Disparities in Rural and Urban Mortality: New York State Chartbook

Companion to *Healthcare in Rural New York: Current Challenges and Solutions for Improving Outcomes*

Chartbook prepared by Adrienne Anderson, Gianna Griffin, Sally Dreslin

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About the Step Two Policy Project

The Step Two Policy Project is a not-for-profit think tank that focuses on policy issues involving health, behavioral health, and human services in New York State. We work to accelerate the adoption of good ideas.

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Cover photo from: https://rockinst.org/blog/stories-sullivan-rural-challenges/

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"[T]here is a well-described, rural-urban divide in the United States, where rural residents tend to be sicker and poorer and to have worse health outcomes than do their non-rural peers."
  -Dr. Macarena Garcia, *Preventable Premature Deaths from the Five Leading Cases of Death in Nonmetropolitan and Metropolitan Counties, United States, 2010 – 2022*.

- This Chartbook will focus on how the above-mentioned "rural-urban divide" extends to mortality rates in New York State.

- While many of the leading causes of death presented in this Chartbook are manageable conditions, apparent access and affordability issues impact health outcomes.

- Primary, secondary, and tertiary prevention in rural areas and urban areas require tailored policy interventions that respond to those communities' needs.

- The accompanying Policy Brief provides more detail on relevant policy considerations and levers.

Rural Americans are at higher risk of early death than urbanites: CDC, ABC News, April 30, 2024.

Key Terms: Rural/Urban, and Non-metro/Metro

We are aware of multiple conventions for defining rural and urban areas, but for the purposes of this Chartbook (and the companion report), the terms **rural** and **urban** are defined by the 2013 Urban Rural Classification scheme and rural is synonymous with **non-metropolitan or non-metro**, and **urban** is synonymous with **metropolitan or metro**. For more context on these definitions:

The CDC WONDER data used the National Center for Health Statistics (NCHS) Urban-Rural Classification Scheme for Counties, which is based on the Office of Management and Budget's (OMB) 2013 delineation of metropolitan statistical areas (MSA) and micropolitan statistical areas. NCHS's six-category, urban-rural classification scheme for U.S. counties and county-equivalent entities is based on their population and commuting patterns (Ingram & Franco, 2014).

In this Chartbook and the accompanying Policy Brief, we collapse the six NCHS urban-rural classification scheme categories into two: urban, which includes the four NCHS sub-categories of large central metro, large fringe metro, medium metro, and small metro; and rural, which includes the two NCHS sub-categories of micropolitan and noncore.

Key Terms for Analysis

- **Crude mortality rate:** a measure of the number of deaths in a population, typically expressed as X deaths per 100,000 population.

- **Age-adjusted mortality rate:** a mortality rate that is statistically processed, or weighted, to allow for standardized comparison of two or more populations with different age demographics without bias. Also expressed as X deaths per 100,000 population.

- **Note: This Chartbook only presents age-adjusted mortality rates.**

- *The NYS Department of Health has a useful* <u>*primer on age-adjustment*</u>*, which includes a relevant example using prostate cancer mortality rates.*

- **All-cause mortality rate**: unlimited to any particular cause(s).

- **Natural-cause mortality**: limited to causes related to illness and disease.

- **External-cause mortality**: limited to causes not related to illness or disease. *See page 9.*

- **All-ages:** encompasses the overall population.

- **Working-age:** captures people 15-64 years of age, understood to reflect the broader working-age population.

- **Prime working-age:** captures people 25-54 years of age, used in many federal labor analyses to represent a group that is especially critical for economic productivity.

Data Source

- This study utilized data from the Centers for Disease Control and Prevention (CDC) Wide-ranging Online Data for Epidemiologic Research (WONDER) system to analyze trends in natural-cause mortality (NCM) and external-cause mortality in the United States. We specifically used the Multiple Causes of Death (MCD) dataset, which is publicly available on the CDC WONDER platform (https://wonder.cdc.gov/mcd.html). The dataset includes information from death certificates, which the CDC collects annually, allowing for a comprehensive analysis of mortality trends. Our analysis covered the period from 1999 to 2020.

Primary Statistic: Age-Adjusted Mortality Rate

- We utilized **age-adjusted mortality rates** to compare health outcomes in regions with different age distributions by eliminating the bias of age in the populations being compared.

Age Cohorts and Stratifications

- The analysis included three primary age cohorts to capture trends across different stages of life:
    1. **All-Ages**
    2. **Working-Age (15-64 years)**
    3. **Prime Working-Age (25-54 years)**
- To further understand rural/urban health disparities, we ran specific queries within the CDC WONDER system to identify age-adjusted mortality rates by various stratifications, including:
    - **Metro Status:** Differentiating between urban and rural populations.
    - **Sex:** Comparing mortality rates between male and female populations.
    - **Age:** Analyzing trends across different age groups.
    - **Leading Causes of Death:** Focusing on the 15 leading causes of death to provide a detailed understanding of the factors contributing to mortality rates.

Query Example: Pt. 1

A-Z Index

CDC Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™

Search

CDC WONDER   FAQs   Help   Contact Us   WONDER Search

Multiple Cause of Death, 1999-2020 Request
Deaths occurring through 2020

| Request Form | Results | Map | Chart | About |

Multiple Cause of Death Data   Dataset Documentation   Other Data Access   Data Use Restrictions   How to Use WONDER   Save   Reset

*Make all desired selections and then click any **Send** button one time to send your request.*

1. Organize table layout: Send   Help

Group Results By [UCD - 15 Leading Causes of Death ▾]   Notes:
And By [None ▾]
And By [None ▾]   • Group Results By "15 Leading Causes" to see the top 15 rankable causes selected
And By [None ▾]   from the corresponding 113 or 130 Cause List. More information.
And By [None ▾]

Measures (**Default measures** always checked and included. Check box to include any others.)
☑ **Deaths**   ☑ **Population**   ☑ **Crude Rate**
For crude rates: ☐ **95% Confidence Interval**   ☐ **Standard Error**
☑ **Age Adjusted Rate**   ☐ **95% Confidence Interval**   ☐ **Standard Error**
☐ **Percent of Total Deaths**

Title [   ]

2. Select location: Send   Help

Click a button to choose locations by State, Census Region or HHS Region.

States ⦿   **Census Regions** ○   **HHS Regions** ○

Browse or **search** to find items in the States Finder Tool, then **highlight** the items to use for this request.
(The *Currently selected* box displays all current request items.)

Finder Tool Help   **Advanced Finder Options**

| Browse | Search | Details |

States   Currently selected:
```
+ 29 (Missouri)                               36 (New York)
+ 30 (Montana)
+ 31 (Nebraska)
+ 32 (Nevada)
+ 33 (New Hampshire)
+ 34 (New Jersey)
+ 35 (New Mexico)
+ 36 (New York)
+ 37 (North Carolina)
```
[Open] [Close] [Close All]

Browse the list by opening and closing items.
Use Ctrl+Click to multiple select, Shift+Click for a range.

Pick between: **2013 Urbanization**
2013 Urbanization ⦿   All Categories
2006 Urbanization ○   Large Central Metro
                           Large Fringe Metro
                           Medium Metro
                           Small Metro
                           Micropolitan (Nonmetro)
                           NonCore (Nonmetro)

3. Select demographics:

Send   Help

Hint: Use Ctrl + Click for multiple selections, or Shift + Click for a range.

Ten-Year Age Groups

Pick between:

Ten-Year Age Groups ⦿
Five-Year Age Groups ○
Single-Year Ages ○
Infant Age Groups ○

Ten-Year Age Groups
All Ages
< 1 year
1-4 years
5-14 years
15-24 years
25-34 years
35-44 years
45-54 years
55-64 years
65-74 years
75-84 years
85+ years

Gender

Gender
All Genders
Female
Male

Hispanic Origin

Hispanic Origin
All Origins
Hispanic or Latino
Not Hispanic or Latino
Not Stated

Race

Race
All Races
American Indian or Alaska Native
Asian or Pacific Islander
Black or African American
White

Default rates per 100,000

4. Select year and month:

Send   Help

Browse or **search** to find items in the Year/Month Finder Tool, then **highlight** the items to use for this request.
(The *Currently selected* box displays all current request items.)

Finder Tool Help   **Advanced Finder Options**

| Browse | Search | Details |

Year/Month

Year/Month	Currently selected:
All (All Date	1999 (1999)
+ 1999 (1999)	2000 (2000)
+ 2000 (2000)	2001 (2001)
+ 2001 (2001)	
+ 2002 (2002)	
+ 2003 (2003)	
+ 2004 (2004)	
+ 2005 (2005)	
+ 2006 (2006)	
+ 2007 (2007)	

5. Select weekday, autopsy and place of death:

Send   Help

Hint: Use Ctrl + Click for multiple selections, or Shift + Click for a range.

Weekday

Weekday
All Weekdays
Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday
Unknown

Autopsy

Autopsy
All Values
No
Yes
Unknown

Place of Death

Place of Death
All Places
Medical Facility - Inpatient
Medical Facility - Outpatient or ER
Medical Facility - Dead on Arrival
Medical Facility - Status unknown
Decedent's home
Hospice facility
Nursing home/long term care
Other

6. Select underlying cause of death:

Send   Help

Click a button to select ICD codes by Chapters or by Groups.

⦿ **UCD - ICD-10 Codes**   ○ **UCD - ICD-10 130 Cause List (Infants)**   ○ **UCD - Drug/Alcohol Induced Causes**
○ **UCD - ICD-10 113 Cause List**   ○ **UCD - Injury Intent and Mechanism**

Browse or **search** to find items in the UCD - ICD-10 Codes Finder Tool, then **highlight** the items to use for this request.
(The *Currently selected* box displays all current request items.)

Finder Tool Help   **Advanced Finder Options**

| Browse | Search | Details |

UCD - ICD-10 Codes

UCD - ICD-10 Codes	Currently selected:
All (All Causes of Death)	*All* (All Causes of Death)
+ A00-B99 (Certain infectious and parasitic diseases)	
+ C00-D48 (Neoplasms)	
+ D50-D89 (Diseases of the blood and blood-forming organs and certain disorders involving the i	
+ E00-E88 (Endocrine, nutritional and metabolic diseases)	
+ F01-F99 (Mental and behavioural disorders)	

Query Example: Pt.3

7. Select multiple cause of death: Send   Help

Click a button to select ICD codes by Chapters or by Groups.

- ◉ **MCD - ICD-10 Codes**
- ○ **MCD - ICD-10 130 Cause List (Infants)**
- ○ **MCD - ICD-10 113 Cause List**
- ○ **MCD - Drug/Alcohol Induced Causes**

Items in the Select Records box will be used for your request.
Enter codes by hand, one per line, or find items in the Finder Tool and *Move (highlighted) Items Over*.

Finder Tool Help

| Browse | Search | Details |

MCD - ICD-10 Codes

Select Records

with any of these items:

[text area]

[Clear]

AND any of these items:

[text area]

[Clear]

Leave box empty, or use
All, to select all values.

Move Items Over <<<

Move Items Over <<<

+ J00-J98 (Diseases of the respiratory system)
+ K00-K92 (Diseases of the digestive system)
+ L00-L98 (Diseases of the skin and subcutaneous tissue)
+ M00-M99 (Diseases of the musculoskeletal system and connective tissue)
+ N00-N99 (Diseases of the genitourinary system)
+ O00-O99 (Pregnancy, childbirth and the puerperium)
+ P00-P96 (Certain conditions originating in the perinatal period)
+ Q00-Q99 (Congenital malformations, deformations and chromosomal abnormalities)
+ R00-R99 (Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere class
+ S00-T98 (Injury, poisoning and certain other consequences of external causes)
+ U00-U99 (Codes for special purposes)
+ V01-Y89 (External causes of morbidity and mortality)

[Open] [Open Fully] [Close] [Close All]

Browse the list by opening and closing items.
Use Ctrl+Click to multiple select, Shift+Click for a range.

Note: Use both selection boxes to select results that contain items from both the first AND second box. See the feature description for more information.
Note: Javascript must be enabled for the "Move" and "Clear" buttons to work. Enter or clear codes by hand if the buttons don't work.

8. Other options: Send   Help

Export Results ☐ (Check box to download results to a file)
Show Totals ☑
Show Zero Values ☐
Show Suppressed Values ☐
Precision [1 ▾] decimal places
Data Access Timeout [10 ▾] minutes

[Send]   [Reset]

Content source: CDC WONDER

These are the categories included in the ICD-10 definition of "accidents":

- Cut/pierce
- Drowning
- Fall
- Fire/flame
- Hot object/substance
- Firearm
- Machinery
- Motor Vehicle Traffic
- Other: pedal cyclist
- Other: pedestrian
- Other land transport
- Other transport
- Natural/Environmental
- Overexertion
- Poisoning
- Struck by or against
- Suffocation
- Other specified, classifiable injury
- Unspecified injury
- Other

Non-metro NYS Counties, 2013

Using the Atlas of Rural and Small-Town America from the USDA Economic Research Service, the map below shows the New York counties that were designated as non-metro (i.e., rural) in 2013, which was the most recent year the urban-rural classification scheme was implemented.

For this Chartbook, we grouped metropolitan subcategories and non-metropolitan subcategories and have equated these combined "metro" groups with "urban," and the combined "non-metro" groups with "rural."

The counties are: Allegany, Cattaraugus, Cayuga, Chautauqua, Chenango, Clinton, Columbia, Cortland, Delaware, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Lewis, Montgomery, Otsego, St. Lawrence, Schuyler, Seneca, Steuben, Sullivan, and Wyoming.

https://www.ers.usda.gov/data-products/atlas-of-rural-and-small-town-america/go-to-the-atlas/
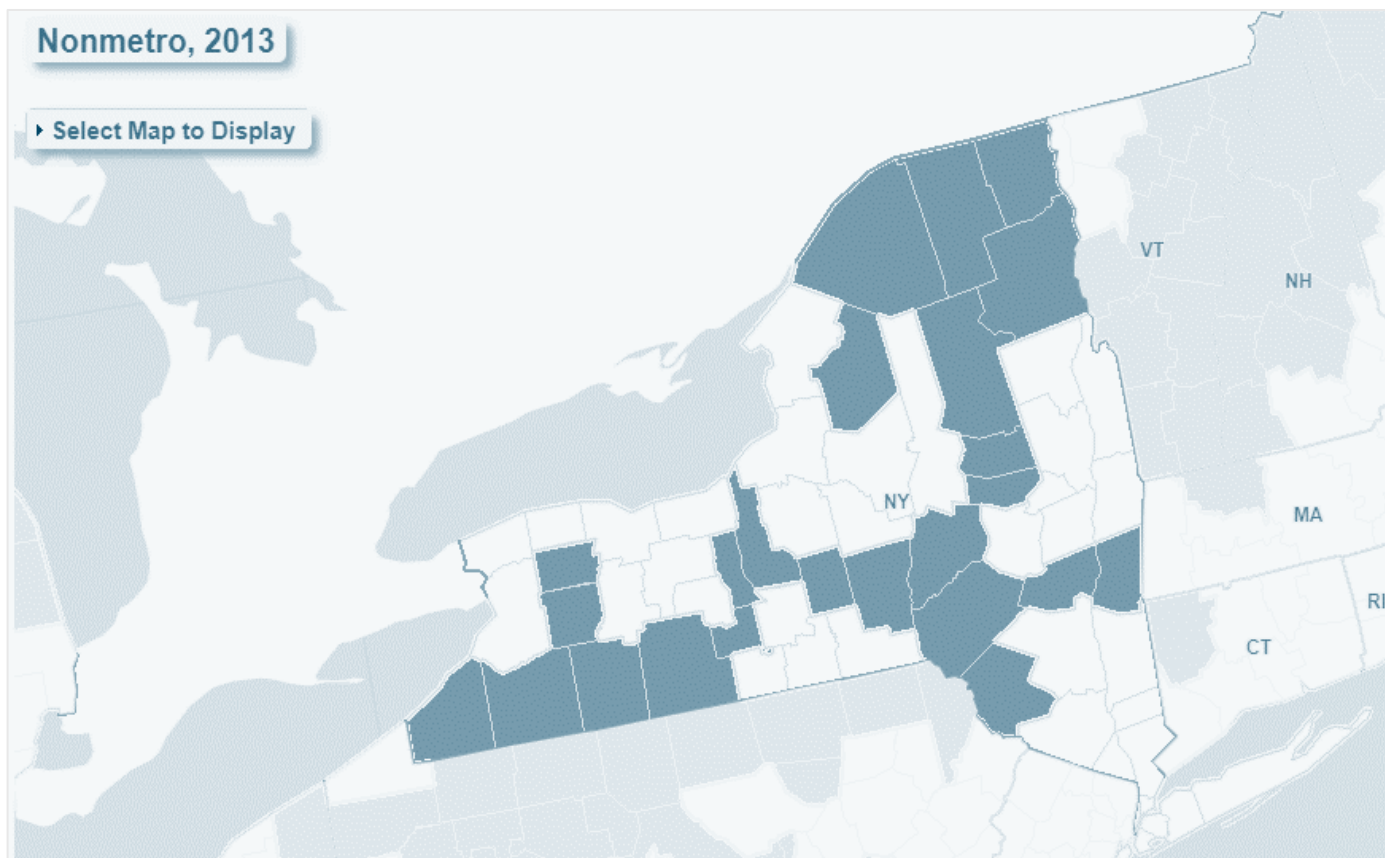
Analysis:
Time Trends

- All analysis is specific to New York.

- All mortality rates are age-adjusted.

- All analyses in this section span 1999-2019, inclusive.

In both rural and urban areas, all-cause, all-ages mortality rates decreased from 1999-2019.

- However, the gap between rural and urban areas widened over that time.
- The rural mortality rate for all causes was 6% higher than in urban areas in 1999. By 2019, it was 13% percent higher in rural areas.

Age-adjusted mortality rates, metro and non-metro areas,1999-2019

All-Cause Mortality → **All-Ages**

Legend:
- Non-metro
- Metro

6% difference
887
837

754
13% difference
657

Mortality rate (deaths per 100,000 residents)
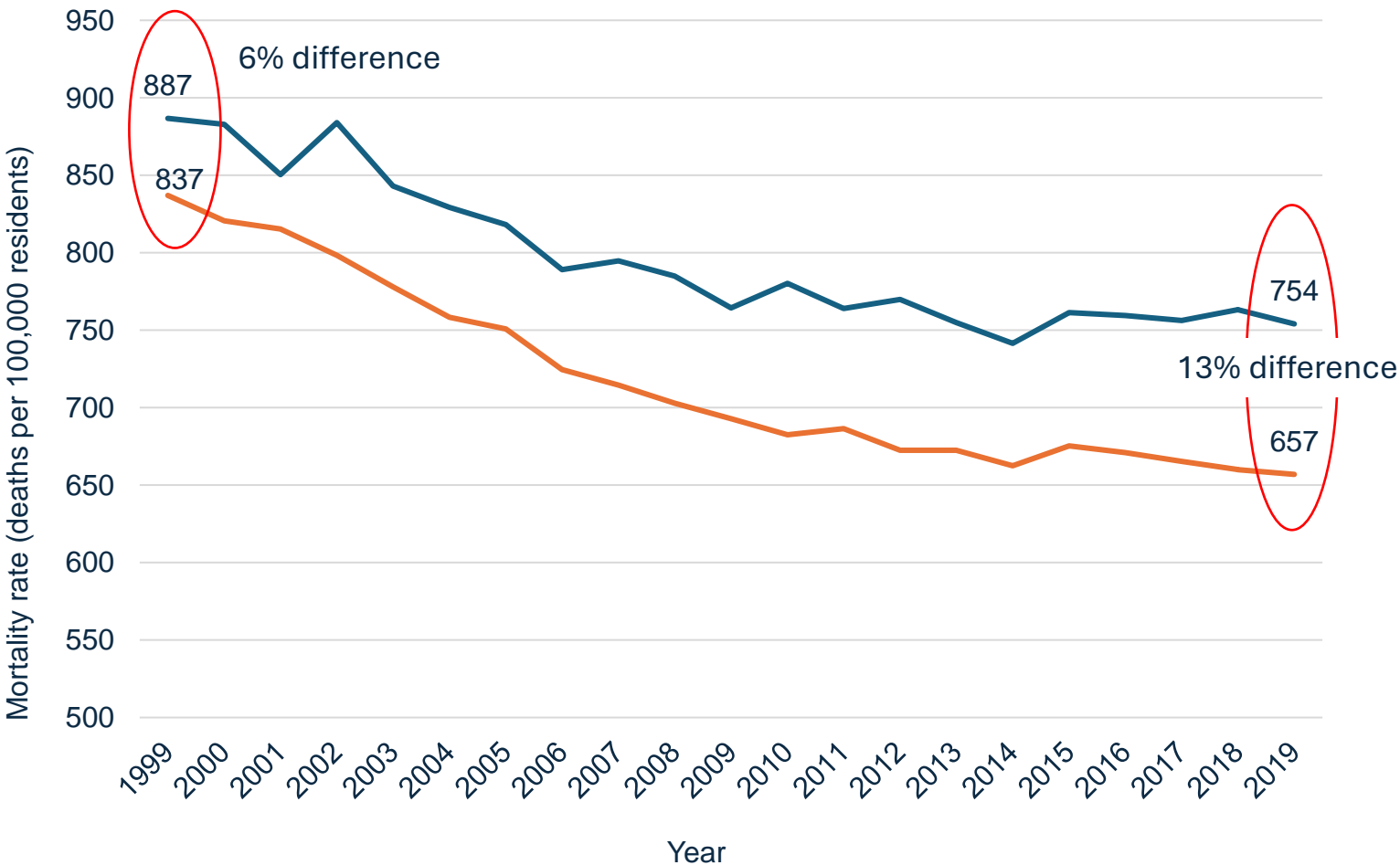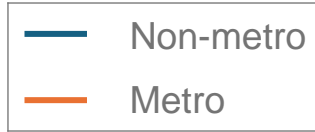
Year

Working-age mortality rates have increased in rural areas and decreased in urban areas.

- In all but one year (2001), all-cause, working-age mortality was higher in rural areas.

- For working-age (aged 15-64) New Yorkers in 1999, the age-adjusted, all-cause mortality rate for rural areas was two percent higher than in urban areas.

- By 2019, it was 18 percent higher in rural areas, compared to urban areas.

