

TOPIC 3.9

DEMOGRAPHIC TRANSITION

Enduring Understanding: Human populations change in reaction to a variety of factors, including social and cultural

Learning Objective: Define demographic transition and describe the characteristics of populations in each stage

Related Reading: pg . 201 – 210 “Environmental Science;The Science Behind the Stories” 4th Edition By:Withgott, Jay and Laposota, Matthew

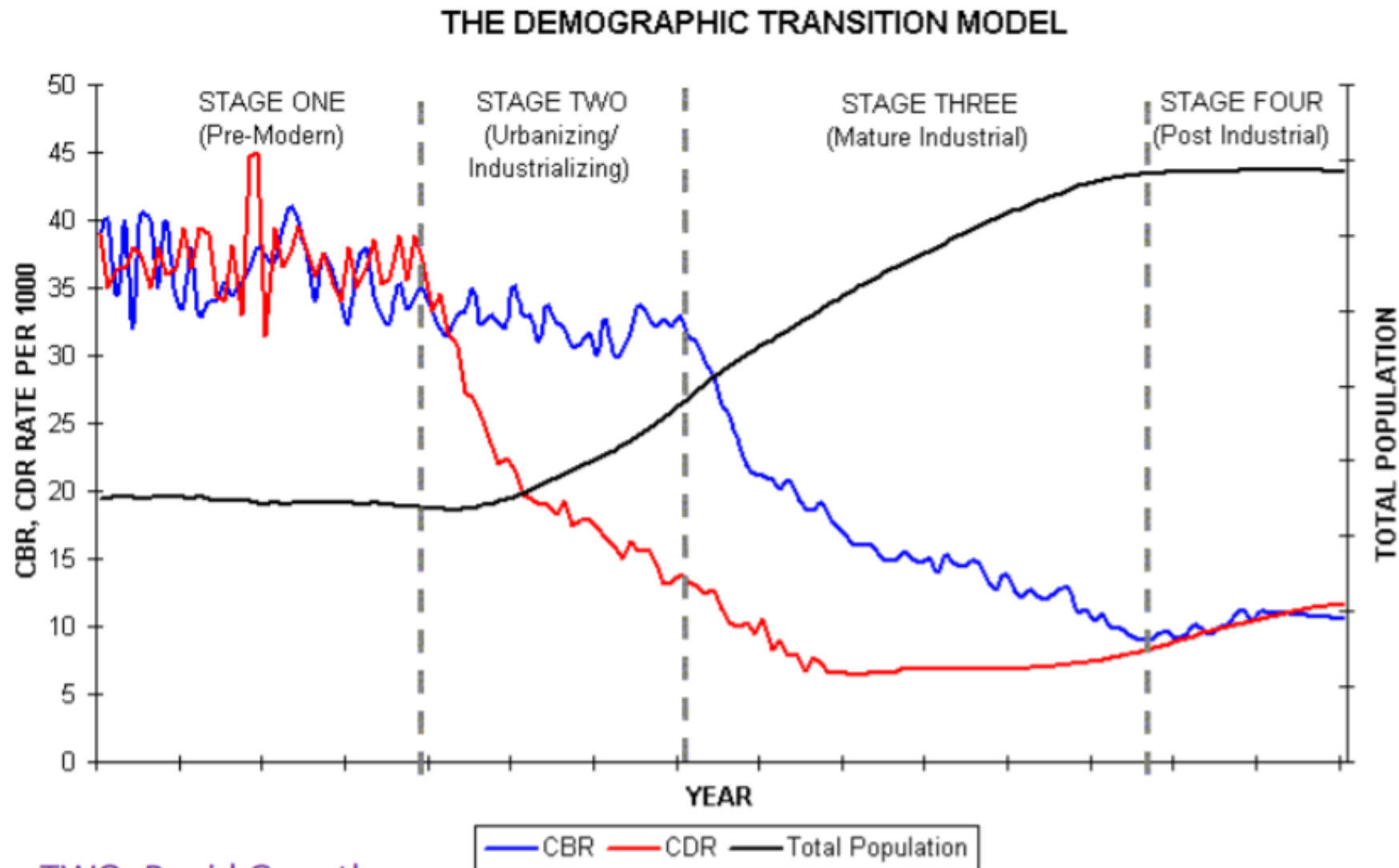
MANY NATIONS ARE EXPERIENCING A DEMOGRAPHIC TRANSITION

- The demographic transition is a four stage model that describes the change from high birth and death rate in a country to low birth and death rates as a country industrializes its economic system.
 - The model predicts that countries will experience increased population growth as they proceed through the transition from Pre-industrial nation to industrialized.

The Four Stages of the Demographic Transition			
1 st : Pre-Industrial	2 nd : Industrializing / Transitional	3 rd : Mature / Industrialized	4 th : Post-Industrial

- **As countries develop and industrialize:**
 - Technological advancements reduce the death rate.
 - As death rates fall and birth rates remain largely unchanged, growth rates increase initially ($r = b - d$)
 - Eventually social and cultural changes reduce the birth rate
 - As birth rates fall to the already low death rate, growth rates stabilize, but at a much higher population size
- **During the demographic transition:**
 - Life expectancy increases, Infant/Childhood mortality decreases, Age of first reproduction increases, Generation time increases

DEMOGRAPHIC TRANSITION



STAGE ONE: PRE-INDUSTRIAL

- **High death rate and Infant Mortality**

- Short life expectancy, high infant mortality
- Disease, lack of health care, poor sanitation, food production / poor distribution
- Poor sanitation, contaminated water supplies, unreliable food supplies, lack of medical care or access to it

