How to Make a Thousand Plots Look Good: Data Viz Tips for Parameterized Reporting

Follow Along!

https://rfor.us/cascadia2024

BAKER COUNTY

Total population
16,539

Total land area
3,088 mi²

Rural population
41%

Net migration, 2020-2021
(per 1,000 population)
18

FEDERALLY RECOGNIZED TRIBES

BP CLUS COQ COW
GR KLA SLZ UMA WSP

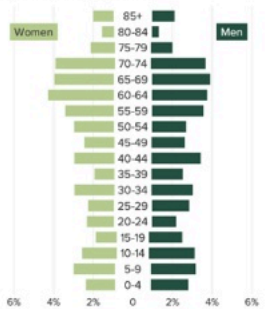
MEDIAN HOUSEHOLD INCOME

Baker $46,922
Oregon $70,084

LIFE EXPECTANCY

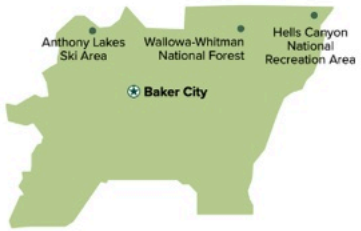
80 years  75 years 

POPULATION BY AGE



Public land
52%

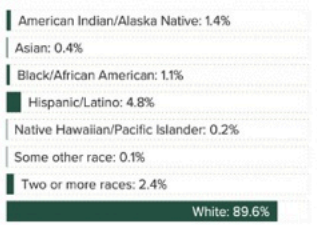
Developed/cultivated land
8%



★ County seat ○ Largest community

HOUSEHOLDS IN FINANCIAL HARDSHIP

POPULATION BY RACE/ETHNICITY



TOP EMPLOYMENT INDUSTRIES

2023

MULTNOMAH COUNTY

Total population
810,011

Total land area
465 mi²

Rural population
1%

Net migration, 2020-2021
(per 1,000 population)
5

FEDERALLY RECOGNIZED TRIBES

BP CLUS COQ COW
GR KLA SLZ UMA WSP

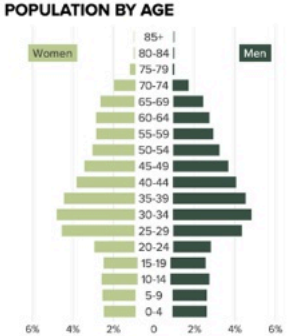
MEDIAN HOUSEHOLD INCOME

Multnomah $76,290
Oregon $70,084

LIFE EXPECTANCY

82 years  76 years 

POPULATION BY AGE



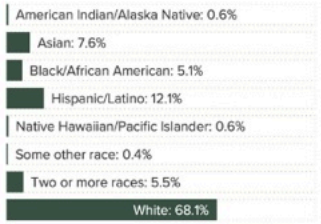
Public land
37%

Developed/cultivated land
42%

★ County seat
○ Largest community

HOUSEHOLDS IN FINANCIAL HARDSHIP

POPULATION BY RACE/ETHNICITY



TOP EMPLOYMENT INDUSTRIES

2023

HOUSING | 2022 Housing Data Profiles | HARTFORD

SINGLE-FAMILY HOMES AS PERCENT OF ALL HOMES

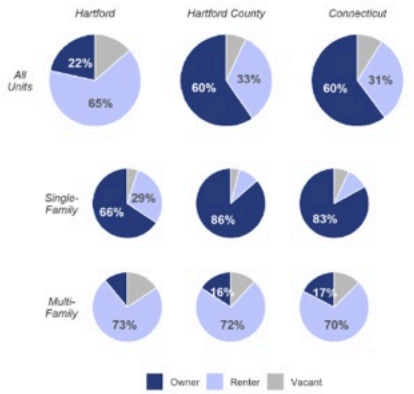
19%

PERCENT OF ALL HOMES OCCUPIED BY OWNERS

22%

Overall, 65% of Connecticut's occupied housing stock is comprised of single-family housing, while 35% is multifamily housing (2+ units in structure). Most single-family homes are occupied by homeowners, while most multifamily units are occupied by renters.

In Hartford, 19% of occupied homes are single-family, and 81% are multi-family. Owners live in 66% of Hartford's 10,626 single-family homes, and renters live in 73% of its 44,561 multifamily homes.

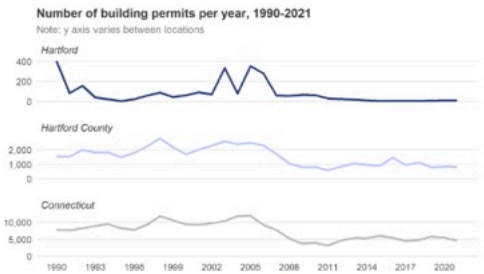


CHANGE IN BUILDING PERMITS, 1990-2021

-97%

Growth is slow in the state, which has seen a 41% decrease in building permits between 1990 and 2021.

In Hartford, there were 405 building permits issued in 1990, compared to 11 issued in 2021, representing a 97% decrease.



Source: Connecticut Department of Economic and Community Development

HOUSING | 2022 Housing Data Profiles | ANDOVER

SINGLE-FAMILY HOMES AS PERCENT OF ALL HOMES

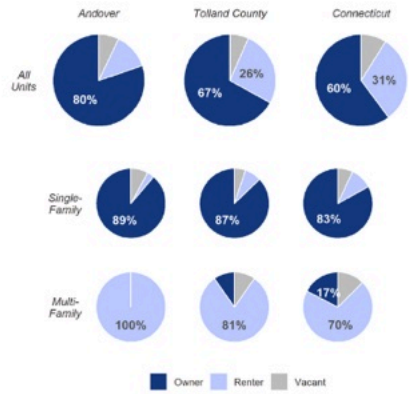
90%

PERCENT OF ALL HOMES OCCUPIED BY OWNERS

80%

Overall, 65% of Connecticut's occupied housing stock is comprised of single-family housing, while 35% is multifamily housing (2+ units in structure). Most single-family homes are occupied by homeowners, while most multifamily units are occupied by renters.

In Andover, 90% of occupied homes are single-family, and 10% are multi-family. Owners live in 89% of Andover's 1,161 single-family homes, and renters live in 100% of its 126 multifamily homes.

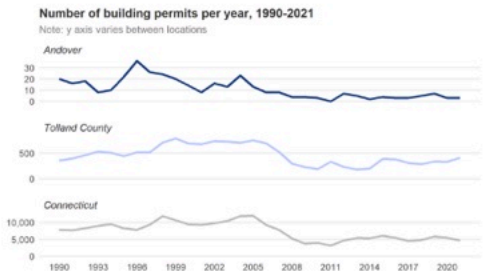


CHANGE IN BUILDING PERMITS, 1990-2021

-85%

Growth is slow in the state, which has seen a 41% decrease in building permits between 1990 and 2021.

In Andover, there were 20 building permits issued in 1990, compared to 3 issued in 2021, representing a 85% decrease.



Source: Connecticut Department of Economic and Community Development

AFGHANISTAN

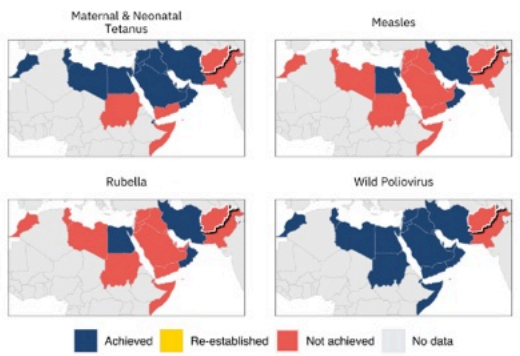
Impact Goals

IA2030

1.2 Control, Eliminate & Eradicate Vaccine-Preventable Disease

In 2022, measles elimination was **achieved** in 4 countries in the WHO region, while it was **re-established** in 0 countries and **not achieved** in 17 countries.

The presentation of maps is not an expression of the opinion of Immunization Agenda 2030 regarding the legal status of countries/ territories, their governing authorities, or their official borders.



Achievement of vaccine preventable disease control, elimination, and eradication targets in Afghanistan:

Data source: Verification, certification, and disease-specific committee reports. Targets for vaccine-preventable disease are elimination of measles transmission, elimination of rubella transmission, eradication of wildtype poliovirus, and elimination as a public health problem for maternal and neonatal tetanus. The baseline year is 2020.

CONGO (DEM. REP.)

Impact Goals

IA2030

1.2 Control, Eliminate & Eradicate Vaccine-Preventable Disease

In 2022, measles elimination was **achieved** in 0 countries in the WHO region, while it was **re-established** in 0 countries and **not achieved** in 47 countries.

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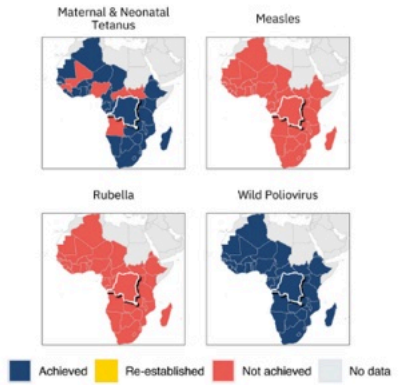
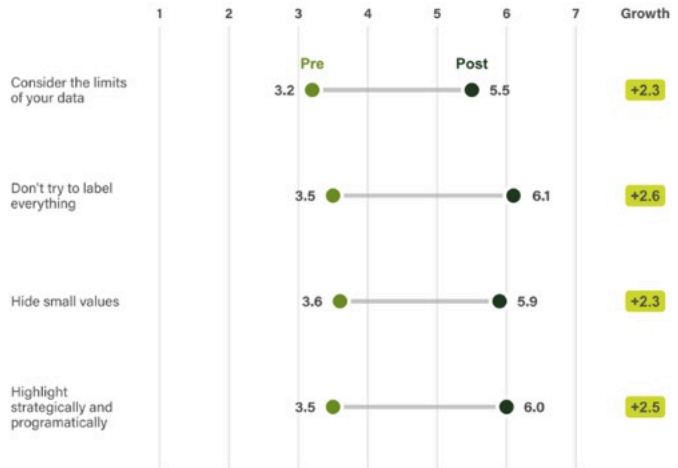


Achievement of vaccine preventable disease control, elimination, and eradication targets in Democratic Republic of the Congo:

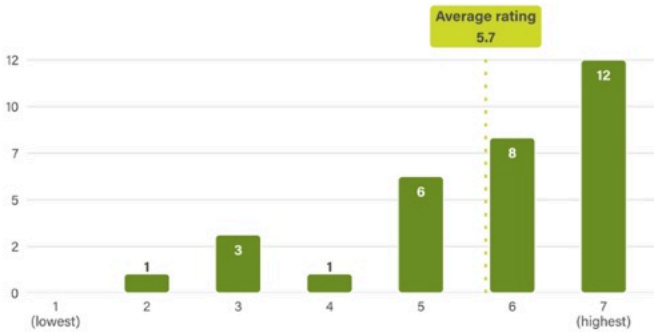
Data source: Verification, certification, and disease-specific committee reports. Targets for vaccine-preventable disease are elimination of measles transmission, elimination of rubella transmission, eradication of wildtype poliovirus, and elimination as a public health problem for maternal and neonatal tetanus. The baseline year is 2020.

PRE-POST Participant Self Assessed Knowledge Ratings

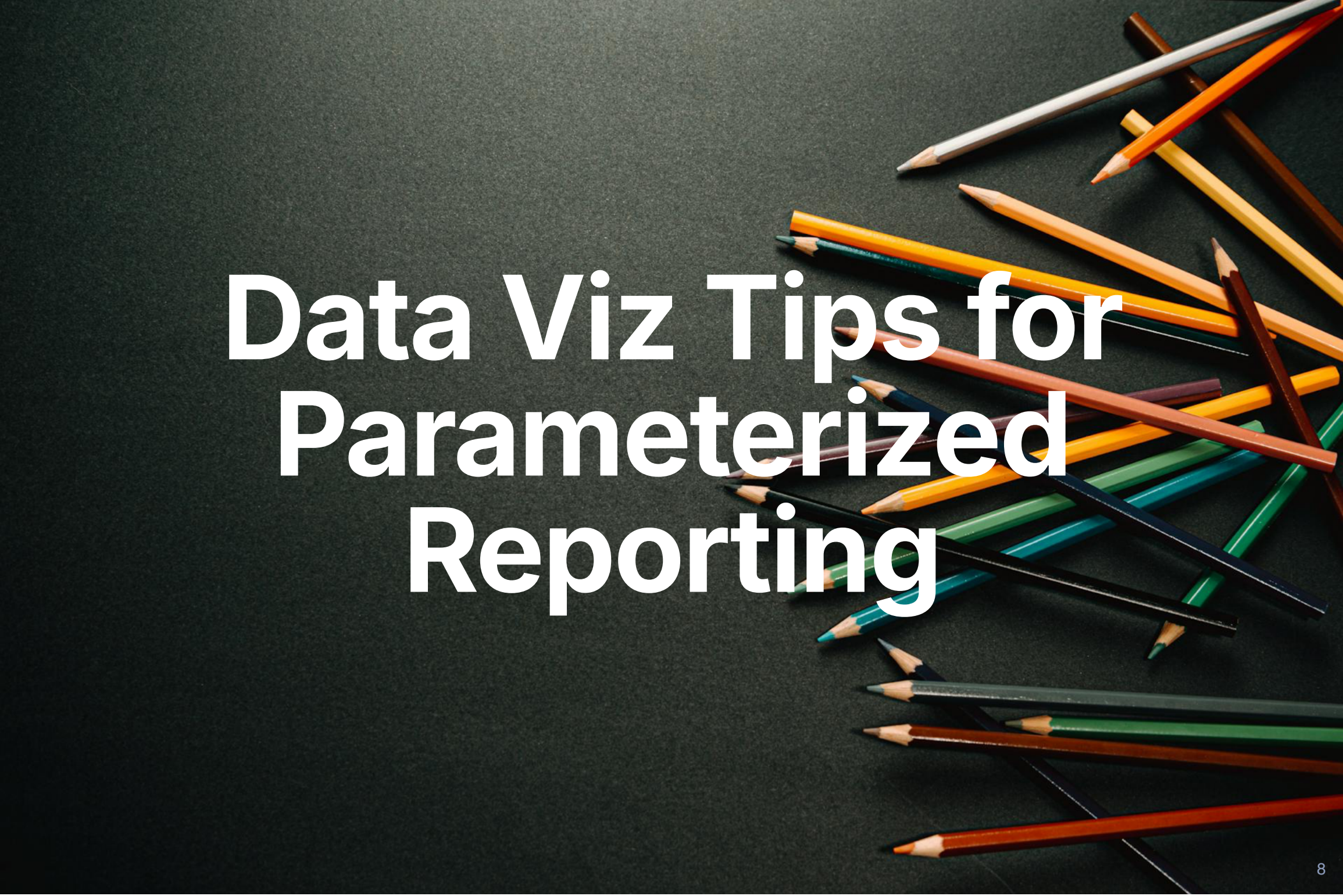


Scale Ratings

How well were the identified **learning objectives** covered?

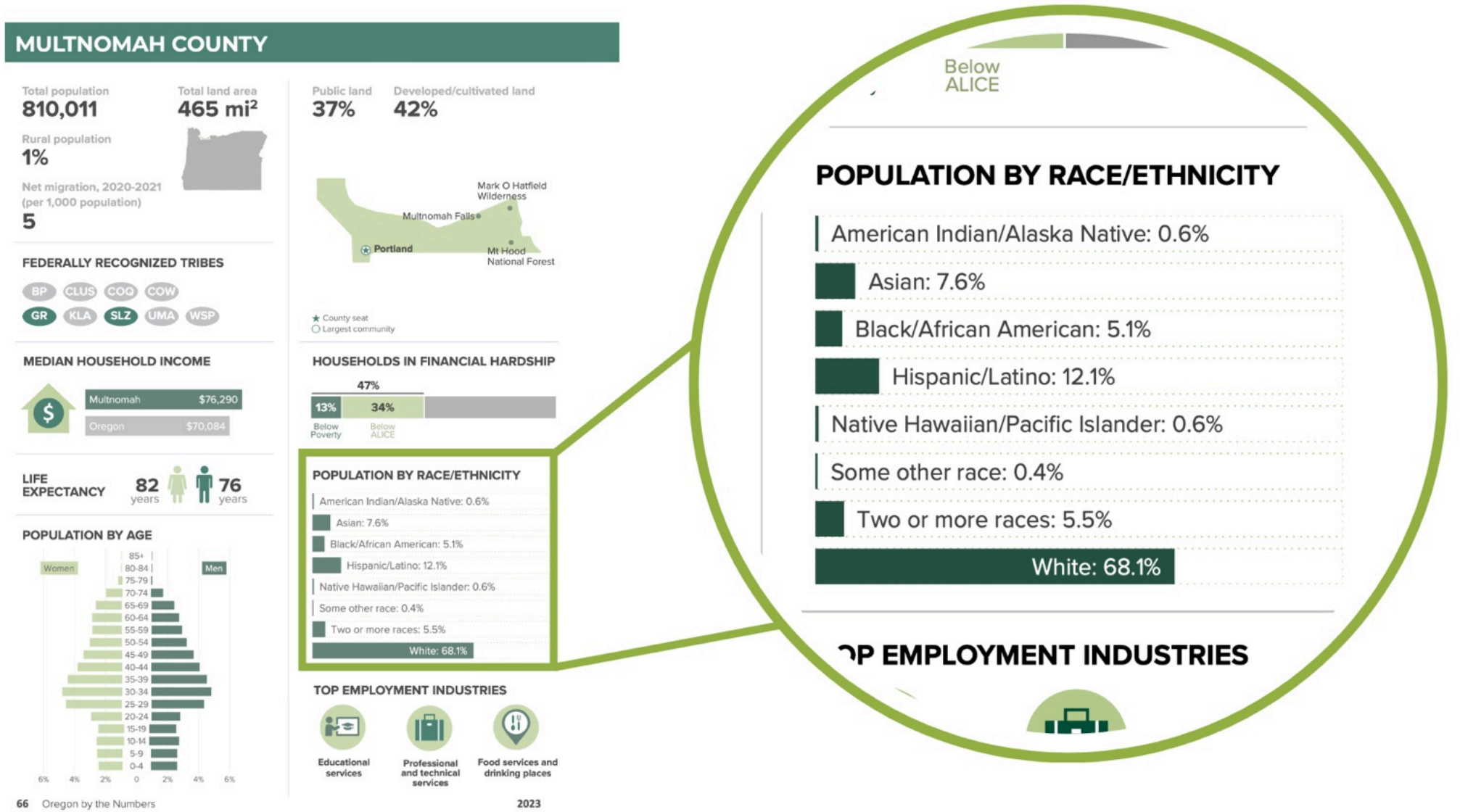


How effective was the **interaction** opportunities provided in keeping you engaged in training?