Age-adjusted mortality rates, metro and non-metro areas, 1999-2019

All-Cause Mortality → Working-Age

Legend: Non-metro, Metro
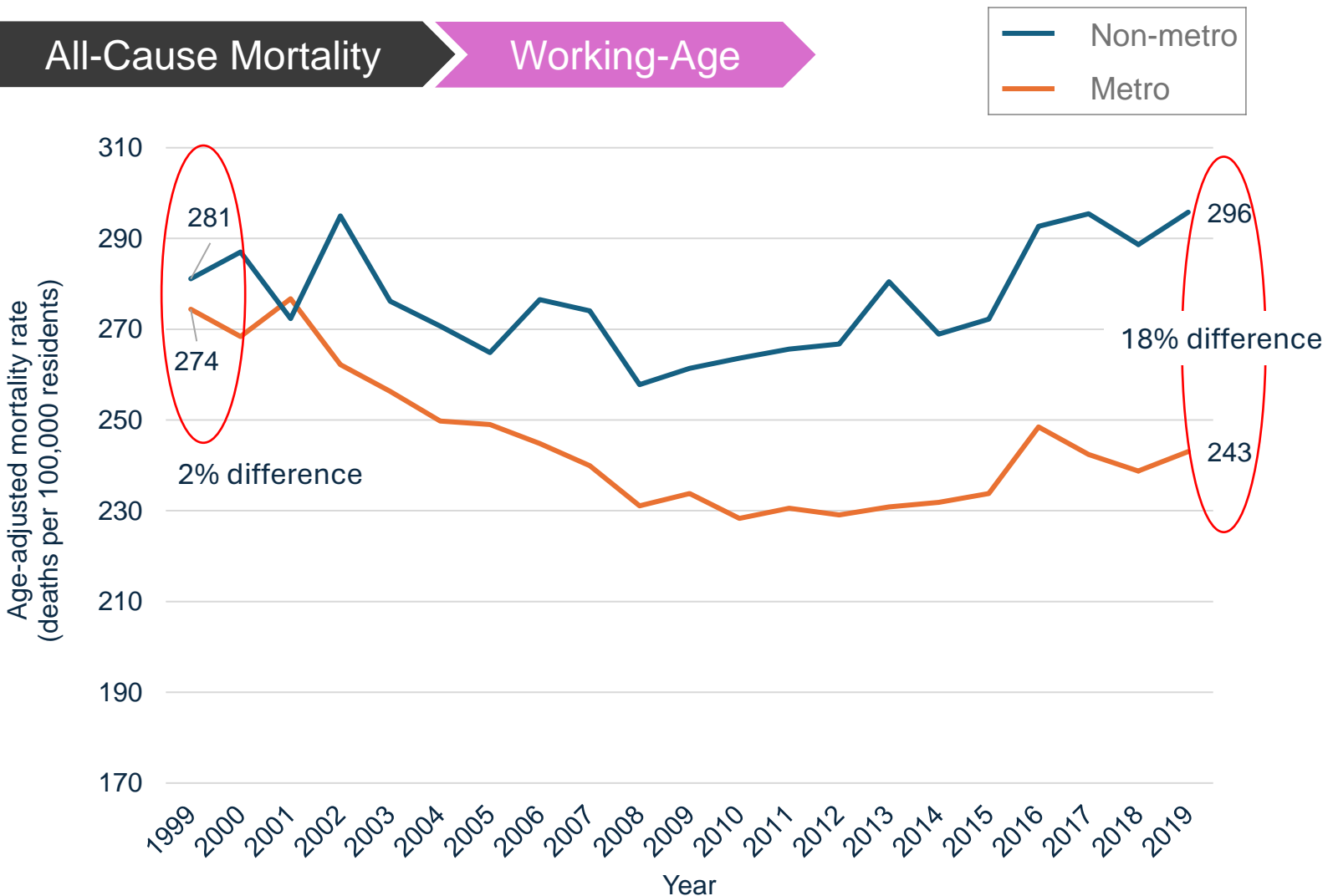
The all-cause, prime working-age mortality rate increased in rural areas from 1999-2019 while the urban rate remained steady.

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- For prime working-age (aged 25-54) New Yorkers in 1999, the age-adjusted, all-cause mortality rate was the same in rural areas and urban areas, and by 2019, it was 17% percent higher in rural areas than in urban areas.

Age-adjusted mortality rates, metro and non-metro areas,1999-2019

All-Cause Mortality | Prime Working-Age

Non-metro
Metro

207
No difference

249
17% difference
206

Age-adjusted mortality rate
(deaths per 100,000 residents)

Year
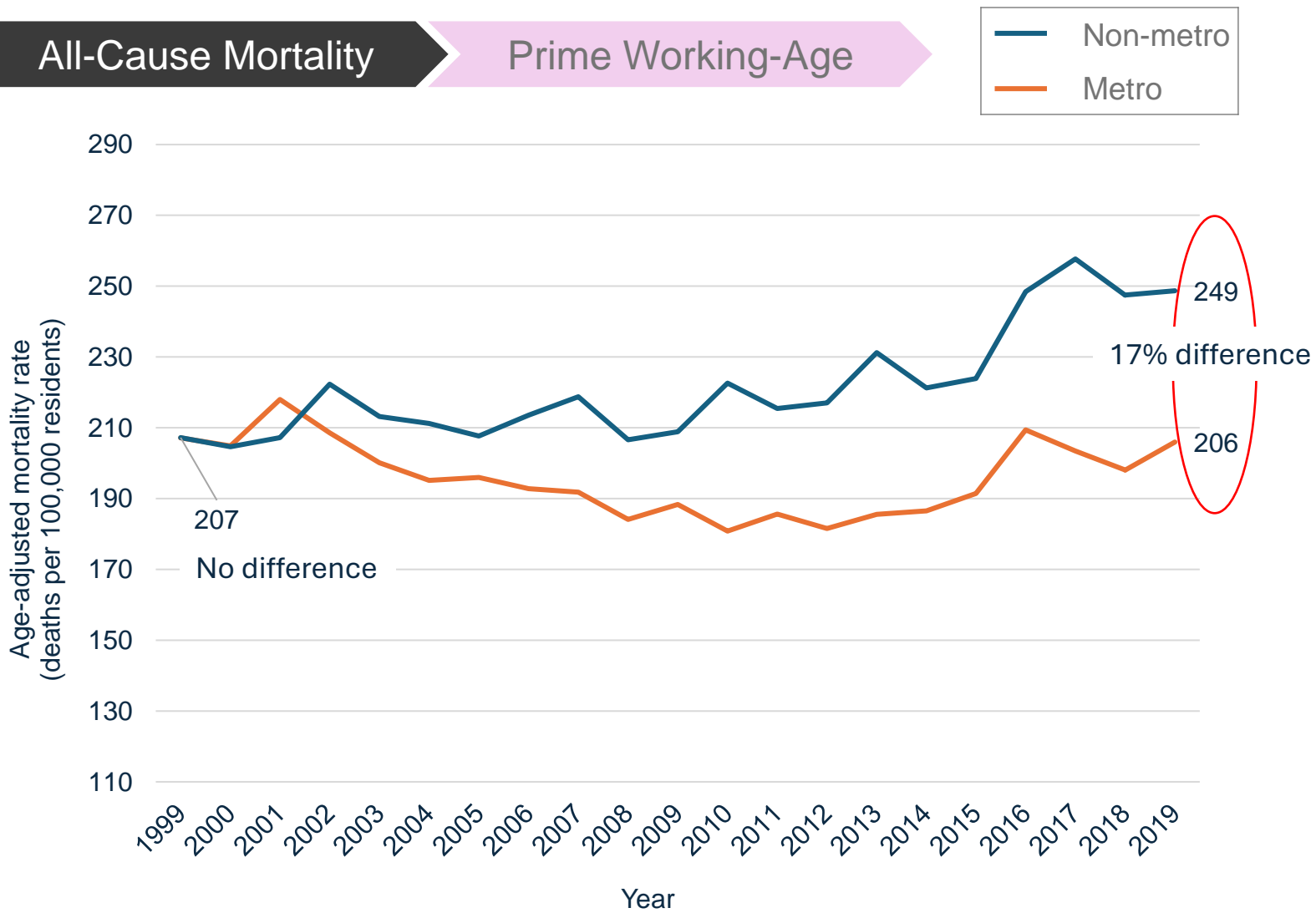
Natural-cause, all-ages mortality rates decreased from 1999-2019 in both rural and urban areas.

- However, the gap between rural and urban areas widened over that time span.
- The natural-cause, all-ages mortality rate was 4% higher in rural areas than in urban areas in 1999. By 2019, it was 13% percent higher in rural areas than in urban areas.

Age-adjusted mortality rates, metro and non-metro areas,1999-2019

Natural-Cause Mortality ➤ All-Ages

Legend: Non-metro, Metro

4% difference

837

800

13% difference

691

603

Y-axis: Age-adjusted mortality rate (deaths per 100,000 residents), 500 to 900

X-axis: Year, 1999 to 2019
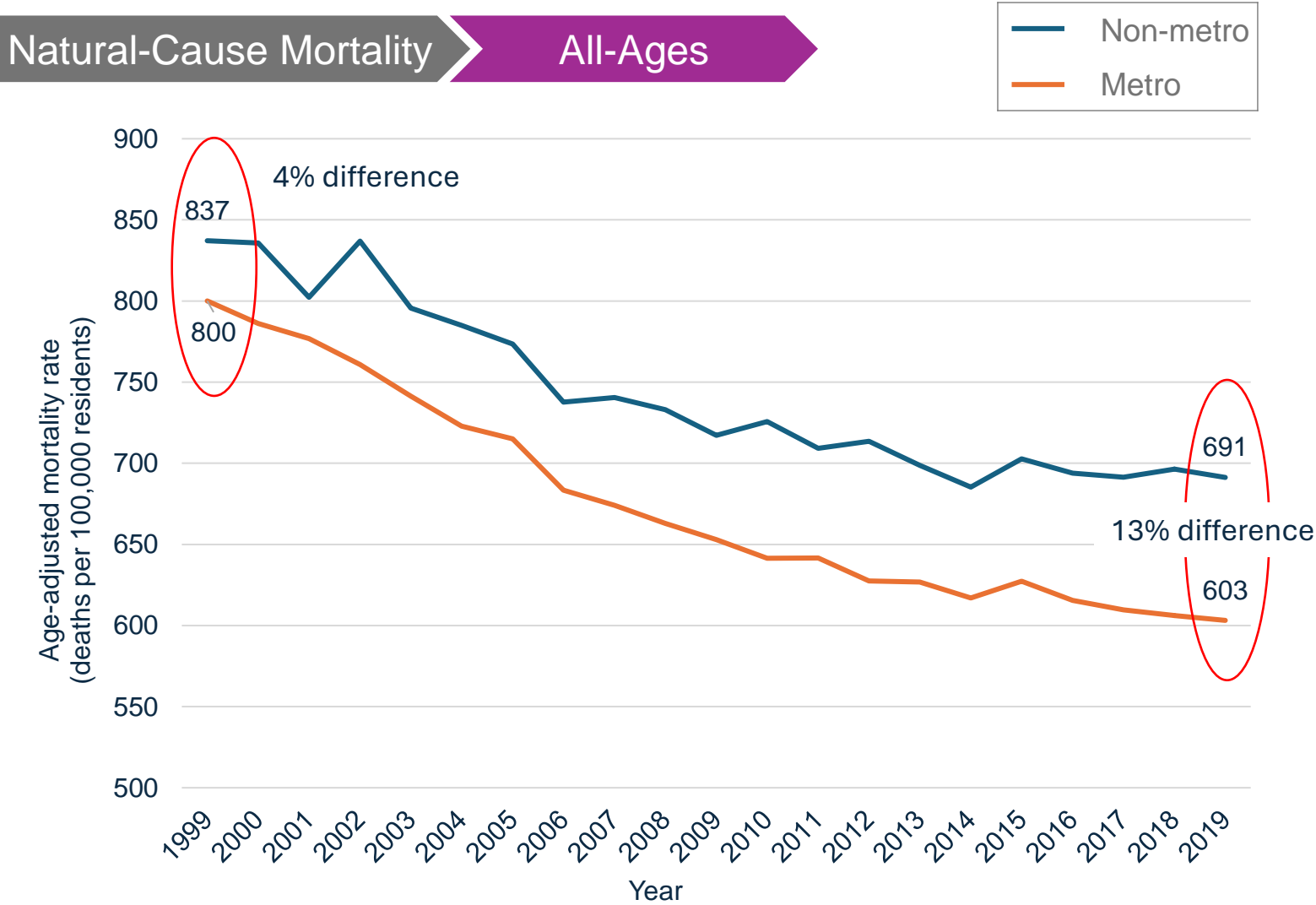
Natural-cause, working-age mortality has declined in both rural and urban areas, but more slowly in rural areas.

- The natural-cause, working-age mortality rate was 2% lower in rural areas in 1999 but 19% higher by 2019.
- Rural and urban areas swapped dominance three times before settling into the current order in 2001.

Age-adjusted mortality rates, metro and non-metro areas, 1999-2019

Natural-Cause Mortality ➤ Working-Age

Legend:
— Non-metro
— Metro

238

234

2% difference (non-metro is lower)

226

19% difference (non-metro is higher)

183

Y-axis: Age-adjusted mortality rate (deaths per 100,000 residents) — 130, 150, 170, 190, 210, 230, 250, 270

X-axis: Year — 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019

Natural-cause, prime working-age mortality was initially slightly lower in urban areas but has become much higher in rural areas.

- The gap between natural-cause, prime working-age mortality rates in rural and urban areas widened between 1999 and 2019 and saw more changes over these two decades than is seen in other cuts of the data.

- The natural-cause, prime working-age mortality rate was 4% lower in rural areas than in urban areas in 1999. By 2019, it was 19% percent higher in rural areas than in urban areas.
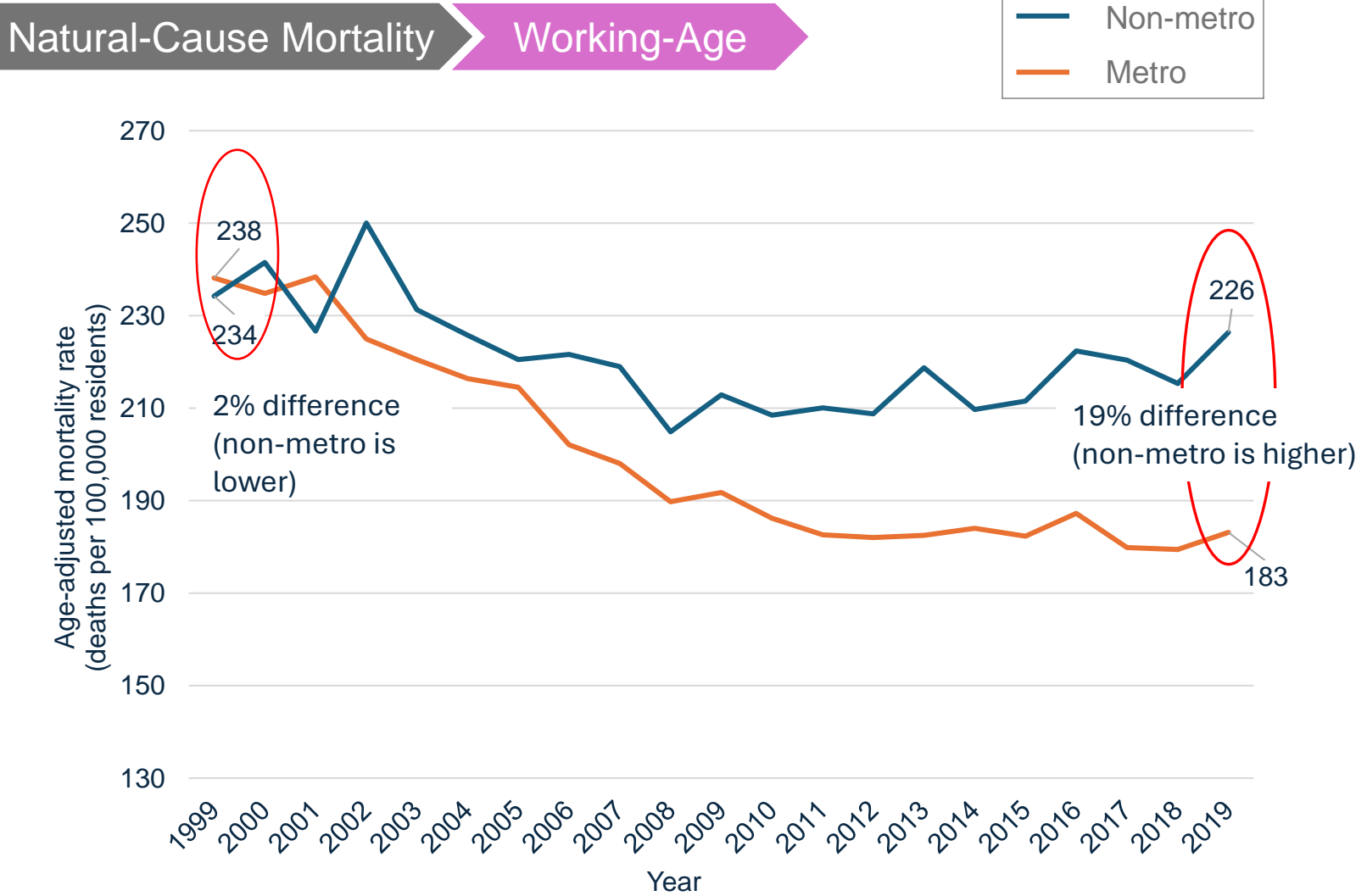
- Rural and urban mortality rates switched dominance in 2002.

Age-adjusted mortality rates, metro and non-metro areas,1999-2019

Natural-Cause Mortality ▸ Prime Working-Age

Legend: Non-metro, Metro

171
164

4% difference (non-metro is lower)

19% difference (non-metro is higher)

169
137

Y-axis: Age-adjusted mortality rate (deaths per 100,000 residents)

X-axis: Year (1999–2019)
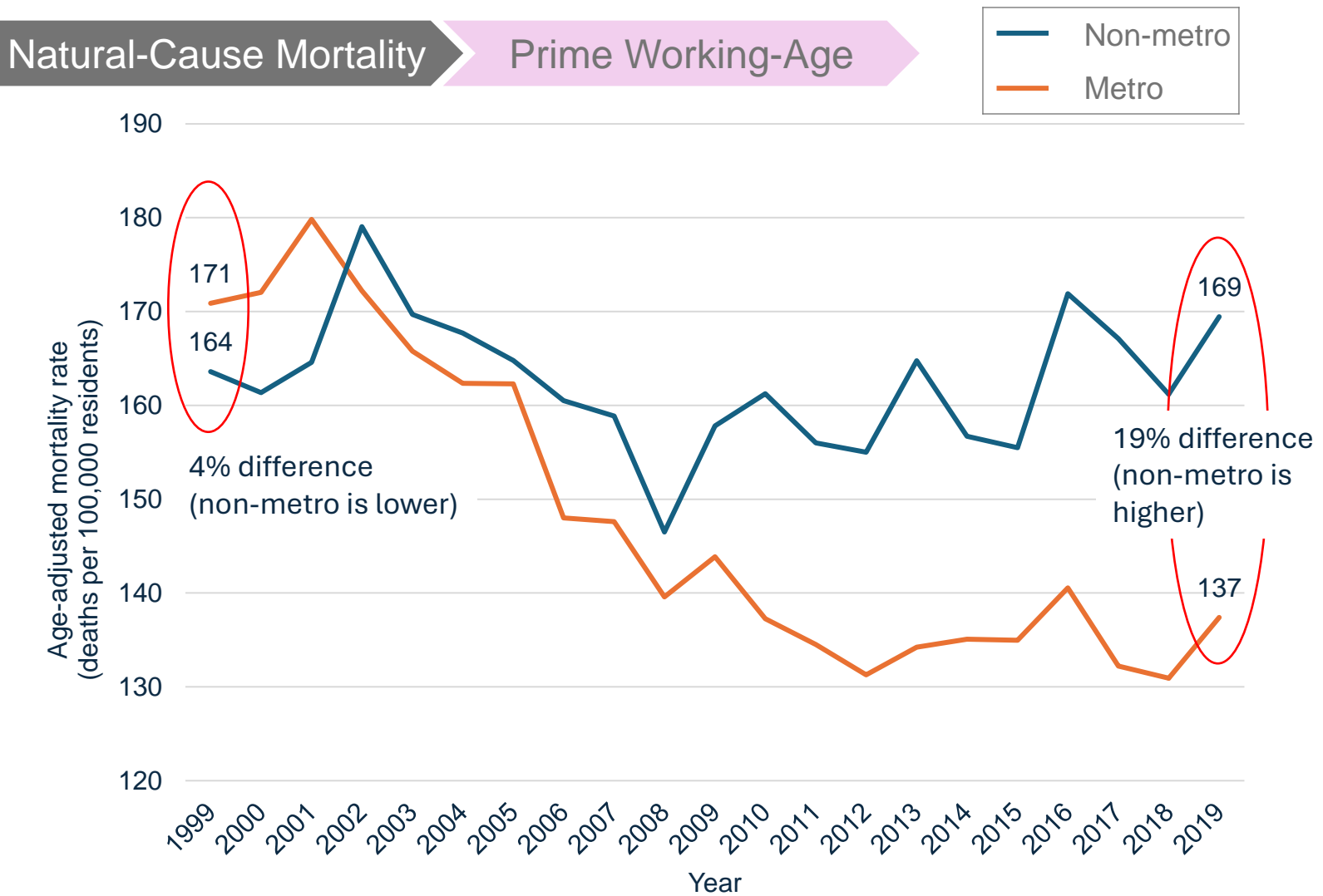
Analysis: Natural- vs. External- Cause Mortality

- All analysis is specific to New York.

- All mortality rates are age-adjusted.

- All analyses in this section compare the two periods of 1999-2001 and 2017-2019.

- Bars to the left of 0% represent a decrease in the mortality rate between the early period and the later period, while bars to the right of 0% represent an increase. 0% represents no change.

Natural-cause, all-ages mortality decreased in both rural and urban areas from 1999-2001 to 2017-2019. Conversely, external-cause mortality increased in both areas.

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- The decline in natural-cause mortality is more pronounced in urban areas (-23%) compared to rural (-16%).

- Within external-cause mortality, the change between time periods increased more dramatically for urban areas (49%) compared to rural areas (34%).

Change in age-adjusted mortality rates, metro and non-metro areas, 1999-2001 vs. 2017-2019
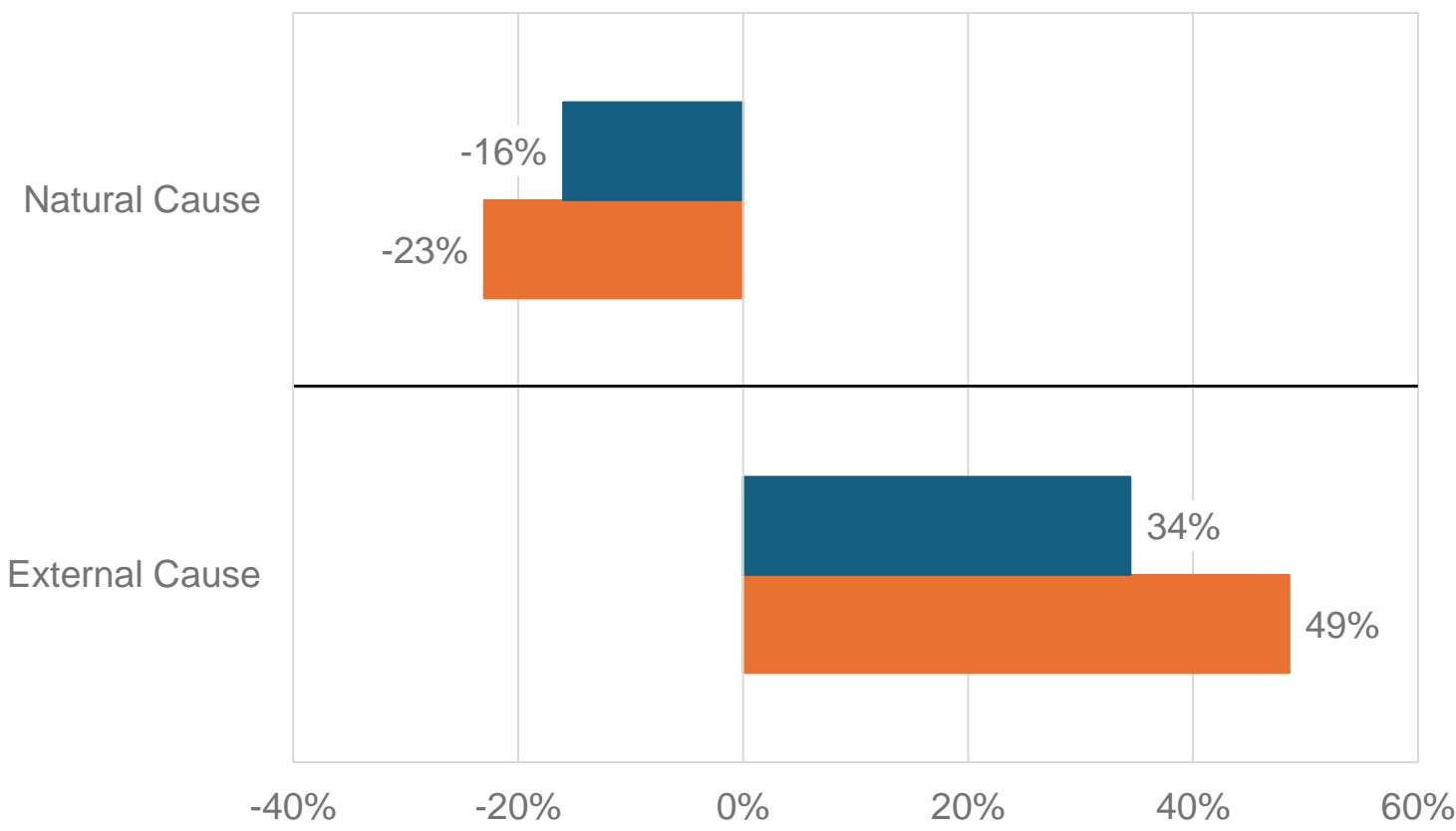
Natural-Cause Mortality
External-Cause Mortality
All-Ages

Non-metro
Metro

Natural Cause
-16%
-23%

External Cause
34%
49%

-40% -20% 0% 20% 40% 60%

Natural-cause, working-age mortality decreased in both rural and urban areas from 1999-2001 to 2017-2019. External-cause mortality increased in both areas.