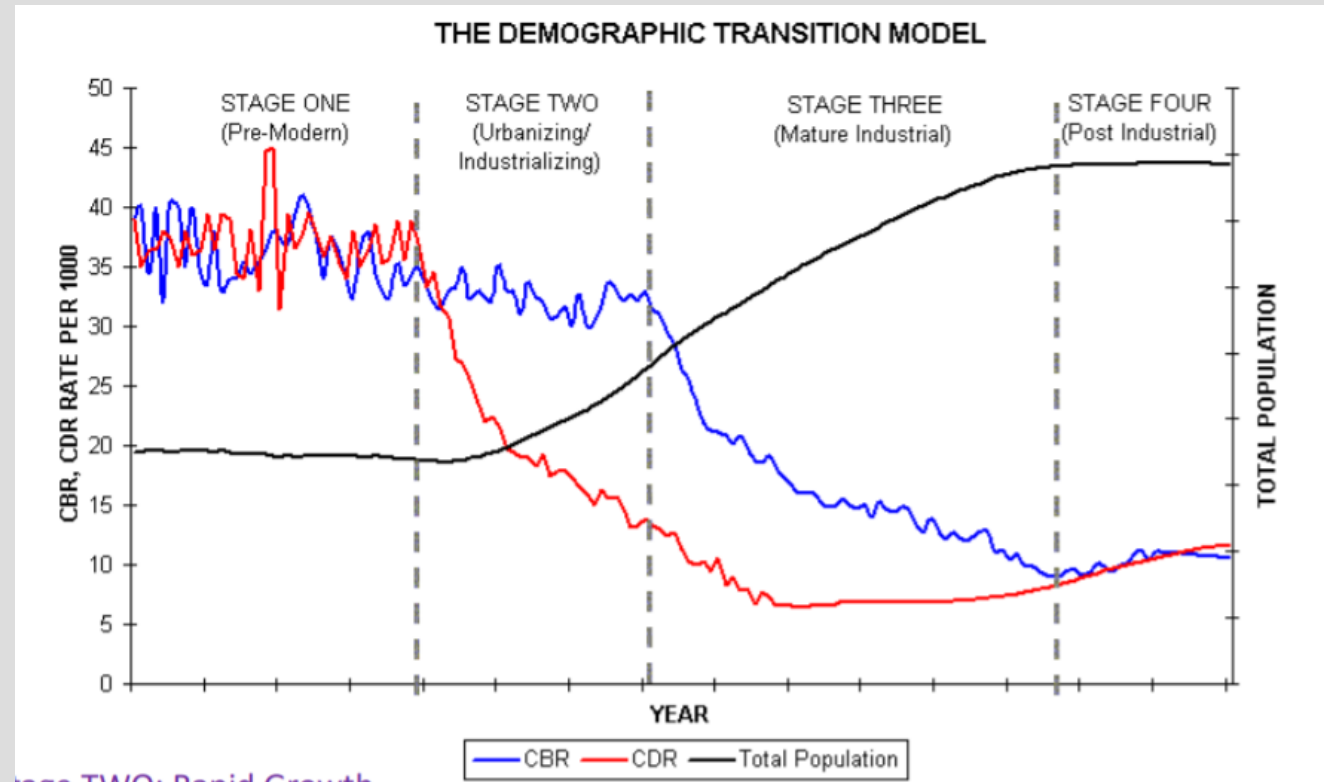
- **High birth rate and TFR**

- Compensates for high death rate
- Rural / agrarian society so kids are beneficial

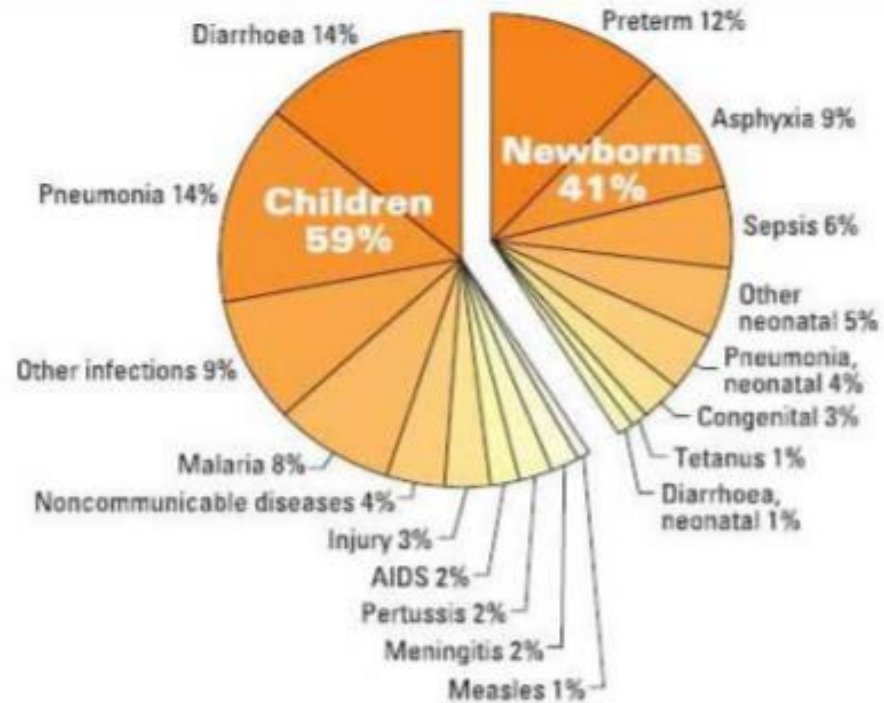
- help around the farm
- care for aging parents

