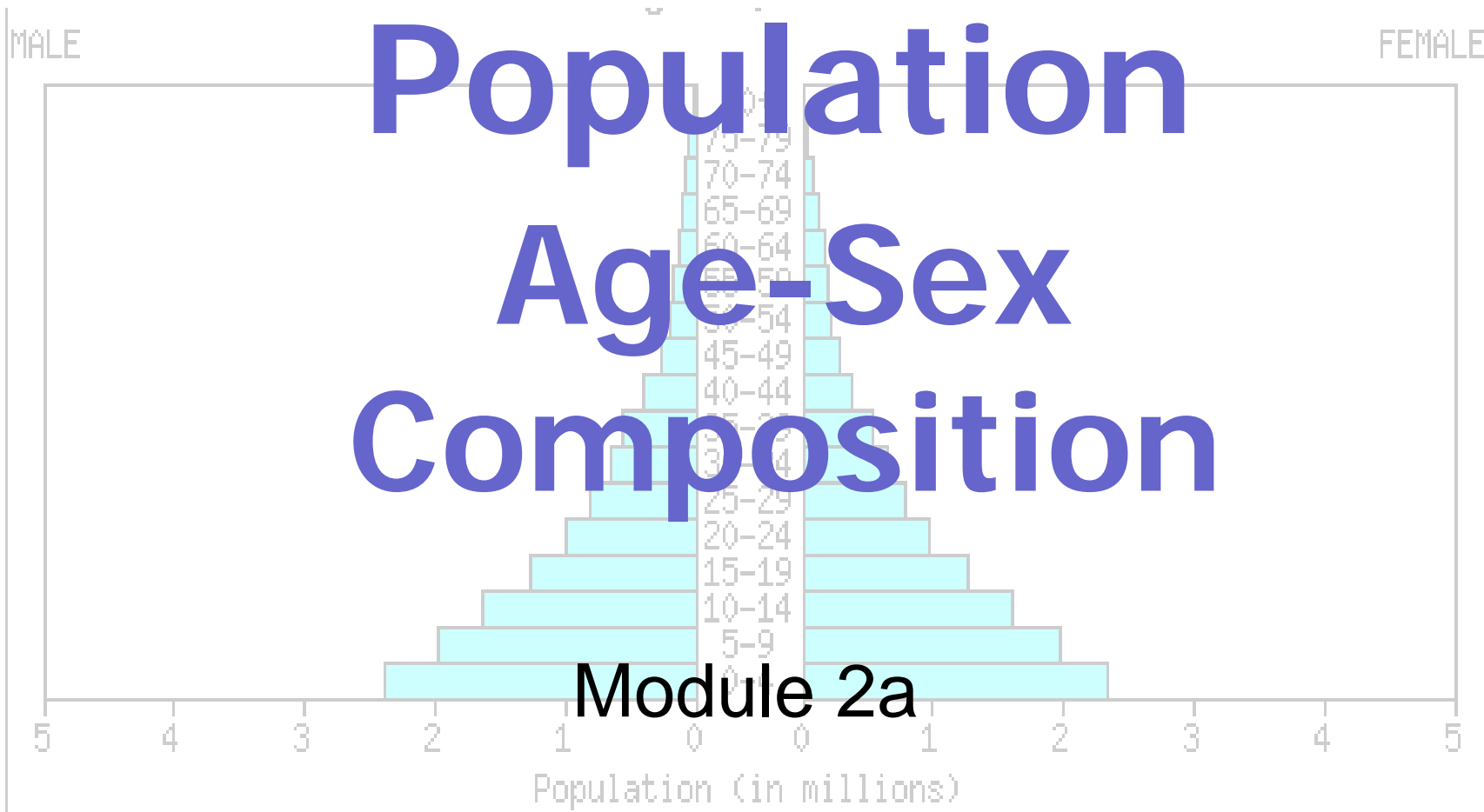


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Population Age-Sex Composition



Module 2a

Learning Objectives

Upon completion of this module the student will be able to:

- ◆ List, define and interpret the measures used to describe the age-sex composition of the population
- ◆ Interpret population pyramids
- ◆ Compare and contrast the age-sex composition of more developed and less developed countries

Age and Sex Composition: What Does This Mean?

- ◆ Proportion of males and females in each age group
- ◆ “Young” population: larger proportion of people in the younger age groups (<15 years)
 - in most less developed countries
- ◆ “Old” or “aging” population: relatively large proportion of people in the older age groups (>65 years) - in the more developed countries

Age and Sex Composition: Why We Should Know It?

- ◆ Has considerable impact on health, social, economic, and political processes, both present and future
- ◆ For example, different age-sex compositions result in different proportions of the population in the labor force or in school, as well as having different medical needs, social investment patterns, etc.

The Census

Selected Questions

- ◆ Age
- ◆ Sex
- ◆ Marital status
- ◆ Citizenship
- ◆ Language
- ◆ Ethnic Group
- ◆ Literacy
- ◆ Educational attainment
- ◆ Occupation
- ◆ Place of birth
- ◆ Place of usual residence

Uganda 2000 Population

Age Group	Population in thousands		Sex ratio
	Male	Female	
TOTAL	11,671	11,646	100
0-4	2,376	2,350	101
5-9	1,983	1,972	101
10-14	1,628	1,614	101
15-19	1,277	1,265	101
20-24	997	980	102
25-29	807	779	104
30-34	661	644	103
35-39	551	533	103
40-44	394	378	104
45-49	267	278	96
50-54	194	228	85
55-59	161	200	81
60-64	136	163	83
65-69	103	123	84
70-74	75	79	95
75+	62	59	106

Source: US Census Bureau www.census.gov

Age Composition :

How Can We Describe It?

