Relocation Database: Prototype Design and Implementation

EPPS 6354: Information Management

Introduction: Why relocation?

- Place of residence can impact quality of life
  - Multiple aspects are dependent on geographical location
    - Ex. health access, travel distance, food access, financial/tax summary, detailed tax rates, etc.

- How can a database help?
  - Outline factors that can be considered before moving
  - Provide insight into socio-economic aspects of society

Literature Review: Aspects of residency

- Travel distance to work influences residential relocation (Clark and Burt 1980)

- Urban form impacts travel behavior (Krizek 2003)

- Landfill site exposure results in multiple health problems including both physical and mental (Hertzman et al. 1987)

- Housing affordability may play a larger role than other housing aspects (Burnley, Murphy, and Jenner 1997)

- Spatial aspects matter just as much as socioeconomic inequities when discussing access to healthy and affordable food (Larsen and Gilliland 2008)

Literature Review: Benefits of a database

- Health-care infrastructure can be improved through collaboration between free clinics and medical schools (VanderWielen et al. 2015)
- Neighborhood racial and income composition impacts distribution of stores supplying healthy food (Miller, Middendorf, and Wood 2015)
- Food access is not the sole factor behind the frequency of welfare diseases (Amcoff 2017)
- Water conservation behavior is driven by pro-environmental behavior and the active pursuit of information concerning water (Dolnicar, Hurlimann, and Grün 2012)
- Adolescent mental and behavioral health is impacted by high poverty residences and exacerbated by relocation to lower poverty residences (Byck et al. 2015)
- Lack of knowledge concerning risks to human health from residing near landfill sites (Vrijheid 2000)

Applications

- No database currently exists which stores information that can inform the public about aspects and characteristics of geographic locations
- Data is not consolidated

- If database existed, it would be effective, efficient, and beneficial to the public

- A database may…
  - help local governments and organizations to identify and potentially address social issues
  - help facilitate and encourage informed relocation decisions
    - users will have access to organized information located in one area

Database Design: Data Collection

- Data source: Texas Association of Counties
    - Information about Texas counties:
        - Age
        - Education/unemployment
        - Ethnicity/race
        - General information
        - Income/poverty
        - Population
- Data is limited for the purposes of the prototype

Database Design: Rationale

- Prototype:
    - Majority of data is organized in accordance to Texas counties

- Final version:
    - Inclusion of additional relations will add more complexity and interrelationships among relations within the database model

- Aim to deliver a simple database model that demonstrates how users may find relevant data
- In the future, data elements will interrelate on additional levels