- **Low to zero growth**

- High Death \approx High Birth



Causes of Infant and Childhood Mortality



• Reducing Infant Mortality

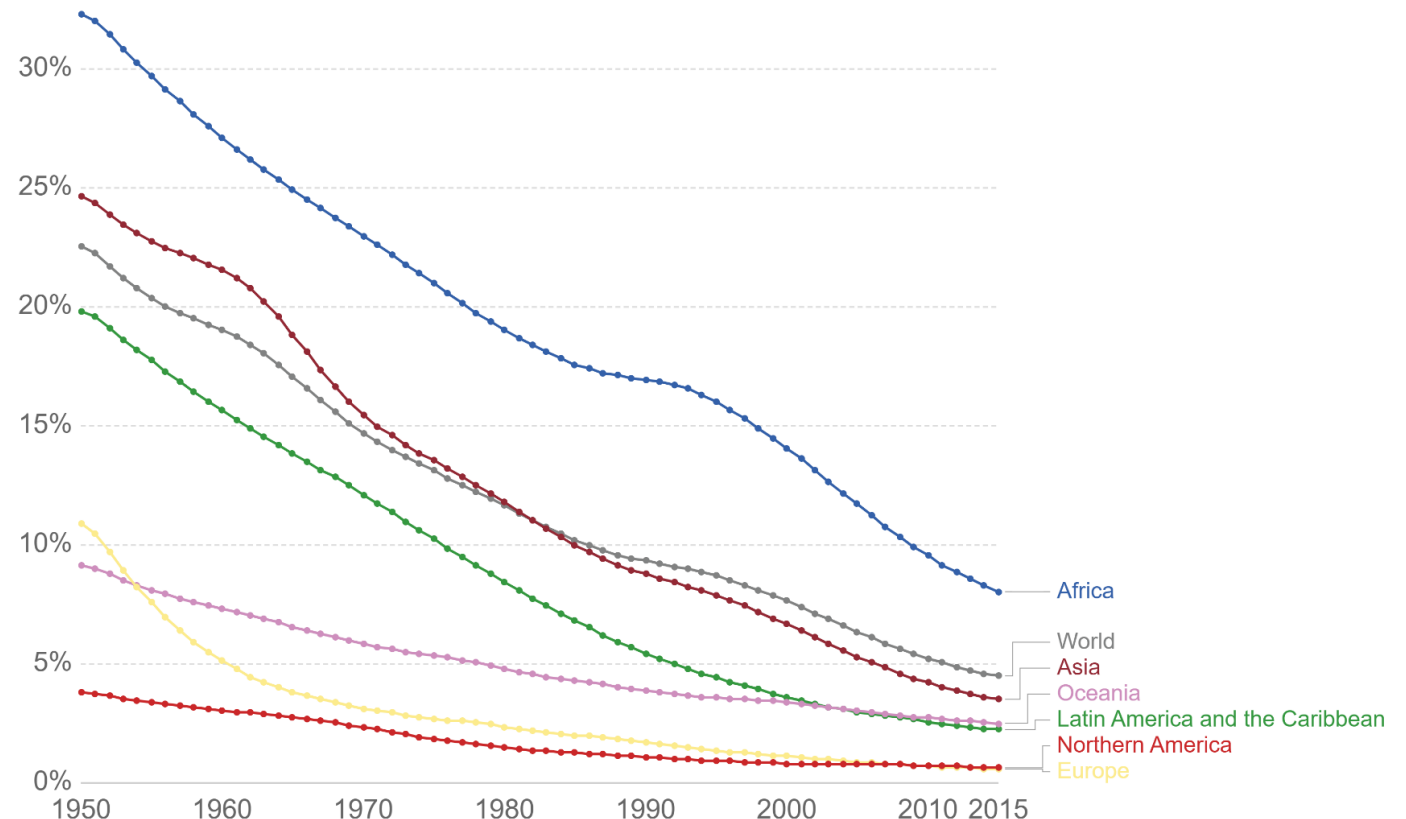
- Opportunity for expectant mothers to rest (paid maternity leave)
- Access to prenatal care and advice
- Access to medicines and medical care during birth
- Access to vaccinations and medicines for young children
- nutrition, water supplies and sanitation facilities also play a role for mother and child.

INFANT AND CHILDHOOD MORTALITY

Child mortality

Share of children, born alive, dying before they are five years old.

