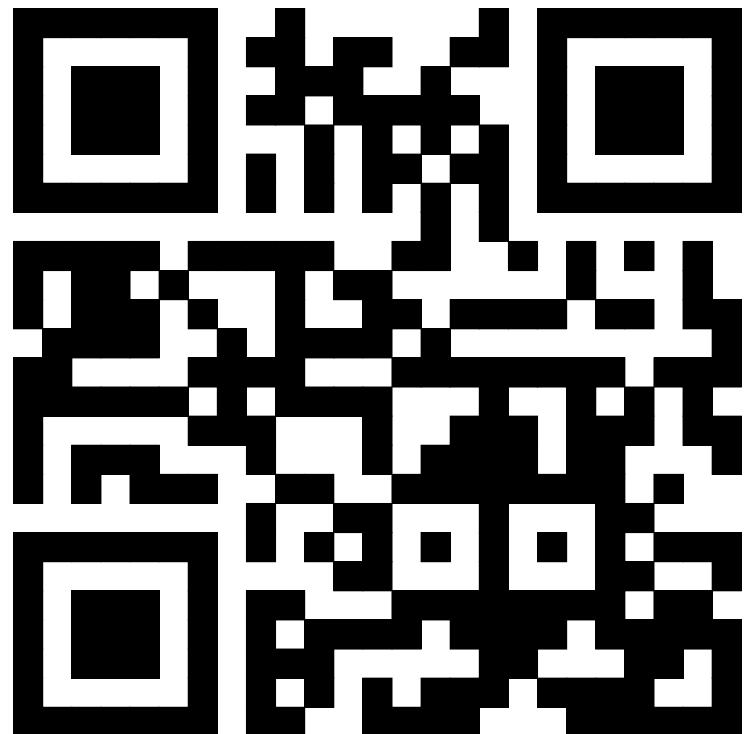


How to Make a Thousand Plots Look Good: Data Viz Tips for Parameterized Reporting

Follow Along!



<https://rfor.us/cascadia2024>

BAKER COUNTY

Total population
16,539

Rural population
41%

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

18

Total land area
3,088 mi²



Public land
52% Developed/cultivated land
8%



★ County seat ○ Largest community

FEDERALLY RECOGNIZED TRIBES

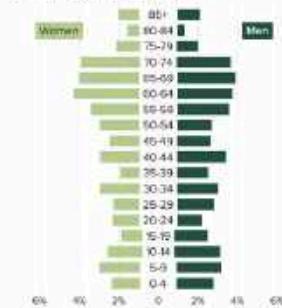


MEDIAN HOUSEHOLD INCOME



LIFE EXPECTANCY **80** years **75** years

POPULATION BY AGE



16 Oregon by the Numbers

MULTNOMAH COUNTY

Total population
810,011

Rural population
1%

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

5

Total land area
465 mi²

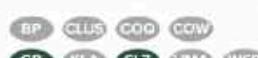


Public land
37% Developed/cultivated land
42%



★ County seat ○ Largest community

FEDERALLY RECOGNIZED TRIBES

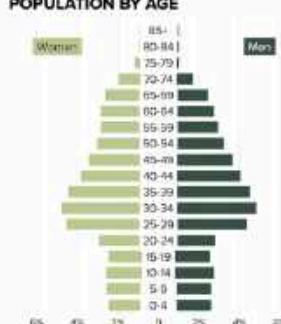


MEDIAN HOUSEHOLD INCOME



LIFE EXPECTANCY **82** years **76** years

POPULATION BY AGE



66 Oregon by the Numbers

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.

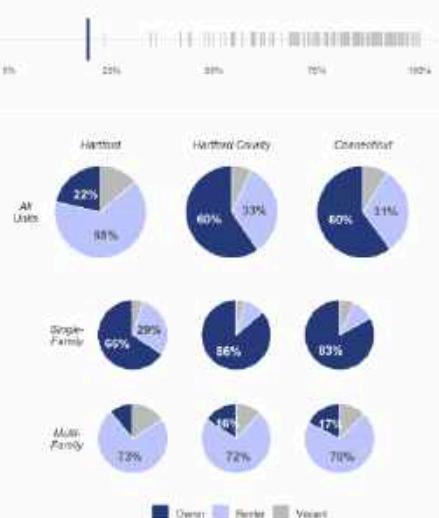
In Hartford, 19% of occupied homes are single-family, and 81% are multifamily. Owners live in 66% of Hartford's 10,626 single-family homes, and renters live in 73% of its 44,561 multifamily homes.

CHANGE IN BUILDING PERMITS, 1990-2021

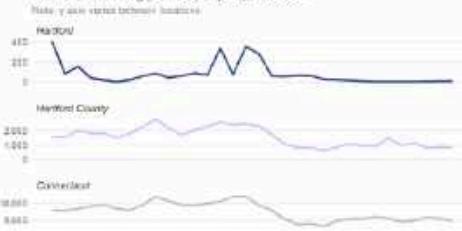
-97%

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.



Number of building permits per year, 1990-2021



Source: Connecticut Department of Economic and Community Development

HOUSING

2022 Housing Data Profiles

ANDOVER

SINGLE-FAMILY HOMES AS PERCENT OF ALL HOMES

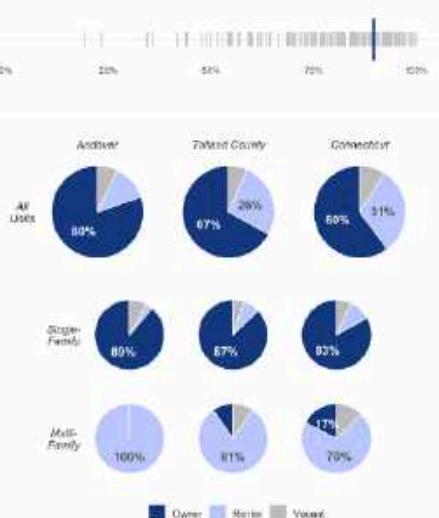
90%

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 multifamily. Owners live in 89% of Andover's 1,161 single-family homes, and renters live in 10% of its 126 multifamily homes.

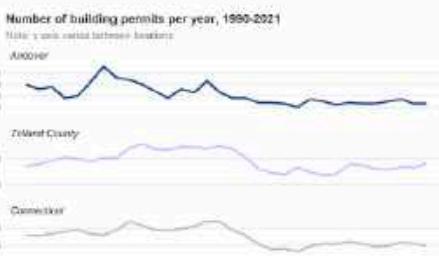


CHANGE IN BUILDING PERMITS, 1990-2021

-85%

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

In Andover, there were 29 building permits issued in 1990, compared to 3 issued in 2021, representing a 85% decrease.



Source: Connecticut Department of Economic and Community Development



AFGHANISTAN

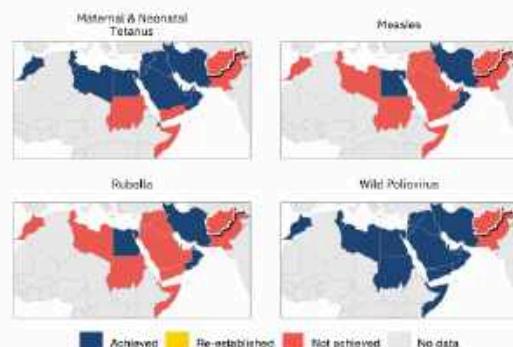
Impact Goals



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:

CONGO (DEM. REP.)

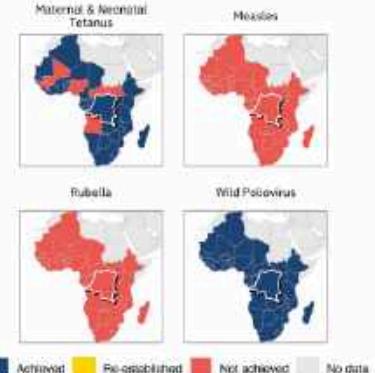
Impact Goals



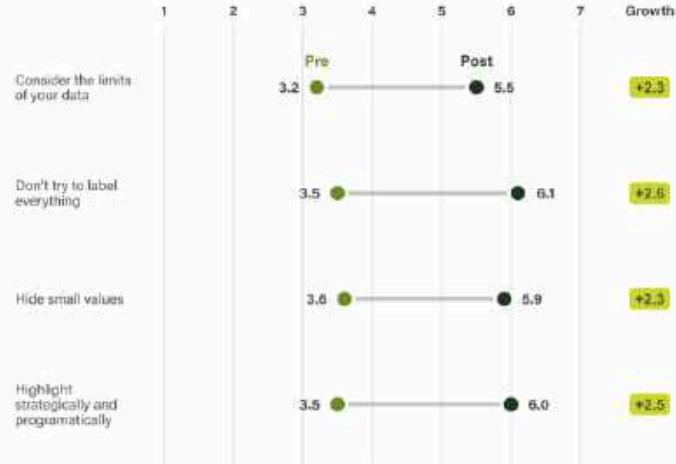
1.2 Control, Eliminate & Eradicate Vaccine-Preventable Disease

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

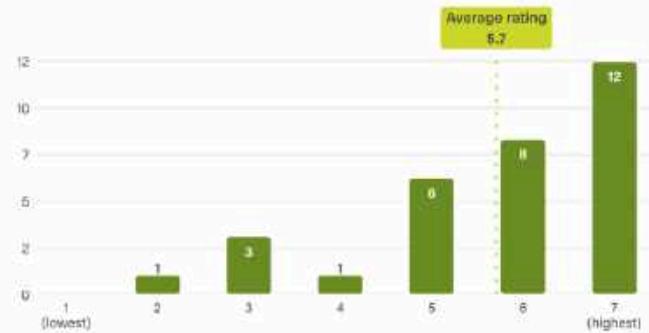
The presentation of maps is not an expression of the opinion of Immunization Agenda 2030 regarding the legal status of countries/territories, their governing authorities, or their official borders.



