Seamless data-driven reporting with {epoxy}

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R/Medicine: 2023-06-08



Photo by Tanaphong Toochinda

> A study of childcare prices in 2,360 U.S. counties across 47 states shows that childcare prices for a single child range from $4,810 for school-age home-based care in small counties to $15,417 for infant center-based care in very large counties. This is equivalent to between 8% and 19.3% of median family income per child in paid care.

National Database of Childcare Prices

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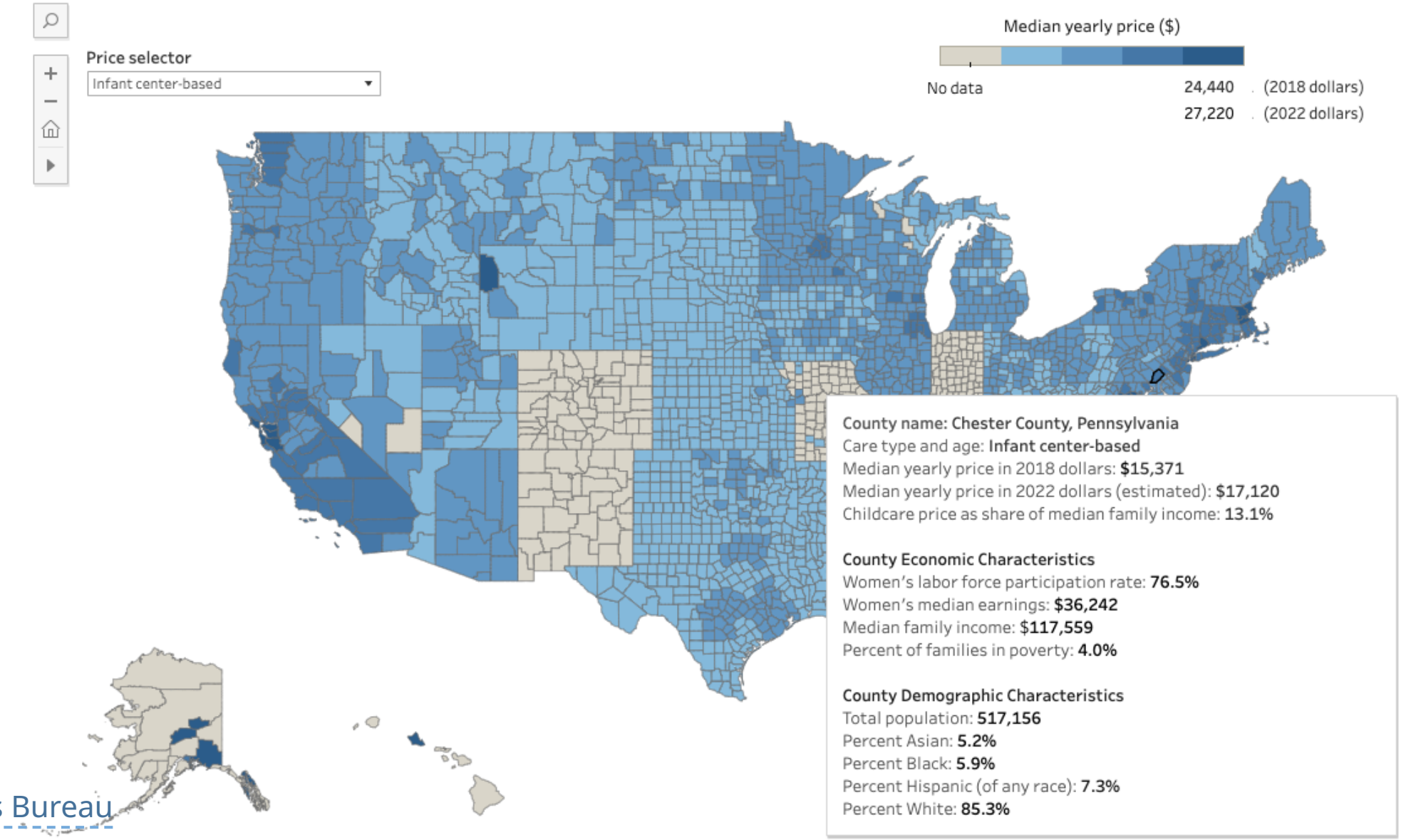
National Database of Childcare Prices