Our World
in Data



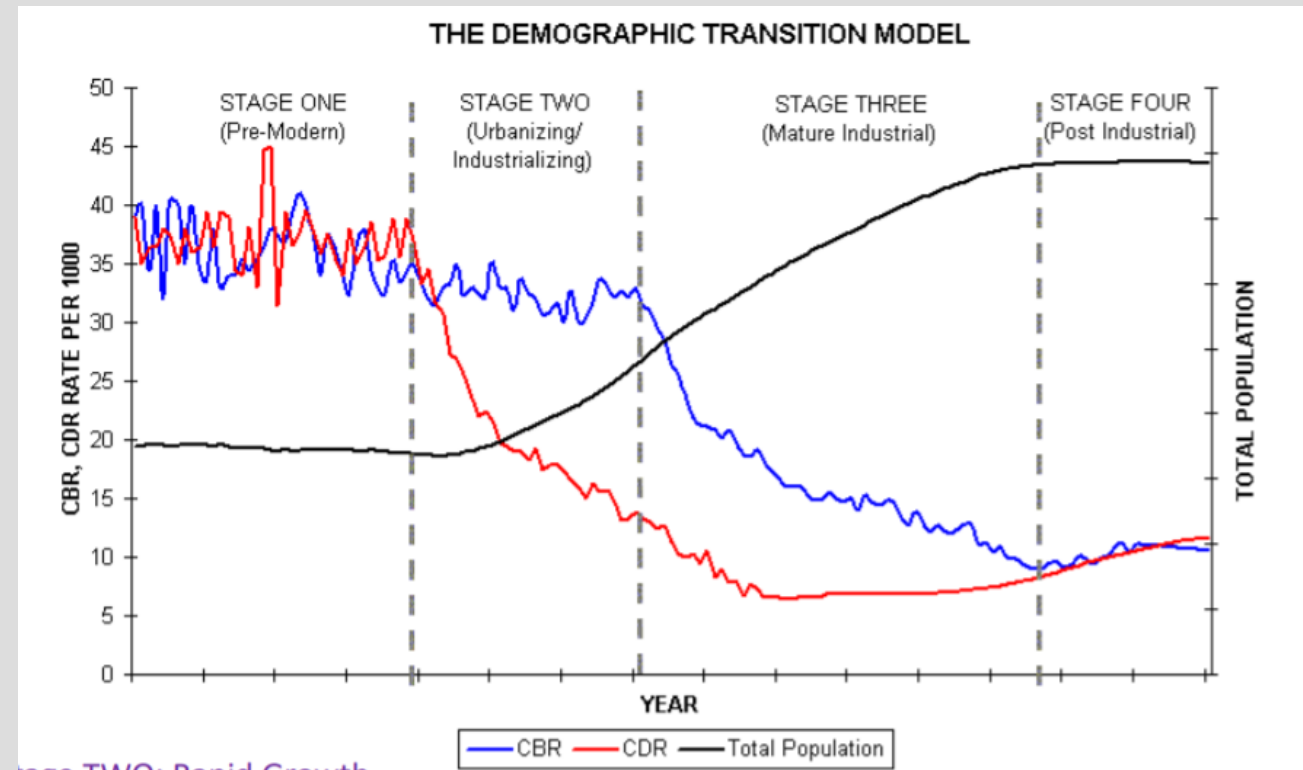
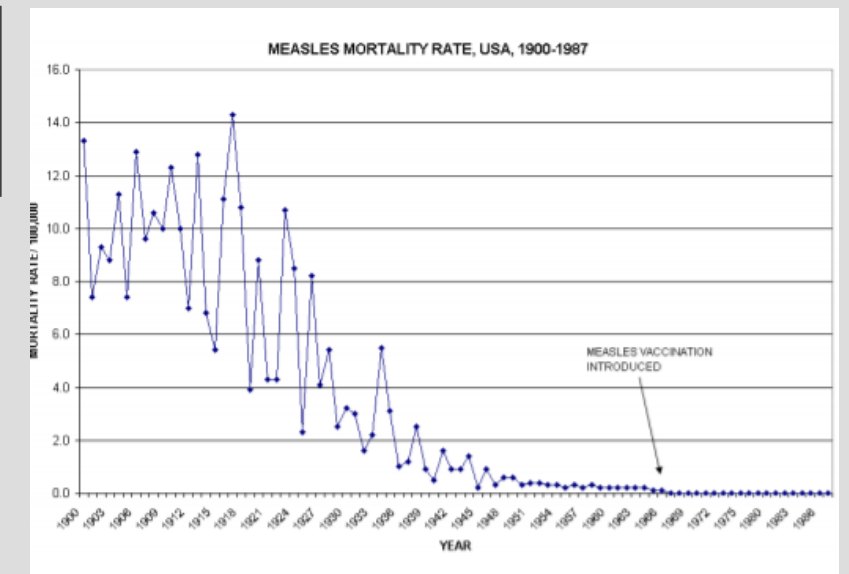
Source: UN Population Division (2017 Revision)

OurWorldInData.org/child-mortality/ • CC BY

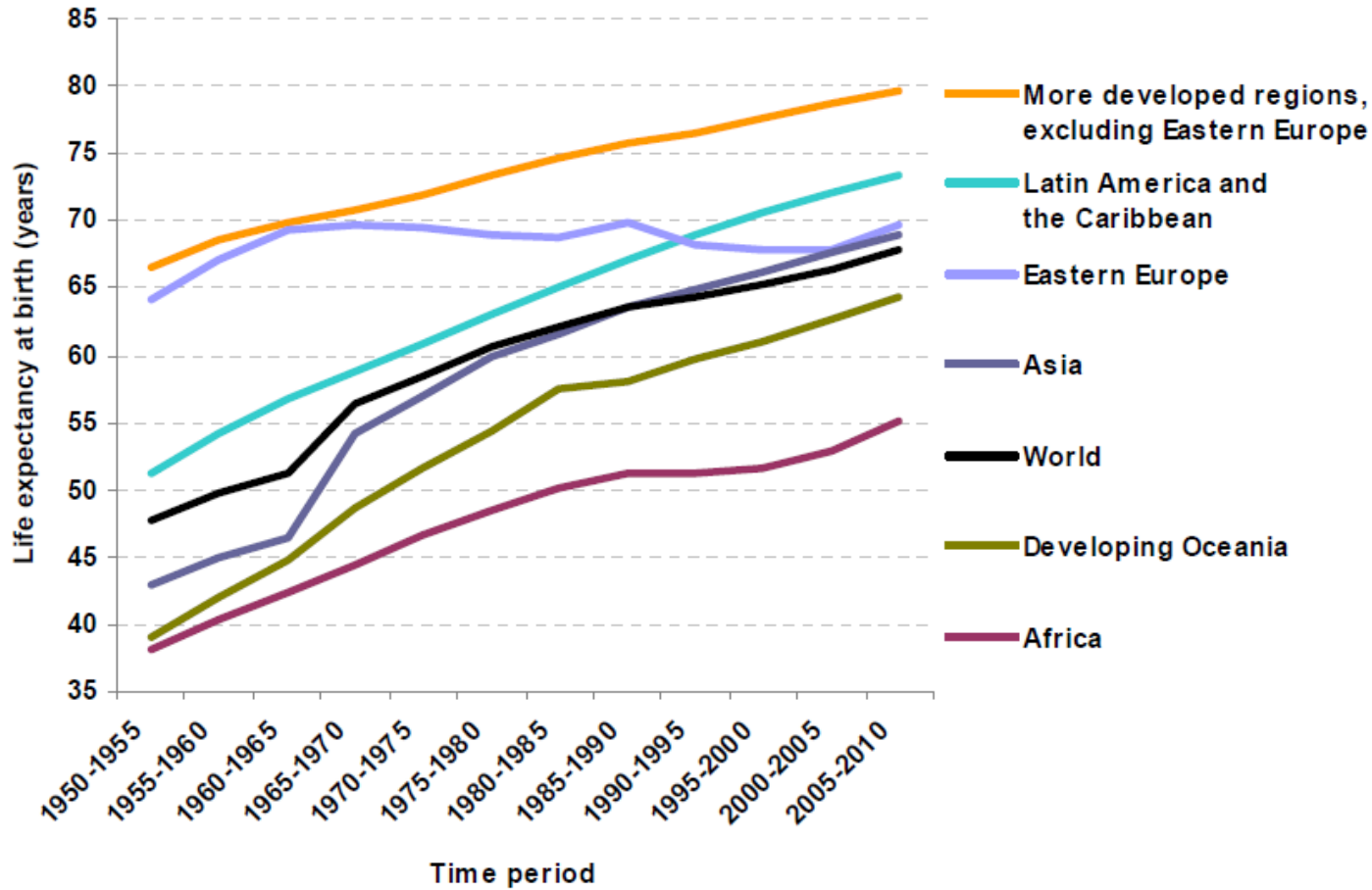
Infant and childhood mortality is generally high in nations during the preindustrial stage of the demographic transition.

