

Synopsis of Our Design Concept

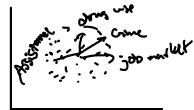
We are studying the predictiveness of variables in several categories (economic, demographic, housing, etc.) which we hypothesize predict homelessness per capita in major US metropolitan statistical areas (MSAs). Our intended users are policymakers, NGO workers, homeless advocates, and journalists covering homelessness, each of whom may be interested in which factors predict homelessness rates in American cities. Our design is part of a plan to visually display the information most important to these stakeholders by building (1) a main dashboard with a heatmap overviewing how predictive each of ~12 variables is of homelessness per capita, (2) detailed views for each variable showing how it has evolved over time in each city and (3) a dashboard quantifying the impact of homelessness in US cities.

Reflections on the 5-Sheet Design Exercise

The 5-Sheet Design Process helped us sharpen rough initial ideas into a focused, considered design. The exercise reinforced the importance of starting with our users' needs and tailoring visualizations to their priorities; we applied this filter consistently as we refined loose ideas for interesting visualizations into more specific plans for effective dashboards capturing information our prospective users would prioritize. Articulating the overview page (Sheet 5) that addresses our likely users' highest-level questions and provides a structured menu for investigating the data more deeply was a key moment in our brainstorming process. The exercise also reminded us to frame general questions about the data precisely in terms of quantitatively testable hypotheses. This helped us think clearly about which specific variables we need to access to address our questions about homelessness in the US. We realized we would not find all the information we wanted in one convenient dataset, requiring us to merge datasets from various sources and think carefully about the granularity & organization of data from each source. Finally, the design process helped us focus our scope in cases where data may be unavailable or insufficiently granular to test hypotheses at an appropriate level.

1. Ideas

Efficacy of rent/utility programs
 Crime in relation to homelessness
 Moving tent cities? Setting up
 tiny home communities?
 Predictors of homeless & economy up
 Happiness indexes? ↑ along w/ use up
 Job market? Cluster map with
 different parameters of effects on
 homeless vulnerable populations



Look at survey data from shelters, what
 works?

Undercounting homeless & 's - Predict
 how many there will be in future? Compare
 to other metros?



2. Filter

Predictors of homelessness
 Making a cluster map,
 modeling geographic data
 Vulnerable populations
 Survey data?

3. Categorize

Background research: Homeless trends,
 understanding of programs, distribution

The now: Situation around
 the country, what is the largest
 indicator?

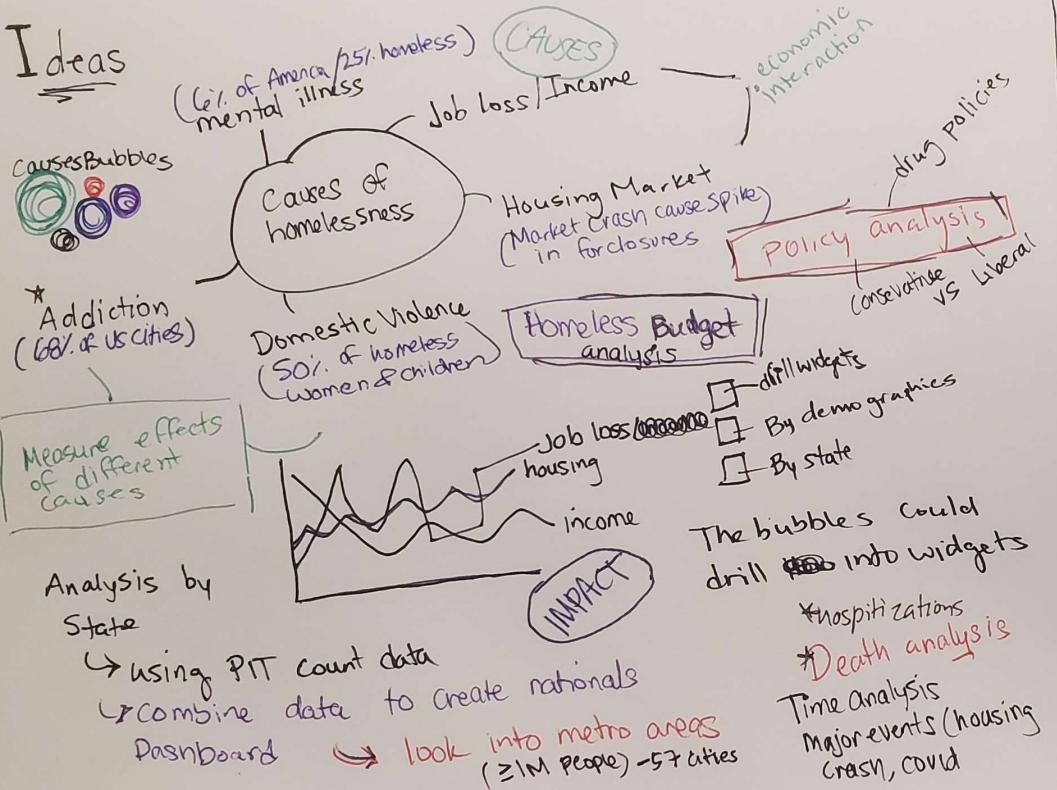
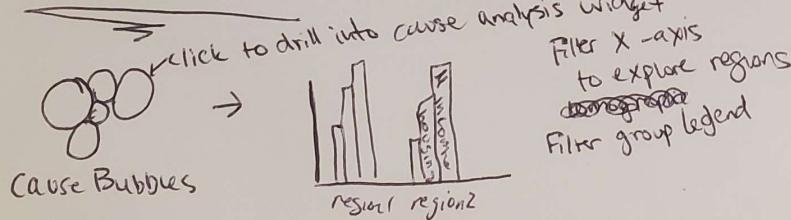
Future: Extrapolate data,
 predict trends, what matters
 most? Break down by finance, health,
 programs?

