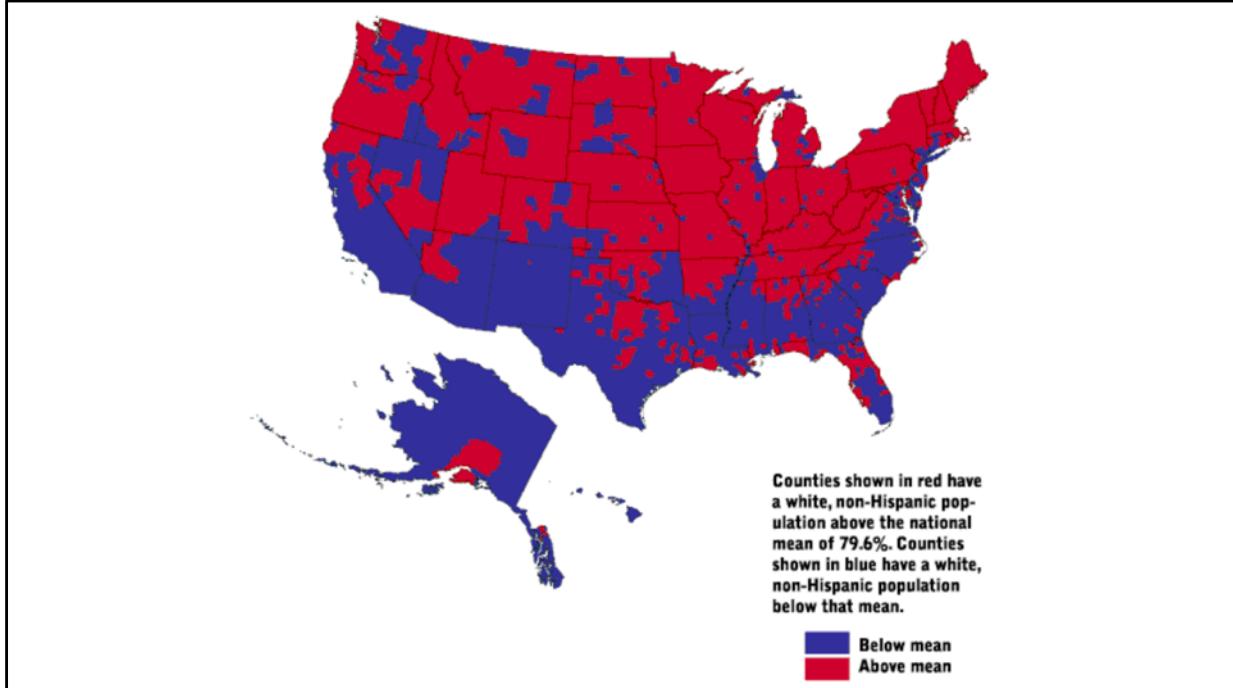


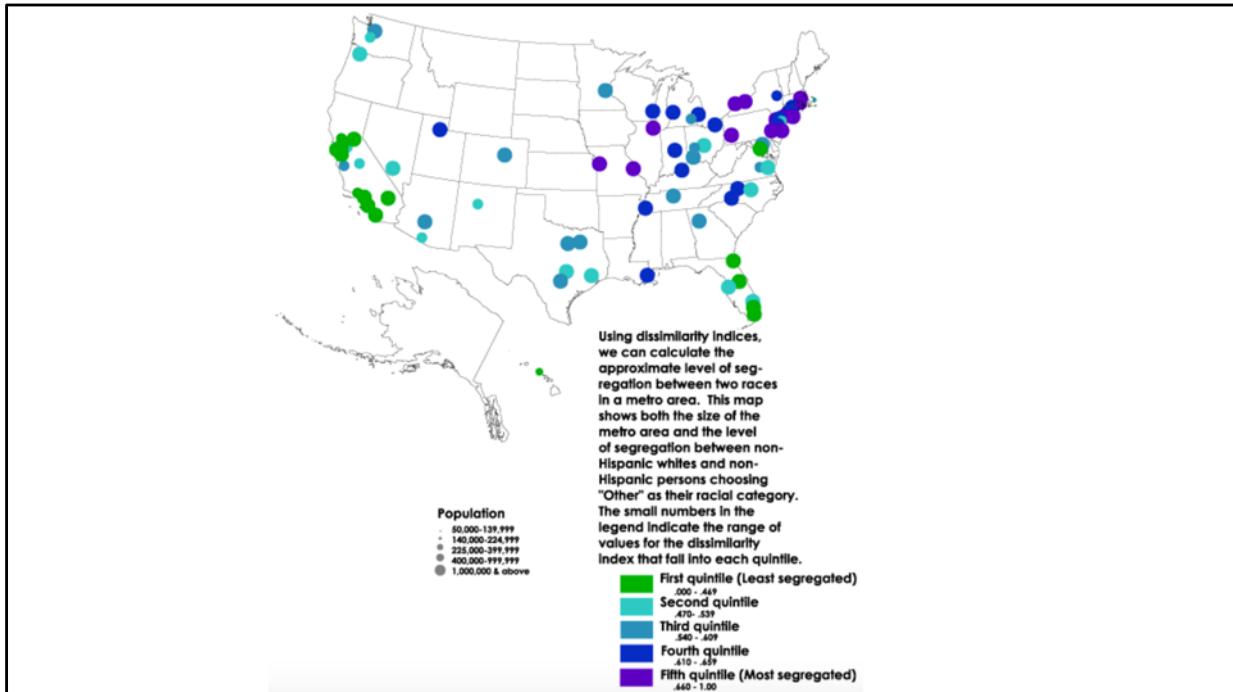
Why does the southeast have the highest percentage of the country's black population? History of slavery.



Why is the Hispanic population clustered where it is? (Hint: the three largest groups of Hispanics in the US are Mexicans, Puerto Ricans, and Cubans).







This is a map of the level of segregation between non-hispanic white and all other populations.

Where are the most segregated cities clustered? Does that surprise you based on last Thursday's lecture?

[http://www.censusscope.org/us/map\\_segregation\\_other.html](http://www.censusscope.org/us/map_segregation_other.html)

## Response to Feedback

Now that we have learned how to use FactFinder and ArcGIS, how can we use them to look at things of personal interest (outside of class)?

The short answer is that if you can find the data you want to map online in the right format, you can start looking at it in ArcGIS. Similarly, you can use the mapping tool in FactFinder to map out demographic data collected by the US Census Bureau.

The somewhat longer answer is that there is one important, but tricky step that prevents you from taking the charts and tables from American FactFinder and mapping them in ArcGIS. Because they aren't shapefiles (they don't have the geographic data attached to them), you need to be able to link them to shapefiles. This can be easy if the data is in a nice clean format, but more often, the data is not. If there is interest amongst the class, I am happy to teach an hour long workshop on how to join tables to shapefiles in ArcGIS outside of class time. So, go ahead and think about it and I will send out an email to gauge interest. If you are particularly interested in this sort of thing, I would strongly recommend you take Geography 360 which goes much more in depth into using GIS. It will next be offered in Spring 2017.

## Questions?

Are there any other questions about material that we have covered so far that I didn't pull from the feedback sheets that you would like me to address?

I also took note of all of the suggestions that were offered and will try to implement as many of them as possible.

## Plan for Today

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- The Baby Boom

What is a Cohort?

## What is a Cohort?

- A group of persons with a common statistical characteristic

Most commonly we talk about birth cohorts or people who were born in the same year (or group of years), but we can also have educational cohorts (people who started or graduated school at the same time), marriage cohorts (people who got married in the same time period), etc.

## What is a Cohort?

- A group of persons with a common statistical characteristic
- Ancient Roman military unit or band of warriors



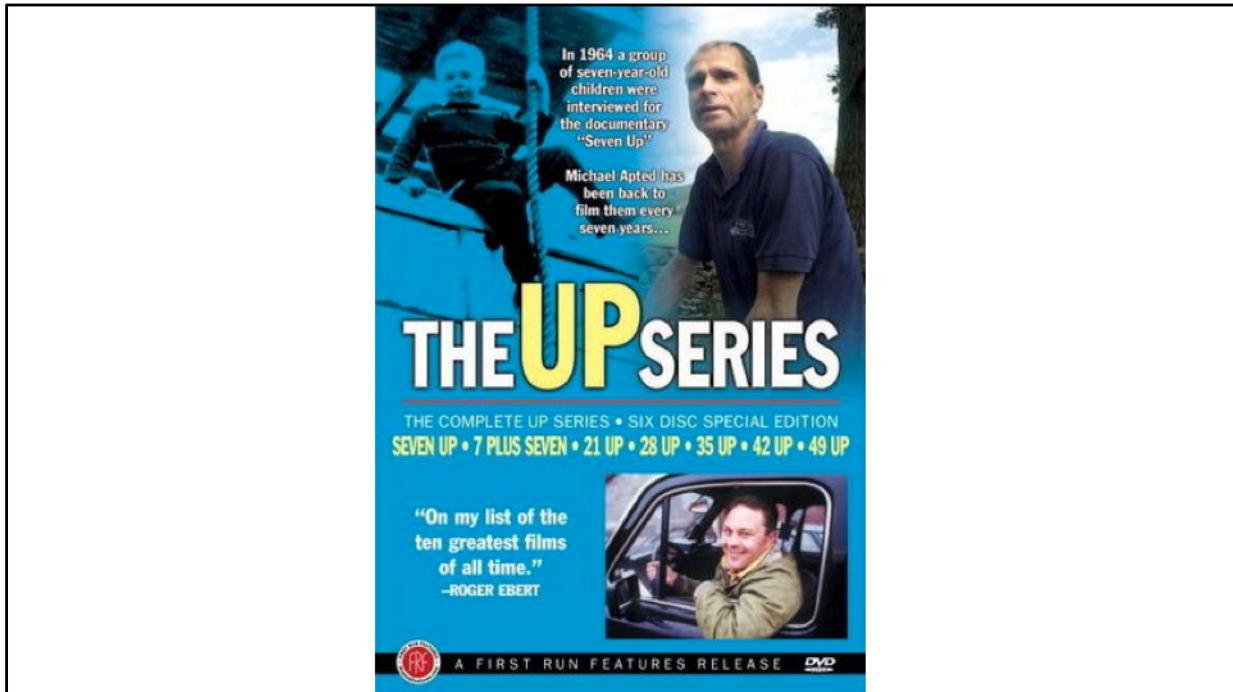
The term is derived from the name for an ancient Roman military unit. Essentially a group of people with some sort of shared experience.