- Between time periods, the age-adjusted mortality rate for natural-cause, working-age mortality decreased in both rural and urban areas; the decline is more pronounced in urban areas (-24%) compared to rural (-6%).

- Among external-cause mortality, the change between time periods increased more dramatically for urban areas (68%) compared to rural areas (58%). Both increases are much greater among working-age populations compared to in all-ages analysis.

Change in age-adjusted mortality rates, metro and non-metro areas, 1999-2001 vs. 2017-2019

Natural-Cause Mortality
External-Cause Mortality
Working-Age

Non-metro
Metro
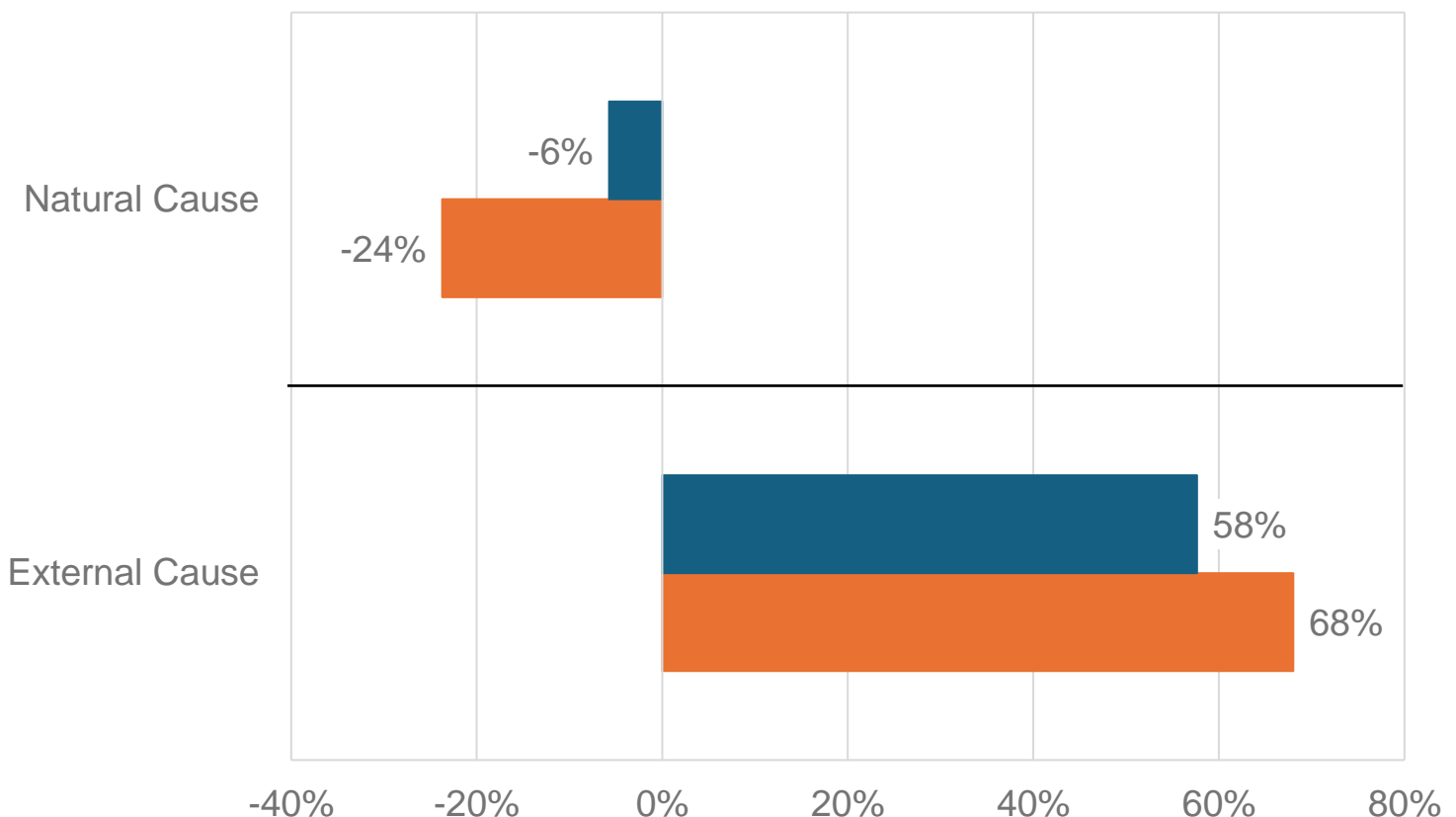
Natural Cause: -6% (Non-metro), -24% (Metro)

External Cause: 58% (Non-metro), 68% (Metro)

Natural-cause, prime working-age mortality decreased in urban areas and increased in rural areas from 1999-2001 to 2017-2019. External-cause mortality dramatically increased in both areas, nearly doubling.

- Between time periods, the age-adjusted mortality rate for natural-cause, prime working-age mortality decreased in urban areas (-23%) while it increased in rural areas (2%)

- Among external-cause mortality, the change between time periods increased more for New Yorkers in urban areas (98%) compared to rural areas (93%). Both populations observed a dramatic increase in external-cause mortality rates from 1999-2001 to 2017-2019.

Change in age-adjusted mortality rates, metro and non-metro areas, 1999-2001 vs. 2017-2019

Natural-Cause Mortality

External-Cause Mortality

Prime Working-Age

Non-metro

Metro

	Metro	Non-metro
Natural Cause	-23%	2%
External Cause	93%	98%

Natural-cause, all-ages mortality decreased in both rural and urban areas from 1999-2001 to 2017-2019 while external-cause mortality increased in both areas, among both male and female New Yorkers.

S2P

- Natural-cause, female and male mortality decreased in both rural and urban areas, with urban areas showing a somewhat larger decrease for male (-21%) than for female (-12%) New Yorkers.

- External-cause mortality rates increased across the board for male, female, rural, and urban New Yorkers. The increase was higher in urban areas, especially for female New Yorkers (54%).

Change in age-adjusted mortality rates, metro and non-metro areas, 1999-2001 vs. 2017-2019

| Natural-Cause Mortality | All-Ages | Sex Stratified |
| External-Cause Mortality | | |

External Cause (Female): Non-metro 34%, Metro 54%

Natural Cause (Female): Non-metro -12%, Metro -22%

External Cause (Male): Non-metro 32%, Metro 43%

Natural Cause (Male): Non-metro -21%, Metro -25%

Legend: Non-metro, Metro

X-axis: -40%, -20%, 0%, 20%, 40%, 60%, 80%

Natural-cause, working-age mortality decreased in both rural and urban areas from 1999-2001 to 2017-2019 while external-cause mortality increased in both areas, for both sexes.

- External-cause mortality rates increased most for female, rural New Yorkers.

- Compared to the all-ages analysis, external-cause mortality for working-age New Yorkers had a larger increase between the two time periods.

Change in age-adjusted mortality rates, metro and non-metro areas, 1999-2001 vs. 2017-2019

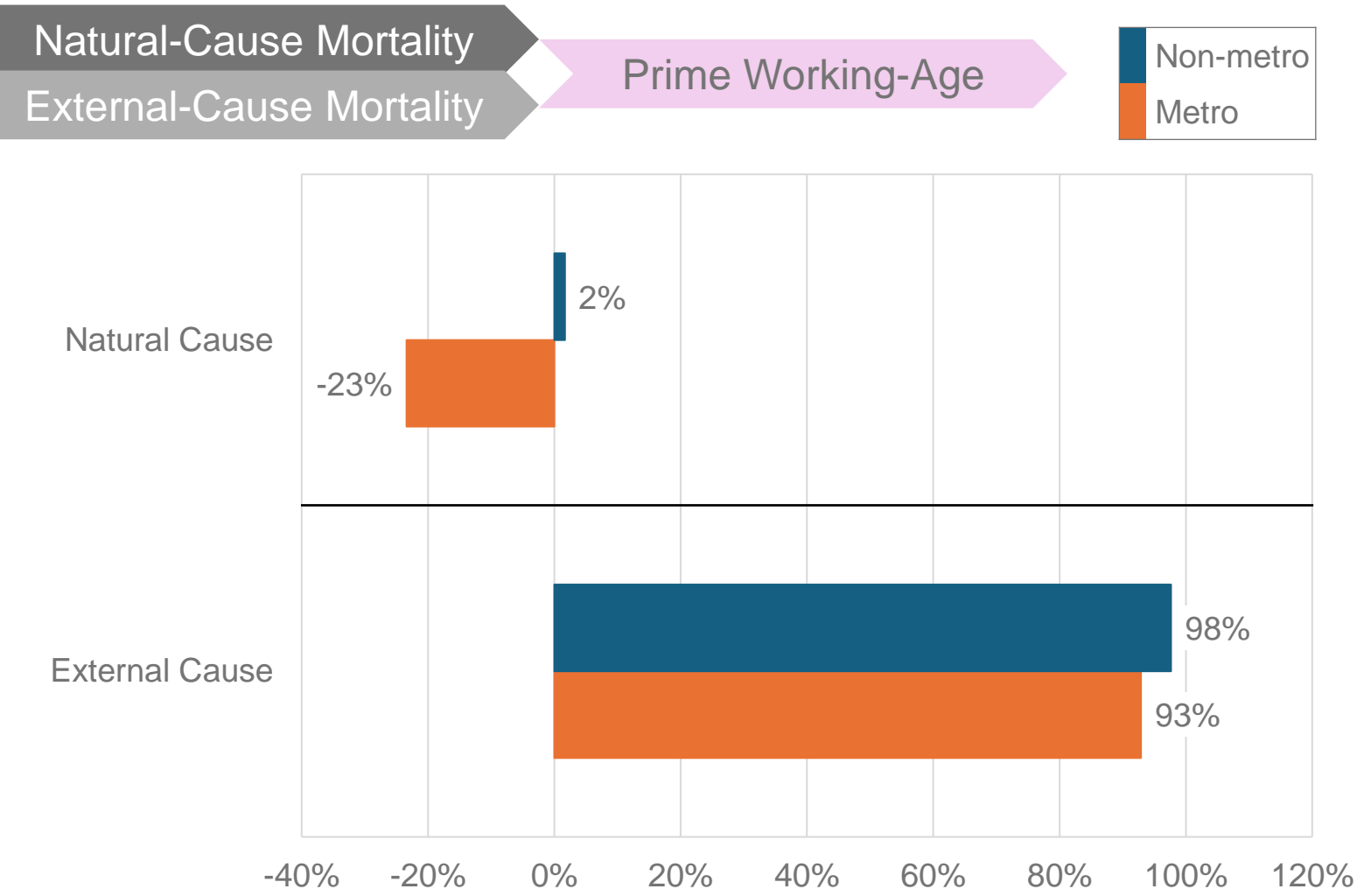Natural-Cause Mortality
External-Cause Mortality
Working-Age
Sex Stratified

Category	Non-metro	Metro
External Cause (Female)	79%	93%
Natural Cause (Female)	-3%	-24%
External Cause (Male)	50%	60%
Natural Cause (Male)	-8%	-24%
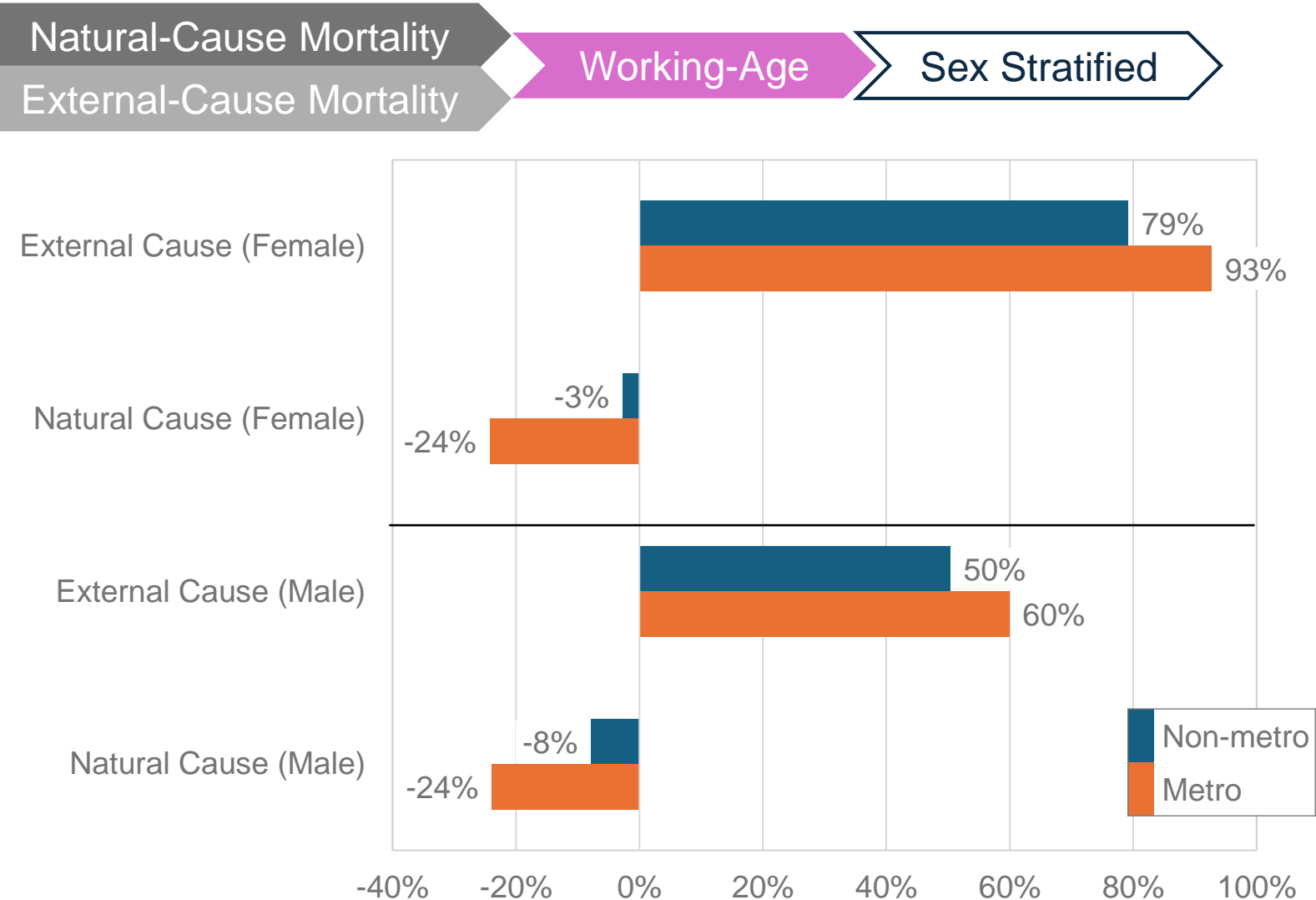
Prime working-age mortality rates display unique findings relative to other age cohorts when stratified by sex.

- For female New Yorkers, natural-cause mortality decreased in urban areas and increased in rural areas. External-cause mortality increased in both areas.

- For male New Yorkers, natural-cause mortality decreased, especially in urban areas. Conversely, external-cause mortality increased in both rural and urban areas, with far greater magnitude in urban areas.

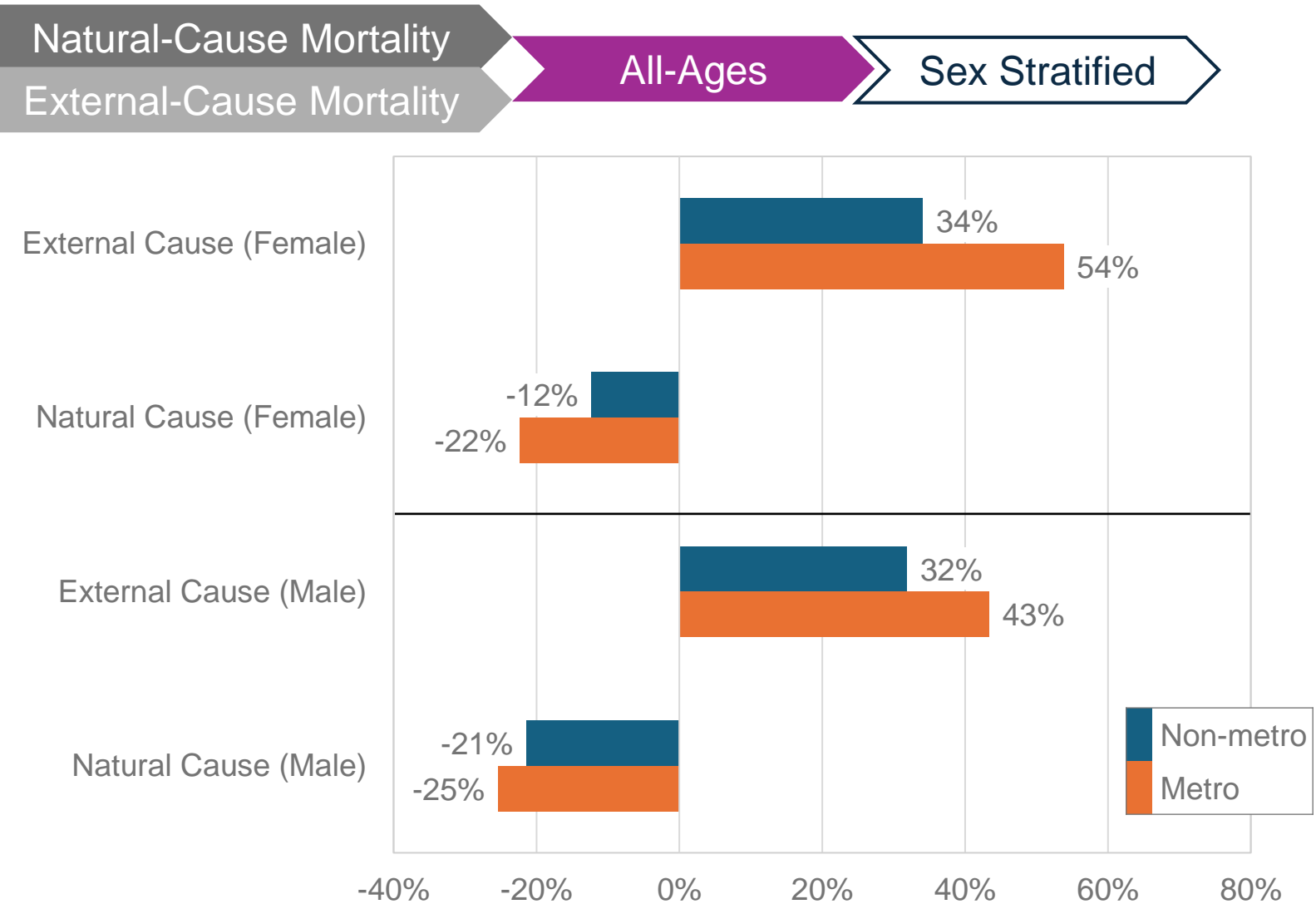- External-cause mortality increased more for rural and urban prime working-age female New Yorkers compared to any other sex or age cohort.

Change in age-adjusted mortality rates, metro and non-metro areas, 1999-2001 vs. 2017-2019

| Natural-Cause Mortality | Prime Working-Age | Sex Stratified |
| External-Cause Mortality | | |

External Cause (Female): Non-metro 150%, Metro 131%

Natural Cause (Female): Non-metro 83%, Metro -23%

External Cause (Male): Non-metro 11%, Metro 80%

Natural Cause (Male): Non-metro -4%, Metro -24%

Legend: Non-metro, Metro

X-axis: -60% -40% -20% 0% 20% 40% 60% 80% 100% 120% 140% 160%
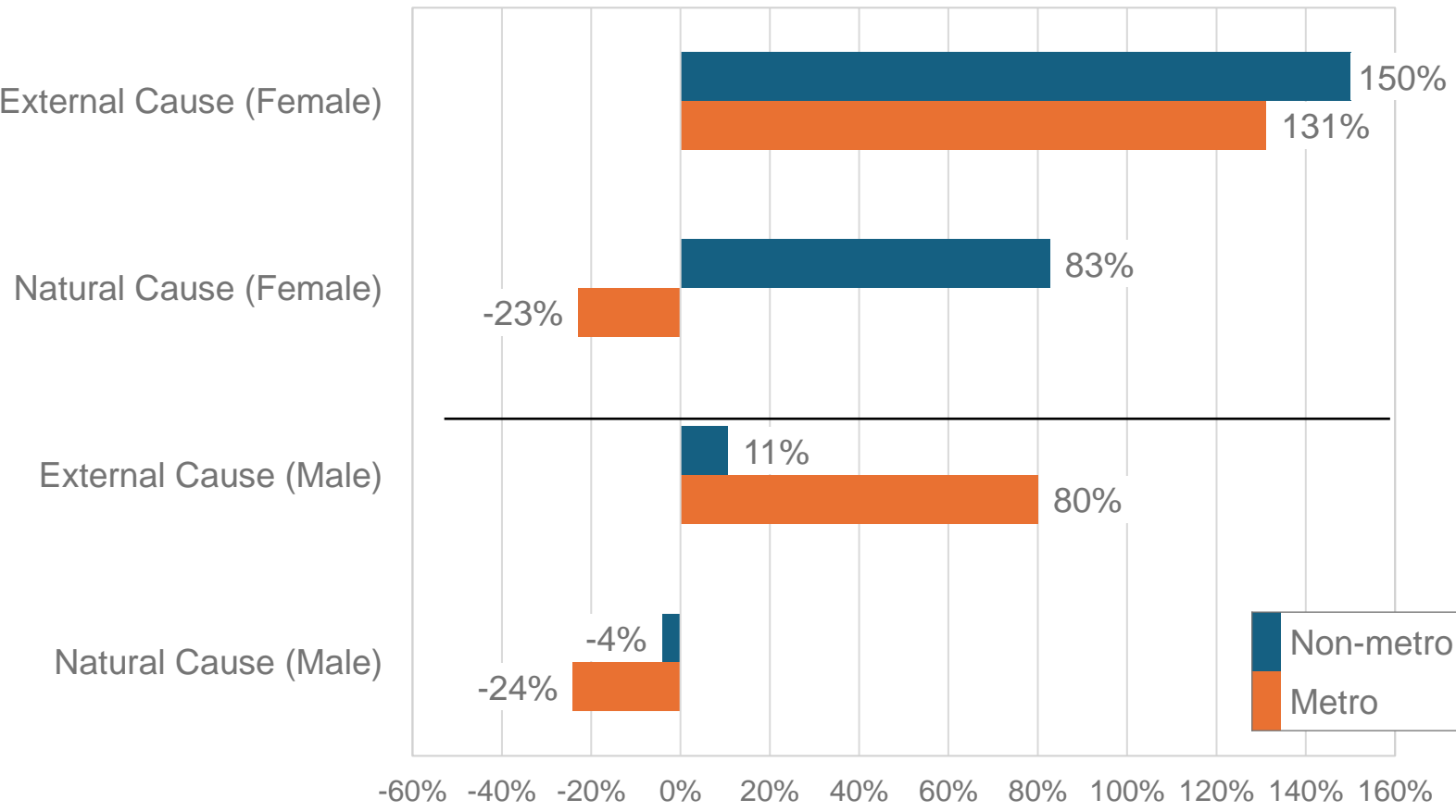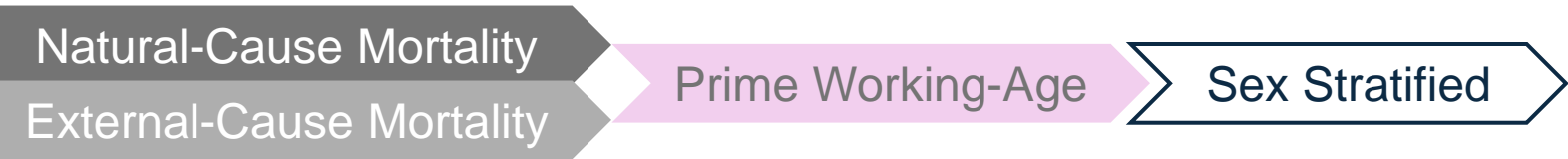
Analysis: Leading Natural Causes of Death by Sex

- All analysis is specific to New York.