Data Viz Tips for Parameterized Reporting


There is No Magic Package


Consider the Outer Limits of Your Data


MULTNOMAH COUNTY
Total population
810,011
Total land area
465 mi²
Rural population
1%
Net migration, 2020-2021
(per 1,000 population)
5
FEDERALLY RECOGNIZED TRIBES
BP CLUS COO COW
GR KLA SLZ UMA WSP
MEDIAN HOUSEHOLD INCOME
Multnomah $76,290
Oregon $70,084
LIFE EXPECTANCY
82 years
76 years
POPULATION BY AGE
Women
Men
85+
80-84
75-79
70-74
65-69
60-64
55-59
50-54
45-49
40-44
35-39
30-34
25-29
20-24
15-19
10-14
5-9
0-4
6% 4% 2% 0 2% 4% 6%
Public land
37%
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Mark O Hatfield Wilderness
Multnomah Falls
Portland
Mt Hood National Forest
★ County seat
○ Largest community
HOUSEHOLDS IN FINANCIAL HARDSHIP
47%
13%
34%
Below Poverty
Below ALICE
POPULATION BY RACE/ETHNICITY
American Indian/Alaska Native: 0.6%
Asian: 7.6%
Black/African American: 5.1%
Hispanic/Latino: 12.1%
Native Hawaiian/Pacific Islander: 0.6%
Some other race: 0.4%
Two or more races: 5.5%
White: 68.1%
TOP EMPLOYMENT INDUSTRIES
Educational services
Professional and technical services
Food services and drinking places
66 Oregon by the Numbers
2023
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OP EMPLOYMENT INDUSTRIES

```
race_ethnicity
```

```
# A tibble: 288 × 4
   county population                          pct pct_formatted
   <chr>  <fct>                             <dbl> <chr>
 1 Baker  American Indian/Alaska Native    0.0142   1.4%
 2 Baker  Asian                           0.00351  0.4%
 3 Baker  Black/African American          0.0113   1.1%
 4 Baker  Hispanic/Latino                  0.0481   4.8%
 5 Baker  Native Hawaiian/Pacific Islander 0.00193  0.2%
 6 Baker  Some other race                  0.000544 0.1%
 7 Baker  Two or more races                0.0244   2.4%
 8 Baker  White                           0.896    89.6%
 9 Benton American Indian/Alaska Native    0.00418  0.4%
10 Benton Asian                           0.0729   7.3%
# ℹ 278 more rows
```

```
race_ethnicity_bar_chart <- function(county_to_plot) {
  race_ethnicity |>
    filter(county == county_to_plot) |>
    ggplot(
      aes(
        x = pct,
        y = population
      )
    ) +
    geom_col(fill = "#004f39") +
    ...
}
```

```
1 race_ethnicity_bar_chart(county_to_plot = "Multnomah")
```

```
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```
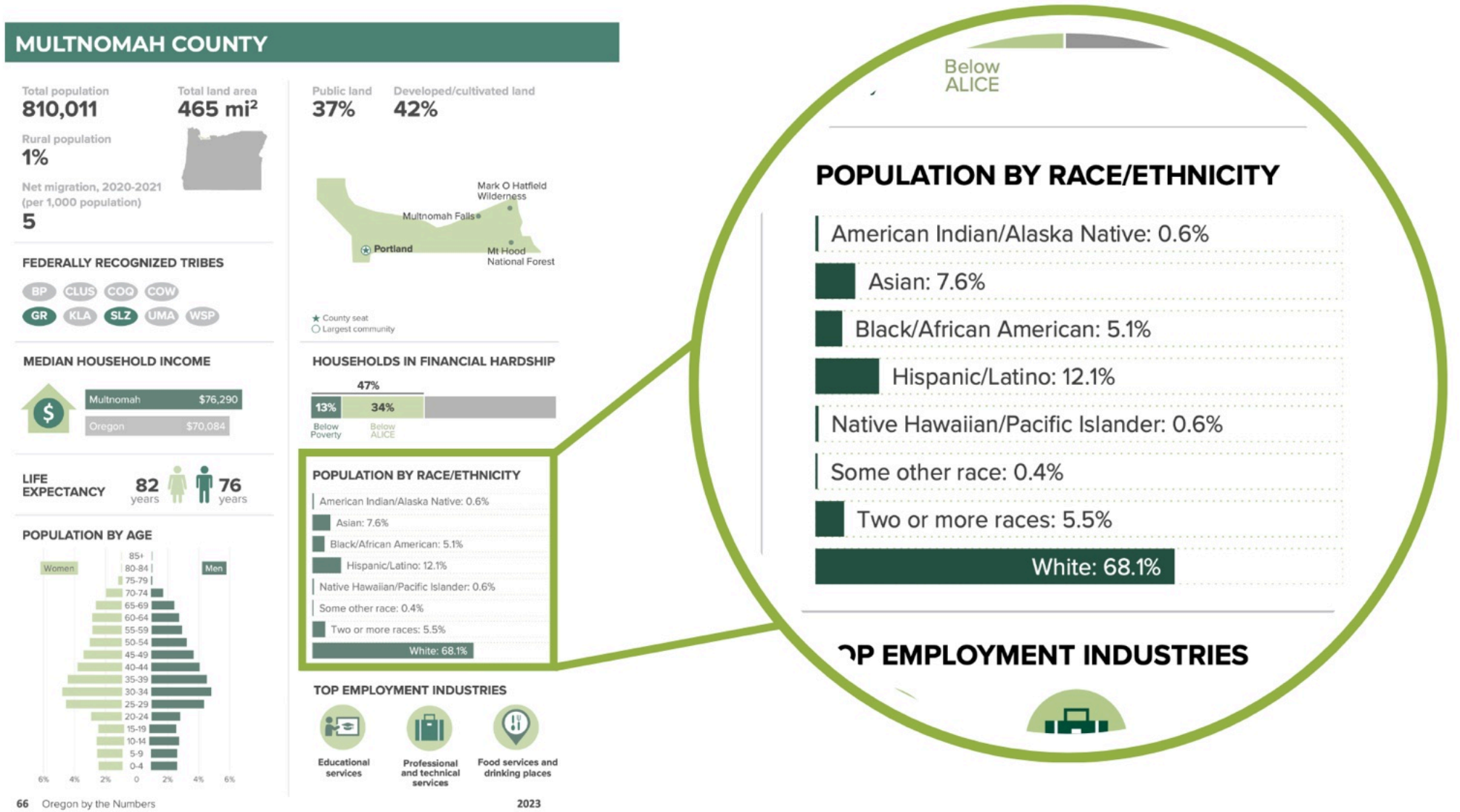


```
1 race_ethnicity_bar_chart(county_to_plot = "Baker")
```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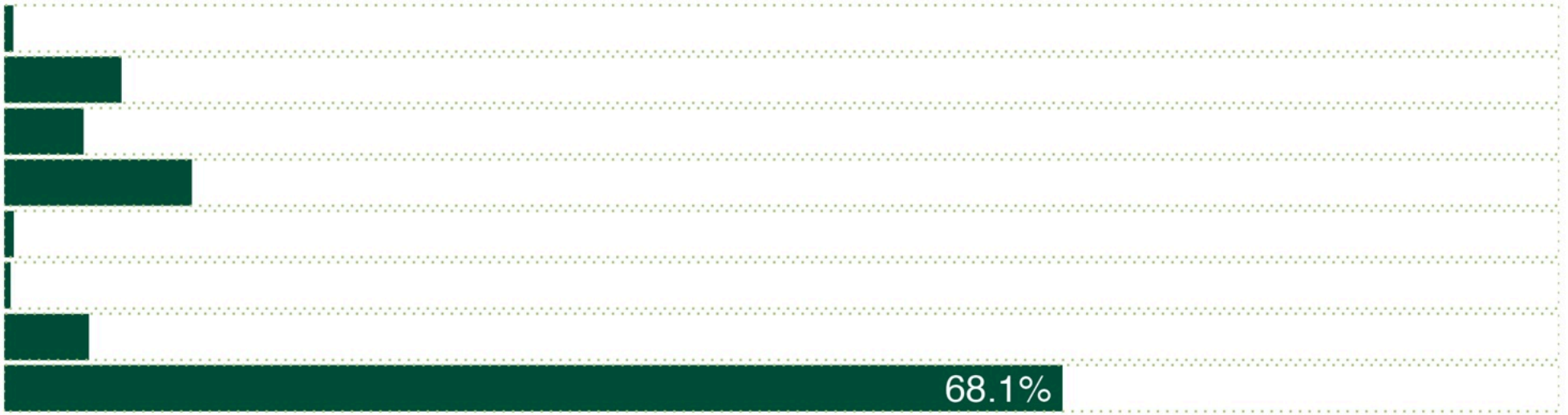
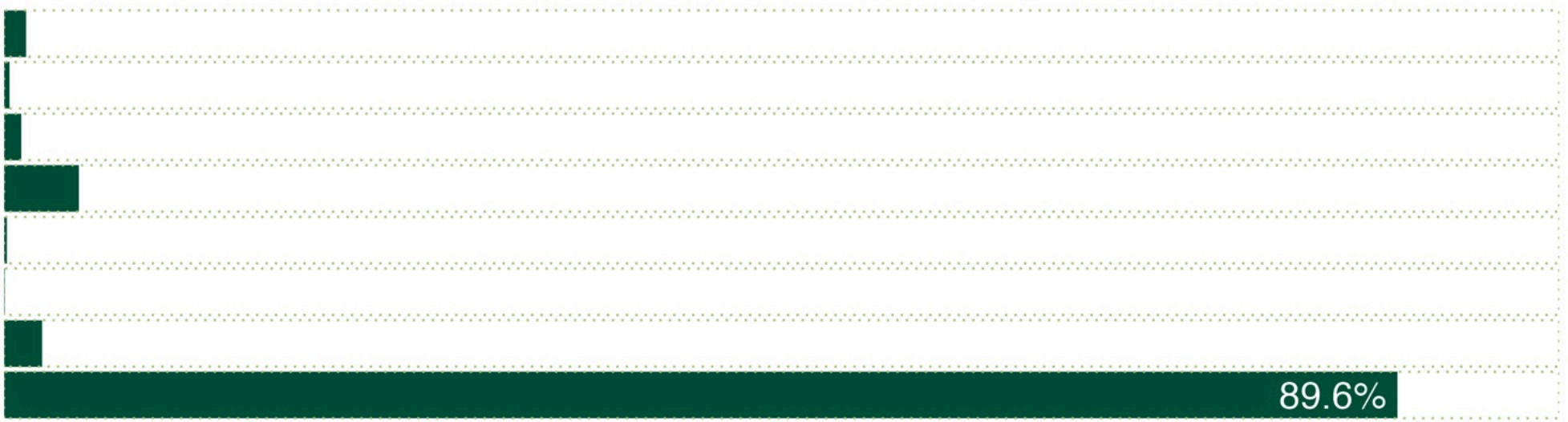
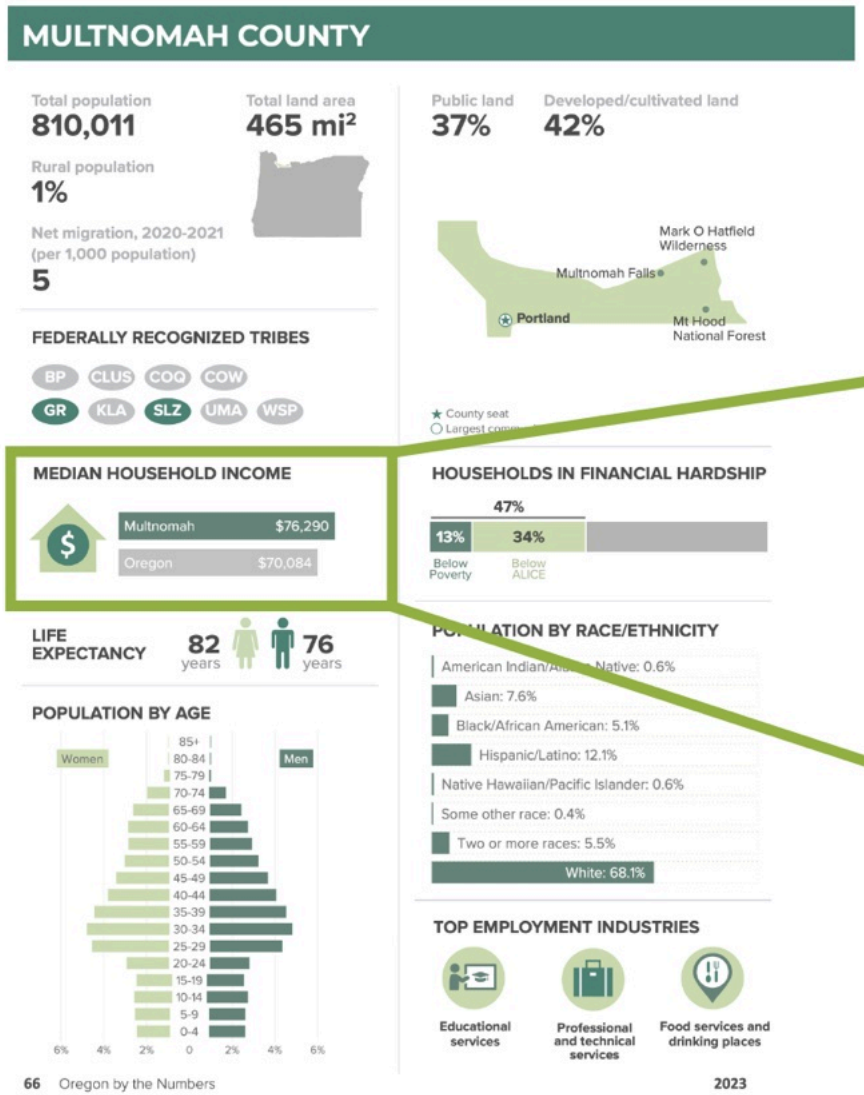
```r
race_ethnicity_bar_chart(county_to_plot = "Multnomah") +
  geom_col(
    aes(
      x = 1
    ),
    fill = "transparent",
    color = "#A9C27F",
    linetype = "dotted"
  )
```

Multnomah



Baker

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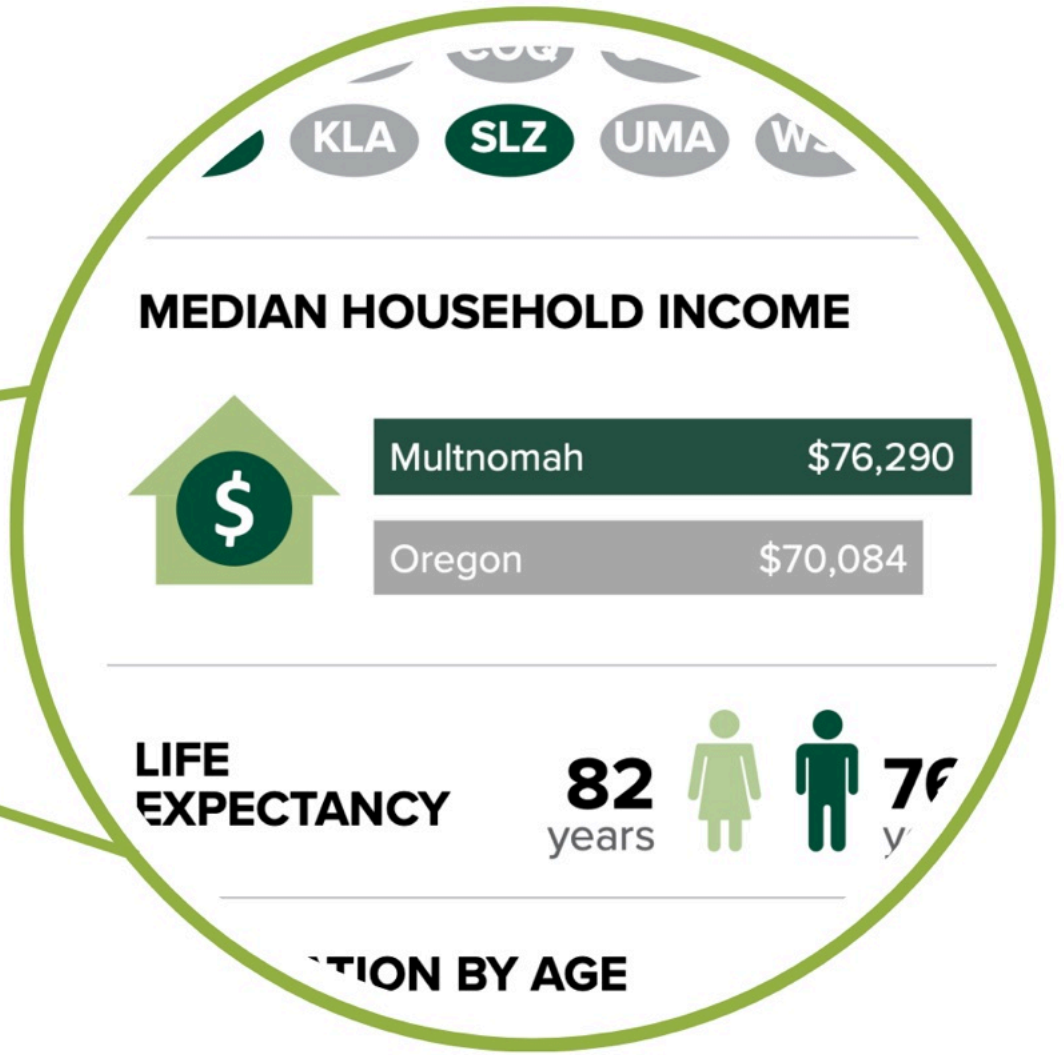
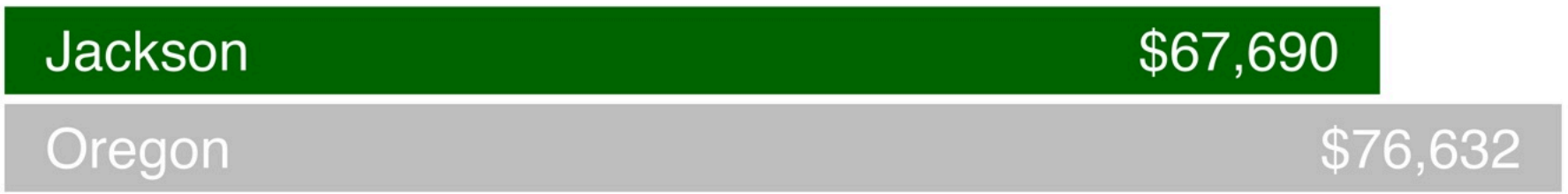

KLA
SLZ
UMA
MEDIAN HOUSEHOLD INCOME
Multnomah $76,290
Oregon $70,084
LIFE EXPECTANCY
82 years

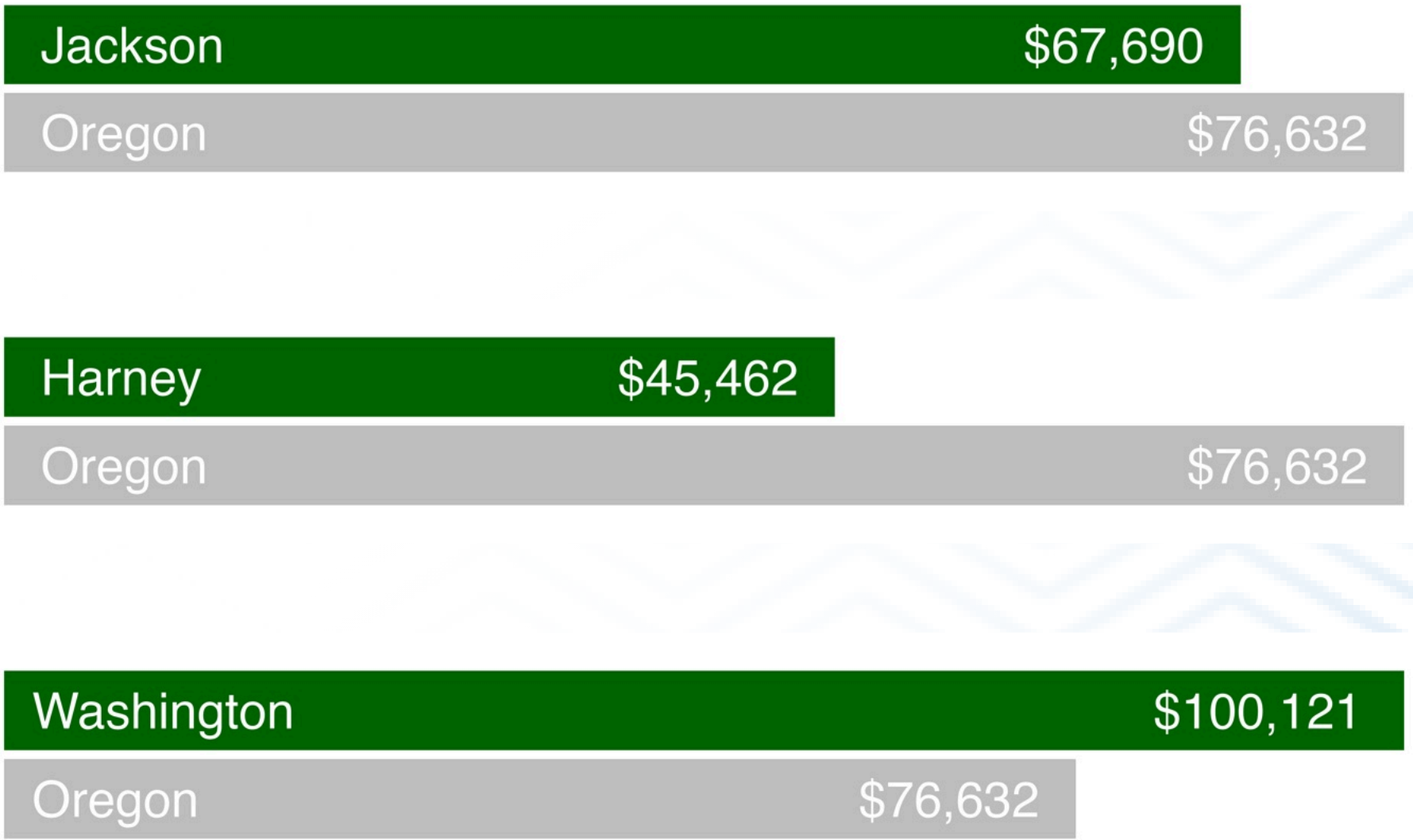
```
median_income
```