Relational Schema Diagram
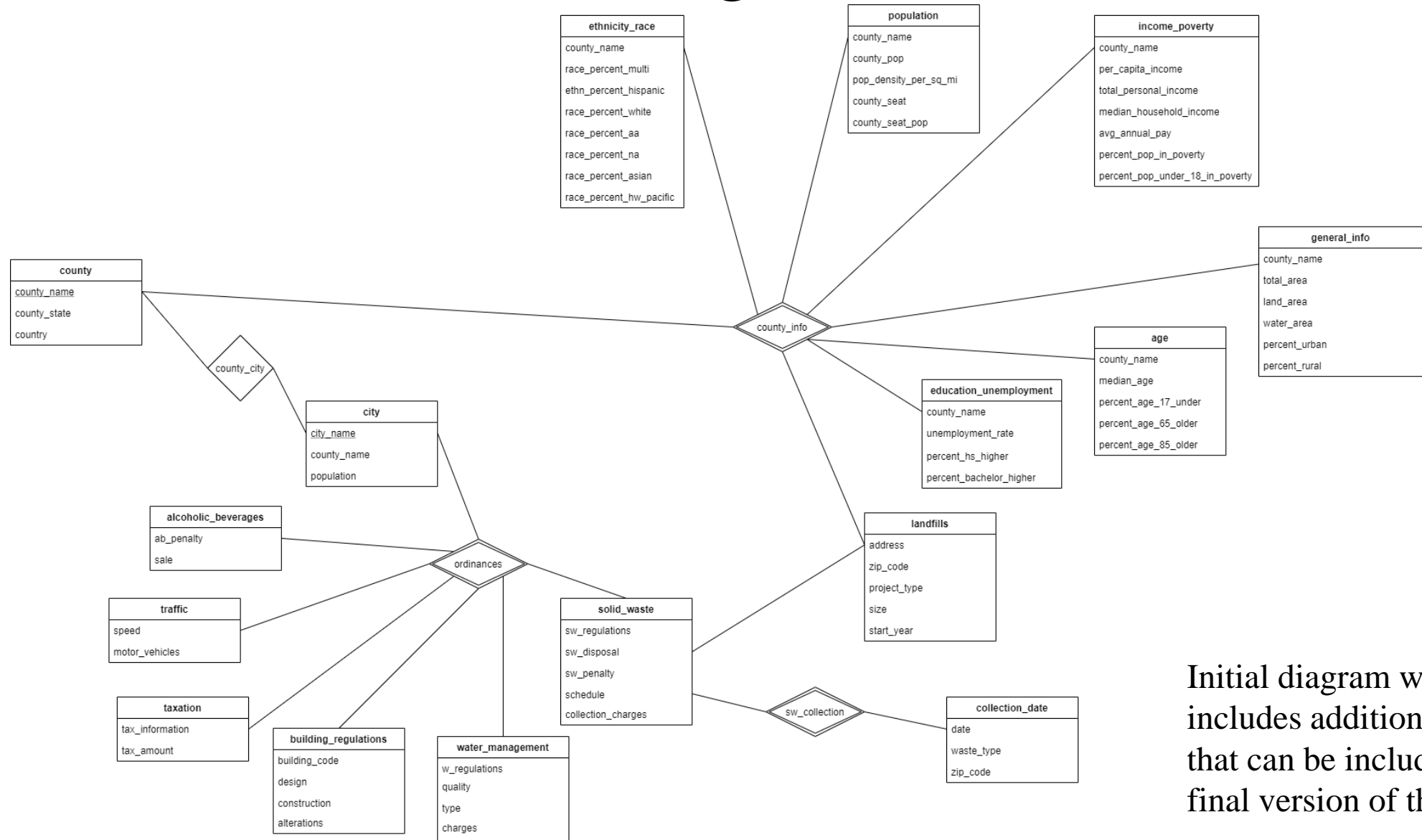
Initial diagram which also includes additional aspects that can be included in the final version of the database

Entity Relationship Diagram
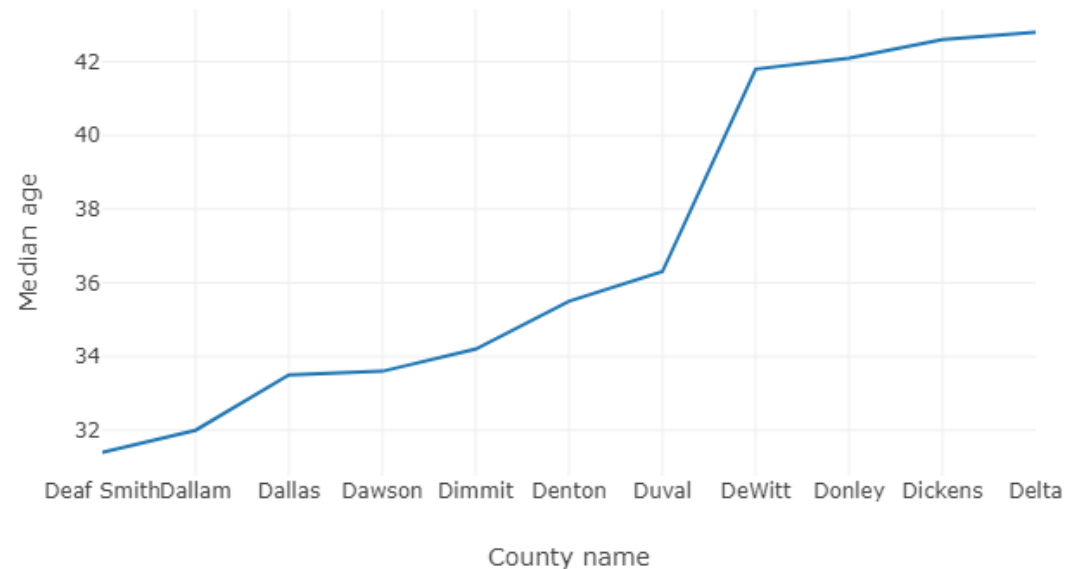

Not focusing on many sides of the relationship

SQL Queries and Visualizations

```sql
1  SELECT DISTINCT c.county_name, a.median_age, g.percent_urban
2  FROM county AS c
3  INNER JOIN age AS a ON c.county_name = a.county_name
4  INNER JOIN general_info AS g ON a.county_name = g.county_name
5  WHERE a.county_name LIKE 'D%'
6  ORDER BY a.median_age ASC;
```