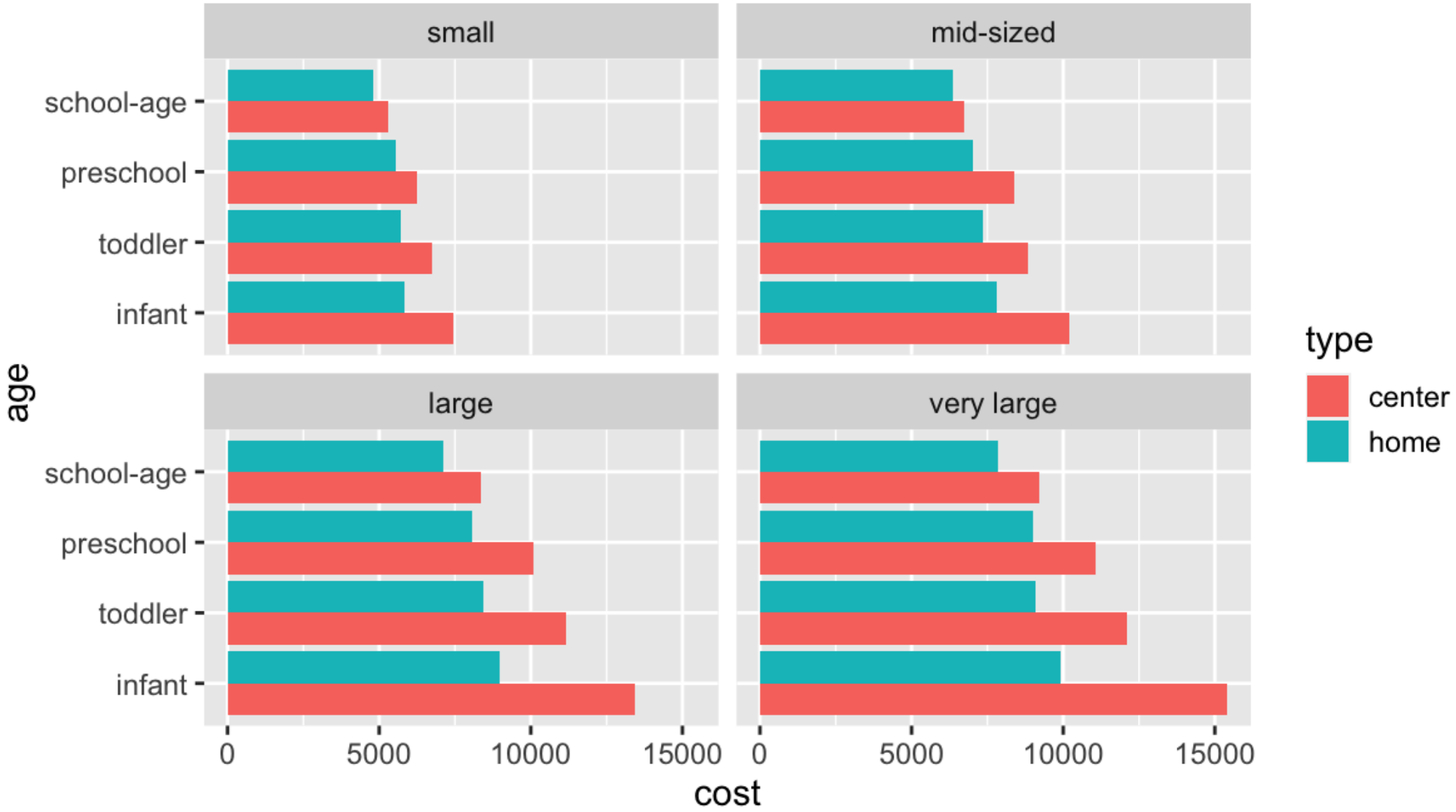


Photo by La-Rel Easter

```
childcare_summary
#> # A tibble: 32 × 5
#>    county_size type   age          cost mhi_pct
#>    <fct>       <chr>  <fct>       <dbl>   <dbl>
#>  1 small       center school-age 5288.  0.109
#>  2 small       home   school-age 4810   0.0991
#>  3 small       center infant     7461.  0.154
#>  4 small       center toddler    6760   0.139
#>  5 small       center preschool  6239.  0.129
#>  6 small       home   infant     5824   0.120
#>  7 small       home   toddler    5713.  0.118
#>  8 small       home   preschool  5541.  0.114
#>  9 mid-sized   center school-age 6732.  0.115
#> 10 mid-sized   home   school-age 6360.  0.108
#> # ℹ 22 more rows
```

Childcare Prices by Age of Children and Care Setting




small
mid-sized
large
very large
school-age
preschool
toddler
infant
age
0
5000
10000
15000
cost
type
center
home

```
ggplot(childcare_summary) +
  aes(cost, age, fill = type) +
  geom_col(position = "dodge") +
  facet_wrap(~ county_size) +
  theme_grey(14)
```

```
ggplot(childcare_summary) +
  aes(cost, age, fill = type) +
  geom_col(position = "dodge") +
  facet_wrap(
    ~ county_size,
    labeller = labeller(county_size = \(x) str_to_title(paste(x, "County")))
  ) +
  labs(
    x = "Median yearly cost",
    y = "Age group",
    fill = "Type of care"
  ) +
  scale_fill_discrete(labels = \(x) paste0(x, "-based")) +
  scale_x_continuous(
    labels = scales::dollar_format(scale_cut = scales::cut_short_scale())
  ) +
  theme_gray(14)
```

```r
ggplot(childcare_summary) +
  aes(cost, age, fill = type) +
  geom_col(position = "dodge") +
  facet_wrap(
    ~ county_size,
    labeller = labeller(county_size = \(x) str_to_title(paste(x, "County")))
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    x = "Median yearly cost",
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  scale_fill_discrete(labels = \(x) paste0(x, "-based")) +
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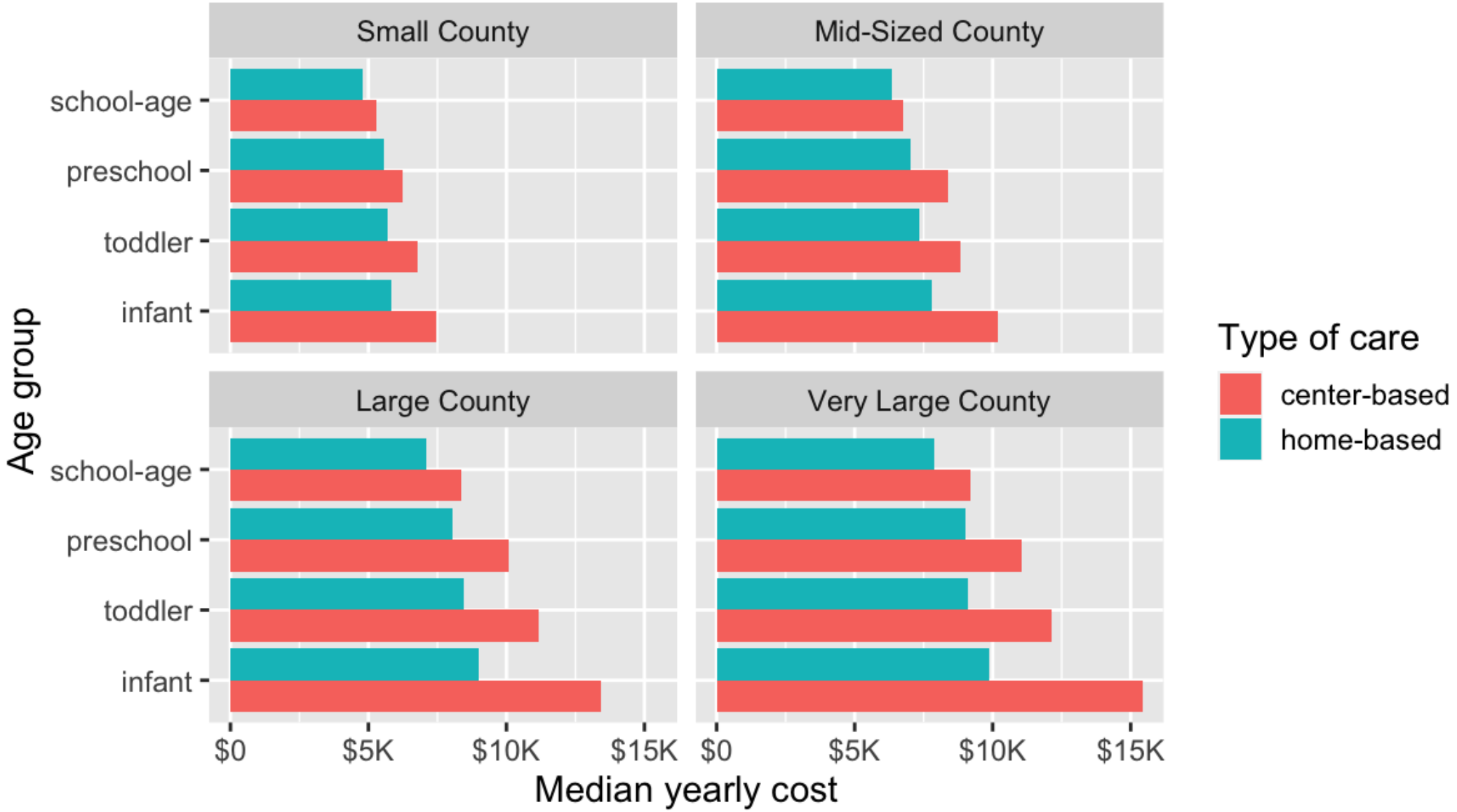
Small County
Mid-Sized County
Large County
Very Large County
school-age
preschool
toddler
infant
Age group
$0
$5K
$10K
$15K
Median yearly cost
Type of care
center-based
home-based