```
# A tibble: 37 × 3
   geography amount amount_formatted
   <chr>      <dbl> <chr>
 1 Oregon     76632 $76,632
 2 Baker      51657 $51,657
 3 Benton     72882 $72,882
 4 Clackamas  95740 $95,740
 5 Clatsop    68025 $68,025
 6 Columbia   83265 $83,265
 7 Coos       57563 $57,563
 8 Crook      74969 $74,969
 9 Curry      64300 $64,300
10 Deschutes  82042 $82,042
# ℹ 27 more rows
```

```
median_income_plot <- function(county_to_plot) {
  median_income |>
    filter(geography %in% c(county_to_plot, "Oregon")) |>
    ggplot(
      aes(
        x = amount,
        y = geography,
        label = amount_formatted,
        fill = geography
      )
    ) +
    geom_col() +
    ...
}
```

```
1 median_income_plot(county_to_plot = "Jackson")
```



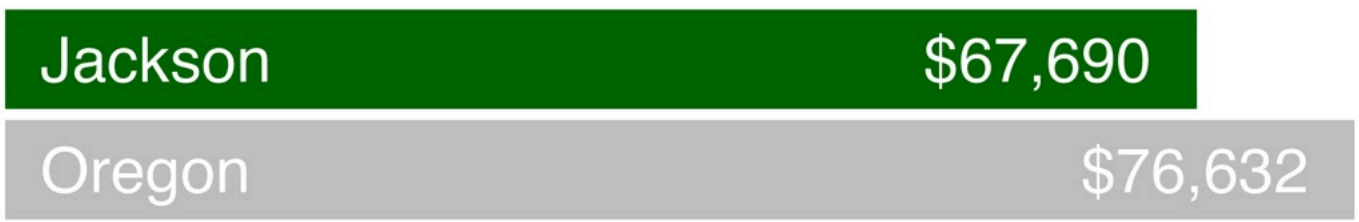

Jackson
$67,690
Oregon
$76,632
Harney
$45,462
Oregon
$76,632
Washington
$100,121
Oregon
$76,632

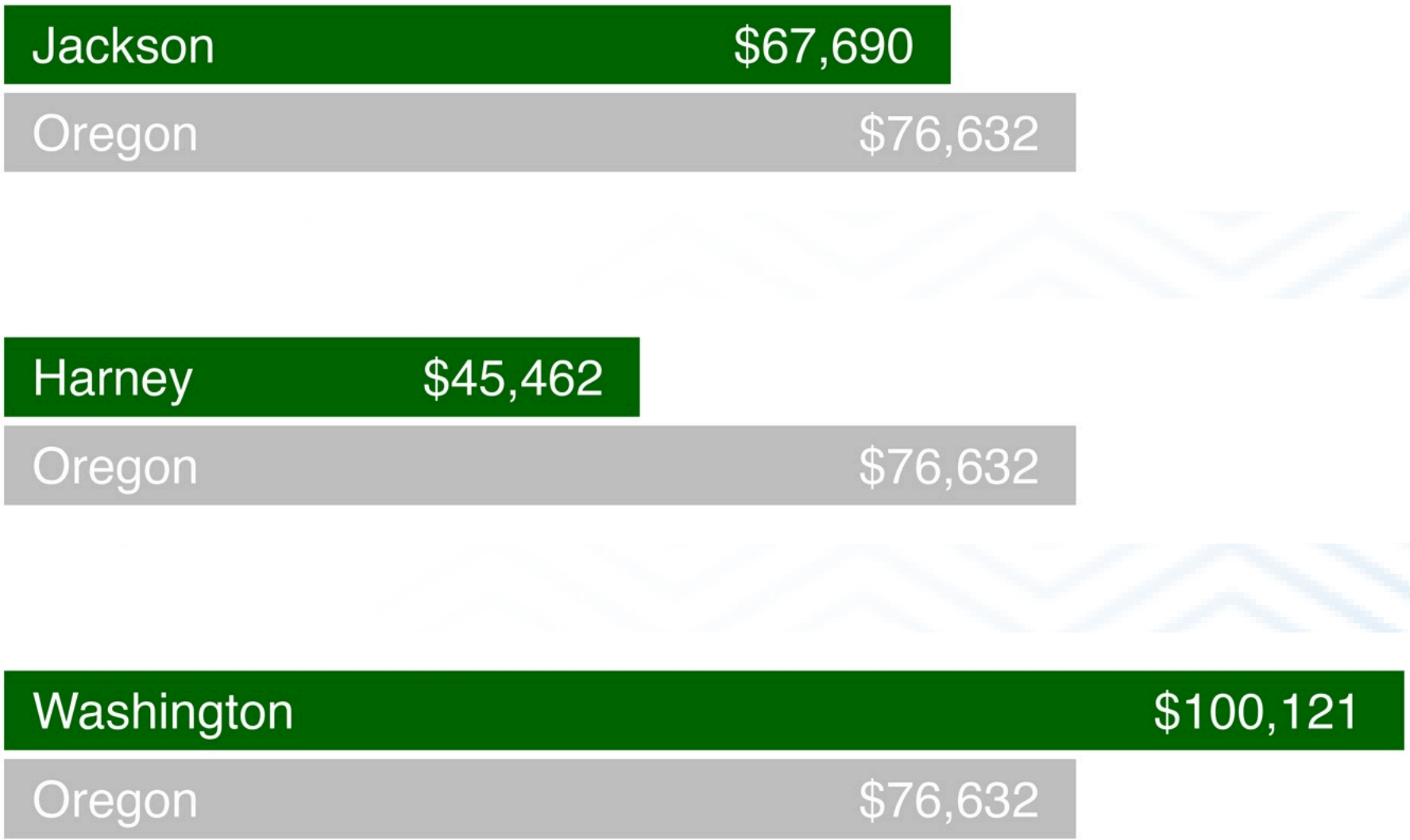
```r
max_median_income <-
  median_income |>
  slice_max(
    order_by = amount,
    n = 1
  ) |>
  pull(amount)
```

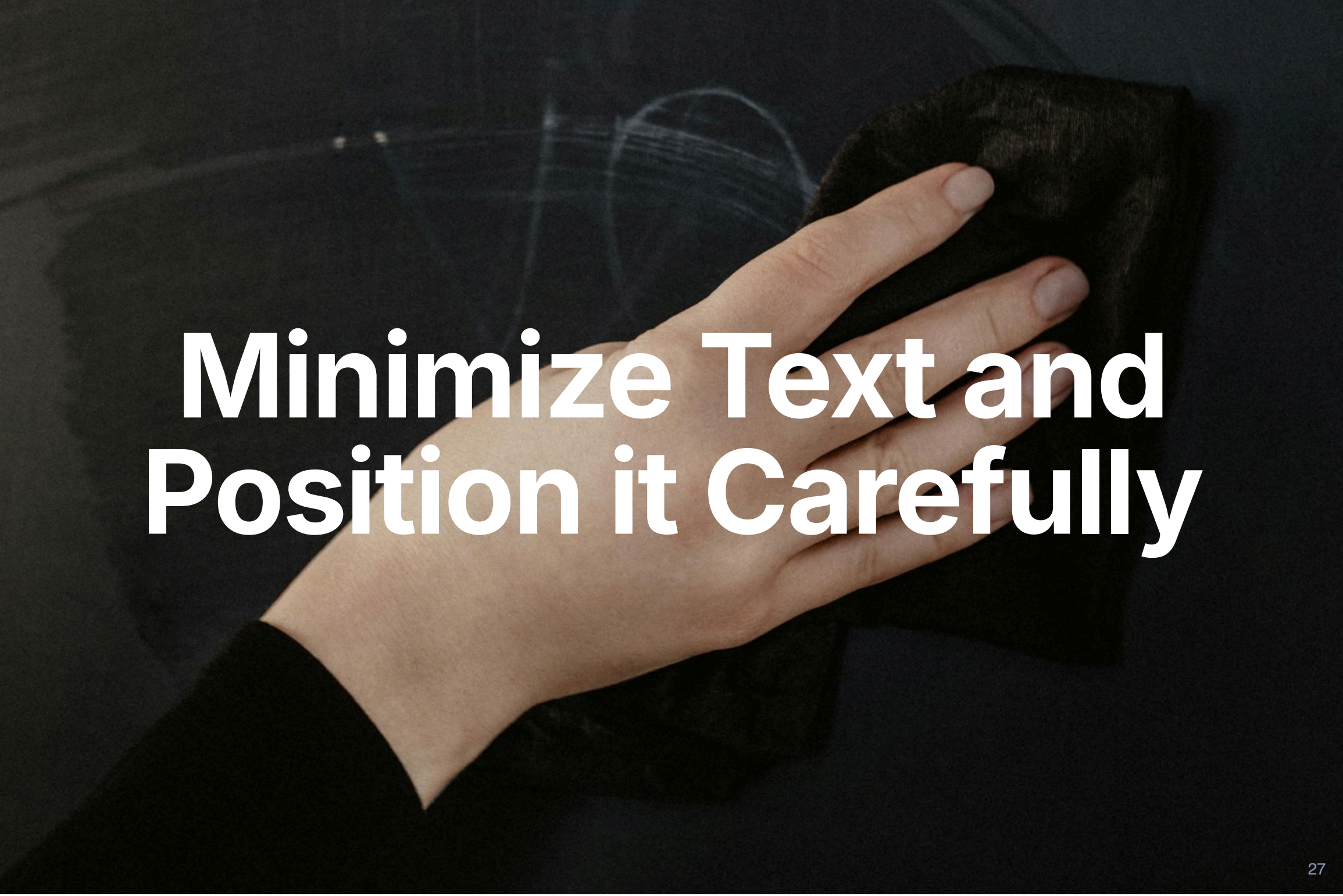
```r
max_median_income
```

```
[1] 100121
```

```r
median_income_plot(county_to_plot = "Jackson") +
  scale_x_continuous(
    limits = c(0, max_median_income)
  )
```




Jackson
$67,690
Oregon
$76,632
Harney
$45,462
Oregon
$76,632
Washington
$100,121
Oregon
$76,632



Minimize Text and Position it Carefully


Don’t Try to Label Everything

POPULATION

2022 Housing Data Profiles | HARTFORD

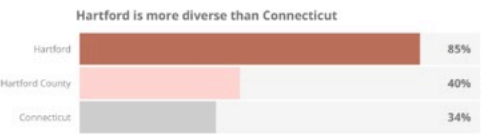
TOTAL POPULATION

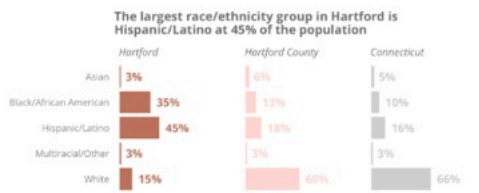
122,549

PEOPLE OF COLOR

85%

Connecticut population is becoming increasingly diverse, but the BIPOC population is concentrated in certain municipalities, especially Connecticut's cities. In Hartford, 85% of residents are BIPOC, while 15% are white.





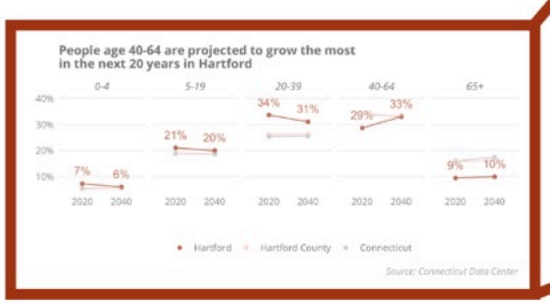
MEDIAN AGE

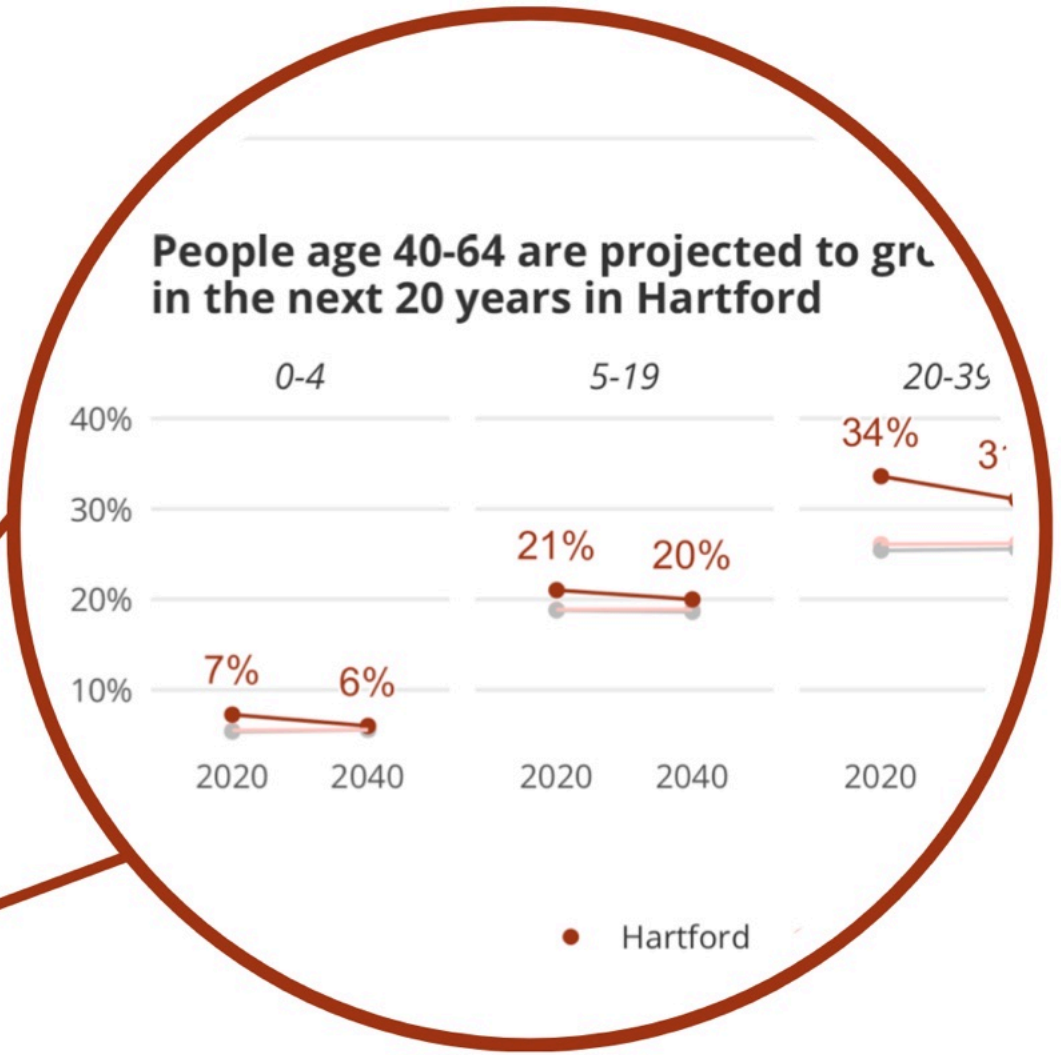
31

POPULATION CHANGE, 2020 TO 2040

+0.3%

In the next twenty years, Hartford's population is projected to grow from 126,443 to 126,846.



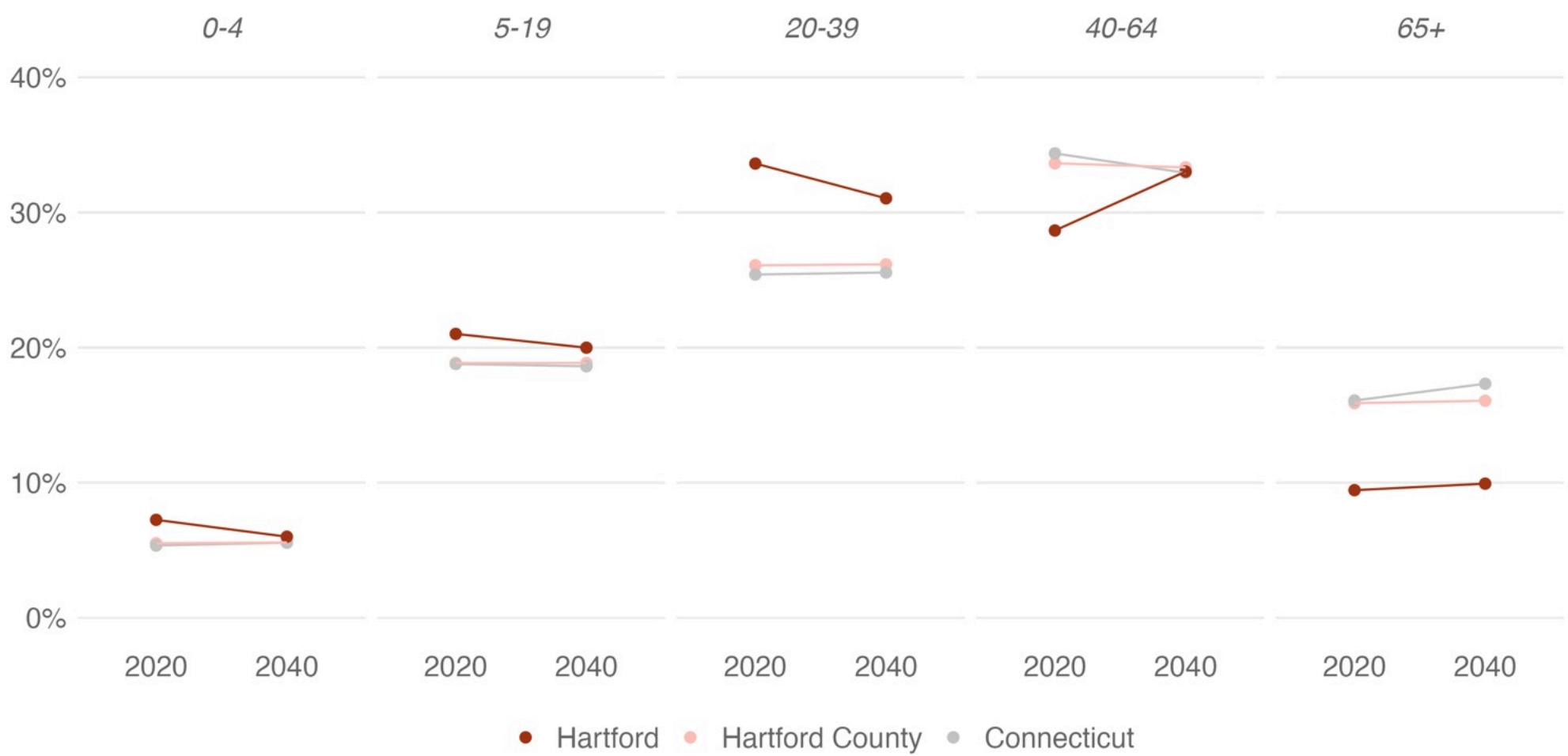