- ◆ **Median age:** Age at which exactly half the population is older and half is younger.
- ◆ May be used to describe a population as “young” or “old”. If median age is:
 - Less than 20 = “young”
 - 30 or over = “old”
 - between 20 to 29 = “intermediate age”

Source: Shryock and Siegel, 1976.

continued

Age Composition :How Can We Describe It?

Median Age

- ◆ In 1999, the median age of Uganda (world's youngest population) was 17.5 years , while that in Italy(world's oldest population) was 39.9 years.

continued

Age composition: How can we describe it?

- ◆ **Age Dependency Ratio** = Ratio of persons in the 'dependent ages' (under 15 and over 65) to those in the 'economically productive' ages

$$\frac{P_{0-14} + P_{65+}}{P_{15-64}} \times 100$$

continued

Age composition: How can we describe it?

Age Dependency Ratio

- ◆ **Child dependency ratio:** ratio of population under 15 to population 15 to 64

$$\frac{P_{0-14}}{P_{15-64}} \times 100$$

- ◆ **Elderly dependency ratio:** ratio of population 65 and older to population 15 to 64

$$\frac{P_{65+}}{P_{15-64}} \times 100$$

continued

Age composition: How can we describe it?

Age Dependency Ratio

- ◆ In Uganda in 2000:
 - Child dependency ratio = 110
 - Elderly dependency ratio = 5
 - Age dependency ratio = 114
- ◆ In Japan in 2000
 - Child dependency ratio = 21
 - Elderly dependency ratio = 25
 - Age dependency ratio = 47

continued

Age composition: How can we describe it?

Age Dependency Ratio

Regions	Age <15 %	Age 15-64 %	Age 65+ %	Dependency ratio
Africa	44.9	52.0	3.0	92.2
Latin America	35.7	59.5	4.8	68.0
Europe	20.5	66.8	12.7	49.8

Source: Bos, et al., 1994

Sex Composition: How Can We Describe It ?

- ◆ **Sex ratio:** Ratio of males to females in a given population ,usually expressed as number of males for every 100 females

$$\frac{\text{\# of Males}}{\text{\# of Females}} \times 100$$

continued

Uganda 2000 Population

Age Group	Population in thousands		Sex ratio
	Male	Female	
TOTAL	11,671	11,646	100
0-4	2,376	2,350	101
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continued

Source: US Census Bureau; www.census.gov

Sex Composition: How Can We Describe It ?

Sex Ratio

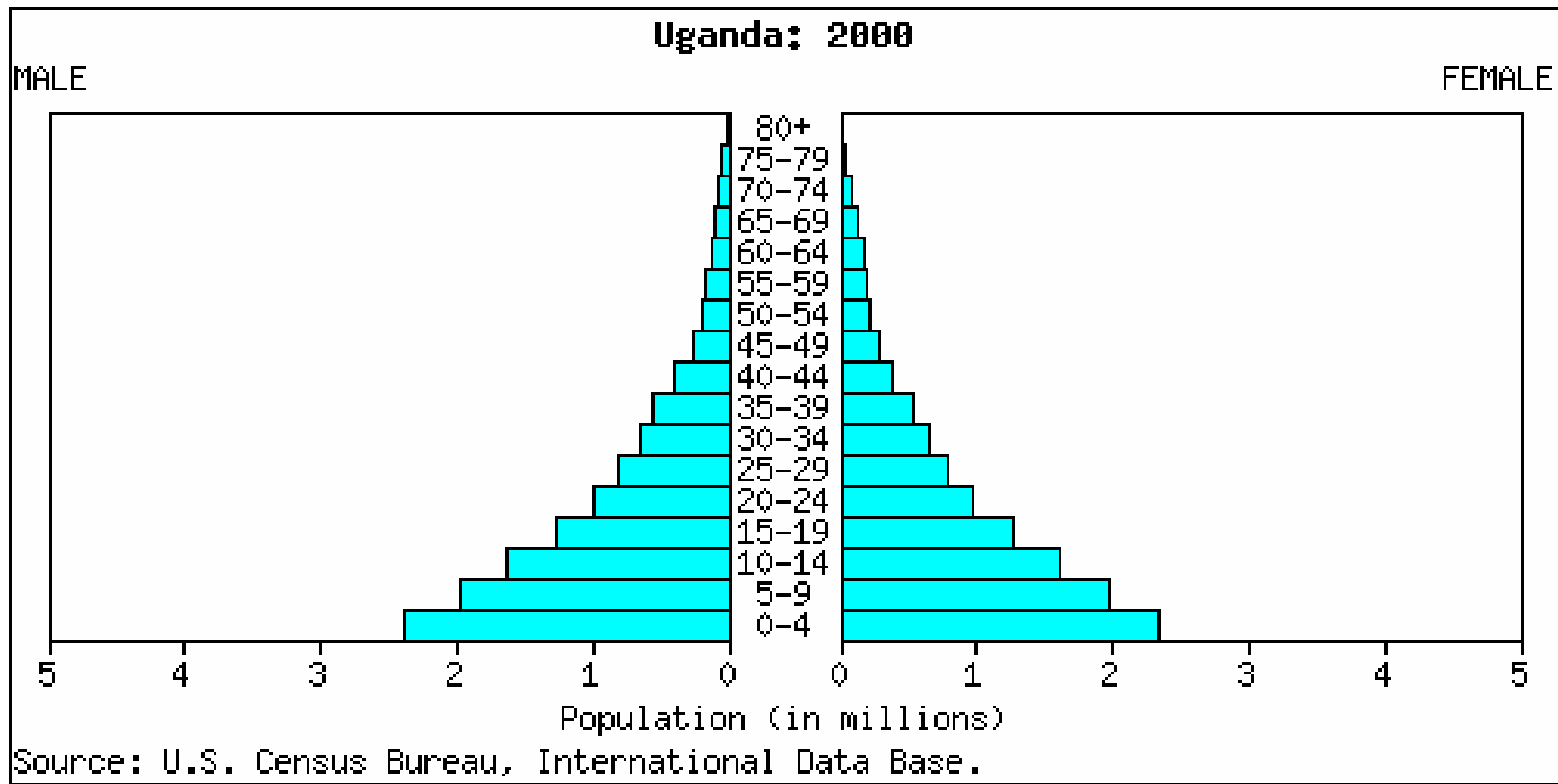
- ◆ Sex ratio is affected by:
 - Sex ratio at birth (always more than 100 with a range from 102-105)
 - Differential patterns of mortality for males and females
 - Differential patterns of migration for males and females in population