4. Combine and Refine

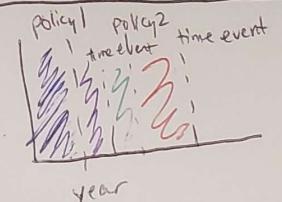
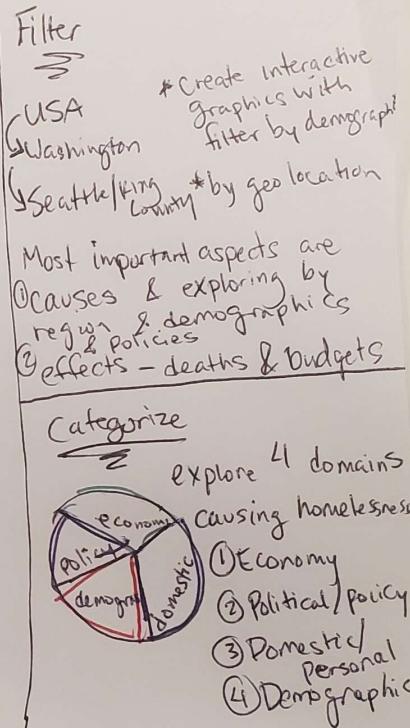
- Need to prioritize time, some background info but only for context.
- Heavy work on the current situation
- Understand the future is unknown and try to determine what we can and cannot say is causal or correlated.
- Use geographical maps, toggle maps over time, maybe parallel coordinates, clustering on parameters

5. Question

How can we predict
 homelessness by
 toggling different
 parameters? What
 are effective ways to help?

IdeasCombine & Refine

or can plot correlations
if have interaction between x & y variables to correlate



Ideas

- Analysis of factors that may relate to homelessness
- Geographic comparisons of socio-economic factors (& related homelessness) by neighborhood
- Cost of living data, job market, etc.
- National-scale context: compare Seattle to other cities
- Legislation/gov./private intervention history & impact
- Opposite directions: How homelessness impacts policy change, Col., inflation, etc.

Heat MapsFilter

- May add too much noise w/ supplementary datasets?
- Combine related/overlapping ideas into multivariate viz

Categorize

- Causes of homelessness
- Chronological/prediction
- Impacts of homelessness

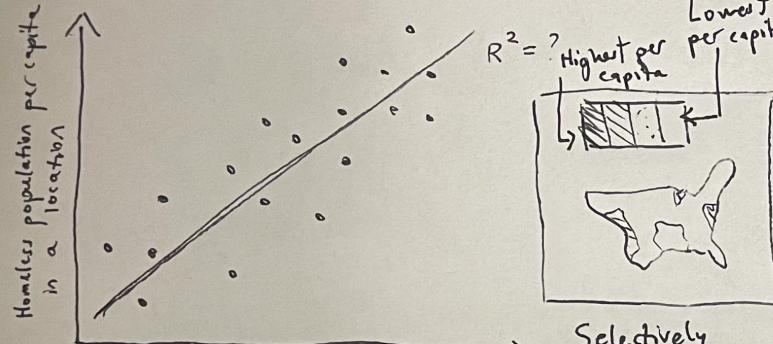
Combine and Refine

Compare Homelessness & factors across cities

Financial/health impact of h/

Question

How do various socio-econ. factors impact homelessness across major U.S. cities?

