2021 Mid-Year Meeting
Washington Group on Disability Statistics

Virtual Meeting
May 26, 2021

Schedule I	09:30 – 12:00 US EDT
	13:30 – 16:00 UTC / GMT
Schedule II	18:00 – 20:30 US EDT
	20:00 – 22:30 UTC / GMT

Session 2

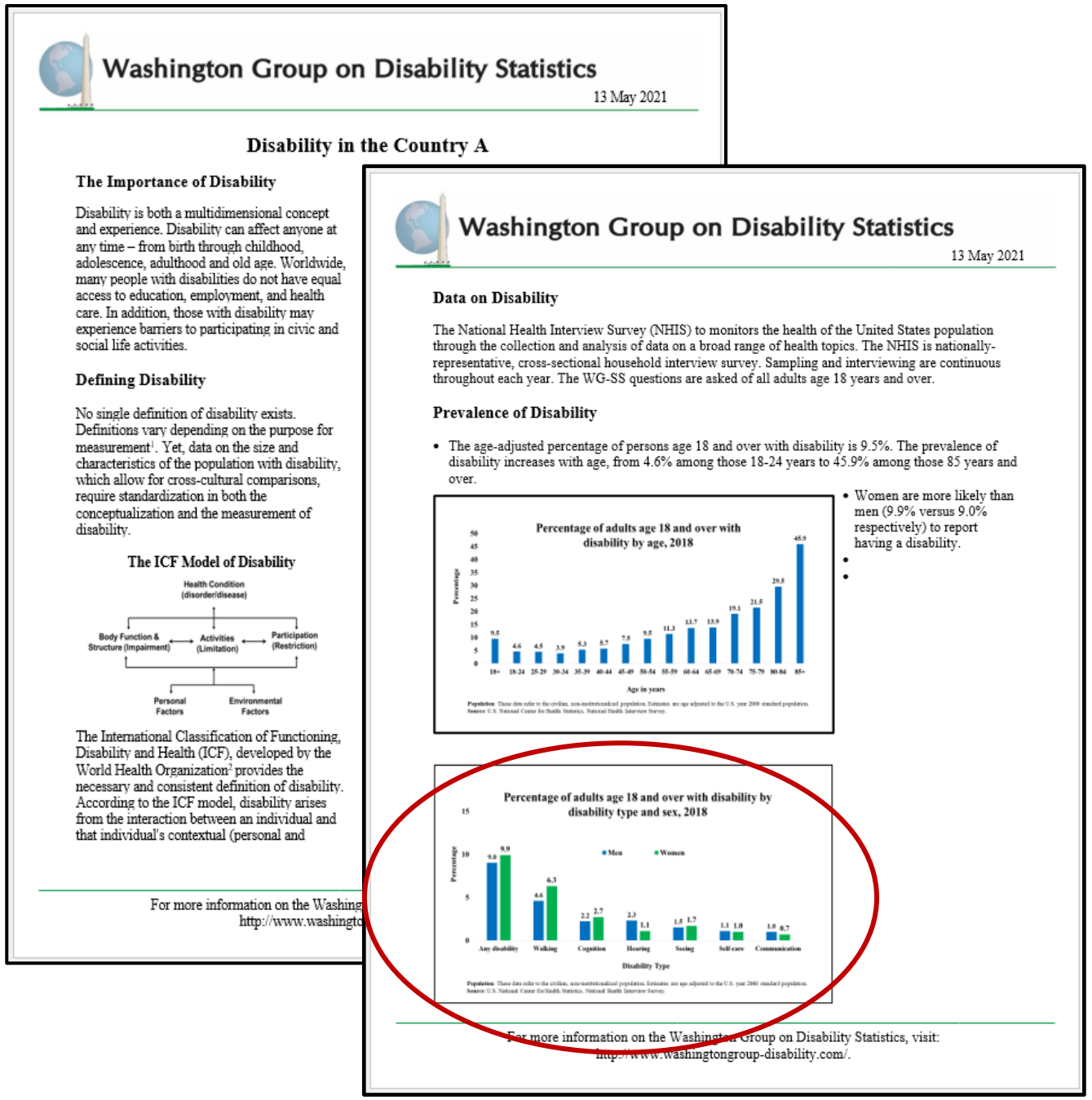
Age-Adjustment of Disability Statistics

Jennifer Madans
Chair, Washington Group

To Age-Adjust or Not To Age-Adjust?

Objectives

- WG interest in developing a short disability report for use by countries as a way of making comparable disability statistics available
- Question was raised as to whether the prevalence estimates should be crude or age-adjusted
- Session is designed to provide background information on age-adjustment for use in determining what should be shown on the reports
- Proposed outcome: constitution of small group to develop Best Practice recommendations to present at annual meeting or at a special webinar



Washington Group on Disability Statistics

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Disability in the Country A

The Importance of Disability

Disability is both a multidimensional concept and experience. Disability can affect anyone at any time – from birth through childhood, adolescence, adulthood and old age. Worldwide, many people with disabilities do not have equal access to education, employment, and health care. In addition, those with disability may experience barriers to participating in civic and social life activities.