Graphical Representation of Age and Sex Composition

Population Pyramids

- ◆ A population pyramid is a special type of bar graph.
- ◆ Male and female populations are plotted on the opposite sides.
- ◆ Number (or proportion) of males and females in each age group is represented by the length of the horizontal bar.

Uganda 2000 Population Pyramid



continued

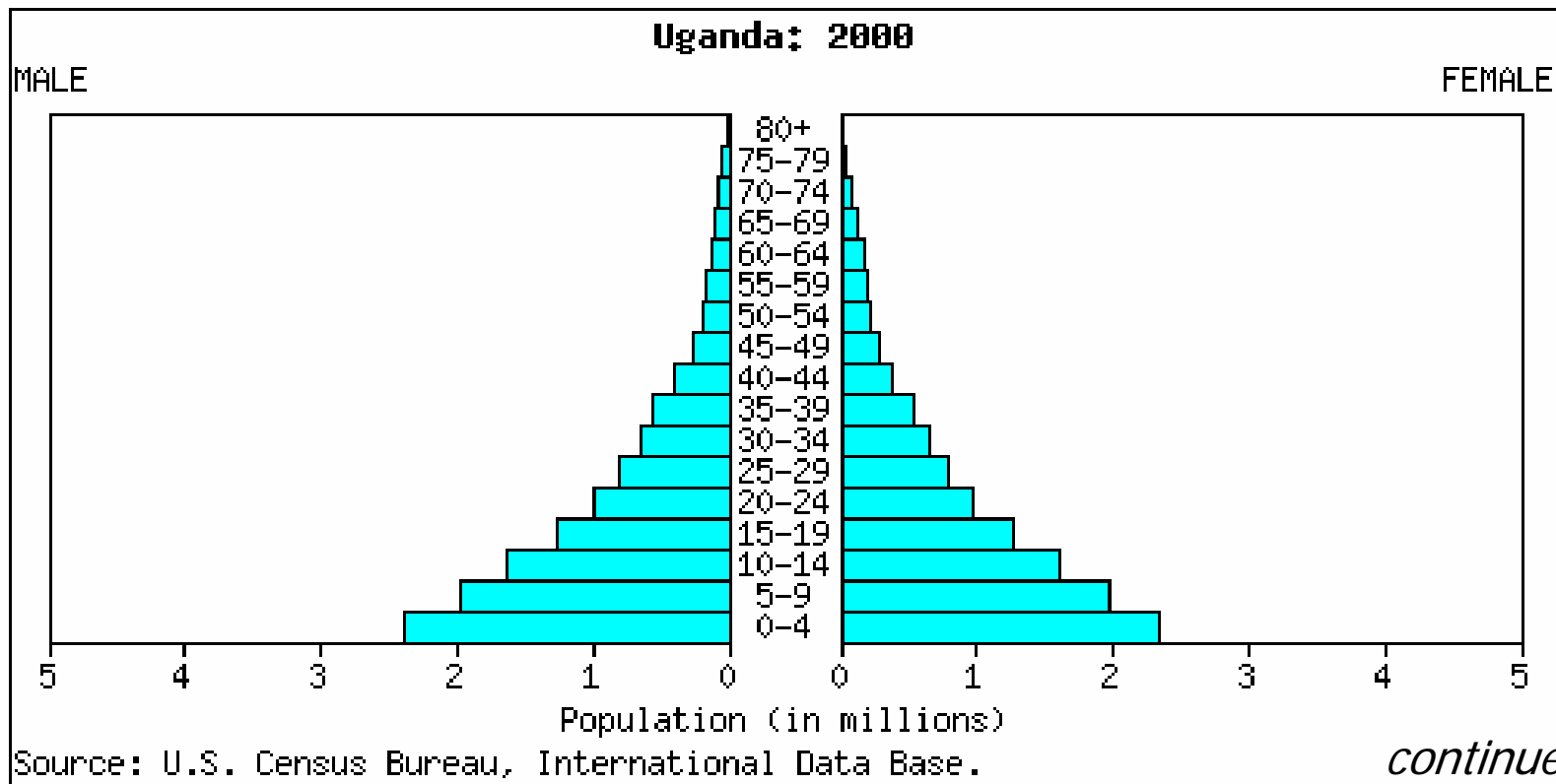
Graphical Representation of Age and Sex Composition