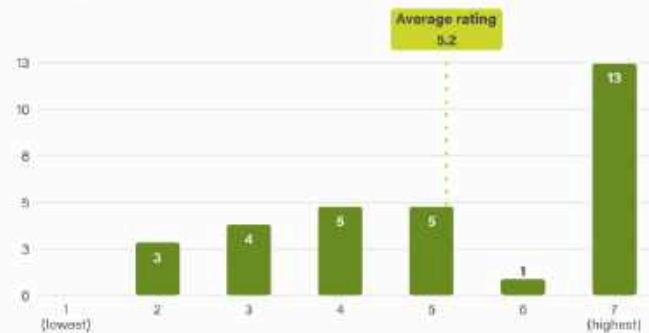
Achievement of vaccine preventable disease control, elimination, and eradication targets in Democratic Republic of Congo:

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?

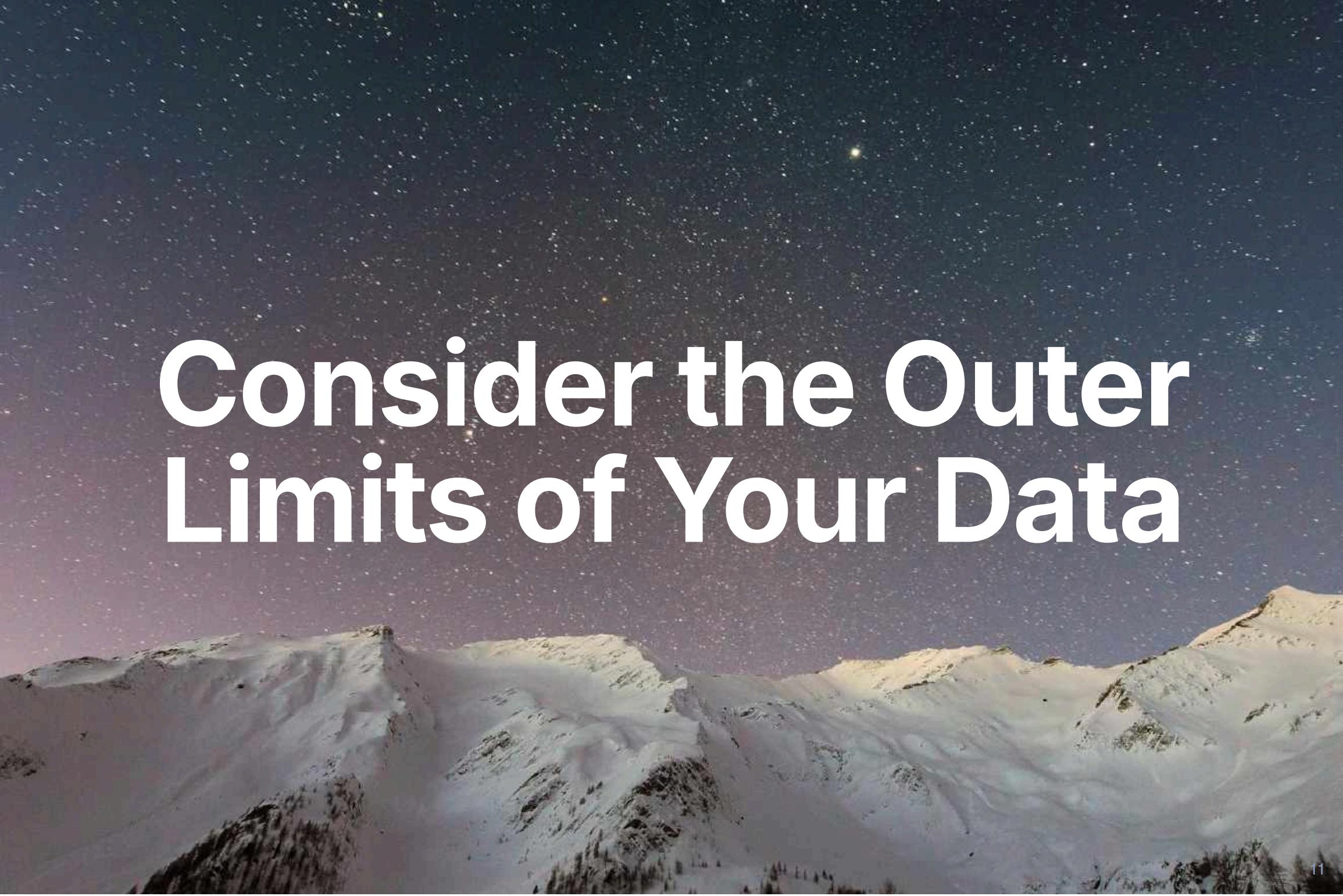


Data Viz Tips for Parameterized Reporting



A dark blue book with a textured cover is tied with a bright teal ribbon in a knot. The book is resting on a dark brown, horizontally-grained wooden surface. The lighting creates a warm glow on the wood grain.

There is No Magic Package

The background of the slide features a dark, star-filled night sky. In the foreground, there are several snow-capped mountain peaks, their white slopes contrasting with the dark sky. The overall atmosphere is one of looking up at the vastness of the universe.

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

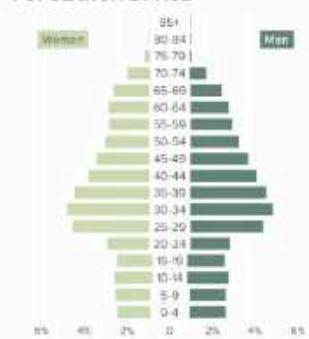


MEDIAN HOUSEHOLD INCOME



LIFE EXPECTANCY 82 years 76 years

POPULATION BY AGE



Public land
37% Developed/cultivated land
42%



★ County seat
○ Largest community

HOUSEHOLDS IN FINANCIAL HARSHSHIP



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%

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



```
1 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
```

```
1 race_ethnicity_bar_chart <- function(county_to_plot) {
2   race_ethnicity |>
3     filter(county == county_to_plot) |>
4     ggplot(
5       aes(
6         x = pct,
7         y = population
8       )
9     ) +
10    geom_col(fill = "#004f39") +
11    ...
12 }
```

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

Multnomah



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

Multnomah



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

Baker



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

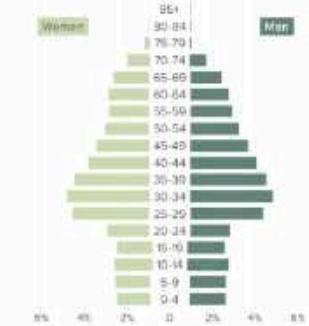


MEDIAN HOUSEHOLD INCOME



LIFE EXPECTANCY 82 years 76 years

POPULATION BY AGE



Public land
37% Developed/cultivated land
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★ County seat
○ Largest community

HOUSEHOLDS IN FINANCIAL HARSHSHIP



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Some other race: 0.4%
Two or more races: 5.5%
White: 68.1%

TOP EMPLOYMENT INDUSTRIES



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

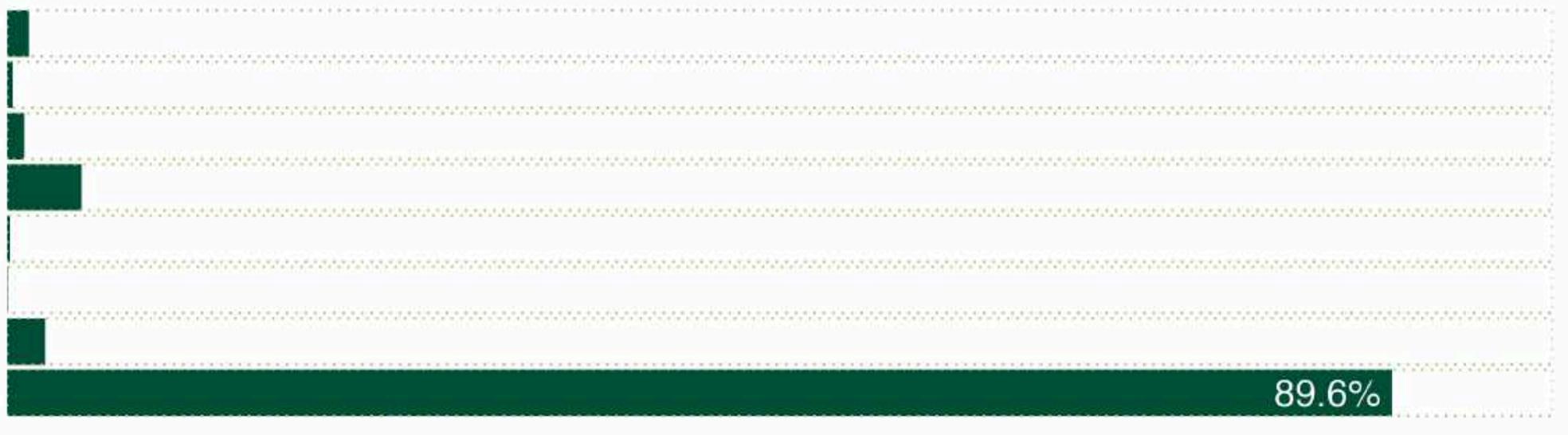


```
1 race_ethnicity_bar_chart(county_to_plot = "Multnomah") +
2   geom_col(
3     aes(
4       x = 1
5     ) ,
6     fill = "transparent",
7     color = "#A9C27F",
8     linetype = "dotted"
9   )
```

Multnomah



Baker



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

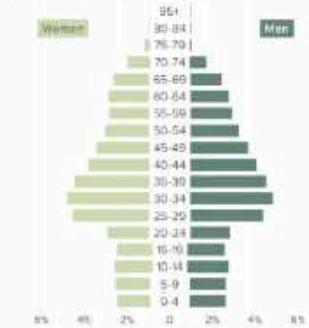


MEDIAN HOUSEHOLD INCOME



LIFE EXPECTANCY **82** years **76** years

POPULATION BY AGE



Public land
37% Developed/cultivated land
42%



HOUSEHOLDS IN FINANCIAL HARSHSHIP



POPULATION BY RACE/ETHNICITY



TOP EMPLOYMENT INDUSTRIES



KLA SLZ UMA WSP

MEDIAN HOUSEHOLD INCOME



Multnomah **\$76,290**

Oregon **\$70,084**

LIFE EXPECTANCY

82 years **76** years

POPULATION BY AGE

82 years **76** years

```
1 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
```

```
1 median_income_plot <- function(county_to_plot) {
2   median_income |>
3     filter(geography %in% c(county_to_plot, "Oregon")) |>
4     ggplot(
5       aes(
6         x = amount,
7         y = geography,
8         label = amount_formatted,
9         fill = geography
10        )
11      ) +
12      geom_col() +
13      ...
14 }
```

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

Jackson

\$67,690

Oregon

\$76,632

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

```
1 max_median_income <-
2   median_income |>
3     slice_max(
4       order_by = amount,
5       n = 1
6     ) |>
7     pull(amount)
```

```
1 max_median_income
```

```
[1] 100121
```

```
1 median_income_plot(county_to_plot = "Jackson") +  
2   scale_x_continuous(  
3     limits = c(0, max_median_income)  
4   )
```

Jackson

\$67,690

Oregon

\$76,632

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

A close-up photograph of a person's hands writing on a dark, textured surface, likely leather or wood. A hand holds a pen, and the other hand stabilizes the writing hand. The lighting is dramatic, highlighting the hands and the pen against the dark background.