What is a Cohort Analysis?

## What is a Cohort Analysis?

- Any analysis that follows a group of people through successive points in time as they age
- This is a type of longitudinal (or long term) study.

So if we are talking about a cohort analysis based on a birth cohort, what would that look like?



[https://www.youtube.com/watch?v=UcrTX6x\\_qpw](https://www.youtube.com/watch?v=UcrTX6x_qpw)

The Up series is a great example of a cohort study. The film series follows 14 individuals who were born in 1957 and checks in with them every seven years, interviewing them for a new film each time. The most recent film, 56 UP, came out in 2012. It started as a one off documentary looking at 14 seven year olds from different social classes to show the way that social classes were crumbling in the UK. Michael Apted, an assistant on the film crew (himself 22 at the time of the first filming), decided to continue the project showing each of the individuals every 7 years to give a better picture of social classes in the UK and how and whether the social class you are born into can predict your achievements as an adult.

So what makes this a cohort study?

Why conduct a Cohort Analysis?

## Why conduct a Cohort Analysis?

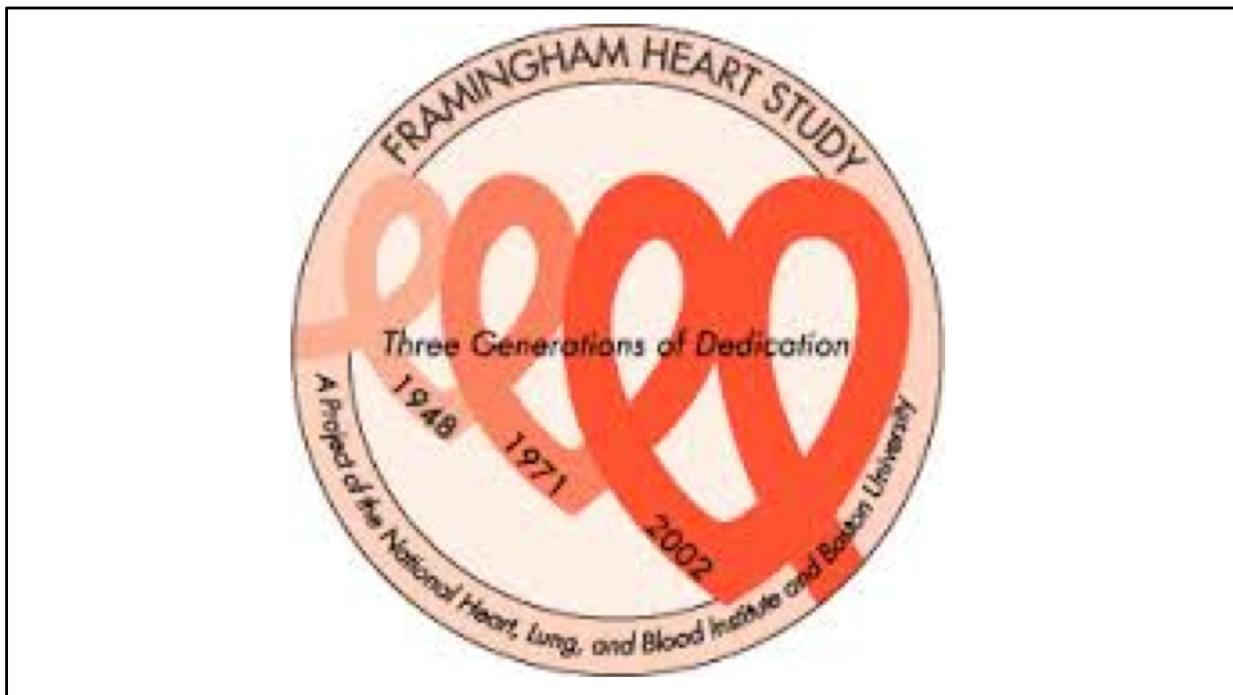
- To track change over time amongst the same people
- To help establish cause and effect (what exposures cause what diseases)
- Because you can gather information about a wide number of things at the same time and see which turn out to be important later

Why NOT conduct a Cohort Analysis?

## Why NOT conduct a Cohort Analysis?

- Can be high losses to follow-up
- Often requires a large sample size
- Takes a long time
- Expensive
- Ethical Issues

Ethical issues can include: you store people's contact info for a long time which increases the likelihood of data breaches, people can feel pressured to stay in the study since researchers have already invested a lot of time and money, etc.



The most famous cohort study is called the Framingham Heart Study. It began in 1948 and followed over 5,000 adults (aged 30-62) from Framingham, Massachusetts. The study grew to include the children of previous participants (as well as new participants to increase the diversity of the sample in 1994) and now has its third generation of participants. Over 1,000 medical papers have now been published related to the data from the study. This study is largely attributed with helping us understand that narrowing arteries and high blood pressure are not just normal parts of aging and that a healthy diet and regular exercise increase people's heart health. It also confirmed that cigarette smoking was linked to an increased risk of heart disease.

Questions?

## Plan for Today

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## Aging as a Demographic Concern

Demographers (and historians) often conclude that the most important event of the twentieth century was the growth of world population (remember from a few weeks ago that within the 20<sup>th</sup> century, the global population more than doubled from 3 billion to 6 billion). While it is a bit too soon to say, some people are guessing that the most significant event of the 21<sup>st</sup> century will be the aging human population.

How do we know a population is aging?

What might we measure or look for?

## How do we know a population is aging?

- Greater number of older people
- Higher median age
- Higher percentage of our population is ‘old’

How do we define old? (most commonly as 65+)

**WIZARD OF ID**

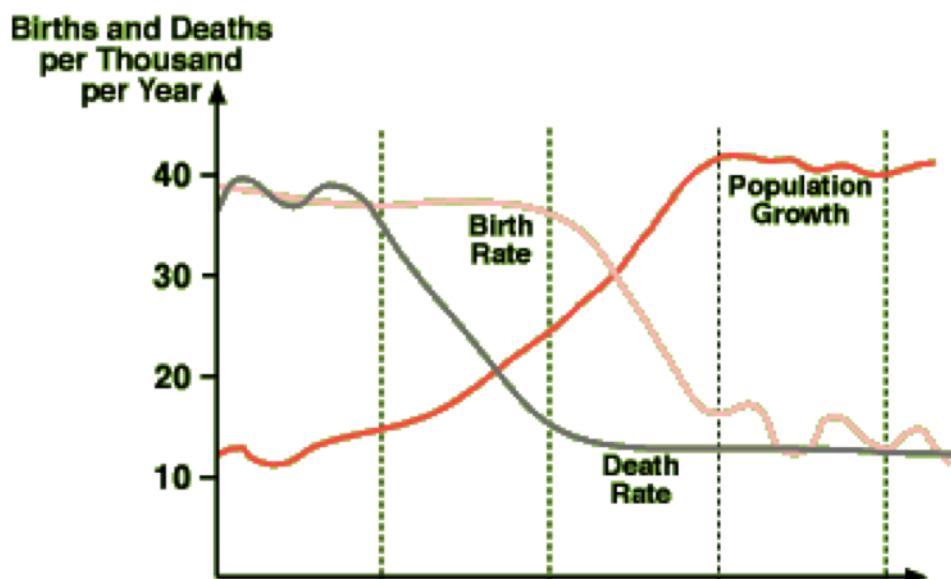


## The Aging of the Global Population is a Triumph of Civilization

- Inevitable consequence of attaining low fertility, low mortality, and high life expectancy

What did we call the theory that all countries/civilizations are moving toward low fertility and low mortality?

## Demographic Transition Model



## Youngest and Oldest Countries (by median age)

### Youngest

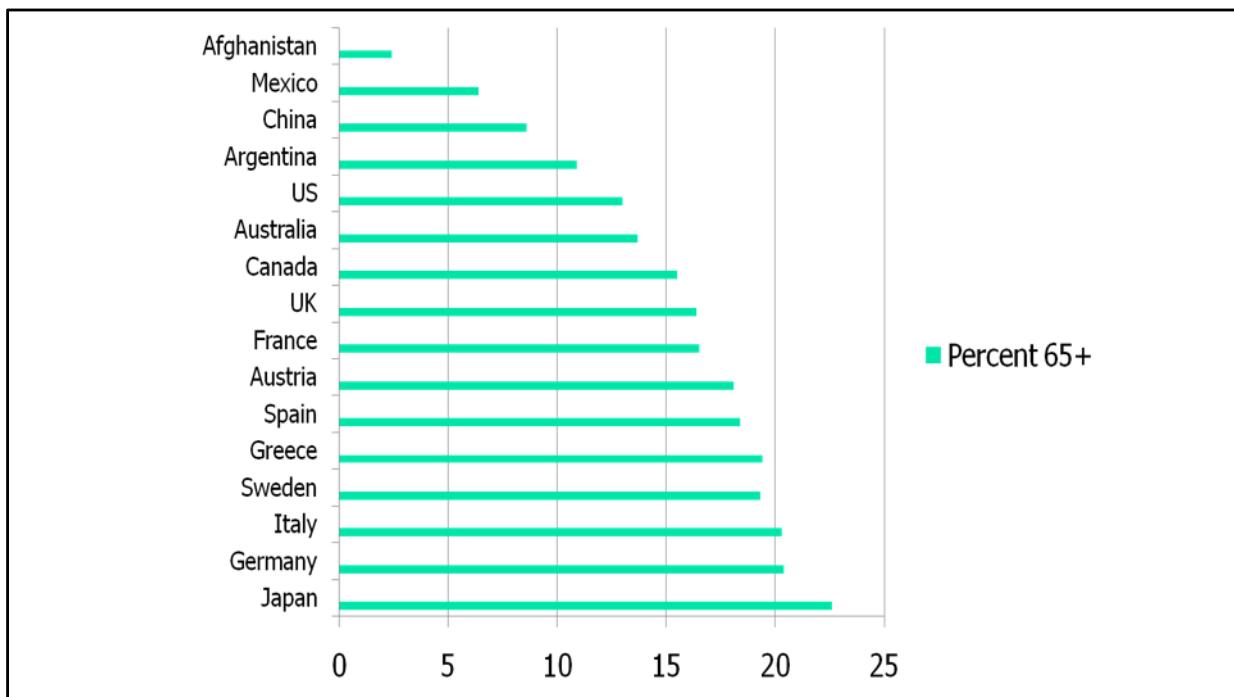
- Mali
  - In 2005, median age = 16
  - By 2050, median age = 25
- Niger
  - In 2005, median age = 16
  - By 2050, median age = 21
- Uganda
  - In 2005, median age = 15
  - By 2050, median age = 23

### Oldest

- Japan
  - In 2005, median age = 43
  - By 2050, median age = 55
- Italy
  - In 2005, median age = 42
  - By 2050, median age = 51
- Germany
  - In 2005, median age = 42
  - By 2050, median age = 49

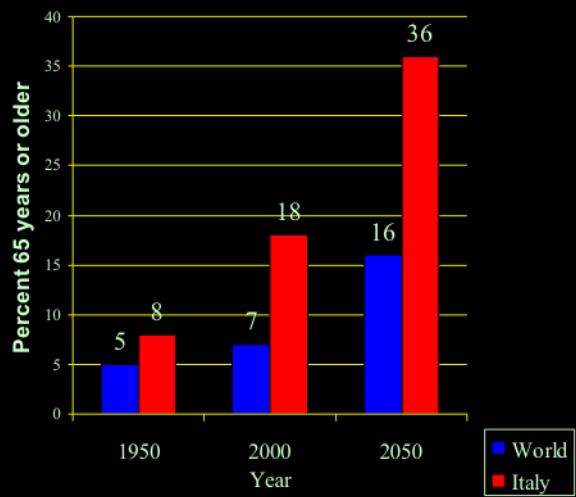
Just as a quick reminder, what is a median? (if you lined up the entire population from youngest to oldest, the median is how old the person exactly in the middle is).