STAGE TWO: INDUSTRIALIZING

- **Decreasing Death Rate**
 - Technological advances reduce death rate
 - Improved Health care
 - Vaccination rates increase
 - Access to medicines increase (ex: antibiotics)
 - Access to clean drinking water increases
- **Birth rates / fertility rates remain high**
 - Culturally adjusting to lower infant mortality and increased life expectancy
- **Rapid growth, but improving living conditions**
 - Imbalance between high birth rates and lower death rates leads to rapid growth

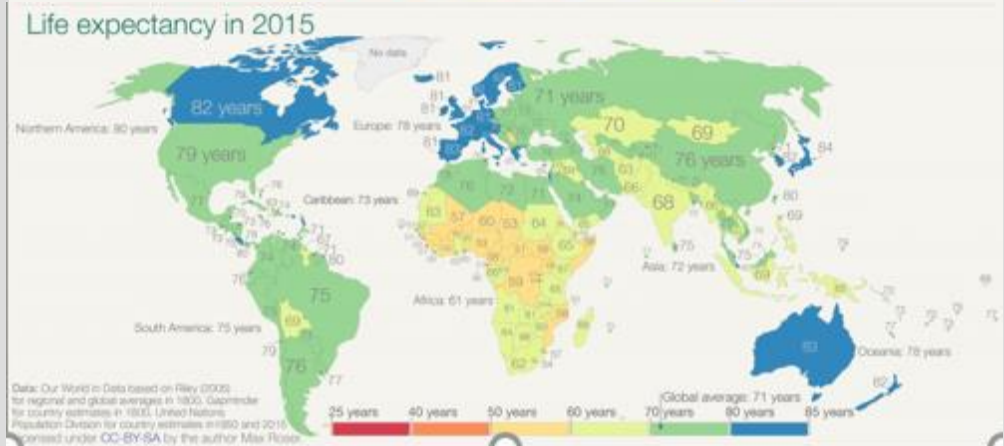
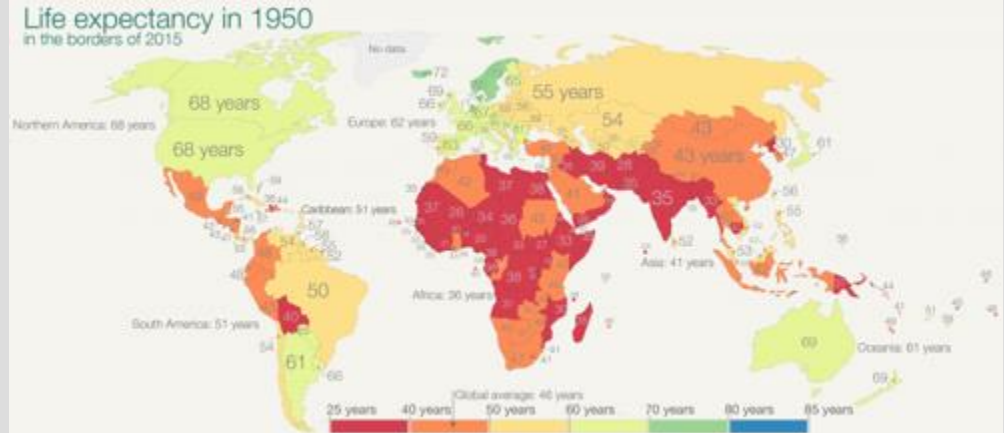
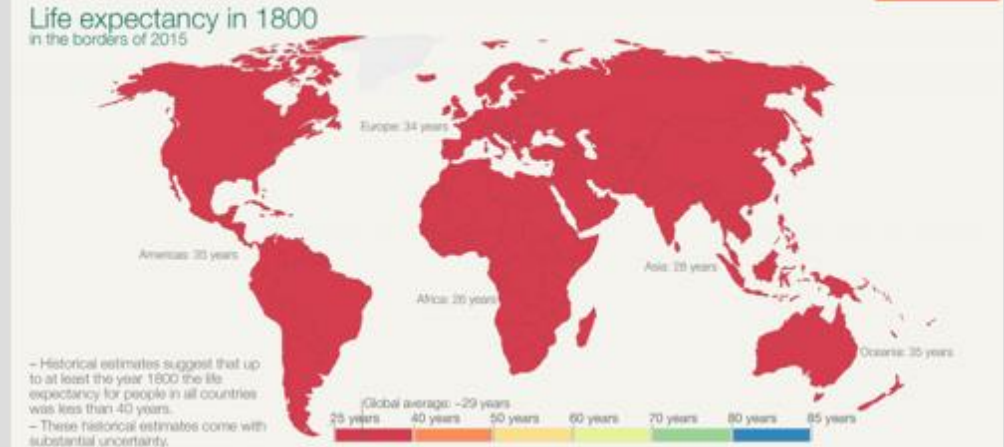


CHANGES IN LIFE EXPECTANCY



During the transitional (2nd) stage, life expectancy starts to increase.