```r
population_projection |>
  filter(location == "Hartford")
```

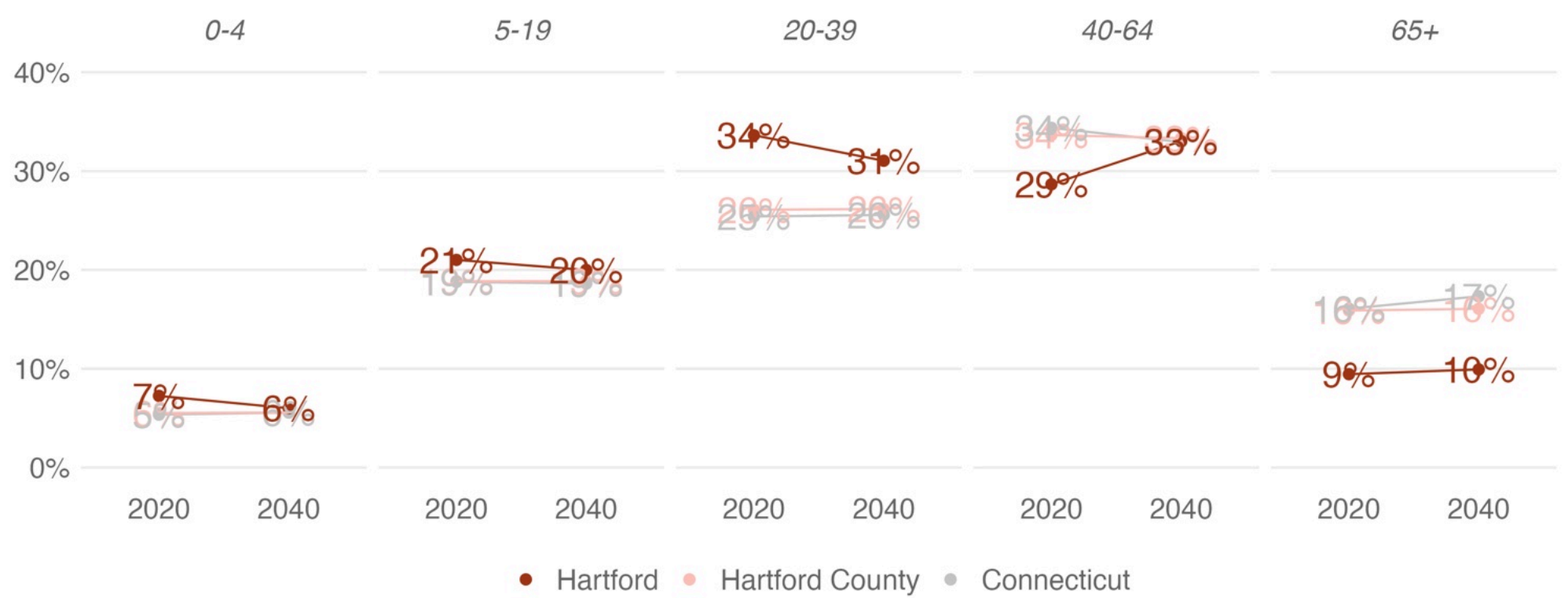
```
# A tibble: 10 × 5
   location year  age_group    pct pct_formatted
   <chr>    <chr> <fct>      <dbl> <chr>
 1 Hartford 2020  0-4       0.0725 7%
 2 Hartford 2020  5-19      0.210  21%
 3 Hartford 2020  20-39     0.336  34%
 4 Hartford 2020  40-64     0.287  29%
 5 Hartford 2020  65+       0.0945 9%
 6 Hartford 2040  0-4       0.0600 6%
 7 Hartford 2040  5-19      0.200  20%
 8 Hartford 2040  20-39     0.310  31%
 9 Hartford 2040  40-64     0.330  33%
10 Hartford 2040  65+       0.0993 10%
```

```r
population_projection_plot <- function(town_to_plot, county_to_plot) {
  population_projection |>
    filter(location %in% c(town_to_plot, county_to_plot, "Connecticut")) |>
    ggplot(aes(
      x = year,
      y = pct,
      color = location,
      group = location
    )) +
    geom_point() +
    geom_line() +
    ...
}
```

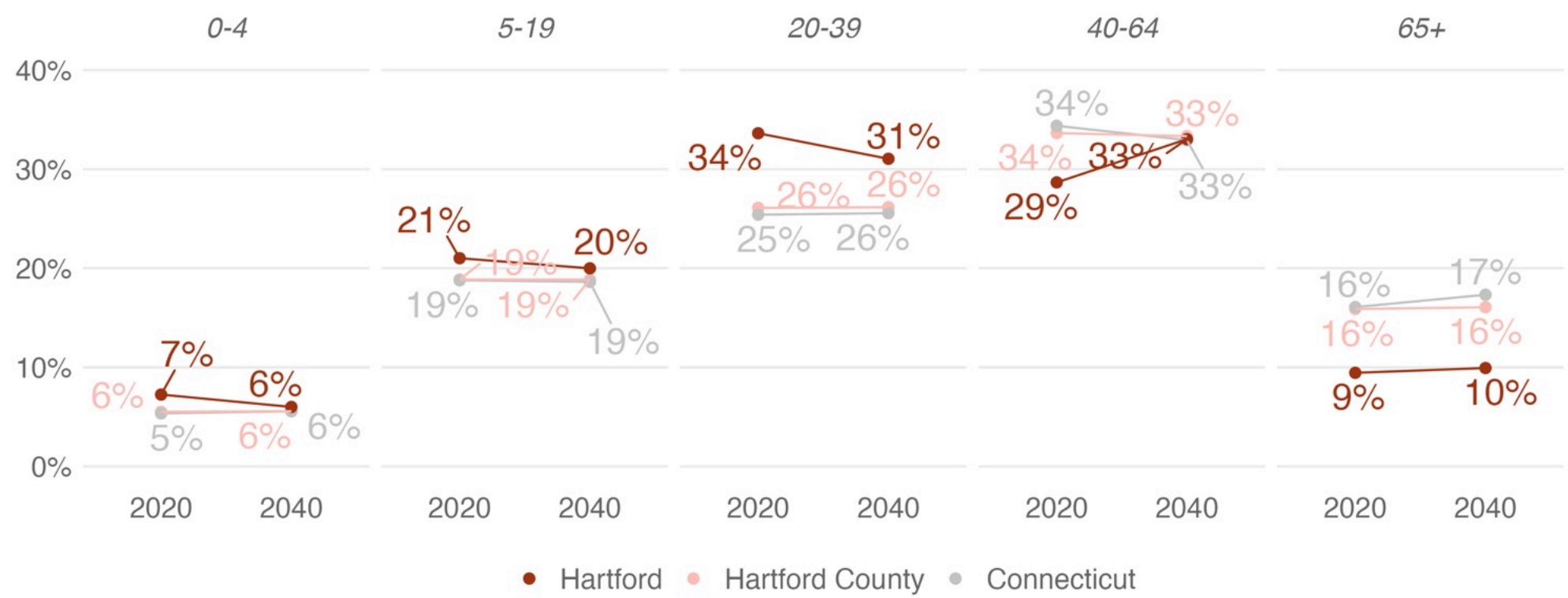
```r
population_projection_plot(
  town_to_plot = "Hartford",
  county_to_plot = "Hartford County"
)
```



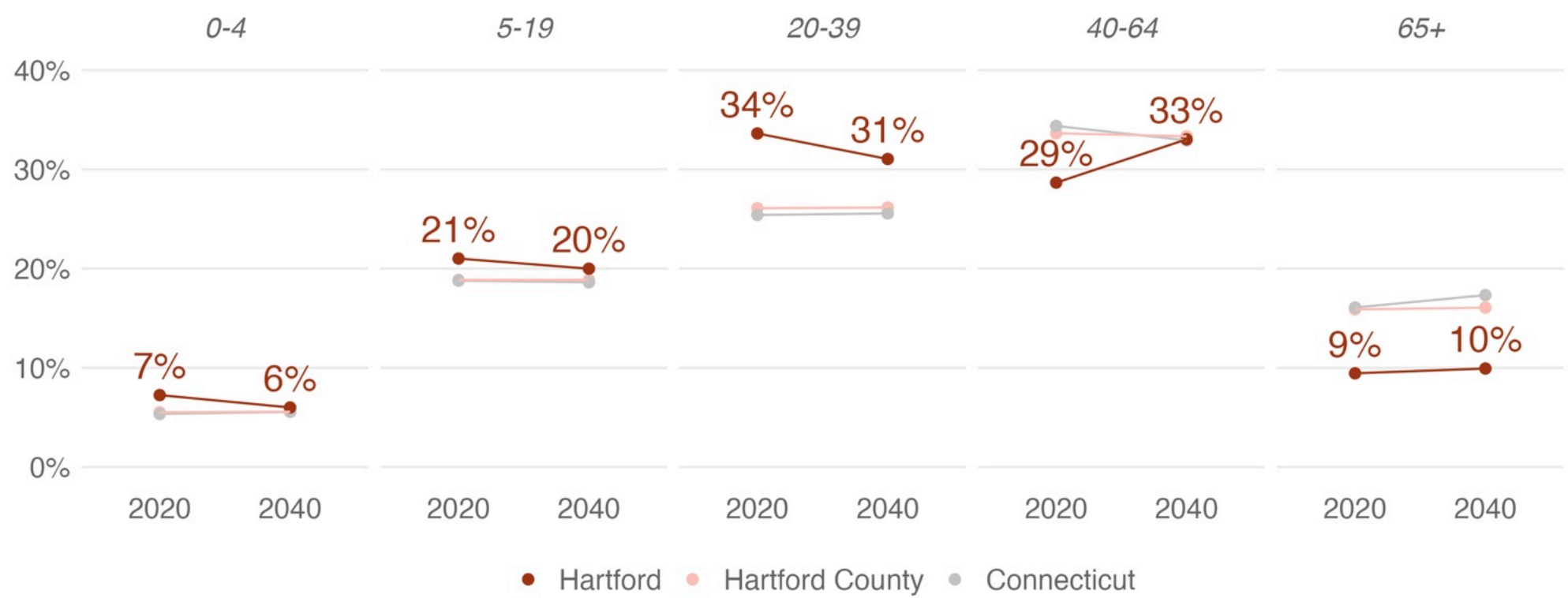
```r
population_projection_plot(
  town_to_plot = "Hartford",
  county_to_plot = "Hartford County"
) +
  geom_text(
    aes(
      label = pct_formatted
    )
  )
```



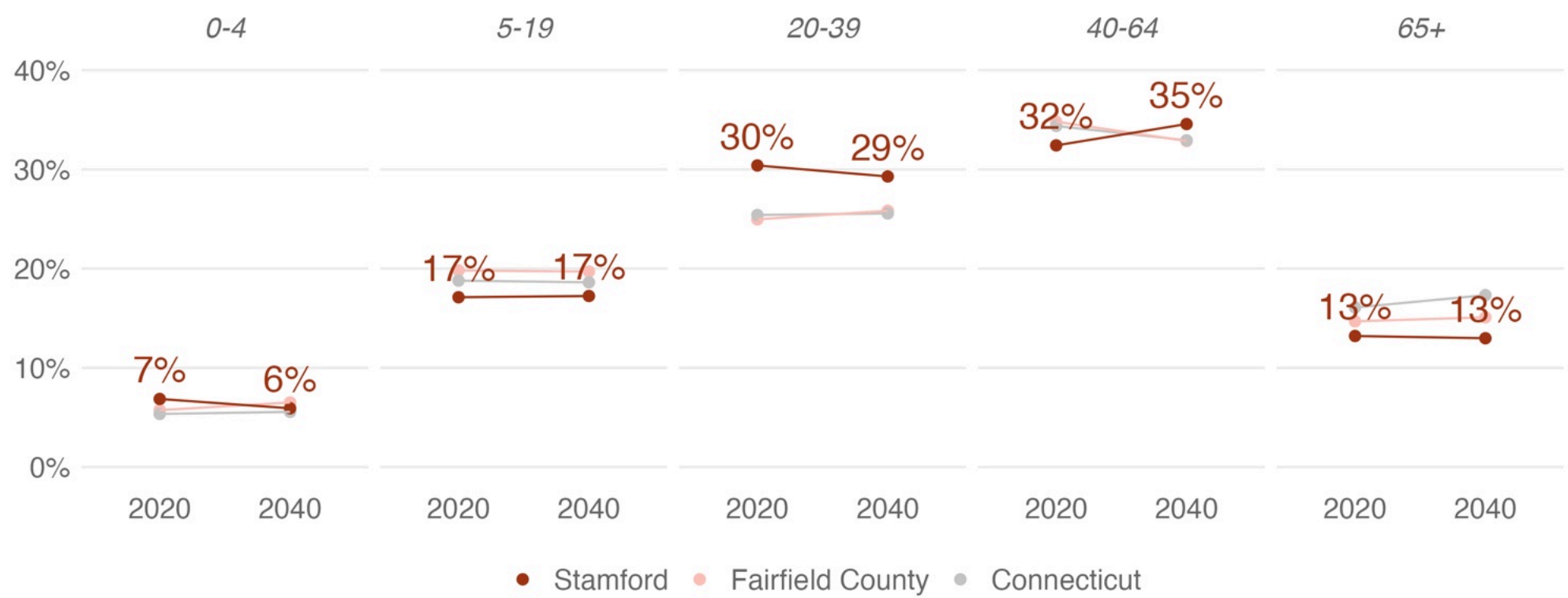
```
library(ggrepel)

population_projection_plot(
  town_to_plot = "Hartford",
  county_to_plot = "Hartford County"
) +
  geom_text_repel(
    aes(
      label = pct_formatted
    )
  )
```



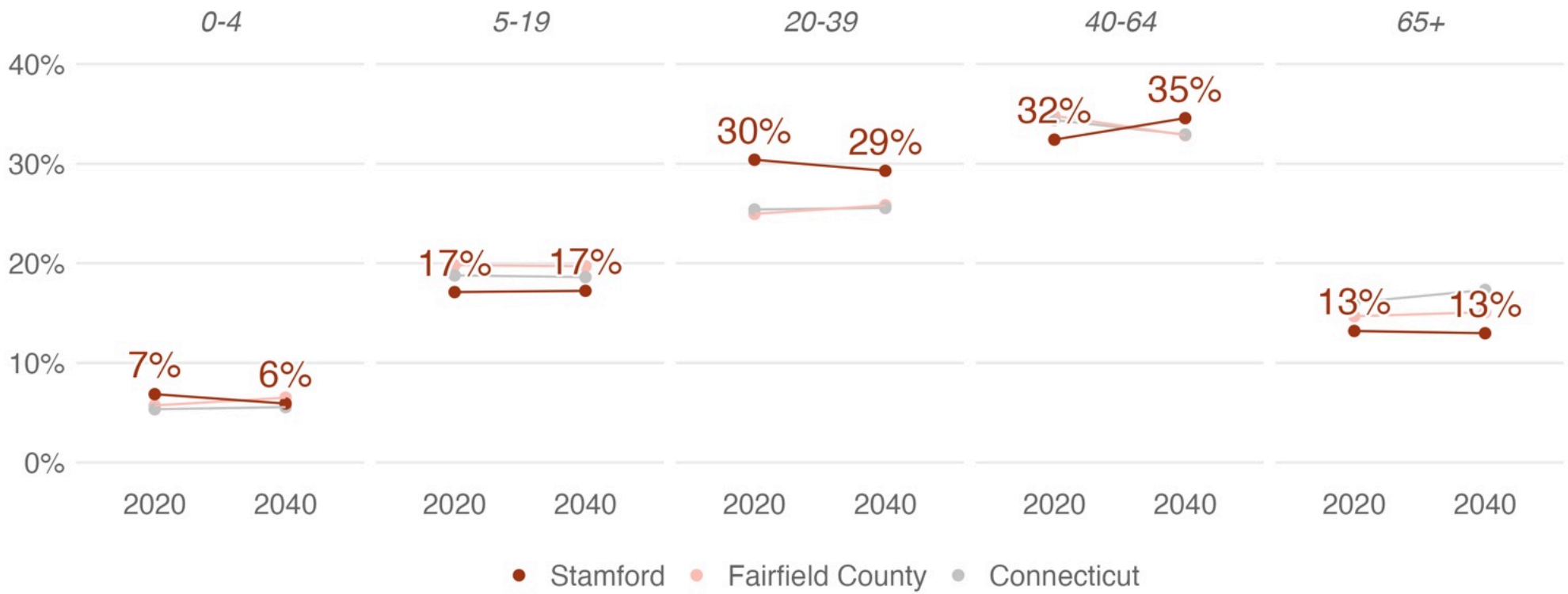
```
population_projection_plot(
  town_to_plot = "Hartford",
  county_to_plot = "Hartford County"
) +
  geom_text(
    data = population_projection |> filter(location == "Hartford"),
    nudge_y = 0.03,
    aes(
      label = pct_formatted
    )
  )
```