- All mortality rates are age-adjusted.

- All analyses in this section compare the two periods of 1999-2001 and 2017-2019.

- 0% is equivalent to the age-adjusted metro (i.e., urban) mortality rate.

- Bars to the left of 0% represent a lower non-metro rate, while bars to the right of 0% represent a higher non-metro rate.

- Order is alphabetical by cause of death, along the Y-axis.

- The names of the leading causes of death are used as they are listed in the CDC WONDER database, which classifies causes of death in accordance with the International Classification of Disease, Tenth Revision (ICD-10) for deaths in 1999 and beyond. For more details on these names, see: https://wonder.cdc.gov/wonder/help/mcd.html#ICD-10%20Codes. We have added parenthetical notes where we expect some explanation would be helpful.

Non-metro age-adjusted, all-ages mortality rates by sex among 15 leading causes of death, 1999–2001 and 2017–2019, as percent above or below corresponding metro rates

All-Ages | Female

Legend:
- 2017-2019 (blue)
- 1999-2001 (green)

Cause of death	2017-2019	1999-2001
Sepsis	30.8%	-13.0%
Nephritis	67.1%	9.9%
Malignant Neoplasms (cancers)	18.9%	4.9%
Influenza and pneumonia	18.1%	-17.7%
In situ Neoplasms (cancers)	24.1%	21.1%
Hypertension & renal disease	9.2%	-21.7%
Diseases of the heart	5.9%	-6.5%
Diabetes	45.2%	9.1%
Chronic lower respiratory disease	79.5%	57.5%
Chronic liver disease and cirrhosis	72.1%	17.0%
Cerebrovascular diseases	24.8%	32.9%
Alzheimer's disease	9.9%	34.6%
Accidents	51.0%	50.7%

Axis: -40% -20% 0% 20% 40% 60% 80% 100%

This equals the metro rate

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Non-metro age-adjusted, all-ages mortality rates by sex among 15 leading causes of death, 1999–2001 and 2017–2019, as percent above or below corresponding metro rates

S2P

All-Ages ▸ **Male**

Legend:
- 2017-2019 (blue)
- 1999-2001 (green)

Cause of death	2017-2019	1999-2001
Sepsis	27.8%	-24.4%
Nephritis	46.2%	14.7%
Malignant Neoplasms (cancers)	15.7%	8.8%
Intentional self-harm (suicide)	70.4%	65.7%
Influenza and pneumonia	-4.1%	-20.8%
Diseases of the heart	5.3%	-2.8%
Diabetes	22.4%	5.3%
Chronic lower respiratory disease	79.0%	71.3%
Chronic liver disease and cirrhosis	29.2%	7.2%
Cerebrovascular diseases	18.4%	32.7%
Accidents	19.3%	32.7%

Axis: -40% -20% 0% 20% 40% 60% 80% 100%

This equals the metro rate

Non-metro age-adjusted, all-ages mortality rates by sex among 15 leading causes of death, 1999–2001 and 2017–2019, as percent above or below corresponding metro rates

S2P

Working-Age → Female

Legend:
- 2017-2019 (blue)
- 1999-2001 (green)

Cause	2017-2019	1999-2001
Sepsis	38.9%	-25.9%
Nephritis	93.3%	-32.0%
Malignant Neoplasms (cancers)	23.4%	4.8%
Intentional self-harm (suicide)	48.9%	53.6%
Influenza and pneumonia	23.3%	-33.3%
Diseases of the heart	27.0%	-6.1%
Diabetes	47.9%	-8.5%
Chronic lower respiratory disease	118.4%	54.8%
Chronic liver disease and cirrhosis	77.8%	2.9%
Cerebrovascular diseases	-2.3%	-9.7%
Accidents	63.4%	35.5%

Axis: -60% -40% -20% 0% 20% 40% 60% 80% 100% 120%
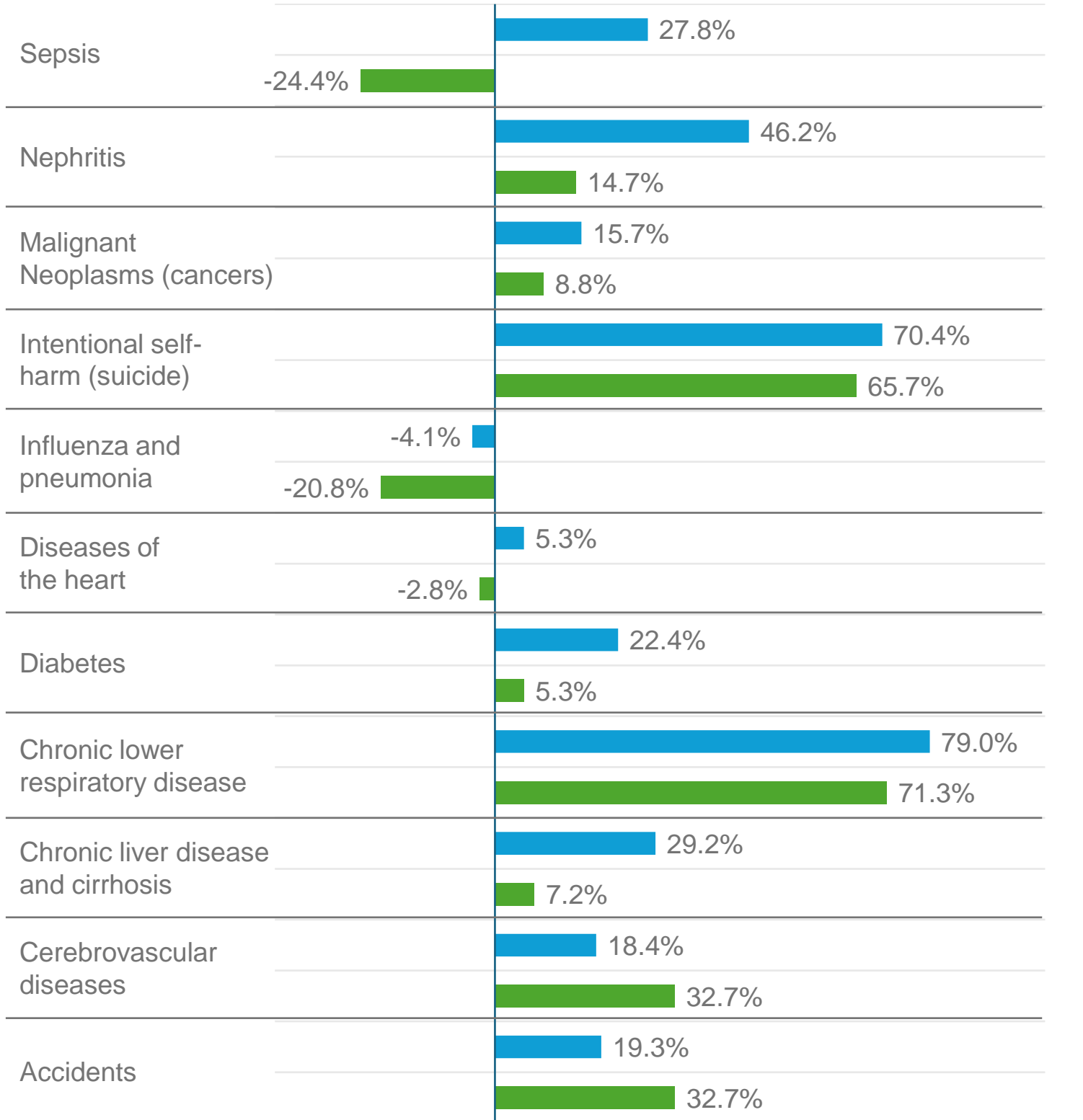
This equals the metro rate

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Non-metro age-adjusted, all-ages mortality rates by sex among 15 leading causes of death, 1999–2001 and 2017–2019, as percent above or below corresponding metro rates

Working-Age | **Male**

Legend:
- 2017-2019 (blue)
- 1999-2001 (green)

Cause of death	2017-2019	1999-2001
Sepsis	62.5%	-14.3%
Nephritis	54.2%	-27.8%
Malignant Neoplasms (cancers)	28.5%	5.2%
Intentional self-harm (suicide)	65.8%	69.4%
Influenza and pneumonia	0.0%	-26.0%
Diseases of the heart	13.6%	-0.5%
Diabetes	16.7%	-2.2%
Chronic lower respiratory disease	100.0%	43.1%
Chronic liver disease and cirrhosis	26.4%	1.9%
Cerebrovascular diseases	0.0%	-14.1%
Assault (homicide)	-49.3%	-86.6%
Accidents	17.7%	23.7%

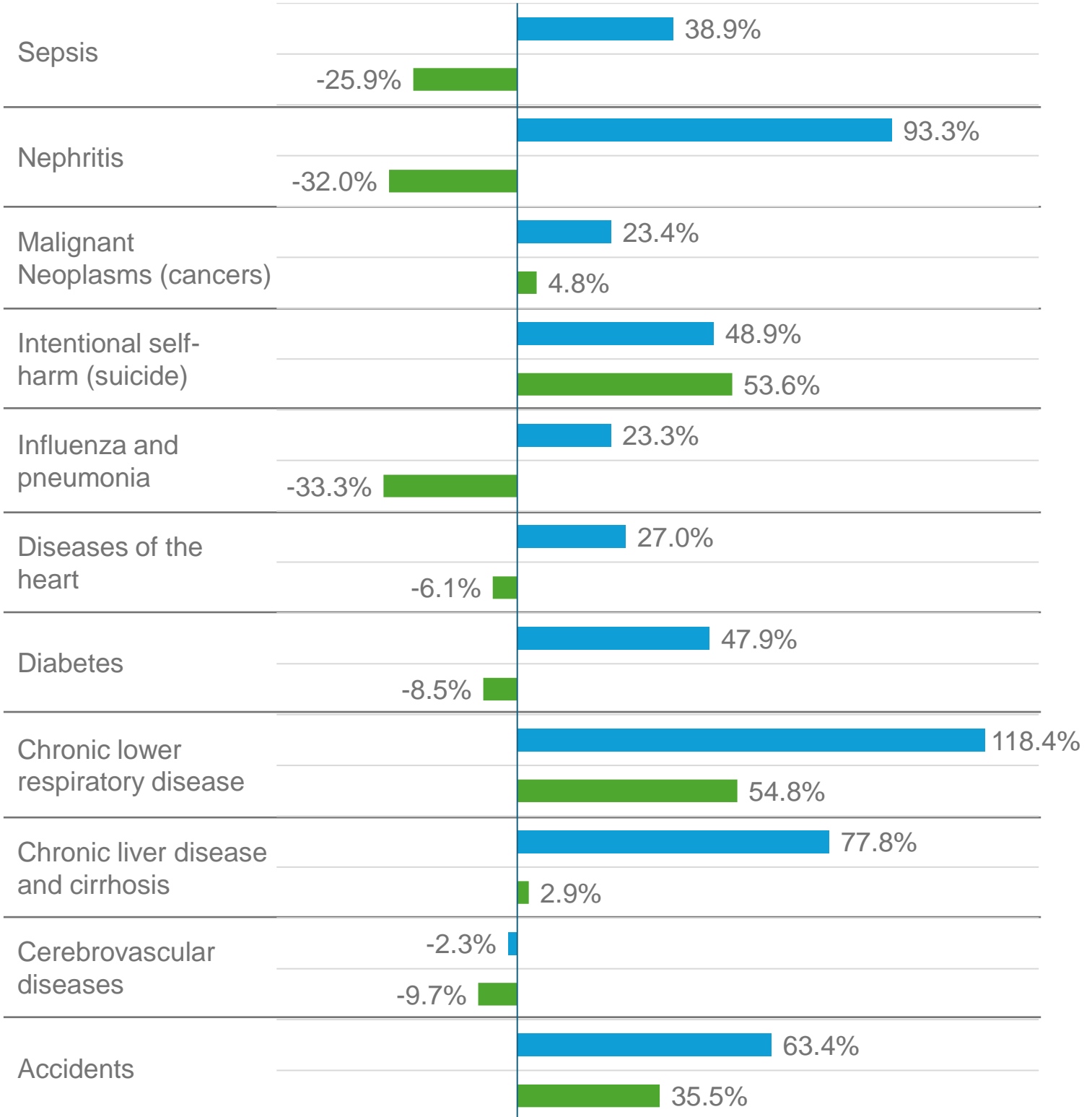x-axis: -100% -80% -60% -40% -20% 0% 20% 40% 60% 80% 100% 120%

This equals the metro rate

Non-metro age-adjusted, all-ages mortality rates by sex among 15 leading causes of death, 1999–2001 and 2017–2019, as percent above or below corresponding metro rates

S2P

Prime Working-Age > **Female**

Legend:
- 2017-2019 (blue)
- 1999-2001 (green)

Malignant Neoplasms (cancers)
- 22.0%
- 3.3%

Intentional self-harm (suicide)
- 64.0%
- 69.0%

Diseases of the heart
- 39.9%
- -2.9%

Diabetes
- 60.0%
- 13.9%

Chronic lower respiratory disease
- 142.3%
- 5.9%

Chronic liver disease and cirrhosis
- 81.8%
- 3.3%

Accidents
- 78.8%
- 13.7%

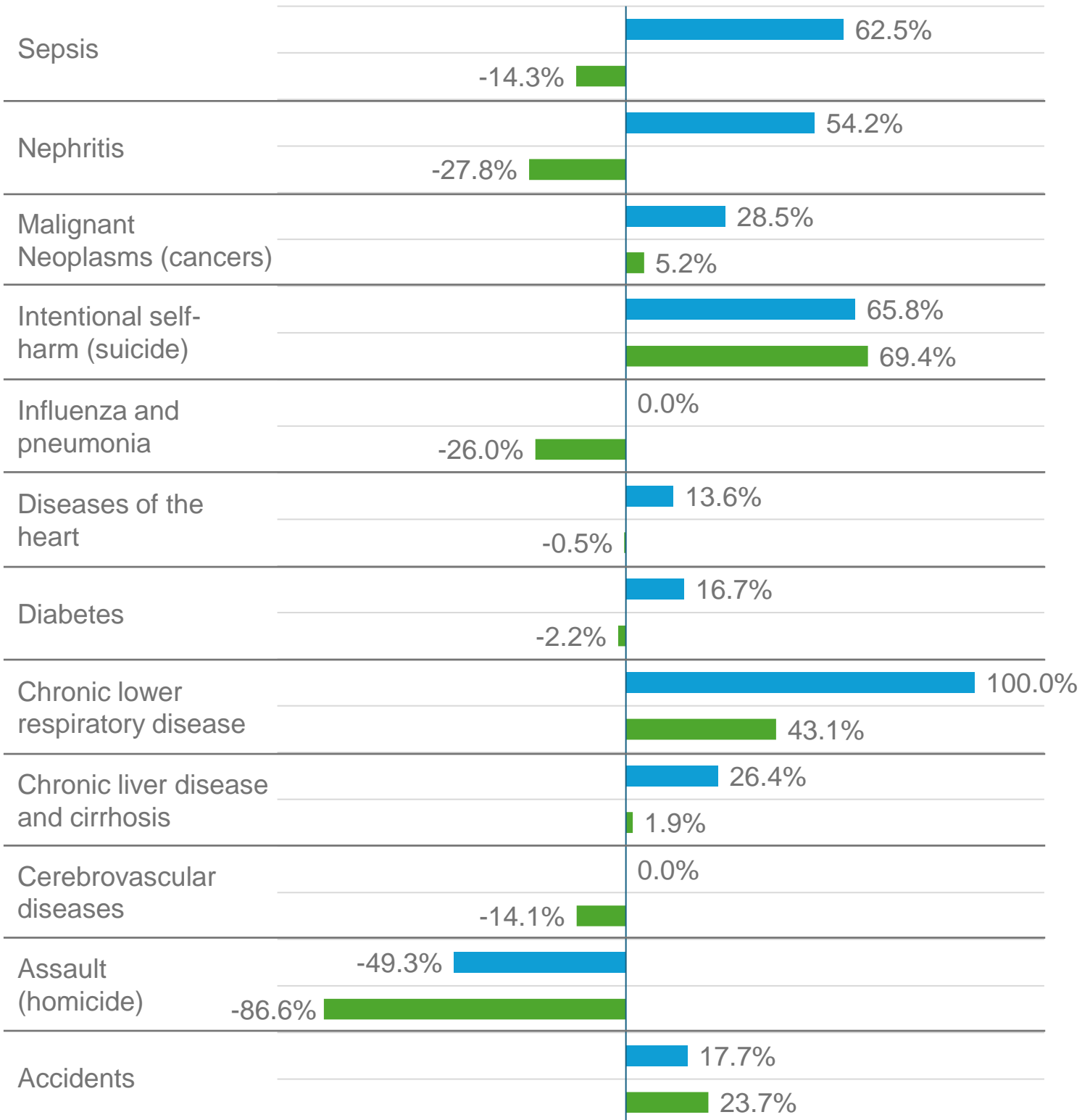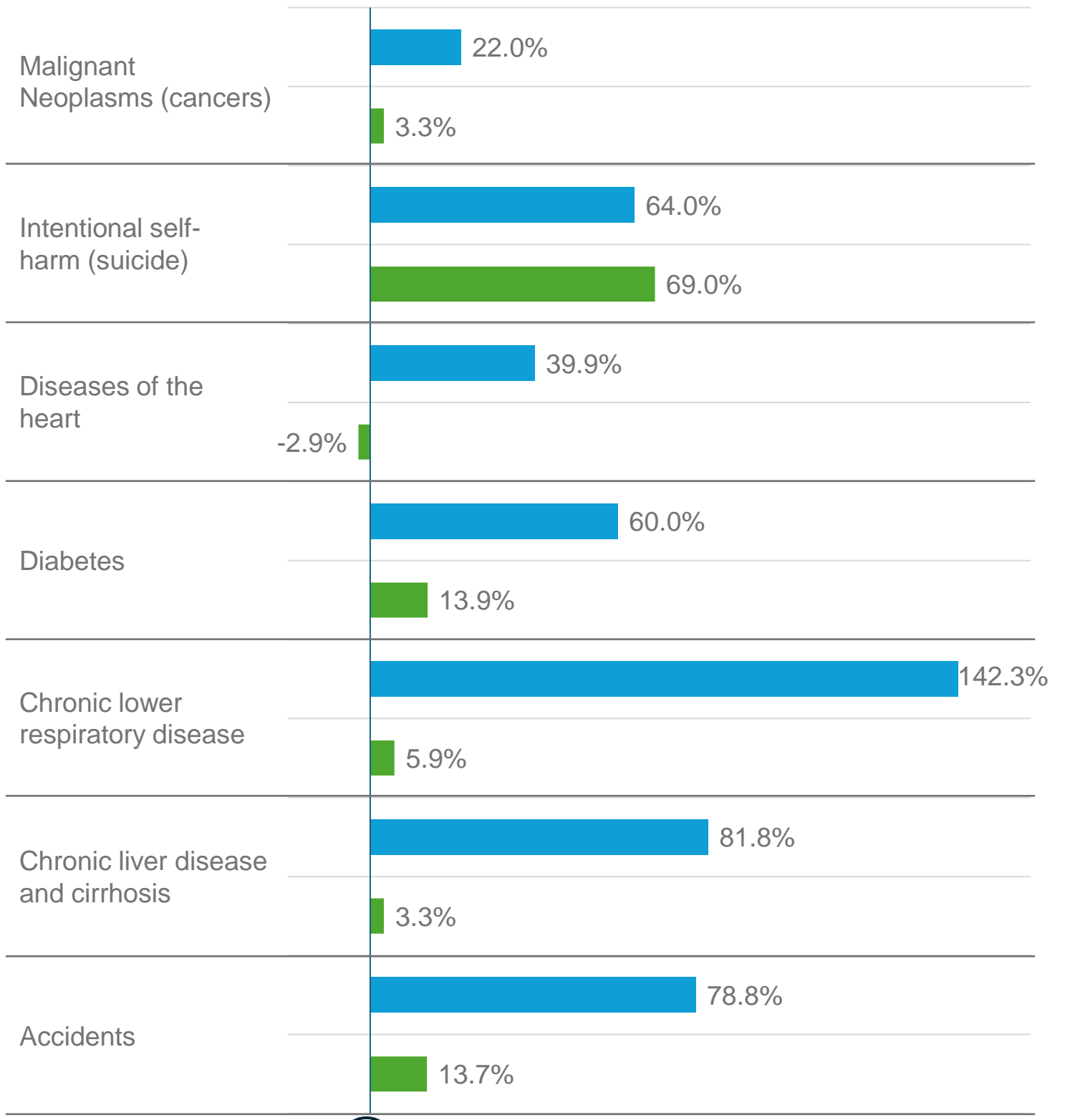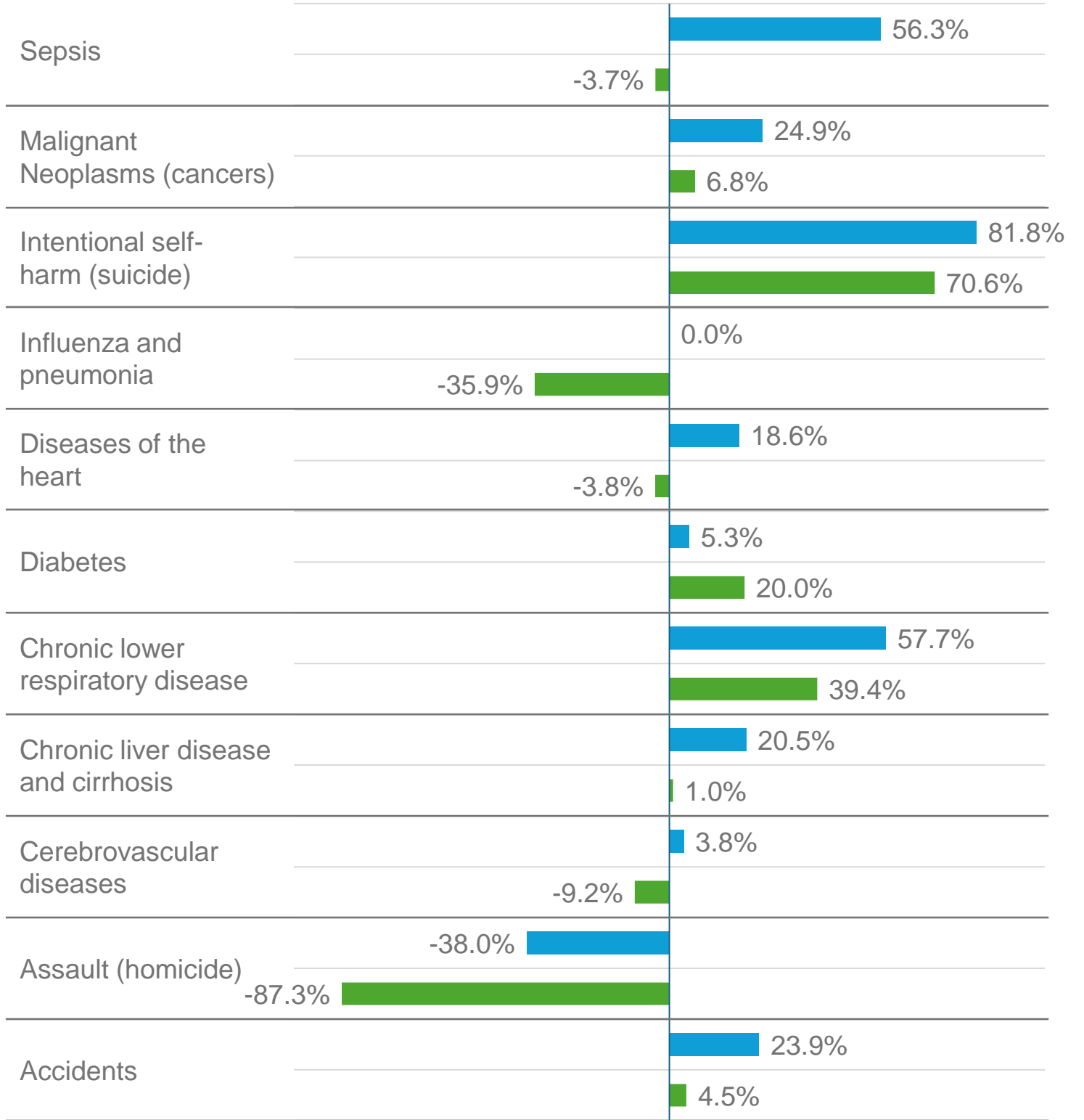Axis: -20% 0% 20% 40% 60% 80% 100% 120% 140% 160%