By comparison, the median age for the entire world was 28 in 2005 and is estimated to be 38 in 2050. The US was 36 in 2005, and is estimated to be 41 in 2050. China was 33 in 2005, and is estimated to be 45 in 2050. India was 24 in 2005, and is estimated to be 39 in 2050.

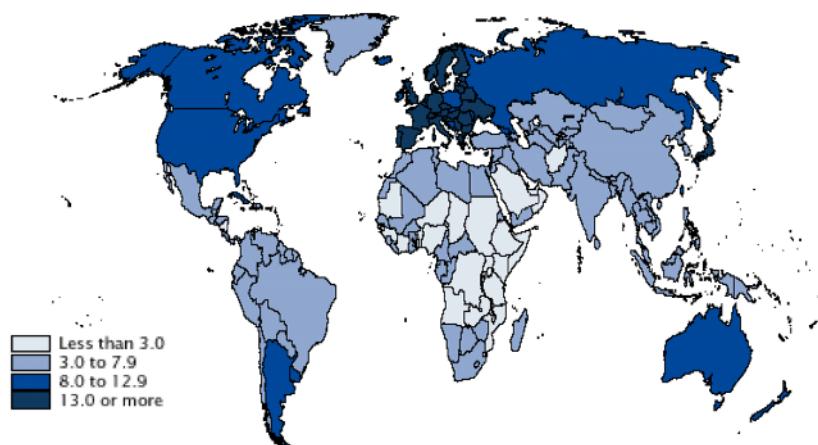


Data drawn from the CIA World Factbook based on 2010.

**Percent 65 Years or Older for  
World and Italy:  
1950, 2000 and 2050**



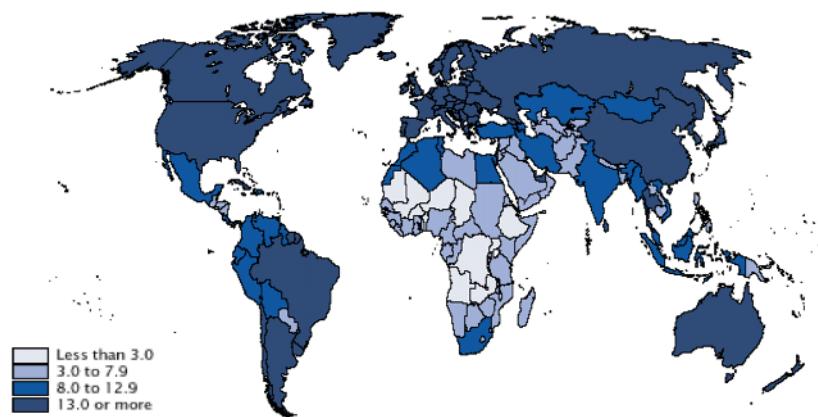
## Percent Aged 65 and Over: 2000



The Global North (in particular, the industrialized nations of Europe) have the highest percentages of older people.

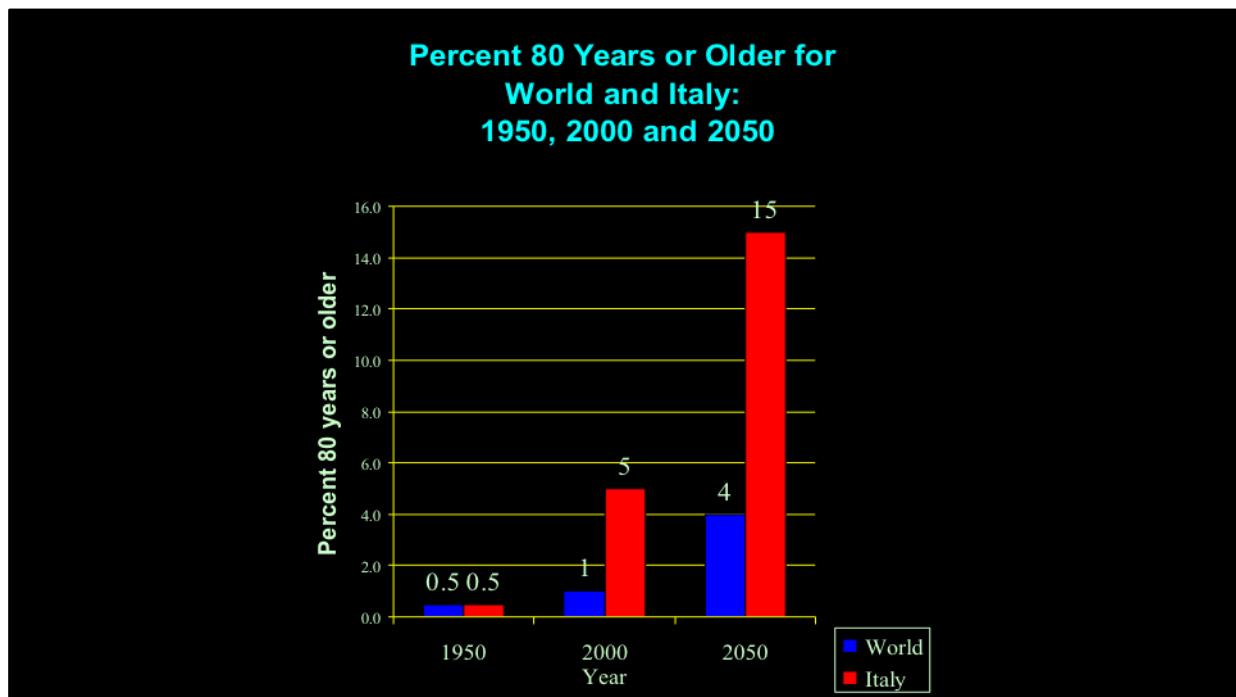
Statistics drawn from the report 'An Aging World' (2001).

## Percent Aged 65 and Over: 2030

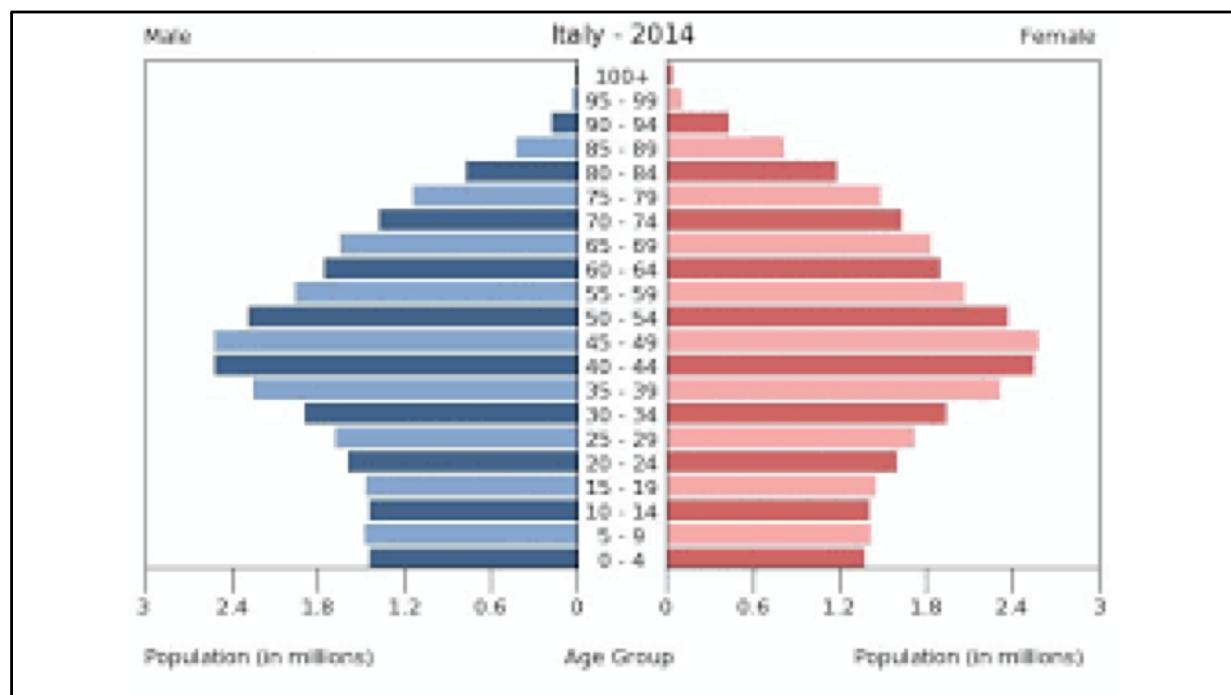


The color scale in both maps is the same. Note how many countries darken (get older) by 2030.

Statistics drawn from the report 'An Aging World' (2001).