```
childcare_summary
#> # A tibble: 32 × 5
#>    county_size type   age          cost mhi_pct
#>    <fct>       <chr>  <fct>       <dbl>   <dbl>
#>  1 small       center school-age 5288.  0.109
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#>  8 small       home   preschool  5541.  0.114
#>  9 mid-sized   center school-age 6732.  0.115
#> 10 mid-sized   home   school-age 6360.  0.108
#> # ℹ 22 more rows
```

epoxy

- Handle **last-mile** transformations

epoxy

- Handle **last-mile** transformations
- Seamlessly use data in **the prose** of reports and apps

epoxy

- Handle **last-mile** transformations
- Seamlessly use data in **the prose** of reports and apps
- Re-usability through **templates** and global settings


glue


EPOXY
EXTRA STRENGTH GLUE

```
install.packages("epoxy")
pak::pak("gadenbuie/epoxy")

library(epoxy)
library(glue)
```

Let's try this together

(speed run)

TidyTuesday (2023, Week 19)

```
library(tidyverse)

tuesdata <- tidytuesdayR::tt_load(2023, week = 19)

childcare_costs <- tuesdata$childcare_costs
counties <- tuesdata$counties
```

TidyTuesday (2023, Week 19)

```
counties
```

```
#> # A tibble: 3,144 × 4
#>    county_fips_code county_name     state_name state_abbreviation
#>               <dbl> <chr>           <chr>      <chr>
#>  1             1001 Autauga County  Alabama    AL
#>  2             1003 Baldwin County  Alabama    AL
#>  3             1005 Barbour County  Alabama    AL
#>  4             1007 Bibb County     Alabama    AL
#>  5             1009 Blount County   Alabama    AL
#>  6             1011 Bullock County  Alabama    AL
#>  7             1013 Butler County   Alabama    AL
#>  8             1015 Calhoun County  Alabama    AL
#>  9             1017 Chambers County Alabama    AL
#> 10             1019 Cherokee County Alabama    AL
#> # ℹ 3,134 more rows
```

TidyTuesday (2023, Week 19)

```
childcare_costs
```

```
#> # A tibble: 34,567 × 61
#>    county_fips_code study_year unr_16 funr_16 munr_16 unr_20to64 funr_20to64
#>               <dbl>      <dbl>  <dbl>   <dbl>   <dbl>       <dbl>       <dbl>
#>  1             1001       2008   5.42    4.41    6.32         4.6         3.5
#>  2             1001       2009   5.93    5.72    6.11         4.8         4.6
#>  3             1001       2010   6.21    5.57    6.78         5.1         4.6
#>  4             1001       2011   7.55    8.13    7.03         6.2         6.3
#>  5             1001       2012   8.6     8.88    8.29         6.7         6.4
#>  6             1001       2013   9.39   10.3     8.56         7.3         7.6
#>  7             1001       2014   8.5     9.18    7.95         6.8         6.8
#>  8             1001       2015   7.64    8.45    6.91         5.9         6.1
#>  9             1001       2016   5.59    6.27    4.99         4.4         4.6
#> 10             1001       2017   5.21    5.84    4.64         4.6         4.9
#> # ℹ 34,557 more rows
#> # ℹ 54 more variables: munr_20to64 <dbl>, flfpr_20to64 <dbl>,
#> #   flfpr_20to64_under6 <dbl>, flfpr_20to64_6to17 <dbl>,
#> #   flfpr_20to64_under6_6to17 <dbl>, mlfpr_20to64 <dbl>, pr_f <dbl>,
#> #   pr_p <dbl>, mhi_2018 <dbl>, me_2018 <dbl>, fme_2018 <dbl>, mme_2018 <dbl>,
#> #   total_pop <dbl>, one_race <dbl>, one_race_w <dbl>, one_race_b <dbl>,
#> #   one_race_i <dbl>, one_race_a <dbl>, one_race_h <dbl>, …
```

Data Dictionary: childcare_costs

variable	class	description
county_fips_code	double	Four- or five-digit number that uniquely identifies the county in a state. The first two digits (for five-digit numbers) or 1 digit (for four-digit numbers) refer to the FIPS code of the state to which the county belongs.
study_year	double	Year the data collection began for the market rate survey and in which ACS data is representative of, or the study publication date.
unr_16	double	Unemployment rate of the population aged 16 years old or older.
funr_16	double	Unemployment rate of the female population aged 16 years old or older.
munr_16	double	Unemployment rate of the male population aged 16 years old or older.
unr_20to64	double	Unemployment rate of the population aged 20 to 64 years old.
funr_20to64	double	Unemployment rate of the female population aged 20 to 64 years old.
munr_20to64	double	Unemployment rate of the male population aged 20 to 64 years old.
flfpr_20to64	double	Labor force participation rate of the female population aged 20 to 64 years old.
flfpr_20to64_under6	double	Labor force participation rate of the female population aged 20 to 64 years old who have children under 6 years old.
flfpr_20to64_6to17	double	Labor force participation rate of the female population aged 20 to 64 years old who have children between 6 and 17 years old.
flfpr_20to64_under6_6to17	double	Labor force participation rate of the female population aged 20 to 64 years old who have children under 6 years old and between 6 and 17 years old.
mlfpr_20to64	double	Labor force participation rate of the male population aged 20 to 64 years old.
pr_f	double	Poverty rate for families.
pr_p	double	Poverty rate for individuals.
mhi_2018	double	Median household income expressed in 2018 dollars.
me_2018	double	Median earnings expressed in 2018 dollars for the population aged 16 years old or older.
fme_2018	double	Median earnings for females expressed in 2018 dollars for the population aged 16 years old or older.
mme_2018	double	Median earnings for males expressed in 2018 dollars for the population aged 16 years old or older.
total_pop	double	Count of the total population.
one_race	double	Percent of population that identifies as being one race.
one_race_w	double	Percent of population that identifies as being one race and being only White or Caucasian.
one_race_b	double	Percent of population that identifies as being one race and being only Black or African American.
one_race_i	double	Percent of population that identifies as being one race and being only American Indian or Alaska Native.
one_race_a	double	Percent of population that identifies as being one race and being only Asian.
one_race_h	double	Percent of population that identifies as being one race and being only Native Hawaiian or Pacific Islander.
one_race_other	double	Percent of population that identifies as being one race and being a different race not previously mentioned.
two_races	double	Percent of population that identifies as being two or more races.
hispanic	double	Percent of population that identifies as being Hispanic or Latino regardless of race.
households	double	Number of households.
h_under6_both_work	double	Number of households with children under 6 years old with two parents that are both working.
h_under6_f_work	double	Number of households with children under 6 years old with two parents with only the father working.
h_under6_m_work	double	Number of households with children under 6 years old with two parents with only the mother working.
h_under6_single_m	double	Number of households with children under 6 years old with a single mother.
h_6to17_both_work	double	Number of households with children between 6 and 17 years old with two parents that are both working.
h_6to17_fwork	double	Number of households with children between 6 and 17 years old with two parents with only the father working.
h_6to17_mwork	double	Number of households with children between 6 and 17 years old with two parents with only the mother working.
h_6to17_single_m	double	Number of households with children between 6 and 17 years old with a single mother.
emp_m	double	Percent of civilians employed in management, business, science, and arts occupations aged 16 years old or older in the county.
memp_m	double	Percent of male civilians employed in management, business, science, and arts occupations aged 16 years old or older in the county.
femp_m	double	Percent of female civilians employed in management, business, science, and arts occupations aged 16 years old or older in the county.
emp_service	double	Percent of civilians employed in service occupations aged 16 years old and older in the county.
memp_service	double	Percent of male civilians employed in service occupations aged 16 years old and older in the county.
femp_service	double	Percent of female civilians employed in service occupations aged 16 years old and older in the county.
emp_sales	double	Percent of civilians employed in sales and office occupations aged 16 years old and older in the county.
memp_sales	double	Percent of male civilians employed in sales and office occupations aged 16 years old and older in the county.
femp_sales	double	Percent of female civilians employed in sales and office occupations aged 16 years old and older in the county.
emp_n	double	Percent of civilians employed in natural resources, construction, and maintenance occupations aged 16 years old and older in the county.
memp_n	double	Percent of male civilians employed in natural resources, construction, and maintenance occupations aged 16 years old and older in the county.
femp_n	double	Percent of female civilians employed in natural resources, construction, and maintenance occupations aged 16 years old and older in the county.
emp_p	double	Percent of civilians employed in production, transportation, and material moving occupations aged 16 years old and older in the county.
memp_p	double	Percent of male civilians employed in production, transportation, and material moving occupations aged 16 years old and older in the county.
femp_p	double	Percent of female civilians employed in production, transportation, and material moving occupations aged 16 years old and older in the county.
mcsa	double	Weekly, full-time median price charged for Center-Based Care for those who are school age based on the results reported in the market rate survey report for the county or the rate zone/cluster to which the county is assigned.
mfccsa	double	Weekly, full-time median price charged for Family Childcare for those who are school age based on the results reported in the market rate survey report for the county or the rate zone/cluster to which the county is assigned.
mc_infant	double	Aggregated weekly, full-time median price charged for Center-based Care for infants (i.e. aged 0 through 23 months).
mc_toddler	double	Aggregated weekly, full-time median price charged for Center-based Care for toddlers (i.e. aged 24 through 35 months).
mc_preschool	double	Aggregated weekly, full-time median price charged for Center-based Care for preschoolers (i.e. aged 36 through 54 months).
mfcc_infant	double	Aggregated weekly, full-time median price charged for Family Childcare for infants (i.e. aged 0 through 23 months).
mfcc_toddler	double	Aggregated weekly, full-time median price charged for Family Childcare for toddlers (i.e. aged 24 through 35 months).
mfcc_preschool	double	Aggregated weekly, full-time median price charged for Family Childcare for preschoolers (i.e. aged 36 through 54 months).

Prepare

- 2018 only
- Where reported
- Pick: population, income, price
- County size