Defining Disability

No single definition of disability exists. Definitions vary depending on the purpose for measurement[1]. Yet, data on the size and characteristics of the population with disability, which allow for cross-cultural comparisons, require standardization in both the conceptualization and the measurement of disability.

The ICF Model of Disability

The International Classification of Functioning, Disability and Health (ICF), developed by the World Health Organization[2] provides the necessary and consistent definition of disability. According to the ICF model, disability arises from the interaction between an individual and that individual's contextual (personal and

For more information on the Washing
http://www.washingto

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Data on Disability

The National Health Interview Survey (NHIS) to monitors the health of the United States population through the collection and analysis of data on a broad range of health topics. The NHIS is nationally-representative, cross-sectional household interview survey. Sampling and interviewing are continuous throughout each year. The WG-SS questions are asked of all adults age 18 years and over.

Prevalence of Disability

- The age-adjusted percentage of persons age 18 and over with disability is 9.5%. The prevalence of disability increases with age, from 4.6% among those 18-24 years to 45.9% among those 85 years and over.

- Women are more likely than men (9.9% versus 9.0% respectively) to report having a disability.

For more information on the Washington Group on Disability Statistics, visit:
http://www.washingtongroup-disability.com/.

The Anatomy of a Rate

Population Rate Calculation

1. Simple method:
   - Rate = number of cases in the population with a characteristic ÷ total number of cases

2. More complicated method:
   - Any population can be divided into components (e.g., age groups)
   - Rate = sum of component-specific rates multiplied by a distribution of the population by that component
   - Distribution would come from the data set that the component specific rates come from

rate component 1	x	proportion of population component 1
rate component 2	x	proportion of population component 2
.		.
.		.
rate component n	x	proportion of the population component n

∑ of products = rate

The Anatomy of a Rate

CRUDE RATE – sum of the component-specific (e.g., age) rates multiplied by the component (age) distribution of the *same* population that the component-specific rates come from

ADJUSTED or STANDARDIZED RATE – sum of the component-specific (e.g., age) rates multiplied by the component (age) distribution of a *different* population

Why Use an Adjusted or Standardized Rate?

- Adjusted rates are NOT ‘real’ – they do not reflect the actual situation in the population -- the crude rates does this; the adjusted rate is a function of the age distribution used
- Adjusted rates are used for comparisons
  - Across time in the same population (country) – for example, trends over the last x years
  - Across different subgroups in the same population – for example, males vs females
  - Across populations – for example, across countries
- Adjusted rates are used when
  - The comparisons should not be affected by the underlying composition of population (for example, the age distribution)
  - When a summary indicator is needed rather than looking at the component-specific rates
- Adjusted rates should not be used if the relationship between the component specific rates varies across population to be compared

When is the Composition of the Population Not of Interest?

- Most demographic and health-related characteristics vary by age so adjustment by age is the most common kind of adjustment
- Decision to use crude or age-adjusted rates is a function of the intended use of the estimate

Example 1: planners need an estimate of the number of people with vision difficulties in urban and rural areas to determine the need for services

Example 2: researchers need estimates of vision difficulties in urban and rural areas to see if exposure to area specific irritants is a determinant of vision difficulties

Crude vs Age-Adjusted Rates

Vision difficulties are age-related and the population in rural areas is older

Example 1:

- requires estimates of ‘burden’ given by a crude rate
- the fact that the population is older in rural areas would translate into greater ‘burden’ in that area and the need for more services

Example 2:

- requires estimates of ‘risk’ given by adjusted rates
- the hypothesis is that risk of vision difficulties is related to irritants in urban areas but observed higher rates in rural areas could be a function of the age of the population not exposure
- In this example, the age distribution of the population does not affect the comparison of ‘risk’ due to exposure and is not of interest
- age-adjusted rates control for the different age distributions so that differences in ‘risk’ can be estimated

The Impact of Age Adjustment on Disability Prevalence

Examples using data from 3 countries – Country A (5 and over and 18 and over), Country B (18 and over), and Country C (5 and over and 18 and over) – with different underlying age structures are used for illustrative purposes only; assume data are from the census

Step 1: Calculate the crude rates for each country

Step 2: Calculate age-specific rates for each country

Step 3: Calculate the age-adjusted rates by weighting the age-specific rates for each country using the age distributions from the census for the other countries – this gives 4 estimates for 5 and over and 9 estimates for 18 and over

Step 4: Compare crude vs adjusted estimates using the different age distributions (standards)

Step 1: Calculate the crude disability rates (percentages)