This equals the metro rate

Non-metro age-adjusted, all-ages mortality rates by sex among 15 leading causes of death, 1999–2001 and 2017–2019, as percent above or below corresponding metro rates

S2P

Prime Working-Age | Male

Legend:
- 2017-2019 (blue)
- 1999-2001 (green)

Cause of death	2017-2019	1999-2001
Sepsis	56.3%	-3.7%
Malignant Neoplasms (cancers)	24.9%	6.8%
Intentional self-harm (suicide)	81.8%	70.6%
Influenza and pneumonia	0.0%	-35.9%
Diseases of the heart	18.6%	-3.8%
Diabetes	5.3%	20.0%
Chronic lower respiratory disease	57.7%	39.4%
Chronic liver disease and cirrhosis	20.5%	1.0%
Cerebrovascular diseases	3.8%	-9.2%
Assault (homicide)	-38.0%	-87.3%
Accidents	23.9%	4.5%

-100% -80% -60% -40% -20% 0% 20% 40% 60% 80% 100%
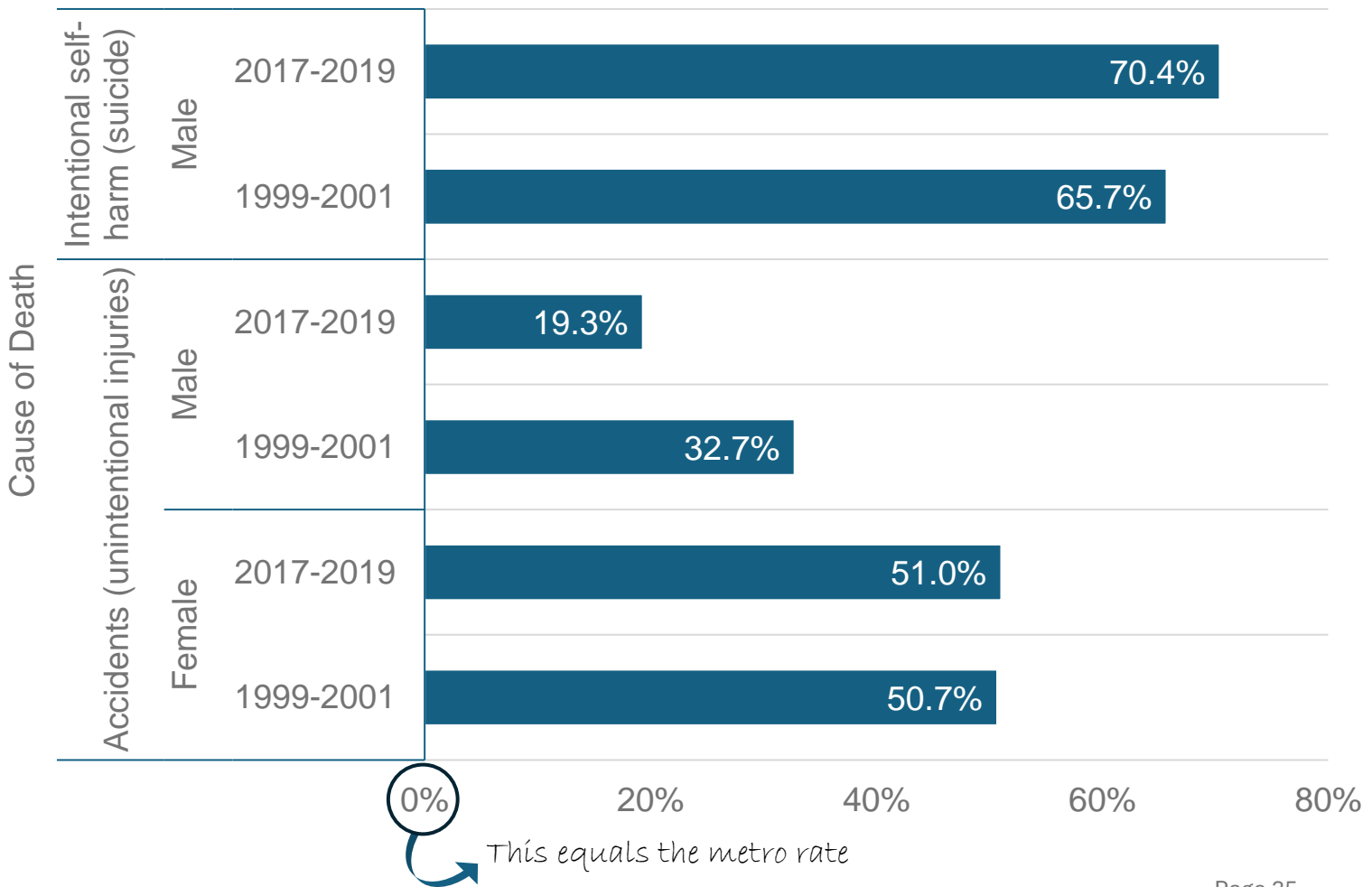
This equals the metro rate

Analysis: Leading Causes of Death: Non-metro vs. Metro

- All analysis is specific to New York.
- All mortality rates are age-adjusted.
- All analyses in this section use only the two periods of 1999-2001 and 2017-2019.
- 0% is equivalent to the age-adjusted, metro (i.e., urban) mortality rate.
- Therefore, the closer a value is to zero, the smaller the rural/urban disparity is.
- *It is important to recognize, however, that a small disparity does not mean the absolute rates are low. All conditions listed in the following slides represent leading causes of mortality, so all are worthy of additional attention.*
- Bars to the left of 0% represent a lower non-metro rate, while bars to the right of 0% represent a higher non-metro rate.
- For each time period, sex, and age group, the leading 15 causes of death vary. We have chosen some notable examples to highlight.
- When we don't have data for a particular variable, we have omitted it from the graph instead of displaying a blank row.

Among leading *external* causes of death in New York, mortality rates for accidents and suicides in rural areas were consistently higher than rates in urban areas.

- Rates of intentional self-harm among male New Yorkers in rural areas were already dramatically higher than in urban areas in 1999-2001 (66%) but grew to 70% higher by 2017-2019. This pattern is directionally consistent with national research comparing suicide in rural and urban areas. (Pettrone and Curtin, 2020)

- *Note: Only male data were available for intentional self-harm (suicide).*

Non-metro, age-adjusted, all-ages mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates (represented by 0%)

External-Cause Mortality	All-Ages	Sex Stratified

Cause of Death

Intentional self-harm (suicide) — Male

2017-2019	70.4%
1999-2001	65.7%

Accidents (unintentional injuries) — Male

2017-2019	19.3%
1999-2001	32.7%

Accidents (unintentional injuries) — Female

2017-2019	51.0%
1999-2001	50.7%

0%   20%   40%   60%   80%

This equals the metro rate

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Among leading natural causes of death in New York, mortality rates for kidney and liver conditions in rural areas were higher than rates in urban areas in both periods.
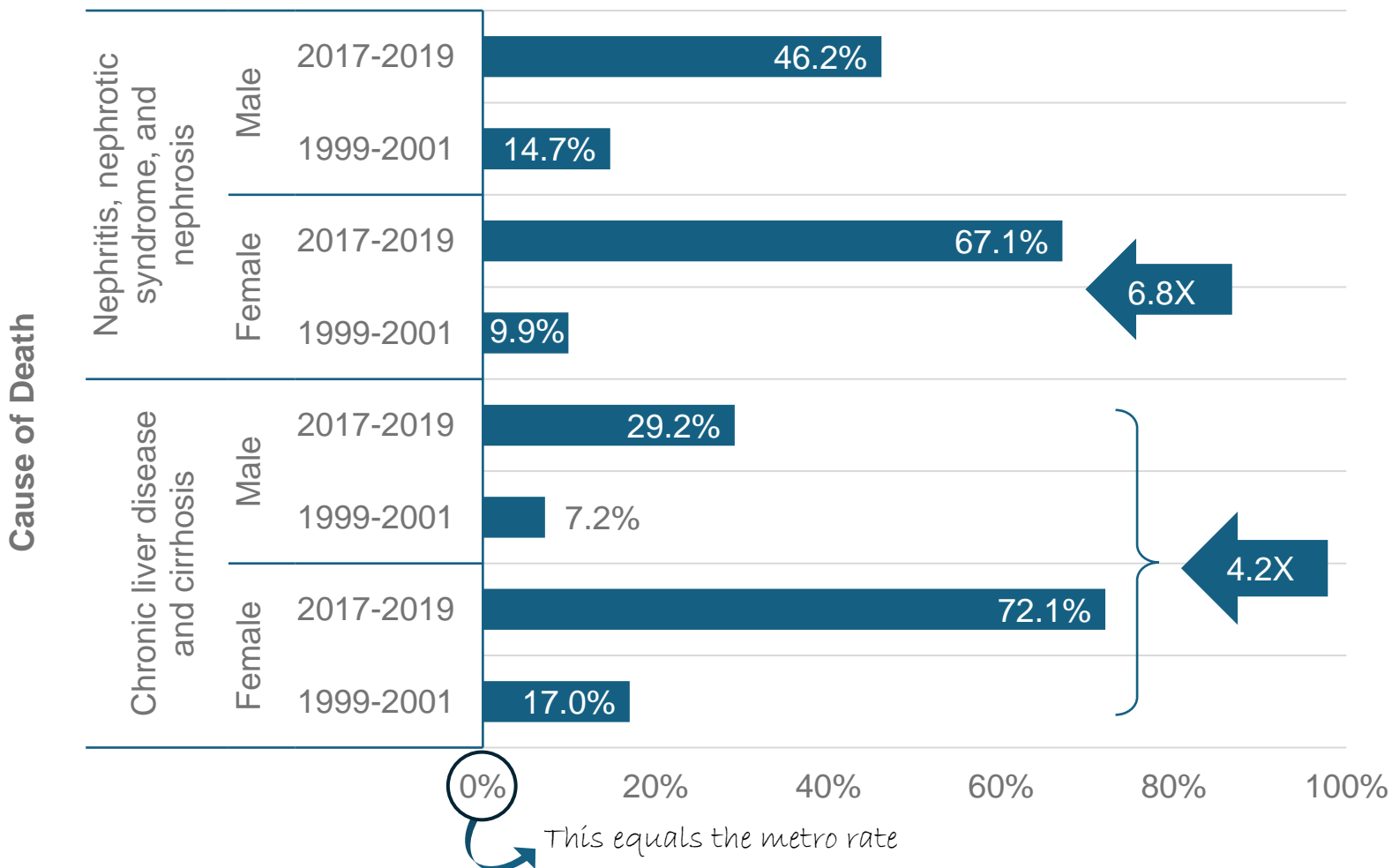
- The rural/urban disparity in age-adjusted mortality rates for chronic liver disease and cirrhosis grew **4.2X** for rural New Yorkers between the two time periods, with a larger disparity emerging between rural and urban *female* New Yorkers.

- The rural/urban disparity in age-adjusted mortality rates for kidney conditions grew **6.8X** among rural female New Yorkers between the two time periods.

Non-metro, age-adjusted, all-ages mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality ▶ All-Ages ▶ Sex Stratified

Cause of Death

Nephritis, nephrotic syndrome, and nephrosis

Male	2017-2019	46.2%
Male	1999-2001	14.7%
Female	2017-2019	67.1% → 6.8X
Female	1999-2001	9.9%

Chronic liver disease and cirrhosis

Male	2017-2019	29.2%
Male	1999-2001	7.2%
Female	2017-2019	72.1%
Female	1999-2001	17.0%

← 4.2X

0% 20% 40% 60% 80% 100%

This equals the metro rate

Age-adjusted mortality rates for septicemia (sepsis) were initially lower in rural areas in 1999-2001, but by 2017-2019 became much higher than in urban areas.
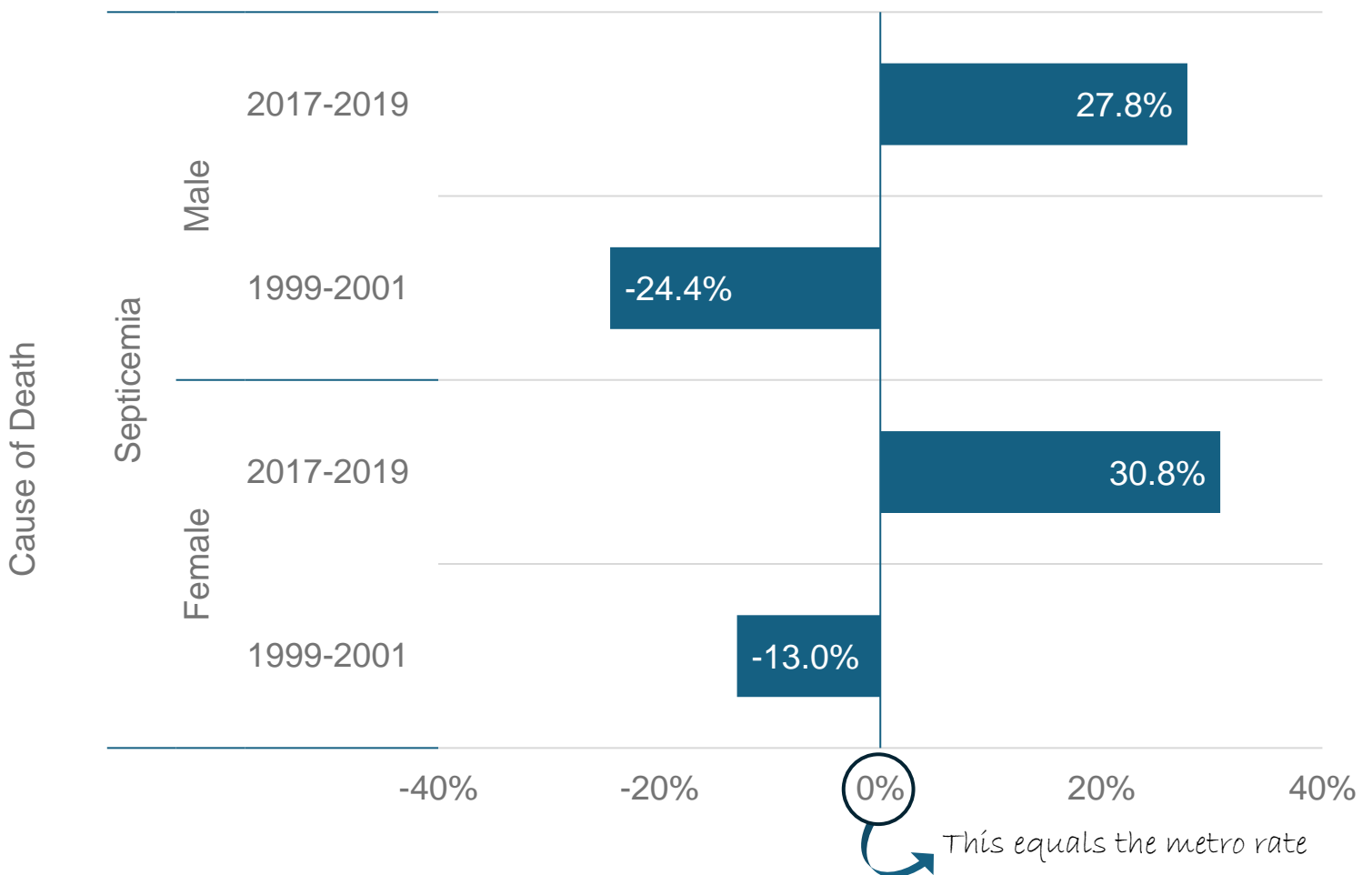
- The four bars in the graph below collectively represent a shift from relatively better to relatively worse sepsis mortality rates for rural New Yorkers.

- The disparity for rural male New Yorkers compared to urban male New Yorkers was originally larger than the rural female disparity, but now the disparities are similar, at 27.8% and 30.8% above urban rates, respectively.

Non-metro, age-adjusted, all-ages mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality | All-Ages | Sex Stratified

Cause of Death — Septicemia

Male
- 2017-2019: 27.8%
- 1999-2001: -24.4%

Female
- 2017-2019: 30.8%
- 1999-2001: -13.0%

-40% -20% 0% 20% 40%

This equals the metro rate

Mortality rates in rural areas for influenza and pneumonia were initially lower but increased over time, especially for the female rate, which shifted from below to above the urban rate.
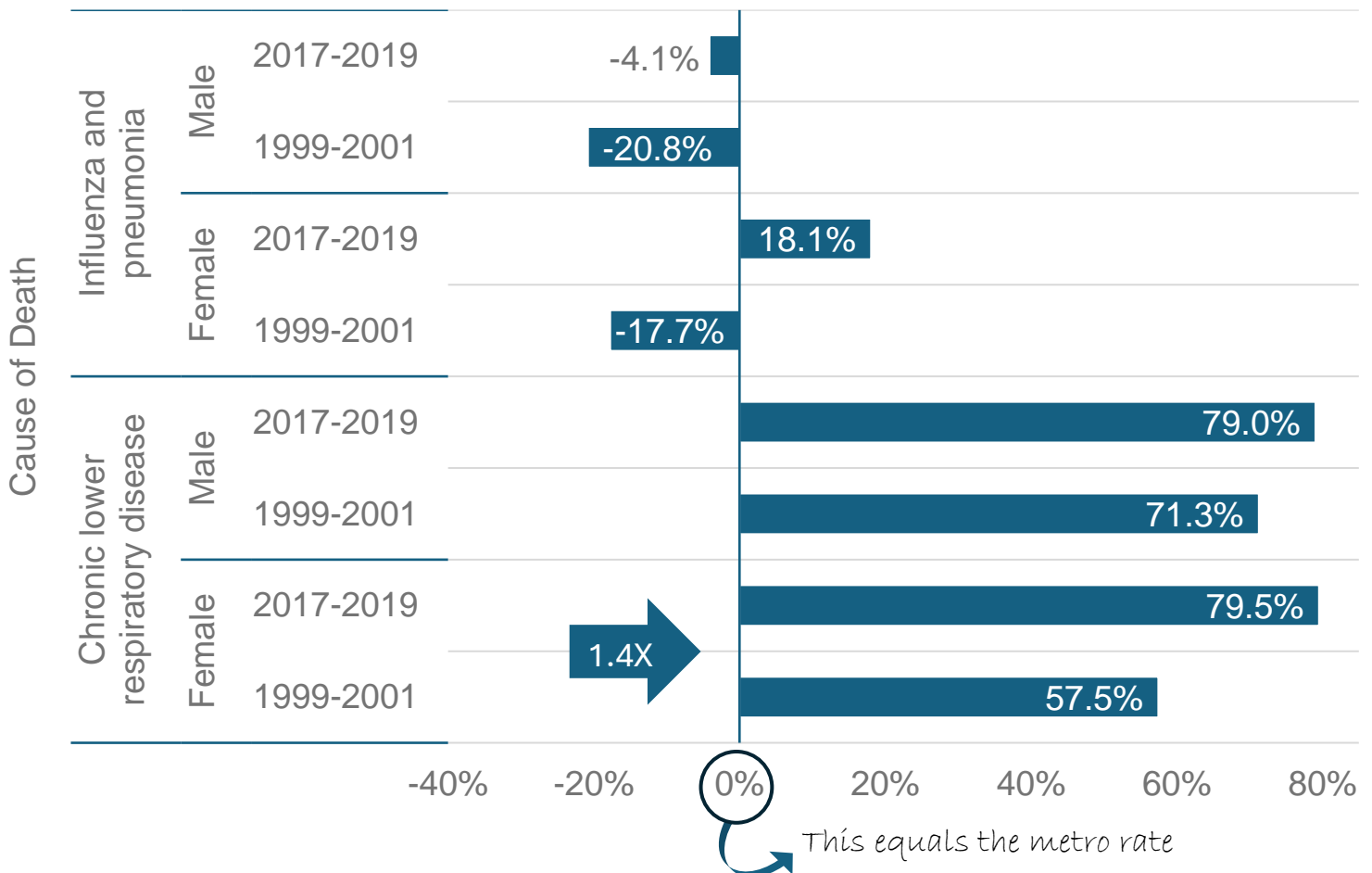
- There was a narrowing of the rural/urban disparity for influenza and pneumonia mortality for male New Yorkers (rural: -4%) but for female New Yorkers, the disparity reached the same magnitude but in the opposite direction (-18% to +18%).

- By 2017-2019, rural female and rural male New Yorkers shared the same mortality disparity for chronic lower respiratory disease (+79.5% and +79.0%).

Non-metro, age-adjusted, all-ages mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality ▸ All-Ages ▸ Sex Stratified

Cause of Death			Period	Value
Influenza and pneumonia	Male		2017-2019	-4.1%
			1999-2001	-20.8%
	Female		2017-2019	18.1%
			1999-2001	-17.7%
Chronic lower respiratory disease	Male		2017-2019	79.0%
			1999-2001	71.3%
	Female		2017-2019	79.5%
		1.4X	1999-2001	57.5%

-40%   -20%   0%   20%   40%   60%   80%

This equals the metro rate

The rural/urban disparity in age-adjusted mortality rates for diabetes grew 4.6X from 1999-2001 to 2017-2019, with a wider disparity for female New Yorkers.

- The rural/urban disparity in mortality rates for diseases of the heart grew for both sexes of rural New Yorkers, shifting from lower-than-urban to higher-than-urban rates.