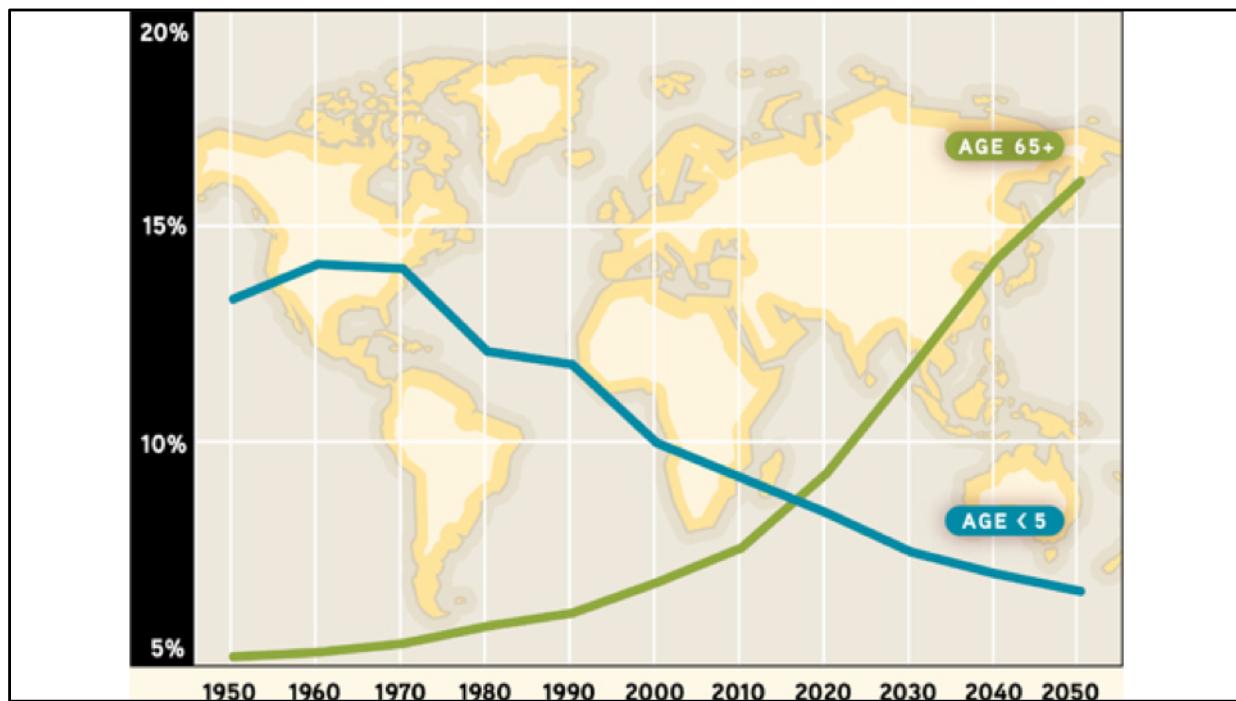
So, what would we expect Italy's population pyramid to look like?



Thinking back to the estimates that Italy's population is aging (rapidly), what about the population pyramid tells us that? (note that the top half has convex sides indicating a low death rate, the base is small indicating low fertility, The pyramid is top-heavy indicating high life expectancy, the lower half shows reclined slopes indicating a declining population)

## The Aging of the Global Population is a Triumph of Civilization

- Inevitable consequence of attaining low fertility, low mortality, and high life expectancy
- But it requires some shifts in the way our populations are organized socially and economically...



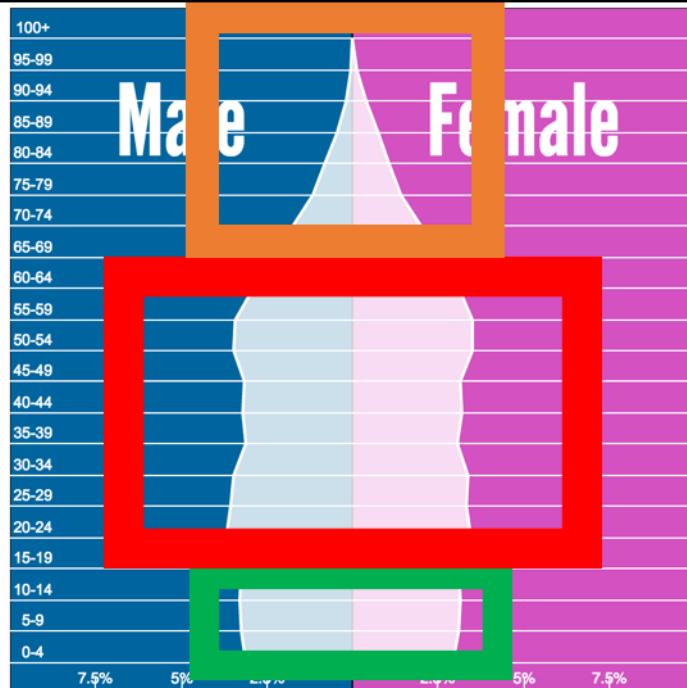
Why does the rise in the 65+ population matter?

## Why does an aging population matter?

- Because it increases the number of people who are dependent, while decreasing the number of ‘productive’ adults.

Populations are generally broken into three parts:

- Young dependents/children [0-14]
- Working aged population [15-64]
- Elderly dependents [65+]



Remember this from a few weeks back?

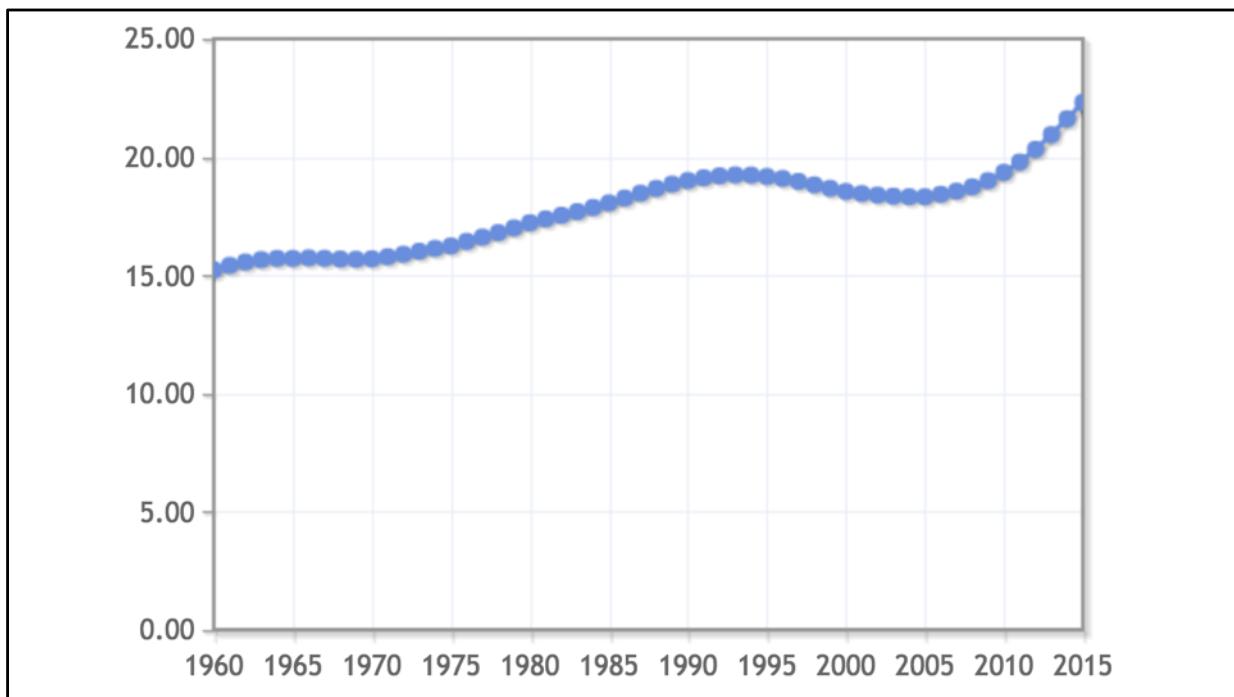
What is the dependency ratio?

## What is the dependency ratio?

$$\text{Dependency Ratio} = \frac{\text{(Population 0-14) + (Population 65+)}}{\text{(Population 15-64)}}$$

What does this get at?

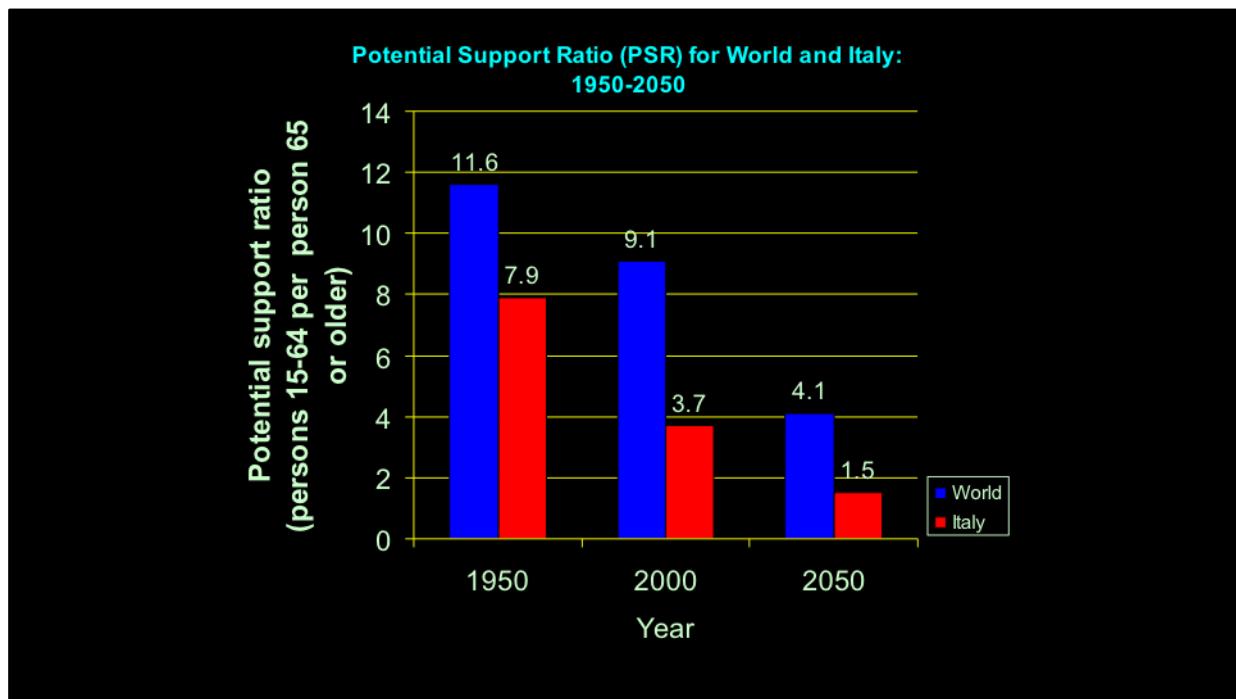
The higher it is, the more each potential worker has to support.  
The lower it is, the fewer number of people dependent on each worker.