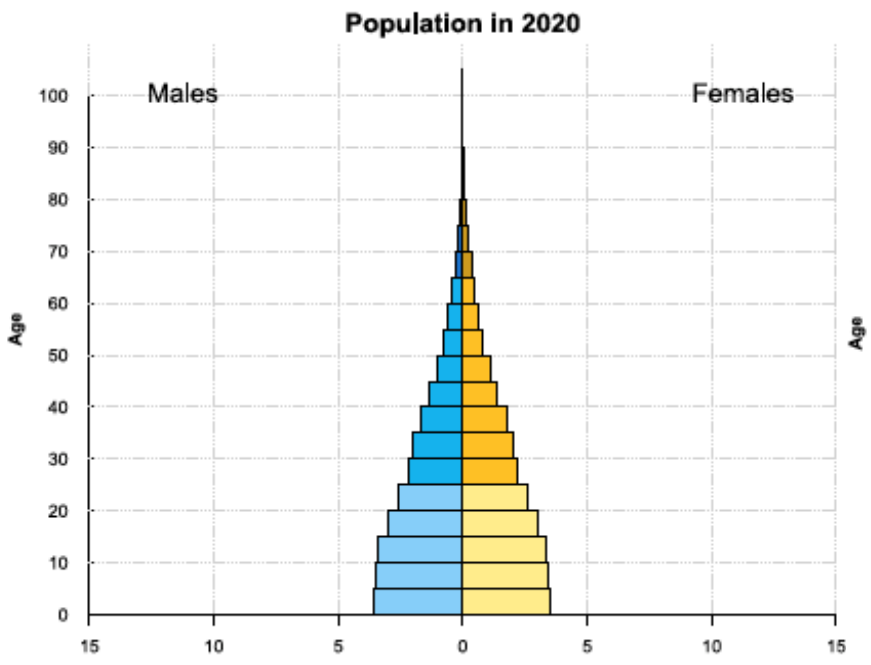
Age	Country A	Country B	Country C
5 years and over	1.8		8.1
18 years and over	2.4	9.1	9.0

Step 2: Calculate crude age-specific disability rates

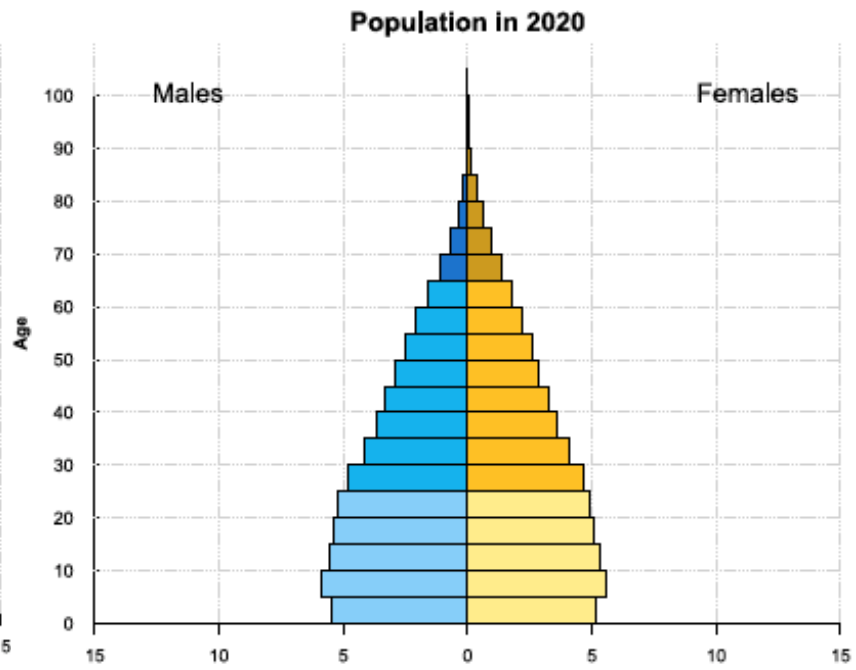
Age group	Country A	Country B	Country C
5-17 years	0.8		3.7
18-29 years	0.9	2.9	3.7
30-39 years	1.2	3.7	4.0
40-49 years	1.9	6.2	5.4
50-59 years	3.6	13.4	10.2
60-69 years	6.9	16.5	12.3
70-79 years	14.4	31.3	16.5
80+ years	26.8	50.9	33.3