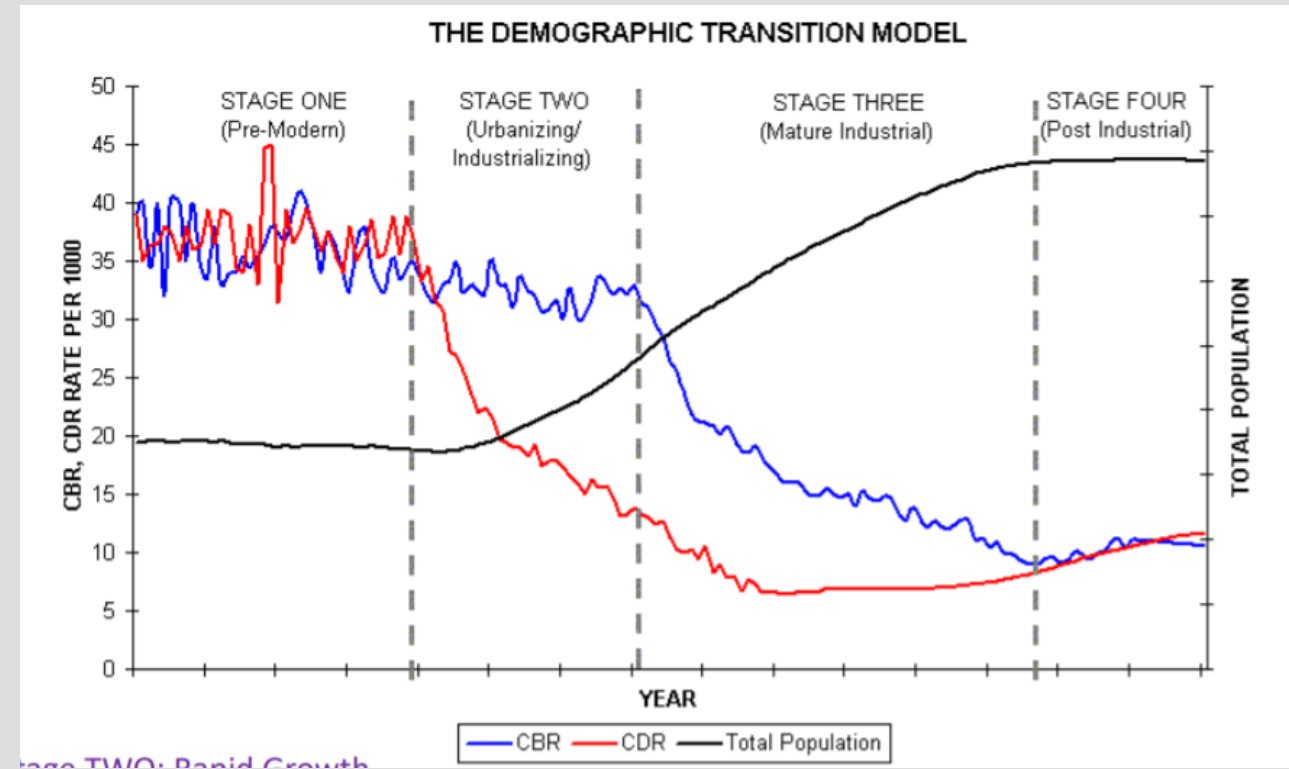
Life expectancy in 1800, 1950, and 2015



Data: Our World in Data based on Riley (2005) for regional and global averages in 1800, Gaumneder for country estimates in 1800, United Nations Population Division for country estimates in 1950 and 2015 licensed under CC-BY-SA by the author Max Planck.