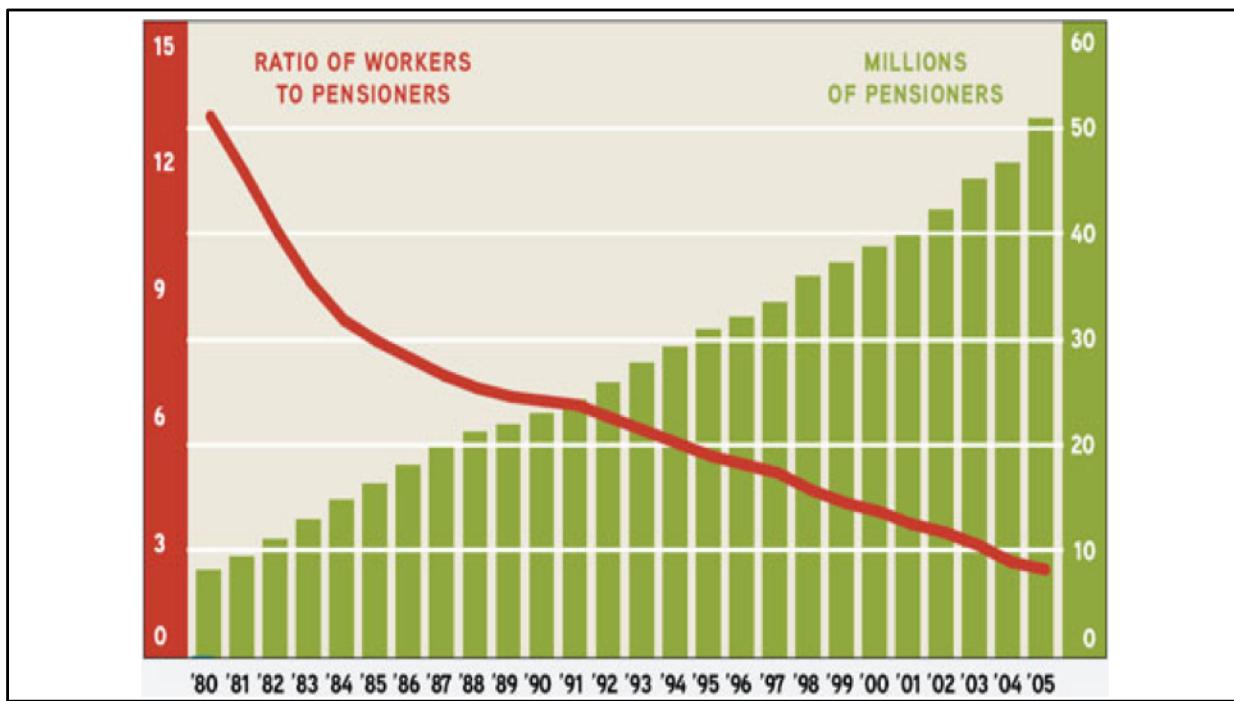
This graph is of the dependency ratio in the US over time. It is only showing dependent elderly (excludes children). It is increasing (though because the child specific one is declining, overall, the dependency ratio isn't moving all that much...yet).

Note, here is shown as a percent (per 100, or in other words, multiplied by a k (constant) of 100).

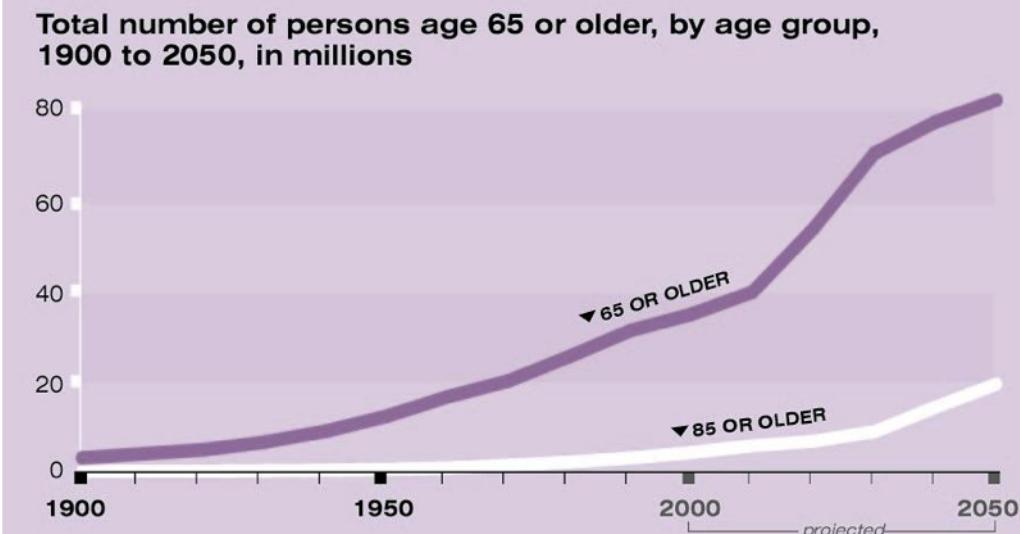
Statistics taken from Index Mundi.



Note here the dependency ratio is being called the 'potential support ratio' (same thing, but doesn't include children).



The term pensioners simply means ‘retired people’—a throwback to the age of pensions.



The elderly are now the fastest growing age group in the US.

This graph uses census data through 2000, and then projects from there.

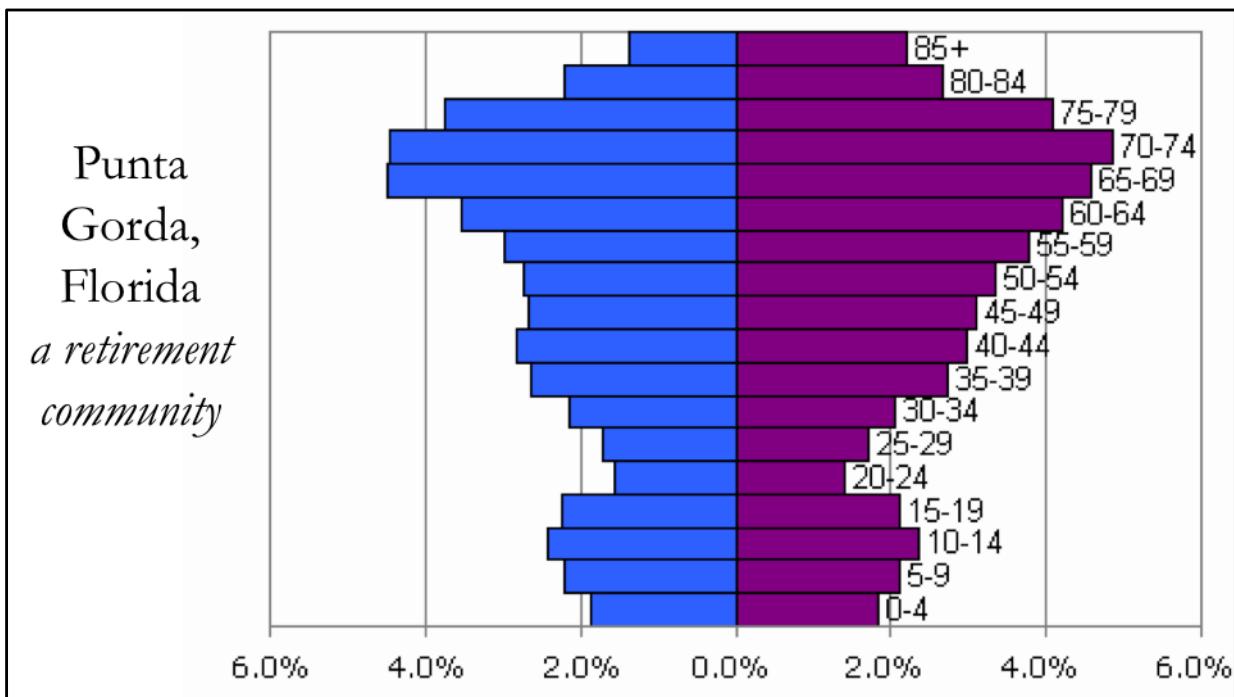
Questions?

What is the feminization of old age?

## What is the feminization of old age?

- In the United States (and in almost every human society), women live longer than men.
- As a population ages, the sex ratio (ratio of males to females) declines

Note, when I say decline, all this means is that females outweigh males by greater numbers. This is just because the ration is written males:females (males to females).



Remember the population pyramid for the retirement community that we looked at a few weeks ago. Notice how the older population of females is significantly higher than that of males.

What causes the feminization of old age?

## What causes the feminization of old age?

- Likely a combination of genetic (XX vs. XY) and environmental (based on the world you live in) factors
- Possible environmental factors:
  - Women experience lesser life stresses (ex. war, physical labor)
  - Women smoke less

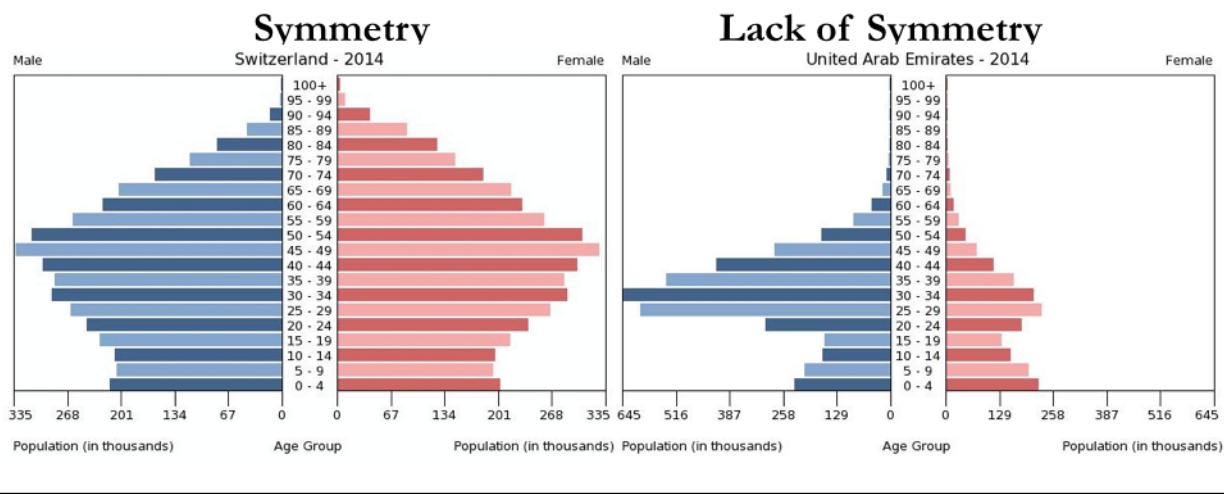
These are arguable! I am just floating the theories that demographers are discussing.