Ideas.

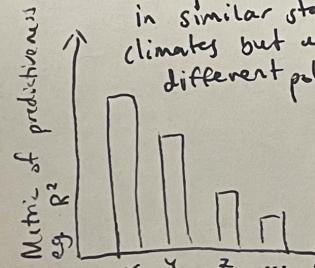
Leading Indicator for Homelessness in that



Selectively compare cities in similar states/climates but w/ different policies?

Datasets

- HUD Datasets
- Census Bureau data
- Inflation data (county level)?
- CDC data - did pandemic influence? Variables studied
- FBI ~~Illegal~~ drug data? Does this exist?

Combine & Refine

Approach: We can endlessly search for variables in the datasets above to find what is explanatory for per-capita homelessness. Better approach seems to be: pick a few variables of interest (limit scope) & quantify to what extent they explain homelessness rates in major metros.

Output is something like:

Raw data, visualize these on heatmap

	Homeless Pop. per Cap.	Variable	R ² w/ Homeless Rate
City A	x	Inflation	x
City B	y	Rent Increase	y
City C	z	Drug Use Prevalence	z
		(COVID) Death Toll	:

Filter.

- Investigating all datasets will be a lot to tackle - need to focus question & choose 1, 2 sheets
- Population threshold - focus on cities with large population - rural areas will almost always have low officially recorded homelessness

Categorize

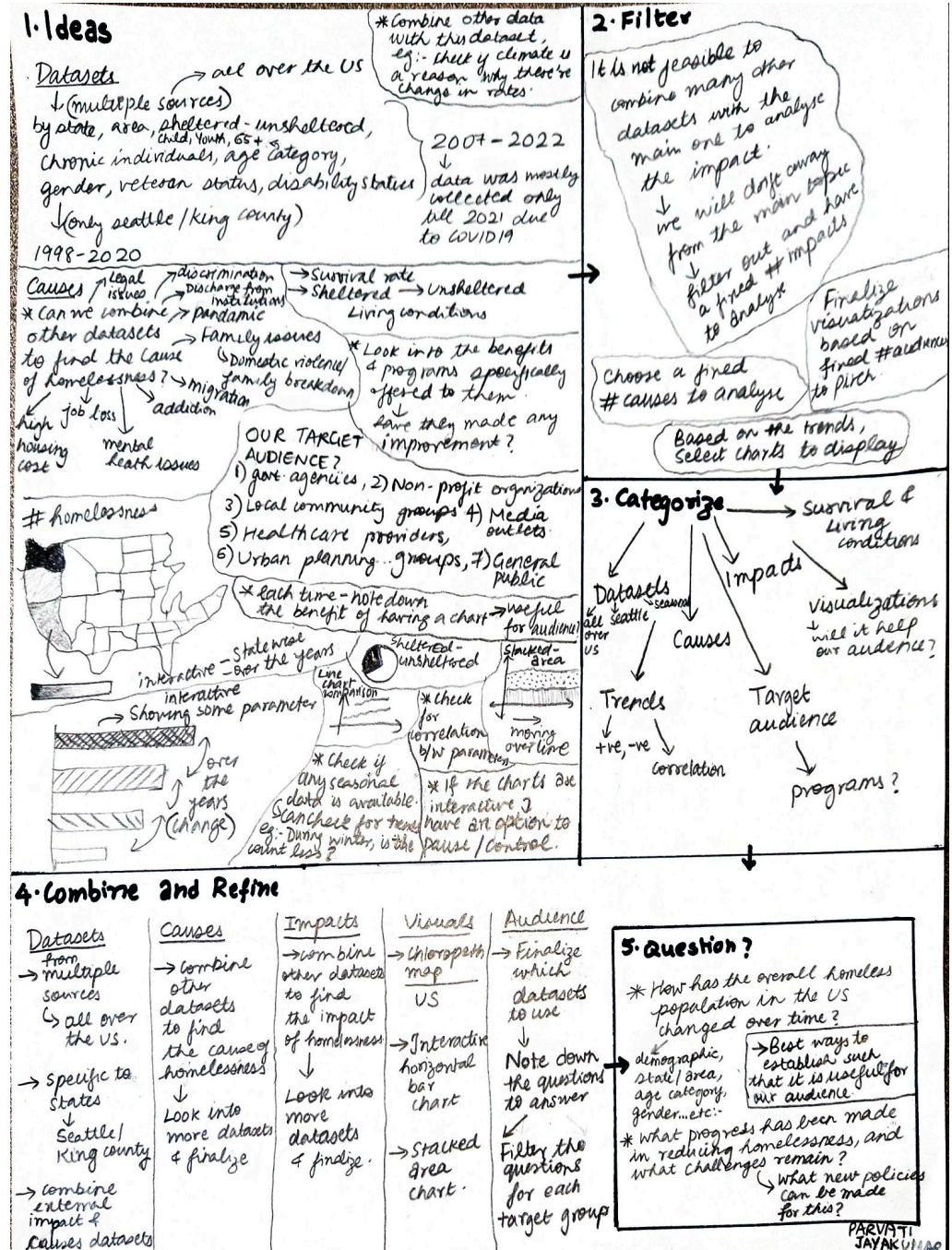
- cost of living causal factors
- Substance-related causal factors
- Public-health related causal factors