```
childcare_summary <-
  childcare_costs |>
  filter(study_year == 2018, !is.na(mc_infant)) |>
  select(1:2, total_pop, mhi_2018, matches("mfcc|mc")) |>
  mutate(
    county_size = case_when(
      total_pop < 1e5 ~ "small",
      total_pop < 5e5 ~ "mid-sized",
      total_pop < 1e6 ~ "large",
      TRUE ~ "very large"
    ),
    county_size = fct_reorder(county_size, total_pop)
  )
```

```
#> # A tibble: 2,360 × 13
#>   county_fips_code study_year total_pop mhi_2018  mcsa
#>              <dbl>      <dbl>     <dbl>    <dbl> <dbl>
#> 1             1001       2018     55200    58786  95.9
#> 2             1003       2018    208107    55962 108.
#> 3             1005       2018     25782    34186  79.2
#> 4             1007       2018     22527    45340 102.
#> 5             1009       2018     57645    48695 127.
#> # ℹ 2,355 more rows
#> # ℹ 8 more variables: mfccsa <dbl>, mc_infant <dbl>,
#> #   mc_toddler <dbl>, mc_preschool <dbl>,
#> #   mfcc_infant <dbl>, mfcc_toddler <dbl>
```

Pivot

- Collect all costs
- Extract information from variable names
- Recode age and type
- Convert to yearly cost

```
childcare_summary <-
  childcare_summary |>
  pivot_longer(
    cols = matches("mfcc|mc"),
    names_to = c("type", "age"),
    names_pattern = "(mfcc|mc)(.*)",
    values_to = "cost"
  ) |>
  mutate(
    age = str_remove(age, "^_"),
    age = recode(age, sa = "school-age"),
    age = factor(age, c("infant", "toddler", "preschool", "sc
    type = recode(type, mfcc = "home", mc = "center"),
    cost = cost * 52
  )
```

```
#> # A tibble: 18,880 × 8
#>   county_fips_code study_year total_pop mhi_2018 county_size
#>              <dbl>      <dbl>     <dbl>    <dbl> <fct>
#> 1             1001       2018     55200    58786 small
#> 2             1001       2018     55200    58786 small
#> 3             1001       2018     55200    58786 small
#> 4             1001       2018     55200    58786 small
#> # ℹ 18,876 more rows
#> # ℹ 3 more variables: type <chr>, age <fct>, cost <dbl>
```

Summarize

- Median cost and income
- By county size, care type and age group
- Cost as a % of income

```
childcare_summary <-
  childcare_summary |>
  summarize(
    across(cost, \(x) median(x, na.rm = TRUE)),
    across(mhi_2018, \(x) median(x, na.rm = TRUE)),
    .by = c(county_size, type, age)
  ) |>
  mutate(mhi_pct = cost / mhi_2018) |>
  select(-mhi_2018)
```

```
#> # A tibble: 32 × 5
#>    county_size type   age          cost mhi_pct
#>    <fct>       <chr>  <fct>       <dbl>   <dbl>
#>  1 small       center school-age 5288.   0.109
#>  2 small       home   school-age 4810    0.0991
#>  3 small       center infant     7461.   0.154
#>  4 small       center toddler    6760    0.139
#>  5 small       center preschool  6239.   0.129
#>  6 small       home   infant     5824    0.120
#>  7 small       home   toddler    5713.   0.118
#>  8 small       home   preschool  5541.   0.114
#>  9 mid-sized   center school-age 6732.   0.115
#> 10 mid-sized   home   school-age 6360.   0.108
#> # ℹ 22 more rows
```

Quote

- Min/max cost

```
costs_min <-
  childcare_summary |>
  filter(mhi_pct == min(mhi_pct))
```

```
#> # A tibble: 1 × 5
#>   county_size type  age          cost mhi_pct
#>   <fct>       <chr> <fct>       <dbl>   <dbl>
#> 1 small       home  school-age  4810  0.0991
```

```
costs_max <-
  childcare_summary |>
  filter(mhi_pct == max(mhi_pct))
```

```
#> # A tibble: 1 × 5
#>   county_size type   age       cost mhi_pct
#>   <fct>       <chr>  <fct>    <dbl>   <dbl>
#> 1 very large  center infant 15417.   0.238
```

Quote

- Also counts of counties and states

```
counties_states <-
  childcare_costs |>
  filter(study_year == 2018, !is.na(mc_infant)) |>
  left_join(counties, by = "county_fips_code") |>
  distinct(state_abbreviation, county_name)

n_counties <- nrow(counties_states)

#> [1] 2360

n_states <- n_distinct(counties_states$state_abbreviation)

#> [1] 41
```

How do we get this into prose?