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.



Hartford is more diverse than Connecticut



The largest race/ethnicity group in Hartford is Hispanic/Latino at 45% of the population



MEDIAN AGE

31

POPULATION CHANGE: 2020 TO 2040

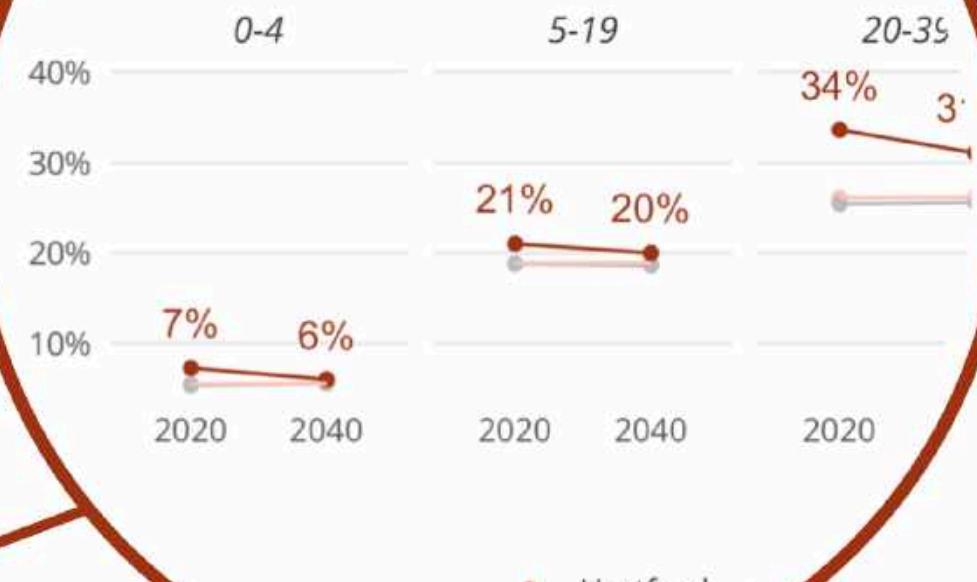
+0.3%

In the next twenty years, Hartford's population is projected to grow from 122,443 to 126,846.

People age 40-64 are projected to grow the most in the next 20 years in Hartford



People age 40-64 are projected to grow the most in the next 20 years in Hartford

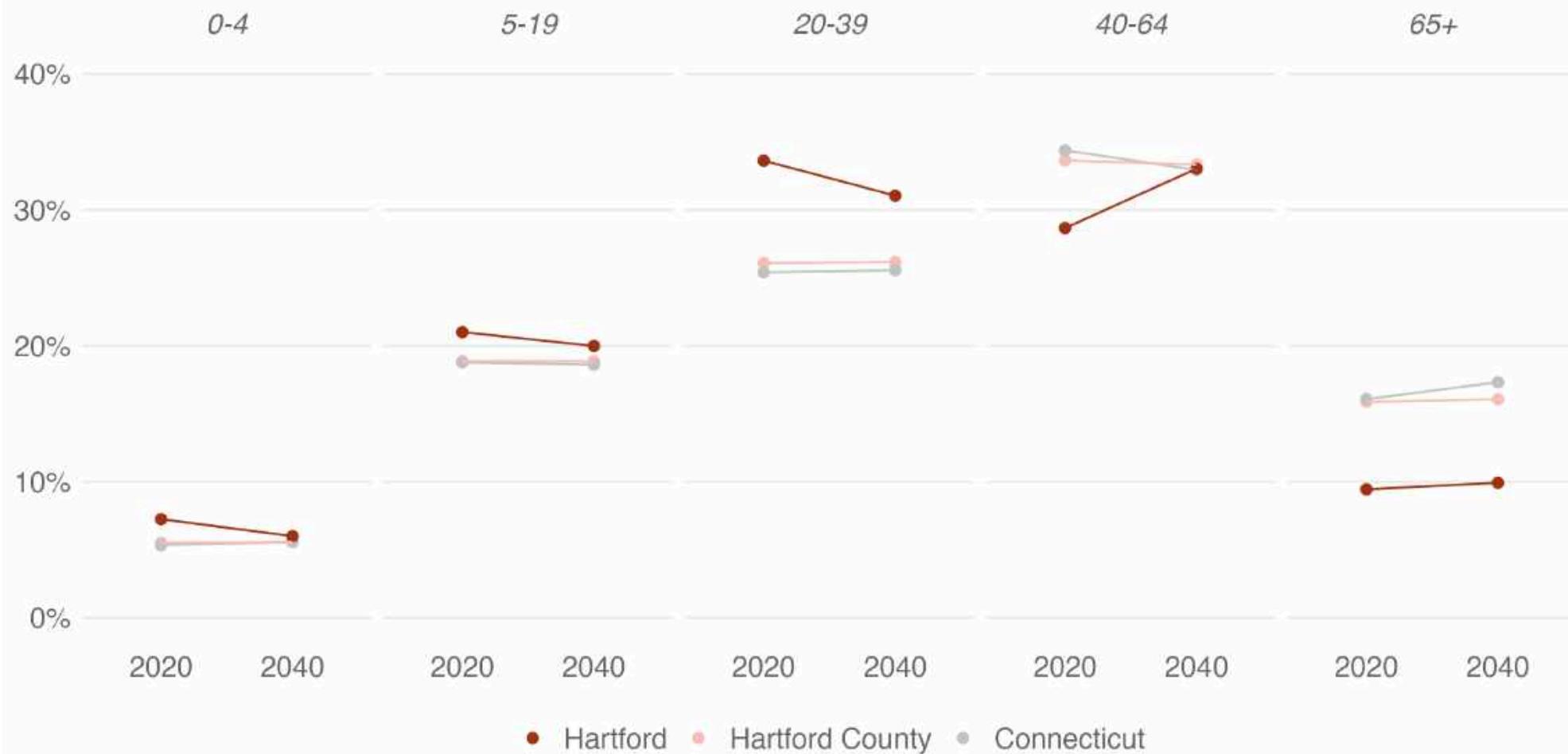


```
1 population_projection |>
2   filter(location == "Hartford")

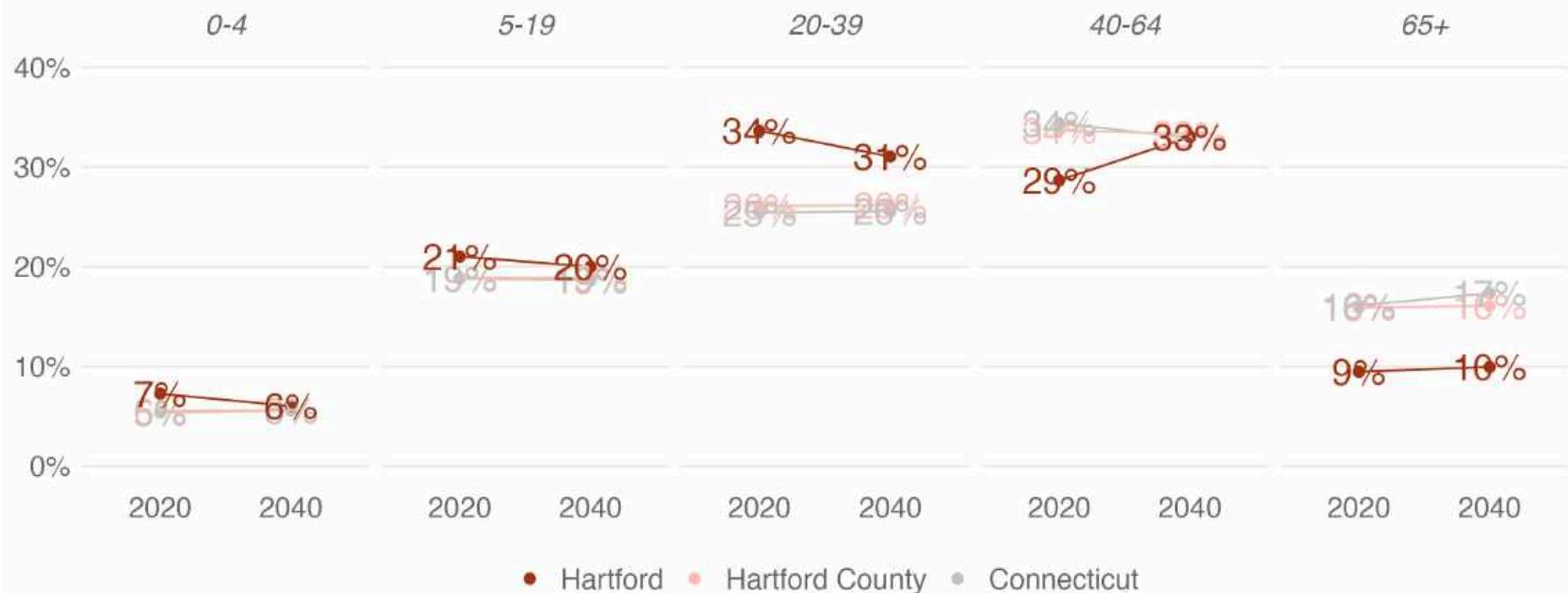
# A tibble: 10 × 5
  location year age_group     pct pct_formatted
  <chr>    <chr> <fct>      <dbl> <chr>
1 Hartford 2020 0-4        0.0725 7%
2 Hartford 2020 5-19       0.210   21%
3 Hartford 2020 20-39      0.336   34%
4 Hartford 2020 40-64      0.287   29%
5 Hartford 2020 65+        0.0945 9%
6 Hartford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