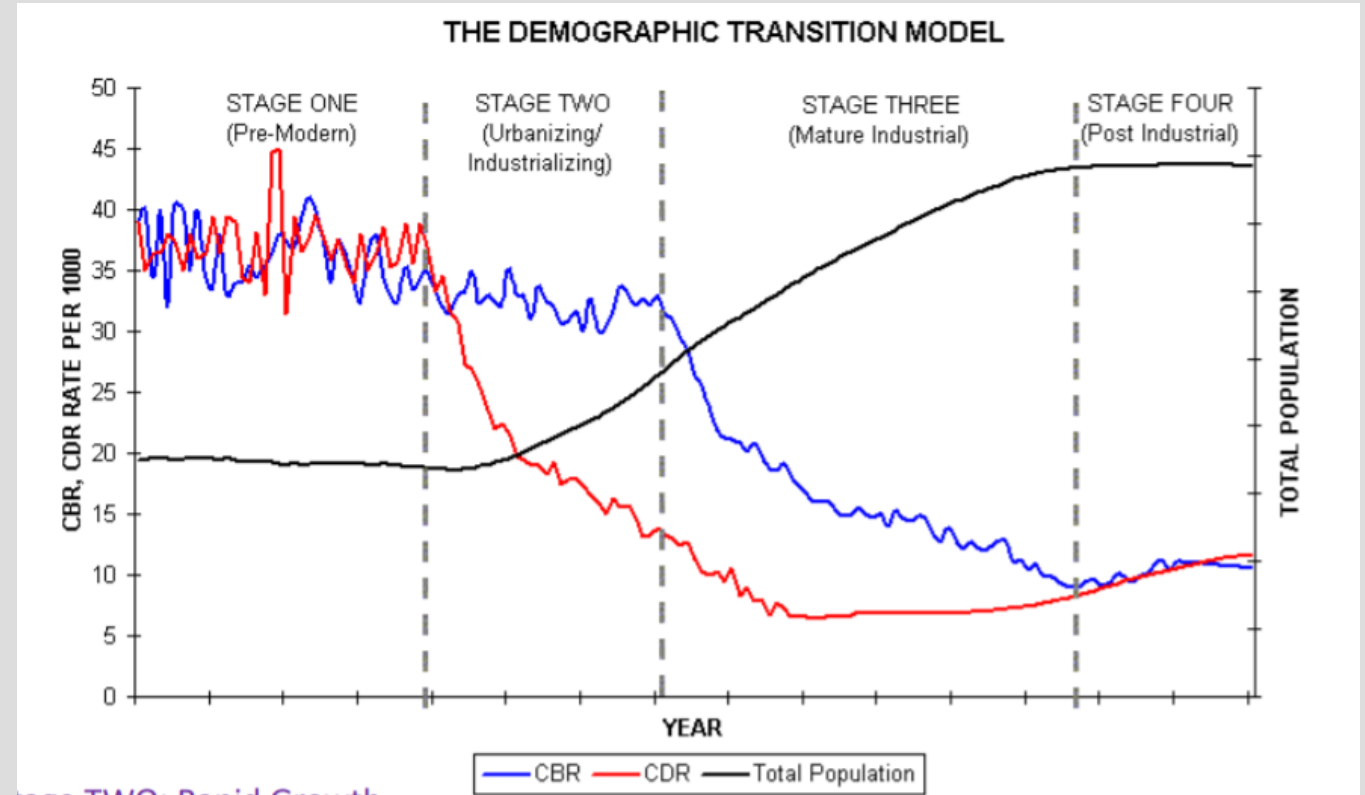
STAGE THREE: INDUSTRIALIZED

- **Decreasing Birth Rates**
 - More efficient food production
 - Less need for child labor
 - Urbanizing population
 - Economy improves
 - Initiation/expansion of government programs (ex: social security)
 - Status and Opportunity for women begins to improve
 - Education, employment, wages
 - Further reduction in infant and childhood mortality
 - Increased access to, and awareness of contraception
- **Falling birth rates \approx death rates (by end of stage)**
 - Population growth slows and approaches ZPG
 - But population is now larger



STAGE FOUR: POST INDUSTRIAL

- **Population size stabilizes**
 - Continued economic development
 - Increasing affluence
 - Greater stability for citizens
 - Further improved status for women
 - Education, employment, wages
 - Increased family planning
 - Generation time increases as age of first reproduction increases
- **Birth rate may eventually drop below death rate**
 - “Kids are a burden”
 - Government may encourage immigration
 - Incentivize children \$\$\$