```
costs_min
```

```
#> # A tibble: 1 × 5
#>   county_size type  age          cost mhi_pct
#>   <fct>       <chr> <fct>       <dbl>   <dbl>
#> 1 small       home  school-age  4810  0.0991
```

```
costs_max
```

```
#> # A tibble: 1 × 5
#>   county_size type   age       cost mhi_pct
#>   <fct>       <chr>  <fct>    <dbl>   <dbl>
#> 1 very large  center infant 15417.   0.238
```

R Markdown is amazing

```
A study of childcare prices in
2,360
U.S. counties across
47
states shows that childcare prices
for a single child
range from
$4,810
for school-age home-based care
in small counties to
$15,417
for infant center-based care
in very large counties.
This is equivalent to between
8% and 19.3%
of median family income per child in paid care.
```

R Markdown is amazing

A study of childcare prices in

____
U.S. counties across

____
states shows that childcare prices
for a single child
range from
$____
for school-age home-based care
in small counties to
$____
for infant center-based care
in very large counties.
This is equivalent to between
____% and ____%
of median family income per child in paid care.

R Markdown is amazing

A study of childcare prices in

____

U.S. counties across

____

states shows that childcare prices
for a single child
range from
$____
for school-age home-based care
in ____ counties to
$____
for infant center-based care
in ____ counties.
This is equivalent to between
____% and ____%
of median family income per child in paid care.

R Markdown is amazing

A study of childcare prices in

____

U.S. counties across

____

states shows that childcare prices
for a single child
range from
$____
for school-age ____-based care
in ____ counties to
$____
for infant ____-based care
in ____ counties.
This is equivalent to between
____% and ____%
of median family income per child in paid care.

R Markdown is amazing

A study of childcare prices in

____

U.S. counties across

____

states shows that childcare prices
for a single child
range from
$____
for **____** **____**-based care
in ____ counties to
$____
for **____** **____**-based care
in ____ counties.
This is equivalent to between
____% and ____%
of median family income per child in paid care.

R Markdown is amazing

```
A study of childcare prices in
`r n_counties`
U.S. counties across
`r n_states`
states shows that childcare prices
for a single child
range from
$____
for ____ ____-based care
in ____ counties to
$____
for ____ ____-based care
in ____ counties.
This is equivalent to between
____% and ____%
of median family income per child in paid care.
```

R Markdown is amazing

```
A study of childcare prices in
`r n_counties`
U.S. counties across
`r n_states`
states shows that childcare prices
for a single child
range from
`r costs_min$cost`
for `r costs_min$age` `r costs_min$type`-based care
in `r costs_min$county_size` counties to
$____
for ____ ____-based care
in ____ counties.
This is equivalent to between
`r costs_min$mhi_pct` and ____%
of median family income per child in paid care.
```

R Markdown is amazing

```
A study of childcare prices in
`r n_counties`
U.S. counties across
`r n_states`
states shows that childcare prices
for a single child
range from
`r costs_min$cost`
for `r costs_min$age` `r costs_min$type`-based care
in `r costs_min$county_size` counties to
`r costs_max$cost`
for `r costs_max$age` `r costs_max$type`-based care
in `r costs_max$county_size` counties.
This is equivalent to between
`r costs_min$mhi_pct` and `r costs_max$mhi_pct`
of median family income per child in paid care.
```

R Markdown is amazing-ish

A study of childcare prices in
2360
U.S. counties across
41
states shows that childcare prices
for a single child
range from
4810
for school-age home-based care
in small counties to
1.541696\times 10^{4}
for infant center-based care
in very large counties.
This is equivalent to between
0.0990792 and 0.2376447
of median family income per child in paid care.

R Markdown is amazing-ish

```
A study of childcare prices in
`r format(n_counties, big.mark = ",")`
U.S. counties across
`r format(n_states, big.mark = ",")`
states shows that childcare prices
for a single child
range from
$`r format(costs_min$cost, big.mark = ",")`
for `r costs_min$age` `r costs_min$type`-based care
in `r costs_min$county_size` counties
$`r format(round(costs_max$cost, 0), big.mark = ",")`
for `r costs_max$age` `r costs_max$type`-based care
in `r costs_max$county_size` counties.
This is equivalent to between
`r round(costs_min$mhi_pct * 100, 2)`% and `r round(costs_max$mhi_pct * 100, 2)`%
of median family income per child in paid care.
```

Spicy hot-take time

Spicy hot-take time



Spicy hot-take time

Write R code where it can be R code.

Bad

```
prices range from $`r format(round(costs_max$cost, 0), big.mark = ",")`
```

Bad

````
prices range from $`r format(round(costs_max$cost, 0), big.mark = ",")`
````

Better

````
```{r}
costs_max$cost <- format(round(costs_max$cost, 0), big.mark = ",")
```

prices range from $`r costs_max$cost`
````

Bad

````
prices range from $`r format(round(costs_max$cost, 0), big.mark = ",")`
````

Better

````
```{r}
costs_max$cost <- format(round(costs_max$cost, 0), big.mark = ",")
```

prices range from $`r costs_max$cost`
````

Better-er

````
```{r}
costs_max$cost <- scales::dollar(costs_max$cost, accuracy = 1)
```

prices range from `r costs_max$cost`
````

````
## Bad

prices range from $`r format(round(quote_max$cost, 0), big.mark = ",")`

### Better

```{r}
quote_max$cost ← scales::dollar(quote_max$cost, accuracy = 1)
```

prices range from `r quote_max$cost`
````

scales::dollar(x, accuracy = NULL, scale = 1, prefix = "$", suffix = "", big.mark = ",", decimal.mark = ".", trim = TRUE, largest_with_cents = 1e+05, negative_parens = deprecated(), style_negative = c("hyphen", <...truncated...>)

```
## Bad

prices range from $`r format(round(quote_max$cost, 0), big.mark = ",")`

### Better

```{r}
quote_max$cost ← scales::dollar(quote_max$cost, accuracy = 1)
```

prices range from `r quote_max$cost`
```

scales::dollar(x, accuracy = NULL, scale = 1, prefix = "$", suffix = "", big.mark = ",", decimal.mark = ".", trim = TRUE, largest_with_cents = 1e+05, negative_parens = deprecated(), style_negative = c("hyphen", <...truncated...>)

Inline code is for the simplist code you cannot possibly mess up.

R Markdown + epoxy

```
A study of childcare prices in
`r n_counties`
U.S. counties across
`r n_states`
states shows that childcare prices
for a single child
range from
`r costs_min$cost`
for `r costs_min$age` `r costs_min$type`-based care
in `r costs_min$county_size` counties to
`r costs_max$cost`
for `r costs_max$age` `r costs_max$type`-based care
in `r costs_max$county_size` counties.
This is equivalent to between
`r costs_min$mhi_pct` and `r costs_max$mhi_pct`
of median family income per child in paid care.
```

R Markdown + epoxy