```
1 population_projection_plot <- function(town_to_plot, county_to_plot) {
2   population_projection |>
3     filter(location %in% c(town_to_plot, county_to_plot, "Connecticut")) |>
4     ggplot(aes(
5       x = year,
6       y = pct,
7       color = location,
8       group = location
9     )) +
10    geom_point() +
11    geom_line() +
12    ...
13 }
```

```
1 population_projection_plot(  
2     town_to_plot = "Hartford",  
3     county_to_plot = "Hartford County"  
4 )
```



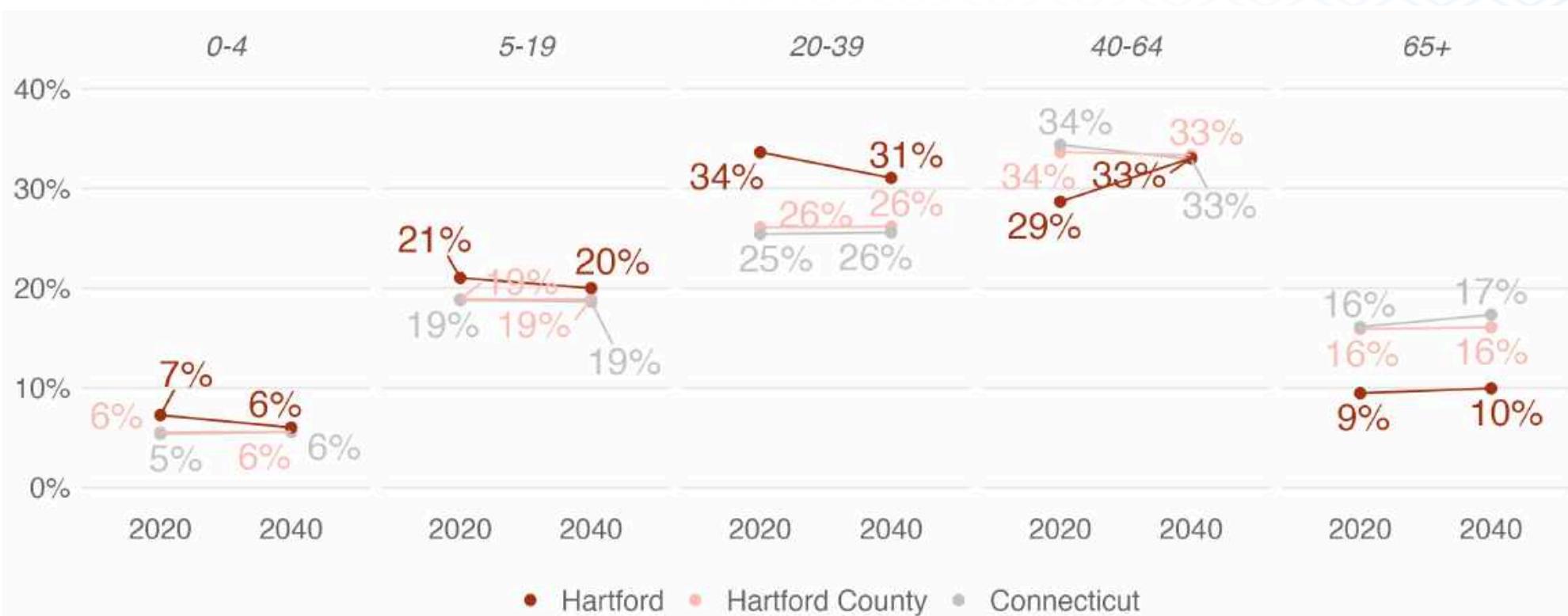
```
1 population_projection_plot(
2   town_to_plot = "Hartford",
3   county_to_plot = "Hartford County"
4 ) +
5   geom_text(
6     aes(
7       label = pct_formatted
8     )
9   )
```



```

1 library(ggrepel)
2
3 population_projection_plot(
4   town_to_plot = "Hartford",
5   county_to_plot = "Hartford County"
6 ) +
7   geom_text_repel(
8     aes(
9       label = pct_formatted
10      )
11    )

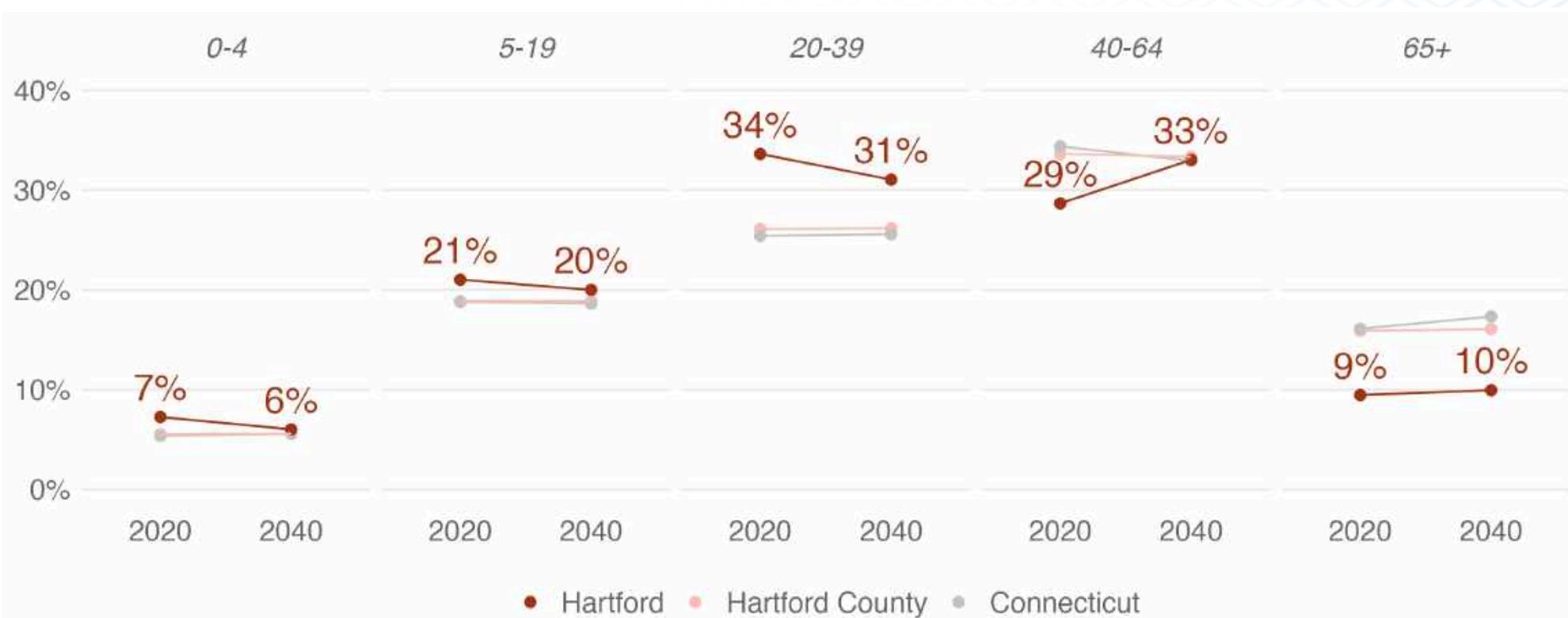
```



```

1 population_projection_plot(
2   town_to_plot = "Hartford",
3   county_to_plot = "Hartford County"
4 ) +
5   geom_text(
6     data = population_projection |> filter(location == "Hartford"),
7     nudge_y = 0.03,
8     aes(
9       label = pct_formatted
10      )
11    )