```
population_projection_plot(
  town_to_plot = "Stamford",
  county_to_plot = "Fairfield County"
) +
  geom_text(
    data = population_projection |> filter(location == "Stamford"),
    nudge_y = 0.03,
    aes(
      label = pct_formatted
    )
  )
```



```r
library(shadowtext)

population_projection_plot(
  town_to_plot = "Stamford",
  county_to_plot = "Fairfield County"
) +
  geom_shadowtext(
    data = population_projection |> filter(location == "Stamford"),
    bg.color = "white",
    nudge_y = 0.03,
    aes(
      label = pct_formatted
    )
  )
```


0-4
5-19
20-39
40-64
65+
40%
30%
20%
10%
0%
7%
6%
17%
17%
30%
29%
32%
35%
13%
13%
2020
2040
Stamford
Fairfield County
Connecticut


Hide Small Values

AFFORDABILITY

2022 Housing Data Profiles | HARTFORD

PEOPLE BURDENED BY COST OF HOUSING

49%

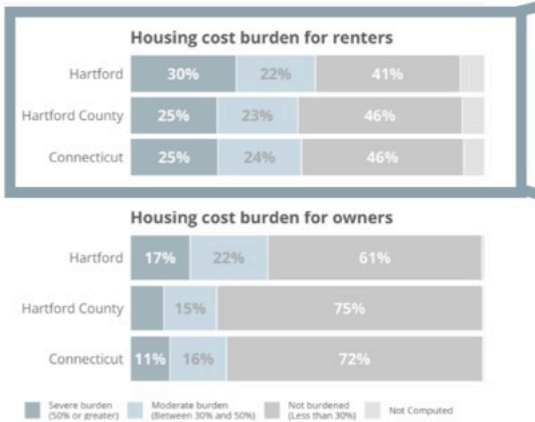
Households that are cost-burdened spend more than 30% of their income on housing. Severely cost-burdened spend more than 50% on housing.

RENTERS BURDENED BY COST OF HOUSING

59%

OWNERS BURDENED BY COST OF HOUSING

39%

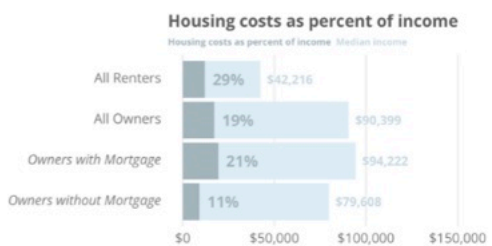


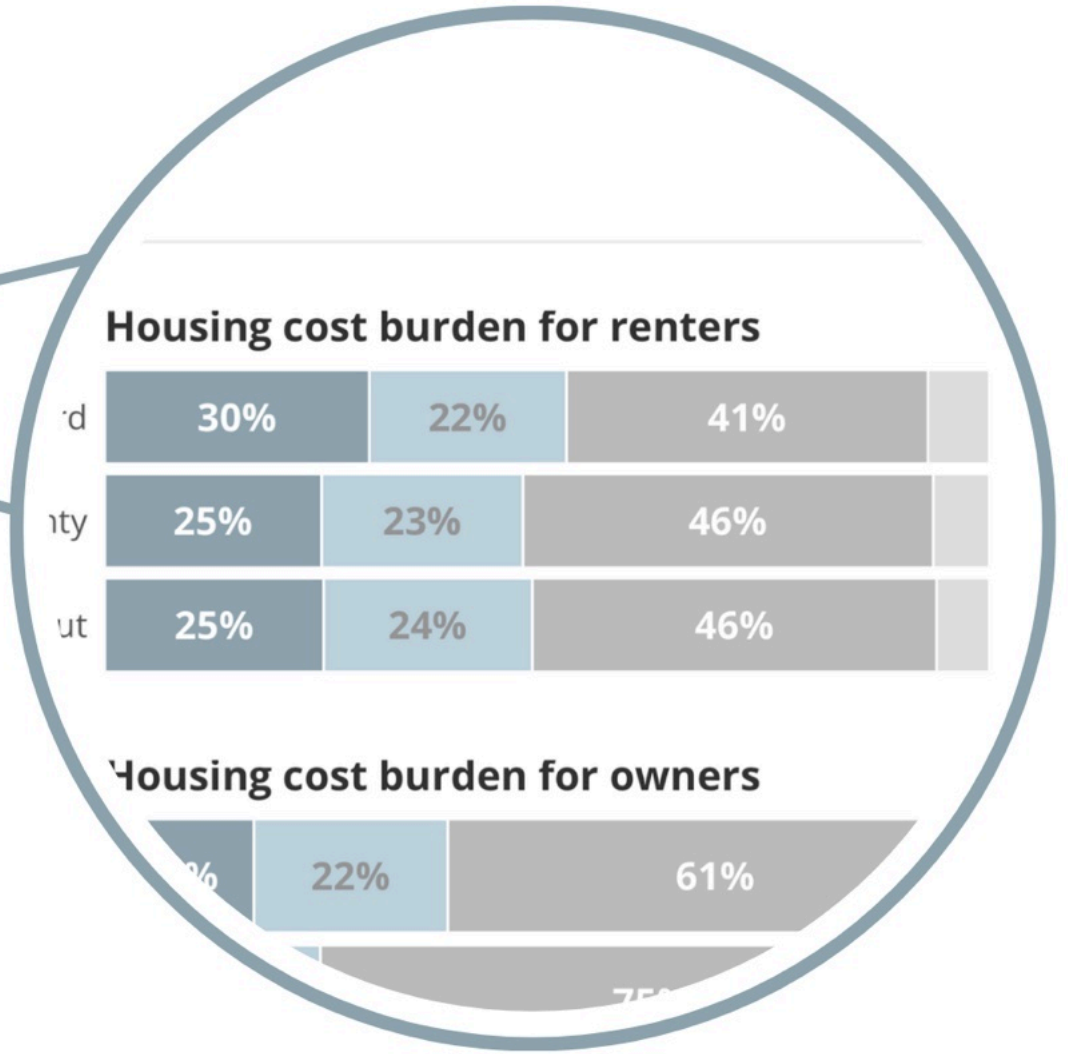
RENTERS' HOUSING COSTS AS PERCENT OF INCOME

29%

OWNERS' HOUSING COSTS AS PERCENT OF INCOME

19%



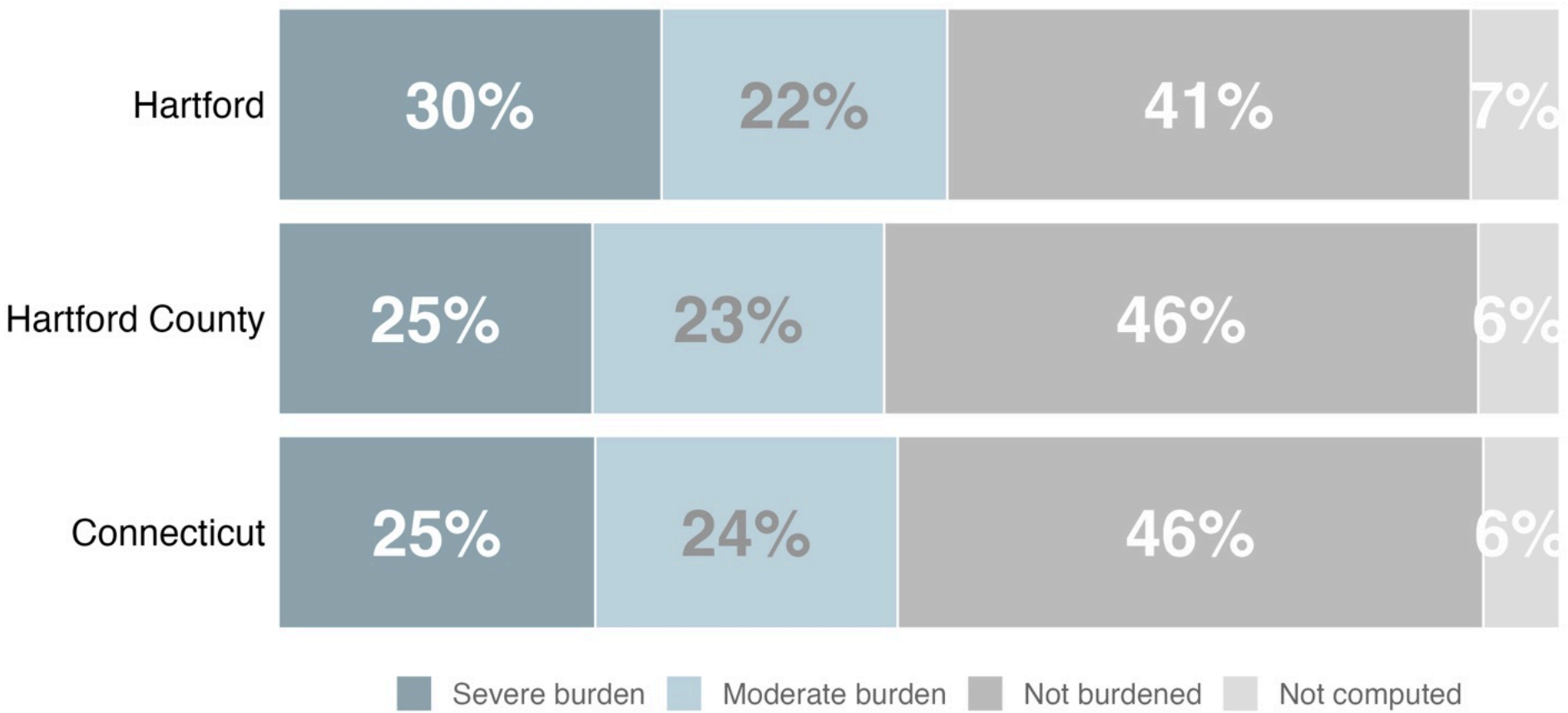


```
housing_cost_burden
```

```
# A tibble: 694 × 4
   location   burden_level       pct pct_formatted
   <fct>      <fct>            <dbl> <chr>
 1 Bethel     Not burdened    0.381  38%
 2 Bethel     Moderate burden 0.352  35%
 3 Bethel     Severe burden   0.229  23%
 4 Bethel     Not computed    0.0385 4%
 5 Bridgeport Not burdened    0.358  36%
 6 Bridgeport Moderate burden 0.260  26%
 7 Bridgeport Severe burden   0.332  33%
 8 Bridgeport Not computed    0.0494 5%
 9 Brookfield Not burdened    0.501  50%
10 Brookfield Moderate burden 0.228  23%
# ℹ 684 more rows
```

```
housing_cost_burden_plot <- function(town_to_plot, county_to_plot) {
  housing_cost_burden |>
    filter(location %in% c(town_to_plot, county_to_plot, "Connecticut")) |>
    ggplot(aes(
      x = pct,
      y = location,
      fill = burden_level,
      label = pct_formatted
    )) +
    geom_col() +
    geom_text(position = position_stack(vjust = 0.5)) +
    ...
}
```

```
housing_cost_burden_plot(
  town_to_plot = "Hartford",
  county_to_plot = "Hartford County"
)
```



```r
housing_cost_burden |>
  filter(location == "Hartford")
```

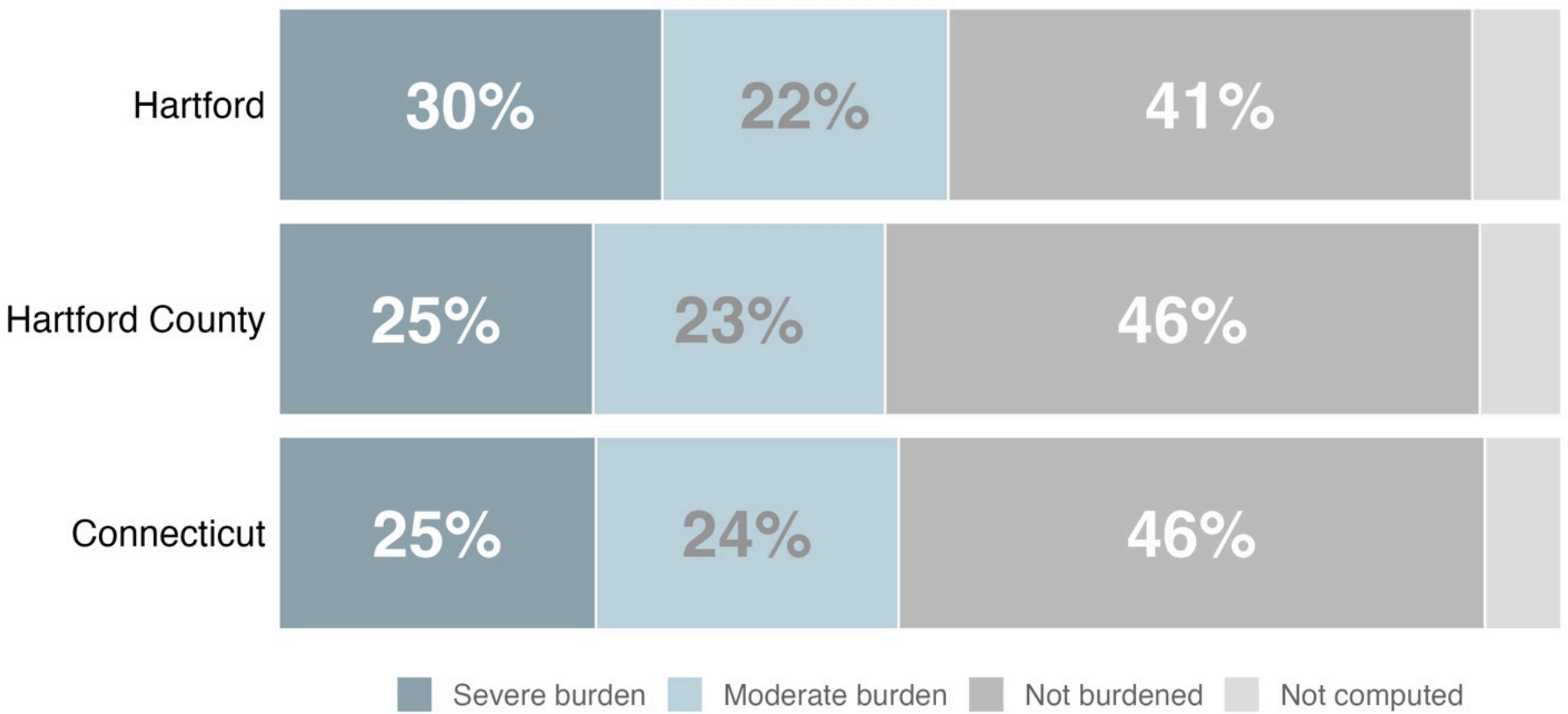
```
# A tibble: 4 × 4
  location burden_level       pct pct_formatted
  <fct>    <fct>            <dbl> <chr>
1 Hartford Not burdened    0.409  41%
2 Hartford Moderate burden 0.223  22%
3 Hartford Severe burden   0.299  30%
4 Hartford Not computed    0.0694 7%
```