Step 3: Calculate Age Adjusted rates - Country Age Distributions

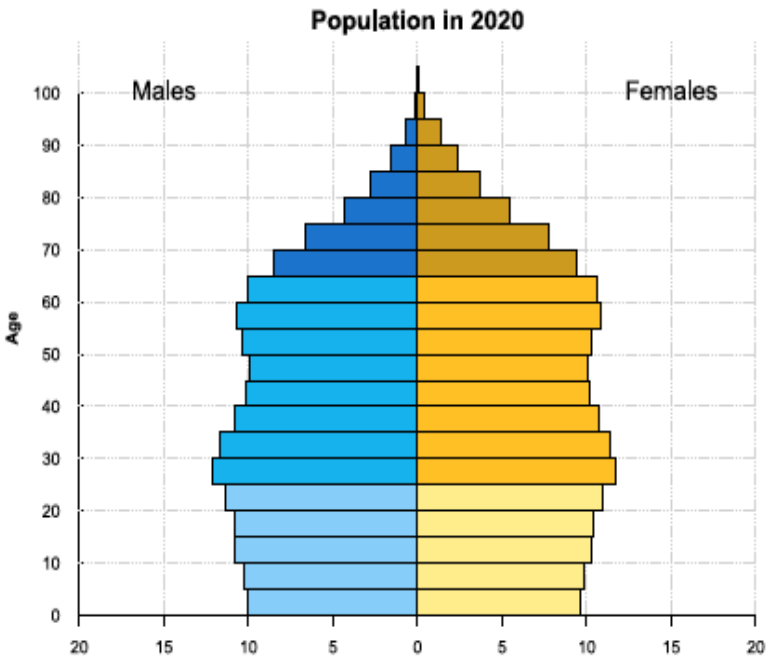
Country A



Country B



Country C



Step 3: Calculate age-adjusted disability rates - population 5 years and over

	Country A age-specific disability rate	Country A age-specific rate x Country C age-distribution		Country C age-specific disability rate	Country C age-specific rate x Country A age-distribution
5-17	0.8	0.1		3.8	1.4
18-29	0.9	0.2		3.7	0.9
30-39	1.2	0.2		4.0	0.6
40-49	1.9	0.3		5.4	0.6
50-59	3.6	0.5		10.2	0.6
60-69	6.9	0.9		12.3	0.4
70-79	14.4	1.1		16.5	0.3
80+	26.8	1.1		33.3	0.3

Step 3: Calculate age-adjusted disability rates - population 18 years and over

	Country A age-specific disability rate	Country A age-specific estimate x Country B age-distribution	Country A age-specific estimate x Country C age-distribution	Country B age-specific disability rate	Country B age-specific estimate x Country A age-distribution	Country B age-specific estimate x Country C age-distribution	Country C age-specific disability rate	Country C age-specific estimate x Country A age-distribution	Country C age-specific estimate x Country B age-distribution
18-29	0.9	0.2	0.2	2.9	1.2	0.6	3.7	1.5	1.0
30-39	1.2	0.3	0.2	3.7	0.9	0.6	4.0	1.0	1.0
40-49	1.9	0.3	0.3	6.2	1.0	1.0	5.4	0.9	0.9
50-59	3.6	0.5	0.6	13.4	1.3	2.2	10.2	1.0	1.5
60-69	6.9	0.7	1.1	16.5	0.8	2.5	12.3	0.6	1.3
70-79	14.4	0.7	1.4	31.3	0.8	2.9	16.5	0.4	0.8
80+	26.8	0.6	1.3	50.9	0.7	2.5	33.3	0.4	0.7

Step 4: What happens to rates when they are age-adjusted?

5 years and over

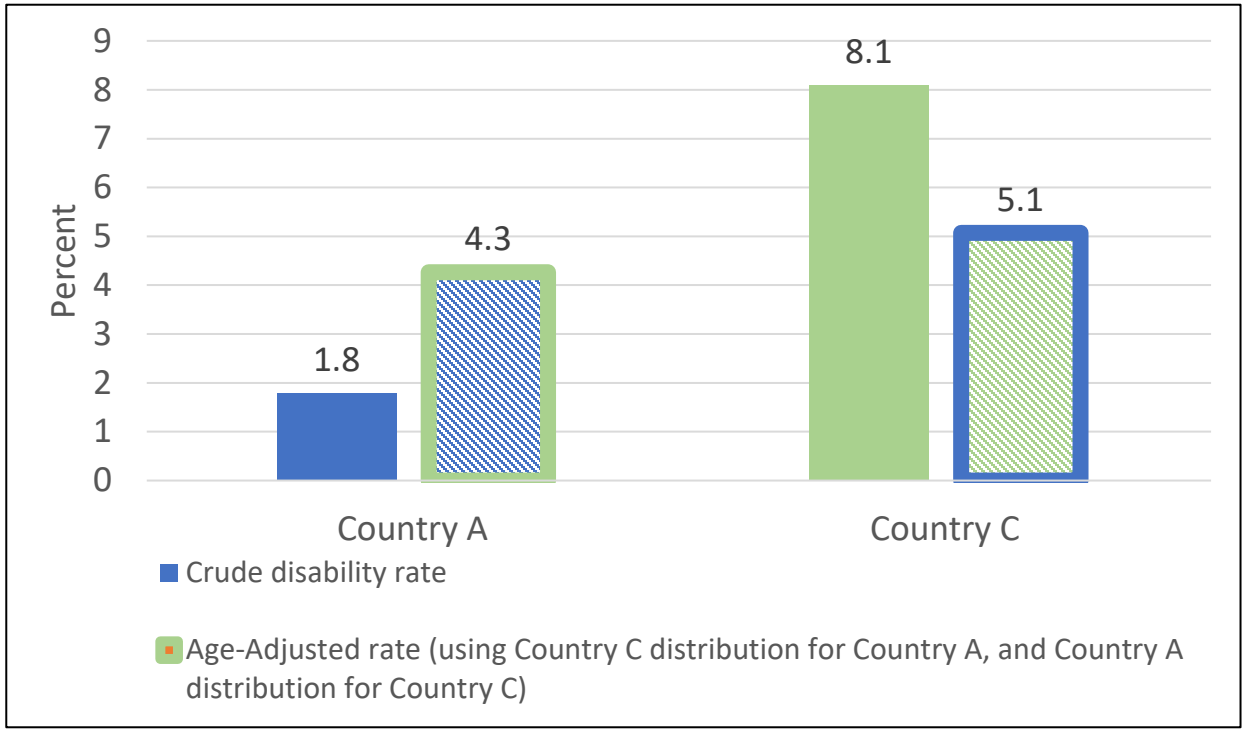
	Crude rate (%)	Age-Adjusted Rate using Country C age distribution (%)	Age-Adjusted Rate using Country A age distribution (%)
Country A	1.8	4.3	
Country C	8.1		5.1