Population Pyramids

- ◆ Each year a new cohort is born and added to the bottom of the pyramid, while the older cohorts move up as they age. The pyramid keeps narrowing with loss of members due to death (assuming no migration in or out).
- ◆ Rapidly increasing death rates after age 45 result in a narrowing peak in all population pyramids.

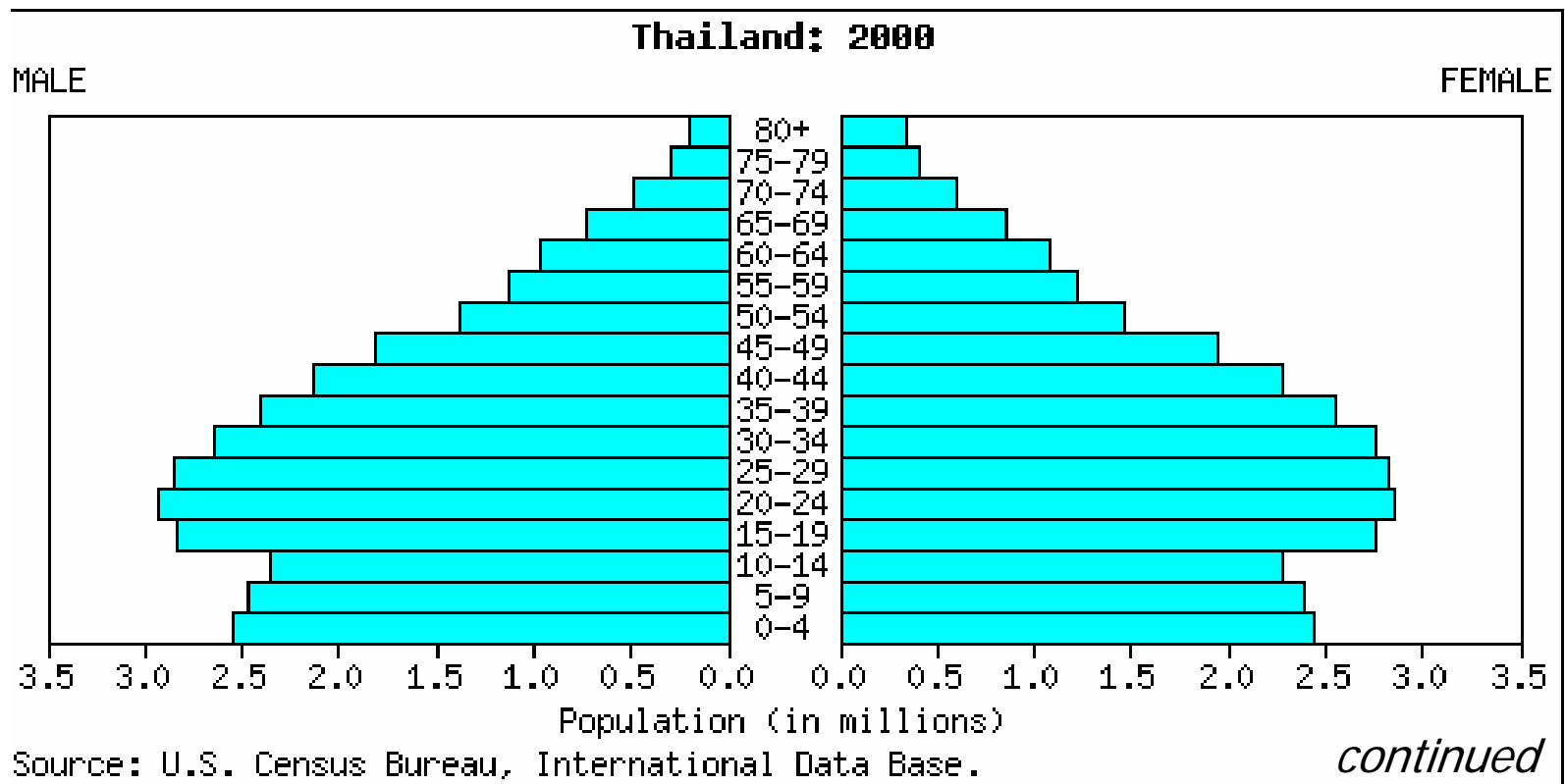
Three Profiles of Age-Sex Composition

1. **Rapid growth:** High fertility populations with large proportion of people in the younger ages