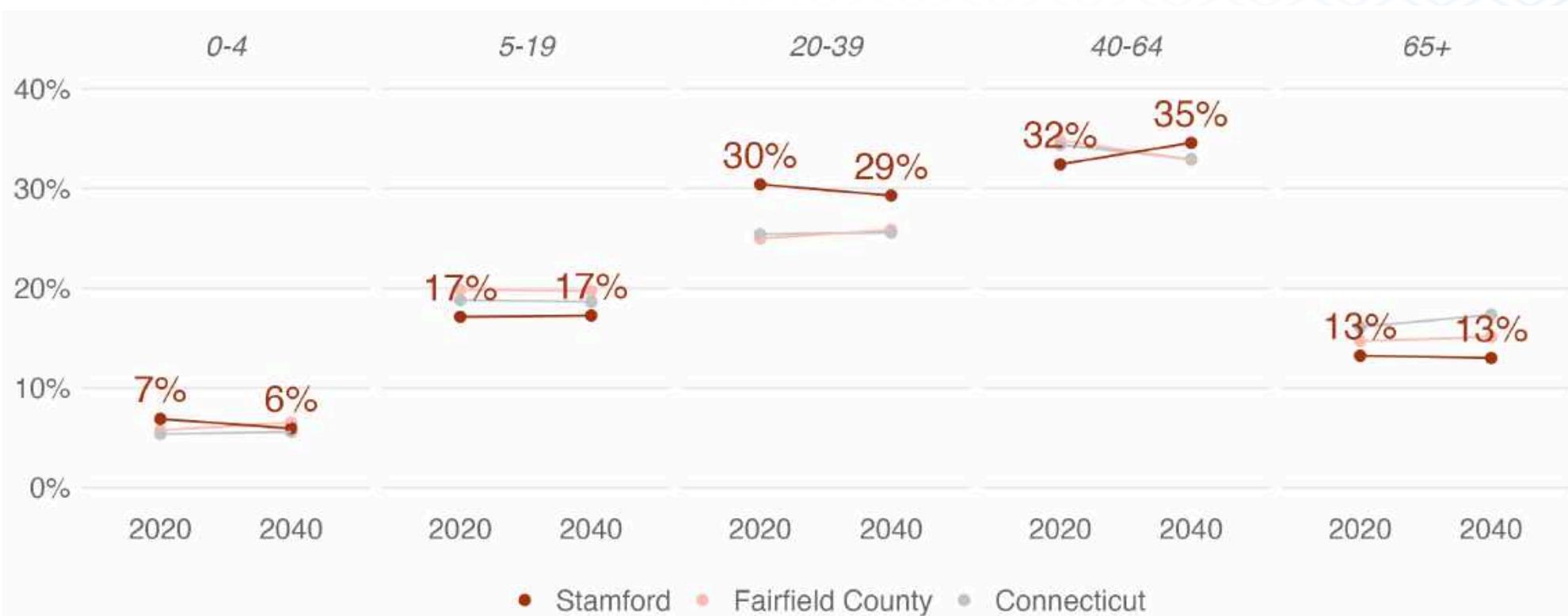
```



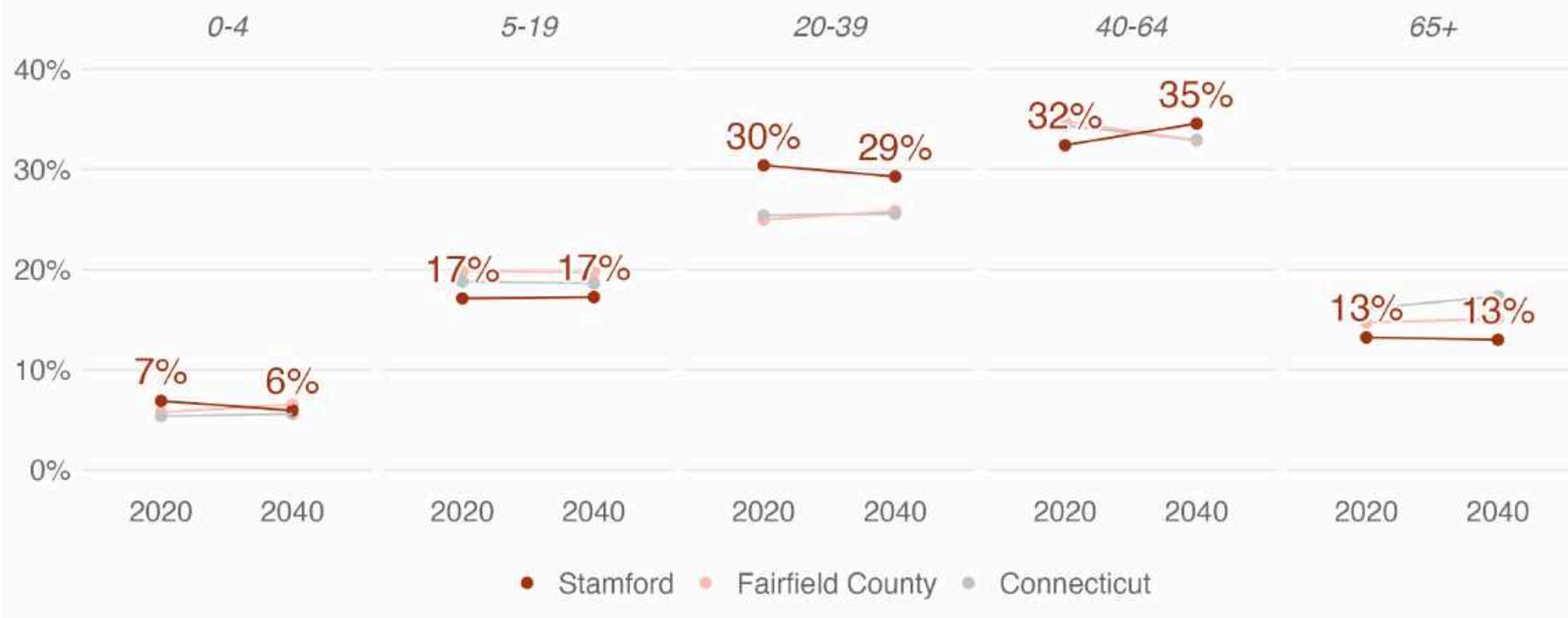
```

1 population_projection_plot(
2   town_to_plot = "Stamford",
3   county_to_plot = "Fairfield County"
4 ) +
5   geom_text(
6     data = population_projection |> filter(location == "Stamford"),
7     nudge_y = 0.03,
8     aes(
9       label = pct_formatted
10      )
11    )

```



```
1 library(shadowtext)
2
3 population_projection_plot(
4   town_to_plot = "Stamford",
5   county_to_plot = "Fairfield County"
6 ) +
7   geom_shadowtext(
8     data = population_projection |> filter(location == "Stamford"),
9     bg.color = "white",
10    nudge_y = 0.03,
11    aes(
12      label = pct_formatted
13    )
14  )
```



1
2
3

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 for renters

	Severely burdened (50% or greater)	Moderately burdened (30% to 49%)	Not burdened (less than 30%)
Hartford	30%	22%	41%
Hartford County	25%	23%	46%
Connecticut	25%	24%	46%

Housing cost burden for owners

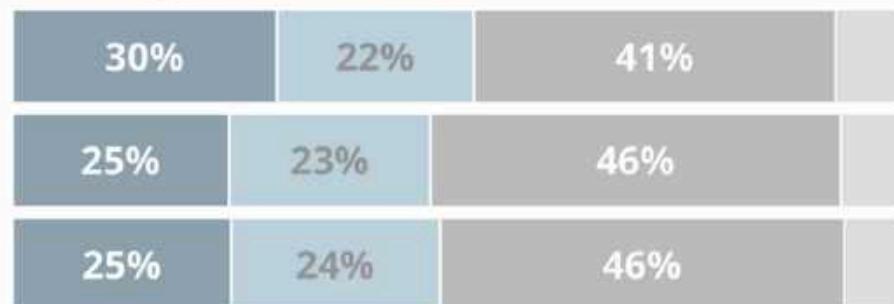
	Severely burdened (50% or greater)	Moderately burdened (30% to 49%)	Not burdened (less than 30%)
Hartford	17%	22%	61%
Hartford County	15%	23%	62%
Connecticut	11%	16%	72%

Legend: Severely burdened (50% or greater), Moderately burdened (30% to 49%), Not burdened (less than 30%)

Housing costs as percent of income



Housing cost burden for renters



Housing cost burden for owners

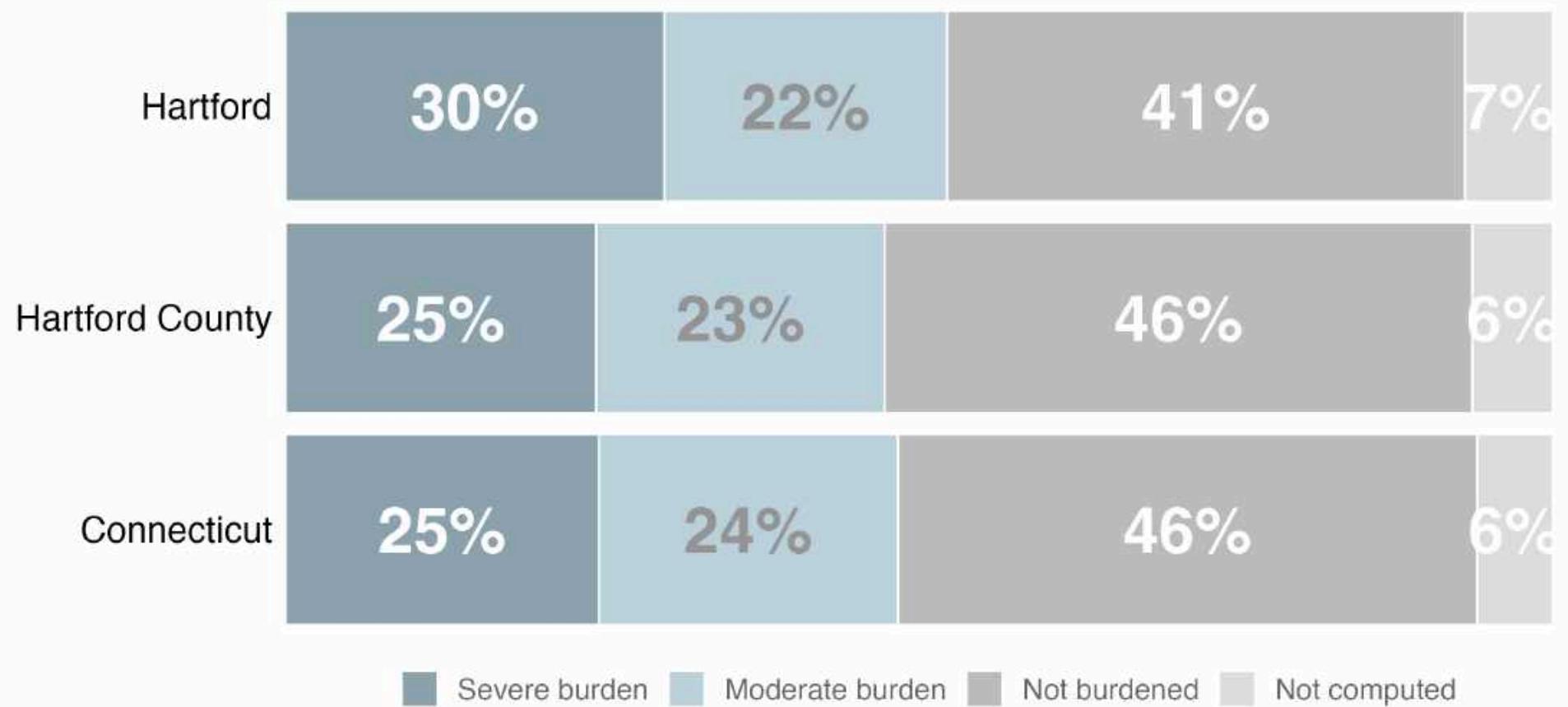