So why is this important demographically?

## What is the feminization of old age?

- In the United States (and in almost every human society), women live longer than men.
- As a population ages, the sex ratio (ratio of males to females) declines
- Given how consistent the feminization of old age is, the sex ratio has become a very crude indicator of population age in otherwise symmetrical populations.

## The Anatomy of a Population Pyramid

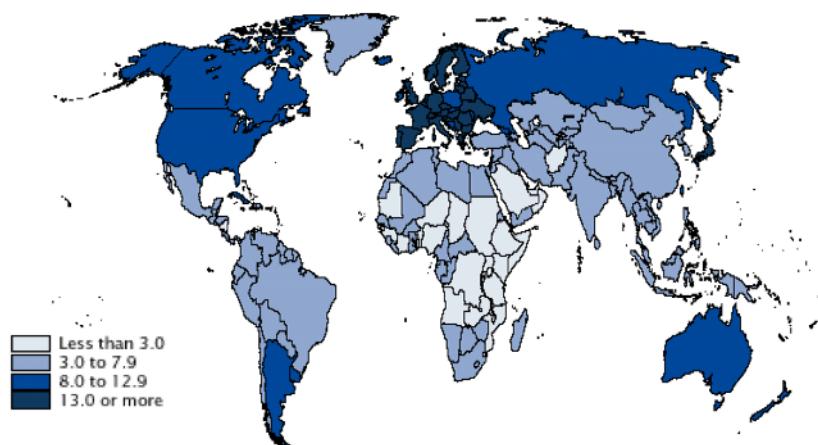


So, it wouldn't tell us anything about the UAE because the asymmetry is so stark, but a graph of the changing sex ratio of switzerland over time would give us a crude estimate of how quickly the population is aging.

Questions?

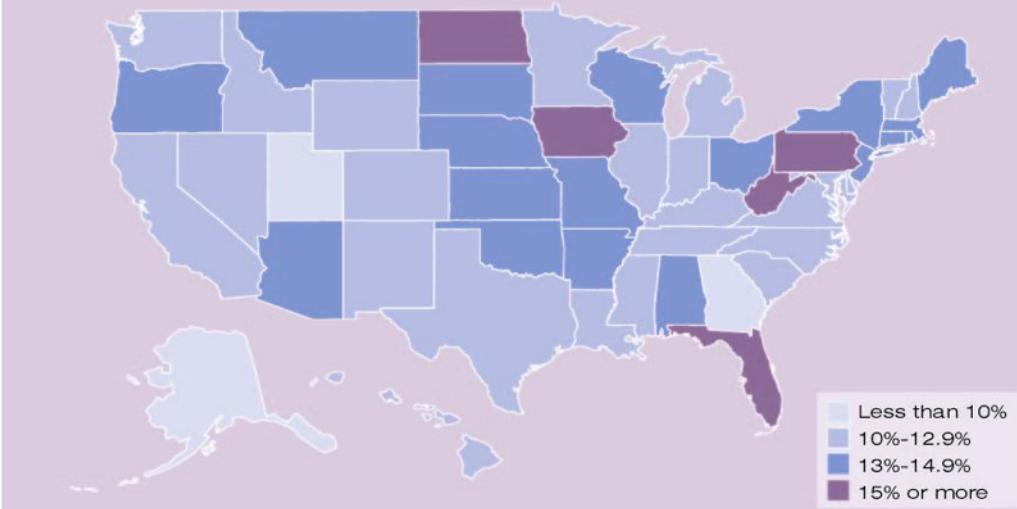
So where are older populations?

## Percent Aged 65 and Over: 2000



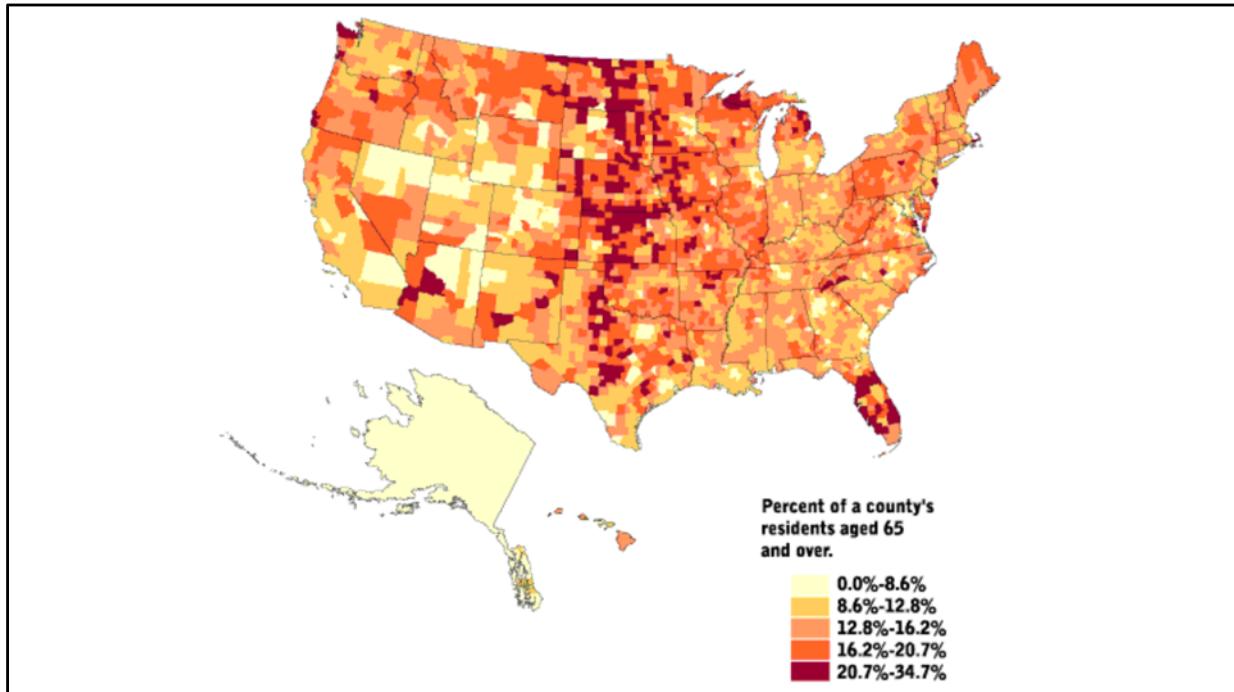
Predominantly in the Global North (by %), though there are actually more elderly in the developing world now than in the 'developed' world (by count). This though, is largely because there are just a larger number of people in the developing world in general.

### Percentage of the population age 65 and older, by state, 2000



Note: Data for the year 2000 are middle-series projections of the population.  
Reference population: These data refer to the resident population.  
Source: U.S. Census Bureau, Population Projections.

Which states did you expect? Which are surprises?



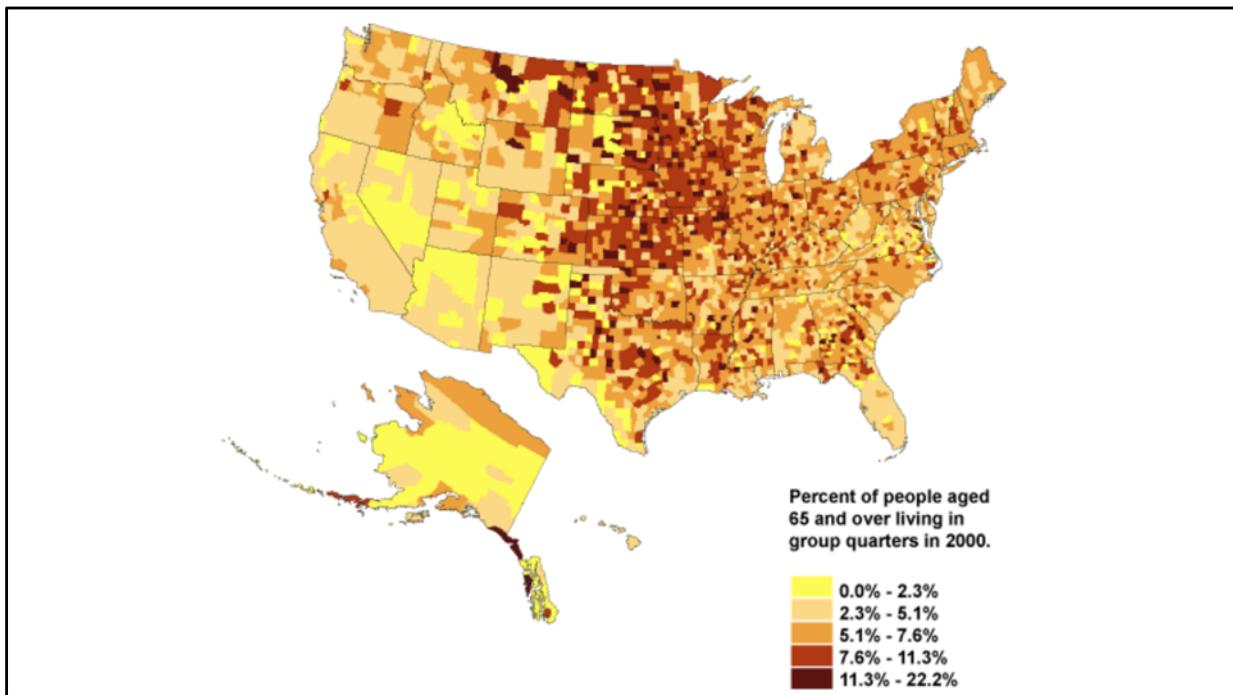
Here is that same data (taken from the 2000 census) broken down by county.

What surprises you?