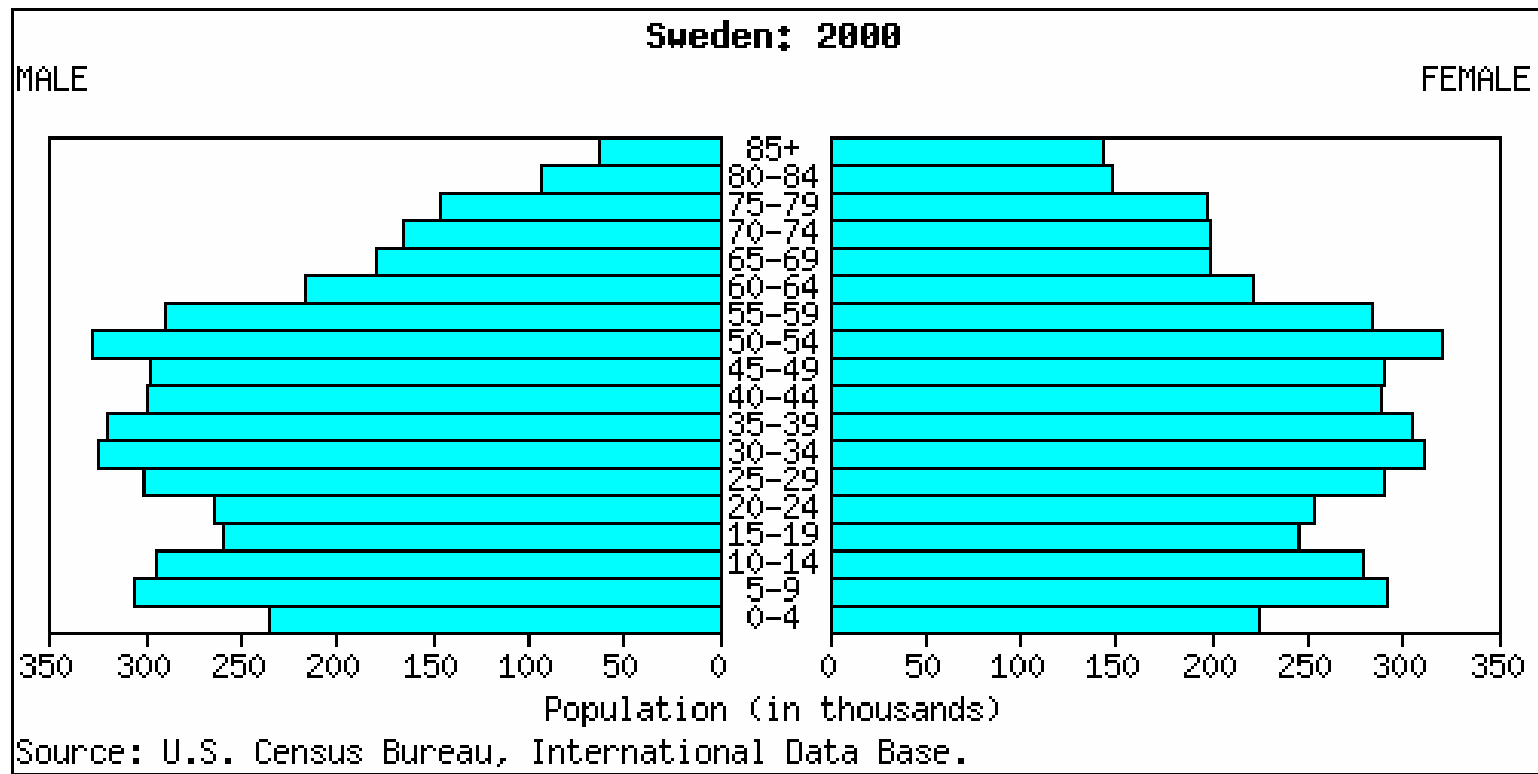
Three Profiles of Age-Sex Composition

2. **Slowing growth:** Declining fertility with a relatively smaller proportion of the population in the younger ages