18 years and over

	Crude rate (%)	Age-Adjusted Rate using Country A age distribution (%)	Age-Adjusted Rate using Country B age distribution (%)	Age-Adjusted Rate using Country C age distribution (%)
Country A	2.4		3.4	5.0
Country B	9.1	6.7		12.4
Country C	9.0	5.8	7.2	

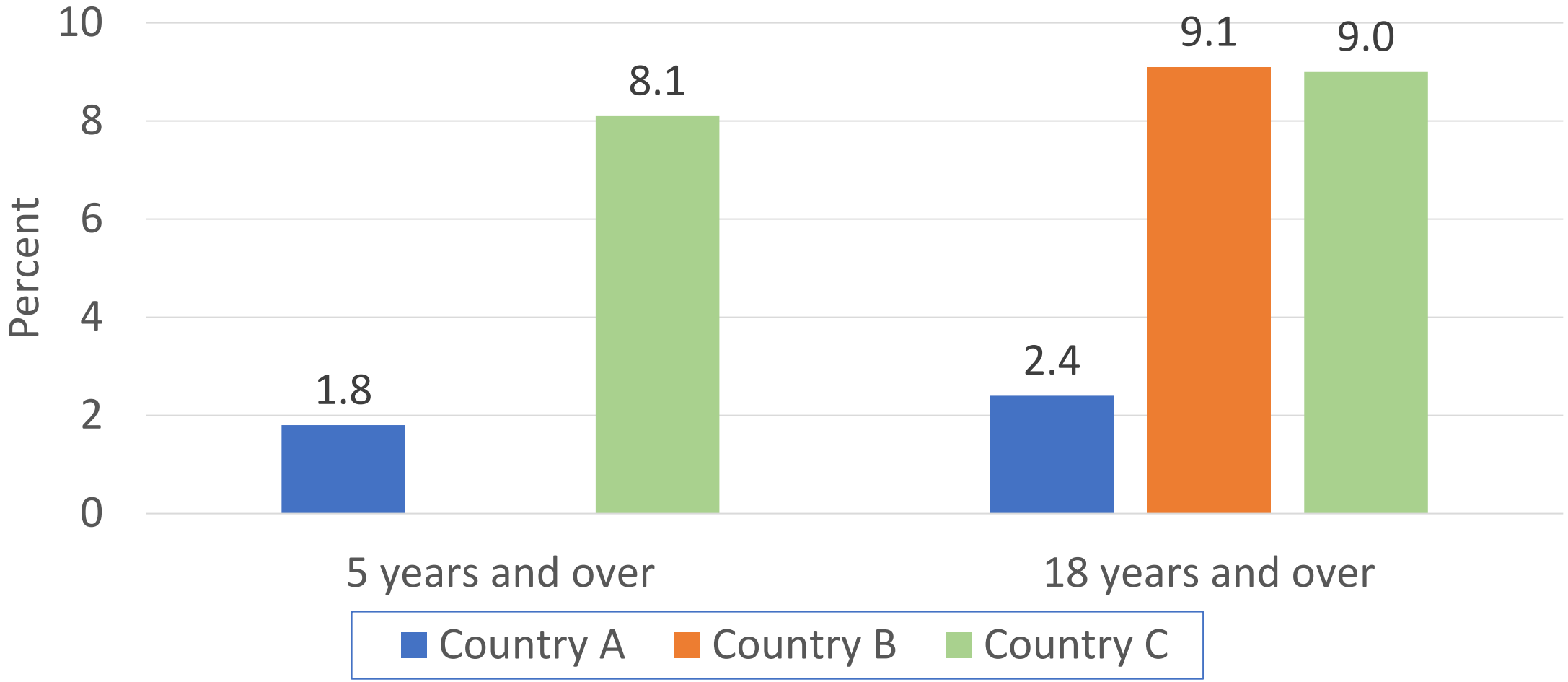
Legends

- Each **country** is assigned a color
  - Country A is **blue**
  - Country B is **orange**
  - Country C is **green**