- Rural female New Yorkers had a lower mortality rate due to essential hypertension and hypertensive renal disease than their urban counterparts in 1999-2001 (-21.7%), but by 2017-2019, the disparity changed direction (+9.2%).

- *Note: Only female data were available for both time periods for essential hypertension and hypertensive renal disease.*

Non-metro, age-adjusted, all-ages mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

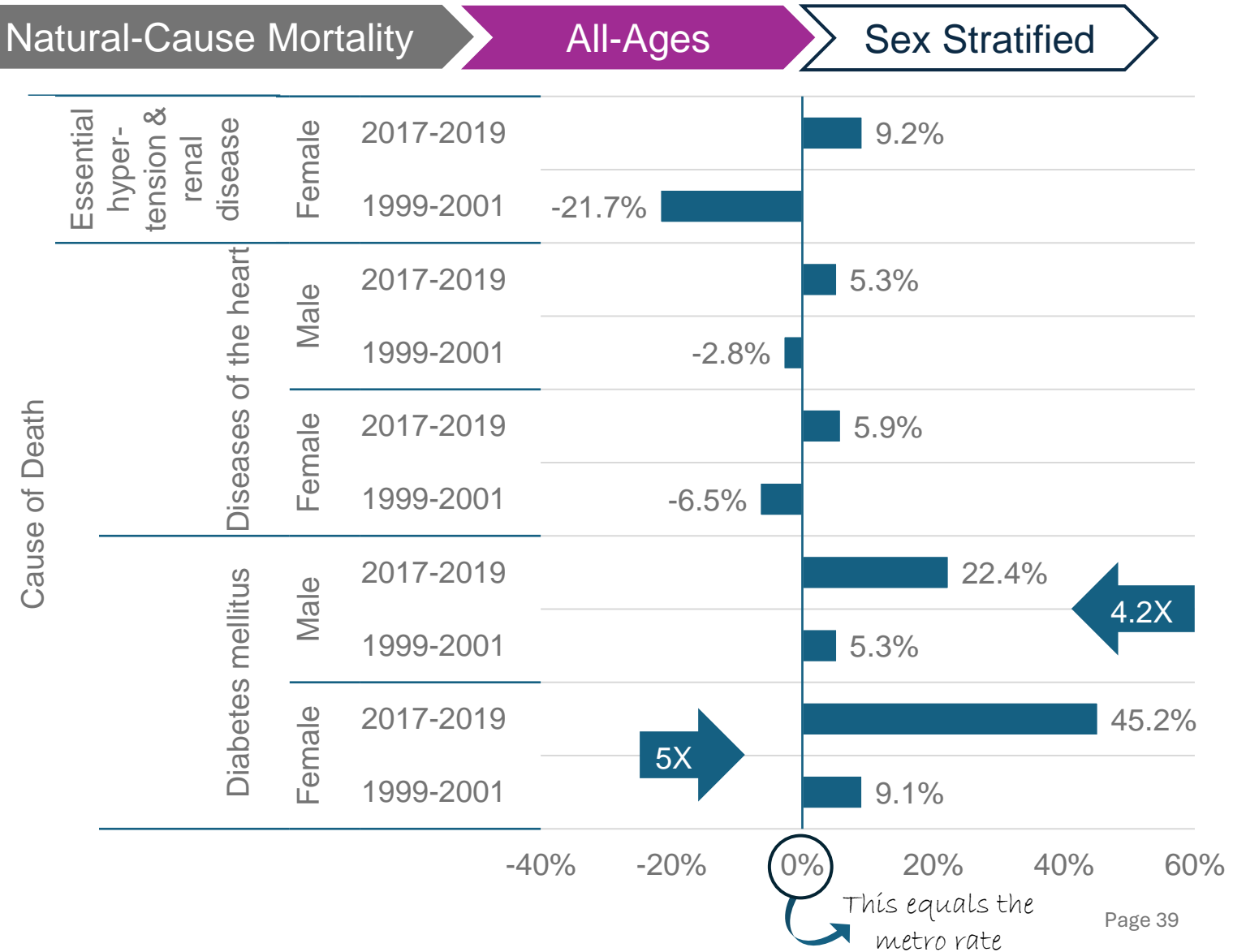Natural-Cause Mortality ▶ All-Ages ▶ Sex Stratified

Cause of Death				
Essential hypertension & renal disease	Female	2017-2019		9.2%
		1999-2001	-21.7%	
Diseases of the heart	Male	2017-2019		5.3%
		1999-2001	-2.8%	
	Female	2017-2019		5.9%
		1999-2001	-6.5%	
Diabetes mellitus	Male	2017-2019		22.4% → 4.2X
		1999-2001		5.3%
	Female	2017-2019		45.2%
		1999-2001	5X →	9.1%

-40%   -20%   0%   20%   40%   60%

This equals the metro rate

Rural/urban disparities in age-adjusted mortality rates for Parkinson's Disease and cancers grew across the board.
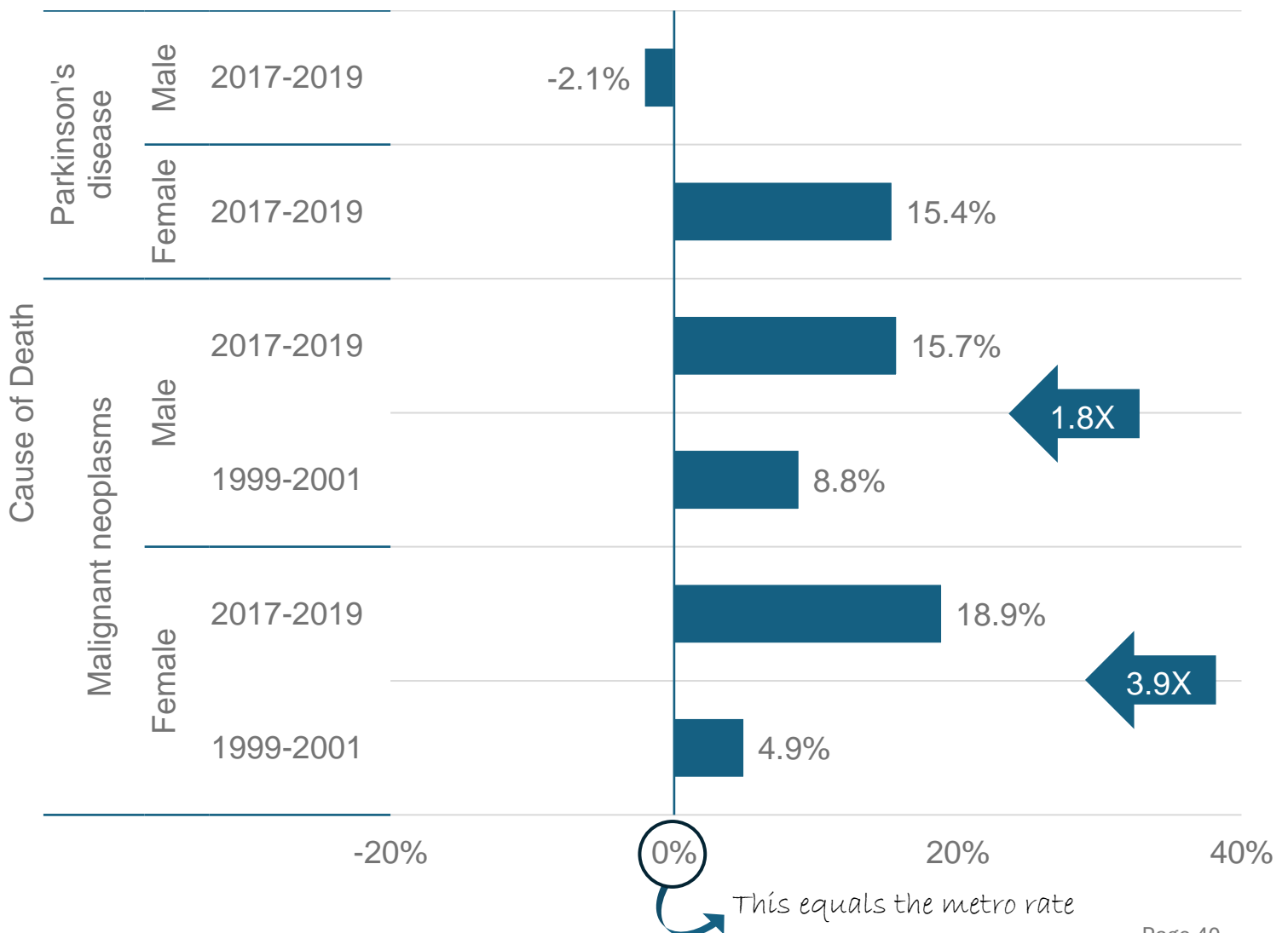
- For female New Yorkers, the disparity between rural and urban mortality rates for malignant neoplasms (cancers) nearly **quadrupled**, with rural female New Yorkers experiencing worse outcomes.

- For male New Yorkers, the disparity between rural and urban mortality rates for malignant neoplasms (cancers) nearly **doubled**, with rural male New Yorkers experiencing worse outcomes.

- *Note: Data for Parkinson's Disease were not available for the earlier time period.*

Non-metro, age-adjusted, all-ages mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality → All-Ages → Sex Stratified

Cause of Death		Period	Value
Parkinson's disease	Male	2017-2019	-2.1%
	Female	2017-2019	15.4%
Malignant neoplasms	Male	2017-2019	15.7%
		1999-2001	8.8%
	Female	2017-2019	18.9%
		1999-2001	4.9%

1.8X (Male)
3.9X (Female)

-20%   0%   20%   40%

This equals the metro rate

Rural/urban disparities in mortality rates for cerebrovascular disease persisted but narrowed between the two time periods.
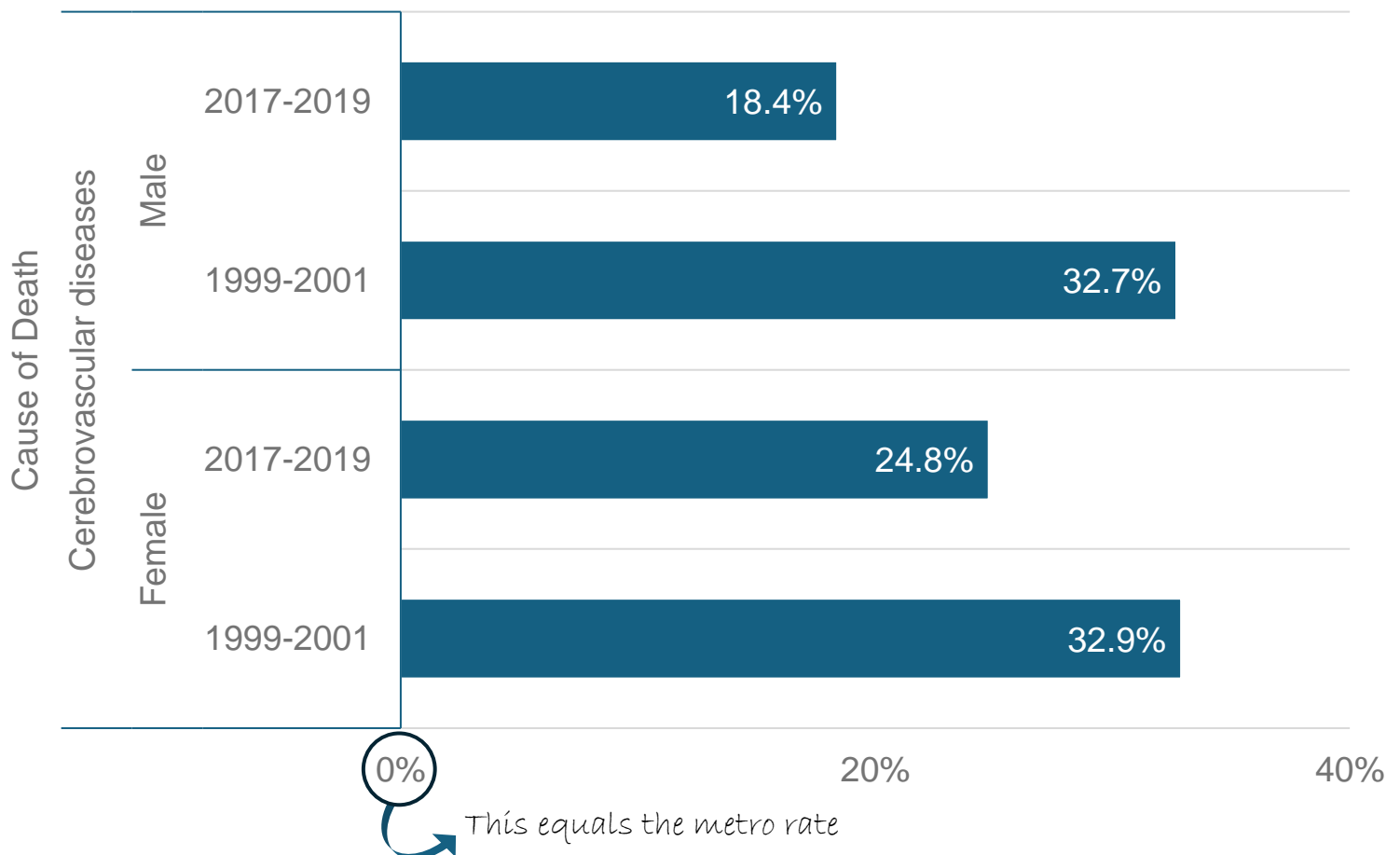
- Deaths due to cerebrovascular diseases include those attributed to stroke, aneurysm, and carotid artery disease.
- Although the rural/urban disparities narrowed by 2017-2019, rural New Yorkers were still more likely to die from these conditions than their urban counterparts.

Non-metro, age-adjusted, all-ages mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality → All-Ages → Sex Stratified

Cause of Death — Cerebrovascular diseases

Male
- 2017-2019: 18.4%
- 1999-2001: 32.7%

Female
- 2017-2019: 24.8%
- 1999-2001: 32.9%

0%   20%   40%

This equals the metro rate

The disparity in mortality due to accidents for rural, female, working-age New Yorkers grew 1.8X between the two time periods.
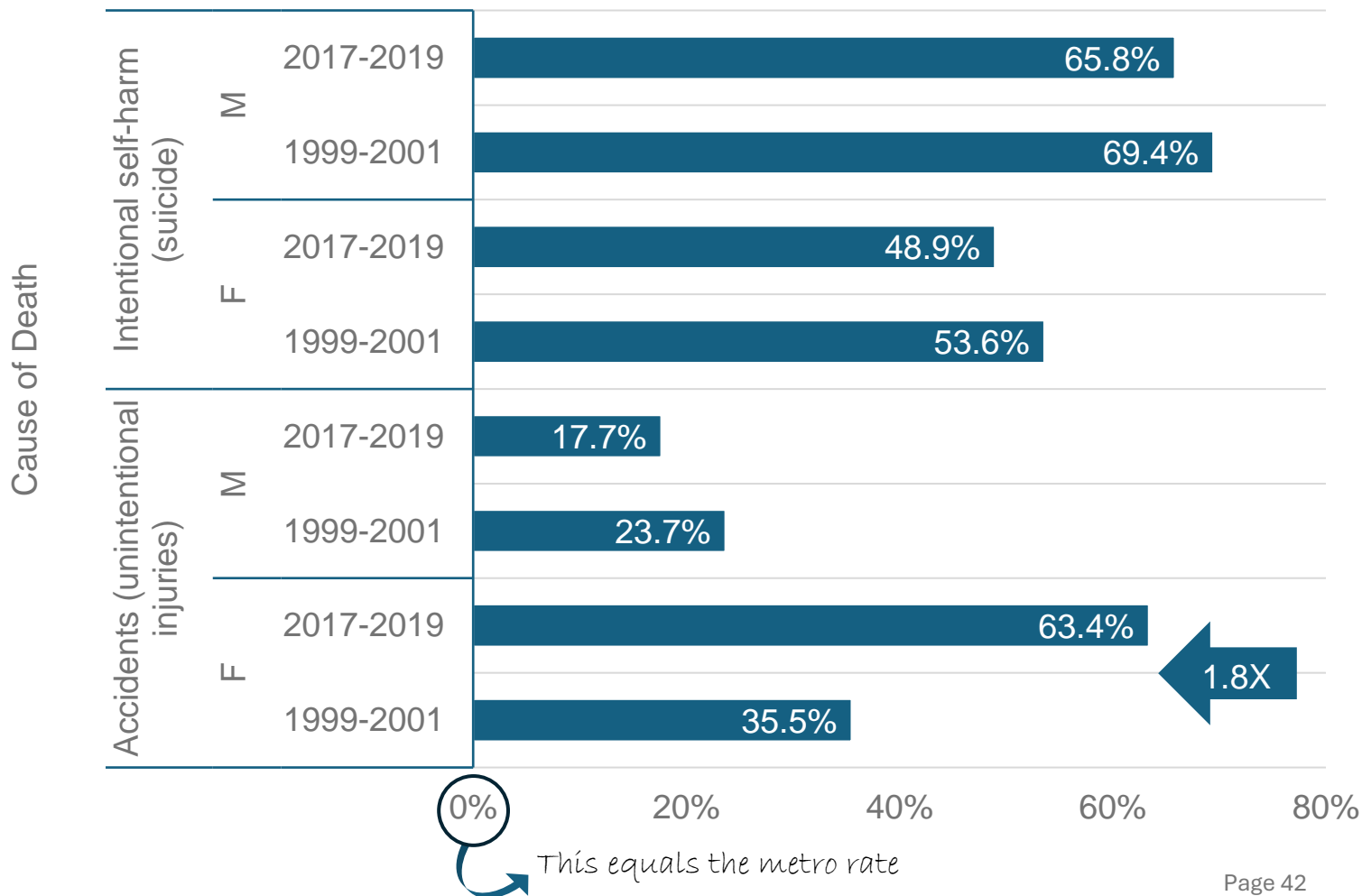
- As with the all-ages trends, among *external* causes within the 15 leading causes for the working-age population in New York State, mortality rates for accidents and suicides in rural areas were higher than in urban areas.

- However, the *only* external-cause, working-age mortality disparity to increase was the mortality rate for accidents among rural female New Yorkers, which **nearly doubled** (**1.8X**).

Non-metro, age-adjusted, working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

External-Cause Mortality > Working-Age > Sex Stratified

Cause of Death

Intentional self-harm (suicide)

M
- 2017-2019: 65.8%
- 1999-2001: 69.4%

F
- 2017-2019: 48.9%
- 1999-2001: 53.6%

Accidents (unintentional injuries)

M
- 2017-2019: 17.7%
- 1999-2001: 23.7%

F
- 2017-2019: 63.4% ← 1.8X
- 1999-2001: 35.5%

0%   20%   40%   60%   80%

This equals the metro rate

Rural/urban disparities in working-age mortality rates for chronic liver disease and cirrhosis grew 13.9X for rural male New Yorkers and 26.8X for rural female New Yorkers between the two time periods.

- The trends in chronic liver disease and cirrhosis directionally mirror the all-ages trends, but the growth in the rural/urban disparity was much more dramatic within the working-age population.

- The widest rural/urban disparity depicted below is the mortality rate for chronic liver disease and cirrhosis for rural female New Yorkers (77.8% above urban female counterparts).

Non-metro, age-adjusted, working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates
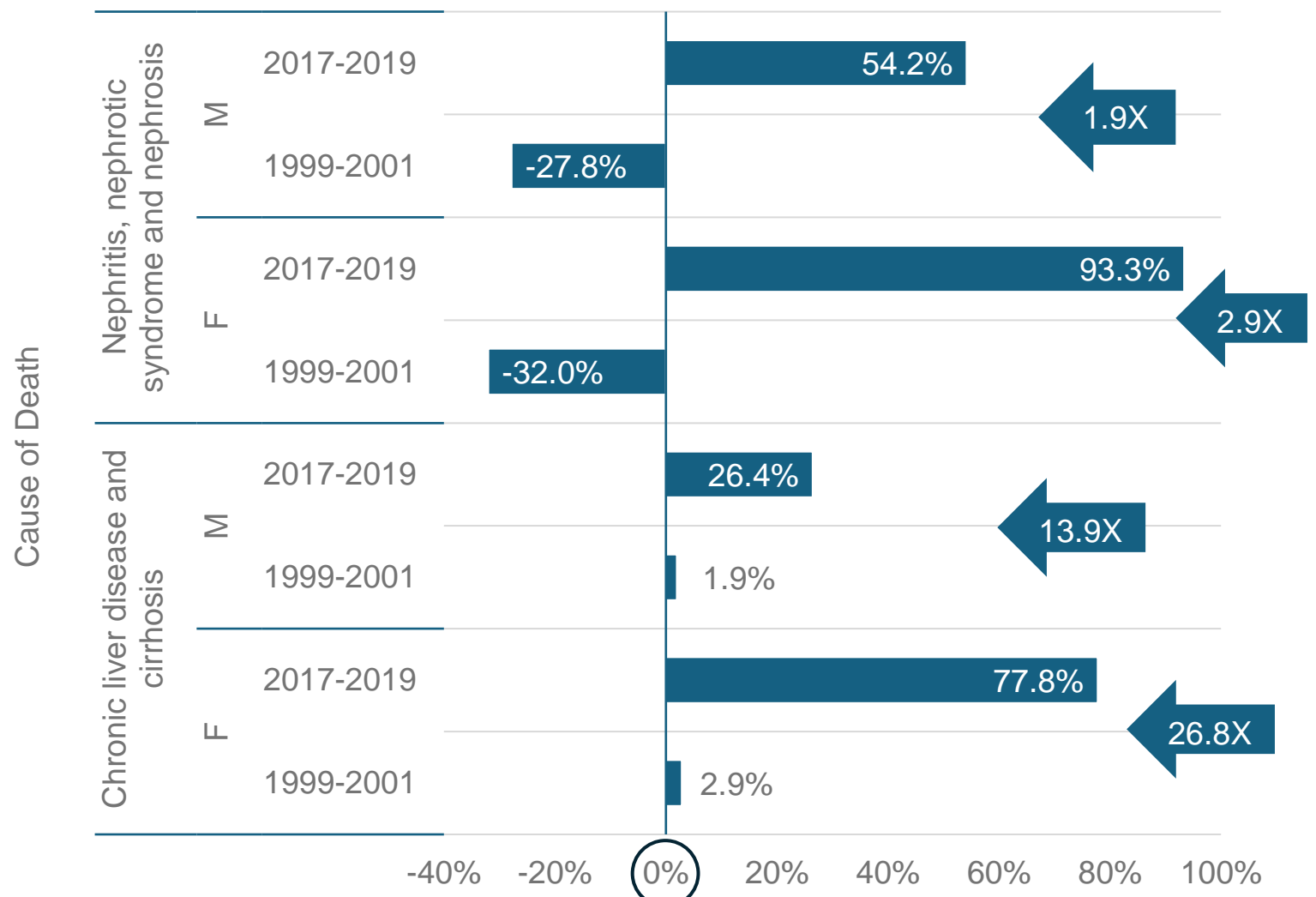
Natural-Cause Mortality | Working-Age | Sex Stratified