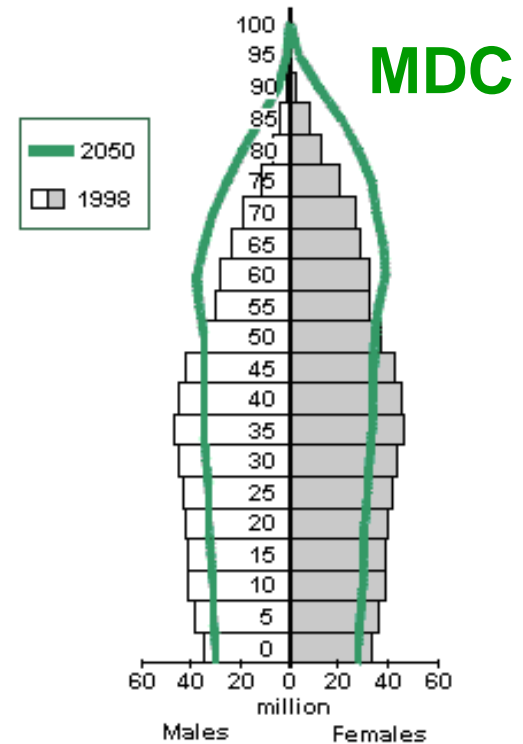
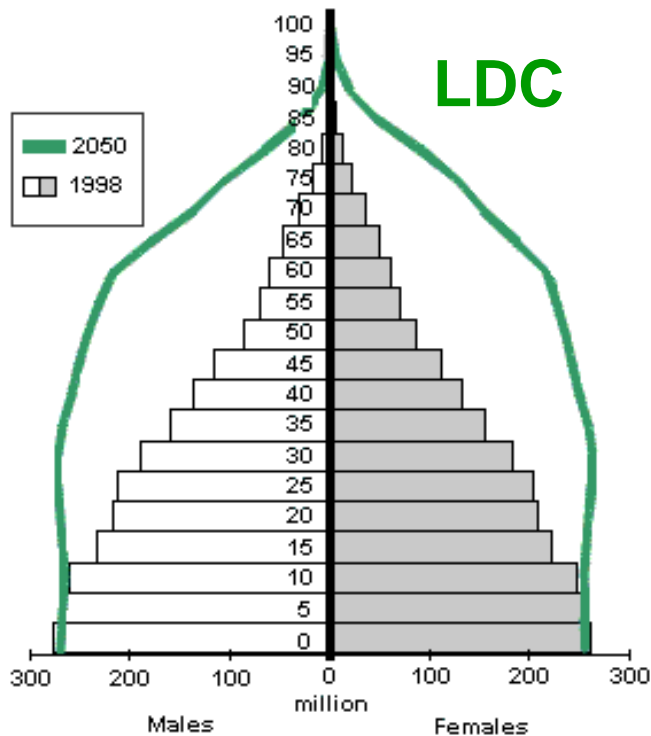


Three Profiles of Age-Sex Composition

3. Zero growth or decreasing population: Roughly equal numbers of people in all ages tapering off gradually at the older ages



Age Structure: Contrasts Between LDC and MDC, 2000 and 2050



Source: United Nations Population Division, *World Population Prospects: 1998 revision*.

Age Structure: Contrasts Between LDCs and MDCs

- ◆ **Age under 15**: Twice as high a percentage of the population in LDCs (34%) compared with MDCs (19%)
- ◆ **Percentage of 65 and over**: Three times higher in MDCs (14%) than in LDCs (5%)
- ◆ **Age-dependency ratio**: much higher in LDCs (64) than MDCs (49)

Summary Slide

This concludes this session

The key concepts introduced in the session

- ◆ Description of age composition: median age, age dependency ratios
- ◆ Graphical description of age composition: population pyramids
- ◆ Description of sex composition: sex ratio
- ◆ Three profiles of age-sex composition
- ◆ Contrasting age structure in MDC and LDC