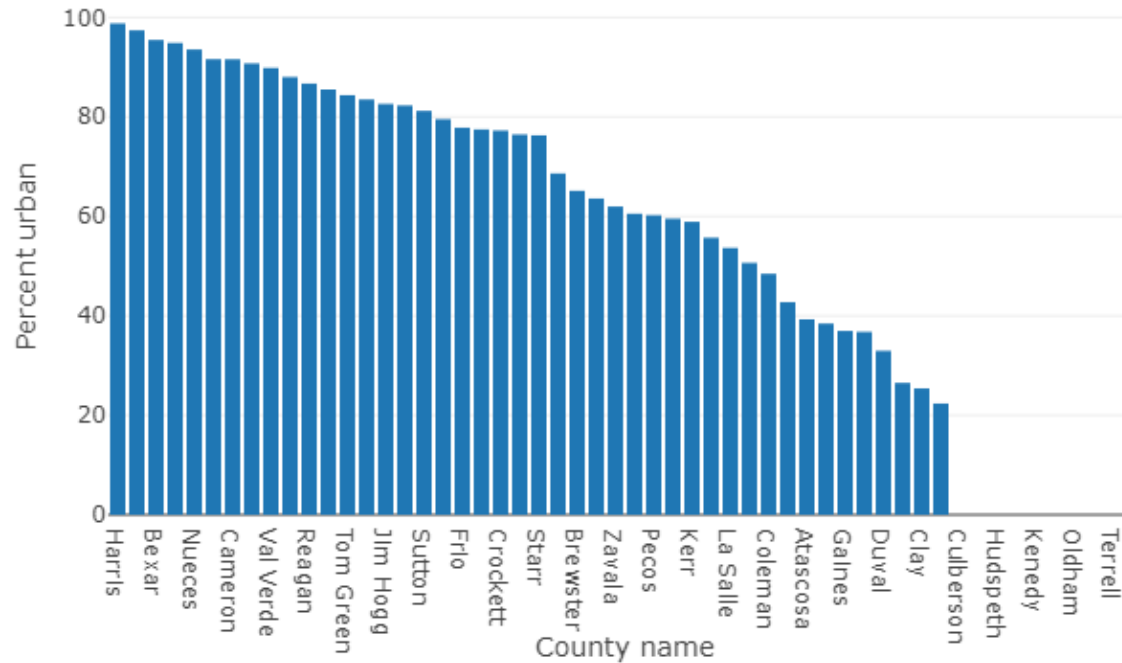SCHEDULE   RUN

Median age in Texas counties

SQL Queries and Visualizations

```
1  SELECT DISTINCT c.county_name, g.percent_urban
2  FROM county AS c
3  INNER JOIN general_info AS g ON c.county_name = g.county_name
4  WHERE g.total_area > '1100.00'
5  ORDER BY g.percent_urban DESC;
```