```
1 housing_cost_burden

# 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
```

```
1 housing_cost_burden_plot <- function(town_to_plot, county_to_plot) {
2   housing_cost_burden |>
3     filter(location %in% c(town_to_plot, county_to_plot, "Connecticut")) |>
4     ggplot(aes(
5       x = pct,
6       y = location,
7       fill = burden_level,
8       label = pct_formatted
9     )) +
10    geom_col() +
11    geom_text(position = position_stack(vjust = 0.5)) +
12    ...
13 }
```

```
1 housing_cost_burden_plot(  
2   town_to_plot = "Hartford",  
3   county_to_plot = "Hartford County"  
4 )
```



```
1 housing_cost_burden |>  
2 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%
```

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

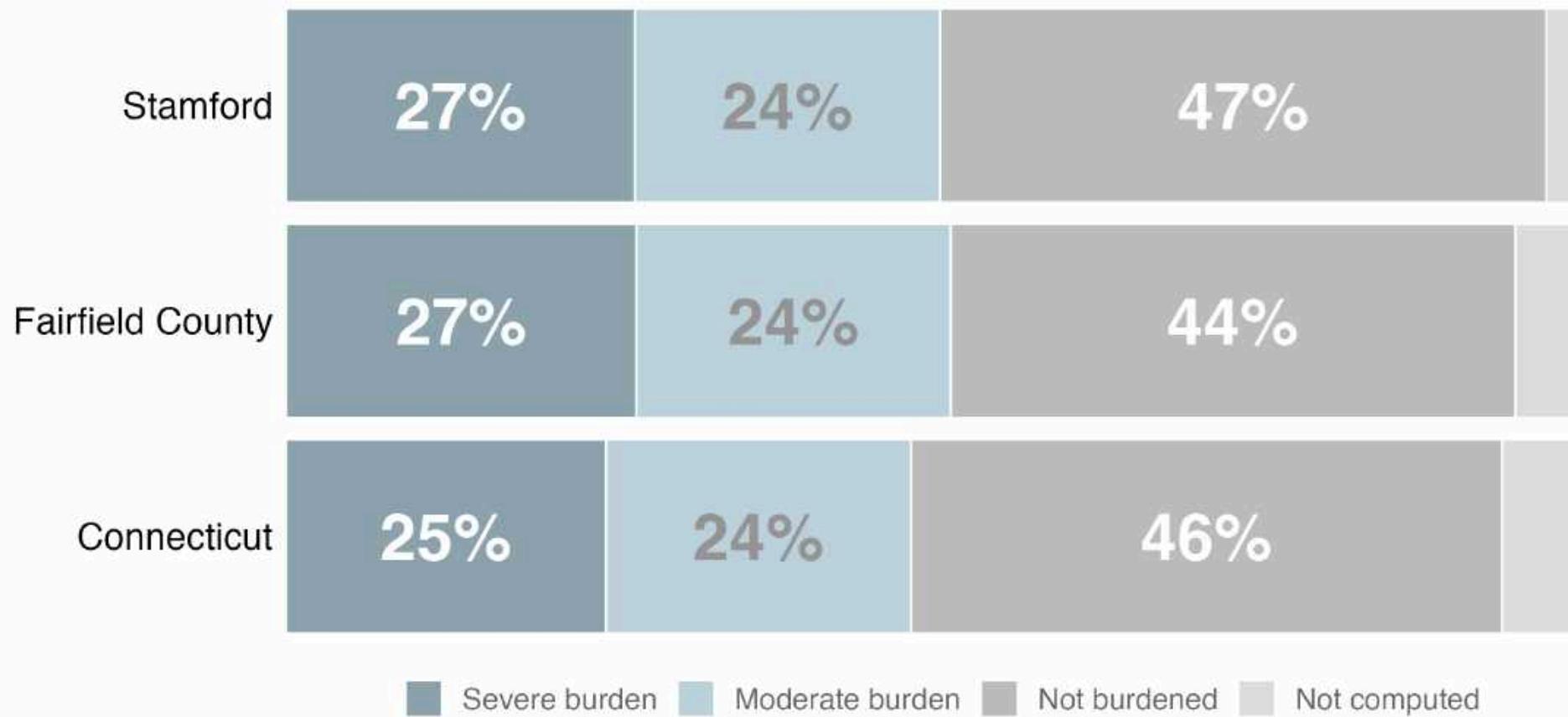
```
1 housing_cost_burden |>  
2 filter(location == "Hartford")
```

```
# 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>
```

```
1 housing_cost_burden_plot(  
2   town_to_plot = "Hartford",  
3   county_to_plot = "Hartford County"  
4 )
```

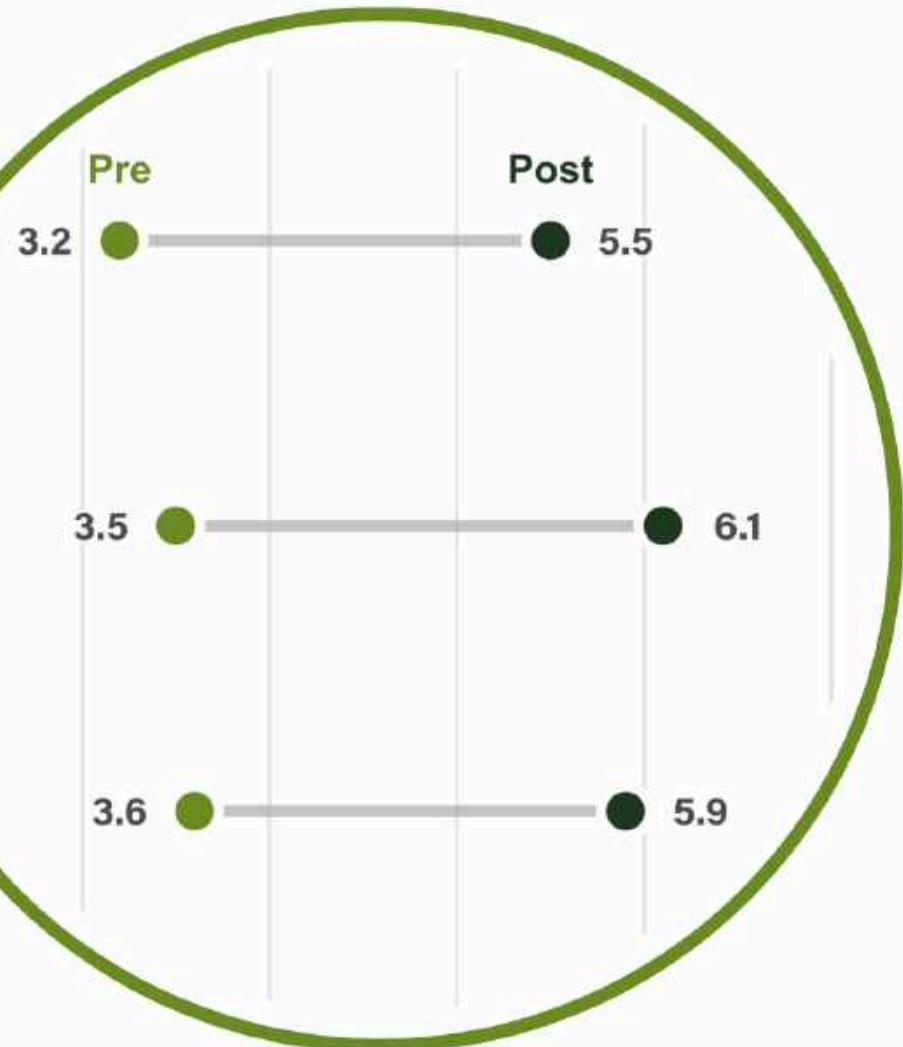
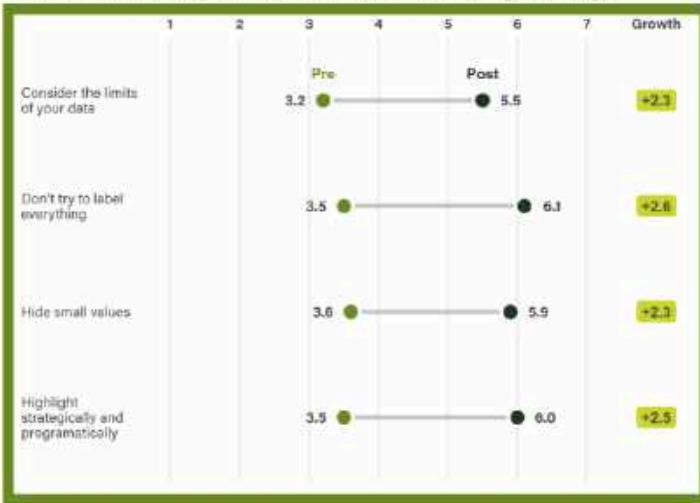


```
1 housing_cost_burden_plot(  
2     town_to_plot = "Stamford",  
3     county_to_plot = "Fairfield County"  
4 )
```



A black and white photograph showing a person's hands held up in front of a camera lens. The hands are positioned to completely obscure the lens, symbolizing how text can be hidden or obscured if placed in the wrong location.

Don't Put Text Where it Could Be Obscured

PRE-POST Participant Self Assessed Knowledge Ratings

```
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 1 Pre        1.6      NA             NA                  NA  
2 Question 1 Post       4.2      2.6            2.6                 2.9
```

```
1 pre_post_plot <- function(df) {  
  df |>  
  ggplot(aes(  
    x = rating,  
    y = question,  
    fill = timing  
  )) +  
  geom_line() +  
  geom_point(shape = 21) +  
  ...  
11 }
```

```
1 pre_post_data |>  
2   pre_post_plot()
```



```
1 pre_post_data |>
2   pre_post_plot() +
3   # Ratings within points
4   geom_text(
5     aes(label = rating),
6     color = "white"
7   ) +
8   # Pre/post labels
9   geom_text(
10    aes(
11      label = timing,
12      color = timing
13    )
14  ) +
15 # Growth label
16 geom_text(
17  aes(
18    x = growth_text_position,
19    label = growth_formatted
20  )
21 )
```