````
```{r}
library(epoxy)
```

A study of childcare prices in
`r n_counties`
U.S. counties across
`r n_states`
states shows that childcare prices
for a single child
range from
`r costs_min$cost`
for `r costs_min$age` `r costs_min$type`-based care
in `r costs_min$county_size` counties to
`r costs_max$cost`
for `r costs_max$age` `r costs_max$type`-based care
in `r costs_max$county_size` counties.
This is equivalent to between
`r costs_min$mhi_pct` and `r costs_max$mhi_pct`
of median family income per child in paid care.
````

R Markdown + epoxy

````
```{r}
library(epoxy)
```

```{epoxy}
A study of childcare prices in
`r n_counties`
U.S. counties across
`r n_states`
states shows that childcare prices
for a single child
range from
`r costs_min$cost`
for `r costs_min$age` `r costs_min$type`-based care
in `r costs_min$county_size` counties to
`r costs_max$cost`
for `r costs_max$age` `r costs_max$type`-based care
in `r costs_max$county_size` counties.
This is equivalent to between
`r costs_min$mhi_pct` and `r costs_max$mhi_pct`
of median family income per child in paid care.
```
````

R Markdown + epoxy

````
```{r}
library(epoxy)
```

```{epoxy}
A study of childcare prices in
`r n_counties`
U.S. counties across
`r n_states`
states shows that childcare prices
for a single child
range from
`r costs_min$cost`
for `r costs_min$age` `r costs_min$type`-based care
in `r costs_min$county_size` counties to
`r costs_max$cost`
for `r costs_max$age` `r costs_max$type`-based care
in `r costs_max$county_size` counties.
This is equivalent to between
`r costs_min$mhi_pct` and `r costs_max$mhi_pct`
of median family income per child in paid care.
```
````

R Markdown + epoxy

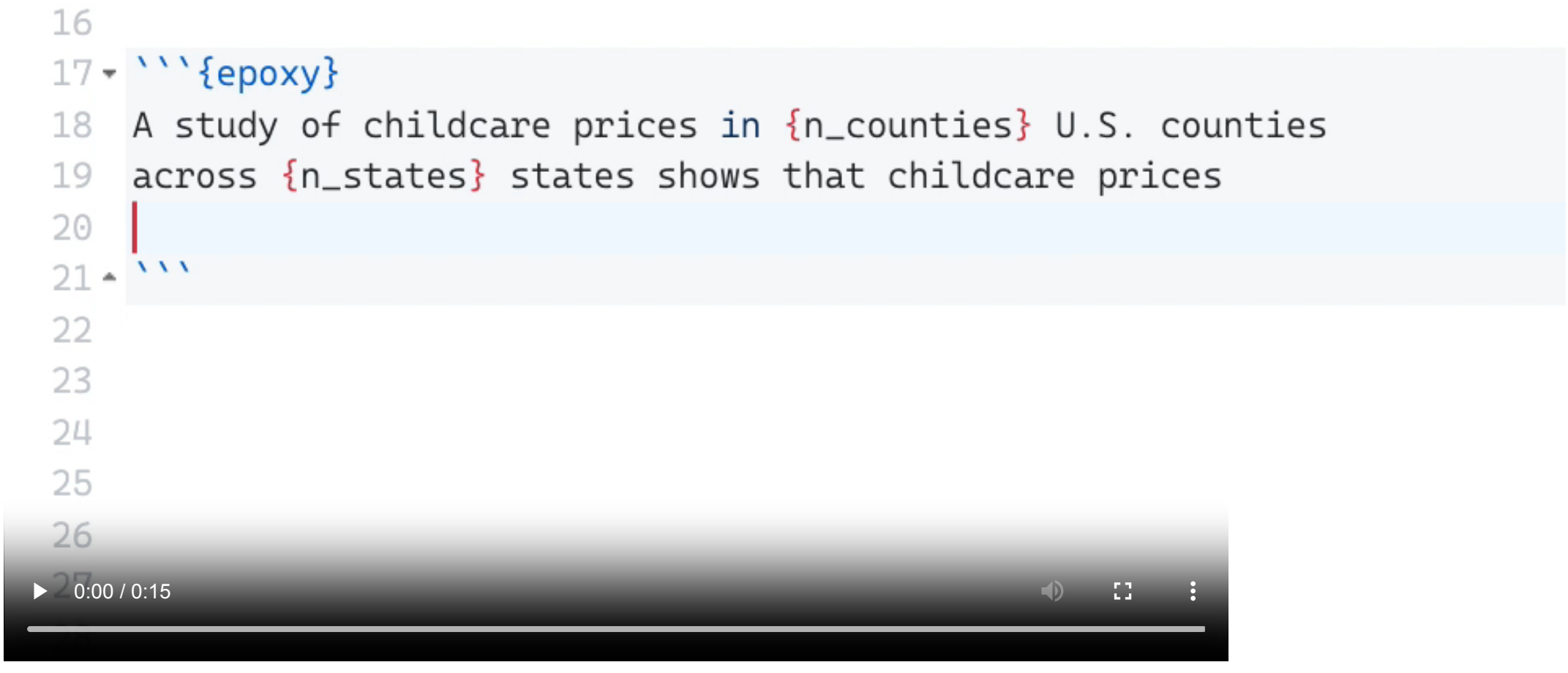
````
```{r}
library(epoxy)
```

```{epoxy}
A study of childcare prices in
{n_counties}
U.S. counties across
{n_states}
states shows that childcare prices
for a single child
range from
{costs_min$cost}
for {costs_min$age} {costs_min$type}-based care
in {costs_min$county_size} counties to
{costs_max$cost}
for {costs_max$age} {costs_max$type}-based care
in {costs_max$county_size} counties.
This is equivalent to between
{costs_min$mhi_pct} and {costs_max$mhi_pct}
of median family income per child in paid care.
```
````

R Markdown + epoxy

````
```{r}
library(epoxy)
```

```{epoxy}
A study of childcare prices in
{n_counties}
U.S. counties across
{n_states}
states shows that childcare prices
for a single child
range from
{costs_min$cost}
for {costs_min$age} {costs_min$type}-based care
in {costs_min$county_size} counties to
{costs_max$cost}
for {costs_max$age} {costs_max$type}-based care
in {costs_max$county_size} counties.
This is equivalent to between
{costs_min$mhi_pct} and {costs_max$mhi_pct}
of median family income per child in paid care.
```
````


16
17 ```{epoxy}
18 A study of childcare prices in {n_counties} U.S. counties
19 across {n_states} states shows that childcare prices
20
21 ```
22
23
24
25
26
27
0:00 / 0:15

R Markdown + epoxy is amazing-ish

A study of childcare prices in
2360
U.S. counties across
41
states shows that childcare prices
for a single child
range from
4810
for school-age home-based care
in small counties to
15416.96
for infant center-based care
in very large counties.
This is equivalent to between
0.099079242795641 3 and 0.23764466504300 6
of median family income per child in paid care.

`r costs_max$cost`

{costs_max$cost}