Separable?

At least these likely need to be grouped

5. Questions

To what extent do a few (presumptively causal) variables explain per-capita homelessness in major US metro areas?



1. Ideas

- Timeline of ODs & Homelessness over the years
 - > Mark date when decriminalization happened
 - > When they bused people over
- States that have the highest rate of homelessness
 - Education rating
- US Census Bureau
- Inflation • Minimum wage
- Housing prices • Gender
- Cost of living • Shelter
- Drug addiction Closing Time

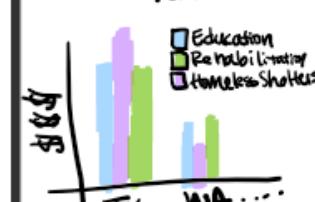
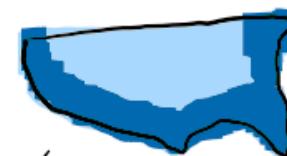
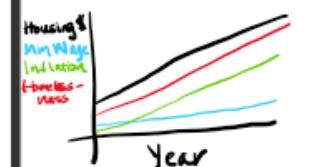
2. Filter

- 1) Housing Prices
- 2) Homeless / Per State
- 3) Education System Rating
- 4) Minimum Wage
- 5) Proximity to border / location

3. Categorize

- 1) Trend line
- 2) Bar chart or geo map
- 3) Bar chart
- 4) Timeline b/w min wage, housing cost, homelessness / inflation
- 5) geo map

4. Combine and Refine



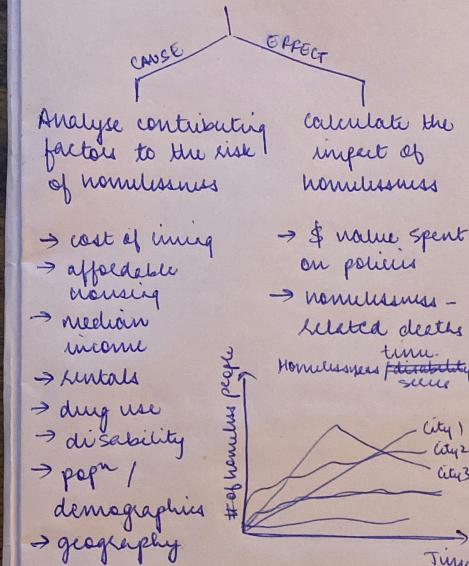
geo maps to indicate homeless rates

How much \$ each state invests in certain programs...

5. Question

- What factors are seen the most in states w/ high homeless rates?
- How does education play a role?