Cause of Death

Nephritis, nephrotic syndrome and nephrosis

M
- 2017-2019: 54.2%
- 1999-2001: -27.8%
- 1.9X

F
- 2017-2019: 93.3%
- 1999-2001: -32.0%
- 2.9X

Chronic liver disease and cirrhosis

M
- 2017-2019: 26.4%
- 1999-2001: 1.9%
- 13.9X

F
- 2017-2019: 77.8%
- 1999-2001: 2.9%
- 26.8X

-40% -20% 0% 20% 40% 60% 80% 100%

This equals the metro rate

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Age-adjusted working-age mortality rates for sepsis were initially lower in rural areas in 1999-2001, but by 2017-2019 were much higher than in urban areas.
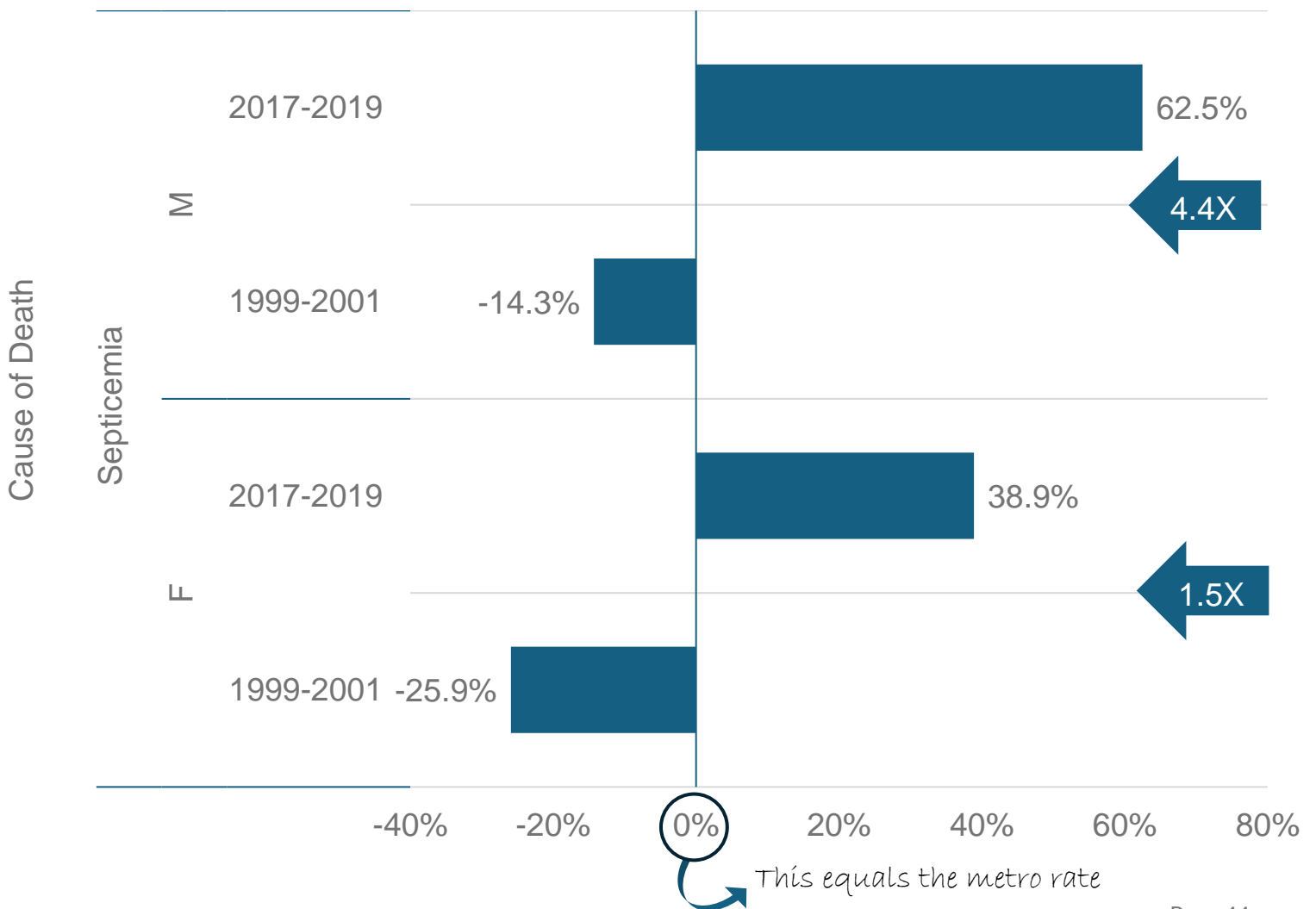
- This trend echoes that seen in the all-ages mortality data on page 37 for all-ages data.

Non-metro, age-adjusted, working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality | Working-Age | Sex Stratified

Cause of Death — Septicemia

M	2017-2019	62.5%
		4.4X
	1999-2001	-14.3%
F	2017-2019	38.9%
		1.5X
	1999-2001	-25.9%

-40%   -20%   0%   20%   40%   60%   80%

This equals the metro rate

Rural/urban disparities in working-age mortality rates for chronic lower respiratory diseases more than doubled between 1999-2001 and 2017-2019.

- The disparity in working-age mortality rates for influenza and pneumonia equalized (0%) between rural and urban male New Yorkers. The disparity increased for female New Yorkers and the rural rate shifted from below the urban rate to above it.

- The rural/urban disparity in working-age mortality rates for chronic lower respiratory diseases more than doubled for male and female rural New Yorkers. The magnitude of the disparity is significant in that the rural rates were at least 100% above urban rates (i.e., the rural male rate was 100.0% higher than the urban male rate and the rural female rate was 118.4% higher than the urban female rate).

Non-metro, age-adjusted, working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

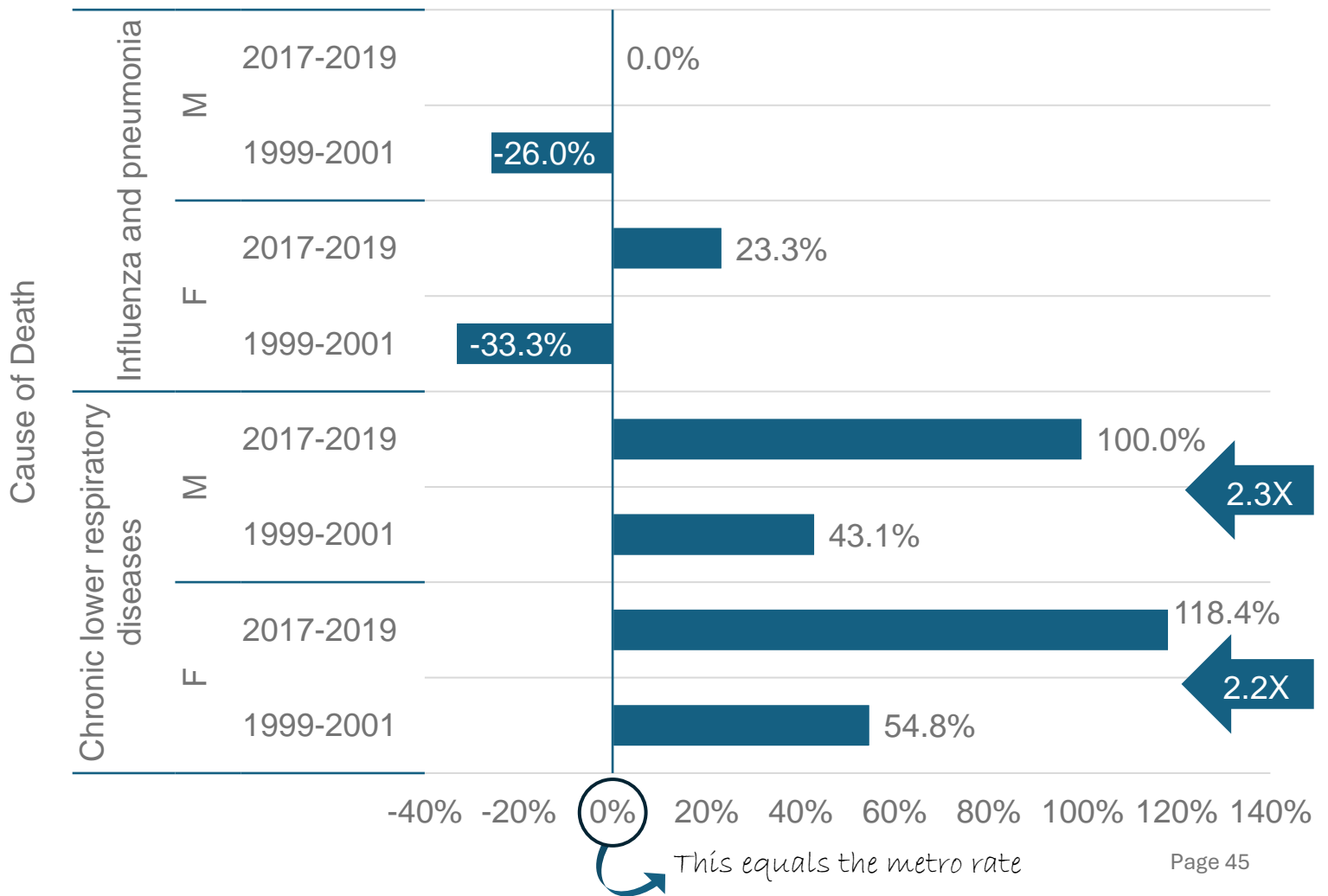Natural-Cause Mortality → Working-Age → Sex Stratified

Cause of Death

Influenza and pneumonia

M
- 2017-2019: 0.0%
- 1999-2001: -26.0%

F
- 2017-2019: 23.3%
- 1999-2001: -33.3%

Chronic lower respiratory diseases

M
- 2017-2019: 100.0%
- 1999-2001: 43.1%
- 2.3X

F
- 2017-2019: 118.4%
- 1999-2001: 54.8%
- 2.2X

-40% -20% 0% 20% 40% 60% 80% 100% 120% 140%

This equals the metro rate

Page 45

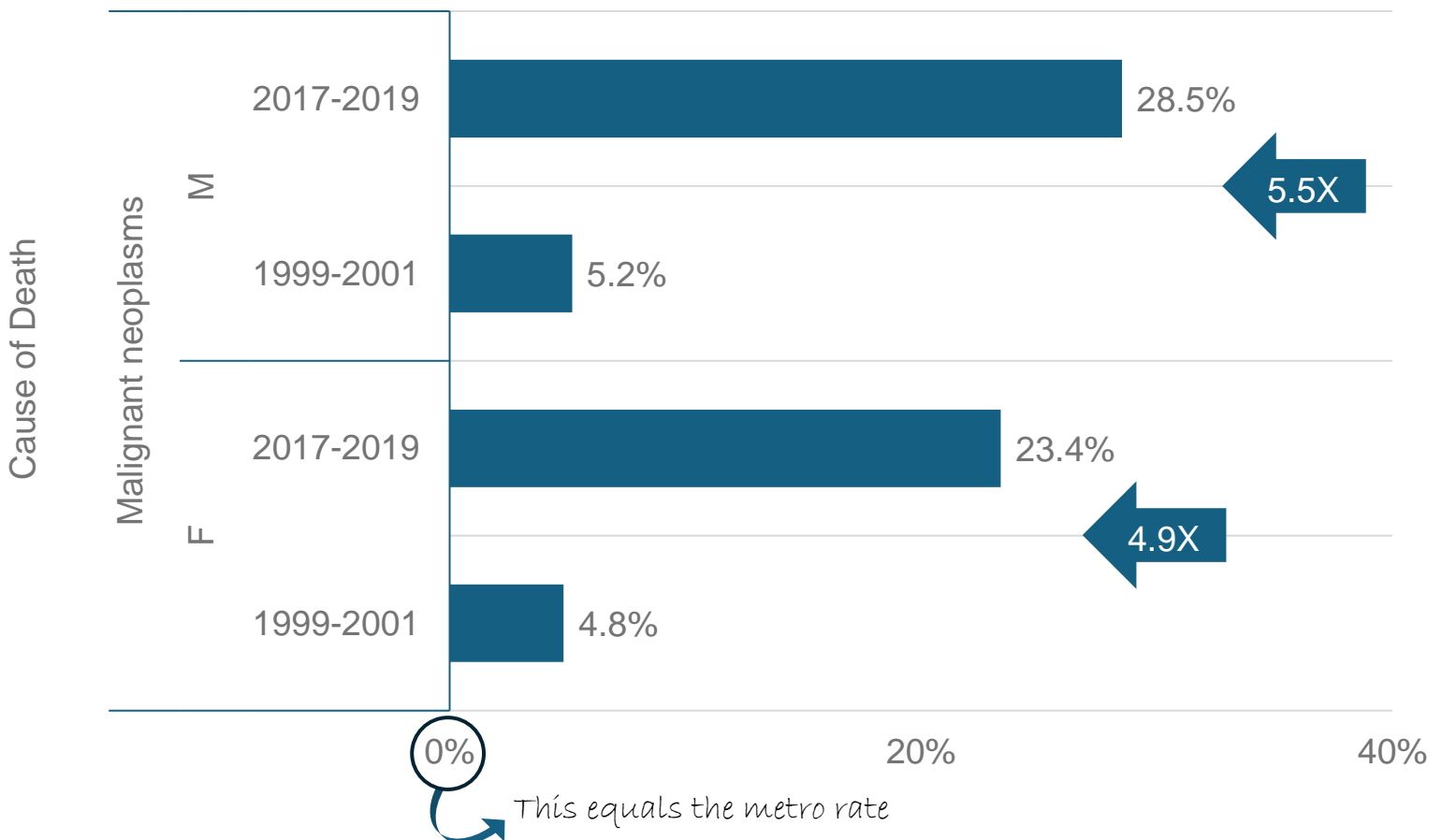# Rural/urban disparities in cancer mortality widened approximately five-fold between the two periods.

- The rural/urban disparity for working-age mortality rates for malignant neoplasms (cancer) grew to **5.2X** the 1999-2001 disparity for rural male and rural female New Yorkers.

Non-metro, age-adjusted, working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality → Working-Age → Sex Stratified

Cause of Death — Malignant neoplasms

M
- 2017-2019: 28.5% → 5.5X
- 1999-2001: 5.2%

F
- 2017-2019: 23.4% → 4.9X
- 1999-2001: 4.8%

0%   20%   40%

This equals the metro rate

Rural/urban mortality disparities nearly closed for cerebrovascular diseases among working-age New Yorkers but grew for heart diseases and diabetes.

- Working-age mortality rates for diseases of the heart and diabetes for rural New Yorkers shifted from slightly below urban rates to well above them.

- Rural/urban disparities narrowed for cerebrovascular diseases among working-age New Yorkers, equalizing for male New Yorkers (0% difference compared to urban).

Non-metro, age-adjusted, working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates
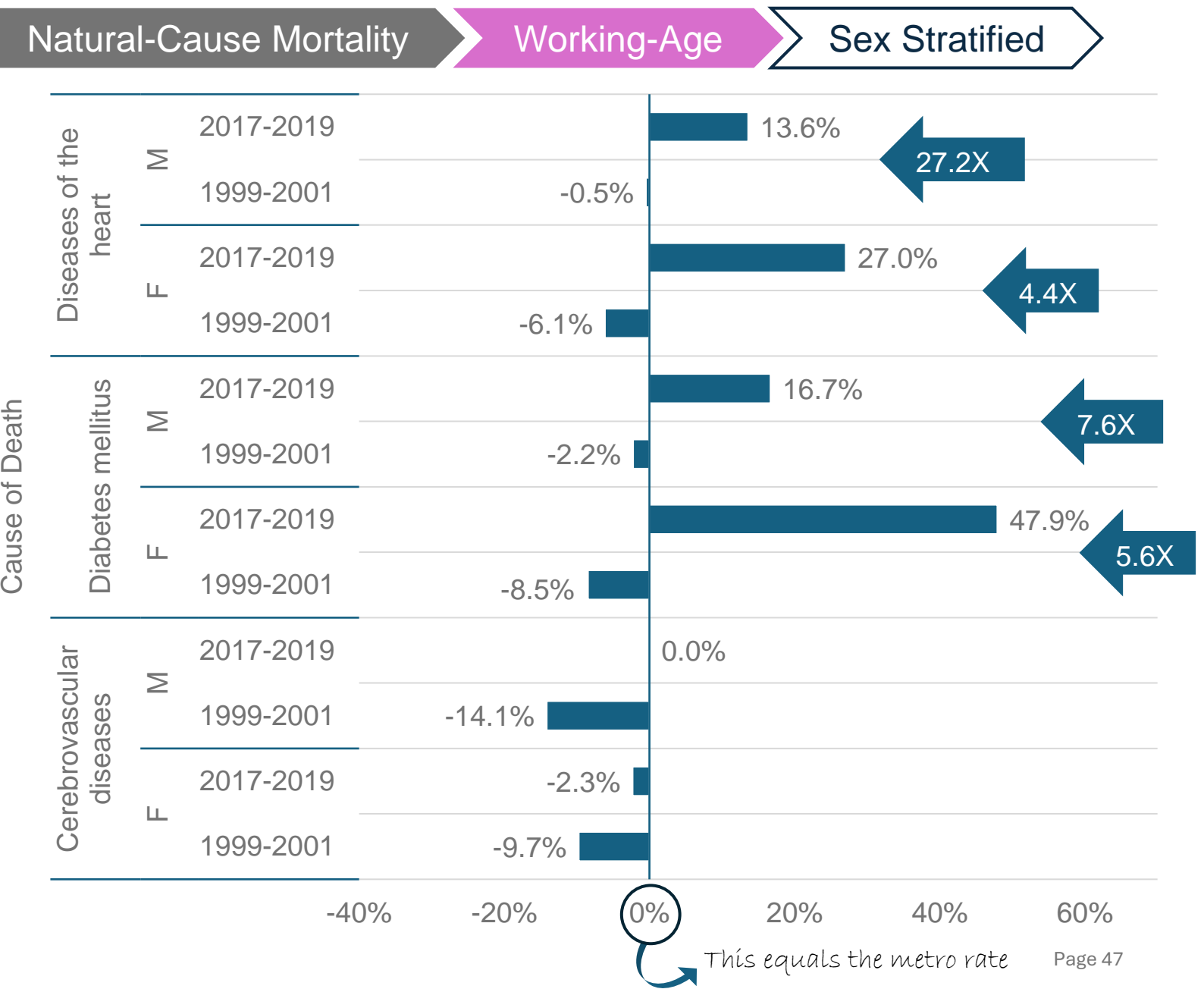
Natural-Cause Mortality	Working-Age	Sex Stratified

Diseases of the heart

	M	2017-2019	13.6%	27.2X
		1999-2001	-0.5%	
	F	2017-2019	27.0%	4.4X
		1999-2001	-6.1%	

Diabetes mellitus

	M	2017-2019	16.7%	7.6X
		1999-2001	-2.2%	
	F	2017-2019	47.9%	5.6X
		1999-2001	-8.5%	

Cerebrovascular diseases

	M	2017-2019	0.0%	
		1999-2001	-14.1%	
	F	2017-2019	-2.3%	
		1999-2001	-9.7%	

Cause of Death

-40%   -20%   0%   20%   40%   60%

This equals the metro rate

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Rural areas experienced higher mortality due to *external* causes among prime working-age New Yorkers compared to urban areas in both time periods.
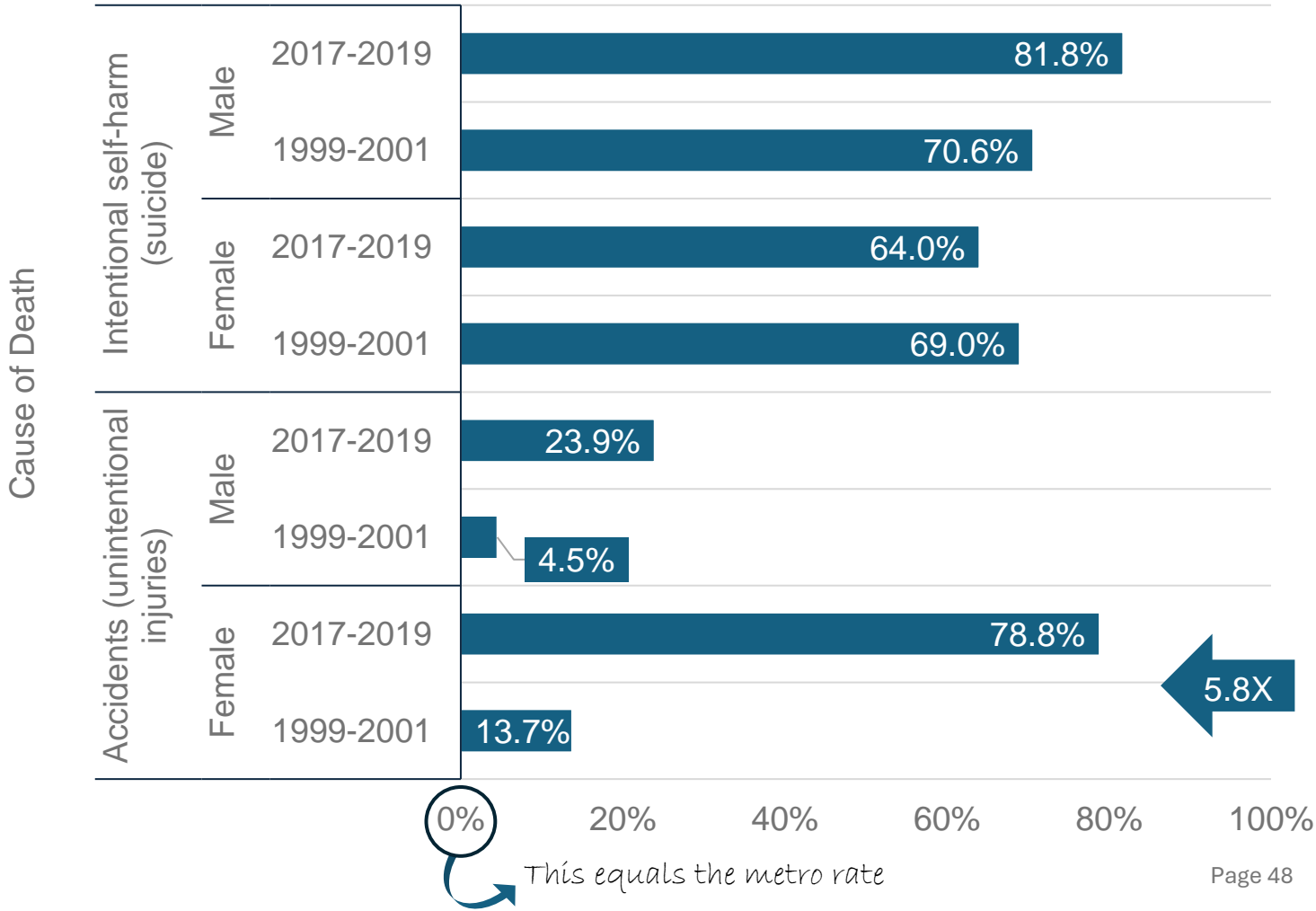
- As with all-ages and working-age trends, among *external* causes within the 15 leading causes for prime working-age New Yorkers, mortality rates for accidents and suicides in rural areas were higher than rates in urban areas.

- The widest disparities were in suicide.

- The disparity for accident-caused deaths among rural female New Yorkers in 2017-2019 was **5.8X** the disparity in 1999-2001.