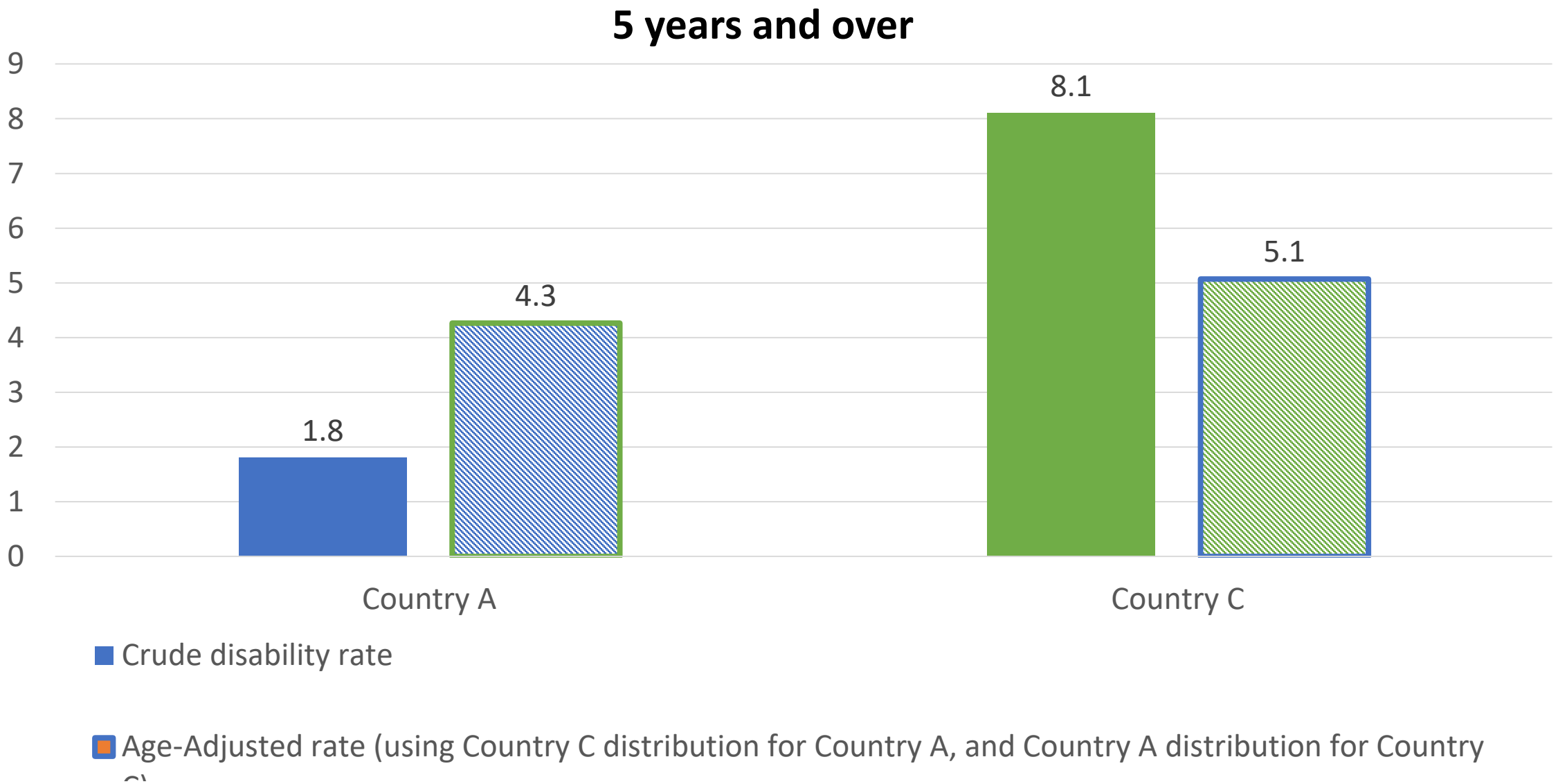


- Solid colors – indicate crude rates (rates calculated using the age distribution of that country)
- Diagonal lines – indicate age-adjustment
- Outline colors – indicate which countries age distribution is used for the age adjustment