Population Age-Sex Composition

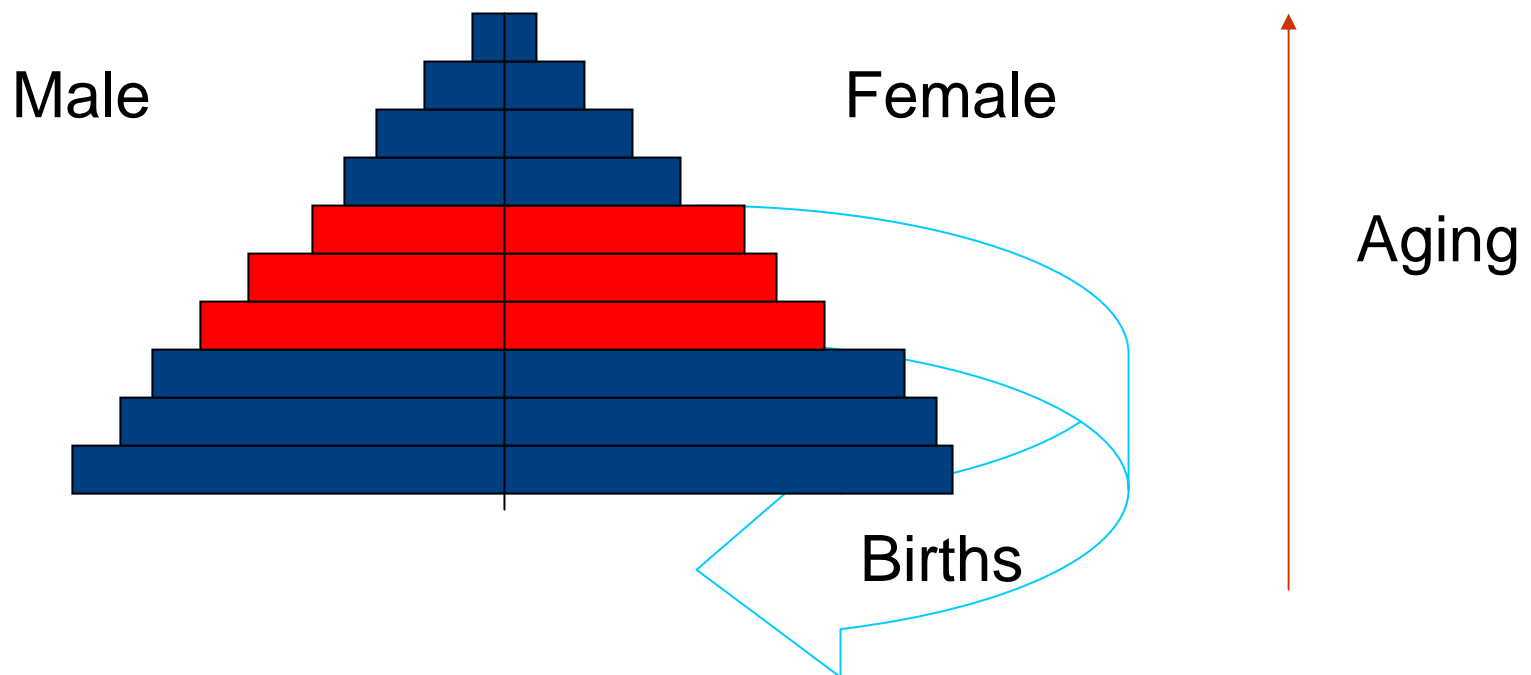
Module 2b

Learning objectives

- ◆ Describe how fertility and mortality affect the age-sex composition
- ◆ Describe how the age-sex composition affects fertility and mortality
- ◆ Explain how the demographic transition affects the age-sex composition of the population
- ◆ Discuss some socioeconomic and health implications of population composition

How Population Processes Determine Structure - Fertility

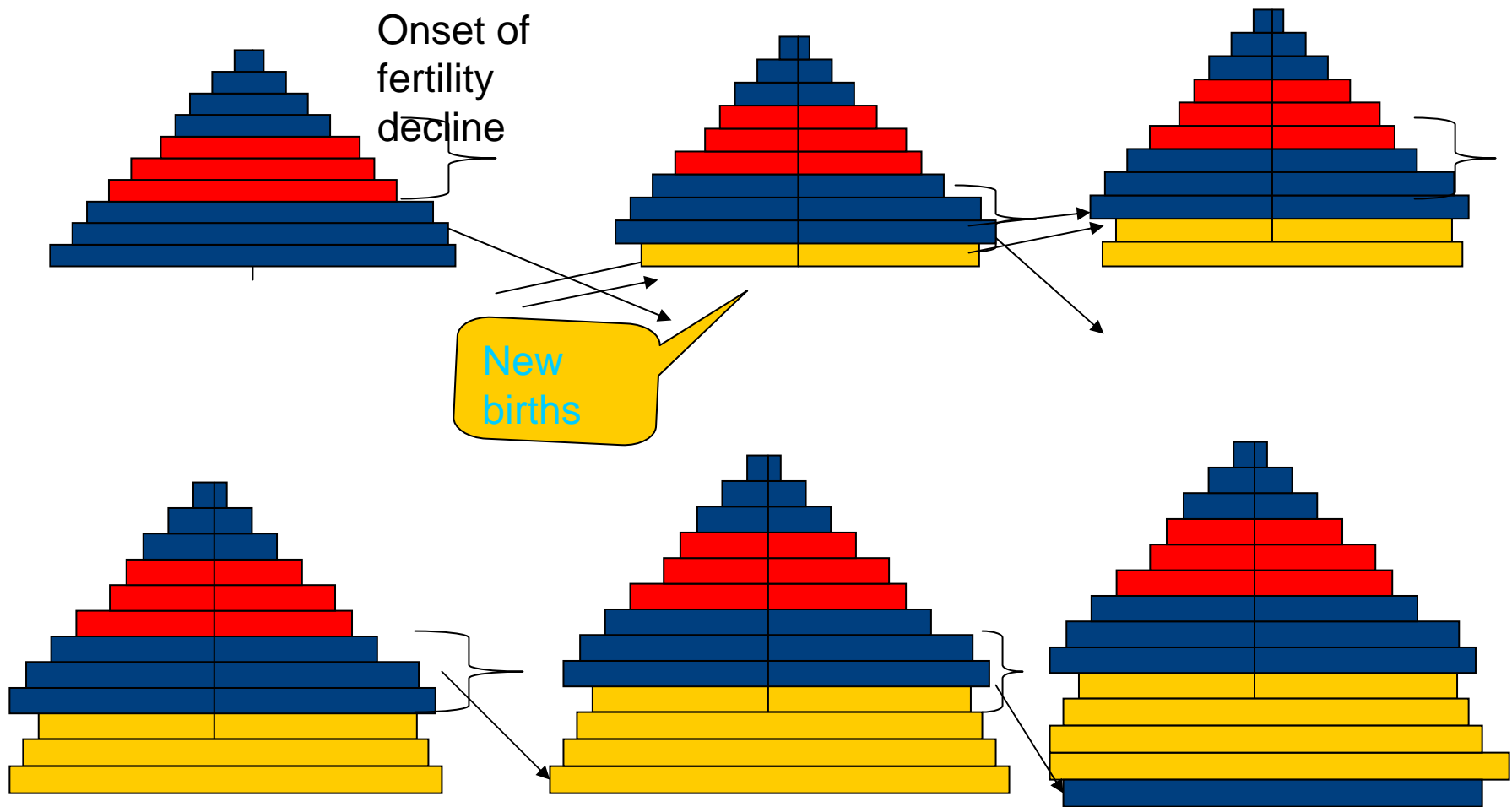
- ◆ The total number of births is a function of:
 - Number of women in the child-bearing age groups
 - Age-specific fertility rates.