Non-metro, age-adjusted, prime-working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

External-Cause Mortality ➤ Prime Working-Age ➤ Sex Stratified

Cause of Death

Intentional self-harm (suicide)

Male
- 2017-2019: 81.8%
- 1999-2001: 70.6%

Female
- 2017-2019: 64.0%
- 1999-2001: 69.0%

Accidents (unintentional injuries)

Male
- 2017-2019: 23.9%
- 1999-2001: 4.5%

Female
- 2017-2019: 78.8% 5.8X
- 1999-2001: 13.7%

0%   20%   40%   60%   80%   100%

This equals the metro rate

Disparities in mortality rates for rural, female New Yorkers from heart diseases and diabetes grew 13.8X and 4.3X, respectively.
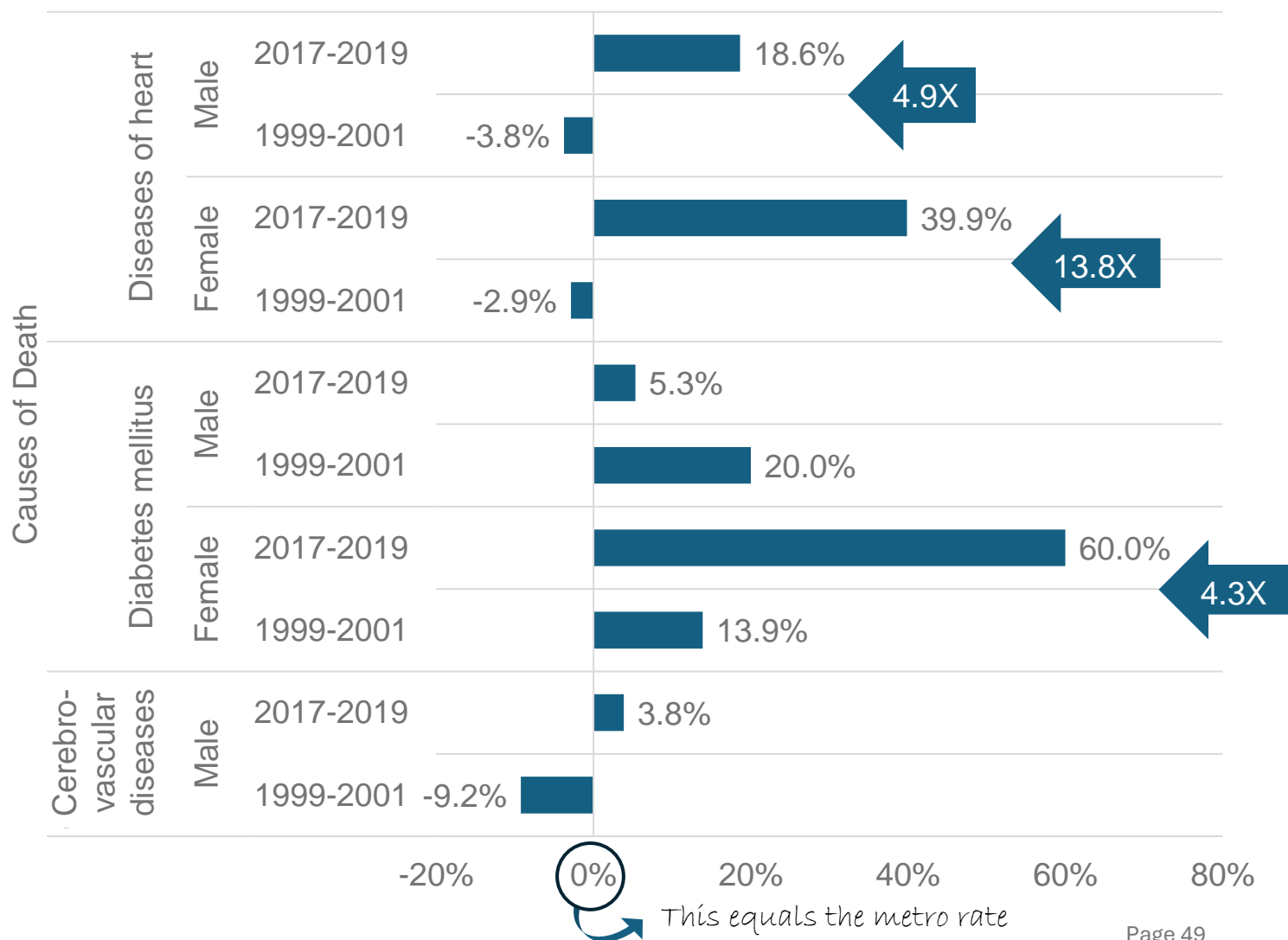
- The rural/urban disparity for age-adjusted, prime working-age mortality rates for heart diseases in 2017-2019 was **4.9X** the 1999-2001 disparity for male New Yorkers.

- The rural/urban disparity in diabetes-related mortality narrowed for male New Yorkers.

Non-metro, age-adjusted, prime-working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates
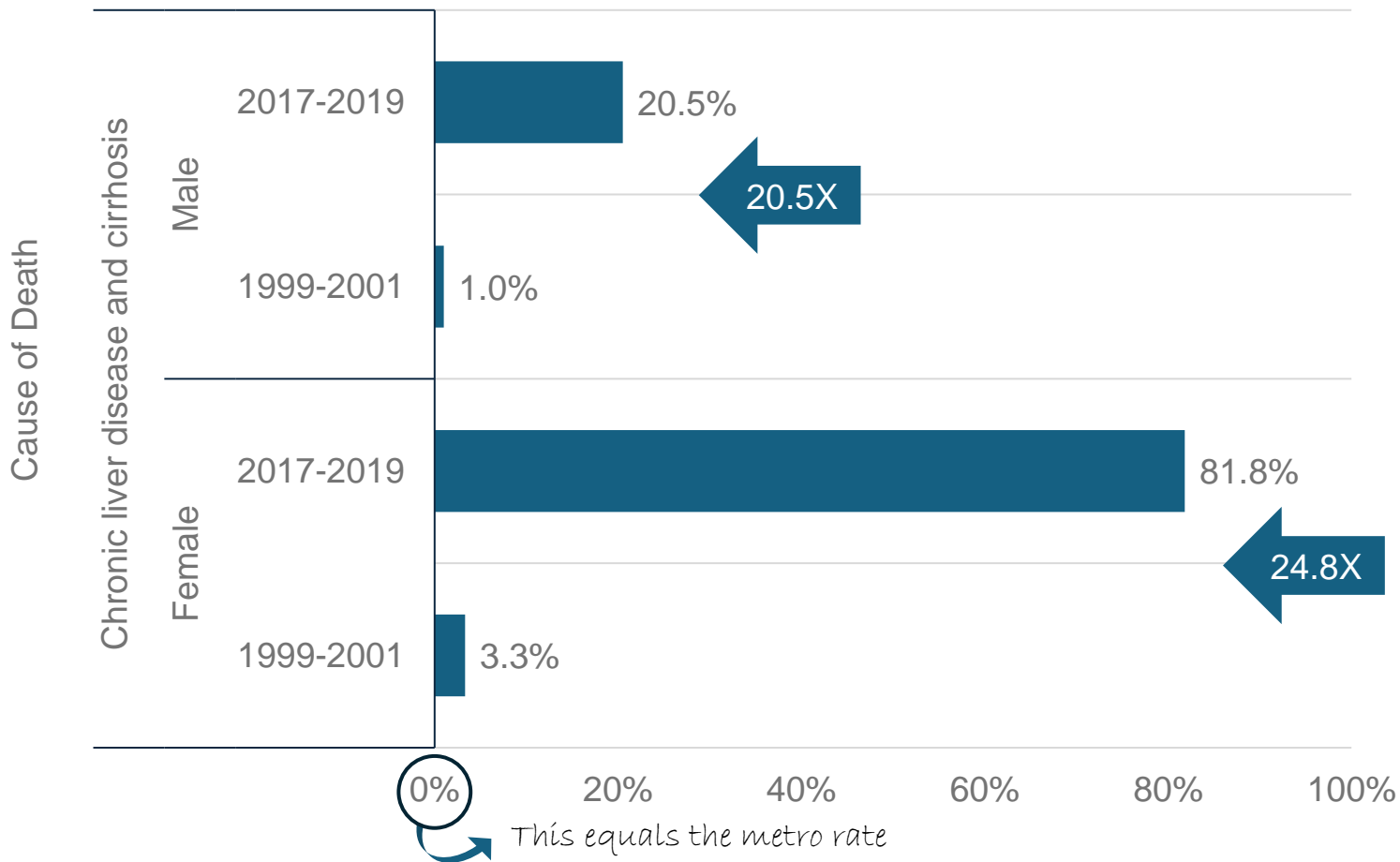
Natural-Cause Mortality → Prime Working-Age → Sex Stratified

Causes of Death			
Diseases of heart	Male	2017-2019	18.6%
		1999-2001	-3.8%
			4.9X
	Female	2017-2019	39.9%
		1999-2001	-2.9%
			13.8X
Diabetes mellitus	Male	2017-2019	5.3%
		1999-2001	20.0%
	Female	2017-2019	60.0%
		1999-2001	13.9%
			4.3X
Cerebro-vascular diseases	Male	2017-2019	3.8%
		1999-2001	-9.2%

-20%   0%   20%   40%   60%   80%

This equals the metro rate

Disparities in prime working-age mortality rate for chronic liver disease and cirrhosis grew more among rural female New Yorkers compared to rural male New Yorkers.

- The rural male mortality rate grew from 1.0% above urban rates in 1999-2001 to 20.5% above urban rates in 2017-2019.

- The growth in the rural female disparity was more dramatic, from 3.3% above urban rates to 81.8% above urban rates. The magnitude of the disparity was also higher than for rural male New Yorkers (80.8% vs. 20.5%)

- The male rural/urban disparity in 2017-2019 was **20.5X** that of 1999-2001. The female rural/urban disparity was **24.8X** that of 1999-2001.

Non-metro, age-adjusted, prime-working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

| Natural-Cause Mortality | Prime Working-Age | Sex Stratified |

Cause of Death — Chronic liver disease and cirrhosis

Male
- 2017-2019: 20.5%
- 20.5X
- 1999-2001: 1.0%

Female
- 2017-2019: 81.8%
- 24.8X
- 1999-2001: 3.3%

0% — This equals the metro rate

20% 40% 60% 80% 100%

By 2017-2019, the mortality rate due to chronic lower respiratory disease among rural, prime working-age, female New Yorkers was 142.3% above the rate of their urban counterparts.
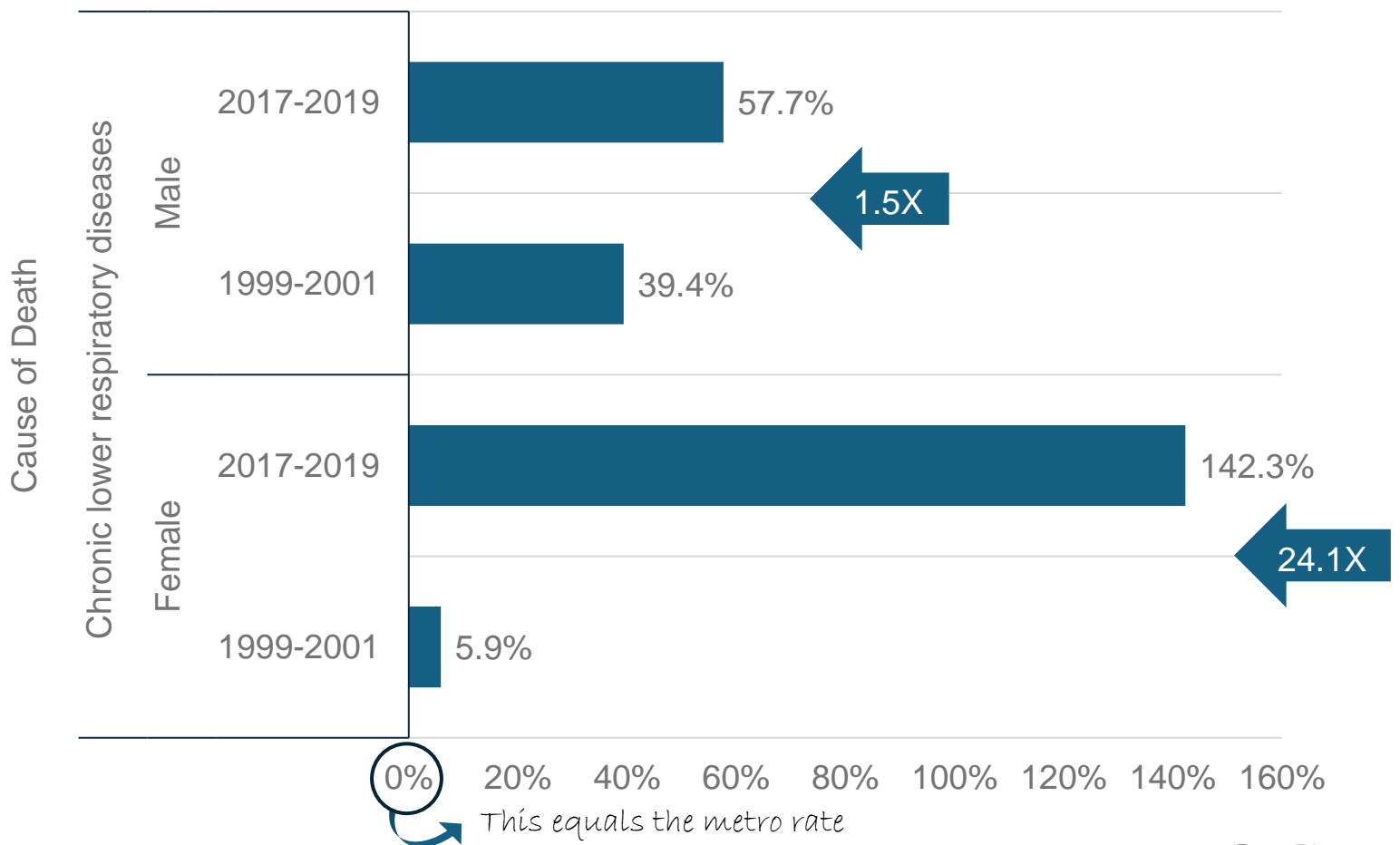
- The rural/urban disparity for chronic lower respiratory disease mortality for female New Yorkers in 2017-2019 (+142.3%) represents **the highest rural/urban disparity observed in any age group.**

- For male New Yorkers, the rural mortality rate increased from 39.4% above urban rates in 1999-2001 to 57.7% above urban rates in 2017-2019.

- The female rural/urban disparity was **24.1X** that of 1999-2001. The male rural/urban disparity in 2017-2019 was **1.5X** that of 1999-2001.

Non-metro, age-adjusted, prime-working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

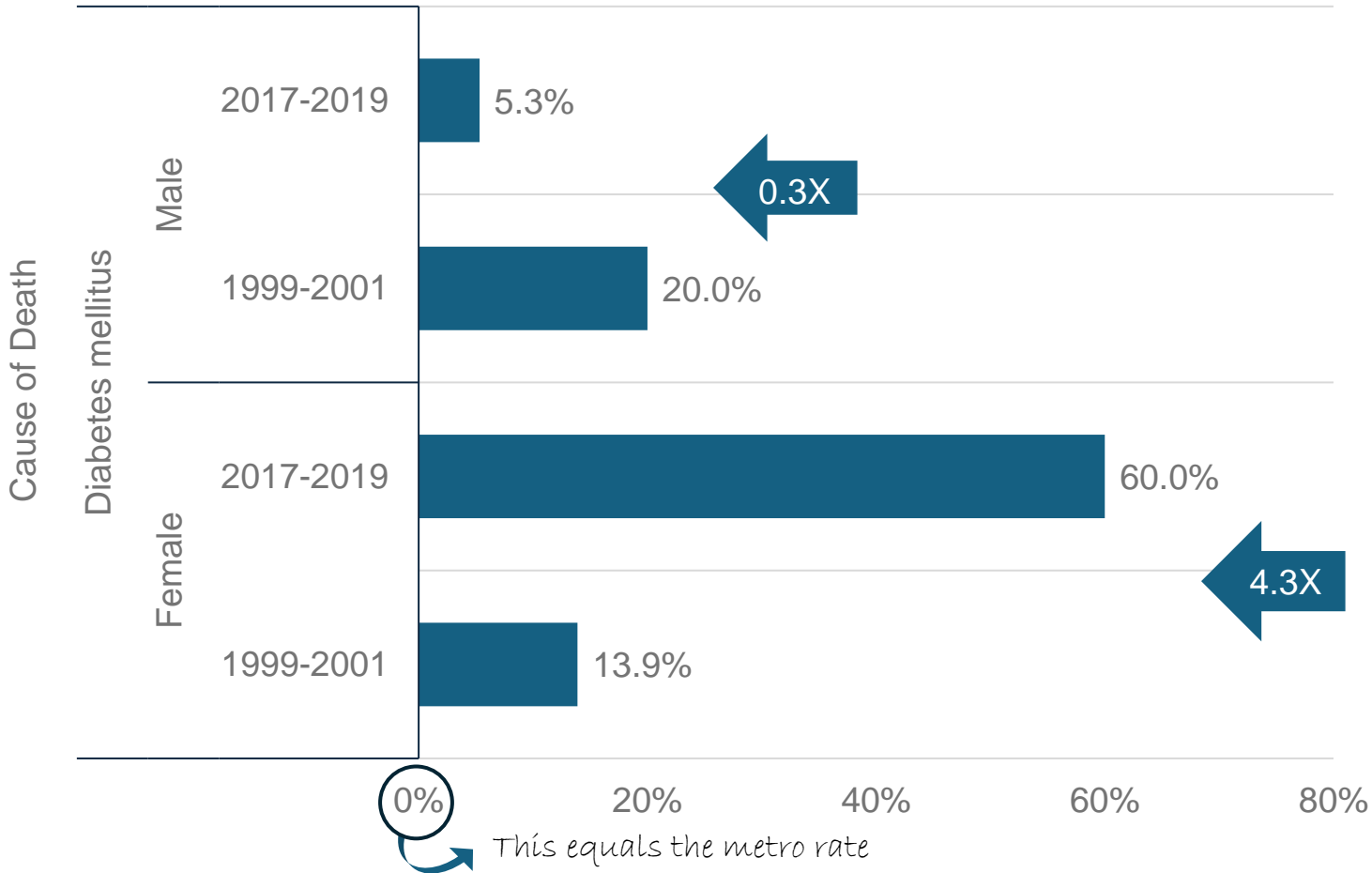Natural-Cause Mortality | Prime Working-Age | Sex Stratified

Cause of Death

Chronic lower respiratory diseases

Male
- 2017-2019: 57.7%
- 1.5X
- 1999-2001: 39.4%

Female
- 2017-2019: 142.3%
- 24.1X
- 1999-2001: 5.9%

0% 20% 40% 60% 80% 100% 120% 140% 160%

This equals the metro rate

The rural/urban disparity in diabetes-related mortality narrowed among prime working-age, male New Yorkers and widened among prime working-age, female New Yorkers.

- For male New Yorkers, the disparity in diabetes mortality decreased.
- For female New Yorkers, the disparity in diabetes mortality grew.
- The female rural/urban disparity in 2017-2019 was **4.3X** that of 1999-2001. The male rural/urban disparity in 2017-2019 was **0.3X** that of 1999-2001.

Non-metro, age-adjusted, prime-working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

Natural-Cause Mortality > Prime Working-Age > Sex Stratified

Cause of Death	Diabetes mellitus		
	Male	2017-2019	5.3%
		0.3X	
		1999-2001	20.0%
	Female	2017-2019	60.0%
		4.3X	
		1999-2001	13.9%

0% 20% 40% 60% 80%

This equals the metro rate

The rural/urban disparity in mortality from heart diseases was more pronounced among rural female New Yorkers compared to rural male New Yorkers.
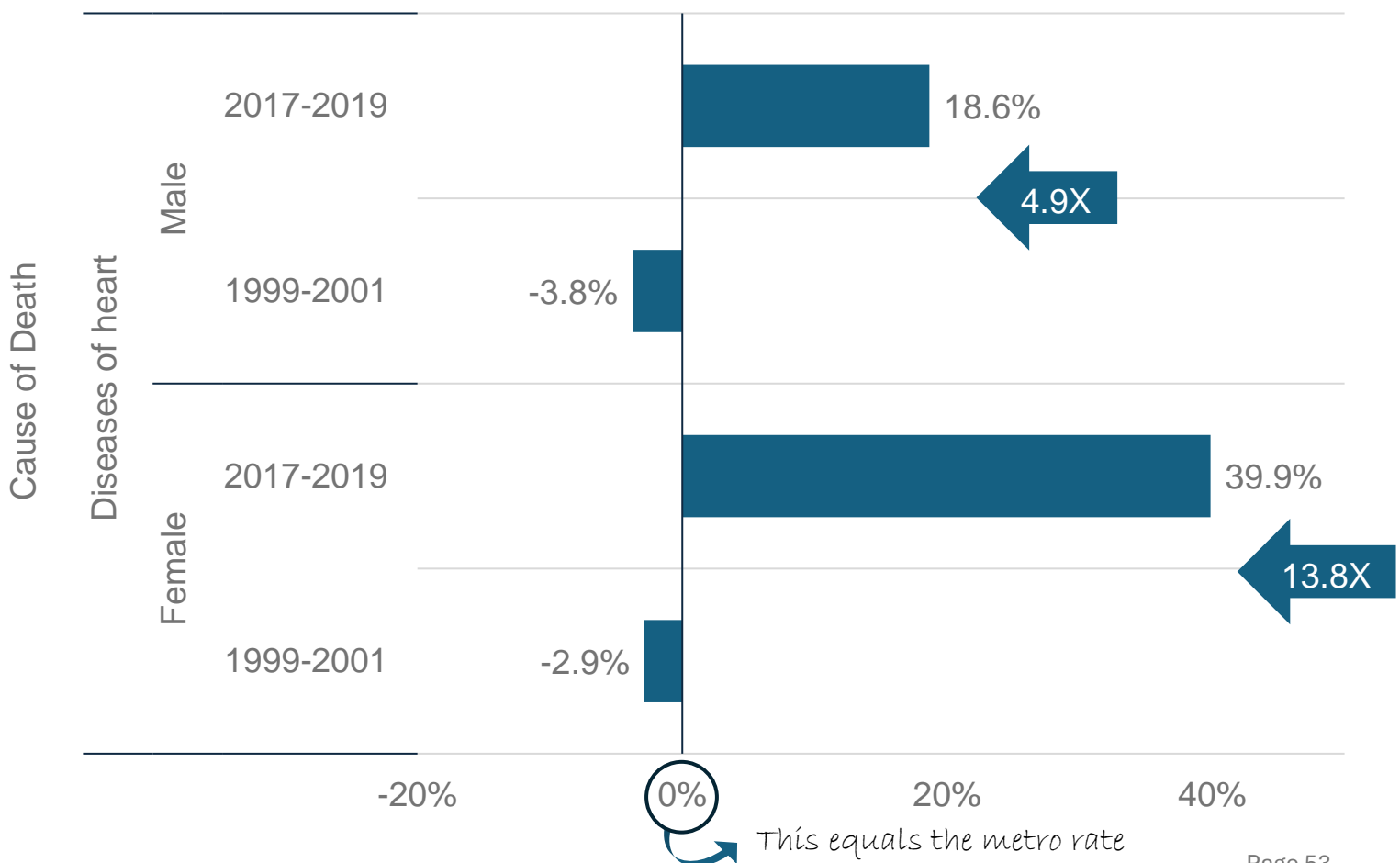
S2P

- For male New Yorkers, the rural/urban disparity increased, shifting from rural rates being lower than urban, to rural rates being higher than urban.

- Female New Yorkers experienced the same directional shift but to a greater degree.

Non-metro, age-adjusted, prime-working-age mortality rates among external leading causes of death, 1999-2001 and 2017-2019, as a percent above or below corresponding metro rates

| Natural-Cause Mortality | Prime Working-Age | Sex Stratified |

Cause of Death — Diseases of heart

Male
- 2017-2019: 18.6%
- 4.9X
- 1999-2001: -3.8%

Female
- 2017-2019: 39.9%
- 13.8X
- 1999-2001: -2.9%

-20%   0%   20%   40%

This equals the metro rate

S2P

- External-cause mortality:
    - Suicide
    - Accidents, including occupational
- Disparities in mortality for rural, female New Yorkers
- Premature, potentially preventable death from chronic conditions, including:
    - Cerebrovascular disease
    - Chronic lower respiratory disease
    - Cirrhosis
    - Diabetes
    - Heart diseases
    - Malignant neoplasms
- Analyses stratified by race and ethnicity (these data were not available from CDC WONDER due to small sample sizes)
- Analyses that examine the relationship between mortality and various rural characteristics (as described in the accompanying Policy Brief), including, for example, timely access to care, poverty, and other determinants of health