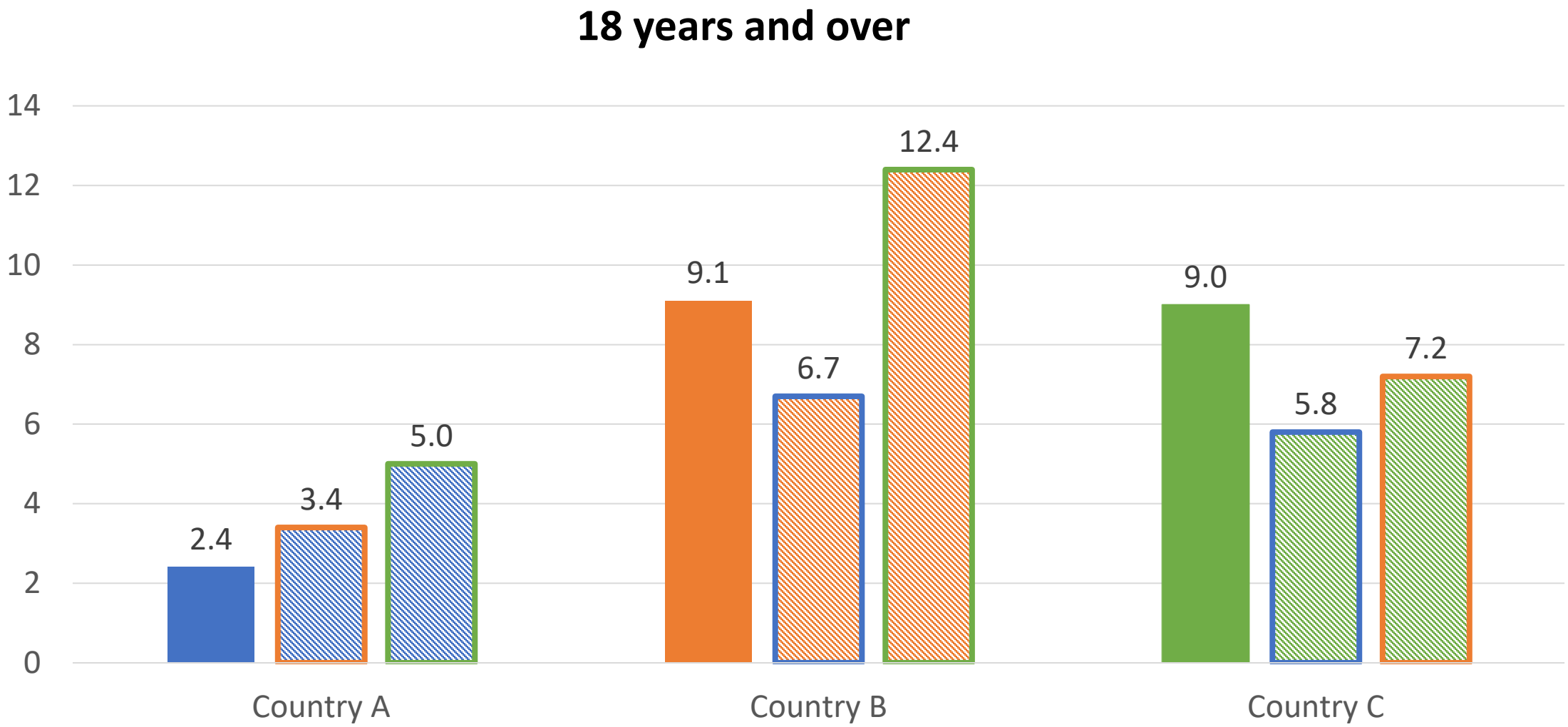
Crude Disability Rates



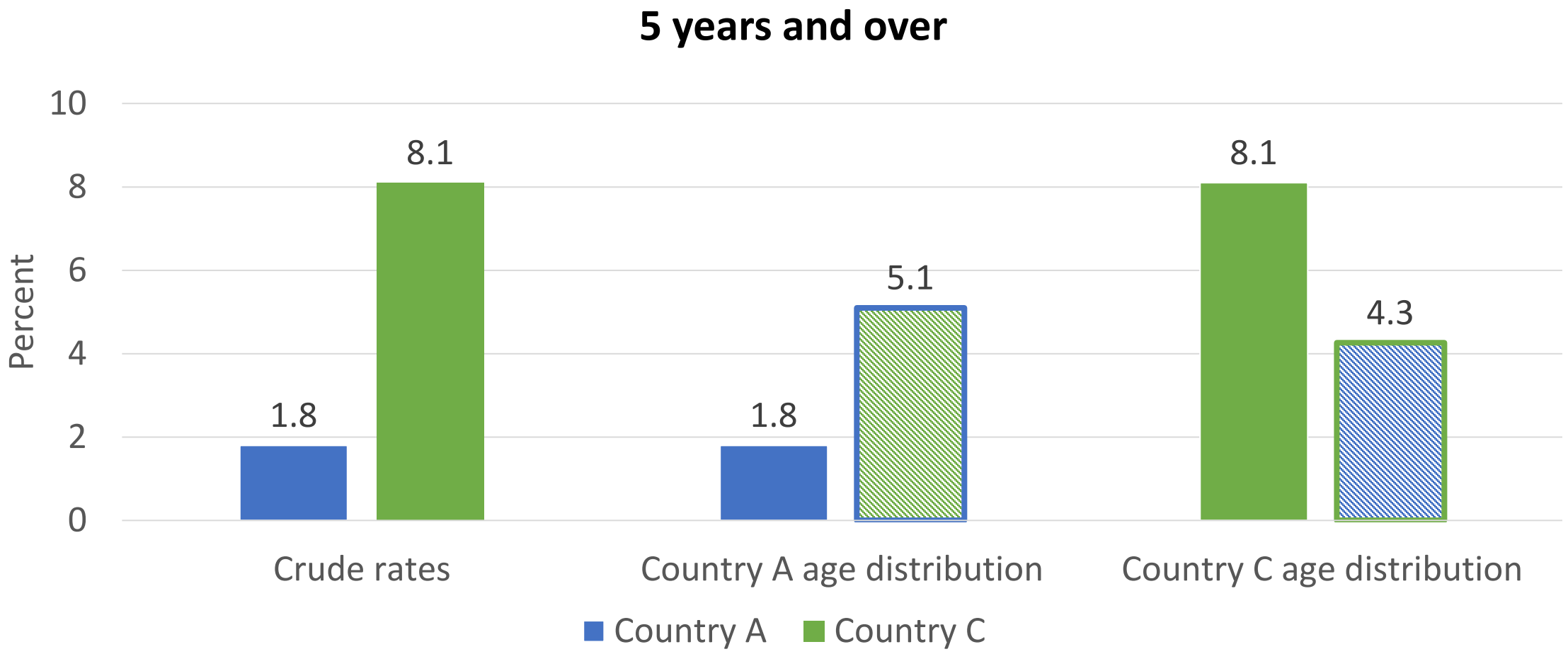
What happens when rates are age adjusted?