SCHEDULE   RUN
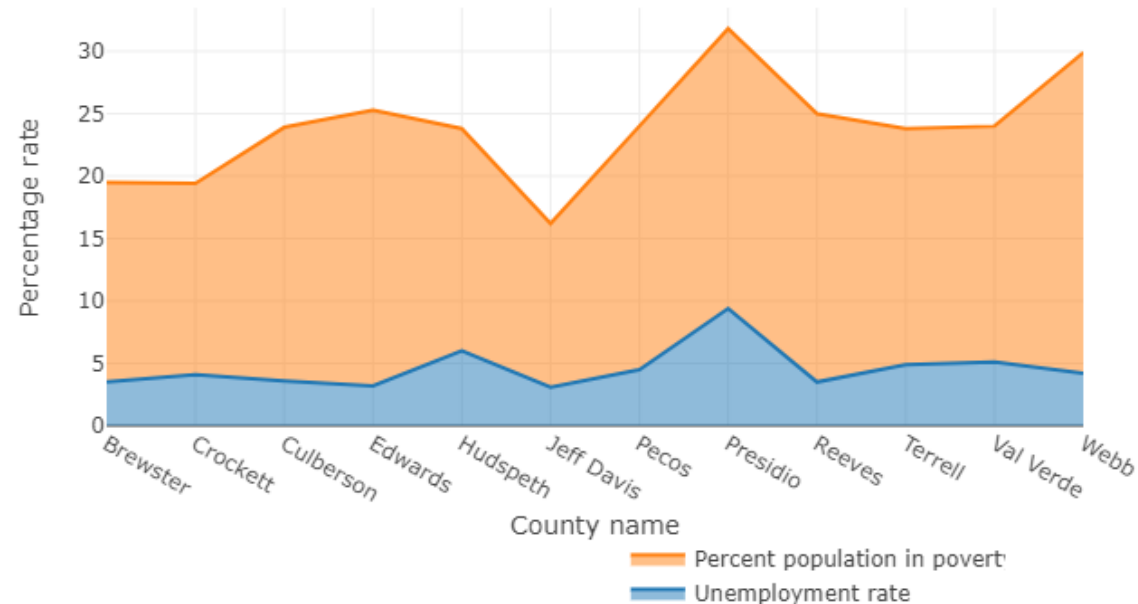

Percent urban in Texas counties

SQL Queries and Visualizations

```sql
1  SELECT DISTINCT c.county_name, e.unemployment_rate, i.percent_pop_in_poverty
2  FROM county AS c
3  INNER JOIN education_unemployment AS e ON c.county_name = e.county_name
4  INNER JOIN income_poverty AS i ON e.county_name = i.county_name
5  INNER JOIN general_info AS g ON i.county_name = g.county_name
6  WHERE g.total_area > '2000.00';
```

SCHEDULE   RUN

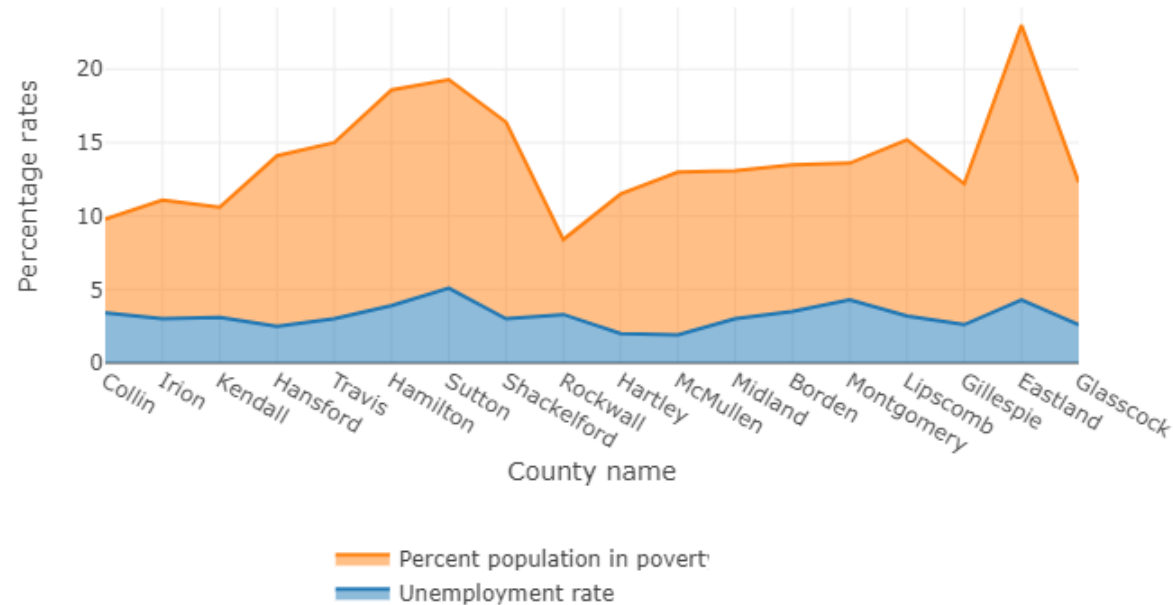Poverty and Unemployment in Texas counties

Percent population in poverty
Unemployment rate

SQL Queries and Visualizations

```sql
1  SELECT DISTINCT c.county_name, e.unemployment_rate, i.percent_pop_in_poverty
2  FROM county AS c
3  INNER JOIN education_unemployment AS e ON c.county_name = e.county_name
4  INNER JOIN income_poverty AS i ON e.county_name = i.county_name
5  WHERE i.per_capita_income_money > '60000.00';
```

SCHEDULE   RUN

Poverty and Unemployment in Texas counties

Percent population in poverty
Unemployment rate

SQL Queries and Visualizations

SQL Queries and Visualizations

```sql
1  SELECT DISTINCT c.county_name, a.median_age, i.median_household_income_money, e.unemployment_rate
2  FROM county AS c
3  INNER JOIN age AS a ON c.county_name = a.county_name
4  INNER JOIN income_poverty AS i ON a.county_name = i.county_name
5  INNER JOIN education_unemployment AS e ON i.county_name = e.county_name
6  INNER JOIN ethnicity_race AS r ON e.county_name = r.county_name
7  WHERE i.per_capita_income_money > '60000.00' AND r.race_percent_na > '1.25';
```