How Fertility Decline Affects Population Age Structure

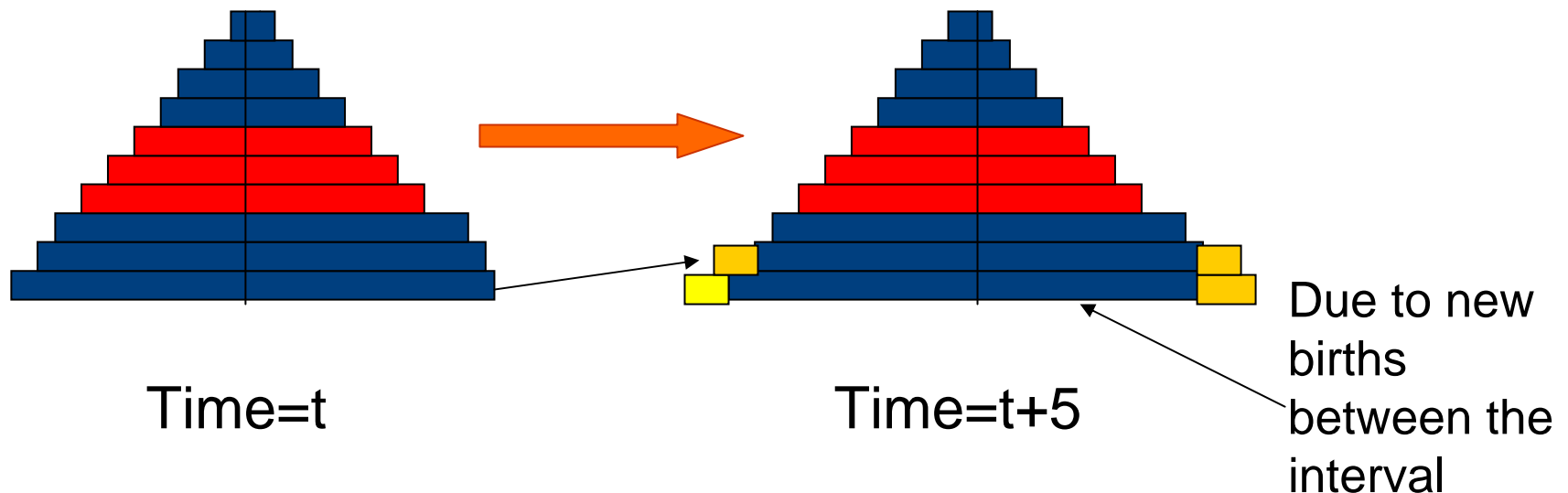
- ◆ Initially there is a decline in number of births entering the bottom of the population pyramid.
- ◆ Some 15 years later the smaller cohorts begin to enter their child-bearing years.
- ◆ Their reduced numbers combine with the already reduced fertility rates to produce even smaller birth cohorts.
- ◆ This continuing decrease in the proportion of population in the younger age groups leads to population aging.

How Does Declining Fertility Affect Age Structure: Population Aging



How Mortality Decline Affects Age-Sex Composition

- ◆ With the initial transition from high to lower mortality, most gain in survival is among infants and children. Therefore, younger cohorts would grow relatively more than the elderly making the population “younger.”



How Mortality Affects Age-Sex Composition

- ◆ Late in the demographic transition, most mortality gain is among the elderly, particularly females, making the population even “older.”

How Age Structure Affects the Population Processes

- ◆ The likelihood of giving birth, dying (and migrating) is not same across all the age categories.
- ◆ Effect on mortality:
 - Higher the proportion of older people in the population- higher the overall (crude) death rate in the population due to inherent higher biological risk of death at old ages.

How Age Structure Affects the Population Processes

◆ Effect on fertility:

- Tendency to give birth varies with age, even within the limited reproductive life span of the women (primarily ages 15 - 45),
- the crude birth rate in population will be relatively higher with a higher proportion of women in the peak reproductive age groups.

◆ Migration:

- mobility is at its peak ages between the late teens and mid thirties

Demographic Transition and Age Composition of a Population

- ◆ The increase in population size during demographic transition is not evenly distributed over all age groups
- ◆ The age groups with the greatest proportional gain in population differ according to the stage of the demographic transition

continued

Demographic Transition and Age Composition of a Population

- ◆ During the successive phases of demographic transition, the age structure is progressively transformed from the general shape of a triangle to the profile of a rectangle

The Demographic Transition and Dependency Ratios

- ◆ With the initial mortality decline, the child dependency ratio and total dependency ratio will increase.
- ◆ With the subsequent fertility decline, the dependency ratio will decline as the proportion of children goes down.
- ◆ In the late stages of transition, the dependency ratio rises again as the elderly gain a larger proportion of the population.

Fertility Decline and the “Demographic Bonus”

- ◆ The dependency ratio is minimum somewhere midway in the demographic transition.
- ◆ At this point the working-age population constitutes the largest share of the total.
- ◆ This “demographic bonus” may last several decades

Individual Aging Versus Population Aging

- ◆ **Individual aging:** Absolute gain in individual life expectancy due to improvements in the quality of the environment and from medical advances among other factors.
- ◆ **Population aging:** Relative increase in proportion of the older population that occurs primarily due to decline in birth rates.

Summary Slide

- ◆ This concludes this lecture. The main concepts introduced in this module include:
 - Effect of different population processes on population age structure
 - Effect of population age structure on different population processes
 - Demographic transition and population age structure