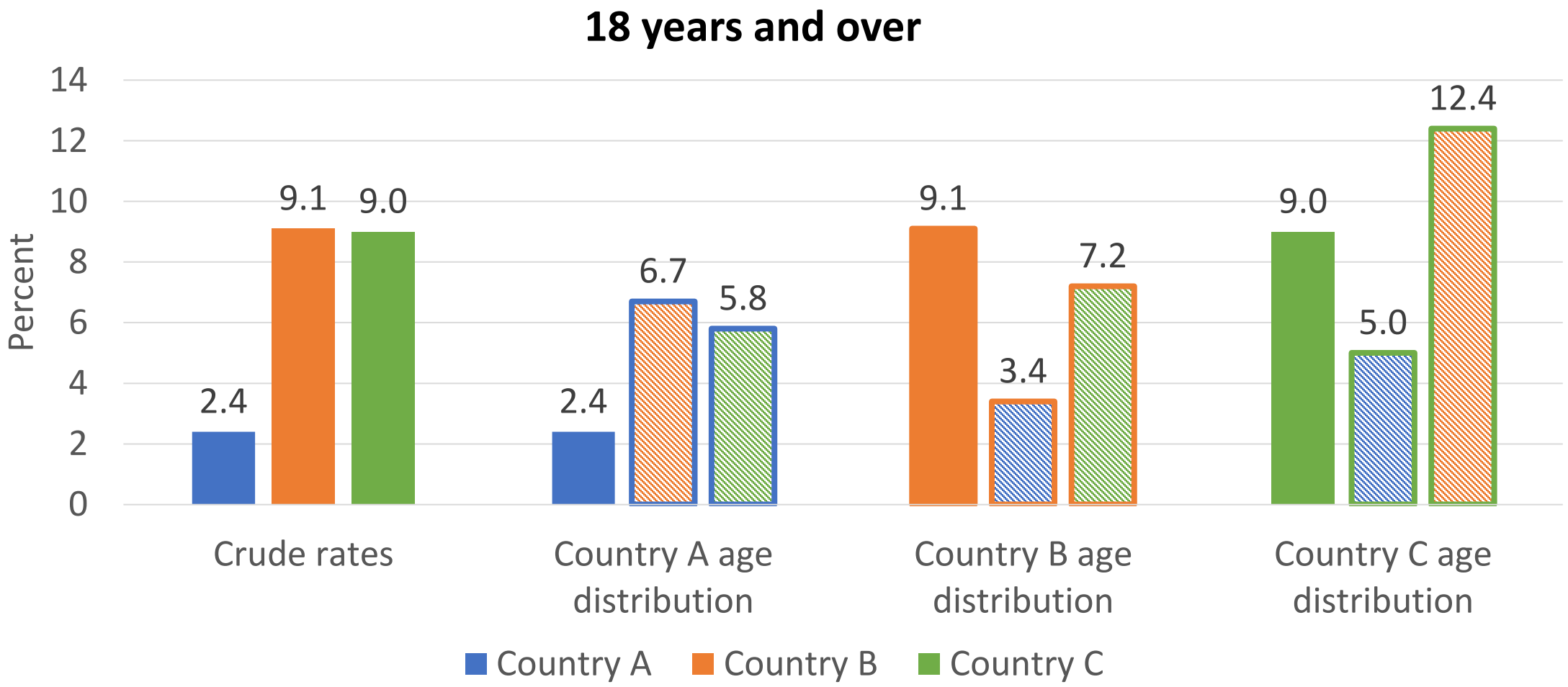
What happens when rates are age-adjusted?



Comparisons when based on same age distribution – 5 years and over



Comparisons when based on same age distribution – 18 years and over



Impact of Adjustment

- Three countries have different age distributions – Country A has the youngest, followed by Country B. Country C has the oldest age distribution
- Three countries have different age-specific rates
- The effect of age adjustment depends on which age distribution is used
  - Using Country A's younger age distribution lowers the rate in Countries B (from 9.1 to 6.7) and C (from 9.0 to 5,8) for the population 18 and over
  - Using Country C's older age distribution raises the rates in Countries A (from 2.4 to 5.0) and B (from 9.1 to 12.4) for the population 18 and over
- Comparisons across countries will change depending on which age distribution (standard) is used

Next Steps

- Should WG products that include prevalence estimates from more than one country present crude or age-adjusted estimates?
- Will including both be confusing and take space if multiple prevalences are given (for example, for all domains)?
- If adjustment is to used, which age composition (standard) should be used?
  - Is there consensus on these topics? The floor is open – please raise your hand if you would like to speak or put your comments in the chat
- Either way we need volunteers for a group to determine Best Practice Recommendations for to address this issue
  - Time limited group
  - Recommendations to be presented at the Fall annual meeting or at a special webinar
  - Any volunteers?