1. Ideas



change in homelessness and other factors (drug use, rental prices) over time

Economic effect
gentrification, inflation, rents
unemployment

empty unaffordable housing
furniture sales
geographic spread of homelessness

2. Filter

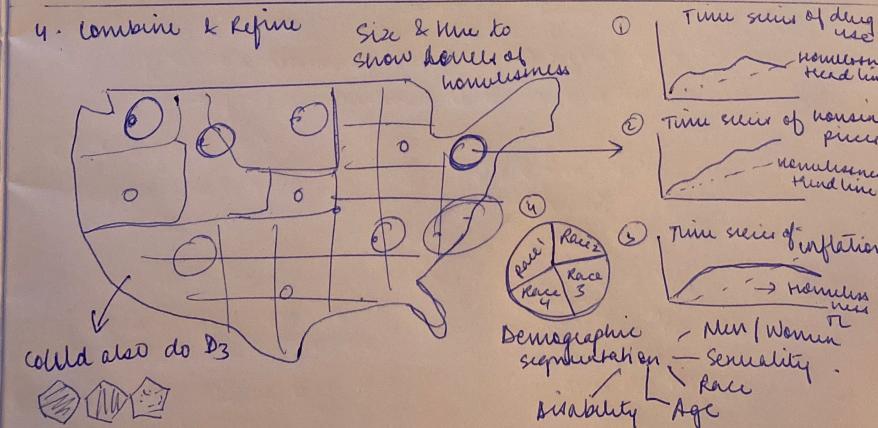
- 5 broad "cause" categories
 - economic
 - social / demographic
 - health
 - climate
 - housing market

Evaluate time series trends of some metric within these categories.

3. Categorise

- Subset: Top 50 metro cities U.S.
- Trends of homelessness over time
- Top 10 & Bottom 10
- compare & contrast

4. Combine & Refine



Layout

Homeless Rates + Change Over Time
in top 5, bottom 5 Metro Areas

zoom in on % in Metro Area.

CAUSAL FACTORS OF HOMELESSNESS

homeless Pop.
Housing Cost
Inflation Rate
Unemployment
Policies due to Politics

Years
Filter by cities

Demographic

Pacific Islander
African American
Hispanic/Latino
Asian
White
Native American

Bar Plot for Public Health

- Mortality
- Hospitalizations due to drugs
- etc...

Dashboard for:

- Housing
- Public Health
- Demographics
- Political Climate
- Macroeconomics
- Welfare Programs

Focus

- Discovery of factors that contribute to homelessness
- Relationship btwn the factors
 - Note ones that are more significant, and even ones that have no relationship

Discussion

Title: Factors That Contribute to Homelessness in Top Metro Areas
Author: [redacted]
Date: [redacted]

Sheet: 2
Task: [redacted]

Operations

Combine datasets for housing \$, macroeconomics, demographics, etc... make sure to center data on homelessness

Layout

- Dashboard... for welfare and health statistics
- filter by state & coc

population

2019

# of recipients	Tanf	Medicaid	Snap	Housing Assistance
2010				
2011				
2012				
2013				
2014				
2015				
2016				
2017				
2018				
2019				
2020				
2021				
2022				

Title: Welfare and Health Impacts of Homelessness
Author:
Date: 11/07/2023
Sheet: 3
Task:

Operations

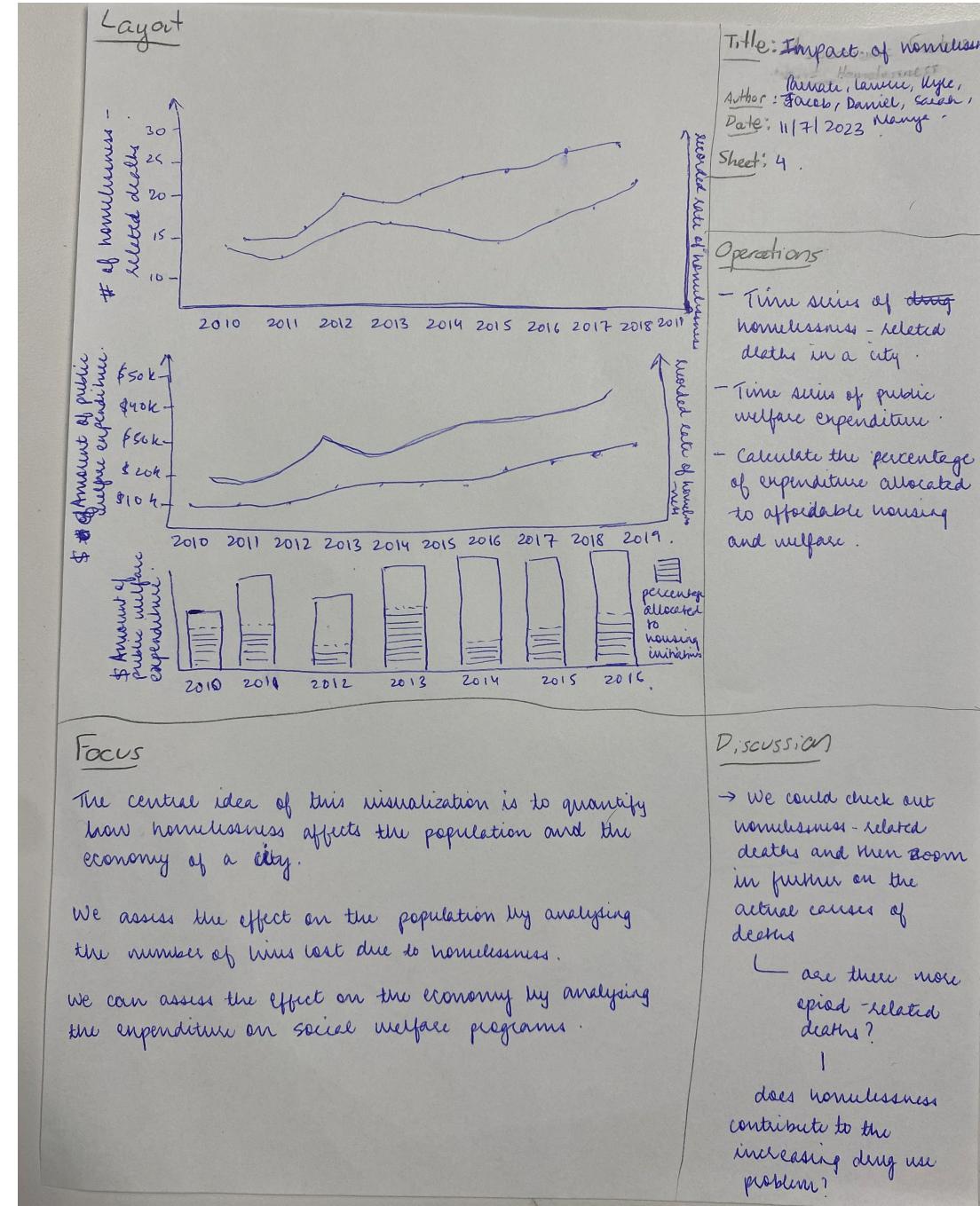
- gather data for years: ~~2010~~ 2010-2022
- find data for welfare programs at national/ state level

Focus

- what are the impacts of homelessness
- medical examiner data shows place of death, characteristics / demographics, cause of death
- Welfare Programs across america
- health stats (ie mental health issues)

Discussion

- How does health insurance affect homelessness?
- Rate of death may change over time due to different policies (i.e. drug policies)
- How does homelessness impact access to healthcare services?



Title: Landing Page Concept
Author: Sarah, Kyle, Mayya,
Sheet: 5
Date: 11/7/2023

Sheet 5:

LAYOUT Which variables are most predictive of an MSA's homelessness rate 5 years later?

LANDING PAGE, with links to detailed views

Category

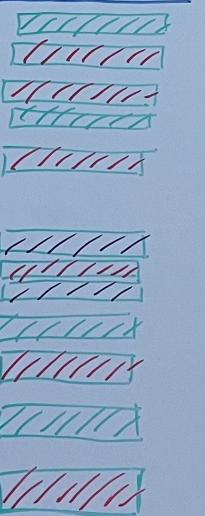
Proxy Variable

plan to include

Category	Proxy Variable
Housing	• % increase in med. rent • % increase in purchase price
Macroeconomic	• % change in MSA CPI • % change in unemployment
Safety Net	• % change in spending on shelter • % change
Demographic	• % in racial group • % gender identity • % sexual orientation
Policy Climate	• dummy var: partisan shift • city council control by party
Public Health	• % change in pop. insured • % change in qual. for Federal disability

to have

Predictiveness (R^2)



highly predictive

moderately predictive

not predictive

FOCUS We aim to answer 2 questions:

• How predictive (quantified by R^2) are several variables of homeless rate 5 years later?

• Quantify the impact of homeless rates (not on the overview screen, separate dashboard.)

OPERATIONS

- Highest-level overview for users, they can choose variables to double-click on from here.
- Hover over color in heatmap: display R^2
- Click on name of proxy var: takes user to detailed view for that var.

DETAILS

- Behind each proxy var, - scatterplot of that variable (x) vs. homelessness (y).
- time series, filterable: how has that variable evolved