SCHEDULE   RUN

TABLE   CHART   EXPORT

Toggle Row Filter

county_name	median_age	median_household_income_money	unemployment_rate
Hamilton	45.60	49210.00	3.90
Hansford	35.10	57240.00	2.50
Lipscomb	37.30	57332.00	3.20

Median household income in Texas counties
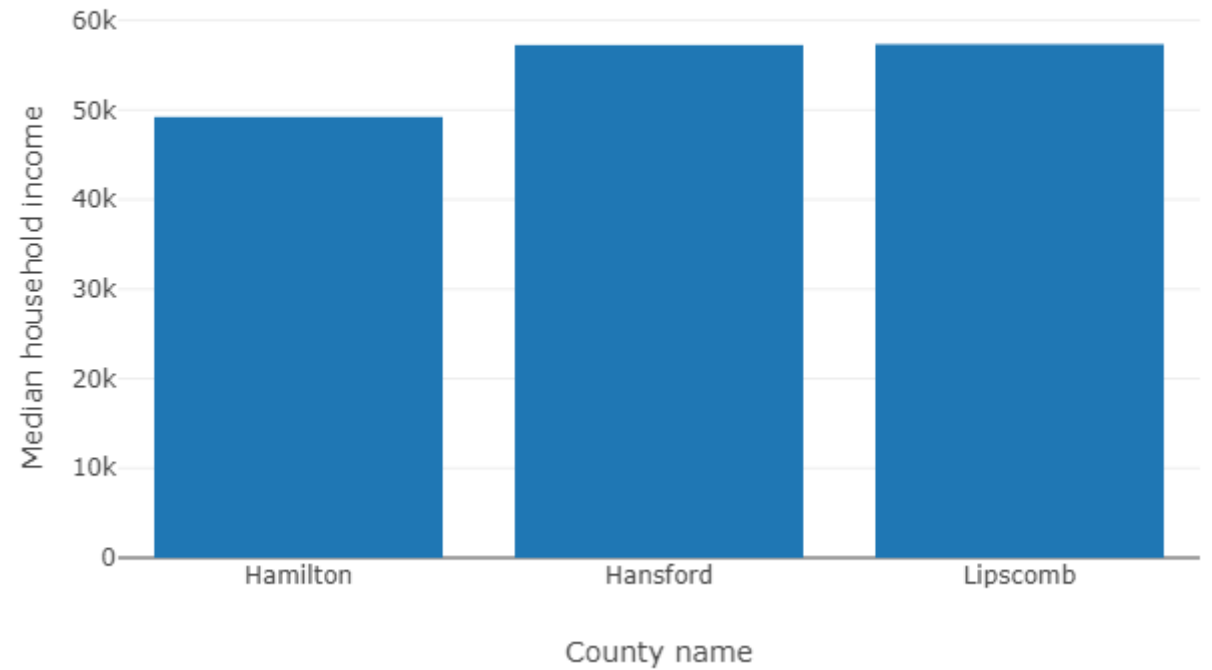
SQL Queries and Visualizations

```sql
1  SELECT DISTINCT c.county_name, g.percent_urban, i.percent_pop_in_poverty, e.unemployment_rate,
2  p.pop_density_per_sq_mi
3  FROM county AS c
4  INNER JOIN income_poverty AS i ON c.county_name = i.county_name
5  INNER JOIN education_unemployment AS e ON i.county_name = e.county_name
6  INNER JOIN ethnicity_race AS r ON e.county_name = r.county_name
7  INNER JOIN general_info AS g ON r.county_name = g.county_name
8  INNER JOIN population AS p ON g.county_name = p.county_name
9  WHERE i.avg_annual_pay_money > '53000.00' AND r.race_percent_white < '77.00';
```

SCHEDULE   RUN

TABLE   CHART   EXPORT

Toggle Row Filter

county_name	percent_urban	percent_pop_in_poverty	unemployment_rate	pop_density_per_sq_mi
Brazoria	77.47	10.10	5.30	230.66
Collin	94.76	6.40	3.40	930.00
Dallas	99.31	14.20	3.80	2718.00
Harris	98.79	16.50	5.00	2402.41
Jefferson	91.60	18.70	7.30	287.89
Tarrant	98.71	12.10	3.70	2094.74