```
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
```



```
1 pre_post_data <-
2   pre_post_data |>
3     mutate(rating_text_position = case_when(
4       timing == "Pre" ~ rating - 0.2,
5       timing == "Post" ~ rating + 0.2
6     ))
```

```
1 pre_post_data |>
2   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
```

```
1 pre_post_data |>
2   pre_post_plot() +
3   geom_text(
4     aes(
5       x = rating_text_position,
6       label = rating
7     )
8   ) +
9   geom_text(
10    aes(
11      x = rating_text_position,
12      label = timing
13    )
14  ) +
15  ...
```

```
1 pre_post_data |>
2   pre_post_plot() +
3   geom_text(
4     aes(
5       x = rating_text_position,
6       label = rating
7     )
8   ) +
9   geom_text(
10    aes(
11      x = rating_text_position,
12      label = timing
13    )
14  ) +
15  ...
```



```
1 pre_post_data |>
2   pre_post_plot() +
3   geom_label(
4     aes(
5       x = 6,
6       label = growth_formatted
7     )
8   ) +
9   ...
```



Highlight Strategically and Programmatically

Color

Size

Shadow

Outline

Opacity

A row of colorful crayons of various colors including green, blue, red, yellow, pink, white, brown, and orange.

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.

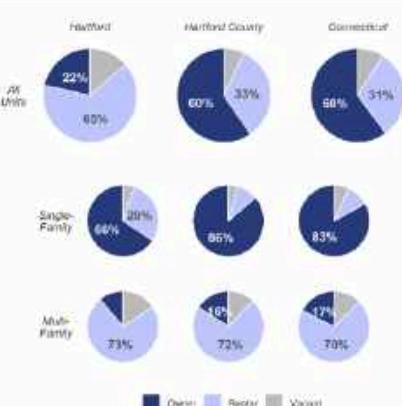
In Hartford, 19% of occupied homes are single-family, and 81% are multifamily. Owners live in 66% of Hartford's 10,625 single-family homes, and renters live in 73% of its 44,561 multifamily homes.

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.



Data Profiles

25%

50%

Hartford

Hartford County



```
1 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
```

```
1 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()
```

0%

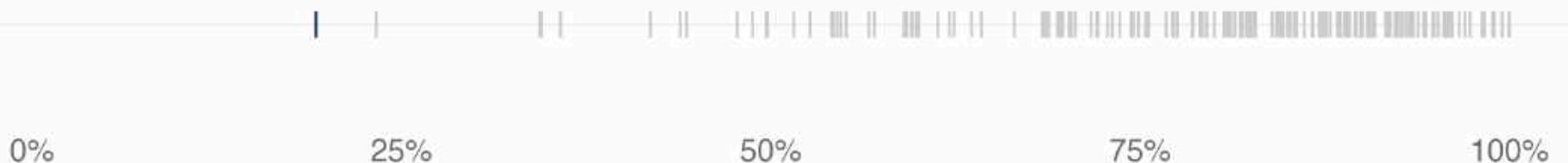
25%

50%

75%

100%

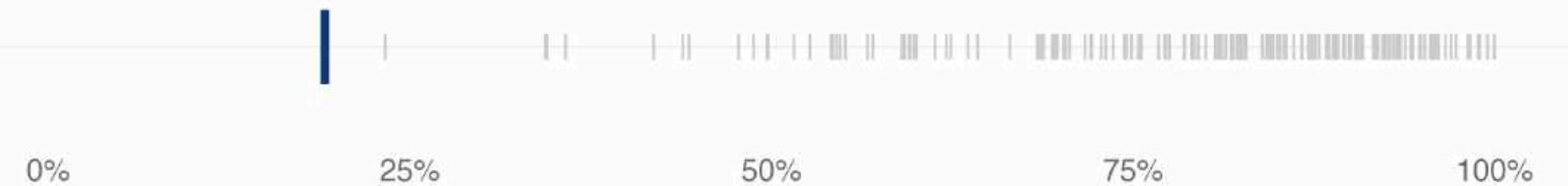
```
1 single_family_homes_plot() +  
2   geom_point(  
3     data = single_family_homes |> filter(location == "Hartford"),  
4     shape = 124,  
5     color = "#15397f"  
6   )
```



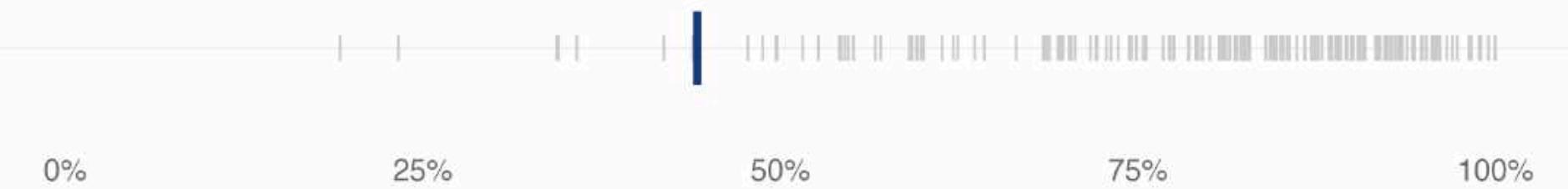


Size

```
1 single_family_homes_plot() +  
2   geom_point(  
3     data = single_family_homes |> filter(location == "Hartford"),  
4     shape = 124,  
5     color = "#15397f",  
6     size = 15  
7   )
```



```
1 single_family_homes_plot() +  
2   geom_point(  
3     data = single_family_homes |> filter(location == "Stamford"),  
4     shape = 124,  
5     color = "#15397f",  
6     size = 15  
7   )
```



Shadow



AFGHANISTAN

Impact Goals

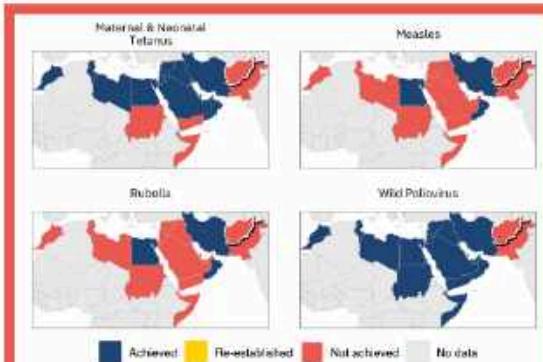


1.2

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.



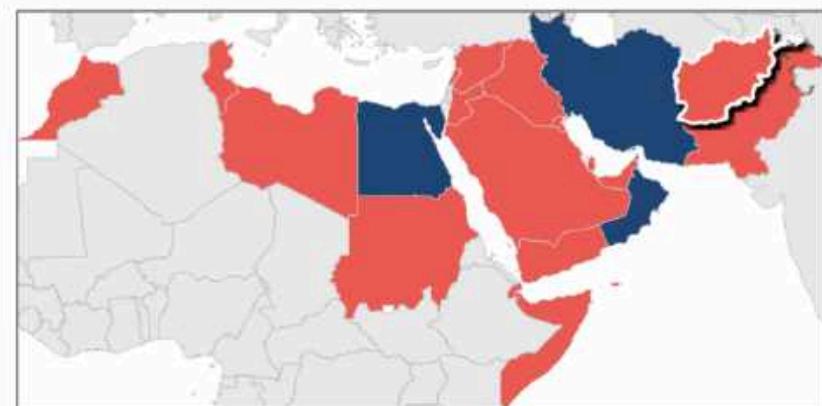
Achievement of vaccine preventable disease control, elimination, and eradication targets in Afghanistan:

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

Legend: Achieved (dark blue), Not achieved (red), Re-established (yellow), No data (light gray)

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 wild-type poliovirus, and elimination as a public health problem for maternal and neonatal tetanus. The baseline year is 2020.

Rubella



Achieved Re-establish