```
{.dollar costs_max$cost}
```

```
{.pct costs_max$mhi_pct}
```

```
{.comma n_counties}
```

```
{.comma n_counties}
```

```
scales::label_comma()(n_counties)
```

R Markdown + epoxy is amazing-er

````
```{r include=FALSE}
library(epoxy)
```

```{epoxy}
A study of childcare prices in {.comma n_counties} U.S. counties across
{n_states} states shows that childcare prices for a single child range from
{.dollar costs_min$cost} for {costs_min$age} {costs_min$type}-based care
in {costs_min$county_size} counties to {.dollar costs_max$cost} for
{costs_max$age} {costs_max$type}-based care in {costs_max$county_size} counties.
This is equivalent to between {.pct costs_min$mhi_pct} and
{.pct costs_max$mhi_pct} of median family income per child in paid care.
```
````

R Markdown + epoxy is amazing-er

A study of childcare prices in 2,360 U.S. counties across 41 states shows that childcare prices for a single child range from $4,810 for school-age home-based care in small counties to $15,416.96 for infant center-based care in very large counties. This is equivalent to between 10% and 24% of median family income per child in paid care.

epoxy is built on glue

```
glue("for a single child range from {costs_min$cost}")

#> for a single child range from 4810
```

epoxy is built on glue

```
glue("for a single child range from {costs_min$cost}")

#> for a single child range from 4810

epoxy("for a single child range from {costs_min$cost}")

#> for a single child range from 4810
```

epoxy is built on glue

```
glue("for a single child range from {.dollar costs_min$cost}")

#> Error in parse(text = text, keep.source = FALSE): <text>:1:9: unexpected symbol
#> 1: .dollar costs_min
#>              ^

epoxy("for a single child range from {.dollar costs_min$cost}")

#> for a single child range from $4,810
```

These are the same

.Rmd

````
```{epoxy}
for a single child range from {.dollar costs_min$cost}
```
````

for a single child range from $4,810

.R

```
epoxy("for a single child range from {.dollar costs_min$cost}")

#> for a single child range from $4,810
```

Inline transformations with epoxy

```
epoxy(
  "range from {.dollar costs_min$cost} to {.dollar costs_max$cost}"
)

#> range from $4,810 to $15,416.96
```

Inline transformations with epoxy

```
epoxy(
  "range from {.dollar costs_min$cost} to {.dollar costs_max$cost}",
  .transformer = epoxy_transform_inline()
)
```

```
#> range from $4,810 to $15,416.96
```

Inline transformations with epoxy

```
epoxy(
  "range from {.dollar costs_min$cost} to {.dollar costs_max$cost}",
  .transformer = epoxy_transform_inline(
    .dollar = scales::label_dollar()
  )
)

#> range from $4,810 to $15,416.96
```

Inline transformations with epoxy

```
epoxy(
  "range from {.dollar costs_min$cost} to {.dollar costs_max$cost}",
  .transformer = epoxy_transform_inline(
    .dollar = scales::label_dollar(accuracy = 10)
  )
)

#> range from $4,810 to $15,420
```

Inline transformations with epoxy

```
epoxy_transform_set(
  .dollar = scales::label_dollar(accuracy = 10)
)

epoxy(
  "range from {.dollar costs_min$cost} to {.dollar costs_max$cost}"
)
```

```
#> range from $4,810 to $15,420
```

Inline transformations with epoxy

```
ages <- childcare_summary |> count(age) |> mutate(across(age, paste))
```

```
#> # A tibble: 4 × 2
#>   age            n
#>   <chr>      <int>
#> 1 infant         8
#> 2 toddler        8
#> 3 preschool      8
#> 4 school-age     8
```

```
epoxy("children were in the age groups {ages$age}")
```

```
#> children were in the age groups infant
#> children were in the age groups toddler
#> children were in the age groups preschool
#> children were in the age groups school-age
```

Inline transformations with epoxy

```
ages <- childcare_summary |> count(age) |> mutate(across(age, paste))
```

```
#> # A tibble: 4 × 2
#>   age            n
#>   <chr>      <int>
#> 1 infant         8
#> 2 toddler        8
#> 3 preschool      8
#> 4 school-age     8
```

```
epoxy("children were in the age groups {.and ages$age}")
```

```
#> children were in the age groups infant, toddler, preschool, and school-age
```

Inline transformations with epoxy

```
ages <- childcare_summary |> count(age) |> mutate(across(age, paste))
```

```
#> # A tibble: 4 × 2
#>   age              n
#>   <chr>        <int>
#> 1 infant           8
#> 2 toddler          8
#> 3 preschool        8
#> 4 school-age       8
```

```
epoxy("children were in the age groups {.or ages$age}")
```

```
#> children were in the age groups infant, toddler, preschool, or school-age
```

Inline transformations with epoxy

```
epoxy("age groups ranged from {.to ages$age}")
```

```
#> age groups ranged from infant
#> age groups ranged from toddler
#> age groups ranged from preschool
#> age groups ranged from school-age
```

Inline transformations with epoxy

```
epoxy_transform_set(
  .to = function(x) {
    glue_collapse(x, sep = ", ", last = " to ")
  }
)

epoxy("age groups ranged from {.to ages$age}")

#> age groups ranged from infant, toddler, preschool to school-age
```

Inline transformations with epoxy

```
epoxy("age groups ranged from {.to {.titlecase ages$age}}")

#> age groups ranged from Infant, Toddler, Preschool to School-Age
```

Inline transformations with epoxy

```
epoxy("age groups ranged from {.to {.tc ages$age}}")

#> age groups ranged from Infant, Toddler, Preschool to School-Age
```

Inline transformations with epoxy

```
epoxy(
  "These slides were rendered on {.date now()} at {.time now()}."
)
```

```
#> These slides were rendered on 2023-06-08 at 14:43:05.
```

`now()` is from `lubridate`, which is now loaded with `library(tidyverse)`!

Inline transformations with epoxy

```
epoxy(
  "These slides were rendered on {.date now()} at {.time now()}.",
  .transformer = c("inline", "bold")
)
```

```
#> These slides were rendered on **2023-06-08** at **14:43:05**.
```

epoxy for LaTeX

```
epoxy("prices in {.comma n_counties} U.S. counties")

#> prices in 2,360 U.S. counties
```

epoxy for LaTeX

```
epoxy("prices in {.comma n_counties} U.S. counties")

#> prices in 2,360 U.S. counties

epoxy("prices in {{.comma n_counties}} U.S. counties")

#> prices in {.comma n_counties} U.S. counties
```

epoxy for LaTeX

```
epoxy("prices in \\textbf{{.comma n_counties}} U.S. counties")

#> prices in \textbf{.comma n_counties} U.S. counties
```

epoxy for LaTeX

```
epoxy("prices in \\textbf{{.comma n_counties}} U.S. counties")

#> prices in \textbf{.comma n_counties} U.S. counties

epoxy("prices in \\textbf{{{.comma n_counties}}} U.S. counties")

#> prices in \textbf{2,360} U.S. counties
```

epoxy for LaTeX

```
epoxy_latex("prices in \\textbf{<.comma n_counties>} U.S. counties")

#> prices in \textbf{2,360} U.S. counties
```

epoxy for LaTeX

```
epoxy_latex("prices in \\textbf{<.comma n_counties>} U.S. counties")

#> prices in \textbf{2,360} U.S. counties
```

This is equivalent to an `epoxy_latex` chunk...