```r
housing_cost_burden <-
  housing_cost_burden |>
  mutate(pct_formatted = if_else(pct > 0.07, pct_formatted, NA))
```

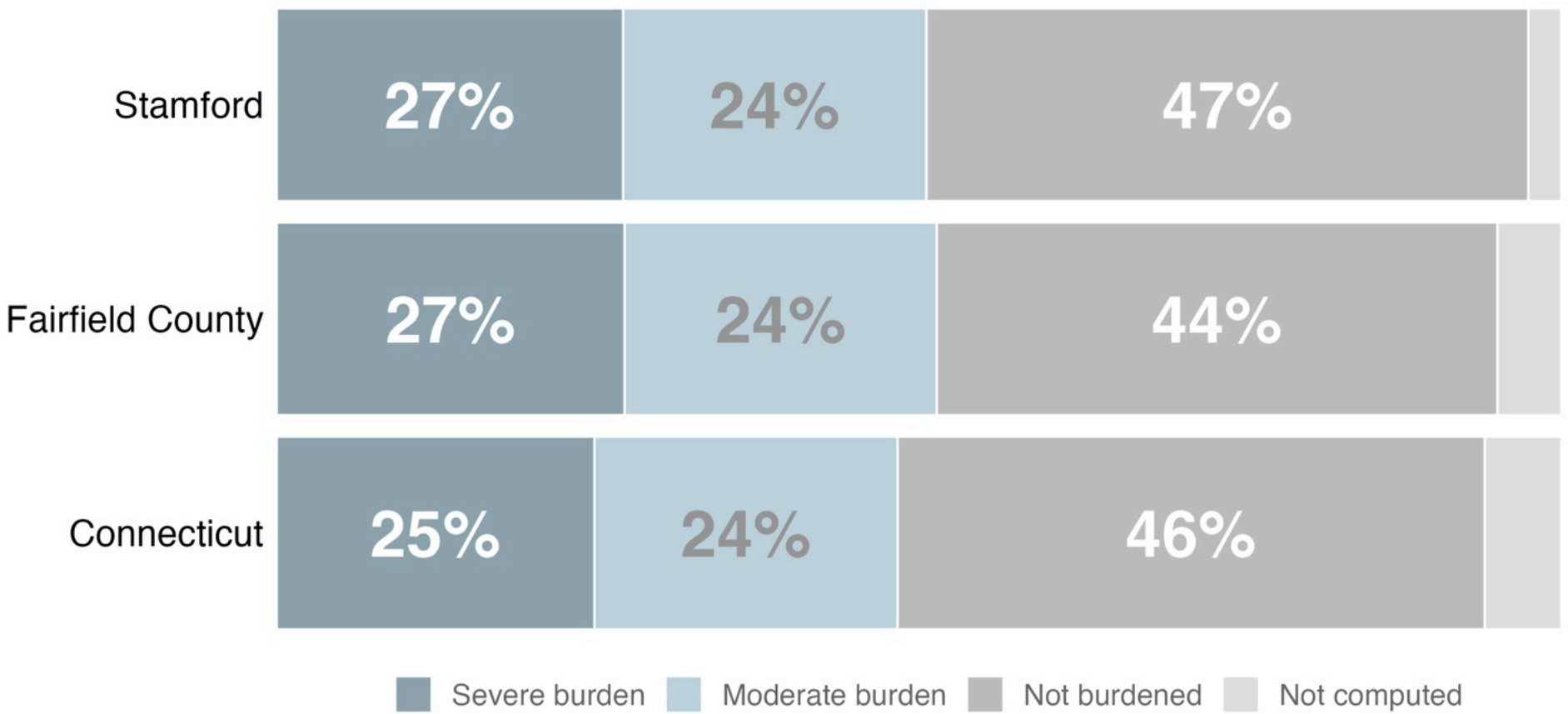
```r
housing_cost_burden |>
  filter(location == "Hartford")
```

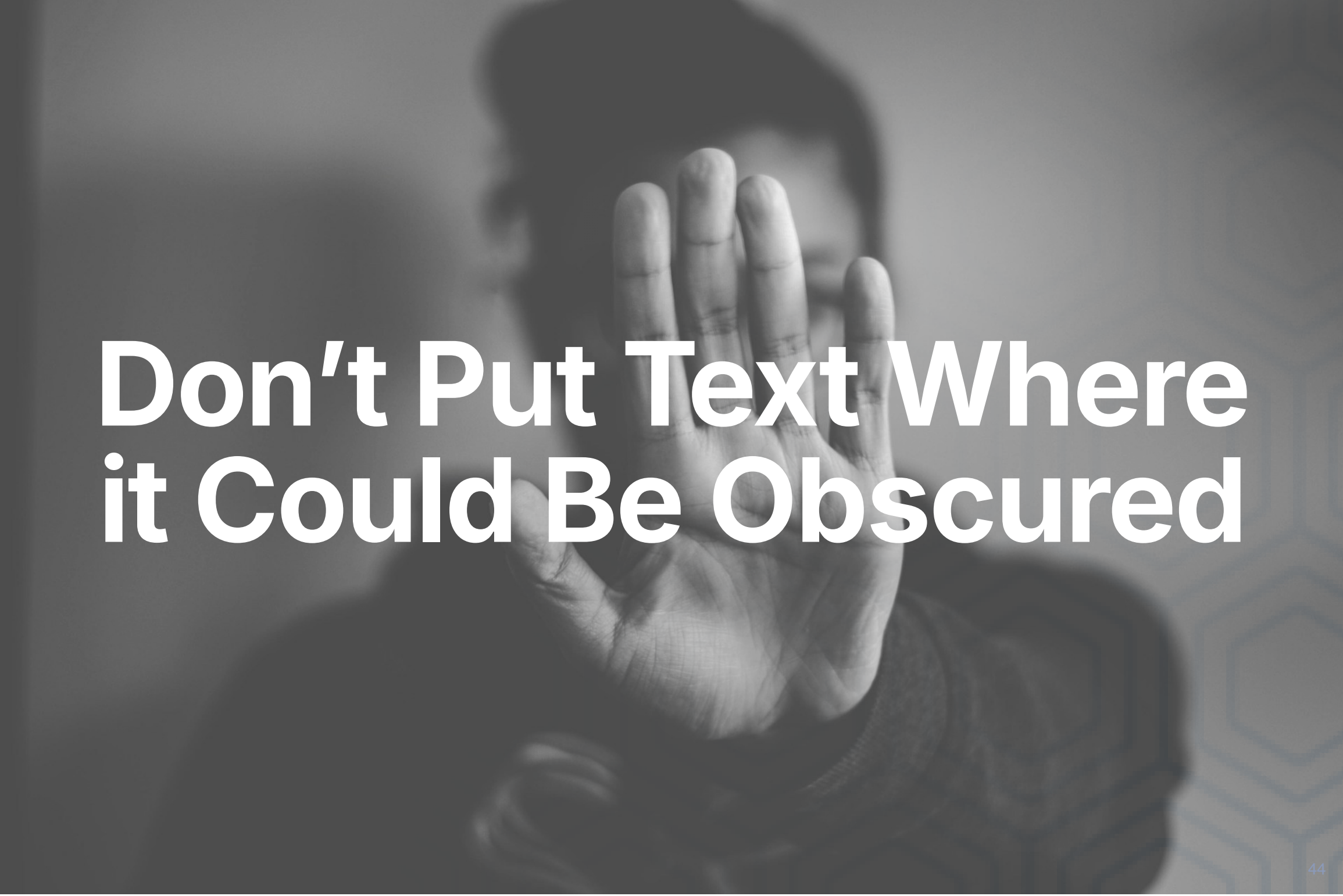
```
# A tibble: 4 × 4
  location burden_level       pct pct_formatted
  <fct>    <fct>            <dbl> <chr>
1 Hartford Not burdened    0.409  41%
2 Hartford Moderate burden 0.223  22%
3 Hartford Severe burden   0.299  30%
4 Hartford Not computed    0.0694 <NA>
```

```
housing_cost_burden_plot(
  town_to_plot = "Hartford",
  county_to_plot = "Hartford County"
)
```

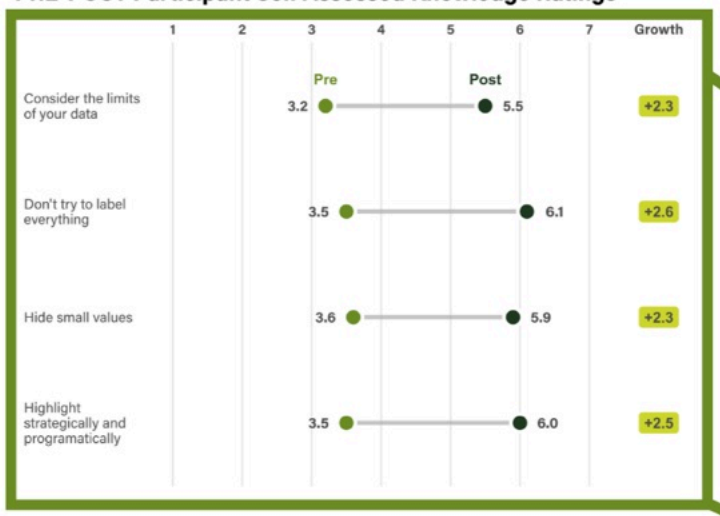


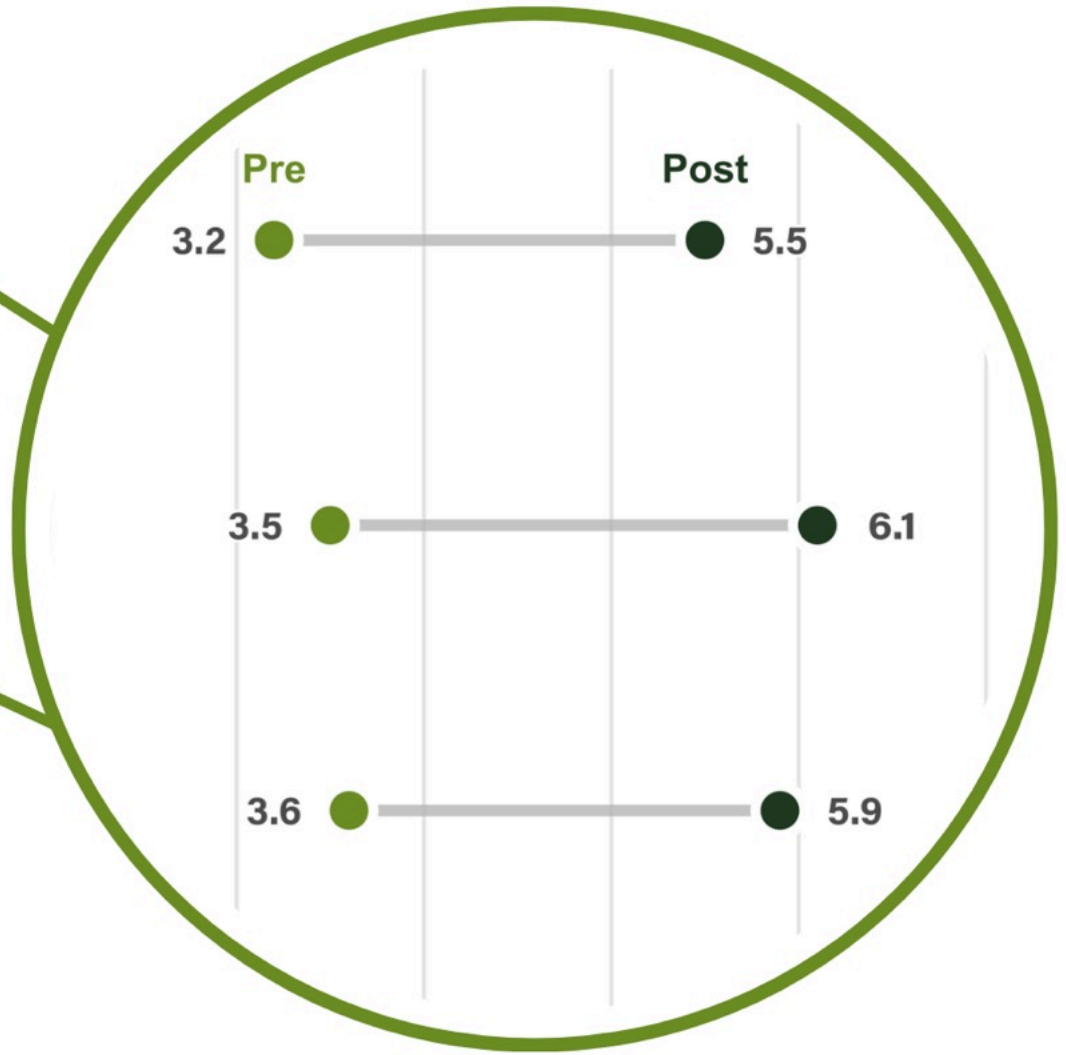
```
housing_cost_burden_plot(
  town_to_plot = "Stamford",
  county_to_plot = "Fairfield County"
)
```




Don’t Put Text Where
it Could Be Obscured

PRE-POST Participant Self Assessed Knowledge Ratings





```
pre_post_data
```

```
# A tibble: 2 × 6
  question   timing rating growth growth_formatted growth_text_position
  <chr>      <chr>   <dbl>  <dbl>            <dbl>                 <dbl>
1 Question 1 Pre       1.6   NA                NA                    NA
2 Question 1 Post      4.2    2.6               2.6                   2.9
```

```
pre_post_plot <- function(df) {
  df |>
    ggplot(aes(
      x = rating,
      y = question,
      fill = timing
    )) +
    geom_line() +
    geom_point(shape = 21) +
    ...
}
```

```r
pre_post_data |>
  pre_post_plot()
```

```r
pre_post_data |>
  pre_post_plot() +
  # Ratings within points
  geom_text(
    aes(label = rating),
    color = "white"
  ) +
  # Pre/post labels
  geom_text(
    aes(
      label = timing,
      color = timing
    )
  ) +
  # Growth label
  geom_text(
    aes(
      x = growth_text_position,
      label = growth_formatted
    )
  )
```

```
1 pre_post_data
```

```
# A tibble: 2 × 6
  question   timing rating growth growth_formatted growth_text_position
  <chr>      <chr>   <dbl>  <dbl>            <dbl>                 <dbl>
1 Question 2 Pre       3.5 NA                NA                    NA
2 Question 2 Post      3.6  0.100             0.100                 3.55
```

```r
pre_post_data <-
  pre_post_data |>
  mutate(rating_text_position = case_when(
    timing == "Pre" ~ rating - 0.2,
    timing == "Post" ~ rating + 0.2
  ))
```

```r
pre_post_data |>
  select(question, timing, rating, rating_text_position)
```

```
# A tibble: 2 × 4
  question   timing rating rating_text_position
  <chr>      <chr>   <dbl>                <dbl>
1 Question 2 Pre       3.5                  3.3
2 Question 2 Post      3.6                  3.8
```

```r
pre_post_data |>
  pre_post_plot() +
  geom_text(
    aes(
      x = rating_text_position,
      label = rating
    )
  ) +
  geom_text(
    aes(
      x = rating_text_position,
      label = timing
    )
  ) +
  ...
```

```
pre_post_data |>
  pre_post_plot() +
  geom_text(
    aes(
      x = rating_text_position,
      label = rating
    )
  ) +
  geom_text(
    aes(
      x = rating_text_position,
      label = timing
    )
  ) +
  ...
```