Urban poverty and unemployment in Texas counties
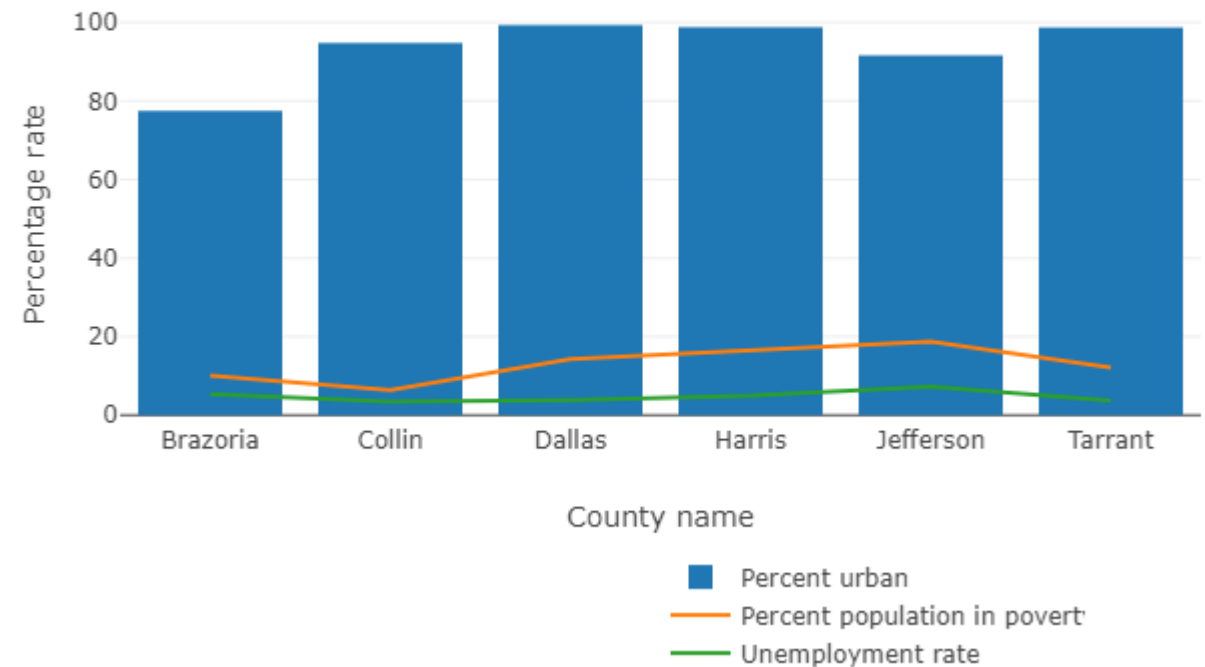
SQL Queries and Visualizations

```sql
1  SELECT DISTINCT c.county_name, a.percent_age_85_older, g.percent_rural, i.percent_pop_in_poverty,
2  e.unemployment_rate, p.pop_density_per_sq_mi
3  FROM county AS c
4  INNER JOIN age AS a ON c.county_name = a.county_name
5  INNER JOIN income_poverty AS i ON a.county_name = i.county_name
6  INNER JOIN education_unemployment AS e ON i.county_name = e.county_name
7  INNER JOIN ethnicity_race AS r ON e.county_name = r.county_name
8  INNER JOIN general_info AS g ON r.county_name = g.county_name
9  INNER JOIN population AS p ON g.county_name = p.county_name
10 WHERE i.avg_annual_pay_money > '53000.00' AND r.race_percent_white < '77.00'
11 AND g.water_area > '120.00';
```

SCHEDULE | RUN

TABLE   CHART   EXPORT

Toggle Row Filter

county_name	percent_age_85_olde	percent_rural	percent_pop_in_pove	unemployment_rate	pop_density_per_sq_
Brazoria	1.15	22.53	10.10	5.30	230.66
Jefferson	1.96	8.40	18.70	7.30	287.89

Web App

- Backend → connect database to web server
  - Using Django with local host to set up web app

- Front end design → create Graphical User Interface (GUI)
  - Graphical icons representing information about aspects of relocation
    - Input includes selection choices from a drop-down menu
  - Output depicted using highlighted areas on map
    - Users can explore locations
    - Additional detailed characteristics and statistics can be provided

Conclusion

- Collect and provide more data concerning various distinct aspects and characteristics of residential locations

- Future improvements:
  - Ability for users to explore how data concerning areas of relocation has changed over time
  - Functions that allow users to compare several areas of relocation
  - Include well-developed and easily accessible GUI

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