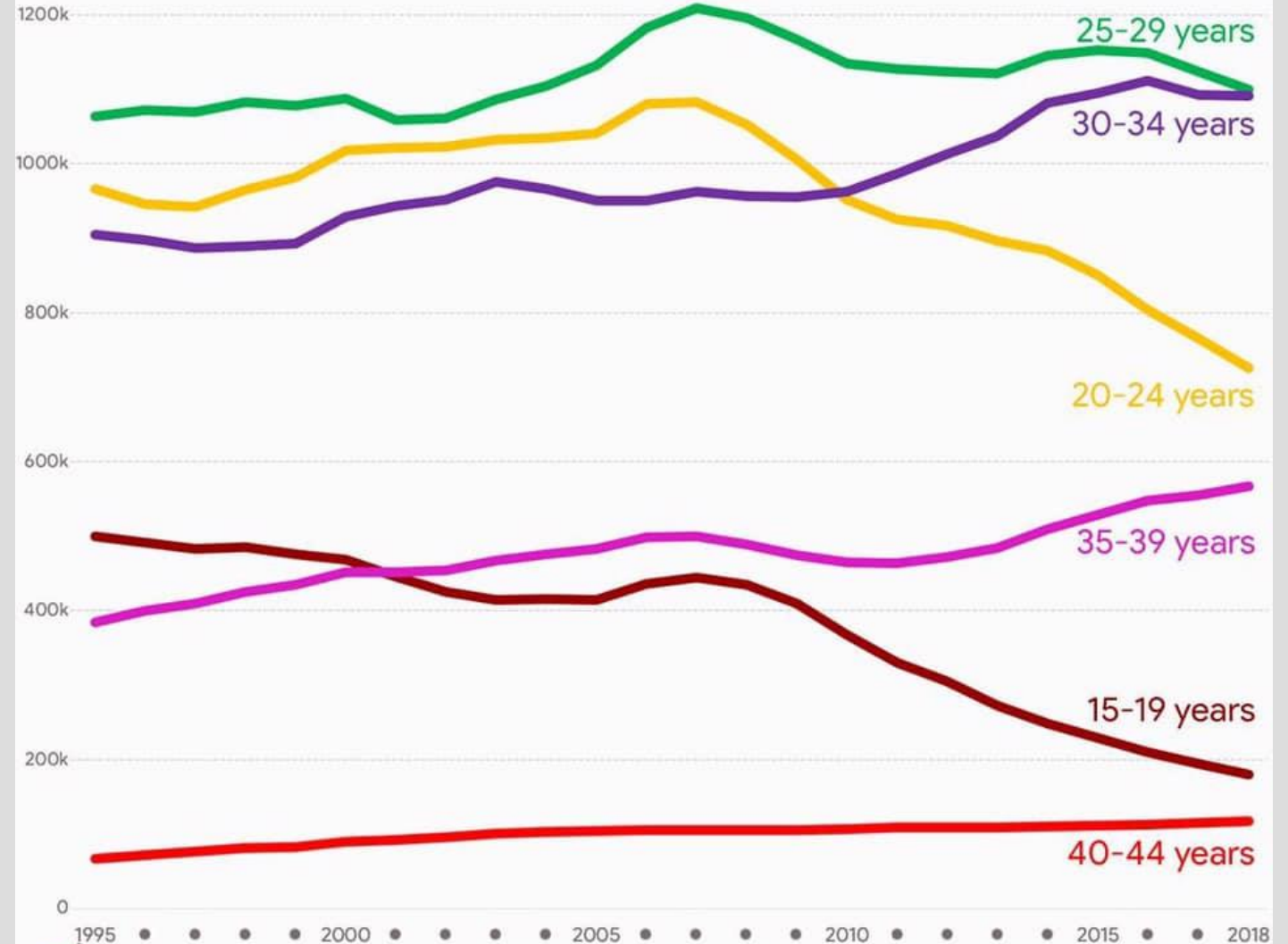


INCREASING AGE OF FIRST REPRODUCTION INCREASES GENERATION TIME

- In what age group of mothers have births decreased the most?
- In what age group of mothers have births increased the most?
- Why?

Generation Time	Number of Children Born per Generation	Generations per 100 years	# of descendants per 100 years
35	1	2.9	≈ 3
25	2	4	28
15	3	6.7	1573

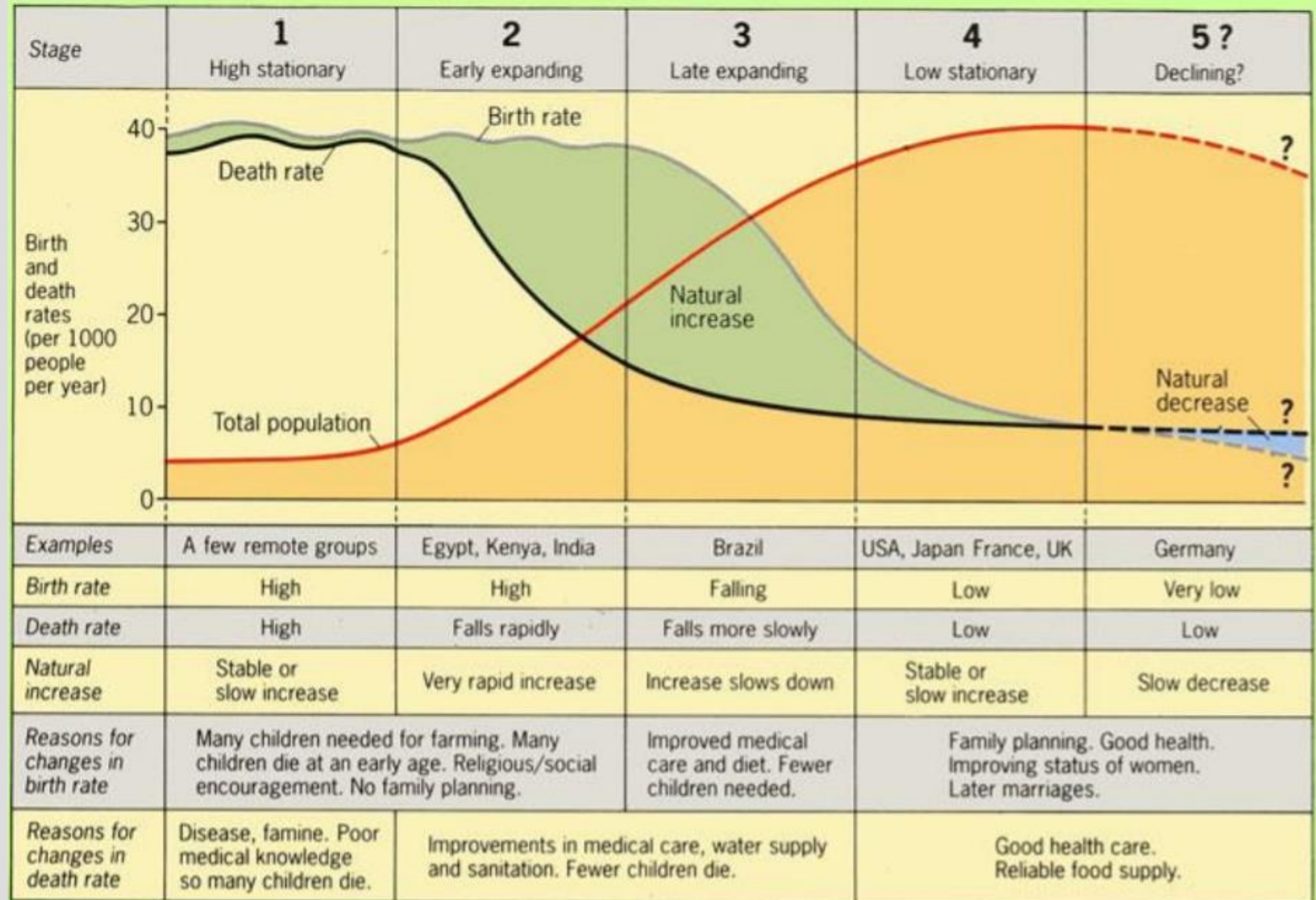
Births by age group of mother in the United States



@Statistics_Data_Facts

Source: United States Department of Health and Human Services (US DHHS), Centers for Disease Control and Prevention (CDC), National Center for Health Statistics (NCHS), Division of Vital Statistics, Natality public-use data 1995-2018

SUMMARY OF EVENTS IN THE DEMOGRAPHIC TRANSITION MODEL



IS THE DEMOGRAPHIC TRANSITION A UNIVERSAL PROCESS?

- It has occurred in Europe, the U.S., Canada, Japan, and other nations over the past 200–300 years
 - But it may or may not apply to nations that are currently developing
 - The transition could fail in cultures that:
 - Place greater value on childbirth
 - Grant women fewer freedoms
- *Why is it important for developed nations to assist developing countries to pass through the transition/industrializing phase of the demographic transition as quickly as possible?*