```
pre_post_data |>
  pre_post_plot() +
  geom_label(
    aes(
      x = 6,
      label = growth_formatted
    )
  ) +
  ...
```

Highlight Strategically and Programatically

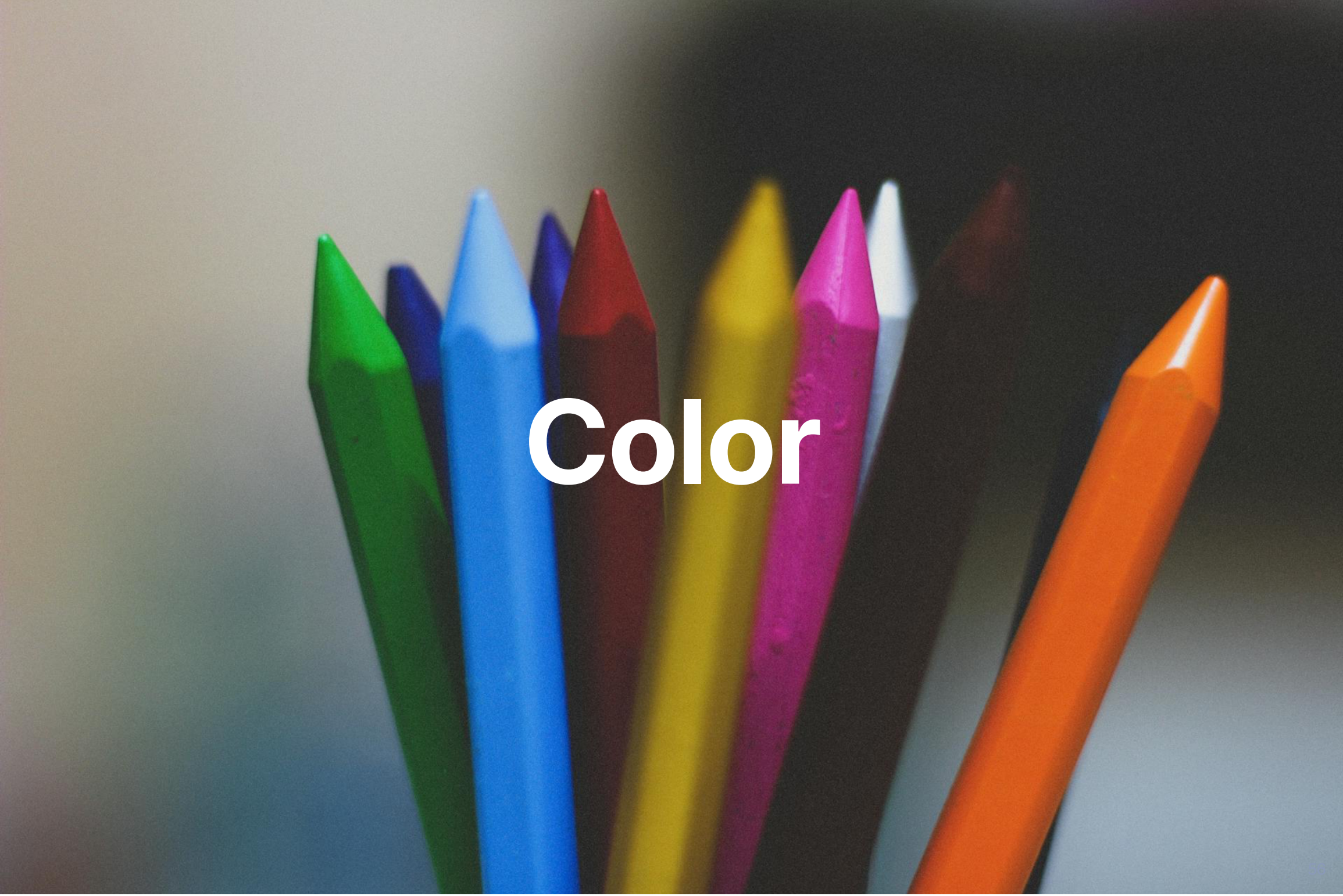
Color

Size

Shadow

Outline

Opacity


Color

HOUSING | 2022 Housing Data Profiles | HARTFORD

SINGLE-FAMILY HOMES AS PERCENT OF ALL HOMES

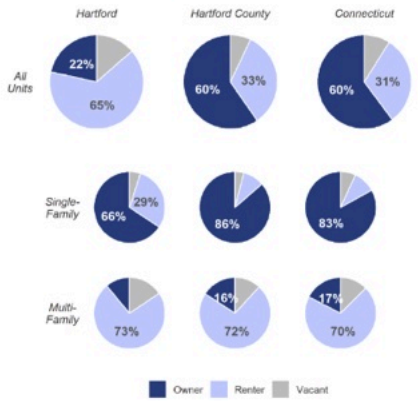
19%

PERCENT OF ALL HOMES OCCUPIED BY OWNERS

22%

Overall, 65% of Connecticut's occupied housing stock is comprised of single-family housing, while 35% is multifamily housing (2+ units in structure). Most single-family homes are occupied by homeowners, while most multifamily units are occupied by renters.

In Hartford, 19% of occupied homes are single-family, and 81% are multi-family. Owners live in 66% of Hartford's 10,626 single-family homes, and renters live in 73% of its 44,561 multifamily homes.

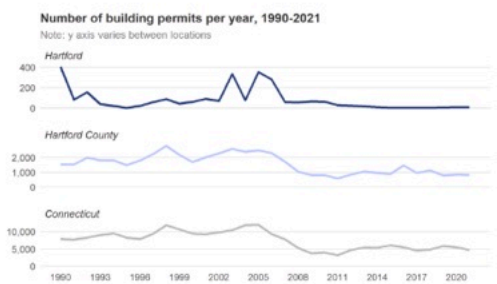


CHANGE IN BUILDING PERMITS, 1990-2021

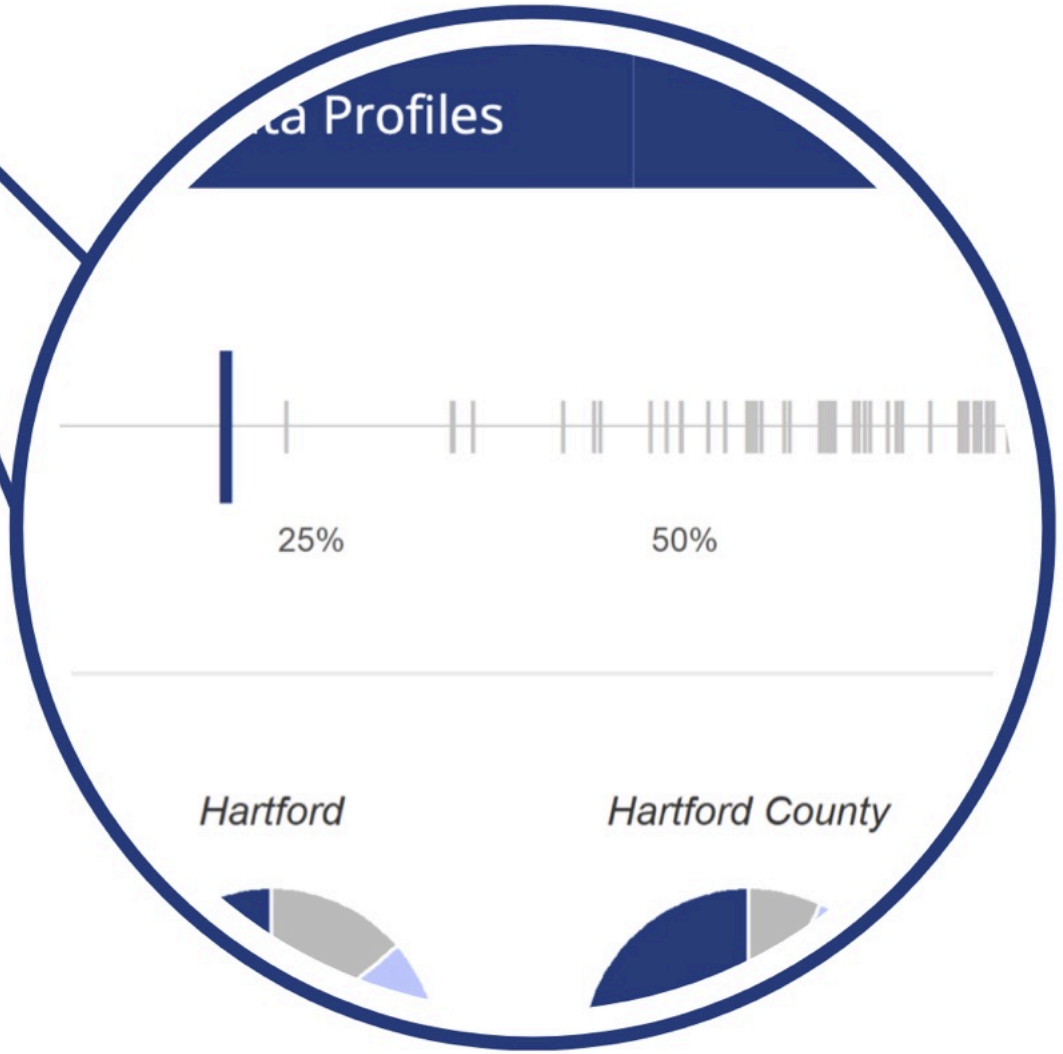
-97%

Growth is slow in the state, which has seen a 41% decrease in building permits between 1990 and 2021.

In Hartford, there were 405 building permits issued in 1990, compared to 11 issued in 2021, representing a 97% decrease.



Source: Connecticut Department of Economic and Community Development



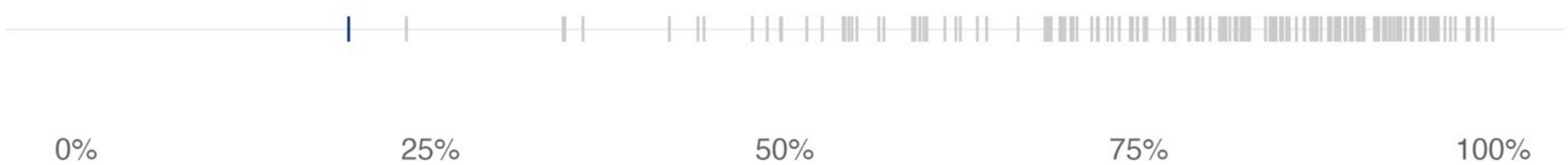
```
single_family_homes
```

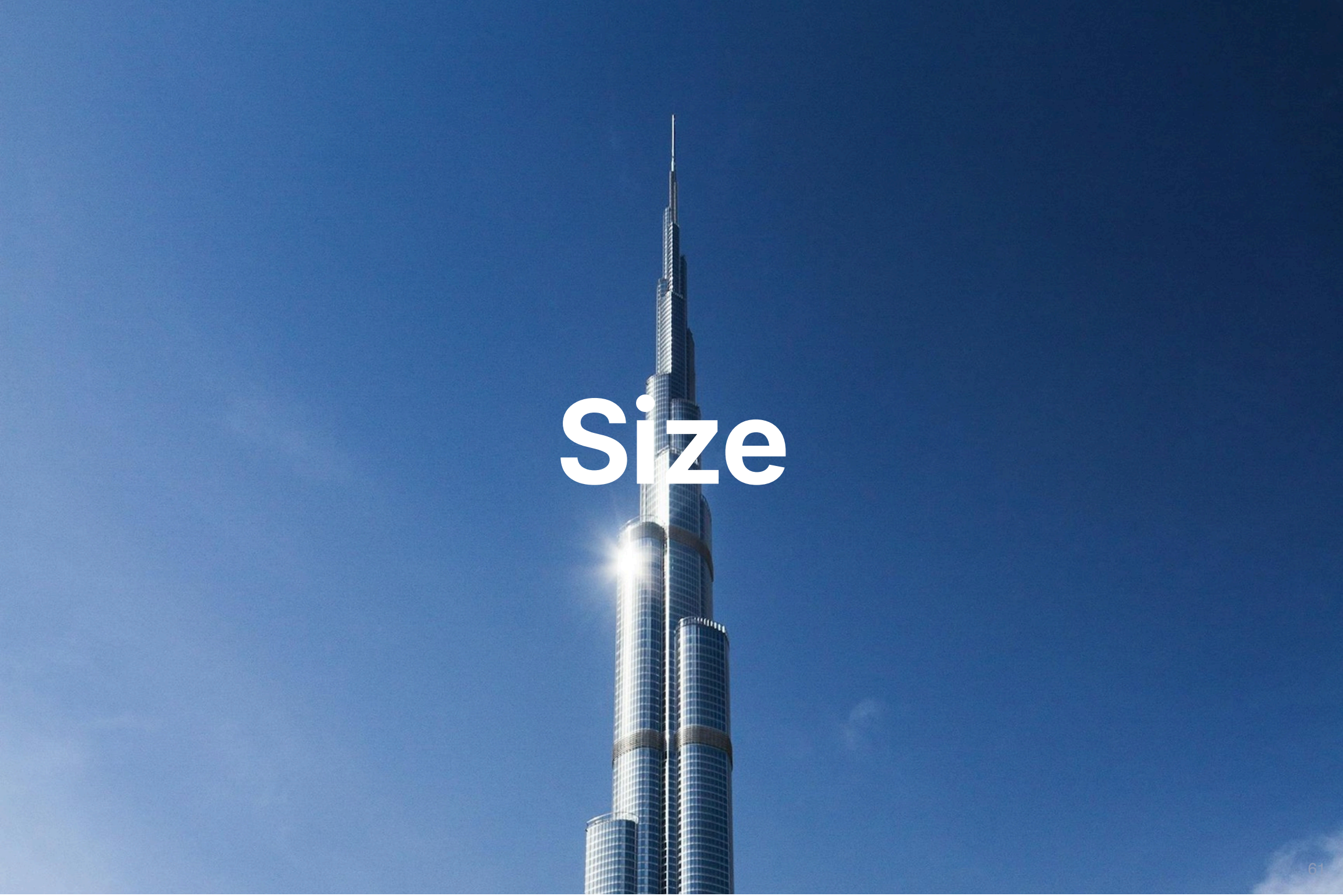
```
# A tibble: 169 × 2
   location       pct
   <fct>        <dbl>
 1 Andover      0.897
 2 Ansonia      0.548
 3 Ashford      0.850
 4 Avon         0.844
 5 Barkhamsted  0.956
 6 Beacon Falls 0.717
 7 Berlin       0.807
 8 Bethany      0.958
 9 Bethel       0.746
10 Bethlehem    0.944
# ℹ 159 more rows
```

```
single_family_homes_plot <- function() {
  single_family_homes |>
    ggplot(
      aes(
        x = pct,
        y = 1
      )
    ) +
    geom_point(
      shape = 124,
      color = "grey80"
    ) +
    ...
}
```

```
1 single_family_homes_plot()
```

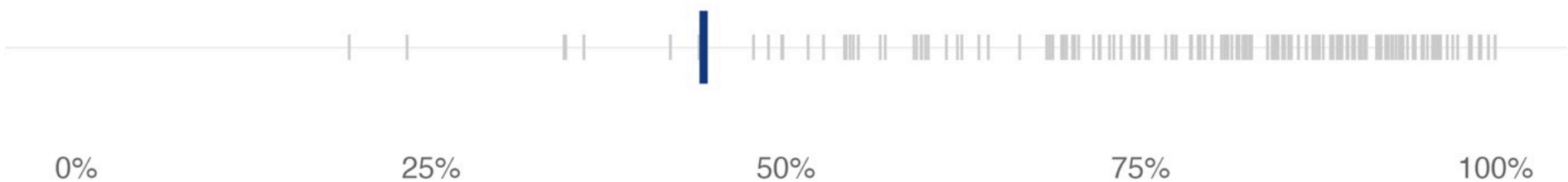
```
single_family_homes_plot() +
  geom_point(
    data = single_family_homes |> filter(location == "Hartford"),
    shape = 124,
    color = "#15397f"
  )
```




Size

```
single_family_homes_plot() +
  geom_point(
    data = single_family_homes |> filter(location == "Hartford"),
    shape = 124,
    color = "#15397f",
    size = 15
  )
```

```
single_family_homes_plot() +
  geom_point(
    data = single_family_homes |> filter(location == "Stamford"),
    shape = 124,
    color = "#15397f",
    size = 15
  )
```



Shadow

AFGHANISTAN

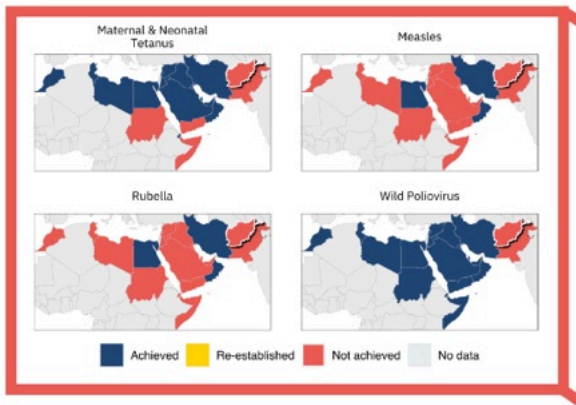
Impact Goals

IA2030

1.2 Control, Eliminate & Eradicate Vaccine-Preventable Disease

In 2022, measles elimination was **achieved** in 4 countries in the WHO region, while it was **re-established** in 0 countries and **not achieved** in 17 countries.

The presentation of maps is not an expression of the opinion of Immunization Agenda 2030 regarding the legal status of countries/ territories, their governing authorities, or their official borders.

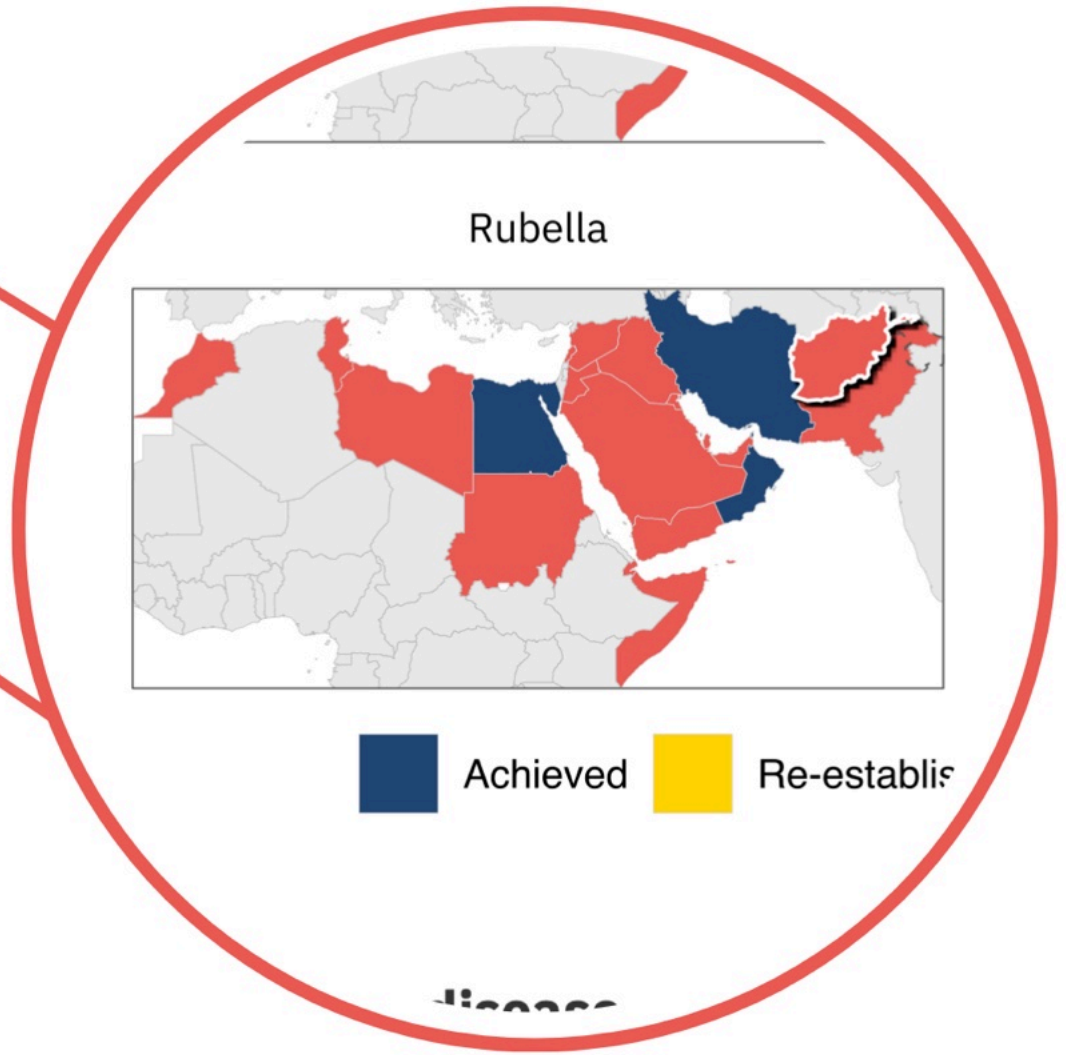


Achievement of vaccine preventable disease control, elimination, and eradication targets in Afghanistan:

	Baseline	2021	2022
Measles	X	X	X
Rubella	X	X	X
Wild Poliovirus	X	X	X
Maternal & Neonatal Tetanus	X	X	X

✓ : Achieved X : Not achieved X : Re-established : No data

Data source: Verification, certification, and disease-specific committee reports. Targets for vaccine-preventable disease are elimination of measles transmission, elimination of rubella transmission, eradication of wildtype poliovirus, and elimination as a public health problem for maternal and neonatal tetanus. The baseline year is 2020.

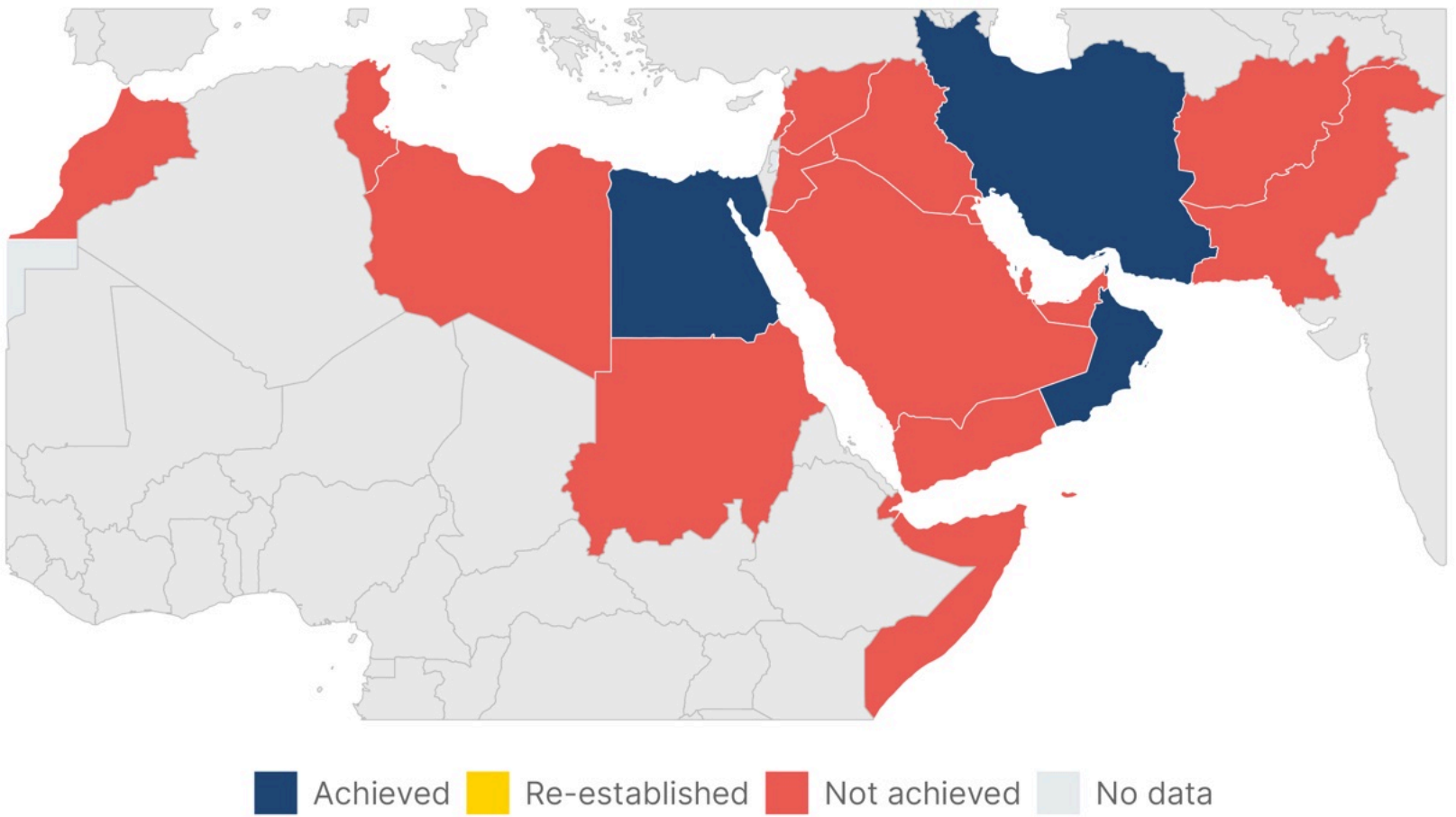