```
1 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

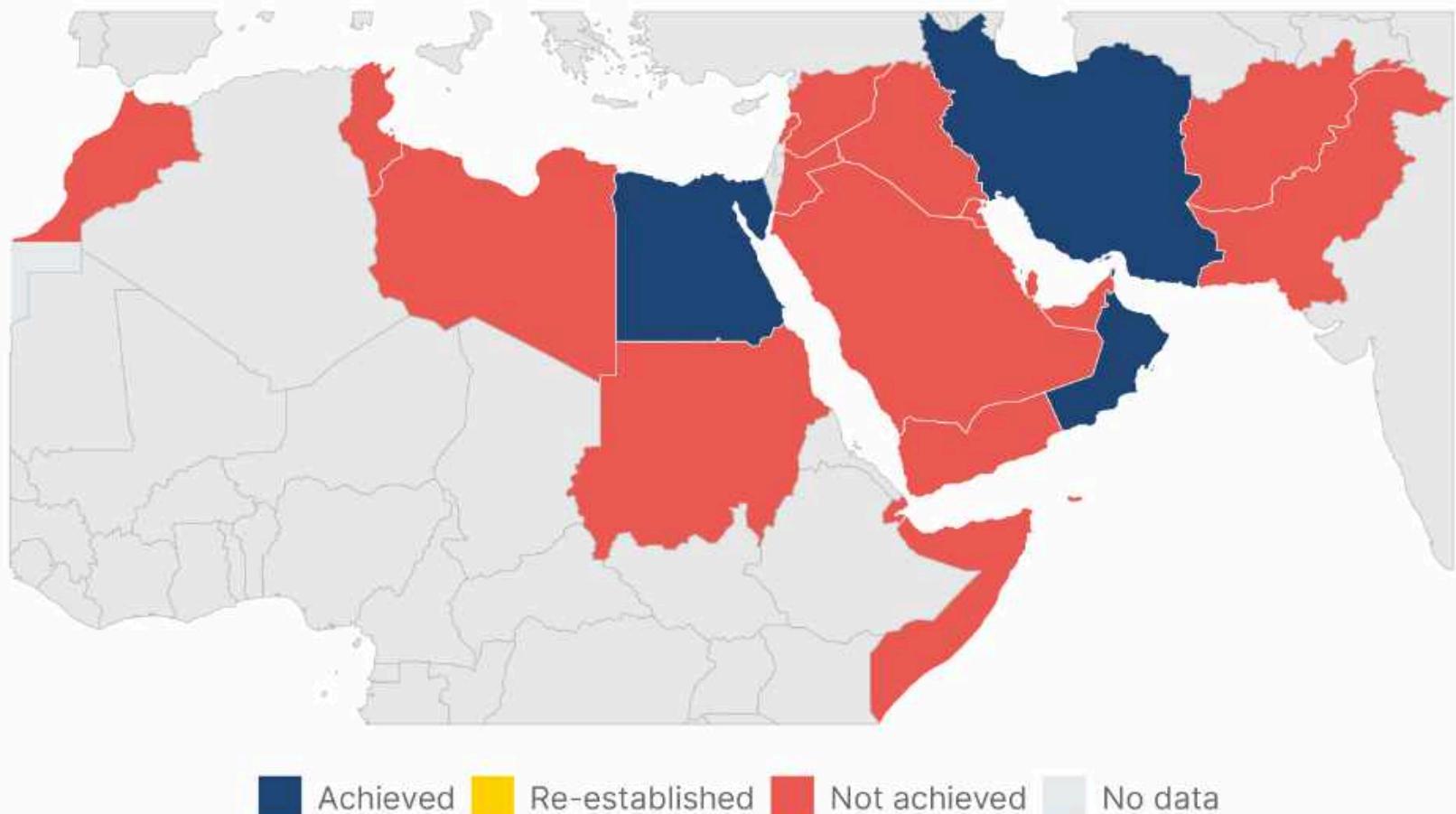
Projected CRS: WGS 84 / World Mercator

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...

```
1 region_map <- function() {  
2   ggplot() +  
3     geom_sf(  
4       data = rubella |> filter(region == 1),  
5       aes(fill = status))  
6     ) +  
7     geom_sf(  
8       data = rubella |> filter(region == 0),  
9       fill = "lightgrey",  
10      alpha = 0.5  
11    ) +  
12    ...  
13 }
```

```
1 region_map()
```

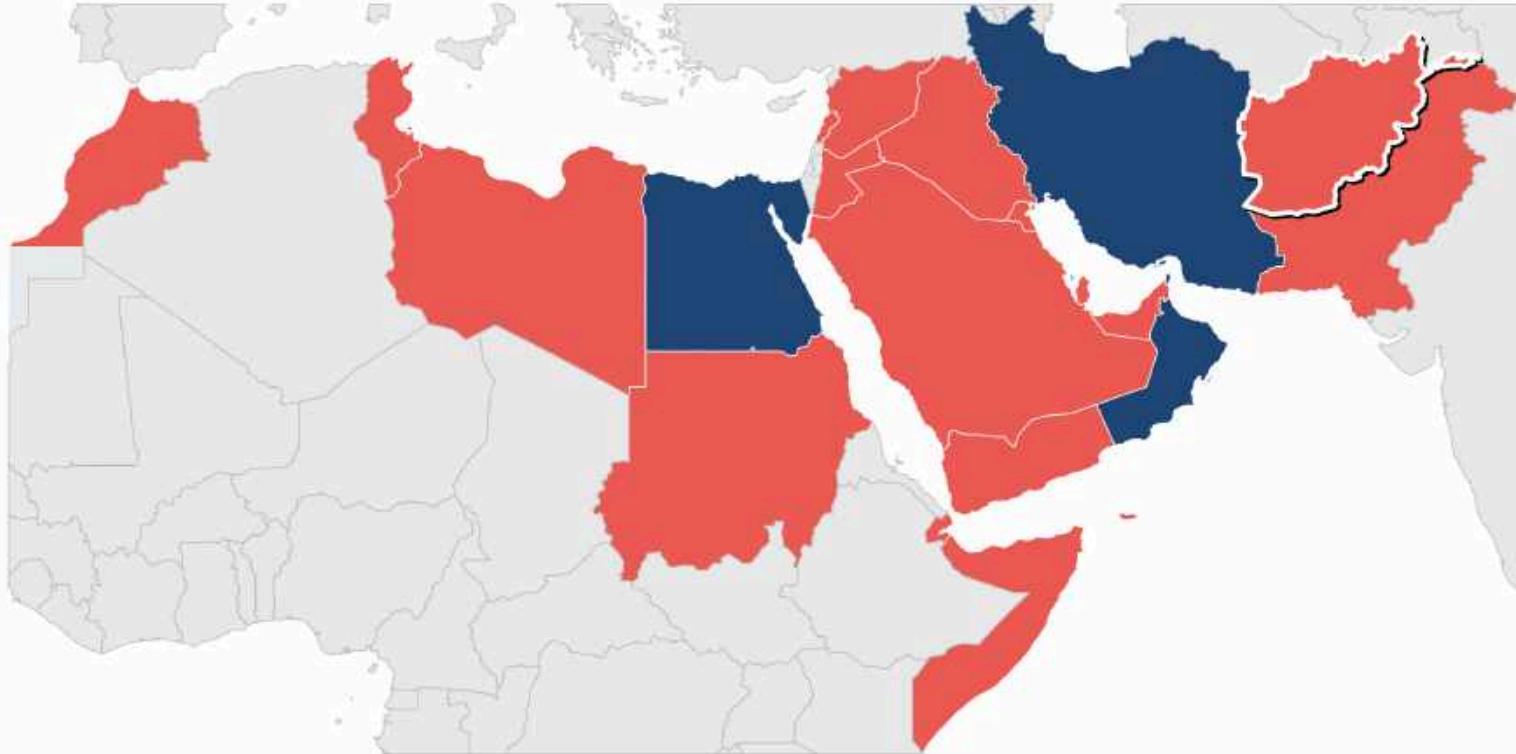


```
1 library(ggfx)
2
3 region_map() +
4   with_shadow(
5     geom_sf(
6       data = rubella |> filter(country == "Afghanistan")
7     ),
8     ...
9   )
```



Outline

```
1 region_map() +
2   with_shadow(
3     geom_sf(
4       data = rubella |> filter(country == "Afghanistan")
5     ),
6     linewidth = 0.8,
7     color = "white",
8     ...
9   )
```



■ Achieved ■ Re-established ■ Not achieved ■ No data

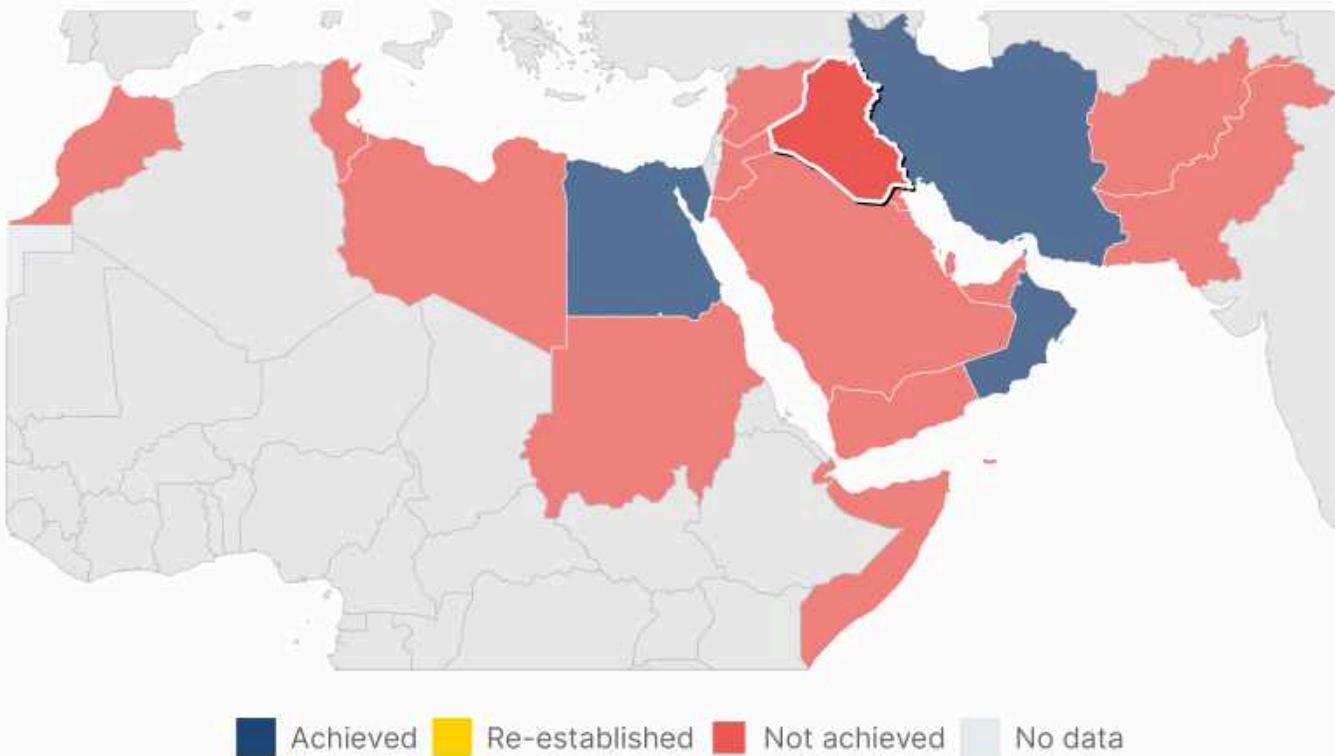
Opacity

```
1 region_map <- function() {  
2   ggplot() +  
3     geom_sf(  
4       data = rubella |> filter(region == 1),  
5       aes(fill = status),  
6       alpha = 0.75  
7     ) +  
8     geom_sf(  
9       data = rubella |> filter(region == 0),  
10      fill = "lightgrey",  
11      alpha = 0.5  
12    ) +  
13    ...  
14 }
```

```
1 region_map() +  
2   with_shadow(  
3     geom_sf(  
4       data = rubella |> filter(country == "Afghanistan")  
5     ),  
6     linewidth = 0.8,  
7     color = "white",  
8     ...  
9   )
```



```
1 region_map() +  
2   with_shadow(  
3     geom_sf(  
4       data = rubella |> filter(country == "Iraq")  
5     ),  
6     linewidth = 0.8,  
7     color = "white",  
8     ...  
9   )
```



Conclusion

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