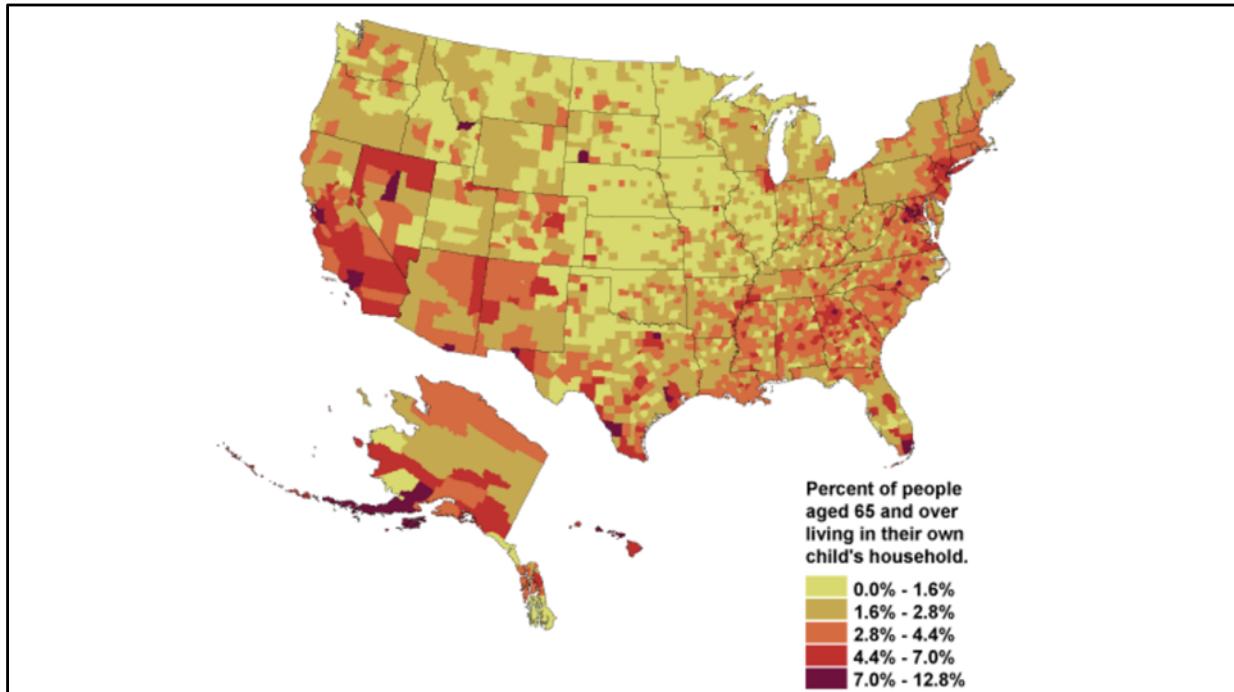
## Aging in Place

- When people retire, they tend to either move south (to Florida or Arizona) or age in place
- The Midwest and Central US have the highest rates of aging in place.

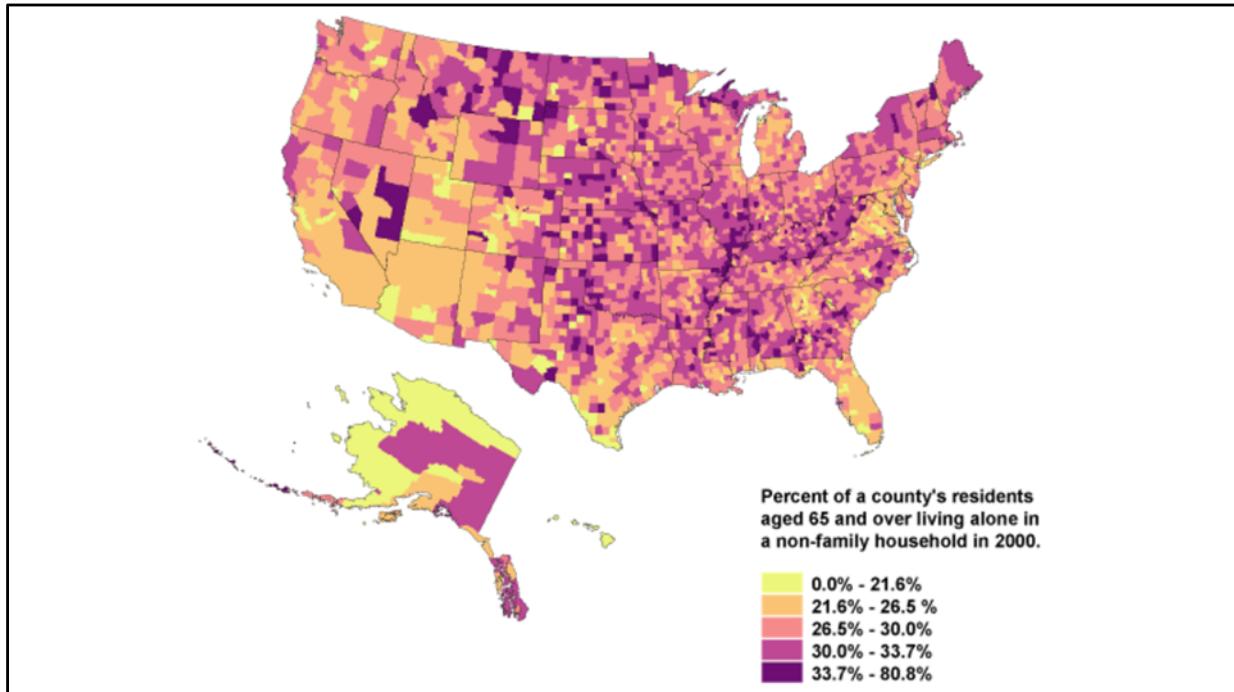
Note: this does not necessarily mean that people aren't moving into nursing homes, but rather that they are not moving out of the area.



What do we mean by group quarters? (retirement/nursing homes)

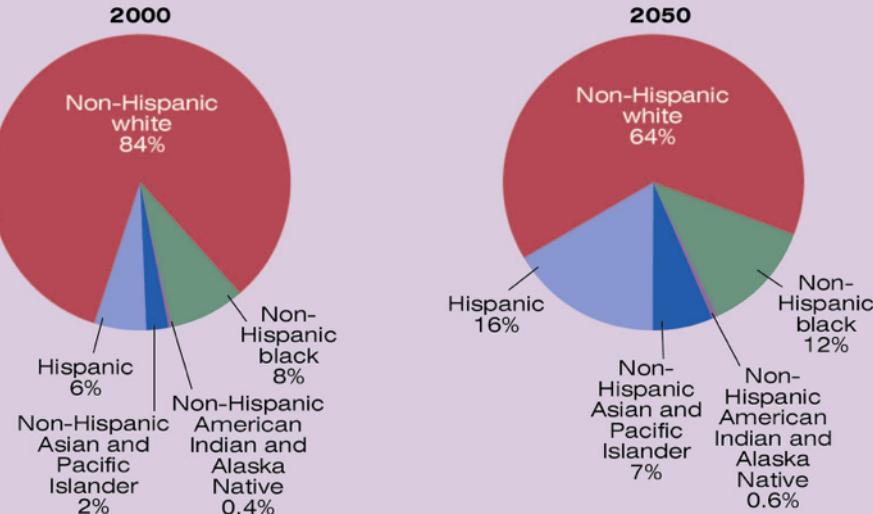


Where do people seem to be living in their children's homes? Hard to say, but potentially where rent is highest (NYC, San Francisco, DC, LA).



Any particular patterns here? Again, hard to say as it is so spread out. In general, Whites and Blacks are much more likely to live alone in old age than are Hispanics.

**Projected distribution of the population age 65 and older, by race and Hispanic origin, 2000 and 2050**



Note: Data are middle-series projections of the population. Hispanics may be of any race.

Reference Population: These data refer to the resident population.

Source: U.S. Census Bureau, Population Projections.

What is going on in the 2000 chart? Why are whites so disproportionately high (they have

Questions?

## Plan for Today

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## What is the Baby Boom?

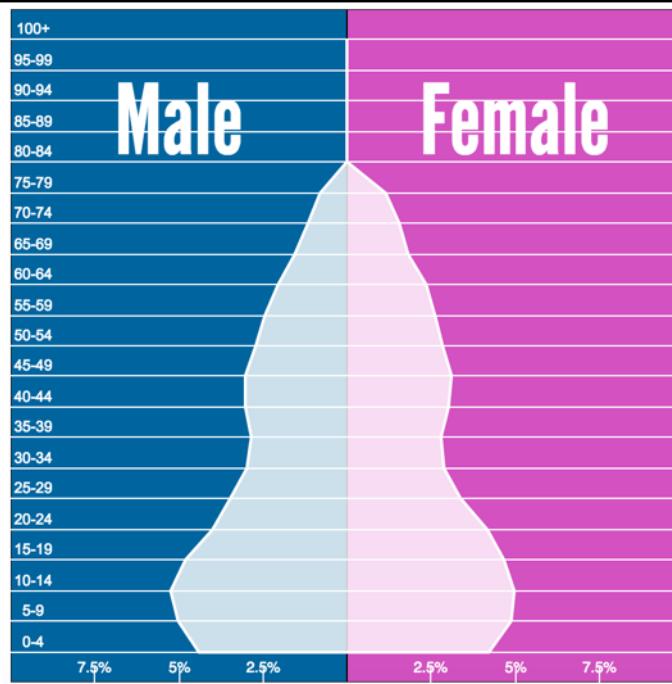
We talked about it a little when we discussed population pyramids, but we will discuss it a little more today.

## What is the Baby Boom?

- Increase in fertility following WWII (1946-1964)
- Baby Boomers: all children born between 1946-1964

We talk about the baby boom specifically in the US, but it is also a phenomenon that we see in other countries that participated in WWII (Canada, UK, etc.)