```
rubella
```

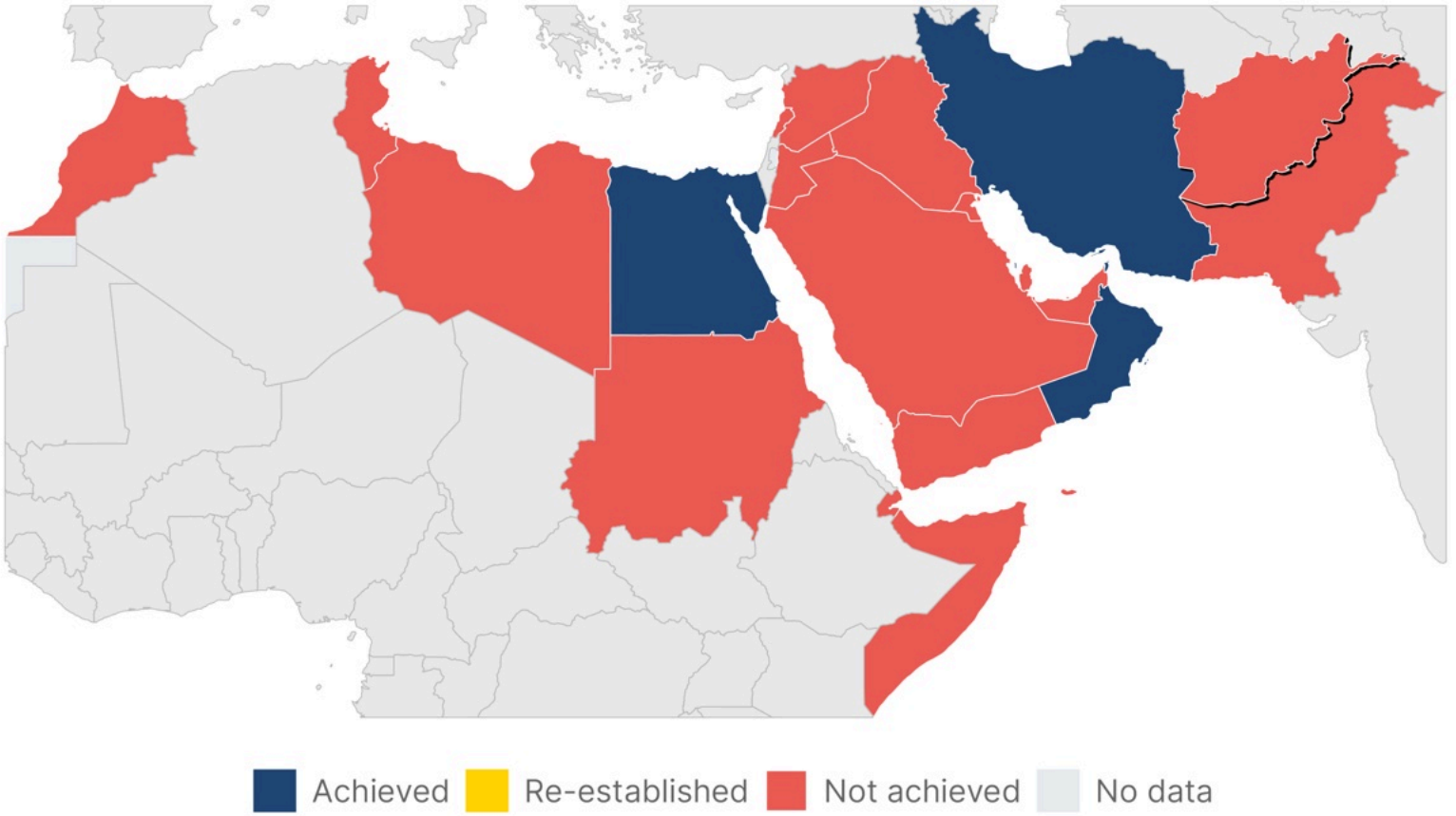
```
Simple feature collection with 69 features and 3 fields
Geometry type: MULTIPOLYGON
Dimension:     XY
Bounding box:  xmin: -1466635 ymin: -185219 xmax: 8649202 ymax: 4806756
Projected CRS: WGS 84 / World Mercator
First 10 features:
                   country region       status                          geometry
1              Afghanistan      1 Not achieved MULTIPOLYGON (((8328599 444...
2      United Arab Emirates      1 Not achieved MULTIPOLYGON (((6004988 275...
3                    Benin      0 Not achieved MULTIPOLYGON (((392437.9 12...
4             Burkina Faso      0 Not achieved MULTIPOLYGON (((21538.26 16...
5                  Bahrain      1     Achieved MULTIPOLYGON (((5634224 299...
6  Central African Republic      0 Not achieved MULTIPOLYGON (((2701448 953...
7                    China      0 Not achieved MULTIPOLYGON (((8649200 420...
8                 Cameroon      0 Not achieved MULTIPOLYGON (((1719405 819...
9                 Djibouti      1 Not achieved MULTIPOLYGON (((4780514 122...
10                 Algeria      0 Not achieved MULTIPOLYGON (((961591.4 43...
```

```r
region_map <- function() {
  ggplot() +
    geom_sf(
      data = rubella |> filter(region == 1),
      aes(fill = status)
    ) +
    geom_sf(
      data = rubella |> filter(region == 0),
      fill = "lightgrey",
      alpha = 0.5
    ) +
    ...
}
```

```
1 region_map()
```

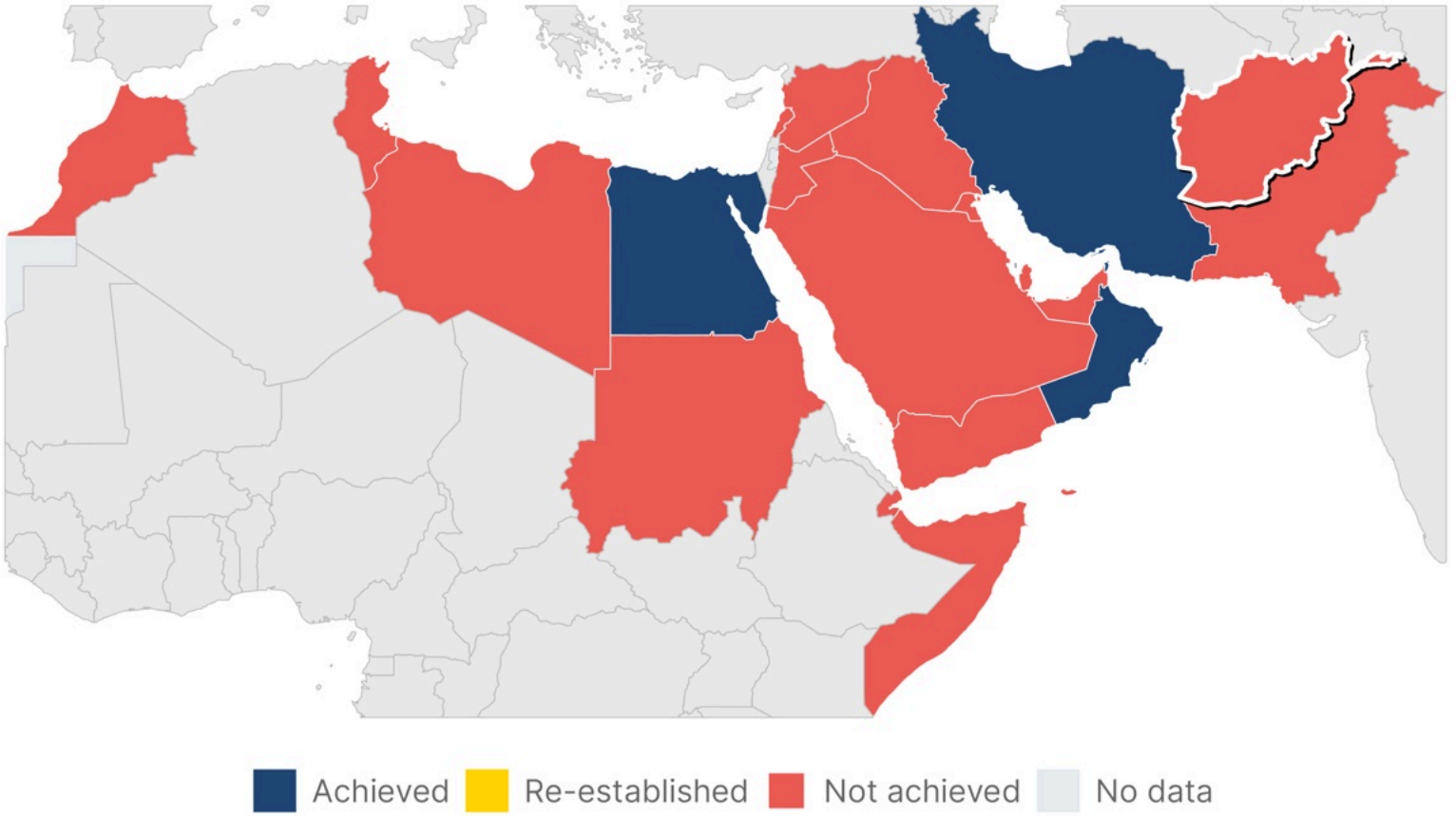


```
library(ggfx)

region_map() +
  with_shadow(
    geom_sf(
      data = rubella |> filter(country == "Afghanistan")
    ),
    ...
  )
```


Achieved
Re-established
Not achieved
No data

Outline

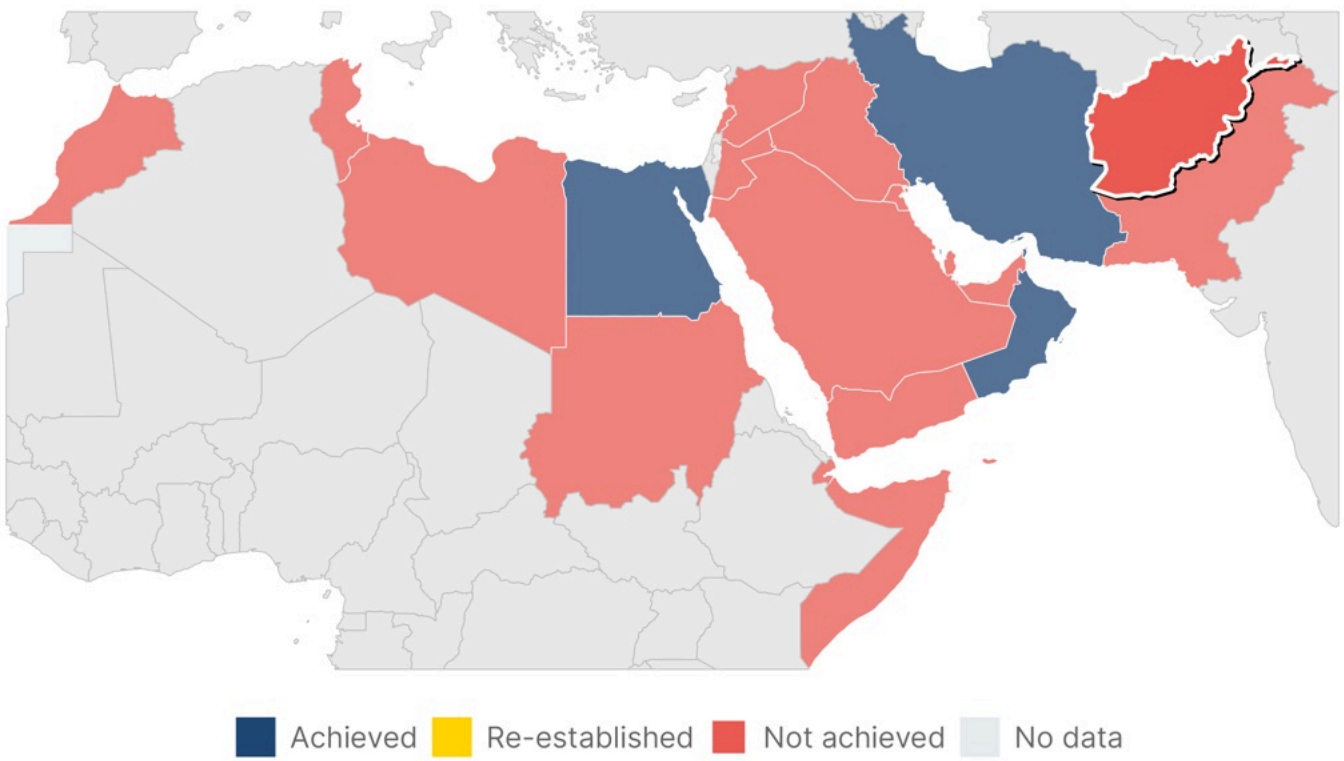
```
region_map() +
  with_shadow(
    geom_sf(
      data = rubella |> filter(country == "Afghanistan")
    ),
    linewidth = 0.8,
    color = "white",
    ...
  )
```


Achieved
Re-established
Not achieved
No data

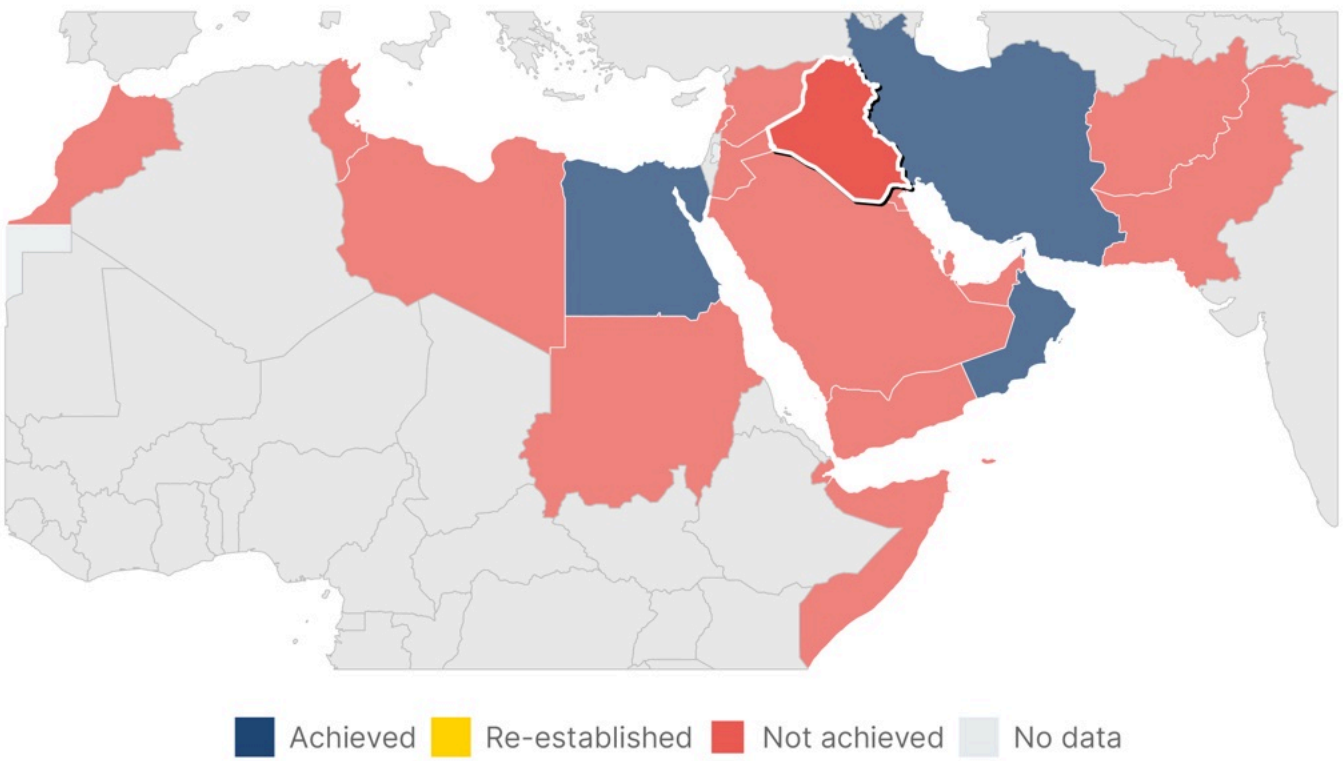
Opacity

```r
region_map <- function() {
  ggplot() +
    geom_sf(
      data = rubella |> filter(region == 1),
      aes(fill = status),
      alpha = 0.75
    ) +
    geom_sf(
      data = rubella |> filter(region == 0),
      fill = "lightgrey",
      alpha = 0.5
    ) +
    ...
}
```

```
region_map() +
  with_shadow(
    geom_sf(
      data = rubella |> filter(country == "Afghanistan")
    ),
    linewidth = 0.8,
    color = "white",
    ...
  )
```



```
region_map() +
  with_shadow(
    geom_sf(
      data = rubella |> filter(country == "Iraq")
    ),
    linewidth = 0.8,
    color = "white",
    ...
  )
```



Conclusion

1. Consider the outer limits of your data
2. Minimize text and position it carefully
3. Highlight strategically and programatically with a range of aesthetic properties
4. Packages are helpers, but you are the one who has to do the thinking