````
```{epoxy_latex}
prices in \\textbf{<.comma n_counties>} U.S. counties
```
````

...but the output of `epoxy_latex` chunks render in LaTeX outputs.

epoxy for HTML

```
epoxy_html("prices in <strong>{{.comma n_counties}}</strong> U.S. counties")
```

prices in **2360** U.S. counties

epoxy for HTML

```
epoxy_html("prices in <strong>{{.comma n_counties}}</strong> U.S. counties")
```

prices in **2360** U.S. counties

```
prices in <strong><span class="comma">2360</span></strong> U.S. counties
```

epoxy for HTML

```
epoxy_html("prices in {{.comma n_counties}} U.S. counties")
```

prices in 2360 U.S. counties

```
prices in <span class="comma">2360</span> U.S. counties
```

epoxy for HTML

```
epoxy_html("prices in {{strong n_counties}} U.S. counties")
```

prices in **2360** U.S. counties

```
prices in <strong>2360</strong> U.S. counties
```

epoxy for HTML

```
epoxy_html("prices in {{strong {{.comma n_counties}}}} U.S. counties")
```

prices in **2,360** U.S. counties

```
prices in <strong>2,360</strong> U.S. counties
```

Templating small and large

Data-masked chunks

```
```{epoxy}
{costs_min$cost} for {costs_min$age} {costs_min$type}-based care
in {costs_min$county_size} counties
```
```

4810 for school-age home-based care in small counties

Data-masked chunks

```
```{epoxy data=costs_min}
{.dollar costs_min$cost} for {costs_min$age} {costs_min$type}-based care
in {costs_min$county_size} counties
```
```

$4,810 for school-age home-based care in small counties

Data-masked chunks

```
```{epoxy data=costs_min}
{.dollar cost} for {age} {type}-based care
in {county_size} counties
```
```

$4,810 for school-age home-based care in small counties

Data-masked chunks

```
```{epoxy data=costs_min}
{.dollar cost} for {age} {type}-based care in {county_size} counties
```
```

$4,810 for school-age home-based care in small counties

Data-masked chunks

```
```{epoxy data=costs_min}
{.dollar cost} for {age} {type}-based care in {county_size} counties
```
```

$4,810 for school-age home-based care in small counties

```
```{epoxy data=costs_max}
{.dollar cost} for {age} {type}-based care in {county_size} counties
```
```

$15,420 for infant center-based care in very large counties

Tiny templates with ref.label

````
```{epoxy cost-summary, data=costs_min}
{.dollar cost} for {age} {type}-based care in {county_size} counties
```
````

$4,810 for school-age home-based care in small counties

````
```{epoxy ref.label = "cost-summary", data=costs_max}
```
````

$15,420 for infant center-based care in very large counties

Tiny templates with ref.label

````
A study of childcare prices in
```{epoxy}
{.comma n_counties} U.S. counties across {n_states} states
```
shows that childcare prices for a single child range from
```
```{epoxy ref.label = "cost-summary", data=costs_min}
```
to
```{epoxy ref.label = "cost-summary", data=costs_max}
```
per year. This is equivalent to between
```{epoxy}
{.pct costs_min$mhi_pct} and {.pct costs_max$mhi_pct}
```
of median family income per child in paid care.
````
````

Tiny templates with ref.label

A study of childcare prices in 2,360 U.S. counties across 41 states shows that childcare prices for a single child range from $4,810 for school-age home-based care in small counties to $15,420 for infant center-based care in very large counties per year. This is equivalent to between 10% and 24% of median family income per child in paid care.

✨ Shiny Apps ✨

epoxy in Shiny apps

```
radioButtons("county_size", "County Size", ...),
radioButtons("type", "Childcare Type", ...),
radioButtons("age", "Age Group", ...)
```

epoxy in Shiny apps

```
radioButtons("county_size", "County Size", ...),
radioButtons("type", "Childcare Type", ...),
radioButtons("age", "Age Group", ...)


p(
  "The median childcare cost for a single ",
  "AGE in TYPE-based care",
  "is COST in COUNTY_SIZE counties."
)
```

epoxy in Shiny apps

```
radioButtons("county_size", "County Size", ...),
radioButtons("type", "Childcare Type", ...),
radioButtons("age", "Age Group", ...)
```

```
ui_epoxy_html(
  .id = "summary",
  p(
    "The median childcare cost for a single ",
    "{{ age }} in {{ type }}-based care",
    "is {{ cost }} in {{ county_size }} counties."
  )
)
```

epoxy in Shiny apps

```
radioButtons("county_size", "County Size", ...),
radioButtons("type", "Childcare Type", ...),
radioButtons("age", "Age Group", ...)
```

```
ui_epoxy_html(
  .id = "summary",
  p(
    "The median childcare cost for a single ",
    "{{ age }} in {{ type }}-based care",
    "is {{ cost }} in {{ county_size }} counties."
  )
)
```

```
output$summary <- render_epoxy(
  age = input$age,
  type = input$type,
  county_size = input$county_size,
  cost = ...
)
```

epoxy in Shiny apps

```
output$summary <- render_epoxy(
  age = input$age,
  type = input$type,
  county_size = input$county_size,
  cost = cost()$cost
)
```

epoxy in Shiny apps

```
output$summary <- render_epoxy(
  age = input$age,
  type = input$type,
  county_size = input$county_size,
  cost = cost()$cost
)


cost <- reactive({
  childcare_summary |>
    filter(
      age == input$age,
      type == input$type,
      county_size == input$county_size
    ) |>
    mutate(cost = scales::dollar(cost, accuracy = 1))
})
```

Demo Time Field Trip

But wait, there's more!

But wait, there's more!

- You can use `{{ }}` anywhere (almost) in any UI element!

  Try `run_epoxy_example_app("ui_epoxy_html")`

But wait, there's more!

- You can use `{{ }}` anywhere (almost) in any UI element!

  Try `run_epoxy_example_app("ui_epoxy_html")`

- You can use markdown instead with `ui_epoxy_markdown()`

  Try `run_epoxy_example_app("ui_epoxy_markdown")`

But wait, there's more!

- You can use `{{ }}` anywhere (almost) in any UI element!

  Try `run_epoxy_example_app("ui_epoxy_html")`

- You can use markdown instead with `ui_epoxy_markdown()`

  Try `run_epoxy_example_app("ui_epoxy_markdown")`

- Mustache templates with `ui_epoxy_mustache()` (and the `whisker` engine)

  Try `run_epoxy_example_app("ui_epoxy_mustache")`

Thanks!

Learn more about epoxy

- Get to know epoxy (`pkg.garrickadenbuie.com/epoxy`)
- Would love to hear from you or help you use epoxy! Come to the discussion board
- slides.garricakdenbuie.com/seamless-epoxy

About me

- Read: garrickadenbuie.com
- Chat: @grrrck@fosstodon.org
- Code: @gadenbuie



🤦 Thank you R/Medicine!