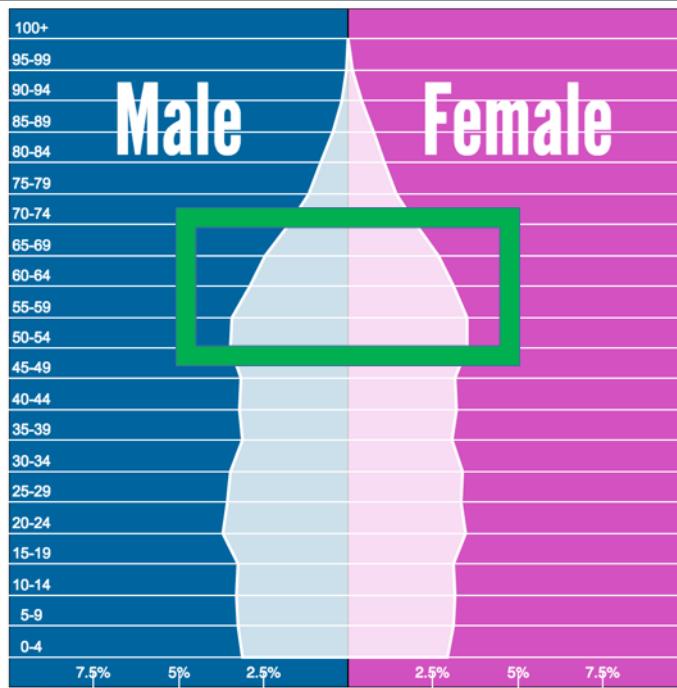
## The US in 1970



From <http://populationpyramid.net/united-states-of-america/>

Note the Baby Boomers generation, now around 10-14 years old.

## The US in 2016



From <http://populationpyramid.net/united-states-of-america/>

Babyboomers today are between 52 and 70 years old.

## What caused the Baby Boom?

Well, before we get to that, it's helpful to compare it to the cohorts that came before it.

## Before the Baby Boom?

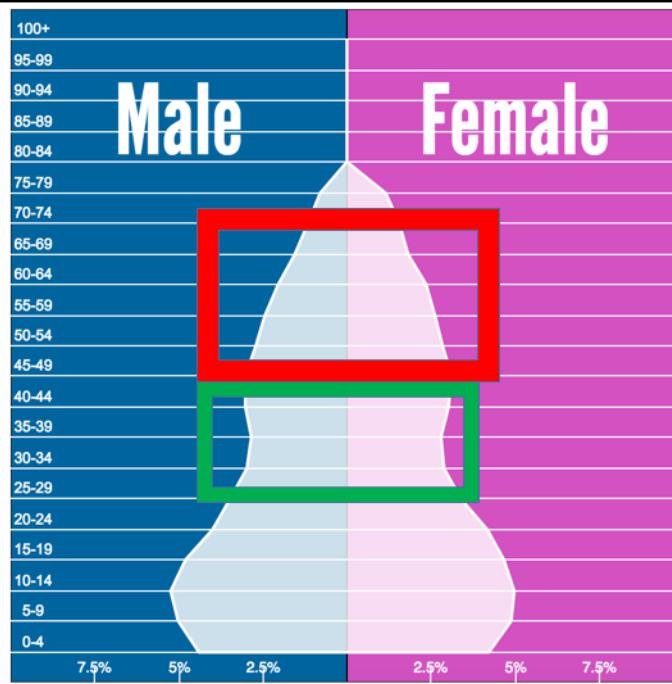


1900-1924: The Greatest Generation (the GI Generation)  
1925-1945: The Silent Generation

The Greatest Generation includes those people born between 1900 and 1924. They grew up with the growth of America, the American Dream. And these people remember (and suffered through) the Great Depression.

The Silent Generation includes those born between 1925 and 1945, notably during the Great Depression and WWII. So already, we see reasons why the fertility rate during the birth period of the Silent Generation might be artificially low. Some demographic historians have theorized that because they grew up in the shadow of two such cataclysmic events they felt silenced and ignored and made up for it by having lots of children!

## The US in 1970



From <http://populationpyramid.net/united-states-of-america/>

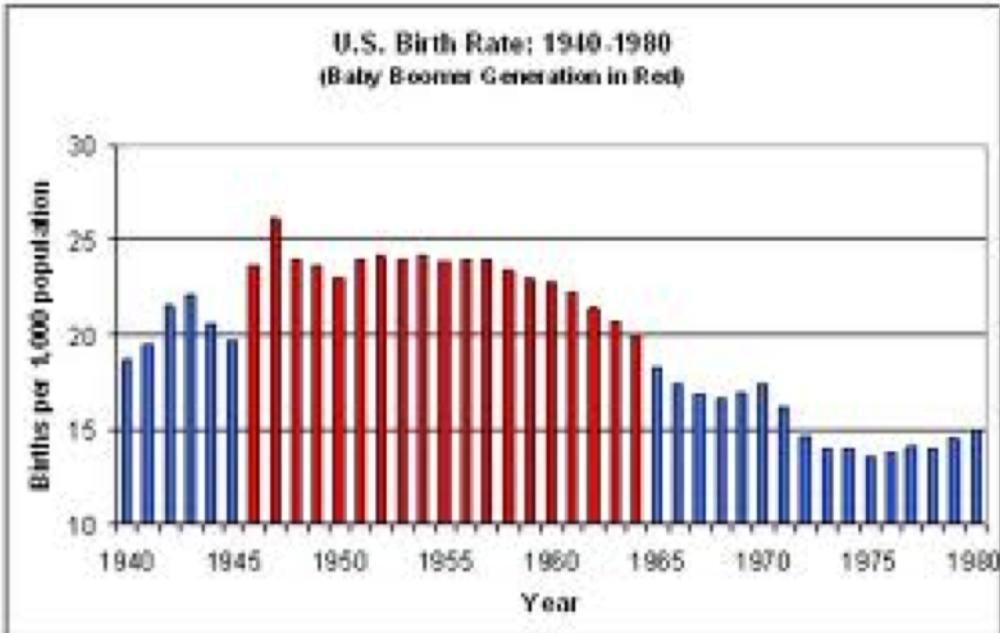
The Greatest Generation in red.

The Silent Generation in green.

Notice that the silent generation is so much smaller than the greatest generation.

## What caused the Baby Boom?

So lets return to the question of what caused the baby boom. Why were people having more children during this time?



Because they were having more children. Fertility rate was up.

## What caused the Baby Boom?



So lets return to the question of what caused the baby boom. Why were people having more children during this time?

## What caused the Baby Boom?

- Lots of GIs returning from war got married and started having kids
- A lot of people had put off having children during the war and even before the war (during the Great Depression)
- More people lived in single family homes—room for lots of kids
- Economic prosperity, more leisure time
- Stronger middle class



We see the rise of suburbs at this time that made space to have lots of kids.

The most famous of these suburbs is that built in Levittown, NY on Long Island. It was a planned community built between 1947 and 1951 and was the first real mass-produced suburb and became the archetype for postwar suburbs.

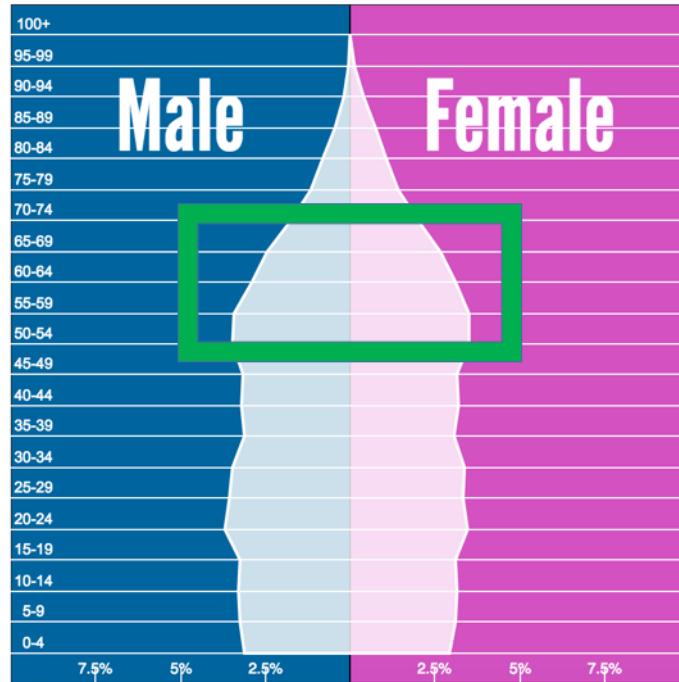
Such suburbs were largely populated by adults between 25-44 years of age and their children (under 15). Very few teenagers, very few grandparents. This set the standard for what a family looked like at the time.

What ended the Baby Boom?

## What ended the Baby Boom?

- The invention of the Birth Control Pill (1961)
- Women were more empowered over their bodies and often delayed marriage (Free Love Era: 1960s)
- Cold War tension increased (Bay of Pigs Invasion: 1961)
- Vietnam War started (1965-1975)

## The US in 2016



From <http://populationpyramid.net/united-states-of-america/>

Babyboomers today are between 52 and 70 years old.

So now that Boomers have gotten older, why do we still care? Given what we have talked about today, what is this cohort of people so important today?

## Baby Boomers exiting the work force

- Remember: Boomers are between 52 and 70 years old now
- Nearly 80 million Boomers will exit the work place within the next decade
  - 8000 per day
  - Over 300 per hour (round the clock)
- By 2030 there is projected to be about 60 million baby boomers between the ages of 66 and 84

That 66-84 age group is important because that is the “dependent elderly” population.

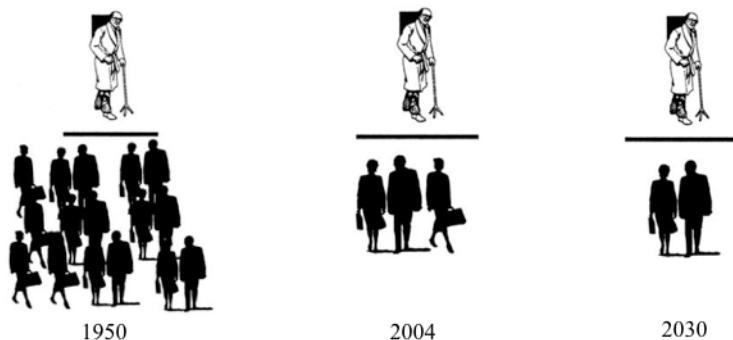
## Baby Boomers exiting the work force



## How does the Social Security System work?

- Pay-as-you-go model
  - You put money in, but that money goes to current recipients and when you retire, then current workers money goes to you

## Workers Per Social Security Beneficiary



- In 1950, there were 16.5 workers per recipient
- Today, there are just over 3 workers per recipient
- By 2030, there will only be 2.2 workers per retiree

There is significant fear that once the baby boomers start retiring, the revenues flowing into the system will be insufficient to finance the promised benefits. Projections show that starting in 2018, payroll tax revenues will fall short of the promised benefits.

In small groups, discuss:

- Why is this a demographic issue?
- Is this likely just a problem for the baby boom generation or part of a longer/larger trend? Why?  
(and by why, I mean, what about the demographic profile of the US suggests that)

I am not asking you to come up with the perfect solution in five minutes.

Questions?